

Tobacco At the Crossroads: The Past and Future of Smoking Regulation in the United States

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In the mid-1990s, the U.S. tobacco industry appeared to be in its best shape in decades. Cigarette consumption per capita, after a decline of almost 40 percent over the previous 15 years, actually rose from 1994 to 1995, before declining only slightly in 1996. Smoking among high school age youth, the traditional pipeline to lifetime consumption of cigarettes, had been rising sharply since the early 1990s. After a price war in the early 1990s, the major industry players appeared to have consolidated their oligopoly and real prices were steadily rising. Despite decades of lawsuits brought by smokers suffering from smoking-related illness or the relatives of deceased smokers, the industry had yet to pay out a penny of damages to any plaintiff. Moreover, despite continual haranguing against the evils of smoking and calls for sin taxes on cigarettes at both the state and federal level, a powerful industry had managed to keep real federal and state excise taxes on cigarettes one-third lower than their peak level of the mid-1960s.

The subsequent years, however, have seen a parade of adverse events for the industry. In May 1994, the state of Mississippi filed a lawsuit against the industry to recover the lost medical costs to the state from smoking-related illness. A number of other states shortly followed suit. After an aborted attempt to negotiate a comprehensive settlement to all of its legal woes, the industry agreed to pay the states \$246 billion over 25 years just to settle the state lawsuits. Shortly after this settlement the U.S. Department of Justice filed an enormous new lawsuit against the industry to recover the medical costs to the federal government of smoking. More recently a jury in Florida awarded a class of plaintiffs a record settlement of \$145 billion in their suit against the industry. In addition, the average state and federal excise tax on cigarettes has risen by more than a third since 1995, to

76 cents per pack. Cigarette consumption has begun to decline rapidly again, falling over 10 percent from 1996 through 1999.

The rapid evolution of public and private actions against this \$65 billion industry suggests that the time is ripe for a review and reevaluation of public policy towards smoking in the United States. This paper begins with a brief review of the background on the tobacco industry and smoking in the United States, and of public regulatory and private legal developments over the past decade. I then discuss the economic theory of tobacco regulation, highlighting both traditional conclusions and some reason to question their validity. Smoking-related illness remains the leading preventable cause of death in the United States, and the typical smoker shortens his or her life by about six years (Cutler et al., 2000). Indeed, calculations presented later in this paper suggest that the rise in youth smoking in the United States in the 1990s could lead to 3.2 million years of life lost for this cohort of teens. Yet, at the same time, existing taxes vastly exceed the interpersonal externalities imposed by smoking, the common benchmark for setting taxes on addictive bads. Are these taxes really too high? Finally, I offer some discussion of future policy choices. The Florida suit suggests the potential of a wave of private actions that could use enormous legal resources, significantly raise the price of tobacco products, and potentially even bankrupt an industry whose products more than 20 percent of American adults use regularly. Even ardent opponents of tobacco use must wonder from time to time if there isn't a better way to proceed.

Background

Facts on Smoking and the Tobacco Industry

Figure 1 graphs the number of cigarettes consumed per capita in the United States back to 1940 (Orzechowski and Walker, 2000).¹ Cigarette consumption grew steadily until the early 1950s (continuing a trend that began back in the mid-1860s), more slowly until 1980, and then began a decline that leveled out briefly in the mid-1990s, but then continued over the past several years.

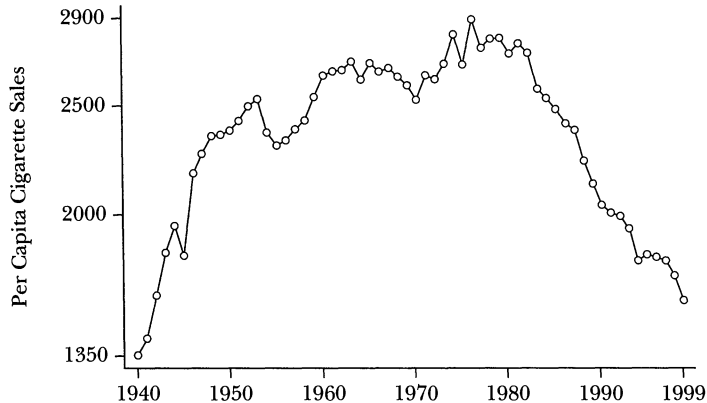
The latest available data show roughly one-quarter of adults smoking in 1997.² The percentage of men who smoke, at 27.6 percent, exceeds the 22.1 percent for women. The percentage of blacks who smoke, at 26.7 percent, exceeds the rate for whites of 25.3 percent. In general, the trends among these groups mirror the time series of cigarette consumption, although the gaps in smoking between men and women and between blacks and whites have closed over time.

The smoking patterns of high school seniors are of particular interest. While youth smokers only account for 2–3 percent of the packs of cigarettes smoked,

¹ This volume, *The Tax Burden on Tobacco*, which is the standard reference on tobacco data for students of this industry, was originally produced by the Tobacco Institute, an industry lobbying arm that was disbanded by the 1998 settlement with the states. All data in this section are from this volume unless otherwise cited.

² Data for 1997, as well as historical data for many years going back to 1955, is available at the Centers for Disease Control website (<http://www.cdc.gov/tobacco/prevali.htm>).

Figure 1
Cigarette Consumption Over Time



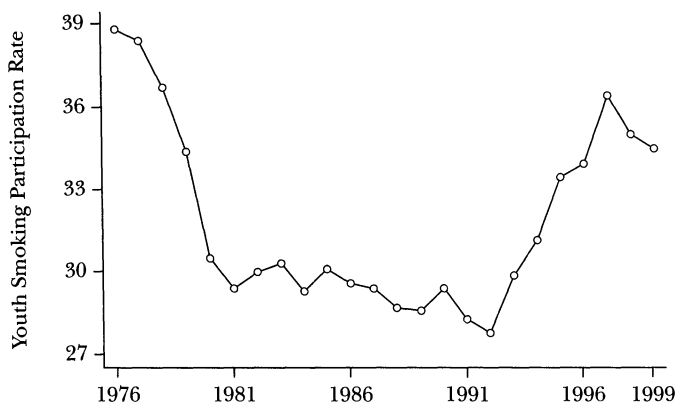
more than three-quarters of smokers begin smoking before their 19th birthday. Figure 2 shows the smoking rate of high school seniors, where smoking is defined as any cigarette consumption over the past 30 days; the trend in regular smoking is similar, although the levels are lower (Gruber and Zinman, 2000). Smoking among high school seniors fell dramatically in the late 1970s, declined slowly in the 1980s, then rose rapidly beginning in the early 1990s, before declining again in recent years. It is striking that regular smoking by youths in 1997 was almost identical to the level of adult smoking, despite being only about two-thirds as high in the mid-1970s. It is also interesting to note that black youth are much *less* likely to smoke than white youth. The means of translation from the relatively lower smoking rate for black youth to the relatively higher smoking rate for black adults is not clear.

Figure 3 illustrates the real price of a package of cigarettes (after excise taxation) over recent decades. Real prices rose steadily from 1954 until 1970, when they were then eroded by inflation until the mid-1980s. Prices then jumped significantly in 1982–83, and rose further up to 1992. However, a substantial price reduction occurred in 1993, and prices were then only slowly rising in real terms until the enormous increases due to the industry settlements with the states in 1998 and 1999. The time trend in prices matches quite strikingly the inverse of the time trend in consumption: a time series regression of per capita consumption on prices, controlling for a linear time trend, yields a highly significant elasticity of -0.65 .

The steep price decline in 1993–94 was the result of a price war, which resulted from a growing market share for the discount brands in the early 1990s. As a result, Phillip Morris announced a 40 cent per pack price cut on its branded cigarettes on April 2, 1993—also known as “Marlboro Friday.”³ This price cut had the intended

³ Philip Morris itself produces some discount brands. As Bulow and Klemperer (1998) describe, Philip Morris tried to capture a large share of the discount market, then to raise prices. But when the other

Figure 2

Youth Smoking Over Time

effect of considerably shrinking the share of the discount market from 36 percent in 1992 to 27 percent of the market by 1998 (Bulow and Klemperer, 1999).

The steep rise in cigarette prices in 1982–83 and 1991 corresponded to the implementation of two major federal excise tax increases.⁴ The federal excise tax rose from 8 to 16 cents per pack in 1983, and from 16 to 20 cents a pack in 1991. But prices rose from 70 cents to 95 cents a pack from 1981 to 1983, and from \$1.53 to \$1.73 in 1991.⁵ This more than one-for-one pass-through of taxes was highlighted by Harris (1987) as an example of the oligopolistic nature of price setting in this industry. Under models such as the one Harris discusses, it may be difficult in steady state for the industry to coordinate a price increase. In this world, industry-wide shocks such as federal excise tax increases serve as a “focal point” that can allow the industry to work together to raise aggregate prices.

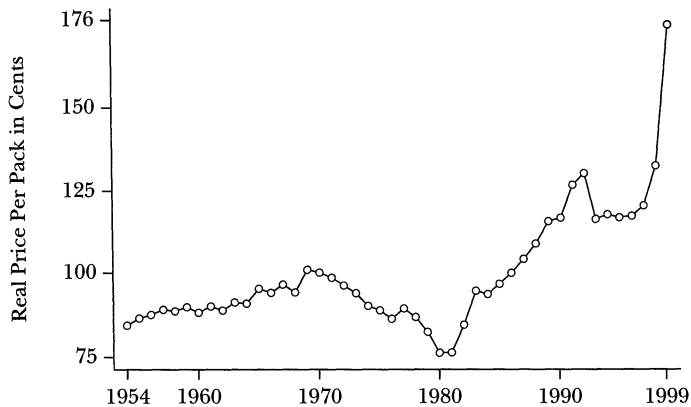
Tobacco is dominated today by four large firms: Phillip Morris (producers of Marlboro, Merit, and others who, according to Bulow and Klemperer [1998] control 49 percent of the market); R.J. Reynolds (Camel, Winston: 25 percent of the market); Brown and Williamson (Cool, Carlton: 16 percent of the market); and Lorillard (Kent, Newport: 9 percent of the market). These firms produce over

major manufacturers of discount brands (Brown and Williamson and Liggett) did not follow, Philip Morris reacted with its steep price cut.

⁴ Cigarette excise taxes are levied on producers: federal taxes on cigarette manufacturers, and state taxes on cigarette wholesalers.

⁵ The anticipatory price increase in late 1982 (the price data are from November of each year) presumably reflects knowledge of the industry that the federal excise tax increase, passed as part of TEFRA in 1982, was scheduled to come into place in 1983. State-specific tax increases, on the other hand, appear to be passed on only slightly more than one-for-one to prices, and roughly 80 percent of within-state variation in prices is explained by within-state variation in taxes (Gruber and Koszegi, forthcoming). But the remaining 20 percent may reflect state-specific pricing by tobacco companies, suggesting that taxes, and not prices, are the appropriate exogenous measure to be used in studies of cigarette demand (despite the use of price as an exogenous regressor in many studies, such as Becker, Grossman and Murphy, 1994).

Figure 3

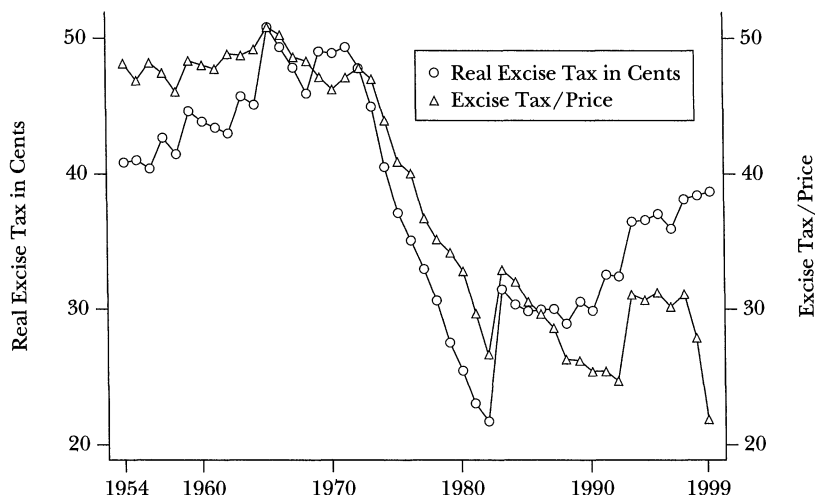
Real Price of Cigarettes Over Time

98 percent of the cigarettes smoked in the United States. As one might expect based on this high level of concentration, the tobacco industry is also very profitable (Bulow and Klemperer, 1998). Profits as a percent of revenue are roughly 38 percent across the industry. Moreover, economies of scale are apparently fairly small; Philip Morris, with half the market, has average costs that are only five cents per pack lower than fourth-ranked Lorillard, which has less than 10 percent. Given these facts, the lack of entry in this industry likely reflects fear of lawsuits and strong existing brand loyalty, as well as the informational barriers posed by advertising restrictions (such as the ban on television advertisements for cigarettes).

Traditional Public Regulation

The public sector has traditionally regulated smoking in one of three ways. The first, and most important, is excise taxation, at both the state and federal level (some localities tax cigarettes as well). Figure 4 shows the evolution of real state and federal excise taxes over time, and the share of those taxes as a percentage of the retail price of cigarettes. Real taxes rose by roughly 10 percent from 1955 through the early 1970s, then declined steadily for a decade before the 1983 federal excise tax increase. Taxes were then roughly constant in real terms until federal excise tax increases in 1991 and 1993 and since have risen in real terms due largely to state actions. As a share of price, taxes were roughly constant until the early 1970s, fell precipitously until the 1983 excise tax rise, then fell again until the tax rises of the early 1990s. The tax share has fallen considerably in the past couple of years, due to settlement-related price increases and now stands at less than one-quarter, about half the level of 35 years earlier. These settlement-related payments can themselves be viewed as a tax, although it is somewhat difficult to assess the price per pack cost of these payments as the recent price increases appear to exceed the settlement

Figure 4

Federal and State Excise Taxation of Cigarettes Over Time

costs greatly. Using a conservative estimate of 45 cents per pack in settlement “tax,” the real tax in 1999 would be 66 cents (instead of 39 cents), a level which is considerably higher than the postwar peak of real taxes; the tax share would only be 38 percent, however, which remains considerably below the postwar peak.

The second tool for regulation is limits on smoking in public places. Both states and localities have placed a variety of restrictions on smoking in sites such as workplaces, restaurants, public transportation, and a host of other sites. As of the end of 1997, all states except for Alabama had some form of such regulation, with 21 states banning smoking in private workplaces. There are a host of additional ordinances at the county and local level, and many workplaces and other sites have voluntarily become smoke-free as well. Jacobson and Wasserman (1997) provide an excellent overview of clean air regulations.

The third set of regulations on smoking involve restrictions on youth access to tobacco products. This was traditionally the purview of state governments, which passed a variety of restrictions on youth purchase of tobacco products; Gruber and Zinman (2000) provide a detailed discussion of such regulations. However, in July 1992, the Synar amendment was included in the federal Alcohol, Drug Abuse and Mental Health Administration Reorganization Act. This legislation required that all states have in place by fiscal year 1995 a law prohibiting any manufacturer, retailer, or distributor of tobacco from selling or distributing to individuals under 18. States were expected to enforce these laws by various methods including conducting random, unannounced inspections, and to develop a strategy and timetable for achieving an inspection failure rate of less than 20 percent.

Tort Actions and Settlements

There is a long history of suing the tobacco industry for causing harm to health, dating back to 1954. Before the mid-1990s, the tobacco industry had won

every legal case it faced, with the single exception of a \$400,000 judgement against the Liggett group that was overturned on appeal.⁶ But the tide began to turn in 1994, as the first class action lawsuit was filed against the industry in *Castano et al. v. The American Tobacco Company* (160 F.R.D. 544, 31 Fed. R. Serv. 3d 1306 (E.D. La. 1995), rev'd, 84 F.3d 734 [5th Cir. 1996]). Sixty-five law firms pooled their resources to file this case, which alleged that the tobacco industry had failed to warn adequately about the addictive properties of cigarettes. This suit was ruled too unwieldy by the Fifth Circuit Court of Appeals in 1996, perhaps reflecting the difficulty of pursuing these types of class actions across state lines given very different state regulatory guidelines (Bulow and Klemperer, 1998). But it set the stage for more state lawsuits to follow.

On March 23, 1994, the state of Mississippi filed a lawsuit against the industry to recover the costs to the state of treating smoking-related illness under its Medicaid program. This lawsuit posed two particular problems for the industry (Bulow and Klemperer, 1998). First, it relied on the argument that the industry was liable to the state for medical costs even if smokers knowingly contributed to their illness. Second, it was filed shortly after the passage of Florida's Medicaid Third-Party Liability Act of 1994 (and the consideration of similar legislation in other states), which allowed the state to sue a manufacturer of an allegedly harmful product for the medical expenses of a group, relying on statistical evidence instead of proving causation and damages in each case. This legislation may have ushered in an era of state legislative and judicial branches working hand in hand to pursue aggressive actions against manufacturers, beginning with the tobacco industry.⁷

In the wake of the Mississippi suit, most other states filed similar suits for Medicaid cost recovery against the industry. In addition, in early 1996, the largest "fringe" manufacturer, Liggett, broke ranks with the major industry participants to settle with five states, in the process providing a host of secret documents that detailed industry knowledge of the damages of smoking and marketing to youth that provided further ammunition for additional cases. The legal risks from state and private class action suits were an enormous drag on the market value of the industry; indeed, Bulow and Klemperer (1998) reported that the implicit market value of the domestic tobacco side of RJR Nabisco was roughly zero.

In the face of this enormous legal risk, the tobacco industry sat down early in 1997 with the Attorneys General of the states filing lawsuits and the lawyers behind the *Castano* class action suit to attempt to hammer out a comprehensive agreement to limit their legal liability. In April 1997, a proposed settlement was announced. The key components were that the industry would agree to pay \$368 billion over 25 years to the states, in return for: a) settling the state suits; b) immunity from future punitive damages as part of individual suits; and c) immunity from future

⁶ A full history of legal action against the industry can be found at (<http://www.tobacco.org>).

⁷ It is also worth noting that these state lawsuits did not directly relate the damages to the *net* cost of smoking to the state, along the lines of the externality measurements discussed below, but rather the *gross* costs of increased medical care to the state, not net of any savings through reduced pensions or even excise tax collections.

class action suits. In effect, this settlement was akin to the industry buying legal insurance. The price paid by the industry for this insurance was fairly modest, since a key component of the payments was a “volume adjustment” that would tie each company’s payment to its volume of cigarette sales, essentially converting the settlement into a tax (with the exception of a \$10 billion up-front payment), which could be passed forward to prices.⁸ Bulow and Klemperer (1998) calculate that, given the inelasticity of demand for cigarettes (discussed further below), the industry could pass this tax on to prices and suffer only a \$1 billion per year reduction in profits while transferring \$13 billion per year to the states. Thus, in essence, the states, the private attorneys, and the industry privately negotiated a tax increase in return for legal protections for the industry.⁹

While the Attorneys General did have the right to settle their state lawsuits, an act of Congress was required to grant the other legal immunities to the industry. In September 1997, the Clinton administration announced that it was not satisfied with the parameters of this tobacco deal and would not endorse legislation to implement it. The key concern was that the “insurance premium” was not large enough, as well as concerns about limited jurisdiction for the Food and Drug Administration over tobacco and other perceived weaknesses. This concern was highlighted by the fact that tobacco stocks jumped significantly on the day the deal was announced, and Wall Street analysts suggested that the enormous discount at which tobacco stocks were trading relative to comparable investments would disappear under this deal.

In spring 1998, the Clinton administration worked with Senator John McCain and others to develop a legislative alternative to the settlement of the Attorneys General. This alternative differed in a number of key ways from the original settlement. First, there was a much larger payment of \$516 billion over 25 years. Second, the Food and Drug Administration was given full regulatory authority over tobacco products, such as it had over other pharmaceuticals and medical drugs. Third, regulations on youth smoking were increased, including greater enforcement of youth access restrictions, and a very sizeable “youth lookback penalty” which imposed both industry-wide and company-specific payments based on progress towards meeting stated goals in reducing youth smoking. Finally, the legal protections provided against private lawsuits were more limited, although the state suits were settled in full. The industry immediately announced its opposition to this tougher deal, and this opposition increased as the legal protections were stripped out during congressional debate. Ultimately, the legislation died in June 1998.

The tobacco industry then went back to the negotiating table with the states, and hammered out a much more limited settlement in November 1998. Under this Master Settlement Agreement (MSA), the industry would make \$206 billion in volume-adjusted payments to the states over 25 years, or roughly 45 cents per

⁸ Indeed, this settlement actually explicitly *mandated* that the payments be passed forward to prices!

⁹ The impact on industry profitability computed by Bulow and Klemperer (1998) ignores the collusive aspects of price setting in this industry. As argued below, the settlement of state lawsuits by the industry may have actually *increased* profitability.

pack.¹⁰ The MSA also included some voluntary advertising restrictions, such as the removal of billboard advertisements for cigarettes and a ban on using cartoon characters in advertisements.

The individual state settlements, the Master Settlement Agreement, and the proposed McCain bill all shared some important limitations, which are nicely highlighted by Bulow and Klemperer (1998). First, these approaches provide contracts only with the major tobacco producers and leave other brands without obligation to make payments. This provides a substantial cost advantage for these other brands, conferring a windfall profit on them. These windfall profits are capped by a feature of the MSA—the “non-participating manufacturers adjustment”—that essentially mandates that states levy taxes on any sales of nonparticipating manufacturers that exceed 125 percent of their 1997 market share; if states didn’t pass such taxes, they risked losing most or all of their state payments (Cutler et al., 2000).

A second area of concern is the enormous payments going to lawyers from this settlement. Under the Master Settlement Agreement, lawyers representing the 46 settling states received \$1.25 billion initially and \$500 million per year thereafter. These enormous payments appear disproportionate to the actual work done by lawyers in many states, some of whom had not even filed cases before the MSA was signed. Jeremy Bulow estimated that the lawyers’ fees based on the actual damage payments would have been about one fortieth of the actual payments they are scheduled to receive (Nasar, 1998).

Both of these concerns represent important inequities arising from settlements; it is unambiguously true that a 45 cent per pack tax on cigarettes would have been better social policy, avoiding disparate treatment of producers and huge lawyer fees. But the legal settlement must be considered relative to the counterfactual. In the current political environment, particularly given current federal budget surpluses, the likely alternative to such a settlement was not a 45 cent per pack federal tax, but rather no federal action to raise the price of cigarettes. In this sense, the payments to lawyers and excess profits to small producers, while inequitable, can be viewed as the political economy costs that must be paid to impose cigarette taxes. If cigarette prices are too low (as will be argued below), then these inequities may be a reasonable cost to pay for the ultimate outcome achieved.

A third concern with settlements is that they may not actually reduce industry profitability. The price rise over 1997 and 1998 exceeded the amount required to pay the costs of state settlements by roughly 20–25 cents per pack (Black, 1998). A price increase this large, given the highly inelastic demand for cigarettes, would imply that tobacco industry profits actually rise, as the profit lost through declining sales is more than overcome by the excess profit earned on the remaining packs sold. This possibility raises a central tension in tobacco control policy: is the goal to punish the industry or to raise cigarette prices? If the former, then approaches such

¹⁰ This is in addition to settlements that were reached during 1998 with Mississippi, Florida, Texas and Minnesota. An interesting aspect of these individual state settlements, pointed out to me by Jeremy Bulow, is that they included volume adjustments that were based on *national* sales volume. Thus, in essence, each state’s settlement was imposing a national tax on cigarettes.

as settlements or excise taxes may not have the desired effect. But if it is the latter, this excess price increase is a positive outcome of the settlements.

Despite this settlement, however, the industry's legal woes are far from over. In 1997, Lorillard paid over \$1.5 million to the family of Morton Horowitz, the first time a U.S. cigarette maker had ever paid a smoking-related personal injury claim, and the industry paid out \$350 million in the Broin case to airline attendants who had illness claims related to secondhand smoke exposure. The tobacco industry has also lost several other high-profile cases in recent years, culminating in the Engle case in Florida in July 2000, in which a jury awarded a class of 500,000 smokers in Florida \$145 billion in damages against the industry. These payments are lump sum, not adjusted for future sales of cigarettes, which raises difficulties in passing the costs forward to prices. While all of these recent decisions remain subject to appeal, the past invulnerability of the industry to private lawsuits is clearly being penetrated.

Moreover, in September 1999, the U.S. Department of Justice filed suit against the industry to recover the costs to the federal government of smoking-related illness. According to the complaint, these costs to the Medicare, Veteran's Administration, and Federal Employees Health Benefit Program amount to more than \$20 billion per year. The complaint also seeks additional damages under a racketeering charge against the industry, due to its alleged conspiracy since the early 1950s to defraud the American public about the dangers of smoking.

Theory and Evidence on Tobacco Regulation

The Appropriate Shape of Tobacco Policy

There has been a long-standing interest in the economics community in modeling the consumption of addictive goods. Until the mid-1980s, most of this literature modeled addiction as habit formation, whereby past consumption of the addictive good increases taste for current consumption. In a pathbreaking article, Becker and Murphy (1988) explored the dynamic behavior of the consumption of addictive goods and pointed out that many phenomena previously thought to have been explainable only with shifting preferences due to habit formation were consistent with optimization according to stable preferences. In the Becker and Murphy model, individuals recognize the addictive nature of choices that they make, but may still make them because the gains from the activity exceed any costs through future addiction. In this "rational addiction" framework, individuals recognize the full price of addictive consumption goods: both the current monetary price, and the cost in terms of future addiction.

Rational addiction has subsequently become the standard approach to modeling consumption of goods such as cigarettes. This standard has been reinforced by a sizeable empirical literature, beginning with Chaloupka (1991) and Becker, Grossman and Murphy (1994), which has tested and generally supported the key empirical contention of the Becker and Murphy (1988) model: that consumption of addictive goods today will depend not only on past consumption but on future consumption as well. More specifically, this literature has generally assessed whether higher prices next

year lead to lower consumption today, as would be expected with forward-looking addicts. The consistent findings across a variety of papers that this is the case has led to the acceptance of this framework for modeling addiction.

The key normative implication of the Becker and Murphy (1988) model is that the optimal regulatory role for government related to smoking is solely a function of the interpersonal externalities induced by smoking. Since smoking, like all other consumption decisions, is governed by rational choice, the fact that smokers impose enormous costs on themselves is irrelevant; it is only the costs they impose on others that gives rise to a mandate for government action. This is in addition, of course, to the standard optimal commodity tax arguments for taxing cigarettes heavily because they are a fairly inelastically demanded good.

There is a large literature that is devoted to measuring the externalities associated with smoking; key contributors include Manning et al. (1989, 1991) and Viscusi (1995), and the literature is nicely reviewed in Chaloupka and Warner (2000) and Evans, Ringel and Stech (1999). The estimates of Manning et al. suggest that the net externalities associated with smoking are only about 16 cents per pack in 1986. This low-sounding estimate reflects the fact that the increased health costs imposed by smokers on others in group insurance and public programs are offset by their premature death, which reduces the costs of health insurance for the elderly under Medicare and of defined benefit pensions, most notably Social Security. The Congressional Research Service updated this analysis to 1995 and estimated externalities of 33 cents per pack, still well below the average level of state and federal excise taxation. Even this low figure is the subject of considerable controversy, as Viscusi (1995) claims that smoking actually generates net *positive* externalities for society.

However, these estimates may be too low for a number of reasons. The first is the health costs of secondhand smoke, arising through increased lung cancer and (even more importantly) cardiac disease risk through exposure to the smoking of others. The size of the health costs of secondhand smoke are quite ambiguous and controversial. While Viscusi (1995) claims that there is little credible evidence of significant costs associated with secondhand smoke, Chaloupka and Warner (2000) suggests that such costs may amount to as much as 70 cents per pack. A second issue involves the case of pregnant women. Smoking leads to an increased incidence of low birthweight babies, which imposes both short-run costs of medical care and long-run costs of special education. Evans, Ringel and Stech (1999) present a detailed calculation showing that these costs may amount to 42 to 72 cents per pack. Of course, both of these cases raise the difficult issue of what share of costs to the family from secondhand smoke (the predominant source of the damage from secondhand smoke) and to one's children from low birthweight should be considered internal and what share external.

A third potentially sizeable externality that remains outside this framework includes the loss in workplace productivity from smoking. Earlier calculations of the negative externalities of smoking include an increase in sick days, but not the lower productivity while working. This is only an externality to the extent that it is not reflected in wages; Levine, Gustafson and Valenchik (1997) do show that

smokers are paid much lower wages, but they do not compute whether this fully compensates for any productivity reduction.

Finally, a more modest but potentially nontrivial externality is the annoyance to nonsmokers from smoking; if each nonsmoker in the United States would value the cost of not dealing with smokers at \$10 per year, this externality would amount to more than 10 cents per pack of cigarettes sold.

But beyond the measurement of the negative externalities associated with smoking, there is a more fundamental issue, which is the applicability of the rational addiction model on which these government policy arguments are premised. As highlighted by Gruber and Koszegi (forthcoming) and Laux (2000), there are a number of reasons to question whether the assumptions of the rational addiction model apply to smoking decisions. In particular, Gruber and Koszegi argue that the decision to smoke is more fruitfully modeled in a framework which allows smokers to be time-inconsistent (Ainslee, 1992).

In experimental settings, consumers consistently reveal a lower discount rate when making decisions over time intervals further away than for ones closer to the present, raising the specter of intra-personal conflict over decisions that have implications for the future. There is, to date, little nonexperimental evidence for time-inconsistency in decision-making. But there is zero evidence, psychological or other, that supports time-consistent preferences. Time-inconsistency has been recently applied in the context of savings decisions (Laibson, 1996; Laibson, Repetto and Tobacman, 1998; O'Donoghue and Rabin, 1999b), retirement decisions (Diamond and Koszegi, 1998), and even economic growth (Barro, forthcoming). Since smoking is a short-term pleasure, and the psychological evidence indicates that time-inconsistency is most prevalent with short horizons, this formulation should be especially fruitful in the case of smoking.

One feature that distinguishes time-consistent agents from time-inconsistent agents is an inability to realize desired future levels of smoking.¹¹ In fact, unrealized intentions to quit at some future date are a common feature of stated smoker preferences. Eight of ten smokers in America express a desire to quit their habit (Burns, 1992). Among high school seniors who smoke, 56 percent say that they won't be smoking five years later, but only 31 percent of them have in fact quit five years hence. Moreover, among those who smoke more than one pack per day, the smoking rate five years later among those who stated that they *would not* be smoking (74 percent) is actually higher than the smoking rate among those who stated that they *would* be smoking (72 percent) (U.S. Department of Health and Human Services, 1994).

There is also indirect evidence from the manner in which people try to stop smoking that their preferences are time-inconsistent. A time-consistent smoker will

¹¹ There is an important distinction to be recognized between sophisticated time-inconsistent consumers, who recognize their time-inconsistency but are unable to overcome it and therefore demand self-control devices, and naive time-inconsistent consumers, who do not understand that they cannot make consistent plans through time. See O'Donoghue and Rabin (1999a) for a richer discussion of this distinction.

make a decision to smoke, or not to smoke, and then follow through. However, a time-inconsistent smoker wants to quit in the future but wants to smoke in the present. As an expression of this ambiguity, a time-inconsistent smoker may use “self-control devices,” which lower the attractiveness of the activity of smoking. These are to be distinguished from quitting aids, which are devices for smoking cessation: whereas quitting aids decrease the disutility from not smoking, self-control devices lower the utility from smoking. Time-consistent decisionmakers might use a quitting aid when they decide to move from smoking to nonsmoking, but in general they won’t use a self-control device—with time-consistency, either they want to smoke or they don’t, and lowering the utility of an undesired alternative is irrelevant for decision-making. But for some types of time-inconsistent agents, self-control devices are valued as a means of combating one’s own time-inconsistent tendencies.

In the relatively small medical literature on self-initiated attempts at reducing or quitting smoking, the voluntary use of self-control devices figures prominently. People regularly set up socially managed incentives to refrain from smoking by betting with others, telling others about the decision, and otherwise making it embarrassing to smoke (Prochaska et al., 1982). Various punishment and self-control strategies for quitting are also widely studied in controlled experiments on smoking cessation (Miller, 1978; Murray and Hobbs, 1981; Bernstein, 1970), and they are recommended by both academic publications (Grabowski and Hall, 1985) and self-help books.¹² In one study, for example, subjects tore up a dollar bill for every cigarette they smoked above their given daily limit, and reduced that limit gradually. Presumably, these experiments are incorporating self-control devices because they are seen as the best option for helping individuals quit smoking, as could be the case if individuals were time-inconsistent.

One might question the relevance of this argument; after all, as noted earlier, there is an empirical literature which presumes to test the rational addiction model by documenting forward-looking behavior by consumers. Gruber and Koszegi (forthcoming) accept that smokers are forward-looking; indeed, they develop even more convincing evidence than previous papers that this is the case.¹³ But, as they highlight, forward-looking behavior by smokers (as documented by their article and by others) *also arises in time-inconsistent models*, so that this evidence does not necessarily support the Becker and Murphy (1988) model and its normative implications. That is, this empirical literature tests one premise of the Becker and Murphy model, showing that smokers are not fully myopic, but not the second key

¹² See “You Can Quit Smoking,” Tobacco Information and Prevention Source, at (<http://www.cdc.gov/tobacco>).

¹³ In particular, Becker, Grossman and Murphy (1994), among others, rely on smokers knowing about unannounced price changes as much as one year in advance, assess the impact of these changes on sales and not consumption, and develop results which are very sensitive to the assumptions of their estimation strategy. In contrast, Gruber and Koszegi (forthcoming) study the reaction of monthly cigarette consumption to tax increases which are legislatively enacted but not yet effective, and find a much more robust reaction of current consumption to known future price increases.

premise, time-consistency. The evidence discussed above suggests that time-inconsistency may be a better assumption to adopt for modeling the smoking decision.

Moreover, if time-inconsistency is incorporated into a “rational addiction” model, then there is an optimal positive tax on cigarettes even in the absence of interpersonal externalities. In essence, government tax policy acts as the self-control device that time-inconsistent agents desire to help in controlling their habits, in addition to correcting any misperceptions among “naive” agents about the addictiveness and health impacts of smoking. In effect, cigarette taxes correct the “internalities” (the effects on one’s own health), as well as the externalities, of smoking.

This distinction is not an academic one. The *internal* costs of consuming a pack of cigarettes, due to the enormous mortality implications of smoking, is over \$30 on average (Gruber and Koszegi, forthcoming).¹⁴ If even a small part of those internal costs count, then it could suggest much higher optimal taxes on smoking. For example, Gruber and Koszegi consider a case with very modest time-inconsistency (much more modest than is suggested by the psychological literature), and with only death-related internalities from smoking (and no other disutility through reduced health), and conclude that the optimal tax is at least \$1 per pack more than is suggested by externalities alone.¹⁵

Gruber and Koszegi (forthcoming) present only one class of alternative to the Becker and Murphy formulation; Laux (2000) discusses other important potential failures of the rational addiction framework, particularly focused on problems with decision-making by youths who are becoming addicted to cigarettes. A critical goal for future work must be to assess empirically the magnitudes of these deviations from full rational addiction. But the important general point is that, when standard public finance analyses suggest that the appropriate tax on addictive bads is equal only to their external costs, those analyses are implicitly embracing a rational addiction model which makes a number of strong assumptions. Given the enormous magnitude of the internal costs to smoking, alternative models which consider the possibility of “internalities” must be considered seriously in designing regulatory policy towards addictive goods.

¹⁴ This estimate is derived by using estimates from Viscusi (1992) on typical value of a life-year, and from Manning et al. (1991) on the minutes of life lost per cigarette smoked; this is clearly an average, and not a marginal, calculation. Larry Summers and Brad De Long independently noted to me that if the true cost of a pack of cigarettes were really on the order of \$32, then a price elasticity of -0.4 calculated on the basis of a \$2 price is really an implausibly low price elasticity of -0.025 on the basis of the true price. This either suggests that the marginal calculation differs substantially from the average, or that the proposition that smoking is fully rational is clearly wrong.

¹⁵ This is a suggestive calculation but there are a number of important issues that remain to be addressed. Foremost among them is the right shape of the social welfare function when preferences are time-inconsistent. As Gruber and Koszegi (forthcoming) discuss, their results are fairly insensitive to the use of either an exponentially discounted (paternalistic) social welfare function or one which arises from aggregating the preferences of sophisticated hyperbolic consumers, who value higher taxes as a self-control device. But this issue gets very difficult, for example, when modeling naive hyperbolic discounters who don’t appropriately forecast their own preferences.

Behavioral Reactions to Policy Changes

There is an enormous literature which investigates the responsiveness of aggregate cigarette consumption to prices, employing the substantial variation across states and over time that arises from differential state excise taxation, which is nicely reviewed in Chaloupka and Warner (2000). This literature generally concludes that the elasticity of total smoking with respect to price is roughly -0.45 . Evidence from micro data on smoking decisions yields similar results (Evans, Ringel and Stech, 1999).

There is also a sizeable literature which estimates the responsiveness of youth smoking to prices. Gruber and Zinman (2000) review this literature, which has produced somewhat mixed results. They present estimates which suggest that high school seniors are very sensitive to the price of cigarettes, with an elasticity of participation in smoking of -0.66 . Younger smokers (8th-11th graders) are not very price-sensitive, however, perhaps reflecting the fact that smoking at those ages is more experimental or plays more of a peer acceptance role. The decline in youth smoking in recent years, in the face of rapidly rising prices, is consistent with significant price elasticity in youth smoking decisions.

There is less evidence on the impacts of other regulatory interventions. Chaloupka and Warner (2000) review the evidence on the impact of clean air regulations and conclude that these regulations significantly deter smoking. In particular, a study of the direct impact of workplace smoking bans on smoking rates found that such bans reduced smoking rates by 5 percent and average cigarette consumption by 10 percent (Evans, Farrell and Montgomery, 1999).

There is also a small literature which has studied the impact of youth access regulations on smoking. Chaloupka and Grossman (1996), DeCicca et al. (1998), and Gruber and Zinman (2000) find little impact of access restrictions on youth smoking, although Gruber and Zinman do find some evidence that these restrictions lower the quantity of cigarettes smoked by younger smokers. But Chaloupka and Pacula (1998) focus on youth access restriction enforcement, and find some evidence that more tightly enforced youth access restrictions lowers youth smoking. Two interesting case studies of communities that implemented tough youth access restrictions found mixed results: Jason et al. (1991) find substantial (50 percent) declines in youth smoking in Woodridge, Illinois, while Rigotti et al. (1997) find very limited impacts on sales to youth and youth smoking in several Massachusetts communities.

A key feature of the 1998 settlement with the states is a reduction in industry advertising outlets and an enormous increase in the funding of anti-smoking counteradvertising. Chaloupka and Warner (2000) report that there is little consensus on the effect of advertising on cigarette consumption. Moreover, as Cutler et al. (2000) highlight, the forms of advertising restricted by the settlement represented less than 10 percent of total advertising expenditures, and tobacco advertising is very fluid across categories.

Although the advertising restrictions may have little effect but to alter its form, there is reason to believe that counteradvertising may be effective in lowering smoking rates. There was a strong decline in smoking in the United States during

the period of the Fairness Doctrine, which was in place from 1967 until 1971 and mandated counteradvertising in proportion to direct cigarette advertising on television. Indeed, some have claimed that the net impact of banning television advertising of cigarettes was to raise consumption by also banning the counteradvertising (Chaloupka and Warner, 2000). California's substantial counteradvertising initiative of the late 1980s also appears to have caused a significant reduction in smoking (Hu et al., 1994, 1995). Thus, the more than 200 percent increase in counteradvertising spending from the Master Settlement Agreement may have a real impact on smoking rates.

It is also important to note that smoking has become very socioeconomically concentrated. In 1994, the smoking rates of the lowest income quartile are almost twice those of the highest quartile; this is a marked change from 20 years earlier, when smoking rates were quite similar across quartiles (Evans, Ringel and Stech, 1999). Expenditures on tobacco products as a share of family income fell from 4 percent in the bottom income quintile to only 0.5 percent in the top income quintile (Congressional Budget Office, 1990). This pattern raises a concern that increased cigarette taxes will be excessively burdensome on those with the lowest incomes.

However, the seeming inequity is smaller than it appears—and it is offset by correspondingly larger benefits. The lifetime burden of excise taxes is typically much smoother than the annual incidence, since income levels vary more over a lifetime than smoking levels (Poterba, 1989). Indeed, as a share of lifetime consumption expenditures (the appropriate proxy for lifetime income in the life cycle model), the tobacco share difference across income groups was much smaller, falling from 1.6 percent for the bottom quintile to 0.7 percent for the top quintile (CBO, 1990). Moreover, if one takes into account benefits to family members from avoiding secondhand smoke, or benefits to one's own health (on the grounds that alternatives to the rational addiction model are correct), then the corrective health benefit of cigarette taxation will also tend to be more concentrated at the bottom of the income distribution. Indeed, Evans et al. (1999) and Farrelly et al. (1998) find that the responsiveness of lower income groups to price is much higher than for higher income groups. Given this, a tax increase would lower smoking more at the lower end of the income distribution, which would skew the corrective benefits even further towards lower income groups.

A final critical issue for thinking about policies towards youth smoking in particular is the intertemporal correlation of smoking decisions: to what extent do changes in youth smoking affect levels of adult smoking? Despite the fact that most smokers start as youth, the answer here is not obvious, since much of the simple correlation between teen and adult smoking may reflect unobserved heterogeneity rather than a causal role for starting as a youth. Thus, it is possible that reductions in youth smoking only cause those predisposed to smoking for other reasons to wait until their adult years to begin smoking, when higher incomes are available to finance cigarette purchases. To estimate the long run impact of price increases or other policies targeted at youth smoking, one must measure the true underlying causal effect of youth smoking on smoking later in life.

Gruber and Zinman (2000) and Gruber (2001) present two pieces of evidence to suggest that there is a sizeable intertemporal correlation. First, there is a very strong correlation of 0.5 across cohorts—as opposed to individuals—in the smoking rate as youths and as young adults, even when conditioning on time trends and trends in smoking among older cohorts. Second, and more convincingly, persons who faced higher cigarette taxes as youths are less likely to smoke as adults, even conditioning on the contemporaneous tax rate. These estimates condition as well on state fixed effects for both state of residence and state of birth, to control for underlying social tastes for smoking in both sites. As Gruber (2001) notes, if one half of the rise in youth smoking in the 1990s persists into adulthood, it will result in 3.2 million years of life lost for this cohort.

Where To From Here?

The federal government now faces a menu of choices with respect to the tobacco industry. At one extreme, it can sit back and let the lawsuits proceed—both private lawsuits and those of the U.S. Department of Justice. The disadvantage of this approach is that the tort mechanism is a very haphazard and inefficient mechanism for reducing tobacco use in the United States, with enormous dead-weight loss through both legal processing costs and fees paid to lawyers.

Moreover, it is quite difficult to predict how the industry will react to enormous damages or settlements. On the one hand, they may collude to pass these costs on to prices. If cigarette taxes are currently too low, then further increases in prices may enhance social welfare; but these increases may go beyond the optimal level. On the other hand, the industry may find itself unable to pass these cost increases on in the form of prices, either because of collusion difficulties, or because of fringe companies that are granted an enormous cost advantage by assessments only on the major industry players. It is even possible that some firms will go bankrupt, and that their brands will pass to new entities who do not face the same legal risk. This could undercut the very goals of anti-smoking advocates, as these new entities would not be subject to penalties and thus could set low prices for their products.

At the other extreme, the government can intervene, providing the industry with the kind of legislative shield against legal risk that it sought through the proposed 1997 Attorneys General settlement, perhaps in return for some level of payment and tighter regulation of tobacco products. But providing a legal shield for the industry is a risky strategy as well. There is enormous uncertainty about the “optimal” cigarette price that would capture accurately at least the externalities—and perhaps also some of the internalities—of smoking. In addition, the federal government does not have an enviable track record for regulating this industry, and once the lobbying begins, there is some risk that the insurance would be sold too “cheaply.” A tradeoff that involves settlement of current lawsuits but no new lawsuits would also cause enormous perceived inequities for those smokers who have not yet brought smoking-related claims. This could set a disturbing precedent, if future

corporations see a possibility of avoiding tort liability by signing government agreements.

Whatever route the government chooses, it appears that the United States is headed toward a future of much higher cigarette prices, which in turn will lead to reductions in consumption. There are two steps that can ease the transition path to this new world. The first step is to increase public funding for smoking cessation, such as subsidized or free provision of quitting aids. An enormous body of evidence suggests that such policies provide a cost-effective means of lowering smoking rates (U.S. Department of Health and Human Services, 1990). Any revenues garnered from the U.S. Department of Justice suit, for example, could be used to subsidize cessation interventions for existing smokers.

The second step is to increase efforts to limit youth smoking. Increases in the price of cigarettes are probably the most effective way to limit youth smoking. But there is also evidence that coordinated access restrictions across all forms of sale—enforcing age limits in stores, banning cigarette vending machines in public places, and so on—can significantly lower youth smoking (Jason et al., 1991). These effects would be magnified if a uniform national access policy were pursued. Since the tobacco industry itself likely has information on how to best manipulate youth use of its product, the government as part of any settlement (or legislation) could include financial incentives for the industry to reduce youth smoking, along the lines of the “lookback” penalties proposed in the McCain bill.¹⁶

Finally, the fact that youths appear to think that they will not be addicted to smoking suggests that standard information campaigns which emphasize the long-term costs of smoking are not likely to be effective. Rather, the government should highlight the short-run implications of smoking in terms of reduced physical performance, appearance, and other costs directly salient to youths. Specific penalties for youths, such as loss of driver’s license if caught purchasing cigarettes when underage, would bring the costs into the time frame on which these youths appear to be focused.

Eventually, a mutually acceptable deal between government regulators and tobacco companies might emerge around some mix of settlement payments and limited protection from lawsuits. For example, the government could mandate a cap on punitive damages which would provide some protection without altogether eliminating the possibility of future lawsuits that smokers might bring. In return, the government could receive settlement payments and perhaps the right for the Food and Drug Administration to regulate tobacco products; these settlement payments could be used to finance cessation and youth smoking interventions. But any such compromise solution would best be approached through an expert

¹⁶ An interesting tradeoff with such policies is whether the incentives should apply to the industry as a whole or to specific companies (Bulow and Klemperer, 1999). On the one hand, there are likely to be industry-wide components to efforts to raise or lower youth smoking, and gathering brand-specific information on smoking rates may be difficult. On the other hand, if individual companies are not targeted, then there may be free rider problems in getting any individual company to take actions to reduce their targeting of youth smoking.

nonpartisan or bipartisan commission that could debate the issues at arms-length from the political pressures that beset Congress when it attempts to discuss this issue.

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