

The Tobacco Deal

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Abstract

We analyse the major economic issues raised by the 1997 Tobacco Resolution and the ensuing proposed legislation that were intended to settle tobacco litigation in the United States. By settling litigation largely in return for tax increases, the Resolution was a superb example of a "win-win" deal. The taxes would cost the companies about \$1 billion per year, but yield the government about \$13 billion per year, and allow the lawyers to claim fees based on hundreds of billions in "damages". Only consumers, in whose name many of the lawsuits were filed, lost out.

Though the strategy seems brilliant for the parties involved, the execution was less intelligent. We show that alternative taxes would be considerably superior to those proposed, and explain problems with the damage payments required from the firms, and the legal protections offered to them.

We argue that the legislation was not particularly focused on youth smoking, despite the rhetoric. However, contrary to conventional wisdom, youth smokers are not especially valuable to the companies, so marketing restrictions are a sensible part of any deal.

The individual state settlements, if allowed to stand, open up unprecedented opportunities for collusion throughout the economy. The fees proposed for the lawyers (around \$15 billion) and the equally remarkable proposed payoff for Liggett (perhaps \$400 million annually, for a company with a prior market value of about \$100 million) also set terrible examples.

We conclude with some views about how public policy might do better.

The Tobacco Deal

Q. Could you please explain the recent historic tobacco settlement?

A. Sure. Basically, the tobacco industry has admitted that it is killing people by the millions, and has agreed that from now on it will do this under the strict supervision of the federal government. –Dave Barry¹

On June 20, 1997 the largest cigarette companies, most state attorneys general, and trial lawyers agreed a comprehensive settlement of tobacco litigation: the Tobacco Resolution. By settling litigation largely in return for tax increases, the Resolution was a superb example of a “win-win” deal. Agreeing to a tax increase that would cost the companies about \$1 billion per year in lost profits and yield the government about \$13 billion per year in revenues² made everybody happy. The companies settled lawsuits cheaply, smoking would decline because of the price rise, state governments raised taxes under the name of “settlement payments”, and the lawyers were able to argue for contingency fees calculated based on tax collections instead of the much smaller cost to companies. Only consumers, in whose name class action suits were filed, lost out.

In effect the Resolution facilitated collusion among the companies to raise prices. (That the proceeds were used to buy off the states and lawyers is irrelevant to this point.) The only problems were that the anti-trust authorities might challenge the Resolution’s collusive pricing and the related entry deterrence provisions needed to maintain high prices.³ Therefore these terms of the deal and others, especially the protections against future litigation, required congressional legislation. The Senate Commerce Committee passed the McCain Bill⁴ which was based on the Resolution. But the Bill evolved into anti-tobacco legislation after lobbying by the anti-smoking community, which had declined to participate in the settlement negotiations. The companies fought back with television ads, denouncing the Bill as a huge tax increase, and it was killed on June 17, 1998.

This paper analyses the major economic issues raised by the Resolution and Bill. We do not debate whether it is good social policy to dramatically increase cigarette taxes⁵, or whether giving companies protection from class action suits is a good idea. Instead, we

¹ “Tobacco Road’s Toll; Except for lawyers, it’ll go up in smoke”, by Dave Barry, Knight-Ridder Newspapers. The Fort Worth Star-Telegram, August 10, 1997.

² See The Tobacco Resolution section.

³ The FTC did object strongly to a provision in the Resolution that would have given the deal anti-trust immunity. See “Competition and the Financial Impact of the Proposed Tobacco Industry Settlement”, Federal Trade Commission, September 22, 1997. Report Prepared By The Staff of The Federal Trade Commission at the Request of The Congressional Task Force on Tobacco and Health. Hereafter FTC. Can be found at <http://www.ftc.gov/reports/tobacco/ndoc95.pdf>.

⁴ The "National Tobacco Policy and Youth Smoking Reduction Act".

⁵ See, for example, Gravelle and Zimmerman (1994), which concluded that 33 cents a pack was both the best and median estimate of studies that have estimated the externalities involved in smoking --- an amount considerably below current excise taxes. Also, see W. Kip Viscusi (1994) which contends that although tar and nicotine yields were about 25 percent of what they were 50 years earlier, most mortality calculations were based on epidemiological studies going back to the 50s and 60s, and on smokers who spent years puffing cigarettes much more toxic than those that are now on the market. Viscusi concluded that smokers actually saved society money by dying younger, and were a breakeven proposition if claims about the effects of second

assume certain objectives for the major players, and ask how a better deal could be achieved for all parties, without taking sides on the major normative issues.

We assume the companies focus primarily on shareholder value, public health officials aim to reduce the health consequences of smoking, and the government wants to pass a politically popular bill that raises tax revenues subject to a constraint on the cost to the firms. Aiming for political popularity means a special emphasis on reducing (or seeming to reduce) youth smoking. The trial lawyers want to maximize their take.

The paper begins with some background on the economics of the industry in 1997, followed by a brief description of the legal environment. In this context we then discuss the economic issues.

We first discuss the kinds of taxes imposed by the Bill and argue that quite different kinds would have served all parties' purposes better. The Bill's unusual "fixed-revenue" taxes yield lower prices, and raise less tax revenue, at a *higher* cost to the firms than ordinary specific taxes would yield. Ad valorem taxes would probably have been an even better choice, especially to combat youth smoking. And public health advocates, at least, should prefer to tax tar and nicotine rather than the volume of cigarettes.

We next address the proposed damage payments and legal protections. The distribution of damage payments demonstrates clearly that the settlement reflects a negotiation based on companies' differing abilities to pay rather than a punishment based on their relative responsibilities for tobacco-related problems. We also focus on the perverse incentive effects of the proposed legal protections, which would have produced a further bonanza for lawyers.

We challenge the proposition that the Bill was primarily focused on youth smoking. Many widely proposed youth smoking measures were never adopted, or were even relaxed during the amendment process. While a focus on overall smoking rather than youth smoking makes sense from a public health standpoint, it is inconsistent with the language of the Bill and the surrounding rhetoric.

We also challenge the conventional wisdom on the importance of youth smoking to the companies. Certainly companies compete aggressively to win new smokers, because smokers tend to be very brand-loyal. But this very competition increases costs and holds down prices, so the present value of profits from new smokers is very small. Therefore the marketing restrictions included in both the Resolution and the Bill would have reduced youth smoking at very little cost to the companies' shareholders.

We consider the fees proposed for the lawyers (Texas's lawyers alone have claimed \$2 billion) and the equally remarkable Liggett exemption that would have produced over \$400 million a year in pre-tax profits for a company with a pre-settlement market value of about \$100 million. While Liggett's turning "state's evidence" may have been a turning point in the battle against Big Tobacco, we question the bases on which these rewards were calculated.

hand smoke were taken at face value. The opposite point of view is represented by Hanson and Logue (1998). These authors contend that smokers do not rationally assess the damage that cigarettes cause to themselves, and to force smokers to make correct calculations about smoking a tax of \$7 or more per pack should be imposed.

We next discuss the individual state settlements that were modeled on the national Resolution, but were the only deals left after the failure of the national legislation. These deals set very dangerous precedents, as collusive agreements that effectively impose federal excise taxes for the exclusive benefit of one plaintiff.

After offering some radical solutions, we conclude with some views about how a better deal for all parties might be negotiated.

The Tobacco Industry in the United States

The tobacco industry in 1997 was a tight oligopoly dominated by four highly profitable firms controlling 98.6 percent of the market.⁶ Entry on a major scale was severely hindered by advertising restrictions⁷ and by the prospect of an entrant becoming embroiled in the industry's legal woes. A further deterrent to entry was the declining size of the market and the strong brand loyalty of most customers.⁸ There are also some economies of scale, but these are not too large at the scales of the major firms: Philip Morris, which has half the market, has average costs that are just 5 cents per pack lower than fourth-ranked Lorillard, which has less than 10 percent. Given the enormous profitability of the major companies⁹ scale economies cannot be the primary barrier to large-scale entry.¹⁰ Table 1 briefly summarizes the size and profitability of the five leading firms.

INSERT TABLE 1 HERE

The market was divided into premium, discount, and deep discount cigarettes. Table 2 shows the companies' different positions in these segments, and Table 3 shows the implications for their profitabilities: while average costs of manufacturing between premium and discount cigarettes vary by only a few cents,¹¹ wholesale prices for premiums are 16½ cents a pack higher than for discounts and 32 cents a pack higher than for deep-discounts. These price differentials mean that most of the market's profits are earned on the premium brands. This explains why Lorillard, with a market share below one tenth, is almost as profitable as Philip Morris, which has half the market, while RJR and Brown and Williamson, with intermediate market shares, lag behind in profitability. Liggett's much poorer profitability seems due both to its much weaker position in the more attractive market segments, and to its higher costs.¹²

⁶ The rest of the market was composed of a fifth firm, Liggett, with a 1.3 percent share, and over 100 fringe firms that in aggregate have perhaps 0.1 percent of the market. See FTC, *op. cit.*, page 1.

⁷ TV and radio advertising of tobacco was banned in the U.S. from 1971.

⁸ Strong brand loyalty is suggested by the fact that only about 10% of smokers switch brands in any year. See Report of the Surgeon General (1989), p.503. Similarly "Only about 10 percent of [cigarette smokers] switched annually, and then often to brands of the same manufacturer." See Kluger (1996), p.632. But note that prices of brands within a category are very similar which does not encourage switching, that perhaps 70 percent of smokers have a second-choice brand, and that about 25 percent regularly buy more than one brand each month. See Sullum (1998), p. 102. We will discuss the role of brand loyalty in more detail below.

⁹ See Table 3.

¹⁰ However, economies of scale, including in distribution, may be more important in hindering smaller-scale entry.

¹¹ For example, Liggett's average costs for its discount cigarettes can be computed as about 2 cents a pack less than its costs for its premium cigarettes. (Source: Brooke Group 10k report.)

¹² One contributing factor to these higher costs is that Liggett's CEO pays himself about 25 percent more than the CEO of Philip Morris, even though Philip Morris's market value and profitability are over 500 times as great as Liggett's. His pay comes to considerably over a penny a pack. (See 10k reports.)

INSERT TABLE 2 HERE

INSERT TABLE 3 HERE

Because different firms have different presences in the premium and discount segments, they have a conflict of interest on pricing. Table 4 presents an abbreviated history of price changes since 1990, and shows a striking change in the relative prices of the three market sectors in 1992-1993. In April 1992 premium cigarettes sold for \$1.10 a pack at wholesale, discounts at \$.97 and deep discounts at \$.36. The discount segments grew to 36 percent of the market. Philip Morris and RJR aggressively pursued share and took 60 percent of the business in those segments. They then began attempting to increase prices. When adequate cooperation from Brown & Williamson and Liggett was not forthcoming, Philip Morris announced a 40 cent a pack cut in the price of Marlboros on April 2, 1993, dubbed "Marlboro Friday". After Marlboro Friday premium cigarettes sold for \$.84, discounts for \$.83, and deep discounts for \$.57. By March 1998, before a series of price rises to offset the effect of state settlements, prices had risen to \$1.00 for premiums, remained at \$.83 for discounts, and had risen to \$.68 for deep discounts. Predictably, the combined share of the discount and deep discount market has fallen steadily since 1993 to about 27 percent; the deep discount segment in particular has collapsed to about 4 percent¹³.

INSERT TABLE 4 HERE

Although the industry is highly profitable, it is clear that full cooperation among the players would lead to much higher prices still: the demand elasticity is widely estimated to be around -.4.¹⁴

Sales are declining over time. Consumption has fallen by about 25 percent since 1981, from 640 billion cigarettes per annum to 480 billion. This decline has come about because of a decline in the number of smokers of approximately 10 percent from the peak, as well as a decrease in the number of cigarettes consumed per smoker. As a result, per capita adult consumption, which peaked at 4345 in 1963, fell to 2423 by 1997. (See Table 5.)

INSERT TABLE 5 HERE

Manufacturers sell their cigarettes to thousands of jobbers, who then resell to retailers. Retail sales are divided primarily among convenience stores (47%), supermarkets (17%), and Cigarette Only stores (13%). The remaining 23% is split among "the vending industry,

¹³ Figures in this paragraph: Prices from Table 4. Market share numbers from "Cigarette Burn: Price Cut on Marlboro Upsets Rosy Notions About Tobacco Profits" by Eben Shapiro, Wall Street Journal, April 5, 1993, p.A1, and Philip Morris 1997 10k report. Current size of the deep discount market is from Table 4.

¹⁴ Traditional estimates have been in the range of -.3 to -.5. (National Cancer Institute, National Institutes of Health, The Impact of Cigarette Excise Taxes on Smoking Among Children and Adults; Summary Report of a National Cancer Institute Expert Panel (1993)). The FTC in its analysis used -.4. Martin Feldman of Salomon Smith Barney stated that his point estimate was -.47, though he used -.36 in some of his calculations. (Statement of Martin Feldman before the Senate Commerce Committee, March 19, 1998. Available at <http://www.tobaccoresolution.com/ctrans/feld03.htm>.) Townsend (1993) cites some higher estimates. The tobacco industry cited a recent study by Becker and Murphy (1994) which estimates a short run elasticity of -.45 and a long run elasticity of -.75. However, the FTC cites studies using a similar approach which indicate less elasticity. (See e.g. Chaloupka (1991) which estimates -.27 to -.37.)

restaurants, mass merchandisers, warehouse clubs, Indian reservations and traditional gasoline service stations.”¹⁵ One implication is that convenience store owners are a force opposing cigarette tax hikes and rules that would restrict where cigarettes can be sold.

A rough breakdown of the cost of the average pack of cigarettes at retail is given in Table 6.

INSERT TABLE 6 HERE

Of the manufacturing costs, 8-9 cents are for leaf and 3-4 cents are for packaging, while fixed manufacturing costs represent only about 2 cents.¹⁶ While some administrative and marketing expenses are subject to economies of scale it is clear that the barriers to entry are not on the production side. Therefore the industry will be vulnerable to entry in the generic segment if new entrants are given a substantial cost advantage over incumbents, as the outcome of litigation or legislation.

The final major firm involved in tobacco litigation in the United States is UST, which sells smokeless tobacco. This business is, if anything, even more profitable than cigarettes. UST's gross tobacco revenues in 1996 were \$1.2 billion and its operating margin was approximately 64 percent.¹⁷

Litigation

TYPES AND NUMBER OF CASES

The three major categories of domestic tobacco litigation are (i) individual personal injury cases; (ii) class action personal injury; and (iii) health care cost recovery, mostly brought by governments and unions. Litigation has mushroomed in all three categories. For example, the number of cases that Philip Morris is defending in the three categories has risen from 185, 20, and 25 in the three categories on December 31, 1996 to 375, 50, and 105 at the end of 1997. Seventeen of the individual cases and six of the class actions involve environmentally transmitted smoke (ETS or “second hand smoke”).¹⁸ RJR was defending 540 cases on March 3, 1998 versus 54 at the end of 1994.¹⁹

The current flood of lawsuits is called the “third wave” of tobacco litigation. Starting in the 1950s the companies faced a first wave of litigation, based on negligence claims. The second wave, starting about 20 years later, again involved individual lawsuits against the companies. These lawsuits were played out as in the Kreps-Wilson-Milgrom-Roberts²⁰ model of entry deterrence --- cases arrived sequentially, most smokers never brought suit, and those who did

¹⁵ Source: National Association of Convenience Stores web site, <http://www.cstorecentral.com/register/resource/resource/tobupdate981.htm>. “Tobacco Update: Facts to Consider”. March 9, 1998.

¹⁶ See Morgan Stanley, Dean Witter March 3, 1998 report on Philip Morris by David Adelman, page 11 Table 5. INVESTEXT REPORT NUMBER 2651147.

¹⁷ UST 10k reports to S.E.C.

¹⁸ Source: Philip Morris 10k report for 1997. The company also faced three class actions overseas, in Canada, Brazil, and Nigeria.

¹⁹ Source: RJR 10k, 1997.

²⁰ See Kreps and Wilson (1982) and Milgrom and Roberts (1982).

faced companies that would never settle and would pay millions to fight (and win) each case, staunching the flow of future suits.

Obviously a large contributory factor to the third wave is that the tobacco companies (and smokers in general) have become so despised. But several other factors have tipped the balance against the companies, and made suing them far more attractive:

A paralegal named Merrell Williams stole over 4,000 pages of sensitive documents from Brown & Williamson,²¹ and traded them to Richard Scruggs, the brother in law of Trent Lott (the Senator for Mississippi and U.S. Senate Majority Leader), for a job and some gifts including the funds to purchase a \$109,600 house for cash.²² Because the documents were stolen, Scruggs could not introduce them directly into a case, but they were copied and distributed widely and anonymously, and University of California professor Stanton Glantz posted the documents on the web on July 1, 1995.²³ These documents, which indicated that the tobacco companies had hidden information about the health effects of smoking, helped plaintiffs erode the defense that health warnings have been posted on cigarette packages since 1965. They helped win an individual case in Florida (*Carter v. American Tobacco Company*²⁴ et. al.) in August, 1996, and have probably led to the discovery of many documents since.²⁵

The recent certification of class actions has greatly increased the potential payoff to plaintiffs' lawyers from filing suits. The first such case was *Castano, et. al. v. The American Tobacco Company, et. al.* in which 65 leading law firms partnered in filing a class action suit in March 1994, charging that the companies had failed to adequately warn about the addictive properties of cigarettes.²⁶ Although this suit was thrown out as unwieldy by the Fifth Circuit court of appeals in May 1996²⁷ (after having been approved by a federal district judge), by then the trial lawyers were ready to file individual state class actions.

It became common, starting with *Castano*, to argue that while cigarette packages contained health warnings there were no adequate warnings of addiction. The state health-care recovery suits were another innovation that circumvented the problem that smokers knowingly contributed to their illnesses.

Stacking the deck further was the passage of new legislation such as Florida's Medicaid Third-Party Liability Act of 1994. This legislation, reportedly conceived by the Inner Circle, "an exclusive group of 100 personal-injury lawyers"²⁸, allowed the state to sue the 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. The statute barred the assumption-of-risk argument, imposed joint and several liability, and allowed the courts to order damages on the basis of market share regardless of the brands used by Medicaid

²¹ See Mollenkamp et al. (1998), p.12.

²² Ibid. p. 47.

²³ Ibid, p. 48.

²⁴ The American Tobacco Company is now part of Brown and Williamson.

²⁵ The Carter verdict was overturned in the spring of 1998.

²⁶ The firms each agreed to contribute \$100,000 per year to fund the litigation.

²⁷ It would have been difficult to consolidate cases from different states with different fraud and negligence laws, as well as different evidentiary laws.

²⁸ Junda Woo, "Tobacco Firms Face Greater Health Liability", Wall Street Journal, May 3, 1994, p. A3, as cited in Sullum (1998), p.210.

patients. The legislation was made retroactive,²⁹ and several other states are in the process of enacting similar legislation.

Market Valuation of Litigation Risk

The companies now face a tremendous amount of risk: Except for BAT (the owner of Brown and Williamson), which is not a U.S. firm and has most of its assets outside the U.S., there is some prospect that firms will ultimately be bankrupted if the lawsuit barrage is left unabated.

The stock market appears to value the present value of future domestic tobacco profits at roughly the present value of settling present and future domestic litigation.

The market value of RJR illustrates this: RJR has non-Nabisco long-term debt of \$5.17 billion, \$.52 billion of preferred stock outstanding, and a common stock value (at \$25 per share on July 14, 1998) of \$8.20 billion. This sums to an enterprise value of \$13.89 billion. Against this, RJR owned 213,250,000 shares of Nabisco worth \$8.17 billion. This leaves a residual value for the combined domestic and foreign tobacco businesses of \$5.72 billion. The foreign business earned \$670 million pre-tax in 1997. According to Gary Black of Sanford C. Bernstein, perhaps the leading industry analyst, RJR's foreign business could be sold for approximately 8.5 times pre-tax earnings, implying a value of \$5.70 billion.³⁰ Therefore the net value of the domestic business cum legal liabilities is approximately zero.^{31,32}

Liggett Turns State's Evidence

²⁹ See Larry Rohter, "Florida Prepares New Basis to Sue Tobacco Industry", New York Times, May 27, 1994.

³⁰ Telephone conversation, June 4, 1998. The calculation was based on the market valuation of comparable European manufacturers such as Gallagher and Imperial.

³¹ Similarly, in explaining RJR Nabisco's eagerness for a settlement, CEO Steven Goldstone stated, "I do not have to tell you that the continuing controversy surrounding our domestic business has caused investors to give that business no value—and I mean zero value when you add up all the components of RJR Nabisco stock. When you realize that today that business earns \$1.4 billion operating earnings a year and it has no value from the stock market, there clearly is some up side." Remarks at an October 27, 1997 conference sponsored by the Investor Responsibility Research Center, to be found at www.irrc.org/profile/tis/conf97/goldston.htm.

³² The market's valuation of potential litigation losses has created an incentive for firms to spin off their domestic tobacco assets from the rest of their businesses, as a way of shielding other assets from litigation. BAT did recently announce a spin off of its tobacco operations from its financial operations, and its stock rose by about 25 percent in one month. "B.A.T.'s ability to move forward with the spinoff is the envy of its American counterparts, which relish the chance to break up their own conglomerates in an effort to raise shareholder value. Tobacco litigation stands in the way of these moves by U.S. companies. Plaintiffs, who want to prevent the companies from taking any action that may diminish their ability to pay future claims, are prepared to charge them with fraudulent conveyance of assets if they try to break apart." See Investors' Tobacco Reporter, Vol. 2, No. 3, July 1998, published by the Investor Responsibility Research Center and available at http://www.irrc.org/profile/tis/itr_iss6/page3.htm. A spinoff would not guarantee a company legal immunity. For example, Fortune Brands, the parent of the American Tobacco Company from 1904 to 1994, is a party to 97 lawsuits. (BAT, which purchased American, is contractually obligated to reimburse Fortune for all related legal expenses and damage payments; see Fortune Brands 10k report.) Of course, in this case Fortune spun off its tobacco businesses. Non-tobacco assets might be a little more protected from litigation if, say, RJR Nabisco spins off Nabisco than if it spins off R.J. Reynolds.

A turning point in the legal war came in early 1996 when Liggett broke ranks with its rivals and settled with 5 states³³. Liggett's position was much different than its rivals' because it had a market share of less than 2% and was teetering on the edge of bankruptcy. It was therefore able to negotiate a light deal³⁴ in return for handing over secret industry documents that would be damaging to the other companies. It also agreed to admit the dangers of smoking and conceded that the industry was liable for damages. Settling early, and in effect turning state's evidence, also offered the possibility of a much larger reward for assisting in the other companies' defeat; just how large this potential payoff was, we will discuss below.³⁵

Settlements

The low stock market values of the companies and the increasingly hostile legal environment, combined with new leadership at Philip Morris and RJR, pushed the four large companies to the bargaining table. They negotiated simultaneously with two groups of plaintiffs, the state attorneys general who had filed Medicaid suits³⁶, and the class action lawyers known collectively as the Castano lawyers. There was considerable mistrust between the two groups of contingency fee attorneys, those who represented the states and the Castano lawyers. Perhaps as a counterweight to the political connections of Scruggs, who represented Mississippi and several other states, the Castano group added Hillary Clinton's brother, Hugh Rodham, even though he had never tried any major cases in his career and had only been an assistant public defender in Florida.³⁷ The lead attorney general was Mike Moore of Mississippi. On June 20, 1997 a settlement, the Tobacco Resolution, was announced.

Because of its terms, the Resolution required Congressional approval. While awaiting legislation, the four major companies made settlements with four states Mississippi (in July 1997), Florida (September 1997), Texas (January 1998), and Minnesota (May 1998), on terms modeled after the Resolution. The Senate Commerce Committee passed Bill S.1415, the "National Tobacco Policy and Youth Smoking Reduction Act" (the McCain Bill), on April 1, 1998. However, the parties to the Resolution had made a major tactical blunder by not explicitly including the Congressional leadership in the negotiations, and by not recognizing the importance of achieving widespread support in the public health community for any settlement.³⁸ The Bill was considerably less favorable than the Resolution to the companies,

³³ Liggett settled with the attorneys general of West Virginia, Florida, Mississippi, Massachusetts and Louisiana on March 12, 1996. They settled with 17 more states on March 20, 1997, four states plus the District of Columbia and the Virgin Islands during the rest of 1997, and 14 states on March 12, 1998.

³⁴ The terms included payments of \$1 million per state to be spread over ten years, plus a share of Liggett's currently non-existent pre-tax profits (7.5 percent for the first five states, 27.5 percent now that 41 states have settled).

³⁵ Liggett's imaginative legal strategy led to an options grant of 1.25 million shares to its lead attorneys, Marc Kasowitz and Daniel Benson. See Liggett's 10k report. It is possible that Liggett may have realized that settlements with the major companies would be largely financed by increases in cigarette taxes and, as we will see, even a partial exemption from such taxes could enable Liggett to become fabulously profitable.

³⁶ There are currently 41 state suits outstanding. A little less than half were filed after the settlement negotiations began. For a comprehensive list of filing dates see "State Suit Summary" available at <http://www.stic.neu.edu/summary.htm>.

³⁷ See "The People vs. Big Tobacco" by Carrick Mollenkamp, Adam Levy, Joseph Menn, and Jeffrey Rothfeder, Bloomberg Press, Princeton, 1996, p.74.

³⁸ The public health community had largely declined to participate in the negotiations. The exception was Matt Myers of the National Center for Tobacco-Free Kids, but most believed that "there's no negotiating with killers" and that using the courts would be a more effective way to achieve their goals (Mollenkamp et. al., op. cit., pp. 188-190.)

and was subsequently amended many times, magnifying the costs to them and, in the end, eliminating their benefits. The companies lobbied and advertised heavily against the Bill, and on June 17, 1998 the Senate voted against cloture, dooming the legislation.

The Tobacco Resolution

The Resolution brilliantly satisfied the needs of the tobacco companies for legal protections, of the attorneys general for a political win, and of the lawyers for big transfers on which to base legal fees. Described as a \$368 billion deal over 25 years, it included a projected \$358 billion in tax increases³⁹, plus \$10 billion in lump sum damage payments by the companies. Specific taxes were to be increased by 35 cents a pack immediately and by 62 cents after five years, with adjustments for inflation. These tax increases would effectively apply to all U.S. tobacco sellers, not just the settling companies, so that new companies would not find it profitable to enter.⁴⁰ The Resolution would have settled the state claims and eliminated state class action suits (Castano claims) and punitive damages for past actions. Individual claims against the industry were to be capped at \$1 billion per year, with a four for one matching fund set up to subsidize plaintiffs who won judgments against and settlements from the companies⁴¹. The companies also agreed to significant marketing restrictions and ratified Food and Drug Administration regulation of tobacco.⁴²

The central trade-off was the companies accepting an increase in cigarette taxes in return for liability protections. Given standard industry demand elasticity estimates of -0.4 and a current retail price of approximately \$2 per pack, a 62 cent tax would reduce sales by about 12 percent. Assuming that average profit margins remain at about 33 cents per pack,⁴³ pre-tax

³⁹ This estimate ignored the inflation adjustment in the tax rate, set at the maximum of 3 percent per year and the rate of increase in the Consumer Price Index, and ignored the effect on tax revenue of projected declines in smoking. The projection was a simple sum, undiscounted.

⁴⁰ Non-settling firms who wished to not participate in the settlement would have been required to escrow (for 35 years!) 150% as much money as they would have had to pay in new excise taxes, as a bond against future legal claims. Furthermore any distributors and retailers who handled non-settling firms' products would lose the proposed exemptions from civil liability suits. As a practical matter, the purpose was to force other cigarette producers to "voluntarily" agree to pay the same excise taxes as the four largest firms.

⁴¹ A rough calculation of the cost of the Resolution to the companies is that the taxes would cost them about \$1 billion per year (see next paragraph), the \$10 billion in lump sum damages are roughly equivalent in cost, settling lawsuits would cost at most \$1 billion, and the other aspects of the deal would not be very costly (see e.g., the section on marketing restrictions, below), so given the firms' domestic pre-tax profits of \$8 billion, the total corresponds to perhaps 40 per cent of their ex-litigation value. So the widespread prediction of securities analysts that passage of the Resolution would help tobacco stocks is probably accurate. (See the Market Value of Litigation Risk section.)

⁴² The FDA claimed the right to regulate tobacco in 1996. On August 14, 1998, after the Bill collapsed, a Federal appeals court ruled that the FDA does not have the authority to regulate cigarettes and smokeless tobacco. See "Court Rules FDA Lacks Authority to Limit Tobacco" by Barry Meier, New York Times, August 15, 1998, p. A1.

⁴³ This is the most important assumption here. The assumption of constant margins is consistent with log-linear demand in a Cournot model. More generally, in a Cournot model the pass-through rate is equal to $N/(N+1+(\text{slope of industry marginal revenue curve}+\text{slope of demand curve}))$, where N is the number of firms in the industry. (This is a simple generalization of the monopoly analysis in Bulow and Pfleiderer (1993).) That is, for linear demand, where the marginal revenue curve is twice as steep as the demand curve, the pass-through rate is less than 100 percent, while for constant-elasticity demand the pass-through rate is more than 100

profits would decline by about \$1 billion per year while the Bill would raise about \$13 billion per year.⁴⁴ This leverage was the primary driver behind the Resolution. Effectively, the Resolution created a collusive agreement between the companies. By agreeing that each of them would pay a per-pack tax, the companies would push the price of cigarettes closer to the monopoly level⁴⁵, enabling them to pay the states and the attorneys about twice as much as their annual pre-tax profits without being badly damaged. The fact that the proceeds of the companies' agreement were to be used to buy legal protections does not in any way alter the collusive nature of the arrangement.

We are concerned, more broadly than in just this case, that negotiating collusive price increases to settle lawsuits will seem a great way to benefit plaintiffs, lawyers, and defendants at the expense of consumers.⁴⁶ This kind of deal would clearly violate the antitrust laws if the companies did not have the plaintiffs as “partners in crime”, and the prospects for mischief with these kinds of settlements is enormous. For example, with a little tinkering the Resolution could be restructured to raise prices enough to both increase tax revenues still further *and* boost industry profits. Raise the tax to \$1.10 per pack, but give each company an exemption equal to 10 percent of base year sales. The increase in specific taxes would reduce sales and profits by about 20 percent⁴⁷, but because of the exemption the companies would *increase* their pre-tax profits by about \$1 billion per year.⁴⁸ Tax revenues net of the exemption would be about \$17 billion, versus \$13 billion under the Resolution.

For political reasons the per-pack payments were called "settlement payments" rather than taxes. The attorneys general wanted to frame their actions as a victory over Big Tobacco

percent. The size of the tax increase means this matters. For example, if 110 percent of a 62 cent tax gets passed through to consumers, then the tax increase will probably increase operating profits.

The issue is further complicated by the two-tier industry price structure. Specific taxes of the kind proposed by the Resolution probably favor the premium brands and may aid profitability (see the section on specific vs ad valorem taxes, below).

Jobber and retailer margins are less important, but the FTC assumed that they would be essentially unchanged, which is roughly consistent with empirical studies which indicate a pass-through rate of slightly more than 100 percent of state taxes at the retail level (see, for example, Sumner (1981) and Merriman (1994)). The industry (who had incentive to say taxes would be costly) argued that at least 112 percent of any tax increase would be passed on at retail (see *Impact of the Proposed Resolution on the U.S. Cigarette Industry*, op. cit.), but Jeffrey E. Harris calculated that real retailer margins fell by 1.3 percent per year from 1994-1997 while real manufacturer revenues per pack rose by 4.7 percent. (See, "Prepared Statement Before the Senate Democratic Task Force" on <http://web.mit.edu/jeffrey/harris/senatedemotask98may13.htm>.)

⁴⁴ The Resolution scaled taxes so that if sales remained constant new tax revenues would be \$15 billion per year. Allowing for a 12 percent reduction in sales reduces this amount to about \$13 billion. Additionally, current state and federal cigarette excise taxes are about \$14 billion per year. Those revenues would also fall by 12 percent. Furthermore, the increase in excise taxes would leave smokers with less money to spend on other goods, ultimately reducing income tax revenues. Allowing for a conventional estimate of a 25 percent offset on income tax collections, the net effect of the Resolution on total state and federal tax revenues would have been about \$8 billion per year.

⁴⁵ Assuming a current price of \$2, a current profit margin of 33 cents, and a demand elasticity of -.4, linear demand would imply a monopoly price of about \$4.34 while log-linear demand would imply a monopoly price of \$6.67.

⁴⁶ The issue here was somewhat confused because theoretically the class action suits were filed on behalf of consumers, but at least the plaintiffs' attorneys were aggressively represented!

⁴⁷ Assumes a log-linear demand curve with a current elasticity of -.4 and a current price of \$2. Also assumes that prices will rise by the amount of the tax increase.

⁴⁸ The lost sales would reduce current profits of \$8 billion by \$1.6 billion. The rebate of \$1.10 on 10 percent of a current 24 billion packs sold per year would raise profits by \$2.6 billion.

rather than a tax increase on smokers. The contingency fee attorneys could get fees as a percentage of “damage payments” but maybe not as a percentage of tax increases. And the companies wanted to describe their concessions as being painful, rather than admit to having sold out their customers by agreeing to cigarette tax hikes in return for protection from lawsuits.⁴⁹

The Resolution required Congressional approval for several reasons. First was the requirement that the terms apply to non-settling companies. Second were the restrictions on future litigation. Third was the collusive nature of the deal. The Resolution specifically included an antitrust exemption for the companies. One of our discussants, Ian Ayres, addresses the issue of whether or not such collusive price agreements would be legal without national legislation. This issue takes on greater relevance now that the Bill has died but state settlements, modeled on the Resolution, remain.

Tax Increases

Although the Tobacco Deal's overall strategy of substituting taxes for damages seems brilliant (from the point of view of the parties involved), the detailed execution of this strategy seems less well done. The differences between the kinds of taxes that the Resolution and Bill proposed, and between these and other possible tax instruments, are critical to whether the parties' objectives would be likely to be met. In fact the taxes started out rather badly designed (in the Resolution) and managed to get worse (in the Bill⁵⁰).

"Fixed-Revenue" Taxation vs. Specific Taxes

The Resolution proposed standard specific taxes (i.e. taxes at a fixed rate per pack).⁵¹ However, instead of setting a per pack tax the McCain bill specified a total tax bill for years 1 to 5, to be apportioned according to market share. The taxes were set at \$14.4 billion in year 1

⁴⁹ Furthermore, according to the industry's official web site:

(i) Under budget-scoring conventions, excise taxes raise only 75% of the actual amounts received because of an offset for lost income taxes. (Simplistically, if you spend a dollar on goods and services, someone else will receive a dollar in income and have to pay an average of 25 cents in income taxes.) Settlement payments would not suffer from this offset if they were treated as fees paid to the federal government. So avoiding the tax terminology would allow the federal government to increase spending by more.

(ii) Excise taxes are scored on the “mandatory” side of the budget, so cannot be used for discretionary spending items unless a 60 percent super-majority votes to waive budget rules. Settlement payments can be treated as user fees that offset discretionary spending.

It was also particularly important for the Commerce Committee not to refer to the payments as taxes, since it has no jurisdiction over tax issues. (Similarly, in the state settlements, avoiding the tax terminology may allow the attorneys general to both negotiate the “damages” and decide how to spend them without consulting the state legislatures. This is currently a hot political issue in Texas.)

See www.tobaccoresolution.com. Click under “Issue Briefs” and “Why Not an Excise Tax” to find a document labeled ““Excise Tax” Treatment for Industry Payments Is Inappropriate”.

⁵⁰ Though some improvements were made to the Bill by economists at the Treasury and the FTC.

⁵¹ The proposed taxes were an increase of 35 cents per pack the first year, rising to 62 cents in year 5. These amounts would then be increased annually by the maximum of 3 percent and the rate of inflation as measured by the consumer price index. They were set so that if volume remained at 24 billion packs, revenue would equal \$8.5 billion in year 1, \$9.5 billion in year 2, \$11.5 billion in year 3, \$14 billion in year 4, and \$15 billion in year 5 and subsequently.

(1999), rising to \$ 23.6 billion in year 5.⁵² For year 6 and thereafter, the original bill specified a switch to a per pack tax, the amount of the per pack tax to be determined by dividing a fixed sum by year 5 sales,⁵³ but this last point was particularly perverse, see below, and was changed later.

It is worth thinking through the impact of the McCain's "fixed-revenue" taxation system. For a monopoly, this would be a lump sum tax. But the industry "only" earns about \$8 billion per year pre-tax. Therefore, if the industry were a perfectly functioning cartel, McCain would put it out of business.⁵⁴ However, all estimates of the demand elasticity for cigarettes imply that the market price is well below the monopoly price, so a tax increase will lead to a much smaller loss in profits, and we must think through the McCain fixed-revenue tax program for an oligopoly.

The most salient feature of fixed-revenue taxation is that firms' marginal tax rates will generally be less than their average tax rate. Let the average tax rate per pack be t and the market share of a firm be s . Then, if the firm makes an additional sale that would otherwise have been made by a competitor, its marginal tax rate is just t , since the tax burden on its other sales is unaffected. However, if selling the additional pack does not affect other firms' sales, the firm will have to pay t in taxes on the new pack, but the industry tax burden on infra-marginal packs will be reduced by t . Since the firm's market share is s , its tax burden on infra-marginal packs is reduced by ts , so the firm's marginal tax rate becomes $t(1-s)$. Note that for a monopolist the marginal rate is zero, and for a competitive (or very small) firm the marginal rate is equal to the average rate.

There are several important implications:

First, fixed-revenue taxation gives firms an incentive to focus on building sales through expanding the market rather than by stealing share from competitors. If the goal of the legislation is to reduce smoking, then this form of taxation clearly provides the wrong incentives.

Second, fixed-revenue taxes give larger firms lower marginal tax-rates than smaller firms, so result in bigger differences in market shares between firms than ordinary specific taxes result in. That is, Philip Morris will have a larger market share under fixed-revenue taxation than under specific taxation.⁵⁵

⁵² Before the Bill died the number of years with fixed payments was reduced to three, thanks in part to economists at the Treasury Department and the FTC.

⁵³ The original bill also included a 2 cents a pack fee on all overseas sales, subsequently eliminated. Philip Morris, RJR, and Brown & Williamson all have substantial international businesses, with Philip Morris's international volume about three times its domestic volume.

⁵⁴ Even if we were to assume that the industry colludes on a monopoly price to maximize the rents available in the market, and then dissipates some of those rents through marketing competition, the magnitude of the McCain tax would drive the industry out of business. That is, gross revenues net of manufacturing costs but before other non-tax expenses are about \$16 billion, which is less than the McCain tax.

⁵⁵ Under the conventional assumption that demand for tobacco is log-linear, a Cournot oligopolist with lower costs than the (unweighted) industry average gains market share under fixed-revenue taxation, while its market share is unchanged under specific taxation. However, with inelastic constant-elasticity demand a low cost firm loses market share under either kind of taxation.

Third, because fixed-revenue taxation gives lower marginal tax rates, it results in lower pass-through to prices than does specific taxation. In a Cournot model, the pass-through of a small fixed-revenue tax increase in an N-firm industry is $(N-1)/N$ times the pass-through of a specific tax increase that yields the same average tax per pack.^{56,57}

The last point has very severe consequences for firms' profitabilities. Making the conventional assumption that industry demand for tobacco is log-linear, specific taxes are passed through dollar for dollar. So a \$1.10 (average) tax increase—the level McCain proposed—imposed through fixed-revenue taxation on a four-firm industry implies only an 82½ cent pass-through or a five-sixths reduction in current industry margins. In other words, the model implies (taken literally) that fixed-revenue taxation that yields the same per pack rate as a given specific tax reduces industry profits to one-sixth of the level achieved by the specific tax, and of course also yields higher sales of cigarettes than the specific tax.⁵⁸ Obviously the parties to the deal, governments who want taxes, firms who want profits, and public health advocates who want lower smoking, can all do better with specific taxes.

Appendix A gives more details of these points.

The quantity adjustment after year 5 in the Bill involved a less subtle mistake. With the per pack tax for the future to be determined by sales in year 5, firms were given a significant incentive to sell as much as possible in year 5, through promotions and through moving sales back from year 6 and forward from year 4. This flaw was ultimately corrected.

The best explanations for the fixed-revenue taxation are (1) Congress wanted revenue certainty for budgetary purposes, and (2) companies would not be able to avoid the tax by aiding smuggling of their brands into the United States.⁵⁹ However, this is only a special case of the argument that with fixed-revenue taxation companies will have an incentive to make more legal sales than with specific taxes.

Distributional Issues

Because cigarettes are an inferior good --- people smoke less as their incomes rise --- taxes on cigarettes are highly regressive. Table 7 illustrates the distributional consequences of the original McCain proposal when fully implemented in 2003. Households with total incomes (in 1998 dollars) of \$30,000 or less would face a 9 percent increase in their total federal tax burden. Consumers with incomes in excess of \$30,000 would face a tax increase of less than

⁵⁶ Because in a Cournot model price depends only on the (unweighted) average of firms' marginal costs plus marginal tax rates, and the average firm has share $s = \frac{1}{N}$, hence marginal tax rate $(1 - \frac{1}{N})t = (\frac{N-1}{N})t$ under fixed-revenue taxation. See Appendix A for more details.

⁵⁷ The same holds true for non-marginal tax increases with standard demand curves including linear, log-linear, constant-elasticity etc.

⁵⁸ Of course a given average tax rate imposed as a fixed-revenue tax yields a higher tax take (because of the higher sales) than a specific tax imposed at the same rate. However, unless the taxes would yield prices above the (no-tax) monopoly price, a given total tax take can be raised at a lower cost to firms' profits, and at higher prices (hence less smoking), through a specific tax than through a fixed revenue tax.

⁵⁹ See "Cigarette Makers Are Seen as Aiding Rise in Smuggling" By Raymond Bonner and Christopher Drew, *The New York Times* - August 26, 1997. This story focuses particularly on RJR.

one percent and consumers with incomes in excess of \$100,000 would pay less than .1 percent more.⁶⁰

INSERT TABLE 7 HERE

Both the Resolution and the Bill were quite careful to deal with the distributional consequences for other interest groups such as tobacco farmers, vending machine owners, quota holders, and even sports events that had been receiving tobacco sponsorship.⁶¹

Taxes on Tar and Nicotine Consumption

The Bill and the Resolution both tax all cigarettes at the same rate. There is no financial incentive for consumers to switch to lower tar or lower nicotine cigarettes, and almost none for firms to develop safer cigarettes.

If we make extreme assumptions that the tar in cigarettes causes all the health problems and that nicotine is the sole cause of addiction, a rational addiction model⁶² would imply that tar is what should be taxed.⁶³ However, it is clear that the public health goals are not based on such a model. If consumers, especially youth consumers, are myopic and fail to understand how addictive cigarettes are, then nicotine levels are critical to lifetime consumption and should also be taxed.

Taxes should perhaps not just be proportional to a (weighted) sum of tar and nicotine: Smoking low tar and nicotine cigarettes may contribute to an addiction to smoking rather than an addiction to nicotine and, of course, cigarettes may contain other dangerous ingredients. Furthermore, it is often claimed that the machines that the FTC uses to determine tar and nicotine levels in cigarettes understate the consumption of real smokers, particularly for low

⁶⁰ These distributional effects might have been somewhat mitigated by the primary amendment to the Bill, which would have used roughly a third of the revenues to reduce the “marriage penalty” tax on two income households, particularly those earning less than \$50,000 per year. This Republican-sponsored amendment was criticized by some public health advocates who wanted all the revenues to be allocated to public health and anti-smoking programs. It was also criticized by some Republicans, who opposed the tobacco bill and were concerned that bundling in the tax cut would increase the chance of passage by attracting more Republican support.

⁶¹ According to the FAQ page produced by the Senate Commerce Committee, “The bill contains legislation drafted by tobacco state Senators to provide comprehensive assistance to farmers and rural communities. Congress is committed to ensuring that innocent, hardworking American farmers and tobacco dependent rural communities will receive the support and assistance they need.” and “The Committee believes the tobacco vending machine companies and employees should be compensated if their industry is adversely affected by a tobacco settlement. The tobacco bill passed by the Commerce Committee would create a non-profit corporation that includes tobacco vending machine industry representatives, to provide payments to vending machine companies. The amount of compensation provided to individual vending companies would be determined by this non-profit Board. The vending machine industry strongly supported this proposal and urged the Committee to include the provision in the bill.” Available at

<http://www.senate.gov/~commerce/legis/tobfaq.htm>.

Furthermore, quoting from the Resolution (Title VII A (5): “Beginning in the second year, \$75,000,000 [will be allocated] annually for a period of ten (10) years to compensate events, teams or entries in such events, who lose sponsorship by the tobacco industry as a result of this Act ...”

⁶² Along the lines of Becker and Murphy (1988).

⁶³ This assumes that health effects are linear in consumption. If smoking twice as much is more than twice as bad, then taxing nicotine might serve as a proxy for taxing heavy smokers disproportionately more. But if smokers can get their nicotine fix from gum and patches, then tar and nicotine become less closely tied and the argument for taxing nicotine becomes less compelling.

tar and nicotine brands (although ideally tests should be developed to accurately reflect the effects of cigarettes on smokers). A straightforward solution is a tax on cigarettes of the form $\text{Tax} = a + b * \text{Tar} + c * \text{Nicotine}$.^{64 65} In any case, it is hard to see the health reason for taxing all cigarettes at the same rate.

There is some implicit recognition of this principle. The Resolution (section 5A) limits cigarettes to a maximum of 12 milligrams of tar based on current testing methods. Both the Resolution and the Bill continue requirements for publishing tar and nicotine ratings, presumably on the basis that the information is useful to consumers. However the quantity restrictions do nothing to encourage the development of safer cigarettes.⁶⁶

Specific taxes v Ad Valorem taxes

A further issue is whether the taxes should be ad valorem (i.e. proportional to the pre-tax price, like a value added tax) rather than specific (i.e. additive to the pre-tax price). Currently all taxes (except state sales taxes) on cigarettes in the U.S. are specific, which is appropriate if the taxes are meant to correct an externality. However, if we imagine that the purpose of the Bill was, as stated in its title, "Youth Smoking Reduction", then ad valorem taxes merit consideration.

Writing a firm's profits absent taxes as

$$p = p \cdot q - c(q),$$

a specific tax of s results in profits

$$p^s = p \cdot q - (c(q) + s \cdot q),$$

while an ad valorem tax of $100t\%$ results in profits

$$p^t = \left(\frac{p}{1+t} \right) q - c(q)$$

$$\Rightarrow p^t = \left(1 - \frac{t}{1+t} \right) (p \cdot q - (1+t)c(q))$$

⁶⁴ Although we are assuming the use of specific taxes in our discussion, a similar formula could be used with ad valorem taxes.

⁶⁵ One could imagine more complex taxes, but these are problematic if smokers use multiple brands.

⁶⁶ There are other clauses in the Resolution that may be detrimental to innovation. For example, the requirement that any safer cigarette technology be cross-licensed across the industry at "reasonable" prices may discourage R&D. The Bill contained a provision making it difficult for a company to get approval from the Secretary of Health and Human Services that a cigarette was "reduced risk". According to Section 913 (2) (B) "the Secretary shall take into account (i) the risks and benefits to the population as a whole, including both users of tobacco products and non-users of tobacco products; (ii) the increased or decreased likelihood that existing users of tobacco products will stop using such products including reduced risk tobacco products; (iii) the increased or decreased likelihood that those who do not use tobacco products will start to use such products, including reduced risk tobacco products; and [iv] the risks and benefits to consumers from the use of a reduced risk tobacco product as compared to the use of products approved under chapter V to reduce exposure to tobacco."

So while a specific tax corresponds to a fixed increase in marginal costs, an ad valorem tax can be thought of as the sum of a profit tax and a multiplicative tax on *all* costs. Relative to a specific tax, an ad valorem tax greatly reduces the incentive to spend on advertising and promotion.⁶⁷ A specific tax causes substitution from the taxed attribute (quantity) to other attributes (quality).⁶⁸

The ad valorem tax, by contrast, gives a strong incentive to cut (pre-tax) price, since an ad valorem tax effectively multiplies a firm's perceived elasticity by $(1+t)$.

In short, specific taxes encourage firms to produce and market high-price and highly-promoted premium brands, while ad valorem taxes encourage the sale of low-price generics. Figure 1 shows how pre-tax prices vary with the level of specific taxes across the European Union.⁶⁹

INSERT FIGURE 1 HERE

The advantage of specific taxes, then, is that they will lead to higher average prices, which *ceteris paribus* would lead to lower consumption.⁷⁰ But correspondingly higher ad valorem taxes can achieve the same price levels, *without* the same level of promotional activity; ad valorem taxes that favor deglamorized generic products may support continued sales to old addicted smokers but fail to attract so many new youth smokers.

Another way to view the argument for ad valorem taxes is that it is similar to that for taxing nicotine content. As noted above, ad valorem taxes effectively tax all costs, that is, they tax the advertising as well as the contents of a cigarette. This is appropriate if the advertising helps get youth smokers addicted.^{71, 72} Ad valorem taxes are also preferred for distributional reasons, since they reduce the relative taxes on cheaper products.⁷³

⁶⁷ A specific tax has no effect on activities that increase the price that can be charged for a given output, but does reduce activity that increases sales.

⁶⁸ See Barzel (1976).

⁶⁹ There is a wide variation between similar countries. For example Sweden has an unavoidable tax of \$3-45 per pack and a proportional tax rate (i.e., $\{(1 + \text{ad valorem rate}) \times (1 + \text{VAT rate}) - 1\}$) of 0.61, while its neighbor Finland has an unavoidable tax of \$1-04 per pack and a proportional rate of 2.14 (as of 1/1/98). Delipalla (1995) and Delipalla and O'Donnell (1998) also study the European industry, and see also Keen (1998) for discussion of the (substantial) shift towards specific taxation in the 1980's in the Netherlands which also seems to have favored more expensive brands.

A number of papers (including Barzel (1976), Johnson (1978), Sumner and Ward (1981), Sobel and Garrett (1997)) have examined the claim that specific taxes favor premium brands, by exploiting the variation in taxes across U.S. states. Limitations include lack of variation in the data, and the facts that firms cannot easily produce different products for different states and that advertising and promotional campaigns may also be at the national level. However the most recent contribution to the debate (Sobel and Garrett (1997)) estimates that "for approximately every 3 cents of state [specific] tax there is an increase of one percentage point in the market share of premium brands [in that state]", while the effect of ad valorem taxes on the share of premiums vs. generics is "insignificantly different from zero." [p. 884].

⁷⁰ However, even if total youth consumption is reduced by the higher prices, the number of youth smoking may not be greatly reduced if the product is made more glamorous, so the effect on future addiction rates may be limited.

⁷¹ Specific taxes are less undesirable if all advertising and promotional activities can be completely banned, but we fear that cigarette companies may continue to find ways to market their brand images.

⁷² There is some evidence that youth smokers are less interested than adults in generics. While only 72.5 percent of cigarette sales are of premium brands, youth smokers report smoking over 90 percent premium cigarettes. See "Comparison of Advertising to Brand Preference" in *Adolescents and Adults, 1993*, Center for

The major argument against ad valorem taxes is that they would probably be far worse for firms' profits.⁷⁴, ⁷⁵ However, there are other ways to compensate the companies. For example, instead of setting average and marginal taxes equal, marginal rates could be set above average rates --- exactly the opposite of what would have happened under McCain's fixed-revenue taxation. This can be done, for example, by allowing all companies an annual tax exemption on one pack for every five or ten sold in 1997. These adjustments could be further tailored to account for the current differences in firms' mix between premium and discount cigarettes.

Lump-Sum Damages

Both the Resolution and the Bill specified that the industry would pay damages of \$10 billion, in rough proportion to the relative market values of the firms. The way these payments were to be split proves that the settlement was based on the relative bargaining power of the various firms rather than on any measure of the damages for which they were responsible.

Table 8 compares the relative amounts of tobacco sold by the five major tobacco companies since 1950 with the percentages of the lump sum payments they were to make.

INSERT TABLE 8 HERE

If firms' lump sum payments were set in proportion to damage to today's sick smokers, RJR and Liggett would probably be liable for even more than their share of tobacco sales since 1950. There are three reasons, all relating to these companies having larger market shares in the early years. First, the amount of tar and nicotine in cigarettes per pound of tobacco has declined over time. Second, sick smokers are predominantly older smokers who have disproportionately smoked the declining brands. Third, one might wish to disproportionately assign liability to the brand that the smoker began smoking when young, if one believes that addiction caused by youth smoking is at the root of smoking problems. Philip Morris's market share when most of today's sick smokers started smoking was closer to 10 percent than 50 percent. Consistent with the second column of Table 8, RJR faces more individual suits than Philip Morris.

In fact, the payments were based on "deep pockets": they were to be directly proportional to firms' equity valuations. This is the outcome we would anticipate from a negotiation in which

Disease Control, Tobacco Information and Prevention Source. Available at <http://www.cdc.gov/nccdphp/osh/brndtbl.htm>.

⁷³ This assumes that poorer people are relatively more likely to buy generics. Some believe that premium cigarettes are seen by the poor as one of their few "affordable luxuries", but Townsend et al (1994) provide U.K. evidence that lower socioeconomic groups are much more sensitive to cigarette prices than higher socioeconomic groups.

⁷⁴ Ad valorem taxes are worse for profits for any given rate (i.e. cents per pack) of tax. However, they are better for a monopoly (or sufficiently collusive oligopoly) for a given amount of tax raised. See Keen (1998) for a summary of the literature.

⁷⁵ A practical concern is that specific taxes may more give more precise control of the market price (and tax revenues) than ad valorem taxes do. A senior UK Treasury official argues that specific taxes provide less scope for fraud. (Private conversation.) The UK has the highest specific taxes in Europe: total "fixed" taxes were \$3.71 per pack at 1/1/98. Finally, by favoring "premium" brands over generics, specific taxes may also tend to favor home producers over inexpensive imports.

there are bimodal expectations for tobacco litigation: either litigation in the absence of a deal will generally fail, or it will be so successful that it will put all the companies into bankruptcy. It is also consistent with the focus in Bill negotiations on whether future suits could be only against the domestic tobacco subsidiaries of the companies or against the conglomerates.⁷⁶

So RJR's leveraged buyout, which left it with less equity and more debt, reduced its payments. Philip Morris's tremendous growth, its dominance of the premium markets, and its ownership of Miller Brewing and Kraft, increased its payments. The allocation of these damages were even less "fair" than the tax increases which allocated companies' costs in proportion to their current and future, but not past, market shares.

The \$6 billion after-tax cost of these lump-sum damages is about four percent of the market value of the equity of the firms, but is perhaps 13 percent of the value of their domestic tobacco businesses ex litigation.⁷⁷ This would have been roughly as costly to the firms as the Resolution's proposed \$358 billion in tax increases.⁷⁸ So while economic theory can explain the allocation of the lump-sum payments, we have more trouble explaining their existence. As part of an efficient deal among the parties concerned, lump-sum payments seem dominated by tax-increases which can raise more money at a much lower cost to companies, and also have the public-health advantage of raising prices.

Legal Protections

In return for the tax increases and lump-sum damages, the Resolution banned all punitive damage suits based on the companies' past actions, and also banned class action suits.⁷⁹ These legal protections are the key reason apart from the taxes why federal legislation was required to implement the Resolution.

The Resolution capped the amount of damages the companies would have to pay out in any one year to \$1 billion. This was done by placing a cap of \$5 billion on the amount that could be awarded in judgments each year, and giving the companies "co-insurance" of 80 percent by paying 80 percent of the judgments from the tax revenues collected.

This co-insurance produces two obvious incentive conflicts. First, the governments and public health agencies that were the financial beneficiaries of the Resolution would effectively pay 80 percent of any verdict against a tobacco company, so they would have more at stake than the companies in trying to defeat the suits. Second, and probably more important, is simply that it would be less costly for a company to settle a suit for \$1 million than it would be to spend

⁷⁶ The Bill first protected the non-domestic tobacco assets of the companies but this provision was loudly protested by anti-tobacco forces.

⁷⁷ Calculation by Gary Black based on approximately \$8 billion in industry earnings before interest and taxes in 1997 before the costs of settling state litigation, a multiple of 6 times pre-tax earnings for Philip Morris, and a 15 percent discount for the rest of the industry, corresponding to about 10x unlevered after-tax earnings for Philip Morris and 8.5x unlevered after-tax earnings for other firms.

⁷⁸ The taxes would have cost the firms about one-eighth of their current profits. See above.

⁷⁹ While it seems unlikely that a federal class action could proceed, based on cases like the Supreme Court asbestos case *Amchem Products v. Windsor* (Amchem Products, 117 S. Ct. 2231, 2249-50 (1997)) the Resolution was meant to ban state class actions.

\$250,000 fighting and winning in court. This would greatly counter the companies' reputational incentive not to settle individual suits and probably lead to more suits.⁸⁰

The original McCain Bill included an 80 percent co-insurance clause, as in the Resolution. It provides a cap of \$6.5 billion per year, versus \$5 billion for the Resolution. A more significant difference is that McCain provided no protection against class actions and punitive damage cases, so there was a much greater likelihood of large payments.

Further incentive problems might arise if the companies came to feel that the cap would be reached every year. There would then be little point in defending against suits, except that some suits might provide disproportionately large claims against one firm or another, so negotiations could be over which suits settle first. We usually think of litigation as having social value in discovering information and in punishing the guilty, but if the companies gave up on trying to keep payments below the cap, the lawsuits would then generate neither of these benefits.

An important provision in the early drafts of the McCain Bill was that companies' liability was limited to their domestic tobacco assets.⁸¹ Since the market value of the firms' domestic businesses was roughly equal to their legal liabilities (see above), this provision in itself should have been enough for the deal to be a good one for stockholders. However, anti-tobacco forces objected to the provision.⁸²

While the public health community and the anti-tobacco lawyers want all of the companies' assets to be available for paying damages, actually putting the companies into bankruptcy might be disastrous. If the companies were placed in Chapter 11, their brands and factories might be sold to new companies that would have no liability for the past actions of the tobacco manufacturers. Facing much less potential legal liability, the new firms would have much less incentive to trade marketing restrictions and tax increases for litigation protection.⁸³

⁸⁰ Of course the companies might currently have an excessive incentive to fight for reputation reasons, so co-insurance might in that way actually improve incentives.

⁸¹ This provision was not included in the Resolution, but was not really needed there, since the Resolution effectively eliminated the risk of bankruptcy from lawsuits. It was important in McCain, because even the original Bill specified some circumstances in which the damage caps would be lifted, and later drafts of the Bill abandoned the caps.

⁸² See Daynard, Enrich, Parmet, Davidson, Kelder, Jr., and Kline (1998). Available at <http://www.tobacco.neu.edu/Congress/McCain/index.html#EXECUTIVE>.

As is clear from our analysis of the allocation of the lump-sum damage payments across companies, as well as of the stock market discounts of the companies, the vulnerability of domestic non-tobacco and foreign tobacco assets to U.S. lawsuits affected the companies' bargaining power.

⁸³ See "Big Tobacco's Endgame" by Jeffrey Goldberg, *The New York Times Magazine*, June 21, 1998. "According to Steven Goldstone of RJR, "This is what would happen if we had to go into reorganization....Any judgment against us would be stayed, the states wouldn't get their money, the shareholders of the company would suffer, all of the lawsuits against the industry would grind to a halt. The only thing that will still be going the day after is that we'd still be making cigarettes. . . . What have these public-health people achieved in 40 years? They think they'll end smoking by bankrupting us, but believe me, that's not going to happen."Goldstone argues that bankruptcy is a real possibility -- and that a bankrupted industry could mean the formation of new tobacco companies with no history, and therefore no liability for past practices. Goldstone sounds almost gleeful when he mentions that scenario."

By the time the McCain Bill had finished being marked up and amended, essentially all of the companies' legal protections --- the carrots that got them to make a deal in the first place --- had been removed.

Youth Smoking

Much has been made of the importance of youth smoking. On the one hand, the stated purpose of the Bill was "Youth Smoking Reduction"; on the other hand, the companies are often said to regard youth smokers as "tomorrow's cigarette business".⁸⁴ However, the truth is that the value to the companies of the youth market is tiny: the vast majority of the present value of future tobacco profits resides in the lungs of smokers who are currently over the age of 18. Nor is it so clear that the public health community is, or should be, primarily focused on youth smoking, although the political salience of referring to smoking as a children's disease is not lost on anyone. It is in these contexts that we will discuss the provisions of the Bill and Resolution that were advocated as youth smoking measures.

The Value to the Companies of the Youth Market

Even if all smokers were equally profitable, the present discounted value of all future smokers would probably be only one sixth, at most, of the present value of all current and future smokers.⁸⁵ But this calculation ignores smokers' strong brand loyalty; only about 10% of smokers switch brands in any year.⁸⁶ That is, many smokers seem to become addicted to a particular brand. Assuming new smokers are relatively uncommitted to any particular brand, the value of new customers is relatively tiny compared with the value of mature smokers. As we show in Appendix B, the competition to capture youth smokers dissipates most of the future profits from them. The argument is that if price discrimination were possible firms would be willing to cut prices substantially to new potential customers. But if price discrimination is impossible firms will still cut prices to all customers a little, in order to capture the youth market. While it will then appear from an accounting perspective that the new customers are as profitable as any others, short run profits will be lower, and long run profits will not be much higher, than if there were no new customers.

The Public-Health Significance of the Youth Market

⁸⁴ See "Cooperation and Miscalculations On Shaping Tobacco Legislation" by Steve Lohr and Barry Meier, The New York Times, April 11, 1998, p.1 quoting an RJR memo from 1974 making this vacuous comment.

⁸⁵ To compute this, observe the current quit rate of all smokers is 2.5 percent per year. Given the long term downward trend of more than 0.5 percent per year in the number of smokers, this implies entry of no more than 2.0 percent per year. Discounting all future profits by 8.5 percent and allowing for a 1 percent decline in cigarette purchases per smoker, the present value of future profits from current smokers are current profits divided by .12 while the present value of future profits including future smokers are current profits divided by .10. The discount rate was chosen to give the companies a price/earnings ratio of 10 in the absence of future litigation costs (summing the discount rate and the decline in annual sales, and assuming that profits per pack would remain constant), which is broadly consistent with how the firms are valued (see note 77).

The value of the youth market is even lower if we use the alternative estimates that the combined quit and death rate of smokers is 3.5 percent while the "smoker formation rate" is 2.2 percent, resulting in a decline of 1.3 percent per year. See "Tobacco Update: Facts to Consider" op. cit. These figures are attributed to analyst Gary Black.

⁸⁶See note 8.

Youth smoking is one of the serious public health issues monitored by the Center for Disease Control's Youth Risk Behavior Surveillance System. Table 9 puts the problem in perspective.

INSERT TABLE 9 HERE

According to the Department of Health and Human Services, "more than 80 percent of all adult smokers had tried smoking by their 18th birthday and more than half of them had already become regular smokers by that age".⁸⁷ But these facts do not necessarily imply that more effective deterrence of youth smoking will lead to a proportional reduction in adult smoking.⁸⁸ For example, black high school senior smoking rates have averaged less than half of white rates over the last 20 years,⁸⁹ but this is not fully reflected in a decreased relative propensity of adult blacks to smoke.⁹⁰

Furthermore, youth smokers only make up two percent of consumption, and their primary death risk is perhaps forty years distant. Much may change in that time to make cigarettes safer, quit rates generally higher, and medical care more effective. In addition, there is some evidence that the health risks of smoking increase more than proportionally with years of smoking.⁹¹ So getting an extra 35 year old to quit smoking seems at least as important as preventing an 18 year old from becoming a regular smoker. Therefore, while youth smoking is a serious problem there would still be public health concerns if youth smoking ended tomorrow.

A disproportionate emphasis on youth smoking is warranted if it is easier to stop youths becoming regular smokers than to get an equal number of adults to stop, but whether this is true is unclear. Until recently, the bulk of studies indicated youth smoking is more elastic than adult smoking,⁹² improving the case for classifying tax hikes as youth smoking measures,

⁸⁷ "Children's Future at Risk from Epidemic of Tobacco Use", press release, August 23, 1998. Available at <http://www.hhs.gov/news/press/1996pres/960823d.html>.

⁸⁸ Of course, it is true that many young people who become addicted to smoking would never start if they could be deterred until age 18. But extreme versions of the argument are reminiscent of the argument that because historically very few women got married after age 25 a structural change that made marriage prior to that age much less likely would result in tens of millions of permanently unmarried women.

⁸⁹ See "Smoking status of high school seniors---United States, Monitoring the Future Project". Data from University of Michigan Monitoring the Future Project, available from CDC web site, <http://www.cdc.gov/nccdphp/osh/hssdata.html>. A flaw of this survey is that it does not include dropouts, who may be more likely to smoke than students.

⁹⁰ See "Number (in millions) of adults 18 years and older who were current, former or never smokers, overall and by sex, race, Hispanic origin, age, and education, National Health Interview Surveys, selected years --- United States, 1965-1994". Table available at the CDC Web site, http://www.cdc.gov/nccdphp/osh/tab_3.html. Black smoking rates in the adult population fell by about 26 percent while white rates fell by 23 percent. The higher ratio of young people in the black community combined with the lower propensity of young people in general to smoke, plus the higher initial smoking rate for blacks, makes this result more surprising.

⁹¹ See Peto (1986) and Townsend (1993).

⁹² For example, the CBO estimates a youth participation elasticity is in the range of -.50 to -.75, implying that a \$1.10 tax increase would drop consumption by about a third. See "Background on Youth Smoking Elasticity Estimates", April 20, 1998. Addiction theory (Becker and Murphy, op. cit.) would also seem to predict a higher elasticity among people who are not yet addicted.

Canadian youth smoking fell by almost 50% from 1981-91 as real prices rose by about 100% (U.S. Treasury "Background on Youth Smoking Elasticity Estimates" April 20, 1998). In Britain Townsend (1993) reports an "increase in teenage smoking from 20% to 25% [from] 1988-90 when the relative price of cigarettes was falling", but youth smoking participation (one cigarette a week or more for those aged 11 to 16) rose from 8% to 13% from 1988-96 despite a 26% increase in real prices (Statement of Martin Feldman, March 19, 1998,

but some recent studies⁹³ have argued the opposite. As a theoretical matter, if youth smokers mistakenly assume that they can and will easily quit in a few years, a price increase will deter them from starting to smoke less than it will persuade an addicted adult that quitting will provide a significant financial benefit.

Of course, many people would argue that adults should make their own choices about smoking, and governments should do no more than correct externalities⁹⁴ so any Bill should be targeted at under-age smoking. However, we believe that the real (and appropriate) goal of the public health community is to reduce smoking in all age groups and that this explains many aspects of the Bill, including the emphasis on a broad bill with smoking cessation programs and high taxes. A problem with the youth smoking rhetoric is that if a narrowly-focused youth bill is passed now, it may become harder to pass broader anti-smoking legislation later.

Non-Price Youth Smoking Measures

The Bill and Resolution both contained marketing restrictions which could be construed as youth smoking measures, and which we will show later to be a sensible part of any settlement. In other ways, though, the Bill moved away from its stated purpose of curtailing youth smoking. The Resolution allowed adults-only outlets to continue color advertising, but this was prohibited by the Bill. To the extent that adults-only outlets are less likely to be sources of underage tobacco purchases, one might wish to encourage their growth.⁹⁵ Similarly an amendment to the Bill eliminated a provision that gave the FDA authority to prohibit cigarette sales in specific categories of retail outlets.⁹⁶

Since the marketing restrictions in the Bill would to a large degree have tied the companies' hands, and since the new taxes meant the states' share of tobacco revenues would be much greater than the companies', strong provisions to encourage states to curtail youth smoking would seem desirable. We would advocate giving the states greater financial incentives to enforce existing laws and to develop other innovative solutions to youth smoking. Perhaps states should be subject to performance penalties if their youth smoking rates fail to fall as much as those in other states.⁹⁷

before the Senate Commerce Committee, citing Office of National Statistics data). This highlights the potential difference in the elasticity of youth demand and youth participation with respect to price.

⁹³ Most notably see DeCicca, Kenkel and Mathios (1998).

⁹⁴ In this case, taxes should be lowered, not raised. See note 5.

⁹⁵ Adults-only tobacco stores, have grown from 1 percent of the market in 1992 to 13 percent in 1998. See The New York Times, August 5, 1997, "Tough Climate May Benefit Smoke Shops; Catering to Adults Only Is Becoming Bigger Plus" by Barnaby Feder.

⁹⁶ These changes were at the behest of the convenience store lobby. See "Thank You NACS Members! Grassroots Outpouring Helped Secure Changes in Tobacco Bill" National Association of Convenience Stores Washington Report June 1, 1998 vol.13 no. 22, available at

<http://www.cstorecentral.com/REGISTER/RESOURCE/washrep/wr060198.htm#head1>

The report says that it became clear that the FDA would eliminate convenience stores as a "class of trade" eligible to sell tobacco and that the provision exempting tobacco-only and adults-only stores from restrictions would have been potentially disastrous. Senator Spencer Abraham (R-MI) is especially thanked for killing these provisions.

⁹⁷ Of course both the states and the companies might argue that youth smoking is affected by exogenous factors. Pringle (1998) p. 174 cites a 1982 in-house study by Philip Morris which noted that high school students over the driving age sharply cut back smoking when the price of gas rose in the late 70s, but those under the driving age did not change their consumption. Pringle quotes from the report, "When it comes to a

In fact there were very few requirements placed on states.⁹⁸ There is also nothing in the Resolution or Bill to increase the legal age for smoking, implement scanner technologies to show proof of age, or implement several other youth smoking measures.⁹⁹ While we do not know enough about these commonly suggested proposals to know whether or not they would make good policy, they have the advantage of discriminating against youth smokers much more heavily than would taxes.

“Look-back” Penalties

The Resolution included “look-back” penalties which increased taxes by about 8 cents a pack if youth smoking participation rates failed to fall by 35 percent over ten years.¹⁰⁰ However, a company that complied with the Resolution would be eligible for up to a 75 percent reduction in these penalties.¹⁰¹ Since even the maximum tax, if applied to the whole industry, would not hurt the companies very much, the real problem for a company would be if it had to pay 8 cents when its competitors only had to pay 2 cents. Therefore the primary effect of the Resolution's look-back penalties would have been to enforce compliance with its marketing restrictions.¹⁰²

The much larger look-back penalties in the Bill moved significantly away from a genuine youth smoking focus. If youth smoking participation fell by less than 38.4 percent over 10 years the excise tax on cigarettes would rise by 28 cents a pack, plus inflation.¹⁰³ For perspective, the maximum penalties would have been imposed even if the number of kids who regularly smoke tobacco fell to less than half the number who now smoke marijuana every month.¹⁰⁴

choice between smoking cigarettes or cruising around in his car, the average red-blooded American male would probably choose the latter.” (So raising gasoline prices might be a better way to cut youth smoking than raising cigarette prices, and would have the additional benefit of reducing global warming, arguably a greater environmental hazard than environmental tobacco smoke.) A larger point is that income effects may be important for youth smoking. (Townsend et al (1994) provide evidence from U.K. data that income elasticities are much larger than price elasticities for young males.)

⁹⁸ Their main requirement was to perform 250 random checks per month on retail smoking outlets per million residents for illegal sales to minors. Assuming that these checks cost a generous \$50 apiece to perform, this imposed a nationwide burden of \$40 million per year.

⁹⁹ To get some idea of the possibilities, see the Tobacco Retailer Responsibility Initiative at <http://stic.neu.edu/trri>. See Chaloupka and Grossman (1996) and Chaloupka and Pacula (1997) and the references they cite for discussion of the effectiveness of various youth-smoking measures.

¹⁰⁰ The maximum penalty was described as \$2 billion if sales remained at the current level of 24 billion packs, with reductions proportional to quantity declines. Youth smoking participation was to be measured by the University of Michigan's “Monitoring the Future” survey data.

¹⁰¹ Specifically, companies would be eligible “if they could thereafter prove to FDA that they had fully complied with the Act, had taken all reasonably available measures to reduce youth tobacco use and had not taken any action to undermine the achievement of the required reductions.”

¹⁰² Because the per-pack penalty rate increased in the number of youth smokers, the companies' marginal tax cost of an extra youth smoker would have exceeded the average rate, creating some small distortions similar to the much larger ones we will highlight in our analysis of the Bill's look-back provision.

¹⁰³ Penalties were to begin if youth smoking participation fell by less than 60 percent, reaching a maximum of about 17 cents a pack if the decline was less than 38.4 percent. Because the penalties were not tax-deductible, the maximum penalty translated to about a 28 cent per pack excise tax increase.

¹⁰⁴ In 1995, 27.6% of students in grade 11 smoked marijuana in the past 30 days (CDC, “Youth Risk Behavior Surveillance – United States, 1995. Morbidity and Mortality Weekly Review; 45 (No. SS-4), 1-86, 1996. Data available at CDC web site, www.cdc.gov/nccdphp/.) In the same year, 21.6 percent of 12th graders reported smoking 1 or more cigarettes per day (CDC table, “Smoking status of high school seniors --- United States,

So the most likely effect of these look-backs would be an increase in the tax rate on all smoking, with no marginal incentive to reduce youth rates. However, if youth participation were to decline by more than 38.4 percent, firms' incentives would become bizarre as we now show.

The look-back penalty per pack was increasing in youth participation for declines between 38.4 and 60 percent, so the marginal tax rate on a pack of cigarette would exceed the look-back rate.¹⁰⁵ For example, if 10 years from now Philip Morris sold an extra 100 million packs of Marlboro and this created 18,000 extra youth participants¹⁰⁶ then the look-back rate would rise by about 1 cent.¹⁰⁷ If Philip Morris were by then selling 6 billion packs¹⁰⁸, the cost to the company of this increase in the look-back rate would be \$60 million, making the marginal tax rate on Marlboro about 60 cents above the average look-back rate. But if youth participation were equally sensitive to an increase in the sales of Lorillard's Newports, Lorillard's marginal rate would be only 10 cents above the look-back rate, since Lorillard is only a sixth the size of Philip Morris.¹⁰⁹ Because the largest firms will have marginal costs that are furthest above average, they would tend to lose market share in equilibrium. The reasoning is the mirror image of that for fixed-revenue taxation, where the large firms benefitted (in terms of market share) by having marginal costs that were the furthest below average.

Because prices reflect marginal rather than average taxes, more than 100 percent of the look-back penalties would be passed through to consumers. So if the decline in youth participation did exceed 38.4 percent¹¹⁰, the look-backs would probably sharply raise industry profits.¹¹¹

Monitoring the Future Project, 1976-1996", available at the same web site.) See also Table 9, which implies that daily youth smoking would have to fall to 40% of monthly marijuana use to avoid maximum penalties.

The Joint Committee on Taxation estimates that penalties at or near the maximum would be paid. See Joint Committee on Taxation JCX-45-98, "Description and Analysis of Revenue-Related Provisions of S. 1415 Relating to National Tobacco Policy as Modified by the Manager's Amendment", June 3, 1998.

¹⁰⁵ Assuming, of course, that youth participation is increasing in total sales.

¹⁰⁶ Assumes a youth smoking decline between 38.4 and 50 percent and initially 3 million youth smokers, based on a population of 19 million and a daily participation rate of about 16% (see table 9). The penalty would increase by one cent for each one percent, or 30,000 participants, but adjusting for the non-deductibility of the penalties makes the rate one cent for every 18,000. Marlboro sales were 8.2 billion packs in 1998 (Philip Morris 10k report) and Marlboro was estimated to have 60 percent of the youth market, implying 22,000 youth smokers for every 100 million packs. See "Comparison of Advertising to Brand Preference" in *Adolescents and Adults, 1993*", op. cit. This source claims that 60 percent of youth smokers report preferring Marlboro, 13.3 percent Camel, and 12.7 percent Newport.

¹⁰⁷ Assumes a youth smoking decline between 38.4 and 50 percent and an estimate of 3 million youth smokers. The penalty would increase by 1 cent for each one percent, or 30,000 participants, but adjusting for the non-deductibility of the penalties makes the rate 1 cent for every 18,000.

¹⁰⁸ Total smoking was estimated to fall 46 percent from 1999 to 2007, to 12.3 billion packs, by the Joint Committee on Taxation JCX-45-98, "Description and Analysis of Revenue-Related Provisions of S. 1415 Relating to National Tobacco Policy as Modified by the Manager's Amendment", June 3, 1998. If Philip Morris's sales fell by the same percentage it would sell about 6 billion packs.

¹⁰⁹ So if the look-back penalty were 20 cents, the marginal tax cost to Lorillard of selling an extra pack of Newport would be 30 cents in all. But each extra pack of Newports that Lorillard sold would cost Philip Morris 60 cents.

¹¹⁰ The companies would benefit most if youth smoking fell 38.4 to 50 percent. If youth smoking fell by 50-60 percent then the marginal impact of an extra smoker on the tax rate would be much lower than if the rate fell by less than 50 percent, so the difference between marginal and average rates would be less.

¹¹¹ The FTC recognized that look-backs could facilitate higher industry prices and profits (conversation with Jonathan Baker, Director of the Bureau of Economics). Note that there might be a strong incentive for firms to collude to get youth smoking to decline by more than 38.4 percent, to create this large wedge between marginal

The Bill also contained company-specific look-backs, which would have had very different effects. Within 10 years companies would have to pay \$1,000 (non tax-deductible) for every estimated youth smoker in excess of 40 percent of their starting amount. So if there are currently 3 million youth smokers and youth participation fell by 30 percent, the companies would be liable for the equivalent of \$1.5 billion in pre-tax profits, or 12.5 cents a pack if overall volume were 12 billion. Again, marginal rates could be very different than average rates --- probably higher but possibly lower, depending on the elasticity of youth participation with respect to overall volume.¹¹²

The penalties would also have a tremendously different impact across companies. Philip Morris would probably have to pay hundreds of millions of dollars per year, while Brown & Williamson (which would be unlikely to have to pay any penalty because of a de minimis exemption¹¹³) would see its profits soar as Morris raised its prices in response to its penalties.¹¹⁴

While taxing young people's favorite brands more heavily seems a good idea in principle, there are problems with this plan. First, the way the penalties are calculated makes them closer to fines than taxes. The penalties would undoubtedly be challenged by Philip Morris, Lorillard, and RJR if they were passed without a global settlement.¹¹⁵ Companies could reasonably argue that if they are not breaking any laws about selling to youth (they sell only to jobbers) they should not be subject to such fines.¹¹⁶ Second, they could contest whether a survey of high school kids was adequate evidence to impose the large penalties in the Bill. For example, if there are about 50,000 students surveyed (as is currently the case) and 19 million youths in grades 8-12, then on the margin a company would owe \$380,000 for each additional kid who said he or she usually smoked one of its brands.¹¹⁷ Beyond that, if smokers typically have

and average taxes. The companies' protests about these penalties is an indication that they did not believe that the maximum penalties would be avoided.

¹¹² For example, if Marlboro gained 18,000 youth smokers from selling an extra 100 million packs its marginal tax rate would be 30 cents a pack. That is, 18,000 smokers times 1,000 dollars divided by 100 million packs equals 18 cents non-deductible, which is the equivalent of a 30 cent excise tax.

The marginal rate would certainly exceed the average rate if the elasticity of youth participation with respect to overall consumption were .6 or greater, but might be lower if consumption and youth participation had little relation. Specifically, if youth participation fell by 100X percent, $X < .6$, then the marginal rate would equal the average rate times $(1-X)/(.6-X)$ times the elasticity of youth consumption with respect to overall consumption. (To check this, note the average rate per pack is $\$1000 \times (\text{Youth participation} - .4x \text{ Initial youth participation}) / \text{Sales}$. The formula for the marginal rate is $\text{Average rate} \times (\text{Youth participation} / (\text{Youth participation} - .4x \text{ Initial youth participation})) \times \text{Elasticity of youth participation with respect to overall sales}$.)

So for example if youth smoking fell by 40 percent the marginal rate would exceed the average rate so long as the elasticity was greater than 1/3.

¹¹³ Very few youth smokers claim Brown & Williamson's discount products as their "usual" brands.

¹¹⁴ With its competitors' average costs increasing, and their marginal costs increasing even more, Brown and Williamson would be well positioned to increase both its margins and its market share. For example, if its competitors passed on cost increases of 12.5 cents per pack Brown and Williamson could choose to go along, raising its profits per pack from about 20 cents to 32.5 cents. An ardently anti-tobacco senior congressional staffer, arguing for even stronger brand-specific penalties, claimed that he had talked to Brown & Williamson, and that they considered such penalties to be "very reasonable". (Private telephone conversation.)

¹¹⁵ Brown & Williamson and Liggett would effectively be exempted from the company-specific penalties by de minimis rules.

¹¹⁶ If the companies violate the marketing restrictions, they should be liable for the penalties prescribed for those violations.

¹¹⁷ There would be little almost any anti-smoking teenager could do to hurt the industry more than falsely reporting that they smoked one of the leading brands.

“usual” premium brands but will sometimes smoke discount and less-popular premium brands, then the penalties on the leading brands will be disproportionate to the fraction of youth smoking that their brands account for. Finally, if firms are left with any non-price weapons to affect sales, their incentives will be as much to get youths to switch to other brands as to get them to quit smoking.^{118 119}

Given the marketing restrictions in the Bill, the main effect of the company-specific look-backs will be to further raise the price of certain brands of cigarettes.¹²⁰ But this could probably be done in a more straightforward manner. For example, ad valorem taxes might have a broadly similar effect¹²¹ without the problems discussed above.

It is our belief that the designers of the look-back penalties had other agendas besides youth smoking --- a desire to further raise cigarette taxes and to punish the most profitable manufacturers. The badly flawed design of these provisions relates to the political expediency of casting them in terms of their impact on youth smoking.

Marketing Restrictions

Both the Resolution and the Bill contained marketing restrictions roughly along the lines of earlier proposals by the Food and Drug Administration. These restrictions seem to be a good idea for several reasons. If youth participation is highly sensitive to promotion, then marketing restrictions are a good way to target youth consumption, and the companies will not lose much because the profits from the youth market are largely competed away by advertising. On the other hand, if marketing expenditures serve largely to redistribute a fixed supply of new customers, then these restrictions will raise company profits.¹²² Also, marketing restrictions do not have the adverse distributional consequences of a tax increase.

Table 10 gives the FTC’s breakdown for industry spending in 1996 on advertising and promotion.

INSERT TABLE 10 HERE

The proposed restrictions affected virtually every category listed other than the first two. The Resolution bans tobacco brand names, logos and selling messages on non-tobacco merchandise, bans sponsorship of sporting and cultural events in the name, logo or selling message of a tobacco product brand, and restricts tobacco advertising to black text on white

¹¹⁸ The analysis is similar to Ayres and Levitt’s (1997) comparison of The Club and Lojack as systems to reduce car theft. The Club, a metal bar locked to the steering wheel, is a device to encourage criminals to steal someone else’s car. Lojack, a hidden device that enables police to quickly find stolen vehicles, will discourage overall theft. Company-specific penalties create Club-like incentives.

¹¹⁹ Of course, companies will be most concerned with affecting reported rather than actual youth smoking.

¹²⁰ If the Bill had dropped the Resolution’s marketing restrictions, or if they had been overturned in court, the company-specific look-backs could also have been important in discouraging youth-oriented marketing.

¹²¹ See the section on Specific taxes vs. Ad valorem taxes.

¹²² Of course if marketing simply redistributes a fixed number of customers between the discount and premium segments and do not affect youth smoking, then the marketing restrictions will serve no public health purpose and may hurt the profits of the premium producers.

background except in adult publications and adult-only facilities. It requires tobacco advertising to carry a statement of intended use ("Nicotine Delivery Device") and bans offers of non-tobacco items or gifts (e.g., t-shirts, gym bags, caps) based on proof of purchase of tobacco products. It also bans human images and cartoon characters like Joe Camel and the Marlboro Man in all tobacco advertising and on tobacco product packages, bans all outdoor tobacco product advertising, including advertising in enclosed stadia and indoor advertising directed outdoors, and bans tobacco product advertising on the Internet unless designed to be inaccessible in or from the United States. Finally, it limits point-of-sale advertising to black-on-white, text-only signs, and regulates the number and size of signs (except in adult-only facilities).

The McCain Bill was similar to the Resolution, except that it also extended some of the restrictions on other outlets to adult-only stores.

Based on the list of current advertising vehicles employed by the industry, very little would be left other than free lighters, black and white point of sale and magazine advertising, some color ads in adult-only facilities, and promotional allowances and coupons. Although promotional allowances and coupons are the largest categories of "marketing expenditures", they are really forms of price cuts that the companies use to price discriminate among retailers and consumers, respectively, and the effect of banning them seems unclear.¹²³

In principle, there are many reasons to promote cigarette brands. Firms may wish to steal customers from other brands or defend their current customers from other brands, but if these were the primary motivations companies would gain from (and not object to) marketing restrictions.¹²⁴ They may wish to deter entry or promote new brands, but neither of these issues looms large given the current state of the industry and since the ban on radio and television ads. There may also be a desire to influence the media¹²⁵ and social culture generally,¹²⁶ but free-riding would make marketing for this purpose unlikely for any company except Philip Morris.

¹²³ The literature about the effects of permitting price discrimination is mixed in its conclusions. For a monopoly firm selling to segmented markets, Varian (1989) shows that price discrimination has ambiguous effects on total output, and if demand curves are linear, then price discrimination leaves total output unchanged. In the case of oligopoly, which is more relevant here, the effects of price discrimination are still ambiguous, but there seems a greater presumption that price discrimination may increase total output. For example, Corts (1998) proposes a duopoly model in which price discrimination causes all prices to fall (hence output rises), and Armstrong and Vickers (1998) analyze a duopoly model in a Hotelling framework, and show that price discrimination causes total output to increase whenever the products are sufficiently close substitutes. Furthermore, banning price discrimination may facilitate collusion by improving price coordination among the oligopolists. See Ordober and Panzar (1980) for discussion of quantity discounts to retailers. Recent work by Scott Morton (1997) and Elzinga and Mills (1997) on prescription drugs also suggest that banning price discrimination may raise prices.

¹²⁴ Although some individual companies might object, we would not expect industry associations (e.g. the U.K. Tobacco Manufacturers' Association) to strongly object to restrictions, as they do.

¹²⁵ Warner et al (1992) shows that magazines' coverage of the health risks of smoking is (negatively) related to the proportion of advertising revenues derived from tobacco advertising (and not merely related to the binary variable of whether tobacco advertising is accepted or not, which suggests the direction of causation may not only be from magazines' attitudes to choice of advertising) and the "Smee report" (*the Effect of Tobacco Advertising on Tobacco Consumption*, U.K. Department of Health Discussion Document, 1992) argues that it is likely that some magazines have modified their stance in deference to tobacco advertisers.

¹²⁶ Marsh et al (1983) shows 44% of smokers and 26% of non-smokers agree with the statement that "smoking can't be really dangerous or the Government would ban cigarette advertising," in spite of the Government's

The most compelling reason why shareholders might lose from marketing restrictions is that marketing can help maintain a brand's premium status, allowing the brand to continue charging a premium price.¹²⁷

Firms' managers may oppose marketing restrictions because the firms are marketing-driven organizations (see Table 6 for the fraction of revenues spent on marketing), and the managers wish to retain their jobs and empires, but this is no reason for shareholders to value marketing. Similarly, marketing may be important for attracting new customers, which is a further reason for executives who value their future jobs to fight to defend it.

However, as we argued above, there is likely to be little net profit gain to the industry in being able to advertise for new customers, because the marketing competition will dissipate a lot of the profits that the new customers generate.¹²⁸

Ironically, the more sensitive youth smoking is to youth-oriented marketing, the larger is the fraction of the present value of profits from today's youth smokers that will be competed away through the marketing competition. So even if advertising is very important for recruiting new customers, restrictions that eliminate the competition for youth smokers are likely to only slightly reduce the market valuations of the companies, and will also increase short term profits. Of course, if the industry-wide number of new smokers is insensitive to marketing effort, firms may actually gain if youth-marketing is banned. These results are consistent with the tenor of negotiations over the Resolution, in which the companies agreed to give up Joe Camel and the Marlboro man after the very first day of meetings.¹²⁹ We develop these points further in a simple model in Section C of the Appendix.

The bottom line is that strong marketing restrictions oriented against youth smoking are an efficient part of any deal.

Special Interests

Liggett

Liggett argued that it should be rewarded because it had in effect turned state's evidence by settling early with the Attorneys General and turning over secret industry documents. The amended version of the Bill accordingly exempted it from the taxes so long as its market share remained under 3% (more than twice its current share). Assuming cigarette sales would be about 19 billion packs once the tax of \$1.10 per pack is instituted, the exemption is potentially

health education program. See also the Smee report (cited in previous note). Tobacco advertising and the sponsorships of sport and other activities may also increase the social acceptability of smoking.

¹²⁷ When marketing a brand to increase the willingness to pay of consumers who already prefer that brand, a firm is in the position of a monopolist and there may be less dissipation of rents than when the oligopolists compete for a new customer. Of course the distinction between different kinds of marketing is very fuzzy.

¹²⁸ So the traditional argument that companies oppose marketing restrictions because of the impact on recruiting new customers (see, e.g. Tye, Warner, and Glantz (1987)), would seem to have to rely on the agency-theory argument of the previous sentence.

¹²⁹ See Mollenkamp et. al., p. 137. For perspective, the negotiations took about two and a half months overall (April 4 – June 20).

worth \$630 million per year. Because Liggett's market share is currently well below 3 percent, it would have to raise prices by a little less than \$1.10 to benefit maximally from its tax break,¹³⁰ and Liggett's state settlements require it to turn over 27.5 to 30 percent of its pre-tax profits to the states¹³¹, so the net pre-tax benefit to the company would perhaps be closer to \$400 million per year.¹³² Still, this is a remarkable annual payment for a firm with a total market value of around \$100 million, pre-settlement.¹³³

We suspect this provision could only have passed because of confusion between the concepts of exempting Liggett from being economically punished by the Bill, and exempting Liggett from paying the “damages” or “settlement payments”, a confusion which would be less likely if the payments had been referred to honestly, as taxes. If the aim were to exempt Liggett from punishment, a simple solution would be to treat it as a new manufacturer. This would imply exempting Liggett from the \$10 billion up front payment, and giving it a tax credit for any amounts it pays to the states under its state settlement agreements. A more generous approach --- it is arguable that Liggett's betrayal of its competitors was a crucial turning point in the war against Big Tobacco --- would be to reward it out of the payments that would otherwise be paid to the attorneys for their part in the victory.

From an economic viewpoint Liggett should probably be closed down (or merged into another firm). Its costs are much higher than the those of the Big Four implying substantial deadweight losses,¹³⁴ and maintaining price competition is not the key objective in this industry.^{135 136}

Small Manufacturers

The Commerce Committee version of the Bill gave companies a 75 percent tax reduction on the first 150 million packs they sold, and a 50 percent reduction on the next 150 million packs.¹³⁷ The implication is that a new manufacturer (or an importer) could market 150 million packs of generic cigarettes at an 80 cents a pack advantage over Philip Morris. This incentive would have swamped the market with billions of packs of generic cigarettes from small labels. The Treasury and FTC noticed this problem, and persuaded the Senate to cut back this

¹³⁰ The company has claimed that it will raise its list prices along with the other manufacturers, but obviously it will have an enormous incentive to provide retailers with whatever incentives it takes to get to a 3 percent share. Given the high market share of deep discount cigarettes before Marlboro Friday, it seems likely that Liggett can return to 3 percent of the market while increasing its prices by close to a dollar.

¹³¹ The settlement is available at <http://www.ag.ohio.gov/agpubs/Tobacco/liggett1.htm>.

¹³² The primary beneficiary, would have been Bennet LeBow, a notorious businessman who controlled Brooke Group, which owns Liggett. On LeBow see "Ready Credit: Head of Brooke Group Draws on Its Coffers to Tune of Millions --- LBO Artist Bennet LeBow, 60% Owner, Gets Loans and Sells Assets to Firm --- Public Company Under Stress" By Laurie P. Cohen, "The Wall Street Journal", July 30, 1993, p. A1.

¹³³ It would have been much cheaper to buy control of Liggett, xerox its secret papers, and close down the company, writing off the cost as part of the litigation expense, than to give the company even a fraction of the proposed subsidy.

¹³⁴ An argument could be made that Liggett is valuable because it mostly sells discount brands, if those brands have less appeal to youth smokers.

¹³⁵ In any case, giving Liggett a fixed market share removes the company as a force for holding down profit margins, because the rest of the firms then know that they will end up with 97 percent of the market no matter what.

¹³⁶ More generally, mergers in this industry might be less undesirable than usual.

¹³⁷ See section 403(d)(B).

provision to apply only to the Kentucky chewing tobacco companies it was originally designed for.

Lawyers' Fees

Because it was widely agreed that even the smallest amount of money the trial lawyers would ask for would seem outrageous, neither the Bill nor the Resolution quantified fees. Instead, the fees were left to be determined by arbitrators.¹³⁸ State settlements adopted the subterfuge of announcing a lower settlement with lawyers' fees to be paid in addition, so that the government could disclaim spending the billions of dollars. Knowing that if the trial lawyers were not bought off the whole deal might fall apart, the companies offered to pay the lawyers an annuity of up to \$500 million per year, presumably in proportion to each company's sales, as part of any national settlement.¹³⁹

One window into the aspirations of the plaintiffs' lawyers comes from the testimony of Jeffrey E. Harris, an MIT economist and long time industry critic, who has served as a plaintiffs' expert witness for over ten years.¹⁴⁰ Harris proposed a scheme under which lawyers from the states that have contingency fee agreements would receive 12.9 to 14.6 percent of the revenues that would go to those states. These rates were consistent with the fees that had already been negotiated in the Texas and Minnesota state cases.¹⁴¹ The Harris plan would cost at least \$15 billion in present value, based on the Bill's taxes, and would be financed by an eight cent per pack "lawyer's tax".¹⁴² Put another way, it would amount to an average of better than \$30 million apiece for 470 class action lawyers, for a deal that yields smokers no money.¹⁴³

The week the Bill died Republicans succeeded in putting caps on legal fees. The cap for lawyers who filed suit before December 31, 1994 was \$4,000 per *hour*.¹⁴⁴ Richard Scruggs, who would have had his fees very sharply reduced by this limitation, argued that the provision

¹³⁸ There would be three arbitrators, one chosen by the lawyers, one by the companies, and one jointly. Smokers, who would pay most of the costs, would have no say.

¹³⁹ See: "Tobacco Firms Quiet on Fees to Be Paid To Plaintiffs Lawyers Under Settlement" by Milo Geyelin, *The Wall Street Journal*, December 15, 1997, p. B16.

¹⁴⁰ "Written Testimony Before the Subcommittee on Courts and Intellectual Property, Committee of the Judiciary, U.S. House of Representatives, Oversight Hearing on Attorneys Fees and the Proposed Global Tobacco Settlement", available at www.mit.edu/people/jeffrey.

¹⁴¹ In Texas a 15 percent contingency fee for the lawyers, projected to be about \$90 million a year forever adjusted for inflation, has been ruled "reasonable" by Judge David Folsom. One calculation indicated that these fees come to as much as \$92,000 per hour. (These fees mean that if the Texas settlement holds, every pack sold anywhere in the U.S. will include a 3/8 cent tax for select members of the Texas plaintiffs' bar.) In Minnesota, attorney general Hubert Humphrey has already defended a proposal to award plaintiffs' attorneys \$469 million over five years. Although this fee was widely reported as 7 percent, the lawyers would be paid over five years while the state would be paid over 25 years. Discounting payments at 10 percent, the lawyers' fee was closer to 17 percent. In both cases the amounts were effectively financed by raising the national excise tax. See "Tobacco War's New Front: Lawyers Fight for Big Fees" by Barry Meier and Jill Abramson, *The New York Times*, June 9, 1998, p.1.

¹⁴² Assumes a tax rate of \$1.10 per pack, Harris's estimates of lawyers' fees of 6.65 to 7.14 cents per dollar, and Harris's estimates of the present value based on the Resolution's taxes. Also assumes that firms would have chosen to divide fee payments by future market shares, effectively turning them into a national excise tax.

¹⁴³ The estimate of 470 lawyers comes from \$50 Million Men: "Tobacco Lawyers Become Sultans" by Paul A. Gigot, *The Wall Street Journal*, June 27, 1997, p. A14.

¹⁴⁴ The caps were \$2,000 per hour for those who filed before April 1, 1997, \$1,000 per hour for those who filed before June 15, 1998 and \$500 per hour for those who filed later.

was unconstitutional,¹⁴⁵ while Richard Daynard, chairman of the Northeastern University Tobacco Products Liability Project, argued that the caps would “protect the tobacco cartel by effectively quashing tobacco litigation forever”.¹⁴⁶

The Senate was surely right to place some limits on fees: we believe there are crucial differences between litigation, under which the lawyers' contingency fee contracts would apply, and legislation. In particular, in a conventional class action lawsuit, parties can opt to not participate in the class. Would Kentucky be allowed to opt out of the Bill, its citizens not paying the tax increase and the state not receiving its share of the tax revenues?¹⁴⁷ No. Could a settlement make as yet unborn companies be liable for “damages” of \$1.10 for every pack of cigarettes they sell, a crucial component of the Bill? Of course not. Because most of the payments would be taxes rather than damages,¹⁴⁸ and all would be the result of legislation rather than litigation, the contingency agreements seem to be of limited relevance. Furthermore, as a general principle, we are very troubled by the prospect of a group of private citizens getting paid a percentage of a tax increase they helped pass.

State Settlements

Before the demise of the Bill, settlements modeled on the Resolution were negotiated in Mississippi, Florida, Texas, and Minnesota. These deals all included up-front payments and graduated national sales taxes, called “damage payments”, as in the national Tobacco Resolution. That is, the revenues for each state are collected nationally even though they are only distributed to plaintiffs in that state. But while Congress has a perfect right to legislate a national tax that is economically equivalent to a collusive agreement¹⁴⁹, and Texas, for example, likewise has the right to raise prices within its own state,¹⁵⁰ the idea that Texas should be able to impose taxes on cigarettes manufactured in Virginia and sold in Kentucky seems a terrible precedent.

¹⁴⁵ See “ Senate Votes to Selectively Limit Fees Of Trial Attorneys in Tobacco Cases” by Jeffrey Taylor, *The Wall Street Journal*, June 17, 1998, p. A4. Scruggs is in line for contingencies from over 20 states.

¹⁴⁶ See “Law Professor says Senate Bill would protect Tobacco Cartel by effectively quashing litigation forever”, June 17, 1998, available at <http://www.tobacco.neu.edu/Congress/GortonPR.htm>. Daynard was a member of the trial lawyer team in Florida, where attorneys have been asking for fees with a present value of \$1.3 billion just for that state settlement. About that controversy Daynard said “If the money is being distributed, I want my share, but I'm not going to get involved” in fee disputes. See “State's Lawyers Battle Over Tobacco-Suit Fees” by John D. McKinnon, *The Wall Street Journal*, September 10, 1997, Florida Journal p. F2.

¹⁴⁷ Similarly, an individual smoker who was part of the Castano classes would not be allowed to withdraw from the “settlement”, not paying the \$1.10 per pack tax increase and not receiving the “free” smoking cessation materials that would be provided in the Bill. Smokers might regard the situation as Orwellian: “their” lawyers would be claiming a great victory, with a net financial cost to the clients of several hundred dollars per year. States can opt out of their share of settlement revenues, but cannot opt out of taxes on their citizens.

¹⁴⁸ If the Bill maintained its fixed-revenue taxation, then part of the cost to firms would probably not have been passed through to consumers and that part might reasonably be regarded as damage payments.

¹⁴⁹ National prices were in fact raised by all firms after the Florida and Mississippi deals, and again on the days after the Texas and Minnesota deals.

¹⁵⁰ While an agreement that raised prices throughout Texas would still be collusive if the “damages” were not interpreted as a tax, it might fall under the principle of “state action”, which is what allows cities and taxi owners to fix fares without running foul of the federal antitrust laws.

Another unappealing feature of states being able to impose national taxes on cigarette companies, is that other state legislatures will feel compelled to pass similar laws to Florida's Medicaid Third Party Liability Act and sue the companies so that they can get their fair shares of national tobacco taxes.¹⁵¹ Already, Maryland and Vermont have done this.¹⁵² States that do not wish to sue the industry, or are unwilling to distort their state constitutions to improve their bargaining power in this case, will find their residents paying new tobacco taxes but not benefitting from the revenues. Similarly, judges who have to face elections will have an incentive to bias their rulings in favor of the state.¹⁵³

A further troubling aspect of the state cases is that they are negatively related to any losses the states might be suffering because of smoking. Table 11 lists taxes on a state-by-state basis, as well as whether or not the state is suing the tobacco companies. Not surprisingly, states that already charge higher taxes to smokers are the ones filing these cases, which are then settled for yet higher taxes on smokers.

INSERT TABLE 11 HERE

Why were the state deals structured as national taxes? First, each state would like nothing better than to get its tax revenue from the residents of other states if it could. Apparently this was more important than achieving the attorney generals' supposed goal of reducing smoking within their own states.

Second, because the states demanding the damages already had high taxes, new state taxes to finance the deals would increase smuggling between states.¹⁵⁴

Third, a crucial difference between the state settlements and the Resolution is that the state deals only apply to the four large firms, and not to Liggett (because of its prior settlement) or to any new entrant. If the state deals were financed exclusively by in-state damage payments

¹⁵¹ Even North Carolina Attorney General Michael Easley has called upon his state's legislature to repeal a law that he says makes it virtually impossible for his state to sue the industry. See "However unhappily, Easley does his duty", Wilmington, N.C. Sunday Star-News, July 26, 1998, p. 6E. The dismissal of Indiana's suit in state court will increase the pressure.

¹⁵² Those states "also stripped the industry of its traditional defenses, such as that smoking carries well-known risks." See Tobacco: Without Legislation, Prices Rises Could Ease" by Tara Parker-Pope and Mil Geyelin, The Wall Street Journal, June 19, 1998 p. B1.

¹⁵³ For example, in Minnesota the companies were not allowed to argue that the state estimates of Medicaid costs were overstated because they did not allow for the premature deaths of smokers. They were also not allowed to argue that the state should only be allowed to sue for its part of Medicaid expenses, rather than the Federal government's part as well. A reasonable case can be made (at least to an economist) that these rulings were flawed, particularly given that what was really being negotiated was a tax hike on smokers rather than liability payments by the companies. You might not want to reduce a company's liability based on the "savings" from smokers dying early, but it is quite another thing to tell smokers who are being asked to pay for the externalities they create that their shorter life expectancy should not be credited. The presiding judge was removed from the case shortly after the settlement was announced. See "Fitzpatrick Removed From Tobacco Case" by Molly Guthrie, St. Paul Pioneer Press, June 10, 1998.

¹⁵⁴ In the United Kingdom, to which smuggling is relatively hard, tobacco smuggled from foreign countries accounts for about 20 percent of cigarette consumption and about two-thirds of hand-rolled tobacco consumption. See "Failing to Kick the Habit" by Richard Tomkins, Financial Times, June 26, 1998 p22 and "Customs to Clamp Down on Smuggling", by John Willman, Financial Times, July 29, 1998 p8. In the United States the classic example of interstate smuggling is between New Hampshire and Massachusetts. For example, in 1996 taxes per pack were 63 cents lower in New Hampshire (including sales taxes). Per capita sales were 74.6 packs in Massachusetts and 158.0 in New Hampshire.

they would create a large cost advantage for Liggett and the fringe firms relative to the major companies, and would enable aggressive entrants and Liggett to dominate the generic business and seriously damage the premium segment for the major companies. By basing damages on national sales, the deals have given Liggett and the fringe a small, non-disruptive, national advantage of a few cents a pack.

An implication is that while the four state deals to date are probably not enough to encourage entry, it seems inconceivable that the companies will make 50 such deals with the 50 states. Increasing taxes on the major firms by the 62 cents envisioned by the Resolution without imposing similar increases on the smaller firms would ultimately wreck the major firms' business.¹⁵⁵ The companies probably settled the first four state claims because they wanted to avoid negative publicity while national legislation was being negotiated.¹⁵⁶ With the death of the Bill and the progressively larger threat of entry as state settlements pile up, we expect the companies to drive harder bargains in the future. If there are more state settlements, either the total size of the tax increase will have to be far less than 62 cents per pack or the settlements will have to be drawn to deter large scale entrants.

Any new multi-state agreement should be structured to treat all fifty states equally, effectively imposing an identical tax in each state, or should otherwise be structured so that each state receives the tax revenues contributed by its citizens.¹⁵⁷

Radical Solutions

This paper has largely focused on the provisions in the Bill and Resolution, and how they could be improved. This brief section looks at two ideas that were not seriously considered, but perhaps should have been.

A more radical approach to a tobacco deal would be to allow the industry to spin off its domestic businesses and for the government to buy them. Applying McCain-like taxes to pay the cost, the debt incurred in a fully debt-financed purchase could be paid off in about two years.¹⁵⁸ Tobacco policy could then be determined without any input from tobacco executives

¹⁵⁵ Another possible problem would arise if the entrants were able to buy the rights to the names of premium brands while maintaining their tax advantages. In this case, the firms might escape their liabilities by selling off their trademarks and liquidating themselves. Liggett is already structured so that its trademarks are owned by separate wholly owned subsidiaries. However, we imagine such transactions would be prevented in some way.

¹⁵⁶ During this same period they also settled the *Broin v. Philip Morris* environmentally transmitted smoke suit, although the scientific evidence behind ETS cases is much weaker than the evidence on direct smoking. In addition to the companies' desire to avoid publicity, the willingness of the attorneys to accept a settlement that gave the plaintiffs no money was key, as was the companies' agreement not to contest the lawyers' fees at the hearing to determine the fairness of the settlement: the lawyers (a husband-and-wife team) received \$49 million. See "Justice is Blind" by Richard Tomkins, the Financial Times, July 17, 1998 p.22.

¹⁵⁷ This could be done by calculating each firm's total payments by summing across all states the product of the firm's market share in the state times the state's negotiated national tax rate times national sales. Because such a tax would only apply to the industry's Big Four the tax rates would be limited by the need to stop entry.

¹⁵⁸ Assuming a price-earnings ratio for the domestic tobacco industry ex litigation expenses of 10, the industry would be worth about \$50 billion. The Resolution showed that the companies would be willing to give up at least a third of that value to settle litigation claims, and the market shows that shareholders would take much less. Excluding the lump sum payments, the McCain Bill would have collected \$29.8 billion in tax revenues in its first two years. Combined with the operating profits from the acquired companies (perhaps another \$13 billion) this should be enough to pay off a fully debt-financed purchase.

and shareholders. The downside of this option is political: there would be no more industry villains to kick around any more, and the government would have to take responsibility if demand failed to decline adequately. However, if there is one thing that government monopolies are traditionally good at, it is deglamorizing their products and making them as consumer-unfriendly as possible.¹⁵⁹

As another alternative, if the public health concern issue is the amount of cigarette smoking, why not regulate quantity directly instead of price? That is, a fixed and declining number of licenses could be sold each year to cigarette makers, analogous to tradable pollution permits.¹⁶⁰ Firms would still have an incentive to market so that they could raise prices, but the marketing would have no first order health consequences. Of course the usual issues about quantity versus price regulation would apply. But even if setting quantity targets is desirable, it may not happen because of politics: the rhetoric has all been about reducing youth smoking while allowing adults to smoke. Setting quantity levels for overall cigarette sales (as opposed to the quantity targets for youth participation in the look-back rules) might be too difficult to defend as a youth smoking policy.

The Way Forward

It is not possible to make a deal that would satisfy both the tobacco industry and its most ardent critics. David Kessler, former head of the Food and Drug Administration, says of the tobacco companies, "I don't want to live in peace with these guys. If they cared at all for the public health, they wouldn't be in this business in the first place. All this talk about it being a legal business is euphemism. They sell a deadly, addictive product. There's no reason to allow them to conduct business as usual."¹⁶¹ What is possible is a deal that would sharply reduce smoking, youth smoking in particular, in return for reducing the companies' exposure to lawsuits. This was the concept behind the Resolution and the early draft of the Bill. In this concluding section, we summarize the main ways in which such a deal should be structured.

Cigarette taxes should be set so that firms' marginal rates are greater than or equal to their average rate, preferably greater. An easy way to do this is to exempt a small fraction of each firm's current sales from the taxes. The Resolution set marginal and average rates equal; the Bill set marginal rates below average.

In the context of this legislation, there is no good rationale for setting the same rate of tax on all cigarettes. One might argue that government's role is to make sure that citizens have adequate information to decide what to eat, drink, and smoke, and to impose taxes based on the externalities imposed on others. But if that is all, then cigarette taxes should be lower than they already are. Higher taxes must be justified by assuming that smokers do not adequately internalize their risks to themselves. If so, then taxes should be higher the more tar and nicotine there is in a cigarette. This approach would be consistent with the provisions in both

¹⁵⁹ One possibility might be to ask Preston Tisch, one of the brothers who controls Lorillard and a former Postmaster General, to run the monopoly and institute post office worst-practice marketing reforms.

¹⁶⁰ The licenses could relate to tar and nicotine content as well as number of cigarettes.

¹⁶¹ See "Big Tobacco's Endgame" by Jeffrey Goldberg, *The New York Times Magazine*, June 21, 1998.

the Bill and Resolution to set maximum levels of tar in cigarettes. Basing taxes on tar and nicotine would also give the companies an incentive to develop safer cigarettes.

If youth smokers are attracted by heavily marketed brands, there is also a rationale for imposing ad valorem taxes. Such taxes reduce the incentive to market premium cigarettes, and would discriminate against youth.

We support the marketing restrictions in the Bill and Resolution. Such restrictions should reduce smoking, and youth smoking in particular, without proportionally reducing profits. The argument that few smokers switch brands, and therefore the reason that companies wish to continue to advertise is to attract youth smokers, is simply wrong. Companies will aggressively fight for new customers, but in doing so will dissipate much of the future profits. It is not surprising that the companies were willing to sacrifice Joe Camel and agree to other marketing restrictions on the very first day of negotiations over the Resolution.

The look-back penalties in the Resolution were a useful mechanism for the marketing restrictions. The look-back penalties in the Bill were simply another poorly designed tax on cigarettes, having little to do with youth smoking. Restrictions on where tobacco can be sold and increases in the minimum legal age would make more sense than look-backs as youth smoking measures. Given the Bill's hand-tying marketing restrictions on the companies, the incentives for reducing underage smoking should be directed at state governments, who would be responsible for the efficacy of anti-smoking programs and would have the police power to enforce rules against the illegal sale and consumption of cigarettes. That said, we believe that regardless of the rhetoric the public health community is more concerned, and appropriately so, with reducing overall smoking than with reducing youth smoking participation rates.

Regardless of whether the companies' past actions should make them liable for damages, we support including protections from lawsuits in any deal. It is the one thing that can be offered to the companies to make them acquiesce to all the other provisions that will be in any legislation. An anti-smoking bill could be passed by Congress, but if there are no legal protections it would have to be done over the vigorous opposition of the industry, which succeeded in defeating the current Bill after its protections were removed.¹⁶²

If the litigation against the companies were focused on truth seeking and a fair calculation of damages, then we would be less enthusiastic about legal protections. But none of the parties seem particularly concerned about relating payments to damages. That is why the up-front damage payments were based on how deep each company's pockets were and not on its contribution to disease. Similarly, the "co-insurance" provisions that made it as cheap for a company to give a plaintiff \$5 million as it would be to spend \$1 million fighting off an invalid claim hardly seem designed to push the legal system to get at the truth. We do not advocate lump sum payments made in proportion to market value¹⁶³, nor do we advocate the co-insurance scheme.

Finally, we have enormous problems with the state settlements, which are the only tangible results of the whole process so far. The collusive nature of these agreements, which effectively

¹⁶² Furthermore the marketing restrictions and the look-back penalties were likely to be challenged in court if Congress passed a bill without industry acquiescence.

¹⁶³ We would not object so much to lump sum payments made in rough proportion to a company's responsibility for damages.

impose national excise taxes on the industry to settle the claims of an individual state, will set a terrible precedent for other litigation, if they are allowed to stand without explicit Congressional approval. They also create a “common pool” problem, with each state now having the incentive to pass laws making it easier for the state to sue tobacco and other industries as a way of taxing consumers in other states.

In the end, whether a deal occurs may depend on how important it is to the anti-tobacco forces to punish the companies. The companies can be bargained into accepting higher taxes, accepting marketing bans, and paying some money. They cannot be bargained into bankruptcy. Without a national settlement the companies may be forced to pay more money, maybe even forced into bankruptcy. But bankruptcy would not make the cigarette industry disappear, and the restructured companies that arose from Chapter 11 would be less vulnerable to lawsuits than the current firms. If the goal is to cut smoking, and do it quickly, then a deal makes sense.

Technical Appendix

A Fixed-Revenue Taxation vs. Specific Taxes

This appendix shows that relative to specific taxes, fixed-revenue taxation (i) results in lower pass-through, and (ii) yields more dispersed market shares.

Let firms $i=1, \dots, N$ have marginal costs c_i , and choose outputs q_i . Let $Q = \sum_{i=1}^N q_i$, and assume a conventional tobacco demand specification $\ln Q = a - bp$, or equivalently $p = a - b \ln Q$, in which p is the industry price.

Assuming Cournot behavior and a specific tax of t , each firm, i , sets

$$c_i + t = \frac{d}{dq_i}(pq_i) = a - b \ln Q - bs_i = p - bs_i, \text{ in which } s_i \text{ is } i\text{'s market share. Aggregating over}$$

all N firms, yields $Np - b = \sum_{i=1}^N c_i + Nt$, which implies $p = c^* + b/N + t$, in which c^* is the (unweighted) average cost of the firms.

However, a fixed-revenue tax $T = tQ$, allocated in proportion to market share, implies that the

individual firm's first-order condition becomes $c_i + (1 - s_i)t = \frac{d}{dq_i}(pq_i) = p - bs_i$, and aggregating

over the N firms yields $p = c^* + b/N + \frac{N-1}{N}t$.

This result that the derivative of price with respect to the average tax is only $\frac{N-1}{N}$ as great with a fixed-revenue tax is independent of the specification of demand, but does depend on the Cournot assumption. We chose the log-linear distribution to illustrate because it is commonly used to estimate cigarette demand and it has the nice feature that specific tax increases are passed on dollar for dollar with no changes in industry market shares.

With the fixed-revenue tax, solving for market share yields $s_i = \frac{1}{N} + \frac{c^* - c_i}{b - t}$, which has the

intuitive implication that market shares will become more dispersed if a fixed-revenue tax is instituted, because the largest firms will face the smallest incremental marginal costs from the tax.

Again, it is not too hard, although algebraically messier, to check that the result that a firm with costs below (above) c^* has a larger (smaller) market share under fixed-revenue than under specific taxation is independent of the specification of demand.

The results are qualitatively the same but not as strong outside the Cournot model. In a Cournot model, a firm's actions do not affect its competitors' sales. In the extreme where industry demand is completely inelastic a firm's marginal tax rate will be equal to the average rate of t . If activity that leads to one extra sale for the firm leads to an increase of δ in industry sales, then the effective

marginal tax rate under fixed-revenue taxation is $t(1-ds_i)$ and the projected pass-through rate is $\frac{N-d}{N}$ times the pass-through rate of a specific tax.

B. The Value of the Youth Market: Price Competition

This appendix describes a simple model of price competition in which (i) the inability to price discriminate between old and young consumers does not affect the value of the youth market, and (ii) the value of young consumers is tiny, because the profits earned from them after they have developed brand-loyalty are dissipated by competition for those profits.

Begin with a single-period N -firm market in which each firm i has a privately-known marginal cost c_i independently drawn from a common distribution $F(\cdot)$.¹⁶⁴ Each firm has $\binom{n}{N}$ "old" brand-loyal customers who have reservation price R for consuming its brand, but a high cost of switching to any other brand.¹⁶⁵ There are also m "youth" consumers who have reservation price R for consuming *any* brand, so will buy the cheapest brand.^{166, 167} Firms are risk-neutral and independently and non-cooperatively choose prices p_i .

To analyze this model let $d_i = R - p_i$ be the "discount" below the reservation price that firm i offers. Think of the firm that offers the highest discount as the winner of a prize worth $m(R - c_i)$, that is, the low-price firm wins the youth market and it is worth $m(R - c_i)$, to it before accounting for the discount. The winning firm pays $\binom{n}{N} + m$ d_i in discounts while non-winners pay $\binom{n}{N} d_i$ in discount costs. (All firms additionally make profits of $\binom{n}{N} (R - c_i)$ on their old customers.) It now follows from the Revenue Equivalence Theorem that the expected profits of the firms in this "discount auction" equal their expected profits if they were bidders in any standard auction mechanism that allocates the same prize.¹⁶⁸ But if an auctioneer simply ran an ascending auction for the prize, raising the asking price until just one bidder remained, the winning bidder would be the lowest-cost firm and would pay the price at which the second-lowest-cost firm (call its actual cost c_2) quits, that is, $m(R - c_2)$. That is, since each firm has the

¹⁶⁴ This assumption allows us to analyze the effects of asymmetries in firms' costs while maintaining a symmetric model structure.

¹⁶⁵ We assume this "switching cost" is so high that no firm finds it profitable to price low enough to sell to other firms' old customers. Obviously, we do not intend this model to be taken literally. See Klemperer (1987a) for discussion.

¹⁶⁶ An alternative model would have these consumers buying from the "best advertised" brand. The results would be similar.

¹⁶⁷ It is trivial to relax the assumption that the "youth" consumers have the same reservation prices as the "old".

¹⁶⁸ The Revenue Equivalence Theorem states that if each of N risk-neutral potential buyers has a privately-known value, v_i , independently drawn from a common strictly-increasing and atomless distribution for a prize, then any mechanism in which the object always goes to the buyer with the highest value and any bidder with the lowest-possible valuation expects zero surplus, yields the same expected revenue to the auctioneer, and results in a buyer with value v_i making the same expected surplus. Here, $v_i \sim m(R - c_i)$. We assume the assumptions of the theorem hold, and note that a bidder with the highest possible cost sets $d_i = 0$, i.e., earns precisely zero surplus from the competition to serve the youth market. For other examples of using the Revenue Equivalence Theorem to efficiently analyse non-obviously-auction situations see Bulow and Klemperer (1994, 1999), and see Klemperer (1999) for further discussion.

lowest costs, say c_1 , with probability $\frac{1}{N}$, its expected profits from the auction are

$$\left(\frac{m}{N}\right)E\{c_2 - c_1\}, \text{ and its expected total profits are } \left(\frac{m}{N}\right)E\{c_2 - c_1\} + \left(\frac{n}{N}\right)E\{R - c_i\}.^{169}$$

But if firms could price discriminate, each firm would make the same expected profits,

$\left(\frac{m}{N}\right)E\{c_2 - c_1\}$, from Bertrand competition for the youth market, and $\left(\frac{n}{N}\right)E\{R - c_i\}$ from its old customers.

Of course, the youth consumers of today become old customers tomorrow: let the market last for M periods, and demand in the first period be as above, and consumers always repeat-purchase from their previous suppliers in all subsequent periods, but to keep things simple assume there are no new consumers after the first period. Then all firms' prices after period one will be R , so the prize of winning the youth customers in the first period equals $Mm(R - c_i)$, that is, is M times as large as before, before accounting for the discounts. So firms will discount their first-period prices M times further below R than before. Expected profits from the "auction", and also total profits, are just M times what they were before. As before, the incremental value to the firms of the youth consumers is exactly their value in a model of (repeated) Bertrand competition without brand-loyalty; the monopoly profits they generate after the first period are dissipated by the correspondingly low prices that are set in period one to attract them.

A full many-period model in which youth consumers enter in every period raises many more technical issues but yields the same messages. Though from an accountant's perspective youth smokers pay the same prices as anyone else, they are responsible for older customers paying less than they otherwise would. The value attributable to current and future youth smokers approximates their present value *absent* brand-loyalty effects, while the value of old smokers is their value taking their brand-loyalty into account.¹⁷⁰

¹⁶⁹ To compute the expected market price without price-discrimination, use the Revenue Equivalence Theorem to observe that the auctioneer's expected receipts from the ascending auction, $E\{m(R - c_2)\}$, equal his expected

receipts from the "discount auction", $E\left\{\left(\frac{n}{N} + m\right)d_1 + \sum_{j=2}^N \left(\frac{n}{N}\right)d_j\right\}$, in which d_1 is the highest discount actually

offered. Note that the former expression equals $E\{(n + m)d\}$ in which \bar{d} is the firms average actual discount,

weighted by their sales, which equals $(n + m)(R - \bar{p})$, in which \bar{p} is the expected average price in the market,

weighted by sales. Reorganizing yields $\bar{p} = \frac{nR + mE\{c_2\}}{n + m}$ which, as expected, varies continuously from $E\{c_2\}$ for

a pure youth market, to R for a market with no youth segment.

¹⁷⁰ In such a model, firms set prices that trade off their conflicting desires to capture new consumers and exploit old consumers in every period, and in symmetric steady state the price is the same in every period and for every consumer. The richest available model of multiperiod competition in which brand-loyalty is developed endogenously is perhaps the model with switching-costs in Beggs and Klemperer (1992). See also Farrell and Shapiro (1988), and Padilla (1995) for other multiperiod models, and Klemperer (1987a, b) for simple two-period models with switching costs. The effects that these models demonstrate suggest this discussion may have *slightly* underestimated the value of the youth market, but the magnitude of the necessary correction is probably not large and even its sign is ambiguous. See Klemperer (1995) for more discussion.

Computing the share of market value attributable to youth smokers requires assumptions about the nature of competition absent brand-loyalty effects. Our simple model assumed winner-take-all Bertrand competition (and monopoly pricing for old consumers) so implies a particularly low relative value of the youth market.¹⁷¹ The advertising model in Appendix C involves less cut-throat competition (as also would a model with Cournot competition, or with some exogenous product differentiation) and yields a somewhat higher value of the youth segment.¹⁷²

The truth probably includes elements of both these models, and lies somewhere between them and the case without brand-loyalty effects.¹⁷³ So while future smokers may account for a sixth of the present value of future revenues, their contribution to future profits is much lower. If industry executives seem to value the youth segment, it is probably due more to concern for their own future jobs than concern for their shareholders.

¹⁷¹ A figure of perhaps 2% of the present value of the whole market is obtained, making the assumptions in note 85, using a generous estimate of the profitability of Bertrand competition with differing costs (say 5c per pack) a conservative estimate of the current value of the old customers to a monopolist (say \$35 billion, which is consistent with linear demand and a demand elasticity of -4), and assuming 10% of smokers switch every year (and then act like new consumers).

¹⁷² See Appendix C. Also observe that our calculations are really valuing current non-smokers, who include some above-age future smokers but exclude under-age smokers who are already hooked. But the value of the under-age segment cannot be very different.

¹⁷³ For the latter case, which yields a value of the youth market at most equal to one-sixth of the value of the whole market, see the main text.

C. The Value of the Youth Market: Advertising Competition

This appendix describes a very simple model of advertising competition in which (i) although firms may advertise heavily to attract young consumers, the value to them of being able to do so may be small and (ii) the more sensitive to advertising young consumers are, the larger the fraction of the future revenue from these consumers is dissipated.

Assume firms $i=1, \dots, N$ independently choose marketing expenditures A_i which generate a flow of new consumers into the industry, $y = (\sum_{j=1}^N A_j)^h$, normalised so that the mass of current smokers is 1. Firms' shares of new smokers are proportional to their shares of current advertising expenditures, and smokers stick with their original firm until they quit the market at rate λ . Assuming a discount rate r , and that each consumer generates profits at rate $Xe^{-\beta\tau}$ at time τ for the company from which he buys (representing a constant real profit per pack and a secular decline of 100β percent in consumption per smoker), the present value of profits from a youth smoker is $X/(r+1+b)$.

So firm i maximises $\left\{ \frac{A_i}{\sum_{j=1}^N A_j} \left(\sum_{j=1}^N A_j \right)^h \frac{X}{r+1+b} \right\} - A_i$, taking other firms' advertising levels as given, so in equilibrium¹⁷⁴ $NA_i = y \left(\frac{N-1+h}{N} \right) \frac{X}{r+1+b}$.

So fraction $(N-1+h)/N$ of the future profits from youth smoking is dissipated in advertising costs. This fraction is increasing in the elasticity, h , of youth consumption with respect to advertising expenditures.

Current industry profits are X without advertising, and $X-NA_i$ with advertising; the market value of the industry is $X/(r+1+b)$ without advertising, and $(X-NA_i)/(r+1+b-y)$ with advertising. To take a simple example, if $y=.02$, $b=.01$, $l=.025$, $r=.085$ (which are all consistent with the data in note C (approximately note 85)), and $h=1/2$, then current profits rise by 7/41, and the industry's present value falls by only 1/41 if advertising, and hence also youth smoking, is eliminated.¹⁷⁵ Extending the model to allow some brand switching would increase the value of the youth market, since firms would spend less money trying to attract customers who might later be diverted to another firm.

¹⁷⁴ We assume symmetric Markov-perfect equilibrium, thus ruling out "punishment strategies" which might allow more "collusive" equilibria to be supported in this dynamic game.

¹⁷⁵ For example, if current pre-tax profits were \$8.2 billion, marketing expenditures would be \$1.4 billion. Eliminating those expenditures would raise short run profits to \$9.6 billion. But the gradual erosion of the customer base would mean that, assuming a 40 percent tax rate, the market value of the domestic tobacco industry would fall from \$49.2 billion to \$48 billion.

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Table 1

Sales and Profits By Firm

Firm	Unit Sales	Market Share	Operating Revenues	Operating Profits	Profits as Percent of Revenue
Philip Morris	235	49.2	10,663	4,824	45
RJR	117	24.5	4,895	1,510	31
Brown & Williamson	77	16.2	3,114	801	26
Lorillard	42	8.7	1,915	777	41
Liggett	6.5	1.3	235	20	9
Industry	478	100	20,822	7,932	38

Units: Unit sales are in billions of cigarettes. There are 20 cigarettes to a pack. Market share is in percent. Operating Revenues and Operating Profits are in millions.

Source: Company 10k reports for all but Brown & Williamson. Operating profits are reported profits plus reported settlement costs deducted from profits. For example, Philip Morris reported domestic tobacco operating profits of 3,267 and Brown & Williamson data is from its web site, www.bw.com. Go to site index and then to B&W annual review. B&W operating profits are from a phone conversation with Sanford C. Bernstein analyst Gary Black. Column 5 is calculated as column 4 divided by column 3.

Table 2

**Product Mix By Company and
Market Shares Across Segments**

Firm	Percentage of Sales in Premium Segment	Percentage of Sales in Branded Discount Segment	Percentage of Sales in Generic and Private Label Segment	Market Share, Premium Segment	Market Share, Discount Segments
Philip Morris	86	12	2	58	26
RJR	63	31	6	21	34
Brown & Williamson	43	51	6	10	35
Lorillard	94	6	0	11	2
Liggett	25	15	60	0.5	3.5

Sources: Column 1, for Philip Morris and RJR, company 10k reports. For Brown & Williamson, Lorillard, and Liggett, “Competition and the Financial Impact of the Proposed Tobacco Industry Settlement”, *op. cit.*, Table 7 (FTC Report). Breakdown between columns 2 and 3, FTC Report. Columns 4 and 5 are taken from the 10k reports of Philip Morris, RJR, and Liggett. Column 4 for Lorillard is from the Loews’ Corporation 10k report. Column 5 for Lorillard is based on the FTC Table 7. Columns 4 and 5 for Brown & Williamson are calculated from the company’s market share and the FTC Table 7.

Table 3

Product Mix and Profitability by Company

Firm	Percentage of Sales in Premium Segment	Revenue per Pack	Costs per Pack	Profits per Pack
Philip Morris	86	\$.91	\$.50	\$.41
RJR	63	\$.84	\$.58	\$.26
Brown & Williamson	43	\$.81	\$.60	\$.21
Lorillard	94	\$.92	\$.55	\$.37
Liggett	25	\$.73	\$.67	\$.06
Industry	73	\$.87	\$.54	\$.33

Units: Revenues, costs, and profits are per pack.

Source: Table 2, and calculations from Table 1.

Table 4
Prices of Premium and Discount Cigarettes
Cents Per Pack

Date	Premium	Discount	Deep Discount
June 1990	89.3	65.0	35.5
December 1990	94.3	70.0	40.5
Jan-Feb 1991	94.5	70.2	40.7
March 1991	96.0	75.2	40.7
June 1991	99.5	83.2	43.2
November 1991	105.0	88.7	45.7
April 1992	110.5	96.7	35.75
July-August 1992	115.5	75.7	39.75
November 1992	121.0	81.2	43.75
January 1993	121.2	81.4	43.95
February 1993	121.2	81.4	51.9
March 1993	123.2	83.4	56.9
August 1993	83.9	83.4	56.9
November 1993	87.9	83.4	60.9
May 1995	90.9	83.4	63.9
April-May 1996	94.9	83.4	67.9
March 1997	99.9	83.4	67.9
September 1997	106.9	90.4	74.9
January 1998	109.4	92.9	77.4
April 1998	112.4	95.9	80.4
May 1998	117.4	100.9	85.4

Source: United States Department of Agriculture. Premium brand prices can be found at <http://www.econ.ag.gov/briefing/tobacco/Table8.htm>. Includes leading brands. A 3-percent discount is made for payment within 10 days or 2 percent within 14 days. Discount and deep discount prices (including federal excise taxes) can be found at Table 7.

Table 5

Total and Per Capita Consumption of Cigarettes

Year	Total Consumption	Per Capita (18+) Consumption
1900	2.5	54
1905	3.6	70
1910	8.6	151
1915	17.9	285
1920	44.6	665
1925	79.8	1,085
1930	119.3	1,485
1935	134.4	1,564
1940	181.9	1,976
1945	340.6	3,449
1950	369.8	3,552
1955	396.4	3,597
1960	484.4	4,171
1963	523.9	4,345*
1965	528.8	4,258
1970	536.5	3,985
1975	607.2	4,122
1980	631.5	3,849
1981	640.0*	3,836
1985	594.0	3,370
1990	525.0	2,826
1995	487.0	2,515
1996	487.0	2,483
1997	480.0	2,423

* means peak year. Total consumption is in billions of cigarettes. Per capita consumption is total consumption divided by population 18 years or older.

Source: 1900-95: Center for Disease Control Web Site

<http://www.cdc.gov/nccdphp/osh/consumpl.htm> which cites the following sources: Tobacco Situation and Outlook Report, U.S.D.A., April 1996 and September 1987.

Miller, R. U.S. cigarette consumption, 1900 to date. In: Harr W, ed. Tobacco yearbook, 1981-page 53. 1996 and 1997 from Department of Agriculture Economic Research Service, April 1998 Tobacco Situation and Outlook, Tables 1 and 2.

Table 6

Breakdown of Cigarette Prices, 1997

Retail Price	\$1.90	
- State Excise Tax		(\$0.34)
- Trade Margin		(\$0.46)
= Wholesale Price	\$1.10	
- Federal Excise Tax		(\$0.24)
=Net to Manufacturer	\$0.86	
-Advertising & Marketing		(0.23)
-Manufacturing Costs		(0.20)
-Other Costs		(0.10)
=Operating Profit	\$0.33	

Sources: Retail price and state excise tax: “Competition and the Financial Impact of the Proposed Tobacco Industry Settlement”. Manufacturing costs: Liggett costs can be calculated at 19 cents for discount and 21 cents for premium cigarettes (10k report). Adelman (Morgan Stanley, Dean Witter March 3, 1998 report on Philip Morris by David Adelman, page 11 Table 5. INVESTEXT REPORT NUMBER 2651147.) calculates Philip Morris costs at 18 cents. These numbers should give an industry bound. Advertising and Marketing: FTC Report, *op. cit.* Operating profits: Estimated from 10k reports plus an estimate of 20 cents per pack for Brown and Williamson inferred from “Impact of the Proposed Resolution on the U.S. Cigarette Industry”, October 9, 1997, by Bozell Sawyer Miller Group for the tobacco industry. Available from Bozell at 202-739-0223.

Table 7
Distributional Effects of the Tobacco Payment Provisions of S. 1415
 Calendar Year 2003

INCOME CATEGORY (2)	CHANGE IN FEDERAL TAXES (3)		FEDERAL TAXES (3) UNDER PRESENT LAW		FEDERAL TAXES (3) UNDER PROPOSAL		Effective Tax Rate (4)	
			Billions	Percent	Billions	Percent	Present Law	Proposal
	Millions	Percent					Billions	Percent
Less than \$ 10,000.....	\$2,544	44.6%	\$ 6	0.4%	\$ 8	0.5%	6.9%	10.0%
10,000 to 20,000.....	3,911	12.3%	32	2.0%	36	2.2%	7.5%	8.4%
20,000 to 30,000.....	4,170	5.4%	78	4.8%	82	5.0%	13.2%	13.9%
30,000 to 40,000.....	3,796	3.3%	114	7.1%	118	7.2%	16.2%	16.7%
40,000 to 50,000.....	2,675	2.2%	120	7.4%	123	7.5%	17.6%	18.0%
50,000 to 75,000.....	4,109	1.5%	280	17.3%	284	17.3%	19.5%	19.8%
75,000 to 100,000.....	1,884	0.7%	252	15.6%	254	15.5%	22.6%	22.8%
100,000 to 200,000.....	446	0.1%	351	21.7%	351	21.4%	24.9%	25.0%
200,000 and over.....	65	(5)	383	23.7%	383	23.4%	29.3%	29.3%
Total, All Taxpayers....	\$23,600	1.5%	\$1,614	100.0%	\$1,638	100.0%	20.8%	21.2%

Source: Joint Committee on Taxation, JCX-40-98 "Distributional Effects of S. 1415, as Reported by the Senate Committee on Commerce, Science, and Transportation", May 18, 1998. Available at <http://www.house.gov/jct/x-40-98.htm>.

Detail may not add to total due to rounding.

- (1) Includes gross payments by tobacco companies distributed equivalent to an excise tax.
- (2) The income concept used to place tax returns into income categories is adjusted gross income (AGI) plus: [1] tax-exempt interest, [2] employer contributions for health plans and life insurance, [3] employer share of FICA tax, [4] worker's compensation, [5] non taxable social security benefits, [6] insurance value of Medicare benefits, [7] alternative minimum tax preference items, and [8] excluded income of U.S. citizens living abroad. Categories are measured at 1998 levels.
- (3) Federal taxes are equal to individual income tax (including the outlay portion of the EIC), employment tax (attributed to employees), and excise taxes (attributed to consumers). Corporate income tax is not included due to uncertainty concerning the incidence of the tax. Individuals who are dependents of other taxpayers and taxpayers with negative income are excluded from the analysis. Does not include indirect effects.
- (4) The effective tax rate is equal to Federal taxes described in footnote (3) divided by: income described in footnote (2) plus additional income attributable to the proposal.
- (5) Less than 0.02%

Table 8

Share of Tobacco Sales since 1950 versus Lump-Sum Damage Payments

Firm	Current Market Share	Share of Tobacco Sales since 1950	Share of Lump Sum Damage Payments
Philip Morris	49	23	68
RJR	24.5	31	7
Brown & Williamson	16	30	18
Lorillard	8.5	8.5	7
Liggett	1.5	7.5	0

Note: Tobacco sales were calculated from FTC data on market shares over time (FTC Report) and USDA Economic Research Service estimates of tobacco consumption in cigarettes. Damage payments were calculated from the Bill. Actual amounts were \$6.58 billion for Philip Morris, \$660 million for Reynolds, \$1.73 billion for Brown and Williamson, \$710 million for Lorillard, and \$320 million for US Tobacco. Percentages were calculated excluding US Tobacco.

Table 9
Major Youth Risk Behaviors, 1995
Grades 9-12

Risk Factor	Lifetime Participation	Current Participation	Frequent Participation
Tobacco	71.3%	34.8%	16.1%
Alcohol	80.4%	51.6%	32.6%
Marijuana	42.4%	25.3%	NA
Cocaine	7.0%	3.1%	NA
Sex	53.1%	37.9%	17.8%

NA = not available.

Definitions: For all categories, “Lifetime Participation means one or more experiences. For tobacco: “Current Participation” means one or more cigarettes in the past 30 days. “Frequent participation” means one or more cigarettes on 20 of the past 30 days. For alcohol: “Current Participation” means one or more drinks in the past 30 days. “Frequent participation” means five or more drinks on at least one occasion in the past 30 days. For marijuana: “Current Participation” means at least one smoke in the past 30 days. For cocaine: “Current Participation” means at least one use in the past 30 days. For sex: “Current Participation” means sexual intercourse within the previous three months. “Frequent Participation” means four or more sexual partners during lifetime.

Note that “look-back” penalties will be based on daily use rather than monthly use.

Source: CDC, “Youth Risk Behavior Surveillance – United States, 1995. Morbidity and Mortality Weekly Review; 45 (No. SS-4), 1-86, 1996. Data available at CDC web site, www.cdc.gov/nccdphp/

Table 10
Marketing Expenditures by Category, 1996

Category	Industry Expenditure	Percent of Expenditures
(1) Promotional Allowances	\$2.15 billion	42.1%
(2) Coupons and Retail value added promotions (e.g. free lighters)	\$1.31 billion	25.6%
(3) Specialty Item Distribution (e.g. branded clothing)	\$544.3 million	10.7%
(4) Outdoor Advertising	\$292.3 million	5.7%
(5) Point of Sale Ads	\$252.6 million	4.9%
(6) Magazines	\$243.0 million	4.8%
(7) Public Entertainment	\$171.2 million	3.4%
(8) Direct Mail	\$38.7 million	0.8%
(9) Transit Advertising	\$28.9 million	0.5%
(10) Sampling Distribution	\$15.9 million	0.3%
(11) Newspapers	\$14.1 million	0.3%
(12) Internet	\$0.4 million	0.0%
(13) Testimonials	\$0	0.0%

Source: “Federal Trade Commission Report to Congress for 1996, Pursuant to the Federal Cigarette Labeling and Advertising Act”, March 17, 1998, Table 3E. Can be found at <http://www.ftc.gov/os/9803/tables96cigrpt.pdf>. The FTC also collects data on expenditures on sporting events, which may be allocated among several categories. The total in 1996 was \$85 million. No money was spent on having cigarettes appear on television or in movies. No money was spent on testimonials since 1988.

Table 11
State Taxation and Propensity to Sue

State	Excise Tax	Sales Tax	Consumer Price	Suing?
Alabama	16.5	7	167.4	NO
Alaska	29	0	214.4	
Arizona	58	11	222.0	
Arkansas	31.5	8	181.3	
California	37	14	200.3	
Colorado	20	0	174.4	
Connecticut	50	13	208.5	
Delaware	24	0	171.9	NO
Florida	33.9	11	182.7	
Georgia	12	5	158.9	
Hawaii	60	9	242.8	
Idaho	28	9	184.4	
Illinois	44	12	198.7	
Indiana	15.5	8	156.3	
Iowa	36	10	189.3	
Kansas	24	8	171.3	
Kentucky	3	9	145.6	NO
Louisiana	20	7	166.9	
Maine	37	11	190.2	
Maryland	36	10	190.7	
Massachusetts	76	12	244.6	
Michigan	75	14	233.8	
Minnesota	48	14	216.8	
Mississippi	18	12	168.6	
Missouri	17	7	163.4	
Montana	18	0	164.9	
Nebraska	34	9	184.8	NO
Nevada	35	13	198.5	
N. Hampshire	25	0	176.6	
New Jersey	40	12	194.6	
New Mexico	21	9	176.0	
New York	56	9	222.5	
North Carolina	5	6	152.0	NO
North Dakota	44	12	194.1	NO
Ohio	24	8	166.8	

Oklahoma	23	8	172.0	
Oregon	38	0	197.6	
Pennsylvania	31	11	176.5	
Rhode Island	61	15	217.0	
South Carolina	7	8	153.9	
South Dakota	33	7	181.7	
Tennessee	13	13	161.1	NO
Texas	41	12	189.8	
Utah	26.5	9	186.2	
Vermont	44	10	201.9	
Virginia	2.5	7	159.6	NO
Washington	82.5	17	265.1	
West Virginia	17	10	160.9	
Wisconsin	44	10	200.7	
Wyoming	12	0	164.1	NO

All numbers are cents per pack.

The average tax in states with suits is 45 cents.

The average tax in non-suing states is 24 cents.

Sources: First 3 columns, "The Tax Burden on Tobacco", Volume 31, 1996. Published by The Tobacco Institute, January 1997. Data are as of November 1, 1996. Data for last column from the State Tobacco Information Center web site at www.stic.neu.edu.

FIGURE 1
PRE-TAX PRICES VS SPECIFIC TAXES

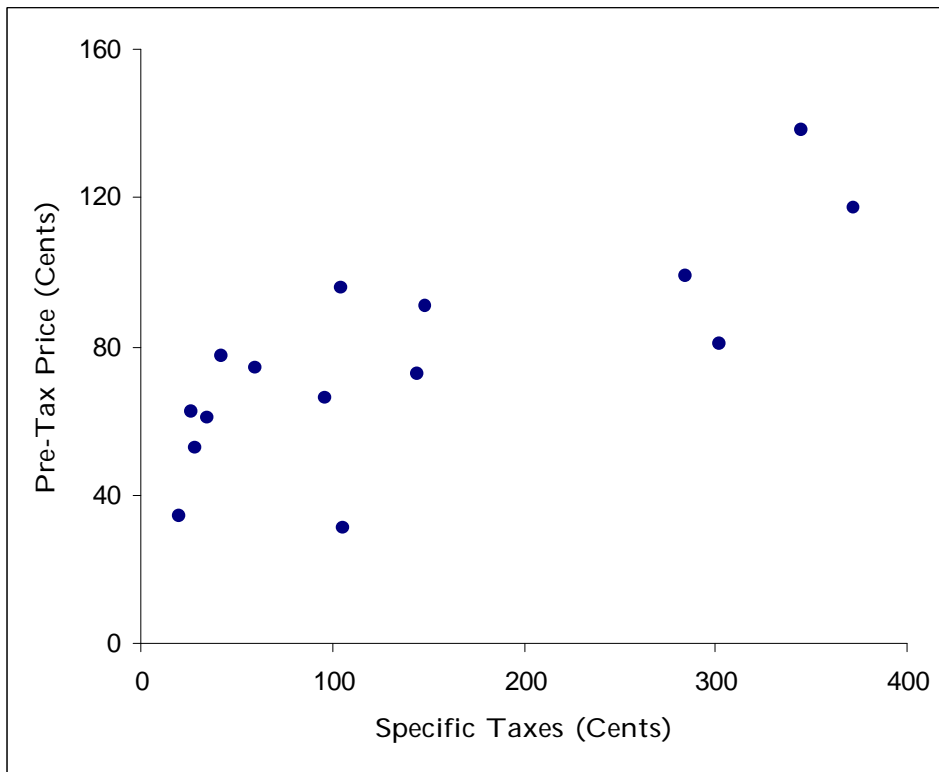


FIGURE 1: Pre-Tax Prices vs. Specific Taxes
in the 15 European Union Countries at 1 January 1998.

"Specific Taxes" \equiv total unavoidable per-pack tax (i.e. tax at pre-tax price of zero). EU Taxes consist of a fixed per-cigarette tax, a proportional "ad valorem" tax that is calculated on the sum of the pre-tax price and the fixed tax, and a "value added tax" that is then calculated on the sum of all the foregoing. So the total unavoidable per-pack tax equals $\{(fixed) \times (1 + ad\ valorem\ rate) \times (1 + VAT\ rate)\}$. (Note that by contrast with our terminology the fixed tax is generally referred to as the specific tax.)

"Pre-Tax Price" \equiv price of most popular price category.

Source: Authors' calculations based on data from U.K. Tobacco Manufacturers' Association and Confederation of European Community Cigarette Manufacturers.

