# Litigation and the Political Clout of the Tobacco Companies: Cigarette Taxes, Prices, and the Master Settlement Agreement[*]

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## ABSTRACT

The goal of our empirical analysis is to assess whether the changes in cigarette excise taxes and cigarette prices can be attributed to litigation brought by the states and the resulting settlements, holding other factors constant. Using pre-post as well as state excise taxes on beer as controls, the evidence provides support for the view that litigation changes the political equilibrium: state cigarette excise taxes were approximately $0.10 higher in the post-MSA period. For tobacco prices, the increases are attributable to the method the settlement used to structure payments as well as the market structure of the cigarette industry.

In 1998, 46 states and the four major tobacco companies entered into the Master Settlement Agreement (MSA), which settled litigation brought on behalf of the states in order to recover medical expenses paid by government insurance agencies for illness brought on by consumption of tobacco products.[1] The four remaining states (Florida, Minnesota, Mississippi, and Texas) settled separately with the companies. The MSA stipulated that the tobacco companies pay the states an estimated $206 billion over the next several years.

The strategy of using litigation as an instrument for discouraging consumption of a commodity deemed to be harmful to consumers is becoming more common.[2] The MSA makes payments from tobacco companies a function of number of cigarette packs sold by the tobacco companies. In this sense, the MSA payment structure resembles an excise tax. The impact that such litigation has on other tobacco control policies, such as excise taxes, depends on the extent to which litigation and such policies are substitutable.

The MSA payments could substitute for excise taxes at the state level. This may be so to the extent that state legislatures have succeeded in levying socially optimal excise tax rates.[3] If so, states would be expected to have reduced excise taxes on cigarettes after the settlements were reached. Similarly, one would expect that various

[1] National Association of Attorneys General, Tobacco Settlement Documents, http://naag.org/issues/tobacco/index.php?sdpid=399, visited August 12, 2003.
[2] W.E. Parmet & R.A. Daynard, The New Public Health Litigation, 21 Annu. Rev. Public Health. 437 (2000).
[3] There is some empirical evidence that state cigarette excise taxes are set at the level on average which accounts for the externalities that cigarette consumption causes (see Willard G. Manning *et al.*, The Taxes of Sin. Do Smokers and Drinkers Pay Their Way? 261 JAMA 1604 (1989) and Willard G. Manning, Emmett B. Keeler, & Joseph P. Newhouse, The Cost of Poor Health Habits (1991)). But these results depend on treatment of secondary smoke within households (see Frank A. Sloan, Jan Osterman, & Gabriel Picone, The Private and Social Cost of Smoking (Manuscript, Duke Univ., 2003)) and not making assumptions that people smoke because they lack self-control. Assuming that smokers lack self-control, Jonathan Gruber & Botond Köszegi, Is Addiction Rational? Theory and Evidence, 116 Quarterly Journal of Economics 1261 (2001), argued that in order for taxes to account for the internal costs of smoking in terms of life/years lost, taxes be set so as to yield a price of $30.45 per pack.

tobacco control policies, such as workplace smoking bans, would be substitutes, albeit imperfect ones, for state cigarette excise taxes and for penalties resulting from litigation that function as excise taxes. Alternatively, litigation and resulting settlement may have changed the balance of power between tobacco control advocates and the tobacco manufacturers with the consequence that the settlements and state excise taxes are complements. The tobacco industry's influence of federal and state legislatures, historically, has been an impediment to enacting tobacco control legislation at either federal or state levels.[4] Rather than crowd out state excise taxes, there is crowd in.

Another important feature of the settlements are their potential impact on consumption. In contrast to a lump sum payment, conceptually, the feature of tying payments to units sold should have caused the cigarette manufacturers to raise product prices. In recent years, the market for cigarettes has been an oligopoly controlled by four large firms. With this market structure, firms optimally shift excise taxes forward to consumers: price increases by more than the amount of the tax.[5] Also, the MSA could have provided an opportunity for cigarette manufacturers to collude on (a higher) price.[6] Finally, as cigarette prices rise, proportionately more highly addicted cigarette consumers remain. Consumption by the remaining smokers may be less responsive to price.[7] Lower price elasticities would lead sellers to boost price. For any or all of these reasons, smokers rather than the companies bear the burden of litigation.

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[4] Graham E. Kelder & Richard A. Daynard, The Role of Litigation in the Effective Control of the Sale and Use of Tobacco, 8 Stan. L. & Pol'y Rev. 63 (1997); Parmet & Daynard, *supra* note 2.
[5] Don Fullerton & Gilbert E. Metcalf, Tax Incidence, in Handbook of Public Economics, Vol. 4 1787 (Alan J. Auerbach & Martin Feldstein eds. 2002).
[6] Jeffrey E. Harris, The 1983 Increase in the Federal Cigarette Excise Tax, in Tax Policy and the Economy, Vol. 1 87 (Lawrence Summers ed. 1987).
[7] Typical estimates indicate that a 10 percent increase in the price of cigarettes would decrease consumption by four to seven percent (see, for example, W. Kip Viscusi, The Governmental Composition of the Insurance Costs of Smoking, 42 J. Law & Econ. 575 (1999)).

A cursory glance at the data supports the view that litigation changes the balance of power and that the settlement payment provisions function as an excise tax on cigarette consumption. Since the MSA and four individual state settlements were reached, the former in November 1998 and the individual settlements reached somewhat earlier, state legislatures have increasingly looked to state excise taxes on cigarettes as a source of revenue, relative to both excise taxes imposed on alcohol and state taxes more generally (Fig. 1). In particular, the largest jumps in the mean real state excise tax on cigarettes occurred in 1997 and 2002. In fiscal year 2003, for example, state excise tax increases were larger than any other single type of tax including major sources of revenue such as income taxes.[8] These increases did not coincide with increases in the mean real state excise tax on beer; the only year in which real state excise taxes on beer rose was 1998. Also, after a decline in cigarette prices from 1993 forward, there was a spike in mean cigarette prices of $0.73 per pack immediately after the MSA imposed a charge on participating companies of $0.62 per pack (Fig. 2), which is evidence that cigarette companies shifted the cost of the settlement forward to smokers.[9]

Such trends could have been due to factors other than the settlement. The goal of our empirical analysis is to assess whether the changes in cigarette excise taxes and cigarette prices can be attributed to the settlement when other factors are held constant. Using pre-post as well as state excise taxes on beer as controls, the evidence on balance provides support for the view that litigation changes the political equilibrium. For

[8] National Governors Association & National Association of State Budget Officers, The Fiscal Survey of States viii (November 2002).
[9] This is the estimate of the cost of the settlement to participating companies given in W. Kip Viscusi, Smoke-Filled Rooms: A Postmortem on the Tobacco Deal 34 (2002).

tobacco prices, the increases are attributable to the method the settlement used to structure payments as well as the market structure of the cigarette industry.

## I. THEORETICAL BACKGROUND

### A. *Excise Taxes*

In the simplest model of taxation and public spending, in which voters have well-behaved preferences on a single issue, the median voter determines the equilibrium policy.[10] In this model, because the only route available for voters to let their preferences be known is through their vote, the equilibrium is determined by the distribution of preferences rather than the intensity of preferences. Preferences may differ systematically by demographic factors and income.

This framework has been extended to include other sources of influence such as lobbying by special interest groups and richer distributions of preferences such as multidimensional preferences or ideology-based cohorts as in models of electoral competition by candidates. Then groups other than the median voter determine the equilibrium policies.[11]

Special interests have influence on policy outcomes because not all citizens have sufficient interest to learn about issues in which they have no direct stake, and interest groups are a source of funds and information on public policies, gives them influence on policy outcomes. In one recent model, Persson and Tabellini, assume that politicians from two different parties maximize their chance of winning an election by committing to announced taxation and spending platforms.[12] The key features of the model are that

[10] Anthony Downs, An Economic Theory of Democracy (1957).
[11] See Torsten Persson & Guido Tabellini, Political Economics and Public Finance, in Handbook of Public Economics, Vol. 3 1549 (Alan J. Auerbach & Martin Feldstein eds. 2002) for a recent review.
[12] *Id*.

voters have differing levels of party bias, or ideology, and that groups of voters can promise policy-conditional contributions to the politicians. In equilibrium, (1) blocks of voters with high proportions of policy-sensitive voters (swing voters) and (2) organized groups (lobbies) are over-represented in the political process relative to the socially optimal benchmark in which the total marginal benefit of spending across groups equals the social marginal cost of raising the funds. In addition, there is an inverse relationship between the extent of over-representation of lobbies and the size of the lobbies.

The major tobacco manufacturers represent a small and "overrepresented" group. Smokers, as do abstainers in alcohol control policy, represent important "swing voters" in the issue of cigarette excise taxes as they have a larger stake in the specific policy and therefore more incentive to rely less on party ideology.

As cigarette prices have increased and information about the adverse health effect of smoking has disseminated, smoking rates have declined.[13] As domestic consumption has declined, tobacco manufacturer output has fallen and there are fewer smokers to oppose policies adverse to smoking. As a result, one should observe increased adoption of such policies.

A special feature of state tax and transfer policies, especially taxes on durable or semi-durable and portable goods, is that decisions made by other states affect an individual state's optimal choice. Benjamin and Dougan developed a model of cigarette tax determination in which the relative ease in which cigarettes can be transported across state boundaries constrains their efficient taxation.[14] From this model, they obtain the prediction that excise taxes rise at a decreasing rate as one moves outward from the point

[13] Sloan, Osterman, & Picone, *supra* note 3.
[14] Daniel K. Benjamin & William R. Dougan, Efficient Excise Taxation: The Evidence from Cigarettes, 40 J. Law & Econ. 113 (1997).

of production. Although they emphasized North Carolina as the key cigarette producing state, there are three major tobacco-producing states: North Carolina, Virginia, and Kentucky. An insight from this model is that excise taxes of bordering states affect the efficient level of taxation in the state. In addition, the preferences of voters in neighboring states are likely to be more similar. We explicitly account for border state excise taxes in our analysis, but do not consider distance from a particular producing state because we include state fixed effects, which also control for time-invariant regional preferences.

Even as extended, the models do not incorporate specific shocks that may affect intertemporal variation in policy adoption. Legislative decisions may be sensitive to various business and election cycles. The political science literature has investigated the determinants of tax changes at the state level.[15] The following hypotheses have been considered:[16] tax increases are more likely 1) when states are facing fiscal crises; 2) early in a governor's term in order to minimize the impact on reelection bids; 3) when political control of the state is conducive for passage (for example, when all branches are controlled by the same party).[17]

### B. *Cigarette Prices*

Four firms have dominated the market for cigarettes. Tax over-shifting is possible in many types of oligopoly models even though it is not possible in models of perfect

[15] Although our analysis is fundamentally economic, there is a history of whether public policy choices can be understood as a conventional economic good or alternatively whether it is desirable to introduce non-economic preference variables into the study. See, for example, Sam Peltzman, Toward a More General Theory of Regulation, 19 J. Law & Econ. 211 (1976) and Matthew E. Kahn & John G. Matsusaka, Demand for Environmental Goods: Evidence from Voting Patterns on California Initiatives, 40 J. Law & Econ. 137 (1997).

[16] Many of these hypotheses have been empirically tested as well (for example, Frances Stokes Berry & William D. Berry, Tax Innovation in the States: Capitalizing on Political Opportunity, 36 American Journal of Political Science 715 (1992)).

[17] Richard F. Winters, The Politics of Taxing and Spending, in Politics in the American States: A Comparative Analysis, 319 (Virginia Gray & Jacob Herbert eds., 6th ed. 1996) and Berry and Berry, *supra* note 16.

competition.[18] Because oligopolistic firms have market power, they might find it optimal to raise price by more than the amount of the increase in excise tax in order to recover revenue lost by the reduction in quantity sold. The presence and extent of over-shifting depends on the nature of competition and the demand specification. For example, with a constant elasticity of demand and constant marginal costs, over-shifting of an excise tax *must* occur under pure monopoly, monopolistic competition, Cournot competition, and Bertrand competition with differentiated products.[19] Profits can even rise in short run with an increase in the excise tax rate.[20] Over-shifting has been measured empirically for a variety of products including cigarettes.[21]

In addition, the MSA could have provided cigarette companies with an opportunity to collude on prices by providing an external event in which to coordinate price increases.[22] Such coordination allows for implicit price collusion when explicit agreements are forbidden. Sumner derived a simple empirical specification based on a Cournot model of competition that allowed the estimation of the extent of competition/collusion in a market as measured by the markup in price over state excise

[18] Fullerton & Metcalf, *supra* note 5.
[19] For treatment of the cases of pure monopoly, monopolistic competition, and Cournot competition, see Fullerton & Metcalf, *supra* note 5. For treatment of Bertrand competition with differentiated products see Simon P. Anderson, André de Palma, & Brent Kreider, Tax Incidence in Differentiated Product Oligopoly, 81 J. Pub. Econ. 173 (2001).
[20] Anderson, de Palma, & Kreider, *supra* note 19.
[21] James M. Poterba, Retail Price Reactions to Changes in State and Local Sales Taxes, 49 National Tax Journal 165 (1996); Timothy J. Besley & Harvey S. Rosen, Sales Taxes and Prices: An Empirical Analysis, 52 National Tax Journal 157 (1999); Douglas J. Young & Agnieszka Bielinska-Kwapisz, Alcohol Taxes and Beverage Prices, 55 National Tax Journal 57 (2002); Daniel A. Sumner, Measurement of Monopoly Behavior: An Application to the Cigarette Industry, 89 J. Political Econ. 1010 (1981); Theodore E. Keeler *et al.*, Do Cigarette Producers Price-Discriminate by State? An Empirical Analysis of Local Cigarette Pricing and Taxation, 15 J. Health Econ. 499 (1996).
[22] Harris, *supra* note 6.

taxes.[23] Modifying this specification slightly allowed us to determine whether the extent of competition changed in the cigarette industry after the MSA.[24]

## II. DATA AND EMPIRICAL SPECIFICATION

### A. *Overview*

We used a pre-post regression design to test whether the litigation substituted for (crowd out) or complemented (crowd in) state excise taxes. Evidence of crowd in would suggest that the settlement-related litigation altered the political equilibrium of states, while the former would suggest that state legislatures re-optimized, given fixed constraints. We divided the time period from 1990 to 2002 into four sub periods: pre-settlements (1990 to 1992 and 1993 to 1997) and post-settlements (1998 and 1999 to 2002). The test of the competing hypotheses was a simple significance test of indicator variables for these sub periods after controlling for other political and economic factors that determine excise tax levels. A similar approach was used to test for changes in the pricing structure of cigarettes caused by the settlements.

Evidence of structural shifts in a pre-post analysis does not rule out causes of the structural shifts other than litigation and the resulting settlements. For this reason, we conducted a parallel analysis of state excise taxes on beer. Beer provides an interesting comparison because, like cigarette tax, beer excise taxes are regressive and are known to affect harmful consumption, such as heavy drinking among youths.[25] The crucial

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[23] Sumner, *supra* note 21.

[24] For other approaches to measuring the extent of competition in a market using excise taxes see Daniel Sullivan, Testing Hypotheses about Firm Behavior in the Cigarette Industry, 93 J. Political Econ. 586 (1985) and Paul G. Barnett, Theodore E. Keeler, & Teh-wei Hu, Oligopoly Structure and the Incidence of Cigarette Excise Taxes, 57 J. Pub. Econ. 457 (1995);

[25] See Michael Grossman, Douglas Coate, & Gregory M. Arluck, Price Sensitivity of Alcohol Beverages in the United States, in Control Issues in Alcohol Abuse Prevention: Strategies for States and Communities (Harold D. Holder ed. 1987); Michael Grossman *et al*., Effects of Alcohol Price Policy on Youth: A Summary of Economic Research, 4 J. Research on Adolescence 347 (1994); Douglas Coate & Michael

difference between excise taxes on cigarettes and beer was that major litigation was not pursued against beer companies as it was against cigarette companies. Thus, we would not expect to see significant changes in beer taxes due to the tobacco settlements.

### B. *Data*

We collected data on state excise taxes and determinants of state excise taxes as indicated in the theory from a variety of sources for 1990 to 2002.[26] There was substantial variation in cigarette excise tax rates across states and over time (Table 1).[27] Virginia had the minimum excise tax of $0.025/pack in 2002 while Massachusetts had the maximum rate of $1.51/pack in 2002. Cigarette taxes were approximately 15 times as high per unit of consumption as excise taxes on beer. Figure 2 shows the mean excise taxes across states over time relative to their initial levels in 1990. There was a clear positive linear trend over the sample period for real cigarette taxes with a spike in 2002. The mean real excise tax on beer fell over the sample period except for a small increase in 1998.

Smokers were the most likely swing voters, those most concerned with cigarette policy; we included state-level smoking rates in the analysis. On average, we expected smokers to oppose additional taxes leading to a negative correlation between the smoking rate and the excise tax. However, some research has noted that smokers may rationally vote for cigarette tax increases as a way to regulate their own smoking and the negative

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Grossman, Effects of Alcoholic Beverage Prices and Legal Drinking Ages on Youth Alcohol Use, 31 J. Law & Econ. 145 (1988); Donald S. Kenkel, Drinking, Driving and Deterrence: The Social Costs of Alternative Policies, 36 J. Law & Econ. 877 (1993); and Philip J. Cook & Michael J. Moore, This Tax's For You: The Case for Higher Beer Taxes, 47 National Tax Journal 559 (1994). These results were sensitive to controls for unobserved factors at the state level through state fixed effects; see, for example, Thomas S. Dee, State Alcohol Policies, Teen Drinking and Traffic Fatalities, 72 J. Pub. Econ. 289 (1999). All of our specifications include state fixed effects.

[26] See Appendix for a thorough discussion of data sources and variable construction.

[27] All dollar (cents) values were converted to real 2002 dollars (cents) for the analysis.

health consequences associated with it.[28] The argument is that state cigarette excise taxes are a self-control device. If favored by smokers, one would expect that higher percentages of smokers would lead to higher rather than lower excise tax rates.

The presence of cigarette producers in the state as a special interest group was accounted for using the volume of tobacco leaf production.[29] In competitive markets, producers would have incentives to oppose taxes on their products as these raise marginal costs of production. However, the nature of the supply side of the market for cigarettes and its implications for tax over-shifting reduces the incentives for producers to avoid taxes.

Another set of variables controlled for factors that affected state policy goals for cigarette excise taxes. The federal excise tax on cigarettes, the presence of a "Smoker Protection" law, an index for clean air regulations, and received MSA payments were included to test whether these substituted or complemented excise taxes in state policy goals. Federal excise taxes could crowd out state excise taxes if state taxes were near an optimal level before any change in the federal level. However, if political factors, such as lobbying at the state level, had prevented an optimal level of taxes, then an increase in the federal rate could provide an opportunity (for example, weakening the political clout of the industry) for the state to approach the optimum (crowd in). "Smoker Protection" laws reserved smoking-permitted areas in public locales**,** usually as a response to clean air regulations elsewhere. Clean air regulations were aggregated into one categorical variable

[28] Mark Crain *et al.*, Rational Choice and the Taxation of Sin, 8 J. Pub. Econ. 239 (1977); Gruber & Köszegi, *supra* note 3.

[29] Health organizations could have also lobbied to influence cigarette taxes in an effort to deter smoking. We were able to collect membership numbers for the American Heart Association, the American Medical Association, the American Association of Retired Persons, and public school teachers for one year of our sample. These variables were uncorrelated with the fixed effects from our primary specification.

based on the number and type of public places where smoking was restricted: none (omitted), nominal, basic, moderate, and extensive.[30]

The minimum and maximum excise tax rate of bordering states captured the impact of neighboring states' excise tax rates. As discussed above, due to issues such as border crossing, smuggling, and lobbying by producers, the political equilibrium in which excise taxes are set is influenced by taxes in neighboring states.[31] The mean taxes in bordering states were much larger (maximum: $0.56) and smaller (minimum: $0.19) than mean taxes ($0.40), implying that states have some discretion in setting excise taxes on cigarettes and are not merely "tax takers."

We also included three sets of variables as indicated by the political science literature on tax determination. First, the fiscal health of the state was measured by the appropriated ending balance for the fiscal year net of appropriated tobacco revenues. This definition most closely matched the information set of government officials at the time they were determining cigarette excise tax rates. It also clearly identifies the role that tobacco taxation must play in order to balance states' budgets. Large budget deficits could lead to increases in excise taxes, although other avenues for decreasing deficits such as other revenue sources and cuts in expenditures might weaken this relationship.

Second, the election cycle was measured using dummies for gubernatorial election years and "off" years that did not have an election or did not immediately follow an election year; years following an election year were the omitted category. Berry and

[30] United States Department of Health and Human Services, Reducing the Health Consequences of Smoking: 25 Years of Progress (1989).
[31] Benjamin & Dougan, *supra* note 14.

Berry found that politicians could minimize the negative political consequences of tax increases by maximizing the time between the tax increase and the next election.[32]

Third, political control was measured by an ideology index that increases in the number of branches of government (governor, house, and senate) controlled by Democrats and by an institutional control dummy indicating years in which all three branches were controlled by the same party, Democrat or Republican. Democrats have tended to prefer a larger role for government services and changes in legislation are easier to implement when the same party controls all branches of the government.[33]

Two groups in the population receive special attention in the tobacco policy debate: teens due to the fact that the majority of smokers start at this age[34] and the elderly who experience the health consequences of smoking. We included the proportion of the states' population ages 10 to19 and 65 and over to test the sensitivity of excise taxes to these important segments of the population. Finally, wealth was measured by income per capita.

The effect of the settlements was measured from the parameter estimates on the period binaries. However, this attributes all of the inter-temporal changes to the settlements. Other factors could have affected states' decisions about taxes in general and excise taxes on "sin" goods in particular. For this reason, we used state excise taxes on beer as a comparison.

We reproduced the model for cigarettes as closely as possible for excise taxes on beer. There were a few minor differences. The presence of swing voters was measured

[32] Berry & Berry, *supra* note 16.
[33] Id.
[34] Jonathan Gruber & Jonathan Zinman, Youth Smoking in the U.S.: Evidence and Implications, in Risky Behavior Among Youth: An Economic Analysis 69 (Jonathan Gruber ed. 2001).

using the share of the state population that abstained from any alcohol consumption (abstainer rates). The regulatory laws for beer included the blood alcohol concentration considered illegal per se and the presence of an open container, anti-consumption, and/or dram shop law (by statute or case law).

### C. *Analysis of Excise Taxes*

We specified a linear model for cigarette and beer excise taxes in state $s$ at time $t$, $tax_{st}$, of the following form:

$$tax_{st} = \alpha_1(1993-1997) + \alpha_2(1998) + \alpha_3(1999-2002) + X_{st}\beta + \mu_s + \varepsilon_{st}. \quad (1)$$

The parameters of interest were the parameters on the time-period indicators. The pre- and post-MSA periods were further subdivided into two sub periods for consistency with the price analysis below: 1990 to 1992, 1993 to 1997, 1998, and 1999 to 2002. The parameter for 1998 captured any immediate shift in policy, while the parameter for 1999 to 2002 captured any long-term structural change in excise taxes. The variables included in $X_{st}$, the variables described in the previous section, were meant to capture the important features from the theoretical models of taxation reviewed above. The error component was decomposed into a state-specific fixed effect ($\mu_s$) and a mean zero error ($\varepsilon_{st}$).

In an alternate specification, we specified states' smoking rates as endogenous and used a instrumental variables method to account for endogeneity. The decision whether or not to smoke responds to price, part of which includes excise taxes. Thus, a negative correlation between excise taxes and smoking rates could be due to smokers responding to taxes, not taxes responding to smokers. Instruments excluded from the state excise tax equation included state-level averages/proportions for demographic variables

shown to influence the smoking decision: education level, gender, marital status, pregnancy, health insurance, and exercise.[35]

D. *Analysis of Cigarette Prices*

To test for over-shifting of the tax by cigarette producers and changes in the extent of over-shifting after the MSA, we specified the following linear model similar to Sumner:[36]

$$\begin{aligned} price_{st} &= \alpha_0 + \alpha_1 tax_{st} + \alpha_2 tax_{st} \cdot (1993 - 1997) + \alpha_3 tax_{st} \cdot (1998) + \\ &\alpha_4 tax_{st} \cdot (1999 - 2002) + \alpha_5 fedtax_t + \alpha_6 (1993 - 1997) + \alpha_7 (1998) + \\ &\alpha_8 (1999 - 2002) + \mu_s + \varepsilon_{st} \end{aligned} \qquad (2)$$

Sumner's model is based on a model of Cournot competition.[37] In his model, state excise taxes are a proxy for the marginal costs faced by cigarette producers; other costs are controlled for using state and year fixed effects. Thus, the coefficient on state excise taxes not only measures over-shifting, but also measures the extent of competition in the market. In this specification, $\alpha_3$ and $\alpha_4$ capture any changes in over-shifting/competition after the MSA. We also estimated the markup over the federal excise tax, $fedtax_t$, on cigarettes. Other time varying costs were captured in three time dummies that represent three distinct periods in the price evolution over our sample (see Fig. 2). The specification allows for state fixed effects ($\mu_s$) in order to control for costs other than excise taxes that cigarette companies faced. We considered two measures of the price of cigarettes: the weighted average price per pack including and excluding generic brands.

[35] Frank A. Sloan & Justin G. Trogdon, The Impact of the Master Settlement Agreement on Cigarette Consumption (Working paper, Duke Univ. 2003). We used the same instruments to control for the possible endogeneity of abstainer rates in the beer tax regression.
[36] Sumner, *supra* note 21.
[37] Id.

## III. RESULTS

### A. *Excise Taxes*

The fixed effect results indicate that state excise taxes on cigarettes were eight cents higher on average in the year of the settlements than in 1990 to 1992 (Table 2). Since implementation, cigarette excise taxes were ten cents higher than in 1990 to 1992. In addition, judging from the parameter estimates on the period variables, there were no significant shifts in excise taxes on beer after the settlements (see fixed effect results in Table 3). These results suggest that litigation complements excise taxes as tobacco control policy and that the litigation and resulting settlements shifted the political equilibrium and reduced the constraints to higher excise taxes on cigarettes, but not for beer. Controlling for state-level heterogeneity substantially affected the results (compare fixed effects to ordinary least squares (OLS) in Table 2).

The smoking rate was negatively related to excise taxes. As mentioned previously, the correlation could have been due to the importance of smokers as swing voters (who oppose higher taxes) or to people responding to higher prices through smoking cessation. Using instrumental variables (IV) including fixed effects did not yield results meaningfully different from those shown.[38]

Tobacco leaf production was included to measure the strength of the cigarette industry as a lobbying force in each state. The OLS results seemed to confirm common intuition—states with higher levels of tobacco production had lower cigarette excise taxes. However, this relationship was purely cross-sectional. Within each state, changes

[38] For cigarette and beer excise tax analysis, Hausman tests failed to reject the null hypotheses that the fixed effect and IV estimates were equivalent. The instruments were jointly significant in the first stage. We also failed to reject the null hypothesis that the instruments were exogenous to the excise tax equation using a Hansen test.

in the level of tobacco production were not associated with changes in the state excise tax.

The federal excise tax on cigarettes, as the settlements, were complements with state excise taxes. Federal increases in excise taxes relax political constraints at the state level that prevented higher state taxes before the increase. For instance, state politicians could infer from the federal legislation that the tobacco producers' lobby has lost influence in the promise of votes or campaign contributions. With a reduced lobbying influence, state excise taxes can approach the efficient level.[39]

In the OLS results for both cigarettes and beer excise taxes, stricter consumption laws were associated with higher excise taxes, suggesting complementarities. Stricter clean air laws for cigarette smoking and higher blood-alcohol concentration and the presence of a dram shop law via case law led to higher excise taxes on cigarettes and beer, respectively. The fixed effects results, which control for time-invariant unobserved sentiment at the state level, suggest that consumption laws and excise taxes were weak substitutes for one another in the policy goal of reducing harmful consumption: extensive clean air laws led to lower excise taxes on cigarettes and stricter blood alcohol content rules and the presence of an open container law lead to lower excise taxes on beer. However, there were not many observations available to identify this effect for cigarette excise taxes in the fixed effect specification. In particular, only eight states changed their clean air status over the sample period, and only one (North Carolina) had a change in clean air status since the implementation of the MSA in 1998.[40]

[39] See discussion in Section IA *supra*.
[40] The eight states were California, Delaware, Louisiana, Maryland, Missouri, North Carolina, Tennessee, and Virginia.

States took account of excise taxes in their neighboring states in setting their own excise tax rates. The fixed effects estimates imply that as the maximum cigarette excise tax in bordering states increased by $1, the state's own cigarette excise tax increased by $0.24, supporting the view that decisions of neighboring states constrain a state's choice of its excise tax rate. Taxes in bordering states were also significant in the analysis of excise taxes on beer, a product without geographic concentration in production. This suggests that the informational/precedent-setting effect is important for excise taxes in general.

Lower ending balances for the states' fiscal years led to higher cigarette excise taxes, but not for excise taxes on beer. States were more likely to use excise taxes on cigarettes than beer to fill gaps in the budget during 1990 to 2002. This could have happened for two reasons. First, assuming that excise taxes on both products were near, but just under the revenue maximizing level and that a budget deficit necessitated a tax increase, the less price responsive good would provide the larger revenue increase for an increase in the excise tax. Second, this effect could be a spillover effect of the shift in the political constraints caused by the tobacco litigation and settlements.

Of the political variables, Democratic control of the state government led to higher excise taxes on cigarettes, perhaps because Democrats have traditionally favored higher public expenditures. Timing in gubernatorial election cycles and single-party control of the state did not affect cigarette excise taxes.[41]

Income was insignificant in the fixed effect specifications for both cigarettes and beer. In both the OLS and the fixed effect specifications, larger youth populations (as a

[41] Excise taxes on beer were lower in years in which a single political party controlled the state government.

share of the total state population) lead to higher cigarette excise taxes. This relationship could indicate the use of excise taxes as a deterrent to smoking initiation. In fact, most teens in this age group cannot vote and thus cannot form a coalition to oppose such action. Higher elderly populations as a share of the state population did not significantly affect cigarette excise taxes in the fixed effect specification, but led to lower excise taxes on beer.

### B. *Pricing*

The coefficient on state excise taxes indicated substantial over-shifting in both price categories (see Table 4). For each $1 increase in state excise taxes, the retail price of cigarettes including generic brands increased $1.38 and the retail price of premium cigarettes, excluding generic brands, increased $1.29. For the price of cigarettes including generic brands, the markup over the state excise tax was not significantly different than in 1990 to 1992. For the price of premium cigarettes, excluding generic brands, the markup over the state excise tax was lower in the period 1999 to 2002. The results suggested that cigarette companies also over-shifted the federal excise tax more than state taxes.[42] The difference in magnitude could be due to concerns of interstate smuggling for state excise taxes that were not present at the federal level. The period 1993 to 1997 had lower prices due to price reductions for premium cigarettes by the cigarette manufacturers. The period 1999 to 2002 had prices $0.76 higher than in 1990 to 1992. This markup was greater than that needed to cover the per pack cost of the settlements. This suggests that the cigarette companies shifted the cost of the settlements to consumers.

[42] Barnett, Keeler, & Hu, *supra* note 24, also found that increases in federal excise taxes lead to larger increases in price than did similar increases in state excise taxes.

## IV. DISCUSSION AND CONCLUSION

The settlements significantly affected both state cigarette excise taxes and the price of cigarettes. State excise taxes increased in response to the MSA by approximately $0.08 per pack in 1998 and an additional $0.02 per pack in 1999 to 2002, which is consistent with the argument that the litigation altered the political equilibrium by reducing the constraints to raising excise taxes that previously prevented an optimal level of excise tax. Cigarette companies passed increases in excise taxes onto consumers. For every dollar increase in state excise taxes, the price of cigarettes increased by $1.38. In addition, the price of cigarettes in the post-MSA period were $0.76 higher than in the period 1990-1992, before the large increase in litigation against the tobacco industry. Thus, the cigarette companies passed on not only the cost of the payments to the states, which because of volume adjustments could be considered similar to an increase in excise taxes, but also passed on the increased excise taxes that resulted from the MSA.

The results help explain why the tobacco manufacturers would strongly oppose excise tax increases and react adversely to litigation resulting in a settlement like the MSA. It is not because that they bear the burden of the taxes. They do not; in fact, there is substantial overshifting. Rather, they fear the change in the political equilibrium and the adverse effects to their business interests that are likely to result.

Overall, is litigation used as a device to improve the public health is ultimately in the public interest? In terms of the health benefits resulting from the price increases, one would answer "yes,"[43] but improved health must be offset, at least in part, by the welfare loss to smokers through reduced consumption. Quantifying the magnitude of this loss is

[43] Sloan & Trogdon, *supra* note 35.

controversial,[44] and debating this issue is beyond the scope of this study. Furthermore, how the receipts from the MSA have been allocated has been a subject of great controversy, the discussion of which is a study in itself.[45] But given the political clout of tobacco, at least historically, it seems improbable that legislatures would set policies, both tax and other, at levels that would be set by a social dictator. Litigation may be advantageous in changing the political equilibrium and in enforcing agreements.

One limitation of this study was the relatively small post-MSA period of four years. In particular, state excises taxes increased dramatically in 2002, the last year of our sample. From articles in the press, it is likely that the average excise tax on cigarettes will again increase in 2003. A longer post-MSA sample would allow researchers to determine if the large increases in recent years were linked to the MSA but delayed due to lags in the political and budgetary process, or if the increases were a temporary response to other factors such as economic recession.

Another limitation of this study is that other tobacco related events occurred concurrently with the MSA. Many of these events, such as the Federal Trade Commission litigation against Joe Camel, revealed new information to the public about the harmful and additive nature of cigarettes and the operations of the cigarette producers. Such information could affect smoking sentiment at the state level around the time of the settlement. To the extent that changes in public sentiment affect smoking rates and restrictions on public smoking, we have controlled for such changes in the analysis.[46] In

[44] Manning, Keeler, & Newhouse, *supra* note 3; Viscusi, *supra* note 9; Gruber & Köszegi, *supra* note 3.
[45] Cary P. Gross *et al*, State Expenditures for Tobacco-Control Programs and the Tobacco Settlement, 347 New Engl. J. Med. 1080 (2002); Frank A. Sloan *et al*., States' Allocations of Funds from the Master Settlement Agreement with Tobacco Companies: Evidence from Six States (Working paper, Duke Univ. 2003); Emily Streyer Carlisle *et al*., Determinants of States' Allocations of the Master Settlement Agreement Payments (Working paper, Duke Univ. 2003)
[46] The data reveal very little variation within states in smoking restrictions post-settlements.

addition, since the lawsuits were filed by the states, tobacco companies admitted that smoking is harmful for the first time. Thus, new information and accompanying changes in public sentiment due to these revelations should be rightly attributed to the settlements. However, our measure of the effect of the MSA could have resulted from changes in voter preferences due to litigation other than the MSA.

During the current recession, states have come to depend on settlement payments to fill budget deficits. Therefore, states now have incentives to maintain the solvency of cigarette companies. The companies have maintained that the implementation of the MSA has had a negative impact on their profits. However, the oligopoly models reviewed above suggested that profits could have actually increased in the short run. The actual impact of the MSA on cigarette companies' profits is an area for future research.

## APPENDIX

## DATA SOUCES

Price and tax data for cigarettes were collected by state and year from the *Tax Burden on Tobacco*.[47] Beer taxes were collected from the Alcohol Epidemiology Program at the University of Minnesota and from the Tax Foundation website.[48] These data were also used to calculate the maximum and minimum excise taxes in bordering states for each state.

Data on tobacco leaf production was collected from the United States Department of Agriculture (USDA).[49] The 16 states that produce tobacco leaf had missing values for 1990.

State-level smoking rates, abstainer (from alcohol) rates, and instruments for these rates were calculated using data from the Center for Disease Control and Prevention's (CDC) Behavioral Risk Factor Surveillance System (BRFSS) for years 1990-2002. The BRFSS is collected annually from a nationally representative sample of the U.S. adult population. A person was considered to be a smoker if he/she reported to have smoked everyday; occasional or irregular smokers were considered non-smokers. A person was considered to have abstained from alcohol if he/she reported zero drinks in the past month. State-level rates were computed using the sampling weights provided in the survey.

There were missing observations from this data for states that did not participate in the BRFSS in the early years of our sample. The alcohol questions were in a rotation

[47] Orzechowski & Walker, The Tax Burden on Tobacco: Historical Compilation 2002, Vol. 37 (2002).
[48] Alcohol Epidemiology Program (unpublished data, Univ. Minnesota, School of Public Health 2003); Tax Foundation, Various State Tax Rates, http://www.taxfoundation.org/variousrates.html, visited January 7, 2003.
[49] United States Department of Agriculture, Crop Production—Annual Summary (Various 1991-2002).

core and not used in every year in every state. We interpolated state-level abstainer rates for these states and years using results from a regression of smoking rate on time and time squared.

Fiscal variables were collected from various editions of *The Fiscal Survey of States* from 1989 to 2002.[50] Three state/years were missing from this data source.

Election cycle and political control variables were collected from a number of sources: *Statistical Abstract of the United States*, *Book of the States*, and the National Governors Association website.[51] The political control variables had 13 missing state/years.

State income per capita was collected from the Bureau of Economic Analysis.[52]

Variables concerning states' tobacco regulation were collected from the CDC's State Tobacco Activities Tracking and Evaluation (STATE) System. The presence of "Smoker Protection" laws was obtained from *State Legislated Actions on Tobacco Issues*.[53]

States' alcohol regulatory laws were collected from various editions of the *Sourcebook of Criminal Justice Statistics* from 1990 to 2002.[54] There were 38 missing values for illegal levels of blood alcohol content.

The amount of money collected from the MSA by state was collected from the *Show Us the Money: An Update on the States' Allocation of the Tobacco Settlement Dollars*.[55]

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[50] National Governors Association & National Association of State Budget Officers, The Fiscal Survey of States (Various 1989-2002).
[51] United States, Bureau of the Census, Statistical Abstract of the United States (2001); Council of State Governments & American Legislators' Association, The Book of the States (1990-1991); National Governors Association, http://www.nga.org, visited January 28, 2003.
[52] U.S. Department of Commerce, http://www.bea.doc.gov/bea/regional/data.htm, visited March 4, 2003.
[53] Coalition on Smoking OR Health. State Legislated Actions on Tobacco Issues (2001).
[54] United States Department of Justice, Sourcebook of Criminal Justice Statistics (Various 1990-2002).

The fraction of the state population ages 10-19 and 65 and over was collected from the Bureau of the Census. Age breakdowns by state were not yet available for youth from the 2000 Census. Thus, the fraction of the state population ages 10-19 was predicted using state-specific linear trends for 2000-2002.

[55] Campaign for Tobacco-Free Kids *et al.*, Show Us the Money: An Update on the States' Allocation of the Tobacco Settlement Dollars (2002).

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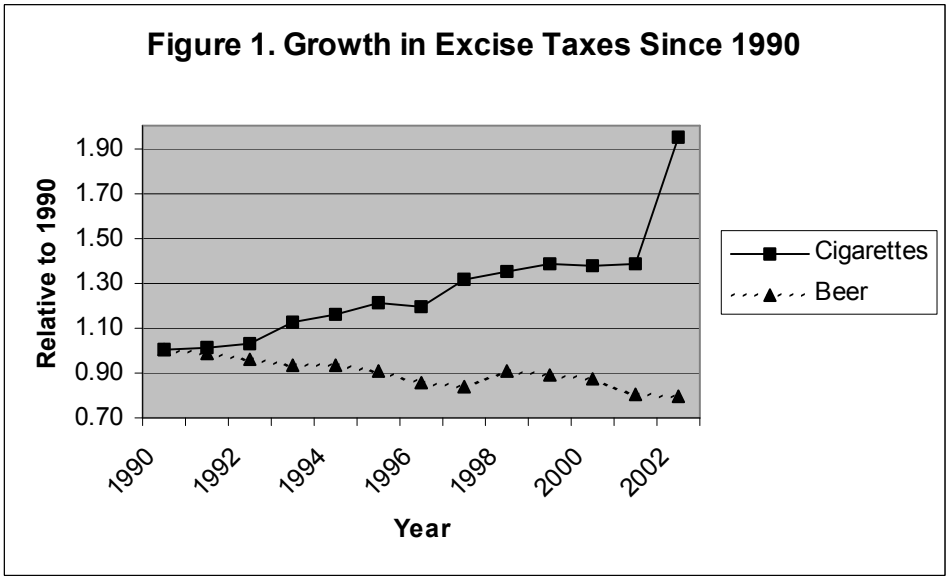
Figure 1. Growth in Excise Taxes Since 1990
Relative to 1990
1.90
1.70
1.50
1.30
1.10
0.90
0.70
1990
1992
1994
1996
1998
2000
2002
Year
Cigarettes
Beer

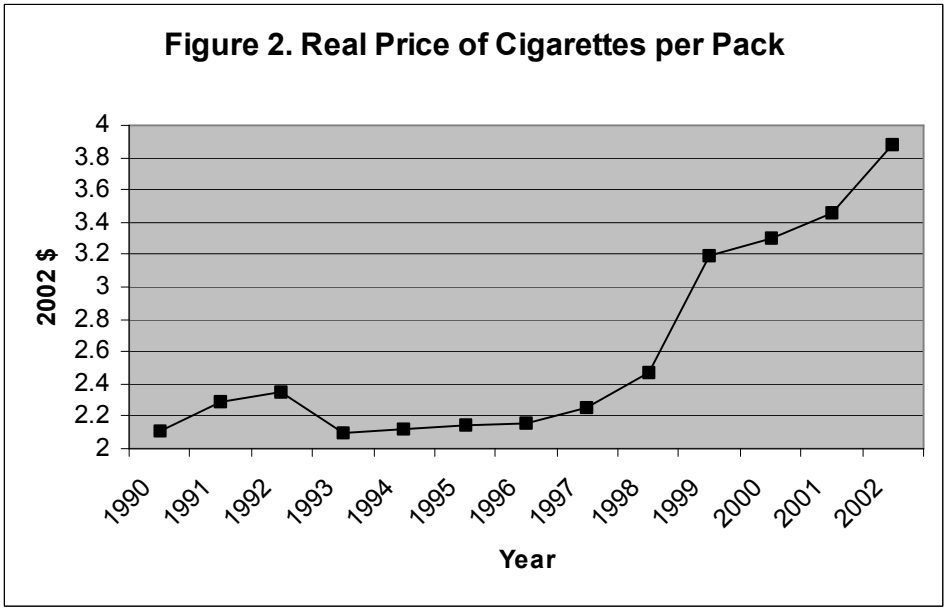
Figure 2. Real Price of Cigarettes per Pack
2002 $
4
3.8
3.6
3.4
3.2
3
2.8
2.6
2.4
2.2
2
1990
1991
1992
1993
1994
1995
1996
1997
1998
1999
2000
2001
2002
Year

Table 1. Summary Statistics: 1990-2002

| Variable | N | Mean | Std. Dev. |
|---|---|---|---|
| Cigarette | | | |
| State Excise Tax on Cigarettes (cents/pack) | 650 | 39.89 | 26.23 |
| Federal Excise Tax on Cigarettes (cents/pack) | 650 | 29.02 | 4.51 |
| Smoking Rate (%) | 637 | 23.16 | 2.94 |
| Tobacco Leaf Production (millions lbs) | 634 | 26.70 | 94.24 |
| Appropriated Ending Balance Net of Tobacco Revenues (millions $) | 647 | 0.03 | 0.04 |
| Maximum Tax in Bordering State | 650 | 55.51 | 27.30 |
| Minimum Tax in Bordering State | 650 | 19.44 | 16.04 |
| Smoker Protection Law | 650 | 0.52 | 0.50 |
| Clean Air Index: Nominal | 650 | 0.12 | 0.33 |
| Clean Air Index: Basic | 650 | 0.17 | 0.37 |
| Clean Air Index: Moderate | 650 | 0.26 | 0.44 |
| Clean Air Index: Extensive | 650 | 0.40 | 0.49 |
| Real Tobacco Settlement Payments ($/capita) | 650 | 7.92 | 17.59 |
| Beer | | | |
| State Excise Tax on Beer (cents/12 ounce drink) | 650 | 2.73 | 2.22 |
| Federal Excise Tax on Beer (cents/12 ounce drink) | 650 | 6.05 | 0.85 |
| Abstainer Rate (%) | 650 | 48.06 | 10.87 |
| Appropriated Ending Balance Net of Alcohol Revenues (millions $) | 647 | 0.03 | 0.04 |

| | | | |
|---|---|---|---|
| Maximum Tax in Bordering State | 650 | 4.11 | 2.76 |
| Minimum Tax in Bordering State | 650 | 1.09 | 1.03 |
| Blood Alcohol Concentration: Illegal per se | 612 | 0.10 | 0.01 |
| Open Container Law by Statute | 650 | 0.61 | 0.49 |
| Anti-consumption Law by Statute | 650 | 0.79 | 0.40 |
| Dram Shop Law by Statute | 650 | 0.72 | 0.45 |
| Dram Shop Law via Case Law | 650 | 0.14 | 0.34 |
| Explanatory Variables in Both Cigarette and Beer Analysis | | | |
| Gubernatorial Election Year | 650 | 0.30 | 0.46 |
| Gubernatorial Off Year | 650 | 0.46 | 0.50 |
| Index of Democratic Control (0 to 1) | 637 | 0.49 | 0.35 |
| Single-Party Control | 637 | 0.41 | 0.49 |
| Real Income ($1000/capita) | 650 | 27.66 | 4.35 |
| Population 10-19 years (%) | 650 | 14.60 | 1.46 |
| Population 65 and over (%) | 650 | 12.63 | 2.00 |

Table 2. Regression Analysis: State Excise Tax on Cigarettes (cents/pack)

| | Fixed Effects | | Least Squares | |
|---|---|---|---|---|
| | Coefficient | Std. Error | Coefficient | Std. Error |
| 1993 to 1997 | 3.371 | 2.093 | 1.287 | 2.628 |
| 1998 | 8.241* | 3.429 | 1.882 | 3.804 |
| 1999 to 2002 | 10.201** | 3.619 | 2.261 | 3.818 |
| Smoking Rate (%) | -1.111* | 0.435 | -0.856** | 0.327 |
| Tobacco Leaf Production (millions lbs) | 0.042 | 0.029 | -0.031** | 0.010 |
| Federal Excise Tax on Cigarettes (cents/pack) | 0.465$^{+}$ | 0.247 | 0.708* | 0.352 |
| Smoker Protection Law | -2.606 | 3.111 | -6.419** | 1.760 |
| Clean Air Index: Nominal | 2.491 | 5.687 | -3.437 | 4.605 |
| Clean Air Index: Basic | -19.520 | 12.496 | 9.458* | 4.715 |
| Clean Air Index: Moderate | -10.502 | 9.738 | 16.112** | 4.703 |
| Clean Air Index: Extensive | -14.253* | 6.413 | 11.073* | 4.691 |
| Real Tobacco Settlement Payments ($/capita) | -0.031 | 0.053 | -0.015 | 0.074 |
| Maximum Tax in Bordering State | 0.238** | 0.043 | -0.095* | 0.038 |
| Minimum Tax in Bordering State | 0.246** | 0.085 | 0.433** | 0.068 |
| Appropriated Ending Balance | -39.298$^{+}$ | 21.425 | -63.830** | 21.154 |

| | | | | |
|---|---|---|---|---|
| Net of Tobacco Revenues (millions $) | | | | |
| Gubernatorial Election Year | 1.201 | 1.559 | 1.430 | 2.381 |
| Gubernatorial Off Year | -0.500 | 1.355 | -0.387 | 2.058 |
| Index of Democratic Control (0 to 1) | 11.352** | 2.669 | 10.624** | 2.735 |
| Single-Party Control | -1.960 | 1.366 | -1.968 | 1.803 |
| Population 10-19 years (%) | 6.482** | 1.592 | 3.106** | 0.990 |
| Population 65 and over (%) | 2.177 | 2.171 | 1.461** | 0.567 |
| Real Income ($1000/capita) | -0.661 | 0.738 | 2.424** | 0.336 |
| Constant | -66.411$^{+}$ | 39.568 | -104.052** | 30.542 |
| N | 605 | | 605 | |
| $R^2$ | 0.38 | | 0.48 | |
| F | 14.98** | | 24.48** | |

NOTE.—The fixed effect specification includes fixed effects for states.

$^{+}$ Significant at the 0.10 level based on a two-tailed test.

* Significant at the 0.05 level based on a two-tailed test.

** Significant at the 0.01 level based on a two-tailed test.

Table 3. Regression Analsis: State Excise Tax on Beer (cents/12 ounce drink)

| | Fixed Effects | | Least Squares | |
|---|---|---|---|---|
| | Coefficient | Std. Error | Coefficient | Std. Error |
| 1993 to 1997 | 0.017 | 0.124 | -0.008 | 0.197 |
| 1998 | 0.002 | 0.225 | 0.544$^{+}$ | 0.316 |
| 1999 to 2002 | 0.117 | 0.212 | 0.143 | 0.236 |
| Abstainer Rate (%) | 0.010 | 0.009 | 0.068** | 0.009 |
| Federal Excise Tax on Beer (cents/12 ounce drink) | 0.043 | 0.049 | -0.048 | 0.094 |
| Blood Alcohol Concentration: illegal per se | 18.787** | 6.839 | -36.658** | 8.751 |
| Open Container Law by Statute | -0.671** | 0.185 | 0.383* | 0.155 |
| Anti-consumption Law by Statute | 0.038 | 0.186 | -1.335** | 0.189 |
| Dram Shop Law by Statute | - | - | 0.052 | 0.221 |
| Dram Shop Law via Case Law | -0.186 | 0.329 | 1.620** | 0.310 |
| Maximum Tax in Bordering State | 0.125** | 0.030 | -0.017 | 0.034 |
| Minimum Tax in Bordering State | 0.265 | 0.267 | 0.491** | 0.100 |
| Appropriated Ending Balance | 1.216 | 1.424 | -1.951 | 1.853 |

| | | | | |
|---|---|---|---|---|
| Net of Alcohol Revenues (millions $) | | | | |
| Gubernatorial Election Year | 0.119 | 0.105 | 0.032 | 0.201 |
| Gubernatorial Off Year | 0.059 | 0.090 | -0.139 | 0.172 |
| Index of Democratic Control (0 to 1) | -0.220 | 0.170 | 0.087 | 0.233 |
| Single-Party Control | -0.249** | 0.091 | 0.109 | 0.148 |
| Population 10-19 years (%) | -0.007 | 0.103 | -0.403** | 0.083 |
| Population 65 and over (%) | -0.592** | 0.138 | -0.304** | 0.045 |
| Real Income ($1000/capita) | -0.038 | 0.048 | -0.103** | 0.029 |
| Constant | 8.479** | 2.449 | 15.923** | 2.525 |
| N | 596 | | 596 | |
| $R^2$ | 0.16 | | 0.42 | |
| F | 5.41** | | 20.48** | |

NOTE.—The fixed effect specification includes fixed effects for states.

+ Significant at the 0.10 level based on a two-tailed test.

* Significant at the 0.05 level based on a two-tailed test.

** Significant at the 0.01 level based on a two-tailed test.

Table 4. Fixed Effect Regression Analysis: Price of Cigarettes (cents/pack)

| | Including Generics | | Excluding Generics | |
|---|---|---|---|---|
| | I | II | I | II |
| State Excise Tax on Cigarettes | 1.378** | 1.281** | 1.287** | 1.149** |
| (cents/pack) | (0.079) | (0.030) | (0.088) | (0.033) |
| State Excise Tax 1993 to 1997 | -0.066 | - | -0.062 | - |
| | (0.069) | - | (0.077) | - |
| State Excise Tax 1998 | -0.130 | - | -0.129 | - |
| | (0.083) | - | (0.092) | - |
| State Excise Tax 1999 to 2002 | -0.090 | - | -0.135$^{+}$ | - |
| | (0.070) | - | (0.078) | - |
| Federal Excise Tax on | 2.922** | 2.925** | 2.911** | 2.906** |
| Cigarettes (cents/pack) | (0.139) | (0.139) | (0.155) | (0.154) |
| 1993 to 1997 | -26.259** | -28.216** | -28.193** | -29.782** |
| | (2.555) | (1.163) | (2.839) | (1.294) |
| 1998 | 7.153* | 2.610 | 5.455 | 1.379 |
| | (3.428) | (1.693) | (3.809) | (1.884) |
| 1999 to 2002 | 76.553** | 73.750** | 80.069** | 75.801** |
| | (2.795) | (1.674) | (3.106) | (1.863) |
| Constant | 108.425** | 111.447** | 126.570** | 131.095** |
| | (4.209) | (3.505) | (4.677) | (3.900) |
| N | 650 | 650 | 650 | 650 |
| $R^2$ | 0.98 | 0.98 | 0.97 | 0.97 |

| | | | | |
|---|---|---|---|---|
| F | 2981.02** | 4771.97** | 2422.39** | 3865.71** |

NOTE.—All specifications include fixed effects for states.

+ Significant at the 0.10 level based on a two-tailed test.

* Significant at the 0.05 level based on a two-tailed test.

** Significant at the 0.01 level based on a two-tailed test.