THE GOVERNMENTAL COMPOSITION OF THE INSURANCE COSTS OF SMOKING*

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ABSTRACT

The estimated health risks from smoking have significant external financial consequences for society. Studies at the national level indicate that cigarettes are self-financing since external costs such as those due to illnesses are offset by cost savings associated with premature death, chiefly pension costs. This paper extends this analysis to all 50 states and considers the costs considered in the state attorneys general suits against the cigarette industry. Cigarettes are always self-financing from the standpoint of costs to each state. The extent of the cost savings is less than at the federal level. However, smokers' higher medical costs are outweighed by reduced nursing home expenditures, lower pension costs, and excise taxes, where each of these factors alone usually exceeds the medical cost effect.

I. INTRODUCTION

THE social costs of cigarette smoking became a major political issue in the 1990s. In part because of the declining political influence of the smoking population and increased scientific evidence on the hazards of environmental tobacco smoke (ETS), a flurry of public efforts have restricted smoking in a variety of ways. These policies have included local antismoking ordinances, proposed Occupational Safety and Health Administration (OSHA) regulations of smoking at the workplace, and Food and Drug Administration (FDA) regulations to restrict sales of cigarettes to minors. In conjunction with the 1994 Clinton health plan initiative, a variety of proposals also sought to raise the federal cigarette tax to as much as $2 per pack. Since that time, several states have raised cigarette taxes.

Potentially the most costly anti-cigarette-industry effort was the series of lawsuits filed by the states. Over 40 states filed lawsuits attempting to recoup what they claim are increased health care costs that cigarette smoking

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imposes on their state budgets.[1] In his 1999 State of the Union address, President Clinton indicated that the federal government would file a similar suit. Moreover, he proposed an additional $.55 per pack cigarette tax. To the extent that cigarette smoking adversely affects health, there will be higher health insurance costs, including higher costs borne by the states, which share in the costs of Medicaid and other health programs.

Smoking is potentially risky and has expected adverse health effects. Although there is likely to be such a cigarette-health cost linkage, cigarettes have other financial consequences as well. The focus in the economics literature has been broader than on medical costs alone. By considering other financial effects, such as pension costs, the consensus in the economics literature has been that cigarettes on balance are self-financing for the country in terms of their insurance consequences.[2] Other studies have assessed some of the broader benefits of the tobacco industry to the economy and have found them to be favorable as well.[3] All previous studies of the financial externalities have focused on the national economic effects, not on the effect on the particular states. Many of the cost savings, such as reduced Social Security costs, are to the federal government. The states could potentially be net losers. Moreover, the distribution of the costs and the excise taxes on cigarettes is not uniform, so some states may lose financially while others gain. Consequently, one cannot necessarily conclude from the evidence in the literature that the states are not adversely affected financially by cigarettes.

Whether the legal focus should be on the state-specific effects or the national consequences is a different matter. Moreover, the extent to which the courts will conclude that the states have incurred costs associated with cigarette smoking may depend in part upon which cost components the courts

[1] Among the states that filed these suits are Arizona, Connecticut, Florida, Hawaii, Illinois, Indiana, Iowa, Kansas, Louisiana, Maryland, Massachusetts, Minnesota, Mississippi, New Jersey, New York, Oklahoma, Texas, Utah, Washington, West Virginia, and Wisconsin. Several cities have filed suits as well, as have Puerto Rico, Guam, the Marshall Islands, and other government entities. Seven tribal suits and five taxpayer suits have also been filed. A detailed review appears in Significant Events in Fight against Tobacco, Seattle Times, June 18, 1998, at A22.

[2] For examples of these studies, see John B. Shoven, Jeffrey O. Sundberg, & John P. Bunker, The Social Security Cost of Smoking, in The Economics of Aging 231 (David A. Wise ed. 1989); Willard G. Manning *et al.,* The Costs of Poor Health Habits (1991); Jane Gravelle & Dennis Zimmerman, Cigarette Taxes to Fund Healthcare Reform: An Economic Analysis (1994); and W. Kip Viscusi, Cigarette Taxation and the Social Consequences of Smoking, 9 Tax Pol'y & Econ. 51 (James M. Poterba ed. 1995). The self-financing property hinges on the discount rate, but for reasonable real rates of return cigarettes are self-financing for the economy as a whole.

[3] For the most comprehensive analysis of this type, see Robert D. Tollison & Richard E. Wagner, Smoking and the State: Social Costs, Rent Seeking, and Public Policy (1988).

recognize in calculating the damages amount. Cigarette smoking increases costs associated with health care, but it also decreases nursing home and pension costs because smoking leads to earlier mortality. Cigarette sales are accompanied by excise taxes as well, which may offset the health insurance costs generated. Here I will explore these various cost components for the states as well as for the federal government to assess the state-specific distribution of the insurance consequences of cigarettes.

This article principally extends previous work by the author[4] to derive state-federal breakdowns of the social costs of smoking, including a state-specific analysis of the costs. Section II provides an overview of the legal and regulatory actions against the cigarette industry and discusses the basis of the state claims. Section III introduces the externality issues involved and the distinction between the approach taken in this analysis as opposed to previous studies. Section IV presents the national social consequences estimates as a reference point and then extends these results to the state of Mississippi. This case study serves as a useful starting point for illustrating the methodology, particularly since Mississippi took the lead in filing lawsuits against the cigarette industry. Section V assesses the state-federal breakdown of the insurance costs of cigarettes more generally and presents estimates of the financial consequences of cigarette smoking for each of the 50 states. Section VI concludes the paper. Overall, the financial calculus suggests that the states do not fare as well as does the federal government. However, the states profit from cigarettes based on a variety of different perspectives on the net financial consequences.

II. The Legal Context

There have been a myriad of legal and regulatory actions against cigarettes in the 1990s, but by far the most significant are the lawsuits filed by the state attorneys general. In this article I will restrict my focus to the set of costs considered in these suits, which are the increased financial costs to the states from smoking. Thus, there is no attempt to perform a full social benefit-cost analysis. The focus is much narrower, as it is on the financial externalities alone. This set of lawsuits involves a staggering level of financial stakes. The cigarette industry settled out of court with Mississippi for $3.5 billion, Florida for $11.3 billion, Texas for $15.3 billion, and Minnesota for $6.6 billion, for a total settlement cost of $36.8 billion. In addition, the remaining states ultimately settled their suits in 1998 for an additional amount estimated in press accounts to be $206 billion (undiscounted) over the next 25 years.

[4] See Viscusi, *supra* note 2.

The most prominent initial effort to resolve this litigation occurred when the cigarette industry and key representatives of the states drafted a "Proposed Resolution" of the litigation in 1997."[5] This document, in turn, was to be the basis for congressional legislation that would resolve the dispute.[6] After lengthy congressional debate over the terms of the agreement and the cigarette industry's withdrawal of support for the legislation that ultimately evolved, Congress rejected legislative resolution of the lawsuits.[7]

The terms of the proposed resolution are nevertheless informative of the scale of the litigation and some of the most salient smoking policy issues. To settle the state lawsuits, the cigarette industry would pay $368.5 billion. They would pay $10 billion up front, followed by annual payments rising from $8.5 billion initially to $15 billion in 5 years. These payments would continue in perpetuity and would be adjusted upward for inflation (by the greater of the increase in the consumer price index or 3 percent). Press accounts focused on the total face value of the payments for the first 25 years, or $368.5 billion. Put into present value terms using a 3 percent real rate of interest, this amount is $255.6 billion for 25 years and $494.4 billion in perpetuity.

These calculations assume, however, that cigarette consumption remains unchanged as a result of this financial settlement. However, the level of all subsequent payments is not fixed but is based on the amount raised from a $.62 per pack tax in addition to the current average state and federal tax total of $.56 per pack. Senator Ted Kennedy and others proposed that the incremental tax be $1.50 per pack, decreasing the attractiveness of the proposal to the industry and contributing to their eventual rejection of the legislation. Whatever the ultimate tax increase would have been, the total amount raised by the tax would have been less than estimated originally, assuming no drop in consumption, because of cigarettes' negative price elasticity of demand.

These demand effects are of particular policy import to the extent that these elasticities differ across the population.[8] A 10 percent increase in cigarette prices would decrease smoking by 4–7 percent overall. This effect may vary across the population. Based on the elasticity estimates reported elsewhere, such a tax hike would decrease smoking rates for teenagers by

[5] The "Proposed Resolution" was released on June 20, 1997. Available on line at http://www.stic.neu.edu/settlement/index.html. Accessed July 2, 1999.

[6] In particular, see the Universal Tobacco Settlement Act, S. 1415, 105th Cong. (1997), introduced by Senator McCain.

[7] The major tobacco companies withdrew their support on April 8, 1998. See David E. Rosenbaum, Cigarette Makers Quit Negotiations on Tobacco Bill, N.Y. Times, April 9, 1998, at A1.

[8] For a survey of these studies see W. Kip Viscusi, Smoking: Making the Risky Decision (1992).

as much as 14 percent.[9] Some smoking critics regard the price sensitivity of smokers as undesirable to the extent that price responsiveness decreases the total cigarette penalties paid. Moreover, they would rather have companies incur the penalty than consumers. Such criticisms fail to recognize that to foster antismoking incentives, which they presumably regard as desirable, the tax cannot be lump sum and must alter the effective price consumers pay.

The Proposed Resolution included major nonfinancial components as well. The FDA would have been given broad authority to regulate cigarettes. Included among these regulations would have been a new series of nine rotating warnings and a ban on the use in advertising of human figures, such as the Marlboro cowboy, or cartoon characters, such as Joe Camel, who was retired voluntarily by R. J. Reynolds in 1997. There would also have been a detailed set of initiatives to discourage underage smoking, including additional tax increases if specified targets for reducing youth smoking were not met.

In return, the cigarette companies were able to resolve all present and future actions by state attorneys general. The settlement would have also precluded all future class actions, all "addiction" claims, and all claims for punitive damages. The comparatively low-cost, and largely unsuccessful, individual lawsuits for past conduct would still be permitted. The prospects of these individual lawsuits may have been affected by the strengthened antismoking climate after the final settlement of the state suits. In February 1999, Phillip Morris lost a $51 million verdict in San Francisco to a female smoker who contracted lung cancer.[10]

The state lawsuits were ultimately settled in a deal with the 46 states that

[9] These elasticity estimates appear in Eugene M. Lewitt, Douglas Coate, & Michael Grossman, The Effects of Government Regulation on Teenage Smoking, 24 J. Law & Econ. 545 (1981). Other estimates fail to show this sensitivity, such as those in J. Wasserman *et al.*, The Effects of Excise Taxes and Regulations on Cigarette Smoking, 10 J. Health Econ. 43 (1991). Other researchers fail to find a price effect on youth smoking initiation rates, as in Stratford Douglas & Govind Hariharan, The Hazard of Starting Smoking: Estimates from a Split Population Duration Model, 13 J. Health Econ. 213 (1994). Ongoing work also questions the strength of the youth response, as in Philip DeCicca, Donald Kenkel, & Alan Mathios, Putting out Fires: Will Higher Taxes Reduce Youth Smoking? (Working paper, Cornell Univ., Dept. of Policy Analysis and Management, March 1999). For further discussion of reasons for failure to find price response differences, see Michael Grossman, The Demand for Cigarettes, 10 J. Health Econ. 101 (1991). Recent evidence on greater cigarette elasticities of demand by young smokers appears in Frank J. Chaloupka & Michael Grossman, Price, Tobacco Control Policies, and Youth Smoking (Working Paper 5740, NBER, September 1996). This evidence is still evolving, and a considerable debate remains regarding the extent of any difference in elasticities, especially for large price changes.

[10] For discussion of the verdict, see Suein L. Hwang & Milo Geyelin, Tobacco Industry to Rethink Its Defense, Wall St. J., February 12, 1999, at B14. The large stakes involved in the state settlement may have boosted the magnitude of the award, $50 million of which consisted of punitive damages.

had not already received an out-of-court settlement. The financial terms were substantially less than the 1997 Proposed Resolution, reflecting both the more limited scope of the agreement and some more recent courtroom victories by the cigarette industry. Tobacco companies participating in the settlement would pay the following amounts, most of which are adjusted for inflation, the firm's market share, and the sales of nonparticipating manufacturers, thus recognizing the potential for new entrants. Over a 10-year period, firms would contribute $250 million to a foundation to reduce youth smoking. Over a 5-year period, firms would contribute $1.45 billion to a national public education fund directed at reducing smoking behavior. Agreement payments included $1.5 million over 10 years to fund the executive committee, $50 million for enforcement, initial payments over 5 years of $12.7 billion, annual payments through 2023 for a total of $190.0 billion, and additional payments of $8.6 billion. The total of all these payment categories through 2023 is $213.0 billion, or a present value of $150.1 billion at 3 percent interest. Moreover, annual payments would continue in perpetuity at $9 billion, yielding a present value total of $281.6 billion.

The actual penalty amount may be less because the penalties are not fixed but are adjusted for the firm's market share and for nonparticipating company sales. In economic terms, the penalties are almost tantamount to a per-pack tax, which for an $8 billion annual payment would be $.33 per pack. Shortly after the signing of the settlement, cigarette prices reportedly rose nationally by about $.35 per pack, and they have since risen more. Higher cigarette taxes will deter smoking behavior and will also reduce the total penalty amounts paid.

The national settlement has antismoking provisions that are similar to those in the Proposed Resolution, but less extensive: bans on cartoon characters, limitation but not prohibition of sponsorships except for youth events, elimination of outdoor advertising, ban on tobacco name merchandise, and required funding of antismoking efforts. Absent are many of the major provisions of the earlier proposal, including recognition of additional FDA authority over cigarettes, settlement of all prospective class action and addiction suits, and a new series of rotating cigarette warnings.

The national settlement also provided for the manufacturers to pay for the states' litigation costs, including the fees of private attorneys. The extraordinarily high level of these fees set by a board of three arbitrators resulted in substantial controversy. In particular, the lawyers representing the states in Florida, Mississippi, and Texas were awarded $8.1 billion in fees by an arbitration panel.[11] It is expected that similar multi-billion dollar fees

[11] For a discussion of these fees, see Lawyers and Their Fees: Knights in Golden Armor, Economist, February 13, 1999, at 28.

could push the total for all states above $20 billion for under 500 lawyers—a staggering amount by any standard.

There have also been numerous other legal and regulatory efforts pertaining to smoking. A major lawsuit now working its way through the federal courts focuses on whether the FDA currently has the legal authority to regulate cigarettes as a drug.[12] Both OSHA and the U.S. Congress have considered, but have not adopted, widespread bans on smoking in public places.[13] Numerous localities have also adopted smoking restrictions, particularly as they affect underage smoking.[14] There have also been a variety of lawsuits seeking damages for environmental tobacco smoke and claims of addiction.

In this article, I will not provide a comprehensive assessment of all these initiatives. By focusing on the state attorneys general suits, I will restrict the attention to financial externalities to the state. This analysis consequently considers the largest stakes component that has been the object of litigation, but it does not delve into the myriad of related issues that are also of potential policy concern.

III. State-Federal Tax Issues

A. *Efficiency Criteria*

Cigarettes are one of the most heavily taxed consumer commodities. As a percentage of the product price, cigarette taxes exceeded the taxes on alcohol, gasoline, and other highly taxed consumer commodities.[15] In 1995, for example, the overall cigarette tax rate was $.56 per pack, with $.32 going to the states and $.24 going to the federal government.[16]

Although taxes have an obvious political role to play as a revenue-raising device, they may serve additional economic functions as well. If smoking decisions are not optimal, either because of failures in individual decisions

[12] Opposing viewpoints on the legality of FDA jurisdiction under existing legislation are presented in Cass Sunstein, Is Tobacco a Drug? Administrative Agencies at Common Law Courts, 47 Duke L. J. 1013 (1998); and Richard Merrill, FDA's Attempt to Regulate Tobacco Products: Audacious and Anomalous, 47 Duke L. J. 1071 (1998).

[13] For a discussion of these proposals, see W. Kip Viscusi, Secondhand Smoke: Facts and Fantasy, 18 Regulation 42 (1995).

[14] For a comprehensive assessment of regulations affecting youth tobacco use and their effect, see Joni Hersch, Teen Smoking Behavior and the Regulatory Environment, 47 Duke L. J. 1143 (1998).

[15] For a review of tax rates for different product groups, see Don Fullerton & Diane L. Rodgers, Who Bears the Lifetime Tax Burden? (1991).

[16] For these statistics, see the Tobacco Institute, 30 Tax Burden on Tobacco, at iii (1995).

or societal externalities, cigarette taxes could serve as a form of Pigouvian tax to align the private incentives with social objectives.

The economic policy questions raised by an analysis of state-specific externalities are twofold. First, to what extent do cigarette taxes reflect the overall social costs of smoking? Second, does the composition of these taxes lead to appropriate levels of compensation of the different governmental entities involved? More specifically, is the state-federal distribution of the taxes commensurate with the state-federal distribution of the external costs of smoking?

To see the potential role of cigarette taxes, it is useful to consider a simple model. Let p be the probability that smoking will lead to harmful health effects and $P(p)$ be the perceived probability by the smoker of adverse health effects. The smoker's income is Y, the cost of cigarettes is C, and the medical costs to the smoker of ill health are M. Let the consumer's utility function in good health when smoking be U, the utility function of a smoker in ill health be V, and the utility function when not smoking be W. For any given level of income Y, $U(Y) > V(Y)$, $U'(Y) \geq V'(Y) > 0$, and $U''(Y)$, $V''(Y) \leq 0$. Similarly, $W'(Y) > 0$ and $W''(Y) \leq 0$. Thus, I assume that the individual is either risk neutral or risk averse in all three possible states and that both the utility and the marginal utility of income are at least as great when healthy as when in ill health, for any given level of income.

A person will choose to smoke if the perceived expected utility of smoking exceeds the expected utility of not smoking, where this condition is given by

$$(1 - P(p))U(Y - C) + P(p)V(Y - C - M) > W(Y). \quad (1)$$

This choice problem omits two potential concerns from the standpoint of social welfare. First, the actual probability of an adverse health consequence may be different from the perceived probability. Given the formulation above, this deviation will potentially lead to a welfare loss to the individual, not to the rest of society. The second potential departure from the private choice framework is that if smoking harms one's health there will be external insurance costs to the state, S, insurance costs to the federal government, F, and private insurance externalities that are not recouped through smoker-specific premiums, I. These components may be positive or negative, as there may be some insurance subsidies being generated. The criterion for social efficiency is that smoking be desirable when consumers perceive the risks of smoking accurately and internalize all smoking costs:

$$(1 - p)U(Y - C) + pV(Y - C - M - S - F - I) > W(Y). \quad (2)$$

By setting tax rates appropriately, it is possible to align the private incentives of smokers and the social efficiency properties of the smoking deci-

sion. Let s be the proportional state tax percentage and f be the proportional federal tax percentage. Then private incentives will be aligned with social efficiency if s and f are set to satisfy

$$\begin{aligned}(1 - P(p))U(Y - C(1 + s + f)) + P(p)V(Y - C(1 + s + f) - M) \\ = (1 - p)U(Y - C) + pV(Y - C - M - S - F - I).\end{aligned} \tag{3}$$

Taxes must be sufficient to lead to the same desirability of smoking as would prevail if smokers perceived risks accurately and internalized all costs. As in the previous literature on smoking externalities, the primary focus of this article and the lawsuits is on issues that are somewhat narrower than total social efficiency. Moreover, the state suits do not include as part of the claim possible utility losses of smokers. If there are such harms, they can be addressed through individual tort suits. Potential imperfections in individual choice due to biased risk beliefs, errors in discounting and intertemporal choice, or the role of addiction and habituation phenomena all relate to private welfare losses.[17] Such matters are not the concern of the state suits focusing on financial externalities to the state when calculating the value of the economic damages.

B. Wrongful Behavior

Even if there are not external costs attributable to smoking, the legal rationale for the suits is unclear. If the assumption of risk defense is valid for claims by the smokers, this defense would also travel with such claims when cast as independent claims by the state for medical assistance to smokers. A principal basis for the suits is the claim that consumers did not in fact assume the risk because they were not aware of the hazards due to the deceptive practices of the industry. Risk awareness issues are consequently central to the states' suits. Similarly, in all the formulations above, the accuracy of risk beliefs plays a central role in determining whether there are private losses due to smoking. Risk awareness concerns have been prominent in assessing the state of consumer knowledge and whether the cigarette industry has been guilty of any wrongful behavior that has led to misperception of the risk. Risk awareness consequently is pertinent in determining liability and also in setting damages. Only the portion of the

[17] The role of discounting has been of particular concern. If, as some researchers hypothesize, youths err in their discounting of future health losses, there will be a market failure. These losses will, however, be private losses and will not alter the financial externality estimates, which include the costs of all smoking, not just irrational smoking by youths. See, generally, Gary Becker & Casey Mulligan, The Endogenous Determination of Time Preference, 112 Q. J. Econ. 729 (1997); and Kenneth Warner *et al.*, Criteria for Determining an Optimal Cigarette Tax: The Economist's Perspective, 4 Tobacco Control 380 (1995).

economic costs of cigarettes attributable to wrongful behavior can be recovered.

Are people aware of smoking risks? A brief review of the risk perception evidence suggests that on average people tend to overestimate the risks of smoking. To judge the accuracy of risk beliefs, one needs a risk reference point to determine the direction of any error. The reference points I use are derived from Surgeon Generals' reports and related government sources.[18] For lung cancer, the true risk range for the proportion of the population who will die from cancer is 0.05–0.10 in 1985 and 0.06–0.13 in 1991 and thereafter.[19]

To assess the accuracy of the risk beliefs, I will consider data from three surveys: a 1985 national survey focusing on lung cancer risk beliefs; a 1991 North Carolina survey focusing on lung cancer mortality, total mortality, and life expectancy loss; and a 1997 national survey focusing on lung cancer, total mortality risk, and life expectancy loss.[20] Consider the risk beliefs of smokers, which are below those of the entire population. The assessed lung cancer probabilities were 0.37 in 1985 and 0.40 in 1997 for national samples, with an assessed lung cancer mortality risk of 0.31 in a North Carolina regional 1991 sample. These values all greatly exceed the true risk reference point.

The results for total assessed mortality risk are similar, where the extent of the overassessment is based on a true risk reference point of 0.16–0.32 in 1985 and 0.18–0.36 in 1991 and thereafter. Smokers assessed the total smoking mortality risk at 0.47 in the 1991 North Carolina sample and 0.42 in the 1997 national sample.

The third set of risk questions focuses on the assessed life expectancy loss, which has a true value of 3.6–7.2 years. To avoid testing the respondent's understanding of normal life expectancy rather than the assessed incremental loss due to smoking, the question wordings tell respondents the incremental life expectancy in the 1991 survey and the total life expectancy in the 1997 survey, where each of these assessments is gender specific for

[18] See Viscusi, *supra* note 8, for further discussion of these measures, which takes the government's estimates of death and related outcomes at face value and converts them into probabilities.

[19] These estimates are for lung cancer mortality, but since over 90 percent of all cases of lung cancer are fatal, the incidence rate for lung cancer (the reference point for my 1985 and 1997 surveys) is similar to the lung cancer fatality rate (the reference point for my 1991 survey).

[20] For a report on the 1985 and 1991 surveys, see Viscusi, *supra* note 8. The 1985 and 1991 surveys, which were prepared in support of litigation, were administered by Audits and Surveys Worldwide. The text of the 1985 and 1991 risk questions appears in *id.* The 1997 text parallels the 1991 survey.

a standardized 21-year-old.[21] Estimates of the life expectancy loss for male smokers due to smoking are 6.9 years in the 1991 local sample and 7.9 years in the 1997 national sample. For female smokers the assessed loss is 10.9 years in 1991 and 12.3 years in 1997. In each case, the average assessed life expectancy loss across the smoking population exceeded the upper bound of the estimated true risk.[22]

Overall, the available evidence with respect to smoking risk perceptions suggests that smokers are aware of smoking risks and perhaps overassess the risks of smoking.[23] These perceptions in turn influence smoking behavior in the expected direction. If there were evidence that smokers did not adequately recognize the risks they faced, then the government could impose excise taxes, which, from an economic standpoint, could discourage smoking behavior in the same way as would higher risk perceptions. For example, a cigarette tax rate that is 30.8 percent of the retail price (the national average in 1985) would have the same effect of decreasing the probability of smoking in that year as would a lung cancer risk perception of 0.17 if the price elasticity of demand for cigarettes is -0.4.[24] For higher elasticity values, the effect on the smoking probability would be equivalent to a larger lung cancer risk perception. Younger smokers and teenagers potentially may be more responsive to the effect of higher excise taxes.[25]

The discussion below focuses on the present value of the social financial costs associated with smoking decisions at a point in time. The analysis will not consider the private costs associated with quitting smoking. The social

[21] Previous results do not provide such life expectancy information, so the question may be eliciting understanding of normal life expectancy and not just understanding of the effect of smoking on life expectancy. The result is that smokers, who are less well educated than nonsmokers, underestimate their life expectancy loss. See D. S. Hamermesh & F. W. Hamermesh, Does Perception of Life Expectancy Reflect Health Knowledge? 73 Am. J. Pub. Health 911 (1983). This is discussed in Viscusi, *supra* note 8.

[22] Schoenbaum suggests that heavy smokers overestimate their survival probability based on data from the Health and Retirement Study. See Michael Schoenbaum, Do Smokers Understand the Mortality Effects of Smoking? Evidence from the Health and Retirement Survey, 87 Am. J. Pub. Health 755 (1997). That risk question was not well posed, as it asked respondents to rate their survival chances from 0 to 10, which is not a probability scale and which does not inform respondents of their normal life expectancy. The resulting patterns are often implausible, as female respondents rate their odds of survival to age 75 and age 85 as being lower the older they get, which is the opposite of actual life expectancy patterns. For a more thorough critique, see W. Kip Viscusi & Jahn K. Hakes, Why the Health and Retirement Survey Survival Probability Is Not a Probability (unpublished manuscript, December 1998).

[23] For a review of this evidence, see Viscusi, *supra* note 8; and W. Kip Viscusi, Constructive Cigarette Regulation, 47 Duke L. J. 1095 (1998).

[24] See Viscusi, *supra* note 8, at 109.

[25] The extent of such a differential effort remains a matter of substantial debate, as noted above.

welfare consequences of the habituation or addiction phenomenon depend in large part on the extent to which the choices leading to this behavior are voluntary.[26] Since the primary concern of this paper is with the insurance externalities of smoking rather than with the total social welfare effects of smoking, it is not necessary to incorporate these concerns in the analysis.

C. *Smoking Externalities*

The first major study of smoking externalities in the literature by Shoven et al. in 1989[27] focused on the financial effects of smoking on the Social Security program. This study found that smokers generated a net subsidy to nonsmokers since their early deaths from smoking prevented them from collecting the same level of Social Security benefits as are received by nonsmokers. The salience of the Social Security effect and the potential for net subsidies by smokers because of the mortality effects of smoking remains a continuing theme in the literature. However, because subsequent studies have a broader focus, they are more pertinent to this paper.

The next set of more comprehensive studies of the social costs of smoking addressed whether the excise taxes from cigarettes exceeded the total expected insurance externalities associated with smoking. More specifically, the question addressed in these studies is whether

$$(s + f)C > p(S + F + I). \tag{4}$$

The conclusion reached by Manning et al. (1991) and Gravelle and Zimmerman (1994) was that on balance the excise taxes imposed on cigarettes exceeded the expected insurance costs.[28]

In earlier work I extended these analyses of national insurance costs

[26] For a detailed empirical analysis of the addiction issue, see Gary S. Becker, Michael Grossman, & Kevin M. Murphy, An Empirical Analysis of Cigarette Addiction, 84 Am. Econ. Rev. 396 (1994); and Frank J. Chaloupka, Rational Addictive Behavior and Cigarette Smoking, 99 J. Pol. Econ. 722 (1991). Additional empirical evidence on smoking quit rates appears in Viscusi, *supra* note 8. Hersch, *supra* note 14, presents evidence on addiction and habituation perceptions.

[27] See Shoven, Sundberg, & Bunker, *supra* note 2.

[28] See Manning *et al.*, *supra* note 2, and Gravelle & Zimmerman, *supra* note 2. The level of insurance costs is, however, sensitive to the discount rate that is assumed. The discussion here assumes a real rate of discount of 3 percent except when indicated otherwise. For discount rates close to zero, the net social costs of smoking are much less, whereas for discount rates that are very high, the present value of the insurance externalities increases and reverses sign. In the Netherlands, the self-financing status of cigarettes is even greater, as smokers have lower health care costs than nonsmokers. Within the health care component alone, the effect of premature death makes cigarettes self-financing. For a discussion, see Jan Barendregt, Luc Bonneux, & Paul van der Maas, The Health Care Costs of Smoking, 377 New Eng. J. Med. 1052 (1997).

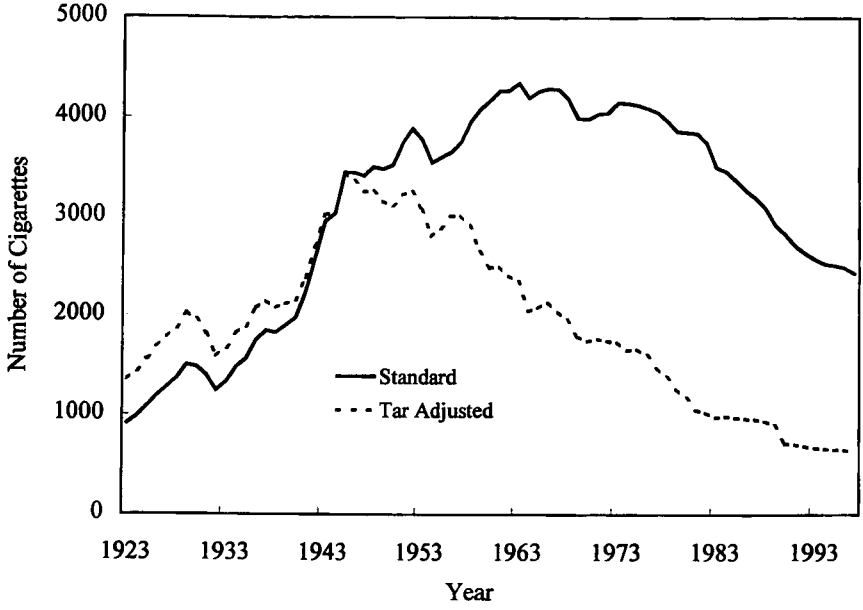

FIGURE 1.—Per capita cigarette consumption in the United States (1923–97). Tar levels have been normalized using the 1944 level as a base.

in two principal ways.[29] First, I incorporated recognition of the changing tar content of cigarettes in the calculations, which has declined much faster than has cigarette consumption (see Figure 1).[30] Perhaps somewhat paradoxically, making the tar adjustment and increasing the safety of the cigarettes increases the net social costs imposed by smoking because of a decrease in the cost savings associated with early smoker mortality. The second principal difference between my work and other studies in the literature is the inclusion of the recent evidence on the social costs of environmental tobacco smoke (ETS).[31] The net financial

[29] See Viscusi, *supra* note 2.

[30] As is discussed in *id.*, the effect of tar levels on cigarette riskiness remains controversial because it depends, for example, on how one smokes. These estimates, however, correct for effects of changes in tar levels on the number of cigarettes smoked. Low-tar cigarettes may also lead to different forms of cancer than higher-tar cigarettes. Estimates without the tar adjustment will be presented as well.

[31] These cost estimates take the highly uncertain estimates of environmental tobacco smoke (ETS) costs by OSHA and EPA at face value and, in conjunction with estimates of the value of life equal to $5 million per life, generate social cost figures for ETS. The health effects are, however, potentially substantial, as indicated in *id.* The principal health effect is that of heart disease. The second set of results reported by Steenland *et al.* confirmed evidence of the earlier linkages used in the heart disease loss estimates reported in Viscusi, *su-*

externality for the state from ETS is not significant, as will be discussed below.

The issues arising with respect to the litigation being filed by a large number of states is whether there is a net social cost imposed on the state. This issue is framed in terms of whether

$$sC > pS, \tag{5}$$

where this calculation is undertaken on a state-specific basis. Thus, to the extent that much of the external cost savings arise through cost savings to the federal government, this influence would not be directly accounted for in such a calculation.

One can also break out the costs for the federal government to assess the net costs at the federal level. Federal revenues exceed the financial costs if

$$fC > pF. \tag{6}$$

The financial cost implications are fairly straightforward if both the state and federal governments are affected similarly. If, however, the federal government benefits financially but the state governments do not, matters become more complex. Conceivably, if the federal government gains and the state governments lose, there could be a financial exchange between the federal government and the states. One could, for example, earmark part of the federal excise tax for the states if the federal government profited from cigarette smoking but the states did not. A higher federal share of Medicaid expenditures would accomplish the same objective. Or, more simply, the state could simply raise its excise tax level.

D. *How the States Calculated Costs*

The court's assessment of the costs of smoking depends in part, however, on what it chooses to recognize as cost components. Although inequality (5) captures the appropriate net social cost calculation from the standpoint of the states, in their litigation, the states focused on a narrower question of whether the health care costs alone are positive. The prospective federal

pra note 2. They note, "Results are consistent with the prior reports that never-smokers currently exposed to ETS have about 20 percent higher CHD death rates. However, our data do not show consistent dose-response trends and are possibly subject to confounding by unmeasured risk factors." See Kyle Steenland *et al.*, Environmental Tobacco Smoke and Coronary Heart Disease in the American Cancer Society CPS-II Cohort, 94 Circulation 622 (1996). Another study on nurses also found an environmental tobacco smoke–health linkage; see Ichiro Kawachi *et al.*, A Prospective Study of Passive Smoking and Coronary Heart Disease, 95 Circulation 2374 (1997). The adoption of smoking restrictions also will continue to reduce the costs of ETS in the future. By 1991, 85 percent of all firms had instituted smoking policies, and restrictions on smoking have continued to increase. Decreasing exposure to ETS consequently will decrease potential costs.

suit will probably also focus on health costs alone. Thus, the states are seeking to exclude from consideration components of S that may be negative as well as the right side of this inequality—the role of excise taxes.[32] The emphasis here is on a more complete social accounting since there is no economic justification for selective inclusion of the different cost components when determining net financial consequences.

Although the states' effort to exclude all cost reductions and taxes paid is a useful summary of their position, it is also instructive to analyze the specific aspects of the damages claimed. The focal point of the states' claimed losses is on the increased costs for Medicaid. To the extent that smokers are sicker, Medicaid expenses will rise, imposing additional costs on the state budgets. Although a sound economic calculation could lead to such a result, there are nevertheless serious and fundamental flaws with the states' approach. First, in calculating the increased medical costs, states count not only the costs incurred by the states but also the federal government's share of Medicaid expenditures. As a matter of program structure, Medicaid costs are shared between the state and the federal government, where the state's share depends on the income level in the state. All states have sought reimbursement for both the state and the federal cost components, although it is only the state portion of the claim that represents a true cost increase for the state budget. The justification given for including the federal share is that the tobacco companies cannot include federal payments, which they claim should be excluded since they are payments by a source independent of the tobacco companies; that is, they are a collateral source.[33] However, the federal payments are not a collateral source in the usual sense, as Medicaid costs are simply shared by the state and federal governments as a matter of policy. It is also noteworthy in this regard that the states vigorously objected when federal budget officials subsequently suggested that the federal government should share in the value of the Proposed Resolution, if in fact it had been passed by Congress, even though such sharing would have been entirely consistent with the nature of the damages claim filed by the states. The 1999 federal budget assumes that the federal government will ultimately share in these funds, but the compromise outcome President Clinton has proposed to the governors is that they make expenditures in certain designated areas.

The second shortcoming in the analysis of medical costs by the states is that these claims are not restricted to costs actually incurred by smokers but instead charge smokers for costs as if they had nonsmokers' life expec-

[32] See Mem. Supp. State's Mot. Ruling In Limine, or, Alternatively, Partial Summ. J., In re Moore, Att'y Gen. ex rel., Miss. Tobacco Litigation (No. 94-1429), Aug. 11, 1995.

[33] See *id.* at 1, 16.

tancy. Proper recognition of the life expectancy of smokers is not a "death credit," as the states have labeled it, but rather, it simply represents appropriate recognition of costs that the state incurred. There are no damages to the state in terms of higher Medicaid costs once smokers are dead. These factors will account for most of the difference between my estimates and those published.

From a legal standpoint, the costs for which the cigarette companies should be liable are those attributable to their wrongful behavior. Thus, to the extent that deceptive advertising, antitrust violations (for example, conspiracy to suppress development of safer cigarettes), or other illegal practices led to additional smoking-related costs, the state would be able to file a legitimate claim for the portion of such costs attributable to the behavior. However, the states' suits do not distinguish the influence of such wrongful behavior but instead include all smoking-attributable costs, which implicitly assumes that smoking rates would be zero had it not been for the wrongful conduct of the cigarette industry.

There are also a myriad of other technical issues that arise in calculating costs. Cigarette smokers tend to be systematic risk takers, not simply in terms of their smoking behavior. For example, they are more likely to be injured both at work and at home.[34] To the extent that the estimation of smoking-related costs does not adequately control for risk factors correlated with smoking status, it will tend to overstate the level of such costs. As we will see below, however, including such refinements that reduce the cost estimates will not prove to be critical once the other fundamental aspects of the cost calculations are done properly.

Another class of financial consequences of smoking pertains to the effects of smoking-related health consequences on state pension costs, nursing home expenditures, and other nonmedical components of state allocations. On balance, such costs' effects are beneficial to the state since the premature deaths of smokers will reduce the total costs of many of these programs. The states have resisted such considerations, claiming that they are a death credit. For example, in the memorandum regarding its tobacco litigation, the state of Mississippi made the following comments:

> 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.[35] . . . The contention of entitlement to an "early death" credit is, on its face, void

[34] See Joni Hersch & W. Kip Viscusi, Smoking and Other Risky Behaviors, 28 J. Drug Issues 645 (1998).

[35] Mem., In re Moore (No. 94-1429), *supra* note 32, at 3.

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.[36] . . . 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.[37]

Indeed, if the states truly believe that the cigarette companies are "merchants of death," one wonders why they have not banned cigarettes rather than sought profits through excise taxes and the recent litigation. The controversial exercise of tallying the financial consequences of smoking was initiated by the states, not the defendants. The objective of such an effort should be to calculate the true financial costs to the state, not to focus selectively on the positive components and to ignore the negative cost-reducing effects. Suppose, for example, that Medicaid consisted of Medicaid Part One, for which cigarettes raised the costs by $1,000, and Medicaid Part Two, for which they reduce the costs by $1,500. Is the net effect of smoking that the states are entitled to collect the $1,000 cost increase, or should one include the reduced cost as well? From the standpoint of efficient deterrence and optimal insurance, it is always the net economic damage that should be assessed.

The final major component of concern consists of the cigarette-related taxes. The states are correct from an economic standpoint in arguing that income taxes paid and general sales taxes paid because of cigarette consumption should not be credited to cigarettes. Presumably, if consumers were not purchasing these products they would be buying other goods that would also be generating similar sales or income taxes. What we want to distinguish is the incremental additional taxes paid by cigarettes, which would be the excise taxes that are distinctive to this product.

The states, nevertheless, consistently seek to exclude the role of excise taxes. One can view the excise tax mechanism as an ex ante substitute for the ex post damages payments in the courts. Suppose, for example, that cigarettes generated some positive costs Ps per pack in the state. If this relationship were known on a prospective basis, the state could charge smokers at the time of purchase for these costs through an excise tax mechanism. Recouping these costs through litigation is simply the analog of excise

[36] *Id.* at 21.
[37] *Id.* at 23.

taxes except that it is done after the fact and involves much higher levels of transaction costs. Indeed, the structure of the settlement functions as an excise tax, not as a lump sum settlement. The mechanism of collecting for the costs imposed on the state is not a matter of economic consequence other than with respect to accounting for transactions costs, which are higher in litigation contexts. Would, however, states have levied higher excise taxes had the health effects of cigarettes been known to the state, assuming they were not? Also, from a legal standpoint, is this distinction consequential? Such key issues were never resolved because of the out-of-court settlement.

The guiding principle for my calculations is to assess the net differential costs specifically linked to cigarettes. The approach here will be to undertake a comprehensive cost-accounting framework that recognizes both excise taxes as well as all insurance-related consequences of cigarette smoking for states.[38] To the extent that excise taxes are based on the state of information at the time of the smoking decision and litigation is based on retrospective assessment, excise taxes will be better suited to provide appropriate levels of deterrence based on the expected social costs of smoking at the time those decisions are made.

The states wish to exclude excise taxes because "tax revenue is the sole domain of the legislature, not the defendants."[39] The fact that legislatures, and not the cigarette companies, set taxes does not affect the net economic cost to the state. The states' second argument against excise taxes is that they were "not paid by the *defendants.* They were paid by the consumers of cigarettes and those who treated them."[40] However, all taxes are shared by the consumers and producers, with the shares depending upon the relative elasticities of supply and demand.

IV. Externalities for the Country and for the State of Mississippi

A. National Baseline Estimates

The basic building blocks of the analysis will consist of estimates of the national externalities associated with cigarette smoking. The essence of my methodological approach will be to adjust the national estimates in various ways to reflect the different cost level for the states. Thus, for each category

[38] It should be emphasized, however, that my tally will consider only insurance, pension costs, tax consequences, fires, and related factors. There may be broader economic consequences as well. These are discussed in Tollison & Wagner, *supra* note 3.

[39] See Mem., In re Moore (No. 94-1429), *supra* note 32, at 2.

[40] *Id.*

TABLE 1

SOCIAL COSTS OF SMOKING IN 1995

	REAL RATE OF INTEREST		
	0%	3%	5%
No tar adjustment:			
Total medical care	.7542	.5804	.5333
Sick leave	.0000	.0134	.0207
Group life insurance	.2539	.1439	.0965
Nursing home care	−.6325	−.2390	−.0801
Retirement pension	−3.0458	−1.2589	−.3857
Fires	.0149	.0167	.0189
Taxes on earnings	.9321	.4247	.1288
Total net costs	−1.7232	−.3186	.3323
Tar-adjusted estimates:			
Total medical care	.6341	.4806	.4374
Sick leave	.0029	.0119	.0182
Group life insurance	.2129	.1206	.0809
Nursing home care	−.5490	−.2074	−.0695
Retirement pension	−2.5532	−1.0553	−.3233
Fires	.0149	.0167	.0189
Taxes on earnings	.7545	.3438	.1042
Total net costs	−1.4829	−.2891	.2668
Manning et al. assumptions:			
Total medical care	.5113	.3825	.3453
Sick leave	.0034	.0140	.0216
Group life insurance	.1704	.0966	.0647
Nursing home care	−.3409	−.1288	−.0432
Retirement pension	−2.5564	−1.0566	−.3237
Fires	.0170	.0191	.0216
Taxes on earnings	.9373	.4271	.1295
Total net costs	−1.2577	−.2461	.2158

NOTE.—All estimates update the 1993 cost estimates in W. Kip Viscusi, Secondhand Smoke: Facts and Fantasy, 18 Regulation 42 (1995), to 1995 data whenever possible. Estimates are costs per pack.

of expenditures this approach distinguishes to the extent feasible the state and federal share of these expenditures, as well as factors that influence the state share differently across states, such as differences in per capita income levels or nursing home care utilization rates.

Table 1 presents the baseline estimates that will serve as the reference point for the discussion below. This table updates my previously published results for 1993–95 data whenever possible.[41] As a result, their underlying assumptions are comparable to the analysis for the states presented below. Three different sets of estimates appear. The set of estimates at the bottom

[41] The previously published data appear in Viscusi, *supra* note 2.

of the table consists of a simple update of a past analysis to take into account price changes.[42] There is no effort within these calculations to change any of the underlying assumptions, such as changes in program benefits levels. The top set of estimates in Table 1 updates the past analysis for prices but also for many substantive changes in these programs, such as the change in the percent of the population in nursing homes.[43] This middle set of cost estimates does not make adjustments for the changing tar content of cigarettes. The third set of estimates in Table 1 consists of cost estimates adjusting for the tar content of cigarettes, where this adjustment is based on a 20-year moving average of the cigarette tar content to reflect the lag time before risk exposures lead to cancer and heart disease.

Since the health care costs associated with cigarettes tend to be more immediate than the insurance-related financial savings, the choice of the discount rate affects the present value of the cost per pack of cigarettes. The cost estimates in Table 1 do not represent the contemporaneous costs but rather the present value of the ultimate stream of costs associated with a pack of cigarettes. In each case, estimates appear for three different real discount rates—0 percent, 3 percent, and 5 percent. The real riskless rate of return in the United States has been in the vicinity of 1–3 percent, so the intermediate case shown in Table 1 is probably the most plausible. For simplicity, all discussions below will focus on results using the 3 percent assumption.

Consider the components of the cost estimates for the middle set of results without a tar adjustment. The total medical care cost externality averages $.58 per pack, where about two-thirds of these costs are incurred before smokers reach age 65. Sick leave and fires are relatively minor cost items, averaging only $.01–$.02 per pack. Group life insurance costs average $.14 per pack, as smokers' earlier expected mortality increases the present value of life insurance costs.

The remaining cost components represent cost savings associated with cigarettes. Although the higher expected morbidity of smokers increases a variety of costs, because of smokers' earlier mortality, smokers on average

[42] The comprehensiveness of these cost estimates parallels that reported in Manning *et al.*, which my study updates; see Manning *et al., supra* note 2. Their study omits the extra maternity costs and costs of neonatal care due to smoking. In their view, consideration of these costs would boost the medical cost estimate by 2 cents per pack (at 84), or 5 percent of their total medical cost estimation. Thus, there would be less than a penny per pack adjustment in the state medical cost numbers. Calculation of the value of life of the fetal deaths would boost the external costs considerably, but these costs are not financial externalities that are the target of the state suits.

[43] For a detailed discussion of these procedures, see Viscusi, *supra* note 2, especially the appendix. The identical procedure was used in that paper except that I use 1995 data for the current analysis. The Appendix to this article describes many of these data sources.

save society −$.24 per pack in nursing home care and −$1.26 per pack in retirement pensions.

The final cost component in the various calculations in Table 1 is taxes on earnings, which involve a cost of $.42 per pack. This tax figure reflects only the payroll taxes for programs such as social security, not income taxes. The rationale for excluding income taxes is that since deceased smokers do not reap the benefits of public spending once they are dead, it would be inappropriate to hold them responsible for income taxes they did not pay.[44] Payroll taxes that finance retirement and medical care programs for the aged merit inclusion in the analysis since the cost savings for premature mortality are recognized.

To calculate the net financial costs associated with smoking, one must recognize both the forgone benefits and the forgone tax revenues. A straightforward updating of the assumptions made in a past analysis indicates that the net social cost of cigarettes is −$.25 per pack, which is a cost savings.[45] If this analysis is updated to reflect changes in program structure, benefit utilization rates, and similar factors, then the net social costs associated with smoking average −$.32 per pack without any tar adjustment. With a tar adjustment, the cost savings are −$.29 per pack. Because of the lower-risk potency of cigarettes after the tar adjustment and the smaller mortality cost savings, the cost estimates are scaled down with the tar adjustment.

An observation in a similar vein is that the cost savings are greatest in my analysis without the tar adjustment, which is possibly surprising since in that analysis the total medical care costs are also the highest. By contrast, the analysis with the lowest total net cost savings is the update of the previous analysis for which the total medical care cost impositions are the lowest of the three sets of estimates.[46] Although the shifts in the analysis are not exactly proportional, the updating procedures that increase estimates of the total medical care costs also tend to increase the estimates of the cost offsets of smoking, with the net result being that there is a greater cost savings when cigarettes are potentially more costly. It should be emphasized that these cost savings reflect only the financial externalities associated with smoking. They do not also capture the $.56 per pack excise tax value paid on each pack of cigarettes.

A potentially large economic externality that has been omitted from the cost calculations is the cost associated with environmental tobacco smoke.

[44] An identical assumption is made by Manning *et al.*, *supra* note 2; and Gravelle & Zimmerman, *supra* note 2.

[45] Updating the assumptions reported in Manning *et al.*, *supra* note 2.

[46] *Id.*

These costs are much debated, highly uncertain, but of great significance based on the expected risk levels assessed by government agencies. An earlier procedure by the author used the environmental tobacco smoke risk estimates prepared by OSHA and the U.S. Environmental Protection Agency (EPA), in conjunction with an implicit value of life of $5 million.[47] This approach generated a cost of environmental tobacco smoke ranging from $.07 to $.68 per pack.[48] The midpoint environmental tobacco smoke cost estimate is $.25 per pack. These costs are almost all direct health costs rather than the financial externalities that are the focus of the article here. Since the upper bound of the environmental tobacco smoke cost estimates for the states yields a financial cost of under $.005 per pack, the analysis presented here will exclude this cost component.

B. Costs to the State of Mississippi

Table 2 presents the state of Mississippi counterparts to the national estimates presented above (in 1995 dollars). The estimates address three different scenarios—the health effects invariant to tar level assumption, estimates with the tar changes recognized, and a simple update of an earlier analysis but on a state-specific basis.[49]

The tax rate per pack of cigarettes in Mississippi is $.18 per pack. The question is whether the net social externalities exceed that amount. As can be seen by the summary of these costs, the total net cost of smoking in Mississippi is the cost savings of −$.03 per pack with tar adjustments and −$.04 per pack without tar adjustments, excluding the excise tax payment amount. The update of the earlier study but on a state-specific basis leads to a cost savings of −$.02 per pack.[50]

These cost estimates reflected a series of adjustments from the earlier national estimates presented above. The procedure used for transforming the national estimates into state estimates represented straightforward application of a series of adjustment factors to reflect state cost shares and state differences. The Appendix to this paper lists the data sources for the various adjustments to be described below.

To see the general approach for developing these cost estimates, let us begin with the focal point of the state litigation efforts—medical care costs.

[47] See Viscusi, *supra* note 2.

[48] These estimates are for the tar-adjusted case. The estimates for the case without the tar adjustment are almost identical. Additional recent studies have bolstered the environmental tobacco smoke–health cost linkage but do not alter the overall spirit of the earlier estimates. See Steenland *et al.*, *supra* note 31; and Kawachi *et al.*, *supra* note 31.

[49] Updating results reported in Manning *et al.*, *supra* note 2.

[50] *Id.*

TABLE 2

STATE BURDEN OF INSURANCE EXTERNALITIES IN 1995
(Cost per Pack)

	MISSISSIPPI STATE ESTIMATE (for Given Real Rate of Interest)		
	0%	3%	5%
Health effects invariant to tar level:			
Total medical care	.0261	.0201	.0185
Sick leave	.0000	.0009	.0014
Group life insurance	.0096	.0054	.0036
Nursing home care	−.0755	−.0285	−.0096
Retirement pension	−.1241	−.0513	−.0157
Fires	.0000	.0000	.0000
Taxes on earnings	.0385	.0175	.0053
Total net costs	−.1253	−.0358	.0036
Tar changes recognized:			
Total medical care	.0220	.0167	.0152
Sick leave	.0002	.0008	.0013
Group life insurance	.0080	.0045	.0030
Nursing home care	−.0655	−.0247	−.0083
Retirement pension	−.1040	−.0430	−.0132
Fires	.0000	.0000	.0000
Taxes on earnings	.0312	.0142	.0043
Total net costs	−.1082	−.0315	.0023
Manning et al. assumptions:			
Total medical care	.0177	.0133	.0120
Sick leave	.0002	.0010	.0015
Group life insurance	.0064	.0036	.0024
Nursing home care	−.0407	−.0154	−.0051
Retirement pension	−.1041	−.0430	−.0132
Fires	.0000	.0000	.0000
Taxes on earnings	.0387	.0176	.0053
Total net costs	−.0817	−.0229	.0029

Medical care costs for the states include two main components: Medicaid and other medical expenditures, which consist of uncompensated care in community hospitals and other state medical expenditures. Medicaid costs are shared by both the federal government and the states, where the average federal share for all states was 60 percent in 1995. The rate of federal matching differs by state and is a critical component in determining the state cost share. This rate is higher for Mississippi than for the United States as a whole due to the Medicaid formula that increases the federal matching rate as the per capita income of the state declines. Thus, in Mississippi the federal matching rate is 79 percent.

Since Mississippi is poorer than the national average, the need-based Medicaid program serves a larger fraction of its citizenry—roughly one and

a half times the national average. However, the state of Mississippi also has lower operating costs (wages, rent, contracted services), and it uses less technologically advanced medical procedures, which account for a lower cost per Medicaid recipient.

The estimates adjust for state differences in non-Medicaid expenditures similarly. After dividing these expenditures into uncompensated care in community hospitals and other state medical expenditures, one can calculate the relative per capita uncompensated care expenditures in community hospitals in Mississippi as compared to the rest of the country and the relative per capita medical expenditures in Mississippi to obtain the relative value of expenditures other than Medicaid. The final component is to take the average state share of hospital, physician, and drug payments and apply this measure to the updated medical costs assessments presented in Table 1 to determine the Mississippi state share of that cost.

Workers in ill health may suffer higher sick leave costs. These costs were relatively minor for the nation as a whole— about $.01 per pack—and are considerably less for the state of Mississippi. To make these estimates specific to the state of Mississippi, the calculations reflected the relative earnings of Mississippi workers relative to the U.S. average, the percentage of the labor force employed by the state, and the average state share of sick leave costs per employee.

In the case of group life insurance, there is no information available to make separate estimates for the state of Mississippi as opposed to the average state. This calculation consequently simply divides the life insurance costs proportionally among federal employees, state employees, and other employee groups based on their employment share.

Nursing home costs are one of the most important external costs associated with cigarettes. However, this category represents a cost savings, not a cost imposition. The starting point for this calculation is to reflect the average state burden of nursing home care costs, which is 33 percent. One can then adjust this amount to reflect factors specific to the state of Mississippi. In particular, the estimates adjust for the relative percentage of the Mississippi population in nursing homes, which is only 86 percent of the national average. The cost of nursing home care is also less than the national average as measured by covered charges per day. Finally, the calculations reflect the Medicaid share paid for by the state of Mississippi as a proportion of that paid by the average state.

The largest component in the total societal externality costs is pension costs. To calculate the Mississippi pension cost savings because of smokers' premature mortality, one first assesses the proportion of pension payments paid by each level of government and by the private sector. The adjustment relative to the average state consists of two parts. First, many

states supplement federal Supplemental Security Income (SSI) payments. Mississippi does not. As a result, one must assess the gross state pension expenditures to reflect the omission of SSI payments from total costs. The second adjustment is to correct for differences in the average state pension payment per recipient. The net result of the pension cost savings of −$.04 to −$.05 per pack for the state of Mississippi depends on the particular assumptions used. This amount is a small fraction of the total societal pension cost savings.

The taxes on earnings reflect direct state employee payments into the system to cover costs of health care, sick leave, group life insurance, and pensions. The starting point for the calculations consists of the state employee's hourly benefit cost. One then can adjust these amounts by the relative benefits for the state of Mississippi taking into account all different components of workers' pretax contributions.

Other components of the insurance externalities are of interest as well. In the case without tar adjustments, total medical care costs are $.02 per pack, whereas nursing home cost savings are −$.03 per pack. Thus, even within the medical component alone there is no net cost imposition if one includes both medical care and nursing home care in the calculations. In addition, the retirement pension cost offset exceeds the cost associated with medical care.

On balance, cigarettes are self-financing for Mississippi (see Table 2). Whereas the cost savings generated by cigarettes were substantial for society as a whole, for the state of Mississippi these savings only averaged −$.03 per pack. The results for the state of Mississippi and other states are, however, sensitive to the rate of discount. Cost savings from smoking increase if there is no discounting, and cigarettes are a break-even proposition at a 5 percent rate. These results paralleled those for other states. Note that these estimates do not reflect the role of excise taxes in the state of Mississippi, which are $.18 per pack.

V. Overall Federal Costs and Effects by State

A. Federal and Average State Externalities

The state of Mississippi is unrepresentative in a variety of ways, chiefly because of the lower per capita income and the consequences this has for the structure of state programs and the demands on them. As a result, it is useful to assess the costs for an average state and to distinguish the costs for the federal government as well. Table 3 presents the three sets of such calculations for both the federal costs and the state costs. As before, one assumes that health effects are invariant to the tar level, a second set recog-

TABLE 3

GOVERNMENTAL BURDEN OF INSURANCE EXTERNALITIES
(Cost per Pack)

	REAL RATE OF INTEREST					
	State Cost Estimate			Federal Cost Estimate		
	0%	3%	5%	0%	3%	5%
Health effects invariant to tar level:						
Total medical care	.0427	.0329	.0302	.3063	.2357	.2166
Sick leave	.0000	.0012	.0019	.0000	.0010	.0015
Group life insurance	.0096	.0054	.0036	.0076	.0043	.0029
Nursing home care	−.2063	−.0779	−.0261	−.3833	−.1448	−.0485
Retirement pension	−.1885	−.0779	−.0239	−2.0480	−.8465	−.2593
Fires	.0000	.0000	.0000	.0000	.0000	.0000
Taxes on earnings	.0584	.0266	.0081	.4856	.2213	.0671
Total net costs	−.2841	−.0897	−.0062	−1.6318	−.5290	−.0198
Tar changes recognized:						
Total medical care	.0359	.0272	.0248	.2575	.1952	.1776
Sick leave	.0003	.0011	.0017	.0002	.0009	.0013
Group life insurance	.0080	.0045	.0030	.0064	.0036	.0024
Nursing home care	−.1790	−.0676	−.0227	−.3327	−.1257	−.0421
Retirement pension	−.1580	−.0653	−.0200	−1.7168	−.7096	−.2174
Fires	.0000	.0000	.0000	.0000	.0000	.0000
Taxes on earnings	.0472	.0215	.0065	.3931	.1791	.0543
Total net costs	−.2456	−.0786	−.0066	−1.3922	−.4565	−.0238
Manning et al. assumptions:						
Total medical care	.0290	.0217	.0196	.2076	.1553	.1402
Sick leave	.0003	.0013	.0020	.0003	.0010	.0016
Group life insurance	.0064	.0036	.0024	.0051	.0029	.0019
Nursing home care	−.1112	−.0420	−.0141	−.2066	−.0780	−.0262
Retirement pension	−.1582	−.0654	−.0200	−1.7189	−.7105	−.2176
Fires	.0000	.0000	.0000	.0000	.0000	.0000
Taxes on earnings	.0587	.0267	.0081	.4884	.2225	.0675
Total net costs	−.1750	−.0541	−.0020	−1.2241	−.4067	−.0326

nizes changes in tar content, and a third set updates an earlier analysis.[51] For both the federal and state government, the costs due to fires are assumed to be zero since these are largely private costs.

The cost effects are similar for both the unadjusted estimates as well as those that reflect tar adjustments. Because of the similarity, I will focus on the tar-adjusted estimates, which reflect somewhat smaller cost savings. The total federal cost savings are −$.46 per pack, whereas the total state cost

[51] *Id.*

savings are −$.08 per pack. This average state cost savings amount is more than double the cost savings for Mississippi because the greater affluence of these other states largely has the effect of scaling up the benefits and the cost savings involved.

Cigarettes impose $.20 per pack of medical care costs on the federal government, as compared to $.03 per pack for the average state. Sick leave costs and group life insurance are relatively small effects. The nursing home care cost savings are −$.13 per pack for the federal government and −$.07 per pack for state governments. As expected, federal retirement pension savings from smokers' early mortality equal to −$.71 exceed the −$.07 per pack value for the states. Taxes on earnings are similarly scaled higher for the federal government than for the states, as one would expect.

There are some differences in the composition of the cost with respect to the cost offsets. Whereas the nursing home care cost savings to the states exceeds the total medical care cost increase, this is not the case for the federal government. In each instance, however, the retirement pension cost savings exceed the medical care cost increase. Moreover, the $.327 average excise tax for the states and the $.24 excise tax for the federal government each exceed the higher value of medical costs.

These estimates of the cost savings are, however, sensitive to the discount rate. Cigarettes are self-financing at the federal level for all rates shown in Table 3, with cost savings ranging from −$.02 per pack at 5 percent interest to −$1.39 at 0 percent. For all states the cost savings range is much narrower—from −$.01 at 5 percent interest to −$.25 at 0 percent. Nevertheless, the self-financing status holds true even without the inclusion of excise taxes.

B. Summary of Effects by State

One can undertake a similar set of calculations as was undertaken for Mississippi for each state. These values appear in Table 4, where for simplicity, I have summarized only the most salient cost components and the total effects for the no-tar-adjustment case. Column 1 summarizes the state excise tax rate for each of the states as well as for the nation as a whole. The next series of five columns presents the principal cost components for the externality costs per pack for the scenario in which costs are invariant to the tar level. The final column presents the net cost per pack for the tar-adjusted case.

The implications of Table 4 are quite dramatic. In every case, the excise tax level roughly equals or exceeds the medical care cost per pack.

TABLE 4

State Cigarette Smoking Externalities

State	State Excise Tax Rate (Dollars per Pack)	Net External Costs per Pack (Costs Invariant to Tar Level Case)				
		Medical Care	Nursing Homes	Pensions	Taxes on Earnings	Total
Alabama	.165	.02453	−.04361	−.07506	.01864	−.06902
Alaska	.290	.03518	−.03766	−.13640	.02129	−.11063
Arizona	.580	.01179	−.04719	−.09375	.01547	−.10714
Arkansas	.315	.02565	−.06886	−.05701	.01892	−.07485
California	.370	.03313	−.11221	−.13198	.02078	−.18324
Colorado	.200	.02762	−.09692	−.10384	.01941	−.14688
Connecticut	.500	.05209	−.10256	−.12893	.02550	−.14693
Delaware	.240	.03985	−.08140	−.06521	.02245	−.07773
Florida	.339	.03108	−.08608	−.06251	.02027	−.09078
Georgia	.120	.03123	−.05047	−.08863	.02031	−.08115
Hawaii	.600	.02729	−.04695	−.09712	.01933	−.09082
Idaho	.280	.01822	−.04656	−.04625	.01707	−.05101
Illinois	.440	.03933	−.12038	−.07040	.02232	−.12246
Indiana	.155	.03201	−.09534	−.04805	.02050	−.08428
Iowa	.360	.02599	−.16245	−.03123	.01901	−.14190
Kansas	.240	.02508	−.14260	−.03448	.01878	−.12676
Kentucky	.030	.02925	−.05065	−.07077	.01982	−.06583
Louisiana	.200	.03695	−.11874	−.03944	.02173	−.09303
Maine	.370	.03963	−.06823	−.07071	.02240	−.07034
Maryland	.360	.03650	−.05986	−.09520	.02162	−.09023
Massachusetts	.510	.04735	−.11261	−.09328	.02432	−.12755
Michigan	.750	.02935	−.04724	−.08216	.01984	−.07331
Minnesota	.480	.03702	−.08937	−.07461	.02175	−.09833
Mississippi	.180	.02011	−.02851	−.05129	.01754	−.03577
Missouri	.170	.02896	−.14337	−.06757	.01975	−.15583
Montana	.180	.02234	−.05199	−.05882	.01810	−.06386
Nebraska	.340	.02765	−.11348	−.03637	.01942	−.09634
Nevada	.350	.02535	−.05229	−.08389	.01885	−.08527
New Hampshire	.250	.03463	−.11980	−.05503	.02115	−.11248
New Jersey	.400	.04619	−.06737	−.09772	.02403	−.08798
New Mexico	.210	.02240	−.03397	−.07920	.01811	−.06617
New York	.560	.08189	−.06644	−.09115	.03290	−.03589
North Carolina	.050	.02774	−.04512	−.07331	.01944	−.06469
North Dakota	.440	.02863	−.05787	−.04698	.01966	−.05009
Ohio	.240	.03434	−.08607	−.07965	.02108	−.10361
Oklahoma	.230	.02344	−.11812	−.09039	.01837	−.16031
Oregon	.380	.02404	−.07009	−.05850	.01852	−.07937
Pennsylvania	.310	.03191	−.10222	−.06512	.02048	−.10826
Rhode Island	.610	.05575	−.08175	−.12990	.02640	−.12275
South Carolina	.070	.02467	−.03540	−.07522	.01868	−.06085
South Dakota	.330	.02507	−.08428	−.04267	.01878	−.07666
Tennessee	.130	.03111	−.05795	−.04708	.02028	−.04720
Texas	.410	.02861	−.07988	−.03772	.01966	−.06281
Utah	.265	.01568	−.03218	−.06727	.01644	−.06091
Vermont	.440	.03120	−.06365	−.06379	.02030	−.06933
Virginia	.025	.02759	−.06953	−.07268	.01940	−.08873
Washington	.815	.02920	−.09506	−.03714	.01980	−.07647
West Virginia	.170	.03225	−.04889	−.05195	.02056	−.04169
Wisconsin	.440	.02896	−.08850	−.10225	.01974	−.13510
Wyoming	.120	.02301	−.06471	−.05265	.01826	−.06969
Averages	.320	.03420	−.08264	−.07533	.02105	−.09608

Note.—All figures assume a 3% discount rate. These average statistics are weighted by the packs of cigarettes sold per state rather than a simple average, which is the approach used for the averages in Table 3.

Moreover, even excluding excise taxes, the total net external cost per pack is always negative. Indeed, even if one only looks at the medical care and nursing home components, from the standpoint of these two medical-related effects, cigarettes are self-financing in almost every instance.

As is evident from Table 4, the medical care costs per pack are somewhat less for Mississippi than for other states, and the pension cost savings and the nursing home cost savings are lower as well. On balance, the net costs per pack of cigarettes in the state of Mississippi represent a −$.04 per pack cost savings. This amount ties for being the lowest net cost savings per pack for any state in the table. It is consequently not surprising that the Mississippi lawsuit to recoup the externality costs was the initial state litigation effort.

Because of the substantial heterogeneity across states, the net consequences of cigarettes for the states differ substantially. The average net cost savings is −$.10 per pack, but this value ranges from a low of −$.04 per pack in the state of Mississippi to a high value of −$.18 per pack in the state of California.

It is useful to consider some extreme states in this table. Virginia has the lowest excise tax rate, which is $.025 per pack. However, even this low level of excise tax roughly equals the state's smoking-related medical care costs. Moreover, the nursing home cost savings associated with smoking are over double the value of the medical care cost increases. On balance, cigarettes save the state of Virginia $.09 per pack as well as the value of the excise taxes.

Another extreme case is that of New York. That state has the highest value of medical care costs associated with smoking, which are $.08 per pack. Nevertheless, the nursing home cost savings offset is almost as great as this amount. Moreover, even for the state of New York, there is a net insurance cost savings of cigarettes of −$.04 per pack. The medical cost amounts are also dwarfed by the value of the state excise taxes imposed on cigarettes in New York, which are $.56 per pack.

The final settlement specified the share of the payments that each state would receive. How well did each of the 46 states participating in the agreement fare relative to smoking costs? Table 5 lists the fraction of total medical costs per pack based on the amount of cigarette packs sold in the state in 1997 and the state medical costs per pack from Table 4. The second column in Table 5 lists the specified state fractional share of the payments as specified in the settlement, and the final column lists the ratio of the medical cost share to the settlement share. States that fared above average included California and Hawaii, which may reflect in part the retirement of smokers to these states. The states where the smoker bought the cigarettes may not

TABLE 5

RATIO OF SETTLEMENT PAYMENTS TO MEDICAL CARE EXTERNALITIES AMONG PARTICIPATING STATES

State	Medical Cost Share	Share of Settlement	Payment per Dollar Medical Loss
Alabama	.01523	.01646	1.08019
Alaska	.00275	.00348	1.26273
Arizona	.00527	.01501	2.85002
Arkansas	.01018	.00843	.82829
California	.08551	.12997	1.51989
Colorado	.01229	.01396	1.13588
Connecticut	.01948	.01890	.97029
Delaware	.00513	.00403	.78425
Georgia	.03154	.02499	.79240
Hawaii	.00212	.00613	2.88591
Idaho	.00229	.00370	1.61504
Illinois	.05609	.04739	.84486
Indiana	.03587	.02077	.57901
Iowa	.00983	.00886	.90065
Kansas	.00830	.00849	1.02278
Kentucky	.02806	.01793	.63919
Louisiana	.02424	.02296	.94743
Maine	.00724	.00783	1.08167
Maryland	.02048	.02302	1.12412
Massachusetts	.03170	.04113	1.29740
Michigan	.03326	.04431	1.33243
Missouri	.02722	.02316	.85096
Montana	.00244	.00432	1.77439
Nebraska	.00569	.00606	1.06547
Nevada	.00521	.00621	1.19131
New Hampshire	.00894	.00678	.75858
New Jersey	.04262	.03937	.92390
New Mexico	.00351	.00607	1.72875
New York	.15170	.12995	.85662
North Carolina	.03491	.02375	.68025
North Dakota	.00211	.00373	1.76418
Ohio	.06148	.05129	.83426
Oklahoma	.01199	.01055	.87998
Oregon	.01003	.01169	1.16483
Pennsylvania	.05298	.05853	1.10479
Rhode Island	.00736	.00732	.99464
South Carolina	.01422	.01198	.84228
South Dakota	.00256	.00355	1.38871
Tennessee	.02874	.02485	.86467
Utah	.00220	.00453	2.05826
Vermont	.00321	.00419	1.30605
Virginia	.02766	.02082	.75274
Washington	.01498	.02091	1.39594
West Virginia	.00978	.00903	.92315
Wisconsin	.01983	.02110	1.06420
Wyoming	.00178	.00253	1.42021

NOTE.—Medical cost externality figures assume a 3% discount rate. Florida, Minnesota, Mississippi, and Texas did not participate in the settlement.

always be the states where the medical expenses are incurred. The most prominent state pushing for the national settlement was Washington, which reaped a payment of $1.40 per dollar of medical costs.

VI. Conclusion

The state and federal breakdown of the financial consequences of cigarette smoking does not simply involve scaling down the national estimates. The distribution of the effects across different cost categories is not symmetric. States, for example, receive over half of the excise taxes associated with cigarettes on average. However, states also receive only a small fraction of the total decrease in pension costs associated with smokers' premature mortality.

The striking economic result is that cigarettes are self-financing when viewed from a variety of insurance cost perspectives. Nursing home cost savings resulting from smokers' early mortality typically exceed the increase in medical costs. Similarly, pension cost savings associated with smokers' premature mortality exceed the increase in medical costs. Finally, excise taxes on cigarettes equal or exceed the medical care costs associated with smoking. At the time smokers purchase cigarettes, they are paying an excise tax fee that fully covers the adverse state medical insurance consequences of their smoking behavior.

The analysis also indicated that the net gains to the federal government from cigarette smoking are greater than to the states. This result illuminates one potential reason why the federal government was not a party to the initial lawsuits against the cigarette industry. In addition to the excise taxes received by the federal government, the nursing home and pension cost savings fully offset the increase in medical costs. However, the driving force of the state suits and the out-of-court settlement was gross medical costs, not net financial externalities. From that standpoint, the stakes of the prospective federal lawsuit are considerably greater.

One puzzle raised by these results is why the cigarette companies would settle such suits rather than litigate them. Whether the industry would have won such suits would have depended on which costs counted and which did not. In many but not all jurisdictions, preliminary rulings excluded recognition of excise taxes and the cost implications of smokers' premature mortality. Making the cost savings argument based on the early death of the product's consumers also is an uncomfortable argument for any industry to make, even if the courts permit this approach. Moreover, if such arguments are unsuccessful, the threat of punitive damages could boost the costs well beyond the settlement amount.

APPENDIX

SUMMARY OF DATA SOURCES FOR ANALYSIS

The update of the author's earlier analysis from 1993 prices to 1995 prices follows a procedure identical to that described in the earlier paper.[52] The only difference is that more recent data were used. The focus of this Appendix will be to summarize the data sources used to develop the state-specific smoking externality estimates.

A. Medical Expenditures

Information on the matching fund rates came from the Medicaid Bureau, Health Care Financing Administration.[53] Information on the percent of state residents receiving Medicaid was from the Health Care Financing Administration.[54] Medical care data on the cost per recipient came from the same source.[55] Total dollar amounts of per capita uncompensated care in community hospitals were from the American Hospital Association.[56] Population estimates for converting to per capita figures were from the Population Distribution Branch, U.S. Bureau of the Census.[57] Information on state medical expenditures and population figures came from multiple sources.[58] The percentage of other state medical expenditures on community hospitals was derived from data published in a national heath care journal.[59] The percentage of state spending on hospitals, physicians, and drugs other than Medicaid spending and the data on hospital, physician, and drug payments came from the same source.[60]

B. Sick Leave

Sick leave costs estimates were assumed to be proportional to the number of employees and their earnings. Information on average state employee earnings came from the U.S. Bureau of the Census.[61] The federal and local employee data came

[52] See Viscusi, *supra* note 2.

[53] See Health Care Financing Administration, Health Care State Rankings 1995, at 287.

[54] Health Care Financing Administration, Eligibles, Recipients, Payments and Services (HCFA-2082), as reported in *id.* at 286.

[55] *Id.* at 284.

[56] American Hospital Association, 1992 Annual Survey, as reported in Sourcebook of Health Insurance Data: 1995, at 105.

[57] U.S. Bureau of the Census, Population Distribution Branch, Estimates of the Civilian Population of States: July 1, 1990, to July 1, 1995, on-line at www.census.gov/population/estimates/state/st95cts.txt.

[58] Health Care Financing Administration, *supra* note 53, at 255; and U.S. Bureau of the Census, Statistical Abstract of the United States: 1994, at 319.

[59] National Health Expenditures, 1993, 15 Health Care Financing Rev. 292 (Fall 1994).

[60] *Id.* at 291.

[61] U.S. Bureau of the Census, Public Employment, as reported in U.S. Bureau of the Census, *supra* note 58, at 323.

from the same source.[62] The sick leave cost for employees came from a U.S. Department of Labor journal.[63]

C. *Group Life Insurance*

The analysis of group life insurance assumed that these costs were proportional to the size of the labor force, with no additional adjustments. Employment data came from the sources cited above.

D. *Nursing Homes*

Data on nursing home costs reflected a variety of adjustments from Mississippi relative to the average U.S. state. Estimates of the percent of the population in nursing homes came from the U.S. Bureau of the Census.[64] Information on the cover charges per day came from the Bureau of Data Management and Strategy.[65] Information used to calculate the average state and federal burden for nursing home care came from a national periodical.[66]

E. *Pensions*

The average state pension cost is calculated as the proportion of pension payments paid for the state, including state supplements to federal SSI benefits. Mississippi does not supplement these benefits. Social Security and SSI payment data came from the Social Security Administration.[67] The federal employee pension costs came from the Employee Benefit Research Institute.[68] Information on state SSI supplementation came from the Social Security Administration.[69] State employee pension costs came from the U.S. Bureau of the Census.[70] That same source was used for local employees. Private pension costs were obtained from the U.S. Department of Labor.[71] Finally, average state pension payments per recipient were obtained from the Council on State Governments.[72]

[62] *Id.* at 319, 323.

[63] Cost of Employee Compensation in Public and Private Sectors, Monthly Lab. Rev. 15 (May 1993).

[64] U.S. Bureau of the Census, Nursing Home Population 1990 (CPH-L-137), as reported in Health Care Financing Administration, *supra* note 53, at 215.

[65] Bureau of Data Management and Strategy, Health Care Financing Administration, as reported in Universal Health Care Almanac, 1995, table 9.5.2.

[66] National Health Expenditures, *supra* note 59, at 291.

[67] Social Security Administration, Annual Statistical Supplement: 1994, Social Security Bull. (1994).

[68] Employee Benefit Research Institute, EBRI Databook on Employee Benefits (3d ed. 1995).

[69] Social Security Administration, *supra* note 67, at 292.

[70] U.S. Bureau of the Census, Finances of Employee Retirement Systems of State and Local Governments, Series GF, No. 2 (1996).

[71] U.S. Department of Labor, Pension and Welfare Benefits Administration, Private Pension Plan Bull. (Summer 1993).

[72] Council on State Governments, The Book of the States, 1994–1995, at 466 (1994).

F. Taxes on Earnings

The earnings taxes reflect direct state employee payments into the system to cover health care sick leave, pension, and life insurance costs. State and local government employee hourly benefit cost data are from a national periodical.[73] Other components needed to calculate taxes, such as relative amounts of medical care in the state in relation to the national average, were based on calculations from previous stages in the analysis.

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[73] Cost of Employee Compensation in Public and Private Sectors, *supra* note 63.

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