Fiscal Research Program

**THE ECONOMICS OF
CIGARETTE TAXATION:
LESSONS FOR GEORGIA**

Bruce A. Seaman

Georgia State University

Andrew Young

School of Policy Studies

THE ECONOMICS OF CIGARETTE TAXATION: LESSONS FOR GEORGIA

Bruce A. Seaman

Acknowledgments

Table of Contents

I. Introduction

On July 1, 2003, Georgia's first increase in excise taxes on tobacco products since 1971 became effective.[1] These higher taxes were approved in the waning moments of the 2003 Georgia legislative session and reflected considerable modifications in the tax proposals originally submitted by Governor Sonny Perdue.[2] The following specific changes were enacted:

- The state excise tax on cigarettes was increased from 12 cents to 37 cents per pack;

- The state ad valorem tax on cigars was increased from 10 percent to 23 percent;

- Smokeless tobacco products were taxed for the first time at the ad valorem rate of 10 percent.

Much of the political debate focused on issues beyond the specifics of tobacco taxation, such as the propriety of the first Republican governor since Reconstruction proposing tax increases (of whatever type), and the related issue of the proper size of government and the extent to which waste and inefficiency characterizes Georgia government.[3] A notable exception was the concerted lobbying by the Georgia Association of Convenience Stores, which provided additional reasons for already reluctant legislators to oppose this specific tax due to concerns with possible severe job and business losses in border areas such as Columbus and Augusta.[4] But, the overall state financing crisis of a $620-$650 million revenue shortfall served as a dramatic backdrop to any budgetary deliberations and generally forced the debate to broader issues.

In the face of such controversies, a detailed analysis of the specific issues in the economics of tobacco (particularly cigarette) taxation generated little legislative or public interest.[5] Thus, almost by default, the arguments being made by the anti-smoking lobbyists were at least implicitly accepted. These arguments were:

1. Increases in tobacco taxes would significantly increase state revenues.[6]

2. There would be noteworthy health benefits as a consequence of reductions in smoking (particularly by young people) following the resulting increases in tobacco prices.

3. Any lost revenues (on tobacco products themselves, general sales tax revenues, or Georgia lottery funds) from the loss of convenience store sales (especially near state borders) as a result of either cross-border shopping, organized cigarette smuggling, or internet shopping would be relatively minor.

4. The threat of job losses and reduced economic activity in the state's tobacco growing and cigarette manufacturing and distribution (e.g., convenience store) sectors would be relatively minor since Georgia tobacco consumers play a small role in the national and worldwide market for tobacco products, and convenience store losses would be short term and limited geographically.

5. An increase in tobacco taxes would correct for various costs (estimated to be $6.38 per pack for Georgia[7]) imposed on society by excessive smoking and other tobacco abuse. This argument was made even though the tobacco "master settlement agreement" had already led to higher cigarette prices and large additional payments by smokers.[8]

Despite the temporary lull in this debate as the governor and the legislature contemplate their further options in a still fiscally fragile state, it is appropriate to revisit these five presumptions about the Georgia tobacco tax increases to determine the degree to which they are supported by conceptual analysis and empirical evidence. Even if each of the five presumptions were valid last year, some of them may be vulnerable in the face of further tax hikes.

This report addresses the current state of academic and policy research regarding tobacco (particularly cigarette) taxation, with an emphasis on the lessons for future Georgia policy-making.[9] The report proceeds as follows. In the next section we discuss cigarette taxation in the U.S. and tobacco consumption patterns. In the face of that background, we then address the following issues:

- The effect of higher cigarette tax rates on state tax revenues, both from the adopted 25 cents tax increase and a further increase of 21 cents, which would result in a total cigarette tax increase equal to the originally

proposed increase of 46 cents. We consider potential future cigarette tax proposals in Georgia because of Georgia's continuing budget problems and the fact that six states recently raised such taxes more than once within a recent two-year period.[10]

- We adjust the revenue estimates to account for various forms of tax avoidance and evasion (cross-border shopping, internet sales, and smuggling). We also consider the degree to which revenue from the sales tax or the Georgia lottery may decline.

- The magnitude of the effect on smoking rates and the resulting potential health benefits is discussed.

- The regressivity of the tax, as well as other incidence questions, are then addressed.

- The magnitude of adverse effects, if any, on the Georgia economy linked to the tobacco industry is assessed, based on the claims made by the tax opponents.

II. Cigarette Taxation, Prices, and Consumption

A. Cigarette Taxation in the United States

The current federal cigarette excise tax rate is 39 cents per pack (effective January 1, 2002). State taxes on cigarettes currently range from 2.5 cents to 205 cents per pack (see Table 1). With almost all states facing pressing budgetary crises, raising cigarette taxes became a popular fiscal option. As many as 29 states (plus the District of Columbia) increased their tax rates in 2002-2003 alone, with average state cigarette tax rates increasing from 31 cents per pack in 1990 (in 2002 dollars) to 62 cents by the end of 2002 and 70.4 cents as of early July 2003.   Six states increased tax rates more than once since 2000 (Connecticut, Kansas, Louisiana, New Jersey, New York, and Vermont), with four increasing cigarette taxes in both 2002 and 2003 (Connecticut by 61 and 40 cents; Kansas by 46 and 9 cents; New Jersey by 70 and 55 cents; and Vermont by 49 cents and 26 cents). Table 1 provides an update of the state cigarette tax picture as of July 1, 2003.

TABLE 1. STATE CIGARETTE EXCISE TAX RATES AND RANKINGS: JULY 1, 2003

State	Tax (Cents per pack)	Rank	Effective Date / Prior Increase / Other Notes
Alabama	16.5	47	7/1/84; 1-6 cent option for cities/counties
Alaska	100	12	10/1/97 (from 29)
Arizona	118	11	11/25/02 (from 60); prior 11/94
Arkansas	59	26	6/1/03 (from 34); prior 7/01 (from 30); + dealers pay $1.25/1000 administrative fee
California	87	19	1/1/99 (from 37)
Colorado	20	43	7/1/86
Connecticut	151	2	3/15/03 (from 111); prior 4/02 (from 50)
Delaware	24	41	1/1/91; increases by 31 cents on 8/1/03
District of Columbia	100	12	1/1/03 (from 65); prior 7/93
Florida	33.9	40	7/1/90
Georgia*	37	36	7/1/03 (from 12)
Hawaii	120	9	10/1/02 (from 100); prior 7/98 (from 80); + 10 cents 7/1/04
Idaho	57	27	6/1/03 (from 28); reverts to 28 cents 7/1/05
Illinois	98	17	7/1/02 (from 58); prior 12/97 (from 44); 10 - 15 cent option for cities/counties
Indiana	55.5	28	7/1/02 (from 15.5); prior 7/1/87
Iowa	36	37	6/1/91
Kansas	79	20	7/1/03 (from 70); prior 6/02 (from 24)
Kentucky*	3	50	7/1/70; + dealers pay .1 cents/pack administrative fee
Louisiana	36	37	8/1/02 (from 24); prior 8/00 (from 20)
Maine	100	12	10/1/01 (from 74); prior 11/97 (from 37)
Maryland	100	12	7/1/02 (from 66); prior 7/99 (from 36)

Table 1 continues next page...

TABLE 1 (CONTINUED). STATE CIGARETTE EXCISE TAX RATES AND RANKINGS: JULY 1, 2003

State	Tax (Cents per pack)	Rank	Effective Date / Prior Increase / Other Notes
Massachusetts	151	2	7/25/02 (from 76); prior 10/96 (from 51)
Michigan	125	8	8/1/02 (from 75); prior 5/94 (from 25)
Minnesota	48	33	7/1/92
Mississippi	18	45	6/1/85
Missouri	17	46	10/1/93; 4 - 7 cent option for cities/counties
Montana	70	22	5/1/03 (from 18); prior 8/93
Nebraska	64	24	10/1/02 (from 34); - 30 cents on 10/1/04
Nevada	35	39	7/1/89 (from 20)
New Hampshire	52	32	7/1/99 (from 37)
New Jersey	205	1	7/1/03 (from 150); prior 7/02 (from 80); 1/98 (from 40)
New Mexico	91	18	7/1/03 (from 21)
New York	150	4	4/3/02 (from 111); prior 3/00 (from 56); 150 also NYC
North Carolina*	5	49	8/1/91
North Dakota	44	34	7/1/93
Ohio	55	29	7/1/02 (from 24)
Oklahoma	23	42	6/1/87
Oregon	128	7	11/1/02 (from 68); prior 2/97 (from 38)
Pennsylvania	100	12	7/15/02 (from 31)
Rhode Island	132	6	5/1/02 (from 100); prior 7/01 (from 71); 7/97 (from 61); + 10 cents on 7/1 for 5 yrs.
South Carolina*	7	48	7/1/77
South Dakota	53	31	3/18/03 (from 33); prior 7/1/95 (from 23)

Table 1 continues next page...

TABLE 1 (CONTINUED). STATE CIGARETTE EXCISE TAX RATES AND RANKINGS: JULY 1, 2003

State	Tax (Cents per pack)	Rank	Effective Date / Prior Increase / Other Notes
Tennessee*	20	43	7/1/02 (from 13);1 cent option cities/counties; + dealers pay .05 cent administrative fee
Texas	41	35	7/1/90
Utah	69.5	23	5/6/02 (from 51.5); prior 7/97 (from 26.5)
Vermont	119	10	7/1/03 (from 93); prior 7/02 (from 44); 9/95 (from 20)
Virginia*	2.5	51	9/1/60; + municipal option as high as 60 cents (50 cities)
Washington	142.4	5	1/1/02 (from 82.4)
West Virginia	55	29	5/1/03 (from 17); prior 8/78
Wisconsin	77	21	10/1/01 (from 59); prior 11/97 (from 44)
Wyoming	60	25	7/1/03 (from 12); prior 7/89
Puerto Rico	123	NA	
Overall State Average	70.4		
Overall State Median	59.0		
Tobacco State Average	12.4		
Non-Tobacco State Average	78.1		

Notes: *designates one of the six tobacco producing states; state averages omit Puerto Rico; rate does not include state and local sales taxes where applicable (all states with a sales tax apply that tax to the portion of the retail price including the cigarette tax except Alabama, Missouri and Georgia).

Sources: Federation of Tax Administrators (2003); Campaign for Tobacco Free Kids (2003a); Orzechowski and Walker (2001), (previous volumes were funded by the tobacco industry through the Tobacco Institute, which was dissolved as part of the Master Settlement Agreement).

B. Cigarette Prices and Consumption, Smoking Rates, and Ranking

Smoking rates, the number of smokers, and cigarette pack sales for each state is provided in Table 2. Georgia ranks 29th among states and the District of Columbia in its adult smoking rate (23.7 percent), with Utah having the lowest rate (13.3 percent) and Kentucky the highest (30.9 percent). The national average is 22.8 percent. The youth smoking rate for Georgia youth is 23.7 percent, which ranks as the 9th lowest, and compares favorably with the national average of 28.5 percent.

TABLE 2. SMOKING STATISTICS IN THE UNITED STATES:2001-2003

State	Sales $ (millions) FY 2002	Retail price ($ per pack incl. 2003 tax rates)	Adult Smokers (thousands)	Adult Rate (percent)	Adult Rank 1 = lowest	Youth Rate (percent)	Youth Rank 1 = lowest
Alabama	378.5	3.15	794.4	23.9	30	23.7	9
Alaska	40.4	4.34	113.9	26.1	44	33.9	42
Arizona	276.1	4.44	809.2	21.5	12	19.0	3
Arkansas	234.8	3.70	510.2	25.6	40	34.7	44
California	1,234.9	4.11	4,235.0	17.2	2	21.6	6
Colorado	292.6	3.01	716.9	22.4	19	25.3	19
Connecticut	227.4	4.74	533.3	20.8	8	25.6	21
Delaware	113.4	2.98	147.8	25.1	38	24.2	14
D.C.	25.4	4.14	95.1	20.8	9	14.7	2
Florida	1,277.3	3.33	2775.6	22.5	22	19.0	3
Georgia	666.2	3.01	1,426.1	23.7	29	23.7	9
Hawaii	62.6	4.57	188.6	20.6	7	24.5	15
Idaho	83.6	3.38	182.2	19.7	3	19.1	5
Illinois	885.2	4.02	2,165.0	23.6	27	34.0	43
Indiana	742.1	3.52	1,239.2	27.5	47	31.6	36
Iowa	249.7	3.22	486.8	22.2	15	32.7	38
Kansas	208.8	3.75	438.5	2.22	16	26.1	23
Kentucky	572.5	2.89	941.5	30.9	51	40.0	48
Louisiana	433.3	3.21	805.8	24.8	37	33.3	40
Maine	102.4	4.12	233.7	24.0	32	24.8	17
Maryland	301.0	3.95	839.3	21.3	10	23.7	9
Massachusetts	354.0	4.82	955.3	19.7	4	26.0	22
Michigan	780.1	4.34	1,887.1	25.7	41	27.6	26
Minnesota	352.8	3.49	806.4	22.2	17	28.9	33
Mississippi	261.5	3.15	525.6	25.4	39	23.6	8
Missouri	558.3	2.94	1,079.4	25.9	42	30.3	35

Table 2 continues next page...

TABLE 2 (CONTINUED). SMOKING STATISTICS IN THE UNITED STATES:2001-2003

State	Sales $ (millions) FY 2002	Retail price ($ per pack incl. 2003 tax rates)	Adult Smokers (thousands)	Adult Rate (percent)	Adult Rank 1 = lowest	Youth Rate (percent)	Youth Rank 1 = lowest
Montana	67.3	3.49	147.2	21.9	13	28.5	32
Nebraska	132.4	3.82	257.2	20.4	5	29.0	34
Nevada	173.1	3.26	401.3	27.0	46	25.2	18
N. Hampshire	166.7	3.33	223.2	24.1	34	25.3	19
New Jersey	495.2	4.64	1,347.6	21.3	11	24.5	15
New Mexico	95.4	3.98	313.2	23.9	31	36.2	47
New York	884.4	5.65	3,340.0	23.4	26	26.8	24
N. Carolina	806.6	3.02	1,576.1	25.9	43	27.8	28
N. Dakota	43.4	3.52	106.4	22.1	14	35.3	45
Ohio	1,101.0	3.51	2,344.8	27.7	48	33.4	41
Oklahoma	352.8	3.09	736.8	28.8	50	24.0	13
Oregon	231.3	3.80	527.8	20.5	6	22.0	7
Pennsylvania	1,067.4	3.95	2,221.4	24.6	36	27.6	26
Rhode Island	79.1	4.65	192.1	24.0	33	24.8	17
S. Carolina	396.2	3.00	786.6	26.2	45	36.0	46
S. Dakota	57.1	3.49	123.7	22.4	20	33.0	39
Tennessee	593.6	3.26	1,046.9	24.4	35	32.4	37
Texas	1,244.3	3.49	3,367.1	22.5	23	28.4	30
Utah	91.0	3.73	201.4	13.3	1	8.3	1
Vermont	57.0	4.11	103.3	22.4	21	23.7	9
Virginia	662.1	2.95	1,201.6	22.5	24	NA	NA
Washington	269.5	4.82	989.9	22.6	25	28.0	29
West Virginia	199.5	3.37	396.5	28.2	49	39.2	49
Wisconsin	408.3	3.89	942.8	23.6	28	27.1	25
Wyoming	46.1	3.50	81.0	22.2	18	28.4	30

Table 2 continues next page...

TABLE 2 (CONTINUED). SMOKING STATISTICS IN THE UNITED STATES: 2001-2003

State	Sales $ (millions) FY 2002	Retail price ($ per pack incl. 2003 tax rates)	Adult Smokers (thousands)	Adult Rate (percent)	Adult Rank 1 = lowest	Youth Rate (percent)	Youth Rank 1 = lowest
State Average	400.0	3.72	941.2	22.8	-	28.5	-

Sources: The latest update from Campaign for Tobacco-Free Kids (2003a) as derived from various sources. Similar data are reported by OTDirect (a cigarette selling organization linked to the Sovereign Seneca Indian Territory) at OTDirect.com. Note that there was no change in the reported Youth Smoking Rates between the latest update of these data and the previous one, suggesting no updated data had been received. The exception is Texas, which dramatically drops from the 28.4 percent reported in the table to 24.7 percent. Since this is the only state where a change is reported, and the magnitude of the change is suspicious, the higher rate is reported in Table 2 consistent with the stable rates reported for all other states.

Note: According to the National Health Interview Survey (U.S. National Center for Health Statistics, 2000), a "current smoker" prior to 1992 was defined as a person who has smoked a least 100 cigarettes during their lifetime and who smokes every day. Beginning in 1992 the definition was modified to also include people who smoke only "some days." This same standard is used by the U.S. Centers for Disease Control and Prevention (2003), and the U.S. Substance Abuse and Mental Health Services Administration (1999).

A more detailed picture of historical trends in smoking and the relationship with education, race, income, and age is reported in Table 3. These data are important for determining just who will bear the primary burden of higher cigarette taxes (see the tax incidence discussion below).

TABLE 3. U.S. SMOKING RATES IN PERCENT BY DEMOGRAPHIC VARIABLES:
SELECTED YEARS 1965-1998

		1965	1974	1985	1990	1995	1997-98
Overall Rate		42.4	37.1	30.1	25.5	24.7	24.0
Age	Age 12-17	-	-	29.4	22.4	20.2	19.9
	18-25	-	-	47.4	40.9	35.3	40.6
	26-34	-	-	45.7	42.4	34.7	44.7
	> 35	-	-	35.5	28.9	27.2	27.9
Income	<$15 K	-	-	-	31.6	28.8	-
	$15-24.99K	-	-	-	29.8	27.2	-
	$25-34.99K	-	-	-	26.9	-	-
	$35-50.00K	-	-	-	23.4	-	-
	> $50K	-	-	-	19.3	17.2	-
Education	< 12 yrs.	-	-	-	31.8	-	-
	12 yrs.	-	-	-	29.6	-	-
	> 12 yrs.	-	-	-	18.3	-	-
Race/Gender	White Male	51.1	41.9	31.7	28.0	26.6	26.3
	Black Male	60.4	54.3	39.9	32.5	28.5	29.0
	White Female	34.0	31.7	27.7	23.4	23.1	22.6
	Black Female	33.7	36.4	31.0	21.2	24.2	20.8
Race/Gender for 18 to 24 year olds	White Male	53.0	40.8	28.4	27.4	28.4	34.1
	Black Male	62.8	54.9	27.2	21.3	14.6	19.7
	White Female	38.4	34.0	31.8	25.4	24.9	28.0
	Black Female	37.1	35.6	23.7	10.0	8.8	8.3

Source: Various tables from the Health and Nutrition section of the *Statistical Abstract of the United States* for the years 2001, 1999, 1997 and 1996. Income ranges are in 1995 dollars. Smoking data for 1995 are from the Behavior Risk Factors Surveillance Surveys cited in Evans et al. (1999).

The data in Table 3 reveal five major points about smoking in the United States:
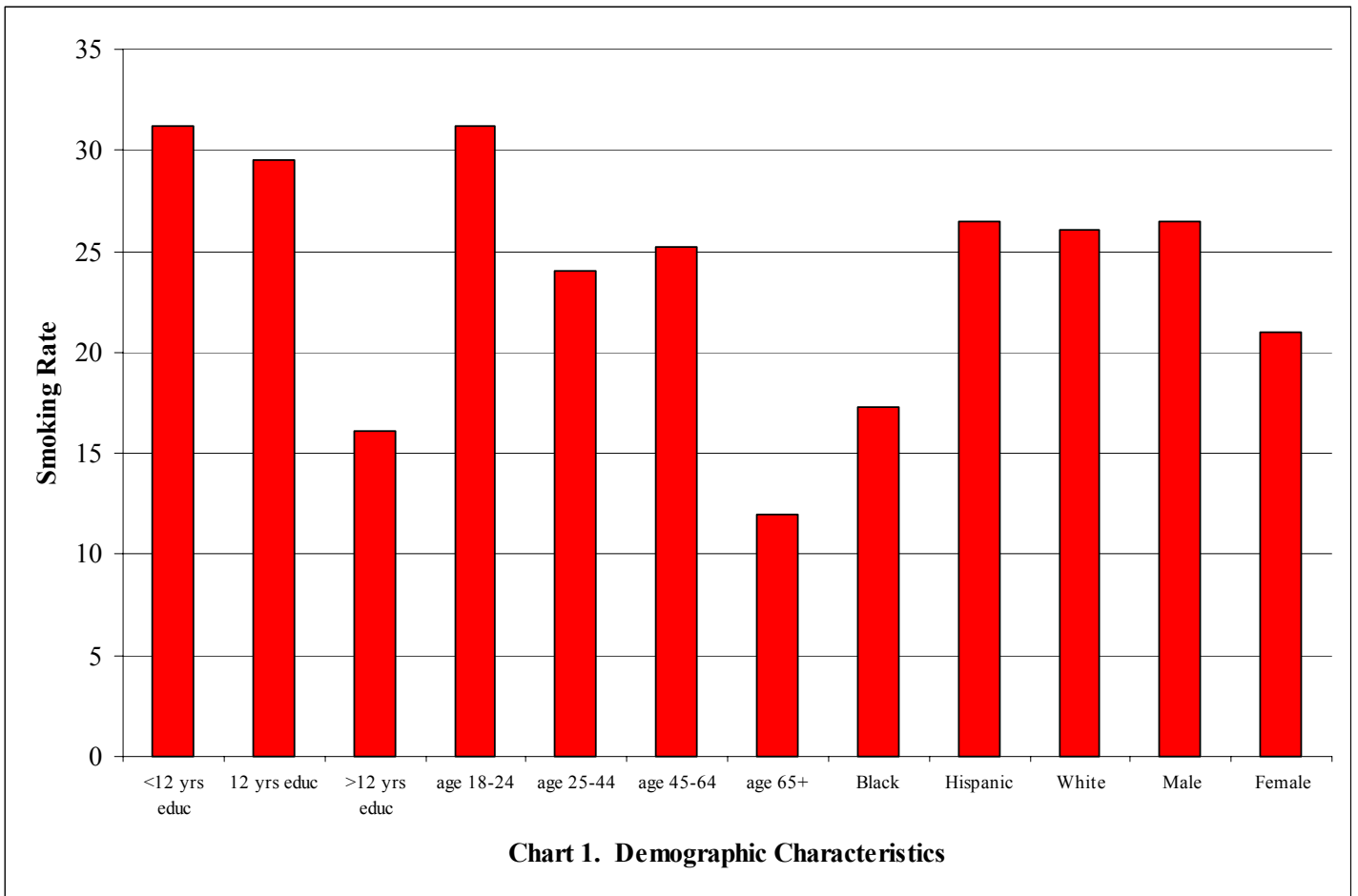
1. Overall smoking rates have declined significantly since 1965, although the rate of decrease has understandably slowed and some age groups have defied this trend in more recent periods, especially whites 18-25 years of age.

2. Smoking rates vary inversely with income, ranging from a high of 31.6 percent for the lowest income class to 19.3 percent for those with the highest incomes.

3. Smoking rates also decline uniformly with education level, from 31.8 percent for those without a high school education to 18.3 percent with those going beyond high school.[11]

4. Black male smoking rates were especially high 40 years ago but have declined even more significantly than those of white males. Thus, by the late 1990s the gap had narrowed from over 9 percentage points to less than 3 percentage points.

5. Racial differences in overall smoking rates differ much less for females, with white rates sometimes below, but more recently slightly exceeding, black rates. Smoking rates among young blacks plummeted starting in the mid 1980s relative both to young whites and to overall black rates, especially among females. By contrast, young whites, regardless of gender, have much higher smoking rates than black youth.

Regarding smoking rates among Georgians, the trend over the period from 1984 to 2001 was a drop from 37 percent to 26 percent for men and from 25 percent to 22 percent for women (Georgia Division of Public Health, 2002). More detailed smoking demographic data for Georgia as of 1999-2000 are described in Chart 1.

These recent statistics for Georgia confirm that smoking: (1) declines with education and generally with age; (2) is more prevalent among whites and Hispanics compared to blacks; (3) is higher among men than women; and (4) remains significant among high school youths, despite the fact that the Georgia smoking rate of 24.3 percent for youth in grades 9-12 is lower than the national rate of 28.0 percent (although slightly higher in grades 6-8; 13.8 percent compared to the national rate of 11.0 percent.

Chart 1. Demographic Characteristics

The more detailed results from the *Georgia Youth Tobacco Survey, Summary Report* (Georgia Department of Human Resources, 1999), which surveyed public school students in grades 6-12, include:

1. Lifetime (ever smoked), current (use on one or more of the previous thirty days) and frequent (use on 20 or more days of the 30 days proceeding the survey) were 49 percent, 14 percent, and four percent, respectively, with lifetime smoking rates of 59 percent for eighth graders versus 36 percent in sixth grade. Male lifetime rates were 51 percent versus 47 percent for females, and Hispanic rates were higher at 63 percent than those for white students (49 percent) and black students (46 percent).

2. Lifetime rates for cigar smoking were lower than for cigarettes. The reported rate was 21 percent among sixth graders, 30 percent for seventh graders, and 39 percent for eighth graders. The overall prevalence of current cigar smoking was 8 percent, with males (11 percent) unsurprisingly higher than females (5 percent).

3. The lowest usage rates were for smokeless tobacco products, with 12 percent reporting some lifetime use and four percent reporting current use. The rate for Hispanics (21 percent) is significantly higher than whites (15 percent) and blacks (6 percent). Males (7 percent) were more than three times as likely as females (2 percent) to be current smokeless tobacco users. While smokeless tobacco use is lower than that of cigarettes, usage in Georgia is high compared to other states, especially among white males.

C. Background Summary

Until 2003, Georgia had not increased its cigarette excise tax in over thirty years. Its 2002 tax rate of 12 cents per pack, when adjusted for inflation since 1971, was the equivalent to 2.7 cents per pack, a real rate not seen since the early 1950s. Had the tax been adjusted solely for the overall change in the consumer price index since 1971, the new tax rate would be 53.3 cents per pack, 44 percent higher than the 37 cent rate that became effective on July 1, 2003, and about 9 percent lower than the 58 cent tax originally proposed by the governor.[12] Despite the recent increase, 35 states have higher tax rates, although the increase did move Georgia from the second highest tax rate among the six tobacco producing states to the highest; Tennessee is second with a tax of 20 cents per pack. On the other hand, Georgia (along with northern Florida) is a

relatively minor tobacco producing region among the seven regions typically identified, generating about 6 percent of total tobacco cash receipts.[13]

Potentially more important to the issue of the loss of cigarette sales to non-Georgia vendors is that Georgia's tax rate of 37 cents per pack exceeds that of all of its neighboring states, with Florida's 33.9 cent rate being the next highest, followed by Tennessee at 20 cents, Alabama at 16.5 cents, South Carolina at 7 cents, and North Carolina at 5 cents (see Table 1).

From the perspective of smoking prevalence, 28 states have a lower adult smoking rates than Georgia's rate of 23.7 percent. Georgia has a better record regarding youth smoking (at 23.7 percent it is notably below the national average rate of 28.5 percent, and is relatively low among high school students). An interesting, but yet untested hypothesis is that Georgia's lower youth smoking rate is possibly influenced by its relatively large black population, among whom smoking rates in younger age groups are remarkably low compared to the white population (19.7 percent versus 34.1 percent for 18 to 24 year old males and 8.3 percent versus 28.0 percent for 18 to 24 year old females).[14]

III. The Revenue Consequence of Higher Cigarette Tax Rates

A. Background

Table 4 shows the most recent five-year history of cigar and cigarette tax revenues in Georgia. For the recently completed FY 2003, cigar and cigarette tax revenue were estimated to be $82 million. Revenues for FY 2003 were 10.9 percent below those for FY 1999.[15] Total revenue for calender year 2000 (CY 2000), averaging FY 2000 and FY 2001, was $85.195 million, with estimated cigarette tax revenue of $81.79 million and cigar tax revenue of $3.41million.[16]

TABLE 4. GEORGIA TOBACCO TAX REVENUES: FISCAL YEARS (FY) 1999-2003

Fiscal Year	Cigar and Cigarette Tax Revenues
1999	$92,153,743
2000	$87,056,144
2001	$83,334,653
2002	$84,833,963
2003	$82,091,779

Source: Office of Planning and Budget.

Higher state cigarette tax rates have an excellent record of raising state tax revenues, although the factors determining the exact magnitudes are complex. The past performance cannot naively be used to project the effects of ongoing tax hikes, especially in high tax states located in lower tax regions.[17] While cigarette tax advocates are correct that all past tax increases have increased state revenues (usually substantially), the Campaign for Tobacco-Free Kids'(2003b) claim that "raising state cigarette taxes always increases state revenues" applies to historical empirical evidence and should not be interpreted as automatically applying to all future tax increases. At the same time, tax opponents such as the National Association of Convenience Stores and analysts such as Bruce Bartlett (2002 and 2003), who warn about the dangers

of assuming that tax revenues will increase, have been more effective in clarifying factors that have merely restrained rather than negated tobacco tax revenue growth.

Not all cigarette tax increases have met their proponents' revenue expectations. In Illinois, revenue increased by $13 million per month compared to the expected $19 million over the first six months following its 40 cent tax hike in 2002 (*St. Louis Post-Dispatch*, 2002).[18]   Nevertheless, increasing cigarette excise taxes has been a reliable strategy for generating more state revenues, especially in the early years following the increase, and at times there have been surprisingly strong short term revenues gains; Michigan's 50 cent increase in August 2002 generated revenue that exceeded expectations by an annual rate of $2 million.[19]

The expected increase in revenue from a tobacco or cigarette tax increase can be estimated in two primary ways: (1) by evaluating past tax increases in other states and (2) by applying an estimated price elasticity of demand[20] for cigarette consumption and adjusting for the effects of various forms of tax avoidance and evasion. Both approaches are used here to derive a plausible range of revenue increases in Georgia from the recently enacted 25 cents a pack increase. In subsection D we present estimates for a further increase in the cigarette tax to 58 cents per pack, which was the governor's original proposal.

B. Experience of Other States

The standard source for documenting the historical experience of tobacco taxation is the annual report of Orzechowski and Walker (2001 is used here), *Tax Burden on Tobacco*; both Farrelly et al. (2003) and the Campaign for Tobacco-Free Kids (2003a) cite that report as their primary source for their respective documentation of selected state experience with tax increases. We selected 23 cases of tax increases for our analysis using two criteria: (1) the tax increase occurred between 1997 and 2000, which allows comparisons of the last full fiscal year prior to the tax increase with the first full fiscal year after the increase; or (2) the tax increase occurred between 1990 and 1996 and was 20 cents or more per pack. The cases are reported in Table 5. The tax

TABLE 5. CIGARETTE EXCISE TAX INCREASES (PER PACK): SELECTED HISTORICAL EXPERIENCE (1 YEAR AFTER TAX HIKE)

State	Year	Tax Change (cents)	Tax Change (percent)	New Tax	Consumption Decline (percent)	Revenue Increase (percent)	Revenue Increase ($ millions)
Alaska	97	71	244.8	100	-13.5	201.8	28.7
Arizona	94	40	222.2	58	-2.1	221.6	116.0
California	99	50	135.1	87	-18.9	90.7	555.4
Hawaii	97	20	33.3	80	-33.6	21.6	6.906
Hawaii	98	20	25.0	100	-8.1	19.9	6.4*
Illinois	97	14	31.8	58	-8.9	19.0	77.4
Maine	97	37	100.0	74	-15.5	66.7	30.8
Maryland	92	20	125.0	36	-15.3	130.4	79.1
Maryland	99	30	83.3	66	-16.3	53.9	69.0
Mass.	93	25	96.2	51	-14.7	68.1	95.7
Mass.	96	25	49.0	76	-14.3	28.0	64.1
Michigan	94	50	200.0	75	-20.8	139.9	341.0
N. Hamp.	97	12	48.0	37	-.6	45.5	22.5
N. Hamp.	99	15	40.5	52	-10.3	26.2	19.2
N. Jersey	98	40	100.0	80	-16.8	68.5	166.6
New York	00	55	98.2	111	-24.48	52.42	352.1 **
Oregon	97	30	78.9	68	-8.3	77.0	79.8
Rh. Island	97	10	16.4	71	-3.7	13.3	7.09 +
Utah	97	25	94.3	51.5	-25.7	42.4	12.7 ++
Vermont	95	24	120.0	44	-19.4	81.7	11.3 ^
Wash.	93	20	58.8	54	-9.1	49.5	65.5
Wash.	95	25	46.3	79	-13.6	28.3	56.1

Table 5 continues next page...

TABLE 5 (CONTINUED). CIGARETTE EXCISE TAX INCREASES (PER PACK): SELECTED HISTORICAL EXPERIENCE (1 YEAR AFTER TAX HIKE)

State	Year	Tax Change (cents)	Tax Change (percent)	New Tax	Consumption Decline (percent)	Revenue Increase (percent)	Revenue Increase ($ millions)
Wisconsin	97	15	34.1	59	- 6.5	25.8	52.9

Source: Adapted from Table A-1, "Sales and Cigarette Excise Tax Revenue," Farrelly et al. (2003) and the Campaign for Tobacco-Free Kids (CTFK) (2003b), Table of "Recent State Experiences with Cigarette Tax Increases."

Notes: * Farrelly et al. (2003) report $6.096 in higher revenue. ** Farrelly et al. (2003) report $365.0 in higher revenue. + CTFK reports $8.6 in higher revenues. ++ Farrelly et al. (2003) report $21.5 in higher revenue. ^ CTFK report $11.7 in higher revenues.

increases between 1997 and 2000 provide sufficiently recent evidence to incorporate the effects of expanding internet sales and intensifying anti-smoking publicity campaigns.[21]

The simplest approach to estimating the likely effects of the Georgia cigarette tax increase on state tax revenues is to derive the elasticity of revenue with respect to tax rates. This elasticity is measured as the percentage change in state revenues divided by the percentage change in tax rates.[22] While this is a relatively crude measure that does not directly assess the effects of higher cigarette taxes on retail prices and consumption, or control for geographic location and relative tax rates in neighboring states, the tax elasticity of revenues is not an uncommon summary measure used in tax analysis. It has the merit of being derivable over 23 state cases and 8 years, including time periods when the variance in tax-inclusive retail cigarette prices was not as great as in the past few years following the flurry of significant tax increases.[23]

The average tax elasticity of revenue for the 23 cases listed in Table 5 is 0.731, implying that, e.g., a 100 percent increase in the cigarette tax rate increases state revenues by about 73 percent. The range of the tax revenue elasticities is 0.45 to 1.04, but the elasticities of 15 of the 23 states fall between 0.6 and 0.85. Georgia's tax increase of 25 cents a pack (from 12 cents to 37 cents) is a 208 percent increase, which using a revenue elasticity of 0.73, yields an expected increase in cigarette tax revenue of 152 percent (= 0.73 x 208 percent). Of the three states that increased tax rates by 200 percent or more (Alaska in 1997; Arizona in 1994; and Michigan in 1994) the average

revenue elasticity is 0.84. This elasticity suggests a revenue gain of 175 percent (= 0.84 x 208). We use these two percentage changes for our revenue calculations.

The total cigar and cigarette tax revenue in Georgia for FY 2002 was $84.834 million (constituting, as noted above, almost entirely cigarette excise tax revenues). FY 2003 revenue was $82 million, which is slightly below the average of FY 2000 and 2001, $85.195 million. Rather than using the most recent year, which reflects a recessionary level, we average the previous three years and use $85.15 million, as the base pre-tax annual cigar and cigarette tax revenue.

A 152 percent increase in revenue applied to the $85.15 million base revenue yields an estimated $214.55 million in total tobacco tax revenue (ignoring the new tax on smokeless tobacco) for FY 2004. A 175 percent increase yields an estimate of $234.16 million. These imply revenue increases of $127.47 million and $149.01 million, respectively, in cigarette and cigar tax revenues.[24] The estimate is not adjusted for any possible offsetting lost of sales tax or lottery revenue, which are discussed below.

C. The Price Elasticity of Demand Approach

A second approach to estimating the revenue increase relies on econometric estimates of the demand for cigarette demand. There have been many cross-sectional and a few longitudinal econometric demand studies, which provide estimates of the price elasticity of demand. These estimates generally range from -0.3 to -0.5 when controlling for cross-border activities (U.S. Department of Health and Human Services, 2000). But estimated elasticities are higher (e.g. -0.71) when tobacco industry oligopoly structure is factored into the estimation (Barnett et al., 1995). Price elasticity estimates are much higher for young smokers (e.g., Douglas, 1998), as high as -1.44 for youths between 12 and 17 (Lewit et al, 1981), and -0.89 for 20-25 year olds (Lewit and Coate, 1982). Furthermore, more recent price elasticity estimates for college students are as high as -1.4 (Chaloupka and Wechsler, 1997), nearly identical to the earlier result for 12-17 year olds (Lewit et al., 1981). Using data from the 1992, 1993 and 1994 "Monitoring the Future Survey," an overall price elasticity of -1.313 was found for youth cigarette demand (Chaloupka and Grossman, 1996). More refined analysis has shown that young

men are more price responsive than women, and African Americans are more price responsive than whites (Chaloupka and Pacula, 1999; Farrelly et al. 2001). In their recent study of the effects of cigarette taxes on smoking surrounding pregnancies, Colman et al. (2003) estimated the price elasticity of "prenatal quitting and postpartum relapse" as close to -1.0.

Guhl (2003) is an excellent recent example of a tobacco tax revenue study using the price elasticity of demand approach (further details of his research are provided in Appendix A.) Building on previous cigarette demand models, especially those focusing special attention on both organized smuggling and more informal bootlegging,[25] Guhl uses 30 years of time series data (1970-2000) to estimate a demand function for in-state cigarette purchases, with the dependent variable defined as "annual per capita packs of cigarettes sold in West Virginia." His key independent variable is the real (i.e., inflation adjusted) cigarette price per pack in West Virginia.

Two of Guhl's results are particularly important. First, he finds that an increase in the real price per pack of 10 cents reduces the taxable quantity of cigarettes by 1.78 packs per capita. Based on the price and quantity of cigarettes in West Virginia, this suggests a price elasticity of cigarette demand of -0.46, which is in the range of elasticity values reported above. Second, Guhl found no effect of bootlegging and concludes that "the amount of bootlegged cigarettes does not significantly change the match between in-state cigarette sales and West Virginia consumption" (p. 819).

These results can be applied to the Georgia case (as further detailed in Appendix A). We assume that the average retail per pack price (prior to the tax increase) in Georgia was $2.76.[26, 27] This implies a 9.06 percent retail price increase due to the 25 cent tax increase.

A key issue relates to the per capita consumption in Georgia. As noted above, since cigarette excise taxes commonly generate nearly all of a state's tobacco tax revenues, a simplifying assumption can be made that the entire $85.15 million in tobacco tax revenue was generated by the original 12 cent cigarette tax. This implies total taxable cigarette consumption of 709.583 million packs (85.15 million /0.12), or 86.68 packs per capita (given a total state population of 8.186 million). This yields a price

22

elasticity of demand of -0.566.[28] Thus, a 25 cent increase in the tax rate yields a first-year state revenue estimate of $249.06 million, an increase of $163.91 million from the base of $85.15 million.[29] It also results in a reduction in consumption of 4.45 packs per capita.

Using the same methodology, we also estimated the revenue effect using the price elasticity of -0.46 derived by Guhl for West Virginia and the lower bound estimate of -0.3 reported by the U.S. Department of Health and Human Services (2000). For the former, a 25 cent increase in cigarette tax yields an estimated increase in revenue of $166.45 million, while for a price elasticity of -0.3, the increase in revenue is estimated to be $170.24 million.

D. Summary of Tax Revenue Projections: Two Approaches

The results derived above for the 25 cent cigarette tax increase are summarized in Table 6, along with an extension of those results to the potential case of a subsequent 21 cent increase to 58 cents, reflecting Governor Purdue's original proposal of a 46 cent increase. The tax elasticity of revenue approach linked to the 23 cases of past tax increases described in Table 5 generated two estimates based on tax revenue elasticities of 0.731 and 0.844, yielding estimated revenue increases for the 25 cent tax increase of $129.47 and $149.01, respectively. The results for an elasticity of 0.844 are cited in Table 6 for the original 25 cent tax increase.

The price elasticity approach demonstrated that the results of a 25 cent tax increase varied from an increase of $163.91 million (using an elasticity of -0.566) to $170.24 million (using an elasticity of -0.3), with an intermediate value of $166.45 (using an elasticity of -0.46). We report $163.91 million, i.e., the lowest estimate in Table 6, and use the elasticity of -0.566 as a foundation for the subsequent analysis of an additional 21 cent tax increase.[30]

TABLE 6. CIGARETTE (CIGAR) TAX REVENUE PROJECTIONS (25 CENT INCREASE / 46 CENT INCREASE)

Tax Rate	Price Elasticity Approach			Tax/Revenue Elasticity Approach		
	12 cents	37 cents	58 cents	12 cents	37 cents	58 cents
Base packs / person, FY 03	86.68	86.68	86.68	NA	NA	NA
Base total packs, millions	709.58	709.58	709.58	NA	NA	NA
Base tax revenue $ mill.	85.15	85.15	85.15	85.15	85.15	85.15
Base retail price, $	2.76	2.76	2.76	2.76	2.76	2.76
% tax change	-	208.33	56.76	-	208.33	56.76
% price change	-	9.06	6.98	-	9.06	6.98
Elasticity	-	-0.566	-0.651	-	0.84	0.72
New retail price, $	-	3.01	3.22	-	3.01	3.22
New packs / person, FY 04 or FY 05	-	82.23	78.49	NA	NA	NA
New total packs, millions	-	673.14	642.60	NA	NA	NA
New total tax revenue $ mill.	-	249.06	372.71	-	234.16	319.65
Increase in total revenue $ mill.	-	163.91	287.56* 123.65**	-	149.01	234.51* 85.49**
% change revenue	-	192.50	337.71* 49.65**	-	175.00	275.41* 36.51**

NA signifies "not applicable."
*Revenue from an increase in the tax rate from 12 cents to 58 cents, i.e., 46 cents.
**Revenue from an increase in the tax rate from 37 cents to 58 cents, i.e., 21 cents.
Note: 12 cents was the tax rate prior to July 1, 2003; 37 cents is the current tax rate; 58 cents would be the tax rate from a further 21 cent tax increase.

Now consider the increase in the tax rate from 37 cents to 58 cents. For the revenue elasticity method, we use an elasticity of 0.72, which is the average for five states where the tax increased between 40 and 60 percent, since a second round tax increase of 21 cents would represent a 56.76 percent increase in the tax rate. This yields an estimated additional revenue increase of $85.49 million, in addition to the revenue generated by the 25 cent tax, for a total revenue gain of $234.51 million from a 46 cents tax increase.

One of the advantages of Guhl's estimation procedure is that the price elasticity is not constant, and with higher prices demand becomes more responsive to price changes, consistent with standard economic theory. Thus, for the price elasticity approach, the relevant price elasticity is -0.651. This implies an increase in tobacco tax revenue of $123.65 million from an additional 21 cent tax increase, or a total of $287.56.[31]

The estimates in Table 6 can be summarized as follows, remembering that these results reflect the estimated first fiscal year revenues and are not adjusted for any loss in sales tax revenues due to the lower quantity of cigarettes sold (see below):

- Both approaches predict that the 25 cent tax increase will generate substantial new state revenues ranging from $149.01 million (the tax elasticity of revenue approach) to $163.91 million (the price elasticity approach), with the latter approach being more consistent with models of revenue projection derived from the academic tax literature;

- While those revenue estimates fall short of the highest projection often appearing in press reports ($180 million), they are fully consistent with other more modest projections that were being generated at the time the tax proposals were being considered;

- If the legislature had passed the governor's original tax proposal for a 46 cent hike to a tax of 58 cents per pack, the first fiscal year projections are for revenue gains of between $234.51 and $287.56 million, short of the higher than $300 million estimate sometimes reported, but quite substantial increases in annual tobacco tax revenue of between about 275 to 338 percent;

- These projections for the 46 cent hike are fully applicable to the consideration of a possible second round tax increase of another 21 cents following the original 25 cent increase, since the elasticities used under both approaches incorporated realistic conservative adjustments (a higher

price elasticity of cigarette demand and a lower tax elasticity of revenue, as retail prices increased). Of course, if measured relative to the now higher projected revenues from the first-round increase, those subsequent gains are more modest at between $85.49 to $123.65 million (i.e. percentage gains of between 36.51 and 49.65 percent).

IV. Adjustments to Revenue Estimates

In this section we consider revenue reductions from other revenue sources (sales tax, Lottery revenue, and tax avoidance and evasion efforts) due to an increase in the tobacco tax rate.

A. Sales Tax Adjustment

As incorporated into the above calculations, Georgia does not apply its 4.0 percent sales tax to that portion of the retail cigarette prices represented by its state cigarette tax.[32] This means that prior to the 2003 tax increase, no sales tax was earned on 12 cents of that retail price, and after the increase, no sales tax will be earned on the additional 25 cent portion of the new retail price.   However, assuming that $2.76 was the base price per pack, sales taxes were earned on $2.64 per pack and should have yielded $74.932 million in sales tax revenue from cigarette sales.[33]

Based on the projected drop in total packs sold to 673.14 million following the 25 cent tax increase, new total taxable sales would be $1,777.1 million, yielding state sales tax revenues of $71.084 million from cigarette sales. This amounts to a loss of sales tax revenue of $3.848 million.

Extending this analysis to the possible effect of a subsequent 21 cent excise tax increase, total cigarette packs sold are projected to fall to 642.60 million. This results in an additional loss of $3.227 million in sales tax revenue, for a total loss of $7.075 million relative to the original base period of FY2003.[34] If these state sales tax revenue losses are subtracted from the revenue projections summarized in Table 6, the 25 cigarette tax increase net effect on state revenues would be $160.06 million instead of $163.91, and the supplemental potential 21 cent tax increase would generate an additional $120.42 million instead of $123.65 million.

Note that these sales tax losses are limited to cigarette sales only. Additional revenue losses could arise if those Georgia residents who cross state boundaries to buy cheaper cigarettes also purchase fewer other taxable commodities within Georgia. The likely magnitude of such effects relates more generally to the question of the seriousness

of tax avoidance and evasion, which is discussed below.

B. Possible Georgia Lottery Net Revenue Adjustment

The gross Lottery revenues were $2.449 billion in FY2002, increasing to a record $2.604 million for FY 2003 (*Atlanta Journal Constitution*, 2003f), with net proceeds transferred to the Lottery for Education Account increasing from $726.2 million in FY2002 to more than $750 million in FY2003 (figures also from the Georgia Lottery Corporation, 2002). In addition to a loss of sales tax revenue, there is a potential for a lost of Georgia Lottery revenue. Such losses could occur if fewer people buy lottery tickets because they either 1) reduce their trips to retail outlets within Georgia to buy cigarettes, or 2) shift retail purchases to outlets located in neighboring states. However, the current dearth of competing state lotteries in neighboring states will exert an offsetting effect.

While Florida has a popular lottery, the cigarette tax differential between Georgia and Florida is only 3.1 cents. While the tax differential with Tennessee is 17 cents, the pending Tennessee Lottery may have minimal effects due to the relatively small Georgia county populations bordering that state. A lottery in South Carolina, which has been a major political issue, would be a bigger threat given that state's 7 cent cigarette tax and the larger Georgia population bordering South Carolina.

Even if Georgians made more shopping trips across state boundaries, the effect on Lottery sales is likely to be minimal. Guhl (2003) and others who have studied cross-border shopping for cigarettes generally focus on the relevant populations in bordering counties since any defensible economic model would compare the potential savings from buying cheaper cigarettes to the required higher travel costs, which depends on distance traveled.

Table 7 documents the 2002 Georgia population living in counties sharing a border with particular neighboring states, the average growth rates in those county

TABLE 7. POTENTIAL GEORGIA BOOTLEGGING POPULATION AND RELATED STATISTICS (2002-2003)

County	Pop. 2002	Avg.% pop. growth 2000-02	Lung cancer death rate	State(s)	Cigarette. Tax Differential (cents higher in GA) / Border size (L, M, S)
Rabun	15,521	1.6	76.9*	NC SC	32 / L 30 / L
Habersham	37,979	2.57	55.1*	SC	30 / S
Stephens	25,712	0.60	73.9*	SC	30 / L
Franklin	20,778	1.23	47.6	SC	30 / S
Hart	23,249	0.73	69.2*	SC	30 / L
Elbert	20,667	0.37	58.0*	SC	30 / L
Lincoln	8,459	0.56	74.0*	SC	30 / L
Columbia	94,958	2.56	47.8	SC	30 / L
Richmond	197,842	-0.27	53.3*	SC	30 / L
Burke	22,794	0.96	45.7	SC	30 / L
Screven	15,201	-0.10	78.2*	SC	30 / L
Effingham	40,832	3.50	38.3	SC	30 / L
Chatham	233,702	0.30	61.0*	SC	30 / L
Camden	44,702	0.83	20	FL	3.1 / L
Charlton	10,553	0.90	66.8*	FL	3.1 / L
Ware	35,558	0.00	115.3*	FL	3.1 / M
Clinch	6,904	0.03	75.1*	FL	3.1 / M
Echols	3,842	2.70	< 1.0	FL	3.1 / L
Lanier	7,216	0.43	67.4*	FL	3.1 / S
Lowndes	93,658	0.76	61.4*	FL	3.1 / L
Brooks	16,428	0.10	81.1*	FL	3.1 / L
Thomas	42,976	0.46	76.0*	FL	3.1 / L
Grady	23,838	0.37	56.0*	FL	3.1 / L

Table 7 continues next page...

TABLE 7 (CONTINUED). POTENTIAL GEORGIA BOOTLEGGING POPULATION AND

RELATED STATISTICS (2002-2003)

County	Pop. 2002	Avg.% pop. growth 2000-02	Lung cancer death rate	State(s)	Cigarette. Tax Differential (cents higher in GA) / Border size (L, M, S)
Decatur	28,243	0.20	69.8*	FL	3.1 / L
Seminole	9,310	-0.10	69.5*	FL	3.1 / S
				AL	20.5 / L
Early	12,172	-0.40	81.9*	AL	20.5 / L
Clay	3,392	0.42	< 1.0	AL	20.5 / L
Quitman	2,621	0.73	< 1.0	AL	20.5 / L
Stewart	5,040	-1.47	93.4*	AL	20.5 / L
Chattahoochee	15,440	1.46	16.4	AL	20.5 / M
Muscogee	185,948	0.03	60.9*	AL	20.5 / L
Harris	25,092	2.37	71.4*	AL	20.5 / L
Troup	59,767	0.80	75.7*	AL	20.5 / L
Heard	11,340	1.86	78.7*	AL	20.5 / L
Carroll	94,907	3.73	55.0*	AL	20.5 / L
Haralson	26,755	1.86	61.7*	AL	20.5 / L
Polk	39,444	1.40	77.0*	AL	20.5 / L
Floyd	92,606	1.06	79.5*	AL	20.5 / L
Chattooga	26,161	1.30	91.3*	AL	20.5 / L
Walker	61,949	0.56	99.3*	AL	20.5 / L
				TN	17 / L
Whitfield	87,037	1.80	51.1	TN	17 / M
Murray	38,544	2.76	74.9*	TN	17 / M
Fannin	20,986	2.57	127.6*	TN	17 / L
Union	18,275	2.73	71.2*	TN	17 / M
Towns	9,768	2.27	95.8*	NC	32 / L
				TN	17 / L

Table 7 continues next page...

TABLE 7 (CONTINUED). POTENTIAL GEORGIA BOOTLEGGING POPULATION AND

RELATED STATISTICS (2002-2003)

County	Pop. 2002	Avg.% pop. growth 2000-02	Lung cancer death rate	State(s)	Cigarette. Tax Differential (cents higher in GA) / Border size (L, M, S)
Border Pop. x .765 (rate of adults in pop.) x .235 (GA adult smoking rate)	1,907,412 (total) 342,905 (adult smokers)				
% GA Adult Pop. (6.017 mill)	5.70				
Border Pop. w/o Florida / Adult Smokers	1,584,204 / 284,800				
% GA Pop.	4.73				

Note: Lung cancer death rates are defined as "deaths per 100,000 population."
*The death rate exceeds the state average of 51.9.

populations since 2000, and the relevant cigarette tax differential as of July 2003, which is a rough proxy for the more relevant per pack (carton) retail price differential. In an attempt to capture variation in the fraction of a county's population that lives close to the border, Table 7 also includes a qualitative measure of whether the common border(s) are "large (L), medium (M) or small (S)" relative to the size of the Georgia county. The counties are listed clockwise geographically starting in the northeast corner of the state.

Clearly, other variables beyond population are relevant to a full evaluation of the potential bootlegging population.[35] We report the combined 1994 and 2001 county-specific lung cancer mortality rates (defined as deaths per 100,000 population) as a proxy for the magnitude of smoking intensity in specific counties.[36] Smoking intensity, even more than mere smoking rates, may well be a better predictor of the propensity of

cigarette consumers to devote time and energy to seeking cheaper cigarettes in bordering states.

Table 7 suggest the following conclusions:

- The total adult population with potentially significant bootlegging incentives is 284,800, which constitutes only 4.73 percent of the adult Georgia population.[37] This population does not include those counties bordering Florida, since the cigarette tax differential of only 3.1 cents provides a minimal incentive for widespread bootlegging.

- The smallest potential adult population with significant bootlegging incentives could be calculated by further eliminating any county with either a below average death rate from lung cancer or a geographical border area designated as small (S). These adjustments yield a border population of adult smokers of 137,211, or 2.3 percent of the Georgia population.

- This 2.3 percent "lowest" relevant bootlegging population should be contrasted with the Florida inclusive "highest" relevant population of 5.7 percent of the Georgia adult population (342,905) to establish the most likely range.

- Given the popularity of the lottery and the implausibility of all border county smokers engaging in significant cigarette tax evasion activities, a defensible projection might be that 20 percent of border county smokers reduce their lottery purchases by 25 percent. If 20 percent of lottery proceeds come from non-Georgians, then lottery proceeds per Georgian are $73.57. This results in an estimated Georgia lottery revenue loss of $1.05 million (substantially less than 1.0 percent of gross, or even net revenues). Including the counties bordering Florida increases the loss to $1.26 million, still a trivial reduction in lottery revenues.

C. Cross-Border, Smuggling, and Internet Sales

The estimated reduction in cigarette packs purchased in Georgia of 36.44 million resulting from the 25 cent tax increase (Table 6) stems both from a genuine reductions in cigarettes consumed and from purchases that escape the Georgia cigarette tax. It is important to distinguish between the three key forms of tobacco tax evasion. First, individual consumers living primarily in bordering jurisdictions with differential tax rates are potential participants in cross-border shopping, trafficking in small per capita quantities for their personal use in order to avoid Georgia's cigarette tax. Second,

organized smuggling, which is big business (netting the smuggler as much as $10,000-$15,000 per van load (Cox III, 2002)) and is not as dependent on specific border county distance proximity and relative populations.[38] Third, mail order, and more recently internet sales (especially from Indian Reservation websites).

Organized smuggling is big business but the magnitude of such smuggling is unknown. It has been subject to specific legal attack under the post-World War II Jenkins Act, directed against wholesale smuggling operations, and later the Contraband Cigarette Act (CCA) of 1978, "prohibiting single shipments, sale or purchase of more than 60,000 cigarettes not bearing the tax indicia of the state in which they are found," which may have ironically increased smuggling due to unexpected reactions of enforcement agencies to passage of the law (Thursby and Thursby, 1994).[39] Regardless of the effects of the Act itself (Warner, 1982, provides a more balanced view), it was motivated by the findings of the Advisory Commission on Intergovernmental Relations in a 1977 study, *Cigarette Bootlegging: A State and Federal Responsibility*, which found evidence of substantial smuggling of cigarettes from the tobacco producing states to the Northeastern states, and that the 22 states (not including Georgia) with the most serious problem were losing between about 10 to 20 percent of their cigarette tax revenues.

There have been few studies regarding mail order, and more recently internet sales. However, this activity is clearly growing, with as many as 200 U.S. sites (up from 40 as recently as 2000; see GAO (2002) and Bryant et al. (2002)), and a similar number of foreign-based sites selling to American smokers. These sales represent 2 percent of current consumption but potentially as much as 14 percent by 2005.[40] This has drawn the attention of the U.S. Congress, with Senate Bill 1177 (the PACT Act) introduced in 2003 to strengthen the Jenkins Act by applying it to mail order and internet sales. This proposal has drawn intense and organized resistance from on-line sellers, warning their customers against this effort to "prevent you from purchasing the cigarette brand of your choice over the internet" (www.otdirect.com/otinfo.html). However, with projections of possible tax revenue losses as high as $200 million across all states in 2001 and short

run projections as high as $1.4 billion (Rubin et al., 2001), expanded legal efforts to restrict such sales are inevitable.

On the other hand, press reports of the behavior of Ohioans (facing a 55 per pack tax versus 3 cents in Kentucky) suggest that potential cross-border shoppers find it "too much of a hassle driving to Kentucky for cheaper smokes," leading to the common conclusion that while some smokers will go out of their way to avoid the higher taxes, "most, however, keep on smoking and paying" (*Cincinnati Enquirer*, 2003).[41]

What more can be learned from serious research about the likely magnitudes of such tax evasion? Guhl (2003) viewed his finding of a minimal impact from cross-state shopping as "particularly remarkable" in the face of the high real cigarette prices in West Virginia throughout the 1970s and 1980s, not just relative to Virginia, Kentucky and Maryland but also to Ohio and Pennsylvania in certain years. This finding is consistent not only with the above discussion, but with the New York evidence from its 2000 tax increase of 55 cents per pack. In the first year New York collected additional revenue of $352.1 million (Table 4), which was followed by a second year revenue increase of about another $50 million. As suggested by the Campaign for Tobacco-Free Kids (2003b), this result suggests a return to normal shopping patterns following an initial enthusiasm for cross-border, internet and even black market shopping, a conclusion reached more generally by Farrelly et al. (2003, pp 8-9).[42]

However, the broader academic research on cross-border cigarette sales and the longer term revenue effects of higher excise taxes is not as uniformly optimistic,[43] and in fact provides some serious warnings about the potential magnitude of the bootlegging, smuggling and internet sales problem.   Such tax avoidance and evasion clearly rises as the differentials among taxing jurisdictions increases, although the magnitude of the problem can vary greatly.

The magnitude of cross-border consumption effects is important for more than just the accurate estimation of state revenues. If most of the reduction in state cigarette sales can be traced to cross-border sales, the beneficial health effects from higher taxes will be limited. The first (1977) Advisory Committee on Intergovernmental Relations

(ACIR) study concluded that 40 percent of in-state sales effects from higher cigarette taxes was due to lower cigarette consumption, and 60 percent linked to cross-border sales. However, in 1985 a second ACIR study reached a dramatically different conclusion, finding that 75 percent of the sales effect of a higher cigarette tax was due to reduced smoking and 25 percent due to bootlegging or smuggling. Therefore, the reason for any observed reduction in state cigarette sales has been highly controversial.

While a detailed survey of the academic literature on this important topic is provided in Appendix B, the overall results can be summarized here. The substantial research literature on cross-border consumption changes resulting from differential tax rates is clearly varied, but the following general observations can be made:

1. The magnitude of cross-border effects due to general sales taxes exceeds those of selective excise taxes.

2. Cross-border shopping effects are likely to be greater at the city level than at the state level, consistent with the presumption that the more narrowly defined the geographic area, the more options are available for cross-border "outside" shopping.

3. The price elasticity of demand for in-state cigarettes is almost uniformly inelastic (less than 1 in absolute value), although unrestricted elasticities that incorporate cross-border effects are always higher than "naive" elasticities that ignore them.

4. Most studies find that cross-border consumption effects are relatively small in magnitude, but can be significant in important selected cases.

5. Nothing in these past studies suggests that the revenue projections derived for Georgia (Table 6) resulting from the 25 cent tax increase or a potential supplemental 21 cent increase are in error, although modifications suggested by some of the studies could lower those projections by about 4 percent.

6. Similarly, nothing in this literature review suggests any substantial error in the analysis related to the likely minimal effects in Georgia of bootlegging and lost Georgia Lottery proceeds following the 2003 tax increase (Table 7), although that analysis was not germane to the issue of more organized cigarette smuggling or internet sales.

7. To the extent that cross-border effects are the primary cause of any decline in state cigarette sales, as suggested by the 1977 (but not the 1985) ACIR study, and later suggested by Coats (1995), the beneficial health claims of anti-smoking advocates for higher cigarette taxes will be lessened, even

though the higher state revenue claims are confirmed by the low overall magnitudes of the estimated state price elasticities of cigarette demand.

V. A Brief Review of Health Benefit Claims Stemming from Higher Tobacco Taxes

Almost no one disputes that tobacco use is the single most preventable cause of death in the United States, and that quitting smoking significantly decreases a person's risk of lung cancer, stroke, respiratory illness, and heart attack. Thus, commonly specified benefits from higher cigarette taxes are similar to those listed for Georgia by the Campaign for Tobacco Free-Kids (2002).[44] The following are the estimated benefits that result from a 25 cent tax increase.[45]

- Fewer packs of cigarettes smoked per year: 21.2 million;

- Increase in total number of kids alive today who will not become smokers: 28,740;

- Number of adult smokers in the state who would quit: 20,333;

- Number of smoking-affected births avoided over the next five years: 3,067;

- Number of current adult smokers saved from smoking-caused death: 4,467;

- Number of kids alive today saved from premature smoking-caused death: 9,200;

- 5-year healthcare savings from fewer smoking-affected pregnancies and births: $3.5 million;

- 5-year healthcare savings from fewer smoking-caused heart attacks and strokes: $7.1 million;

- Long-term healthcare savings in state from adult and youth smoking declines: $510 million.

Health experts and economists may dispute the magnitudes of any one of these particular claims, especially the measurement of the long-term healthcare dollar savings which might not fully adjust for the longer life expectancies that are predicted to arise from smoking reductions. Longer life expectancies also generate greater financial liabilities to governments from various pension and related social insurance programs.

However, it is clear that almost all of these benefits stem from the prediction that a 25 cent increase in Georgia's cigarette tax will reduce smoking by 21.2 million packs per year. The supplemental assumption is that kids will be more affected by the tax

increase than adults, as indicated by the roughly 40 percent higher predicted number of kids who will not become smokers relative to the adults who will quit, and the prediction that twice as many kids will be spared a premature smoking related death than adults. Is a reduction by 21.2 million packs per year a defensible projection?

Based on the revenue projections and the analysis of bootlegging and related tax avoidance behaviors provided above, the answer is "yes" for five interrelated reasons:

1. The Campaign for Tobacco-Free Kids also predicted that had the tax increase been as high as 75 cents, the tax increase would have generated $472.2 million in additional revenues. Applying a simple proportionality of tax rates (25 cent relative to 75 cents), the 25 cent tax increase would be predicted to generate one-third as much revenue, or $157.4 million. A less than proportional claim made by the same group was $168 million.

2. This $157.4 million projection is remarkably close to the average of the two revenue projections summarized in Table 6. The price elasticity approach generated a predicted increase of $163.91 million in the first year (close to the higher $168 million projection), while the tax rate elasticity of revenue approach yielded a more conservative $149.01 million prediction. The simple average of these two projections is $156.46 million.

3. The price elasticity approach generated a predicted reduction in the total number of annual packs of cigarettes sold in Georgia of 36.44 million packs (from 709.58 to 673.14 million).

4. A predicted reduction of actual smoking by 21.2 million packs when there was a reduction of packs sold in Georgia of 36.44 million packs implies that 15.24 million packs would be smoked by Georgians but purchased from lower price vendors outside the state. This implies that of the total reduction in state sales, 41.8 percent stemmed from a combination of bootlegging, smuggling and internet sales, while 58.2 percent was the result of legitimate smoking reductions. As noted above, the first 1977 ACIR study of bootlegging reported that 40 percent of an average state's reduction in cigarette sales was the result of consumption falling while 60 percent was due to cross-border sales. By 1985, the second ACIR report found a significant change in these ratios, with consumption declines accounting for 75 percent of the state sales reduction and only 25 percent due to cross-border sales (due in large part to a narrowing of the state tax differentials).[46] With those state tax differentials rising again, it is likely that the mix of consumption and cross-border factors may well be somewhere between those figures for most states. A simple average of the 60 percent and the later 25 percent cross-border factors yields 42.5

percent, implying that 57.5 percent of the reduction in sales is due to consumption declines. Those ratios are remarkably close to the ones derived from a combination of the Table 6 revenue analysis and the Campaign for Tobacco-Free Kids assertion about the predicted decline in actual smoking (41.8 percent cross-border versus 58.2 percent reduced smoking). While that similarity hardly proves that either the data in Table 6 or the Campaign for Tobacco Free-Kids analysis is correct, it does indicate that those results are well within reasonable boundaries and can be considered highly plausible.

5.   The claim of a 21.2 million pack smoking reduction is also consistent with the derivation of 1.783 million Georgia smokers, including about 1.414 million adults and 368,535 youths under age 18, and an average number of packs per year for smokers of 398 (see endnote 37). Dividing 21.2 million by 1.783 million smokers yields an average reduction per smoker of a modest 11.89 packs per year. If one also adjusted for the Campaign's claim that 20,333 adults would quite smoking outright and 28,700 youths would not become smokers, one might reduce the number of continuing smokers to 1.734 million. This would require the average continuing smoker to reduce smoking by a still quite modest 12.23 packs per year (the equivalent of about 5 cigarettes per week). Those are hardly exaggerated claims, which strongly suggests that the Campaign for Tobacco-Free Kids' prediction of a 21.2 million pack per year smoking reduction following a 25 cent tax increase is very defensible, and the claims stemming from that prediction should be taken quite seriously.

It should also be noted that a recent review of the literature regarding youth smoking by Liang et al. (2003) found strong confirmation for the claim that the effects of higher cigarette prices are especially strong among the young: "The most consistent finding in this literature is that higher cigarette prices discourage youth smoking" (p. 105). To further elaborate, the authors note that "compared to the effects of cigarette taxation and price on youth smoking, the evidence on the effectiveness of the youth access laws and clean indoor air laws are still mixed and inconclusive" (p. 105). Thus, the claims made about the youth benefits of the higher Georgia cigarette tax are generally supported by the research surveyed by Liang et al. (2003).

There are two particular counter-claims made by cigarette tax opponents that still must be addressed: (1) higher cigarette (and cigar) taxes will just encourage smokers and potential smokers to shift toward equally or even more harmful smokeless tobacco products (moist snuff and chewing tobacco), although there is no clear evidence that

smokeless tobacco products are more harmful than smoking; and (2) reductions in the number of packs consumed overstates the health benefits since smokers will simply smoke each cigarette more completely, inhale more intensely, and/or shift to somewhat higher tar and nicotine products to maintain their addiction.

The smokeless tobacco claim is easily dismissed in the Georgia case due to the implementation, for the first time in the state, of a 10 percent ad valorem tax on smokeless tobacco products. Thus, while cigarette prices were increased by approximately 9.1 percent, prices of smokeless tobacco products increased by a predicted 10 percent. Therefore, even though the empirical evidence does indeed confirm the fear that increasing cigarette taxes without offsetting taxes on smokeless tobacco will indeed shift smokers toward more smokeless tobacco usage (Ohsfeldt et al., 1997), the argument does not apply to this case. The other claim about "more intense smoking" is much harder to assess. It is likely to be legitimate, but unlikely to be a significant enough factor to significantly compromise the projected health benefits of a projected 21.2 million pack annual reduction in cigarette consumption.

In summary, while this report is not capable of confirming every health benefit claim for the Georgia cigarette tax increase made by smoking opponents such as the Campaign for Tobacco- Free Kids, nothing in this analysis nor in the academic literature suggests that those claims are significantly overstated.

VI. Tax Incidence: Who Pays the Cigarette Tax?

There is little dispute that cigarette (and other tobacco) excise taxes represent a higher proportion of the incomes of low income consumers, i.e., that such taxes are regressive.[47] Not only do smoking rates consistently fall with education and income, but more detailed studies of household spending habits reveal that cigarette expenditures are about 3.2 percent of the income of those in the bottom one-fourth of the U.S. income distribution, while making up only 0.4 percent of the budgets of those in the top one-fourth (Gruber and Koszegi, 2002).

However, two interesting considerations might modify the magnitude of this "perverse" distributional effect: (1) the relative response of low income smokers to higher cigarette taxes, and (2) the relative "utility" value of reductions in smoking following tax-induced retail price increases. Empirical studies of cigarette price elasticities generally show larger smoking reductions (including quit rates) among younger than older smokers, and higher price elasticities among low- than high-income consumers. Farrelly and Bray (1998) estimated the lower-income price elasticity to be -0.29 versus -0.17 for upper-income smokers. Evans et al. (1999) reported that the price elasticity was -0.322 for those below the median income level and -0.17 for those with incomes higher than the median.[48] To the extent that low-income smokers are motivated to reduce smoking more than high-income smokers, the regressive disparity between their relative tax burdens will be reduced to some degree.

Furthermore, if, on average, low-income smokers reduce smoking more than high-income smokers in response to tax-induced price increases, they will benefit disproportionately from the health benefits that accompany lower smoking rates. While this will not apply to the truly addicted, one might argue that the subjective value of being induced to exert greater self-control when the commitment to stop or reduce smoking has been insufficiently strong will thus be greater for poorer relative to richer smokers (Gruber and Koszegi, 2002). Gruber and Mullainathan (2002) find that smokers and potential smokers self-report increased levels of well-being in response to higher cigarette taxes. The higher average response rates to increased tobacco taxes among the

poor, could then be used to infer a relatively higher benefit accruing to low- income smokers, hence again moderating the degree to which such taxes are regressive. However, neither of these clarifications is generally thought sufficient to reverse the conclusion that tobacco taxes are regressive (Gruber and Koszegi, 2002).

While the variation of the tax burden by income level is the most commonly stressed incidence issue, the smoking demographics in Georgia would also indicate that the 2003 tax will be especially burdensome on (1) young adults aged 18-24, especially white males; (2) Hispanics, especially males; (3) and those with less than a high school education, holding income constant. Of course, the higher price elasticities among younger smokers generates a relatively larger reduction in consumption that modestly reduces the tax burden for the 18-24 age group.

VII. Potential Adverse Effects on the Georgia Tobacco Manufacturing and Distributing Sectors: How Significant?

The most visible opposition to Georgia tobacco tax increases was led by the Georgia Association of Convenience Stores (GACS). In testimony to a subcommittee of the Georgia legislature, GACS president Jim Tudor stressed that tobacco sales account for about 40 percent of the merchandise sold in convenience stores, and that such stores employ more than 56,000 workers in Georgia.[49] The potential adverse effects on Georgia retailers was also the focus of the analysis provided by the Communications and Public Affairs department of Brown & Williamson (B & W). B & W is the third largest (10.7 percent market share) American cigarette manufacturer and employs 2,368 workers at its Macon, Georgia cigarette manufacturing (and research and development) facilities and domestic sales office in Atlanta.[50]

A reduction in cigarette sales in Georgia resulting from a 25 or 75 cent tax increase will have no measurable economic impact on the tobacco manufacturing or growing sectors. The industry argued that there are large cross-border sales effects of any Georgia tax increase, which implies that the primary effect will not be to reduce overall cigarette consumption but rather to shift the location of cigarette sales. Thus, it is not surprising that, other than observing that "about 2,200 manufacturing jobs were created in Georgia as a direct result of tobacco and cigarette production," creating nearly $100 million in annual compensation, there was minimal focus by cigarette tax opponents on the manufacturing sector and even less on the tobacco growing industry in Georgia.

In addition, the minimal size of the Georgia market for cigarette consumption relative to the national and world markets, combined with the fact that the Brown and Williamson share of the national market is only 10.7 percent and Georgia tobacco growers account for less than 6 percent of total U.S. tobacco cash receipts, simply renders implausible any argument that a 21.2 million pack reduction in actual smoking in Georgia (the Campaign for Tobacco-Free Kids (2002) projection linked to the 25 cent tax increase discussed above) could have any real effect on those Georgia sectors. With

about 610 billion cigarettes manufactured per year in the United States, roughly 25 percent exported to the rest of the world,[51] the predicted drop in Georgia cigarettes consumed is less than 0.07 percent of total production. The recent decline in Brown and Williamson employees in Georgia from 3,109 to 2,368 is clearly a reflection of the ongoing decline in cigarette manufacturing driven by industry trends utterly unrelated to Georgia.

However, opponents of higher cigarette tax make the following predictions about commercial losses in Georgia linked to the distribution sector. (These projected effects were originally based on a potential tax increase of 75 cents. Therefore the specific numerical predictions are again proportionately adjusted to reflect the approximate effects of the 25 cent tax change):

- A 9.33 percent, or 61 million pack decline in cigarette sales within Georgia, based on an initial 666 million packs prior to any tax increase, with "many of these sales losses [being] to the low tax states on Georgia's borders" (B&W, 2003, p. 5);[52]

- A gross retail value loss of about $192.76 million (61 million packs valued at a "final retail price of $3.16 per pack."[53] In addition, "sundry product sales" normally bought in conjunction with tobacco products would fall by about $53.33 million (cited as based on past studies by Price Waterhouse);

- Gross profit losses to Georgia retailers of about $46.67 million;

- A decline in convenience store cigarette sales of 35 million packs (57.4 percent of the total decline), generating an average loss of about $27,333 in cigarette plus sundry product sales and $5,000 in annual profits;

- A loss of about 635 Georgia retailer and wholesaler jobs (cited as based on a study by the American Economics Group).

The foundation for much of these projections is an assessment of cross-border sales effects that suggests a greater magnitude of that problem than was generally implied by the research surveyed above.[54] Since most of the examples cited relate to the very high tax states of California, Massachusetts, Michigan and New York, they are clearly not directly applicable to the Georgia case, where even after the 2003 tax increase the state ranks as the 36th lowest tobacco taxing state in the country. Even another 21 cent increase would change that ranking to the 27th lowest tax state, and that would occur

only if none of the nine states with current tax rates between 37 and 58 cents also increase their tax rates.

While these particular predictions of reduced cigarette sales in Georgia exceed those generated in the analysis above, it is noteworthy that even the suggested 635 jobs lost due to the 2003 tax increase would impose minimal disruptions upon the Georgia economy. Even if accepted as fully accurate, despite the disruption that any job losses would create to those workers (at least in the short run), this is an extremely small proportion of total employment in the state. Furthermore, the diversion of spending away from cigarette sales to other products will create other jobs to partly or entirely counterbalance those lost jobs.

VIII. Summary and Conclusions

For the first time in thirty-two years, Georgia increased tobacco taxes in 2003. The state excise tax on cigarette packs rose from 12 to 37 cents; the ad valorem tax on cigars rose from 10 percent to 23 percent; and smokeless tobacco products were taxed for the first time at the ad valorem rate of 10 percent. Proponents of higher tobacco taxes had supported much higher increases (e.g., a 75 cent increase in the cigarette tax), making the following claims:

- Increases in taxes would significantly increase state revenues, with projections for a 25 cent per pack cigarette tax increase typically ranging from $145 to $180 million in additional revenues per year.

- In addition to providing a boost to lagging state revenues, noteworthy health benefits would result from reductions in smoking, especially among young people.

- Revenue losses (linked to tobacco products themselves, as well as general sales tax revenues or Georgia lottery funds) from the loss of convenience store sales near state borders, or resulting from more organized cigarette smuggling or internet shopping would be relatively minor.

- Similarly, any job losses in the tobacco growing and cigarette manufacturing sectors could be largely ignored since Georgia tobacco consumers play a small role in the national and international markets for tobacco products. Tobacco distribution (largely convenience store) jobs losses would occur, but be short term and limited geographically.

- While such taxes are generally regressive, such adverse distributional effects would be smaller than often claimed, and outweighed by the efficiency gains stemming from a reduction in excessive smoking and tobacco abuse.

A thorough analysis of these claims in the context of the 2003 tax hikes reveals the following:

- Even after the 2003 tax increase, Georgia ranks 36th of 51 (including the District of Columbia) regarding its state cigarette excise tax, with New Jersey being the highest (number 1) at a per pack tax of $2.05 and Virginia ranked number 51 at only 2.5 cents (although fifty cities within the state have the option of imposing their own tax of up to 60 cents per pack). Georgia's long time rate of 12 cents per pack, when adjusted for inflation since 1971, had become the equivalent of only 2.7 cents per pack.

- Georgia's tobacco tax revenues (a sum of the cigarette and cigar tax

revenues) had declined by 2.8 percent between FY 1999 and 2002, but had risen modestly by 1.8 percent between FY 2001 and 2002.

- Based on two different approaches to revenue estimation, the first year increase in tax revenues from the 25 cent cigarette tax increase was calculated to range between $149.01 million to $163.91 million. This range is consistent with the claims made by tax increase proponents, but falls short of the highest estimates of $180 million per year.

- Furthermore, it was estimated that a 46 cent cigarette tax hike, to 58 cents per pack (Governor Perdue's original proposal) would have generated between $234.51 and $287.56 million in additional first fiscal year tax revenues. This is somewhat lower than the frequently claimed $300 million in additional revenues linked to that higher tax rate.

- It was confirmed that there would be some offsetting loss of sales tax revenues, although such projected losses are relatively modest: $3.848 million stemming from the 25 cent tax increase, and $7.075 million had the tax increase been 46 cents. These losses are linked to a decline in annual cigarette packs consumed of 36.44 million following the 25 cent increase, and a decline of 66.98 million packs had the tax increase been 46 cents. Such losses stem from the fact that Georgia is relatively unique in not applying its state sales tax (4.0 percent) to that portion of the retail cigarette price represented by its state cigarette excise tax.

- A careful analysis of the magnitude of cross-border bootlegging concluded that concerns about significant losses of Georgia Lottery revenues as Georgians shopped for cigarettes (and other goods) in border states with lower tobacco taxes are unwarranted. It was estimated that less than $1.5 million in Georgia Lottery revenues was likely to be lost as a result of such cross-border shopping, far less than even 1.0 percent of the total.

- There is no denying that tobacco excise taxes (as with all excise or sales taxes) tend to be regressive, but academic studies have shown that this effect is partially mitigated by evidence that lower income smokers reduce smoking more than high income smokers as a result of tax-induced cigarette price increases, which also suggests that the health benefits of such tax increases are realized disproportionately by lower income smokers. Nevertheless, the smoking demographics within Georgia reveal that the incidence of the higher tobacco taxes will fall disproportionately on (1) young adults aged 18-24, especially white males; (2) Hispanics, especially males; and (3) those with less than a high school education, controlling for income. However, since younger smokers do have higher price elasticities of demand for smoking, they are projected to exhibit

larger relative reductions in consumption of tobacco products, which will at least modestly reduce their tax burden.

- While no independent effort was made to verify all of the health claims made by tax increase proponents, this study does confirm that a sizeable portion of the drop in projected cigarette sales following the 25 cent tax hike (i.e., 36.44 million packs in the first year) is likely to result from genuine declines in smoking (21.2 million packs) as opposed to mere cross-border shopping in lower tax states (15.24 million packs). This proportionate effect of smoking reductions versus bootlegging or smuggling of cigarettes (58.2 percent) is close to that derived from other studies, and the actual estimated drop in the number of packs smoked is similar to that claimed by the Campaign for Tobacco-Free Kids (2002), which would tend to confirm at least the primary premise of all of the health benefits assertions: that higher taxes will not just lead to a diversion of cigarette buying from other states, but will actually reduce smoking.

- Finally, this study also confirms that there is no threat of meaningful job loss in either the tobacco growing or cigarette manufacturing sectors in Georgia as the unique result of either the 25 cent cigarette tax increase (or for that matter a higher 46 cent tax increase). By contrast, it is highly likely that some jobs will be lost in the tobacco retail distribution sector (primarily convenience stores located near the border of lower tax states). However, even if one accepts the projected loss of 635 such jobs (including wholesaler jobs) generated by the American Economics Group, such a loss would represent no more than 0.09 percent of retail employment in Georgia.[55] Longer term net job losses will inevitably be lower as the diversion of spending away from cigarettes and other tobacco products generates additional economic activity in other sectors of the Georgia economy.

In summary, this study has largely confirmed the arguments made by proponents of higher tobacco taxes as applied to Georgia. However, it must be said that no state should consider higher tobacco taxes to be a magic solution to fundamental structural fiscal problems. To the extent that such taxes further contribute to the decline in cigarette and tobacco consumption that is the result of other factors, the long term revenue potential of tobacco taxation is limited. While expenditure requirements of the state grow over time, it is common for tobacco tax revenues to remain stable or decline over time. Also, the projections derived herein for Georgia were supportive of the case for higher taxes in part because even after the 25 cent increase in cigarette taxes, Georgia remains one of the states with relatively modest tobacco taxes, and is not a state

surrounded by states having dramatically lower taxes, nor are the border populations that are most likely to engage in small-scale cigarette bootlegging especially large. The supplemental projections made in this study did indeed confirm that further revenue and health benefits could be obtained by a subsequent tax increase of, say, 21 cents to a total tax of 58 cents (consistent with the governor's original 46 tax increase proposal), this should not be interpreted as justifying a longer term strategy of regular tax tobacco increases as a solution to Georgia's fiscal challenges.

NOTES:

1. Tobacco taxation in Georgia started in 1923 and following gradual increases reached 5 cents per cigarette pack by 1955. It was raised to 8 cents in 1964 and then to 12 cents in 1971. Thus, the thirty-two year gap between tax increases was the longest since 1923; the 1971 tax rate had effectively fallen to an inflation adjusted rate not seen since the early 1950s.

2. The governor originally proposed raising the cigarette tax by 46 cents per pack, along with higher taxes on alcoholic drinks (ranging from 14 cents for a six-pack of beer to 50 cents for a bottle of liquor), as well as higher taxes on other tobacco products.

3. See, e.g., *Atlanta Journal Constitution* (2003c, p. F4). Key Republicans were more comfortable proposing spending cuts and layoffs of state employees to balance the budget, and most Democrats were hesitant to champion even selective tax increases without assurances of Republican support.

4. See e.g., National Association of Convenience Stores (2003).

5. Several opinion columns represented exceptions, although it is unclear that they affected the political debate. See e.g., Sue Blevins (2003); and *Atlanta Journal Constitution* (2003e). While Daniel Michael Clifton of Americans for Tax Reform addressed the Georgia Senate Republican Caucus (Clifton, 2003) opposing higher cigarette taxes by challenging some of the presumptions identified below, his organization's basic position was to oppose all tax increases of whatever type.

6. A commonly cited revenue projection for the 25 cent cigarette tax increase was $180 million per year. See, e.g., *Atlanta Journal Constitution* (2003b). However, internal Office of Planning and Budget projections were more modestly in a range of $145 to $170 million. The original higher proposed combined tobacco taxes were projected to raise $348 million in the first fiscal year (*Atlanta Journal Constitution*, 2003d), although one tax expert cited the revenue gains from only the cigarette tax component as $91.5 million (Stathopoulos, 2003). The Campaign for Tobacco Free Kids (2002) claimed that a 75 cent tax increase would generate $472.2 million in annual revenues.

7. This is a Centers for Disease Control (CDC) estimate, as further documented by the Campaign for Tobacco Free Kids (2003a).

8. Governor Perdue's extensive speaking tour around the state in support of his original tax proposals typically generated large and supportive crowds, and public opinion polls consistently showed strong support for higher tobacco taxes (typically over 70 percent), especially if contrasted to other proposals for higher gas or property taxes. Of course, this is hardly surprising given the Georgia adult smoking rate of 23.5 percent (see Table 2). By mid-March, all such alternative taxes including the liquor taxes had been scrapped by the governor.

9.   In May 2003, RTI International released a study (Farrelly et al, 2003) prepared for the Tobacco Technical Assistance Consortium at Emory University's Rollins School of Public Health that addresses some of these issues without focusing specifically on the recent Georgia tax changes. Farrelly et al. (2003) provide an especially useful survey of the evidence regarding the effects of cigarette tax evasion on state revenues and draws nine key conclusions, among them "states that significantly increase their tobacco tax rates gain tobacco tax revenue, despite related consumption declines, tax avoidance, and smuggling" (p. ES-1).

10.   While Georgia tax revenues were down another 5.6 percent in June 2003, yielding an overall decline in tax collections of $340 million (2.6 percent) over the past year (*Atlanta Journal Constitution*, 2003a), August began a three consecutive month surge in revenues compared to the previous year, with October's overall growth of nearly 6.0 percent (8.2 percent in sales tax revenues) offering some optimism that at least the worst of the budget crisis was nearing an end (*Atlanta Business Chronicle*, 2003).

11.   Given the high correlation between income and education, it is hard to determine whether these factors have separate effects on smoking rates.

12.   The CPI (consumer price index) for the United States was 40.5 in 1971 compared to 179.9 by the end of 2002 (4.44 times the earlier level). The average annual inflation rate over that period was 4.93 percent, although annual inflation has slowed to about 2 percent in recent years. While the change in the regional CPI measures vary slightly compared to that of the United States as a whole, such differences are relatively small regarding Georgia (e.g. the Atlanta metro CPI was 98.9 percent of the U.S. metro average in 1998, a typical relationship over time). See, e.g. *Statistical Abstract of the United States, 2002* or the *Economic Report of the President*, both published annually for updates on the Bureau of Labor Statistics CPI measures.

13.   Kentucky is first with 29 percent of tobacco receipts, followed by the "coastal plain"(Eastern North Carolina) at 24 percent, the "Piedmont"(the Virginia, North Carolina border area) at 24 percent, the "Pee Dee Lumber River" area of Southeast North Carolina and eastern South Carolina at 12 percent, Tennessee with 9 percent and "other areas" summing to 4 percent. See Economic Research Services (1997), pp. 37-39.

14.   See *Statistical Abstract of the United States* (2001), reporting data from the U.S. National Center for Health Statistics (2000).

15.   As is true with other tobacco related statistics, differences in reported revenue exist across sources. For example, the fiscal year 2001 revenues reported in Table 4 are $83.334 million compared to the $83.450 million reported on the R.J. Reynolds webpage (seemingly linked solely to cigarettes and not cigars) documenting state-by-state tobacco statistics. While that disparity is trivial, the CDC reported cigarette tax revenues collected in 2000 as $67.064 million. The Georgia Department of Revenue regularly reports revenues from the combined

category "cigar and cigarette tax." As reported in Table 4, such revenues for both fiscal years 2000 and 2001 were in the mid $85 million range. But it is extremely unlikely that the 21 percent disparity between the lower CDC cigarette revenue estimate and this combined figure is explained by cigar tax revenues, since past studies by The Tobacco Institute (*The Tax Burden on Tobacco*) have concluded that cigarette excise taxes commonly account for as much as 96 percent of all state tobacco excise tax revenues. Thus, the reason for the unusually low CDC cigarette revenue estimate is unclear.

16. Since calendar year 2000 includes part of fiscal years 2000 and 2001, the revenue was averaged over those two fiscal years. Cigarette revenues are estimated at 96 percent of the total, consistent with The Tobacco Institute finding cited in endnote 15.

17. As documented in Table 1, Georgia continues to rank as a low tax state (36th highest of 51, including the District of Columbia) even following the 2003 tax hike. But as discussed further below, it now ranks relatively high among its neighboring states.

18. Anti-smoking groups were especially vexed by the simultaneous cuts in Illinois' smoking cessation program budget from $47 million in 2001 to $12 million in 2002 at the very time that smokers would seemingly be more motivated to seek such assistance in an effort to quit. Kathy Drea, the director of public policy for the American Lung Association of Illinois said, "Illinois has really screwed this up" (Drea, 2003).

19. The *Holland Sentinel* (2003) reported that forecasters had predicted a drop of about 9.5 percent in monthly cigarette sales compared to the actual 8.5 percent decline. This is an intriguing example because Michigan's previous 50 cent tax increase in 1994 is commonly cited by tobacco tax opponents as a primary example of the effects of bootlegging, comparing the 21 percent drop in Michigan taxable sales with increases in neighboring states such as Indiana's 8.5 percent increase following a several year decline (National Association of Convenience Stores, 2002). The 1994 tax differential between Michigan and Indiana was 59.5 cents (75 versus 15.5); by 2002 it was 69.5 cents, although Indiana had also raised its tax in 2002 by 40 cents to 55.5 cents.

20. The price elasticity of demand measures the responsiveness of quantity consumed to price changes, and is calculated as the ratio of the percentage change in quantity to the percentage change in price.

21. The period from 1997 to 2000 was also characterized by unusually large wholesale cigarette price increases as manufacturers coped with the financial demands of the Master Settlement Agreement. Thus, cigarette retail prices were rising substantially for both tax and non-tax reasons during this period.

22. Note that this concept (alternatively called the "tax elasticity of revenue") is

quite different from the price elasticity of the demand for cigarettes, which is a critical concept in the alternative approach used below to estimate the revenue effects of this and future Georgia tax increases.

23. Farrelly et al. (2003) show that the average tax differences between states was quite stable from 1980 to about 1990, then started to increase gradually until about 2000, before spiking upward dramatically between 2000 and 2002 (Figure 2, p. 5). Even with this recent increase in tax differences, the retail prices per pack listed in Table 2 including 2002 tax rates do not differ as much as might be expected. The lowest price in South Carolina ($3.15) is 18 percent below the national average of $3.85, while the second highest price of $4.98 (Washington) is 29 percent higher than the average. New York at $5.80 per pack is the outlier at 51 percent above average.

24. While this simple calculation assumes that the 175 percent increase can be applied to the entire cigarette plus cigar state revenue, any error is likely to be minor since not only do cigarette revenues constitute most of these combined revenues, but the Georgia cigar excise tax itself more than doubled (from 10 to 23 percent) at the same time the cigarette tax rate was increased.

25. Licari and Meier (1997), Coats (1995), Saba et al. (1995), the Advisory Committee on Intergovernmental Relations (1977) are cited by Guhl as especially important for his own model. Many studies include some attempt to address smuggling or "spillover" effects; see Brown (1995); Benjamin and Dougan (1997), Merriman (1994); Thursby and Thursby (1994); Chiles and Sollars (1993); and Warner (1982).

26. The price of $2.76 equals the latest tax inclusive price of $3.01 (Table 2) less the 25 cent tax. While the economic theory of excise tax incidence does not generally suggest that every one cent tax increase results in a one cent price increase, we assume that it does in this case. There is reasonable evidence that this simple "pass-through" is in fact common in the case of cigarettes (Barnett et al., 1995; Keeler et al., 1994; and Coats, 1995). Furthermore, Sumner's (1981) finding of a sufficiently high price elasticity of demand for any one cigarette manufacturer (i.e. -20.0) can be interpreted as implying a nearly horizontal supply curve of cigarettes to any state such that any state's excise tax will be fully shifted to consumers. The 25 cent tax increase thus translates into a 25 cent higher price (no adjustment for sales taxes is required).

27. An earlier version of the data reported in Table 2 cited $3.31 as the average price for Georgia, even before the 25 cent tax increase. That price and all other state prices, however, did "not reflect the temporary 65 cent reduction in Marlboro and three other brands initiated in January 2003 by Philip Morris, nor do they fully reflect retail-based discounting and promotions by the major cigarette companies" (from the notes to the original data source). The updated data reported in Table 2 still do not reflect the retail-based discounting and other promotions, but were changed to reflect the temporary 65 cent wholesale price

reduction. However, the *Macon Telegraph* (2003) reported that "the average price for a pack of cigarettes in Georgia is now $3.27." While the tax only went into effect on July 1, if this price already incorporated the 25 cent tax increase, it would be $0.26 higher than that reported in Table 2. Clearly, documenting average retail cigarette prices is subject to potential reporting error.

28.   Using the pre-tax increase price of 276 cents, consumption of 86.68 packs per capita, and the slope of -1.78 yields a price elasticity of -0.566 (= -0.1778 x (276 / 86.68)).

29.   An elasticity of -0.566 implies a percentage reduction in packs consumed due to a tax increase of 25 cents of 5.13 percent (-0.566 x 9.06 percent increase in price), and a reduction in consumption of 4.45 packs per person, from 86.68 to 82.23 per year. The new total predicted consumption of cigarette packs is 673.135 million (= 8.186 million people x 82.23 packs per person). At a total tax per pack of 37 cents, this would generate $249.06 million in the first year (673.135 million x 37 cents).

30.   Since there is only about a 4 percent difference between the highest and lowest of these values, and the -0.566 elasticity was specifically derived for Georgia as an extension of the Guhl analysis of West Virginia (rather than just assumed based on past econometric studies), this -0.566 case is cited in Table 6.

31.   A price increase of an additional 21 cents on a base of 301 cents is a 6.98 percent price increase. When multiplied by the -0.651 price elasticity, a 4.54 percent decline in per capita cigarette consumption is generated, or 3.73 packs to 78.5 packs per capita, or a total number of packs of 642.6 million. With a per pack tax of 58 cents, this generates $372.71 million in revenue, which is $123.65 million above the $249.06 million projected from the 25 cent tax increase.

32.   Georgia counties may add local option sales taxes of from 1 to 3 percent to this 4 percent state tax rate. Since the focus of this analysis is on the state, such county revenue effects are not considered, but since counties do not directly receive any of the cigarette tax revenue, the loss of local option sales tax revenue represents a net loss to those jurisdictions.

33.   This is based on 709.58 million packs (the base packs as of FY 2003 in Table 6), or on $1.8733 billion in total sales.

34.   This yields taxable sales revenue (in 2003 dollars) of $1.6965 billion and cigarette sales tax receipts of $67.860 million.

35.   Table 3 and Chart 1 (and related statistics) indicate that smokers in Georgia are more likely to be male, 18-24 years old, white or Hispanic, with no more than a high school education, and earning modest incomes. Thus, a fuller database

would report such demographics for each county as a proxy for detailed specific county smoking rates.

36.   Smoking is estimated to cause 90 percent of all such lung cancers. A potential alternative measure is death rates from cardiovascular disease (CVD), since smoking is also a major risk factor for CVD. However, since physical inactivity, being overweight and high blood pressure are also major risk factors for CVD, its connection to smoking is not as strong as that of lung cancer. Lung cancer death rates and related information are reported by the Georgia Department of Human Resources (2003).

37.   The standard methodology used in Table 7 utilized the per capita packs consumed, based on the entire state population, to derive total state consumption both before and after the tax increase. However, when analyzing issues like bootlegging and the health benefits from legitimate cigarette consumption reductions, the more meaningful figure is per capita smoking by smokers. Since approximately 73.5 percent of the Georgia population is 18 years and older, about 6.017 million residents are defined as adults. Applying the 23.5 percent adult smoking rate to the adult population yields 1.414 million adult smokers. Census data also indicates that Georgians aged 5-17 constitute about 19 percent of the population, or 1.555 million youths. Applying the youth smoking rate of 23.7 percent to that population yields 368,535 youth smokers. Thus, adult plus youth smokers total 1.783 million Georgians. Since the base number of packs sold (Table 6) is 709.58 million, a rough estimate of the annual packs per smoker is 398, or about 7.65 packs per week, or about one pack per day. Note that this somewhat overstates the amount of cigarette smoking per smoker because, to simplify the calculations, the cigar portion of the combined tobacco tax revenues was attributed to cigarettes in deriving the base annual figure of 709.58 million packs of cigarettes sold.

38.   Various news reports (e.g. America Online, 2003) have identified the breakup by Federal agents of smuggling rings that made as much as $20 million shipping cigarettes from Virginia to New York, and another ring that trucked cigarettes from North Carolina to Michigan. The tobacco industry has stressed the role of the mob and organized crime in their advertising opposing higher state cigarette taxes, while anti-smoking groups counter by accusing the industry of purposely oversupplying wholesalers in low tax states to encourage such activity. The Libertarian Party warned that a $1.10 federal cigarette excise tax increase proposed in 1998 could "launch the second Golden Age of organized crime" and "trigger a deadly crime wave" (Libertarian Party Press, 04/02/98).

39.   A related and increasing organized crime activity is the counterfeiting of cigarette tax stamps. As reported by Corrigan (2003), apparently "Chinese counterfeiters can accurately duplicate not only a state's stamps, but also the cigarettes and packaging as well," with very little risk of detection, as evidenced by the absence of reported interceptions of counterfeit shipments (p. 461). Indian "smoke shops" (physical locations, not the internet sites often run by Indian

tribes) have also presented special challenges to states, which have sometimes responded by signing "compact statutes" with the tribes to essentially allow them to not only collect, but keep the tax revenue if they agree to traffic only in "legitimate" cigarettes (Corrigan, 2003, p. 461).

40. See Don Mathews (2003), citing projections by U.S. Forrester Research, Inc., a private consulting firm.

41. An important statistic also cited in that press report is that as many as 60 percent or more of smokers buy their cigarettes one to two packs at a time, rather than in cartons (quoting Eric Lindblom (2003), policy research manager for the Campaign for Tobacco Free Kids). While that particular source is certainly not neutral in the tobacco tax debate, the statistic cited is hardly implausible.

42. This suggestion is made in a footnote to the Center's commentary related to its documentation of recent state experience with tax hikes. See the Campaign for Tobacco-Free Kids' (2003b).

43. Lav (2002) in particular warns about subsequent year revenue declines.

44. Lindblom (2003) cites numerous research studies. Citing these specific claims in no way belittles the similar assertions effectively presented by the many other anti-smoking groups including the American Lung Association of Georgia, the American Cancer Society, the Centers for Disease Control and Prevention and many other organizations cited throughout this report.

45. The benefits were originally based on a 75 cent increase; we report a proportionately adjusted benefit to reflect the actual 25 cent tax hike.

46. Admittedly, the Coats (1995) conclusion that as much as 80 percent of the typical drop in state cigarette sales can be traced to cross-border shopping would imply that of the 36.44 million predicted drop in Georgia cigarette sales (Table 6), fully 29.15 million would be due to cross-border effects and only 7.29 million due to smoking reductions. If that were applied to the Georgia case, the Campaign's predictions regarding the health benefits to the state could be as low as about a third of those identified above (i.e. 7.29 / 21.2 = 0.34). However, nothing in the Table 7 analysis of bootlegging or the general consensus of the magnitudes of cross-border sales from other studies would suggest that the Coats result is applicable to the 2003 Georgia tax hike.

47. Lav (2002) provides an excellent overview of this issue.

48. Note that each of these price elasticities is below the -0.566 and -0.651 values used to derive the revenue projections in Table 6. One interpretation would be that the higher Table 6 elasticities have thus already fully adjusted for the effects of tax evasion behavior which make "unrestricted" elasticities larger than "naive" elasticities, as discussed above. An extreme version of a lower "smoker elasticity" would be the essentially zero elasticity value derived by Wasserman et al. (1991) based on individual smoker behavior. An even more conservative

adjustment to the Table 6 revenue projections, using a possible -0.98 price elasticity to further adjust for the tax evasion problem, was also reported above.

49.   From the National Association of Convenience Stores (2003). There is no independent confirmation of this 40 percent figure for convenience store tobacco sales; tax proponents have cited a figure closer to 25 percent.

50.   This analysis and predictions of the adverse consequences of higher Georgia cigarette taxes was submitted to the author in mid-December 2002 in response to a request for the company's position at a time when much higher tax increases were being discussed than eventually were enacted. For an overview of the role of tobacco in the Georgia economy, see UGA Tobacco (2003).

51.   Economic Research Services (2000). The figures cited were for 2000 as reported in Table 986 of the *Statistical Abstract of the United States, 2001*.

52.   This 666 million pack base of cigarette sales is about 6 percent lower than the base utilized in the revenue projections derived and reported in Table 6. This difference may reflect the combining of cigar and cigarette sales into an "equivalent" cigarette base figure for the Table 6 analysis, and hence will naturally overstate the cigarette sales somewhat. In any case, the B & W figure is linked to a claimed $2.2 billion gross retail value, which would imply that the average retail price was $3.30 pre-tax increase, substantially higher than the $2.76 price (linked to the data in Table 2) that served as an important assumption behind the analysis reported in Table 6. However, since the important number of base cigarette packs sold used in the analysis was derived by dividing the base revenue of $85.15 million by the initial 12 cents per pack (yielding 709.58 million packs), without using the initial price, this price disparity does not significantly affect the analysis in this report.

53.   The use of a retail price of $3.16 is inconsistent with the derivation of an average pre-tax retail price of about $3.30, which was itself based on the B&W figures for pre-tax increase retail packs sold relative to retail value generated (see endnote 52).

54.   In particular, B&W cites the 1996 Tax Foundation study and a subsequent updated study to suggest that "cross-border sales represented nearly 14 percent of total U.S. sales in 1997" (B&W, 2003, p. 2). If that 14 percent figure were applied to total Georgia sales prior to the tax increase, it could be interpreted (as a simplification) as suggesting that as many as 99.26 million cigarette packs could be subject to cross-border sales in Georgia, dramatically higher than the roughly 15.24 million packs predicted above to be purchased from outside Georgia following the 25 cent tax increase. Of course, that Tax Foundation result was especially affected by comparisons between the highest tax states and the lowest tax states, with limited direct applicability to Georgia under any reasonable assumption about future Georgia cigarette tax increases.

55.   As of November 2002; retail employment was 686,767 (*Georgia Economic*

Indicators, 2003).

References

Advisory Commission on Intergovernmental Relations (ACIR). 1977. "Cigarette Bootlegging: A State and Federal Responsibility." Washington, D.C.: U.S. Government Printing Office.

Advisory Commission on Intergovernmental Relations (ACIR). 1985. "Cigarette Tax Evasion: A Second Look." Washington, D.C.: U.S. Government Printing Office.

American Online. 2003. "Interstate Tobacco Smuggling." (May 9).

Atlanta Business Chronicle. 2003. "State Tax Revenue Up in October." November 4.

Atlanta Journal Constitution. 2003a. "Little Wiggle Room Left on Budget." July 18.

Atlanta Journal Constitution. 2003b. "Smokers Brace for Pricier Packs." July 1: A1 and A5.

Atlanta Journal Constitution. 2003c. "Split: House GOP Deserts Perdue on Tax." March 30: F4.

Atlanta Journal Constitution. 2003d. "Legislators Map Out Budget Without Tobacco Tax Hike." March 22: H1 and H2.

Atlanta Journal Constitution. 2003e. "The Right Price Plan for Coughers, Coffers." Editorial. January 19: Q8.

Atlanta Journal Constitution. 2003f. "Lottery Revenue a Record." July 15.

Baltagi, Badi H. and Dan Levin. 1986. "Estimating Dynamic Demand for Cigarettes Using Panel Data: The Effects of Bootlegging, Taxation and Advertising Reconsidered." *The Review of Economics and Statistics* 68(1): 148-55.

Barnett, Paul G., Theodore E. Keeler and The-Wei Hu. 1995. "Oligopoly Structure and the Incidence of Cigarette Excise Taxes." *Journal of Public Economics* 57: 457-70.

Bartlett, Bruce. 2002. "Get Off This Tobacco Road." National Review Online (July22). At http://www.nationalreview.com, July 22.

Bartlett, Bruce. 2003. "Milking the Cigarette Tax Cow." *Capitalism Magazine* (March 27). At http://capmag.com/article.asp?ID=2568.

Beard, T. Randolph, Paula A. Gant and Richard P. Saba. 1997. "Border-Crossing Sales,

Tax Avoidance, and State Tax Policies: An Application to Alcohol." *Southern Economic Journal* 64 (1): 293-306.

Benjamin, Daniel K. and William R. Dougan. 1997. "Efficient Excise Taxation: The Evidence from Cigarettes." *Journal of Law and Economics* 40 (April): 113-26.

Bishop, John A. and Jang H. Yoo. 1985. "Health Scare, Excise Taxes and Advertising Ban in the Cigarette Demand and Supply." *Southern Economic Journal* 52 (2): 402-11.

Blevins, Sue. 2003. "Smokers Shouldn't Make Up Shortfall." *Atlanta Journal Constitution* January 19: Q9

Brown, A. Blake. 1995. "Cigarette Taxes and Smoking Restrictions: Impacts and Policy Implications." *American Journal of Agricultural Economics* 77(November): 946-51.

Brown and Williamson (B&W). 2003. "The Economic Impact of a 75 Cent Cigarette Tax Increase in Georgia." Macon, GA: Communications and Public Affairs Department, B&W.

Bryant, J.R., M.J. Cody and S.T. Murphy. 2002. "Online Sales: Profit Without Question." *Tobacco Control* 11:226-27.

Campaign for Tobacco-Free Kids. 2002. "Benefits from a Cigarette Tax Increase in Georgia." (April 20). At www.tobaccofreekids.org.

Campaign for Tobacco Free Kids. 2003a. "2003 State Cigarette Excise Tax Rates and Rankings." At http://tobaccofreekids.org/research/factsheets/pdf/0099.pdf.

Campaign for Tobacco Free Kids. 2003b. "Raising Cigarette Taxes Always Increases State Revenues and Always Reduces Smoking." At http://tobaccofreekids.org/ research/factsheets.

Chaloupka, F. J. and M.P. Grossman. 1996. "Tobacco Control Policies and Youth Smoking." NBER Working Paper No. 5740, Cambridge, MA: National Bureau of Economic Research.

Chaloupka, F.J. and R.L. Pacula. 1999. "Sex and Race Differences in Young People's Responsiveness to Price and Tobacco Control Policies." *Tobacco Control* 8:373-77.

Chaloupka, F.J. and H. Wechsler. 1997. "Price, Tobacco Control Policies and Smoking

Among Young Adult." *Journal of Health Economics* 16:359-73.

Chiles, Ted W., Jr., and David L. Sollars. 1993. "Estimating Cigarette-Tax Revenue." *Journal of Economics and Finance* 17(3):1-15.

Clifton, Daniel Michael. 2003. "Americans for Tax Reform." Speech before the Georgia Senate Republican Caucus opposing higher cigarette taxes (February 5). At http://www.atr.org/speechtestimony/022003.html.

Cincinnati Enquirer. 2003. "Legislators Drag Feet on Cigarette Taxes." February 14.

Coats, R. Morris. 1995. "A Note on Estimating Cross-Border Effects of State Cigarette Taxes." *National Tax Journal* XLVIII (4): 573-84.

Colman, Greg, Michael Grossman and Ted Joyce. 2003. "The Effect of Cigarette Excise Taxes on Smoking Before, During and After Pregnancy." *Journal of Health Economics* 22(6): 1053-72

Corrigan, Eugene. 2003. "Not Taxing Sin." *State Tax Notes* 28 (5): 461-62.

Cox, Russell A., III. 2002. "Smuggler's Paradise." *State Tax Notes* 25 (11): 803.

Douglas, Stratford. 1998. "The Duration of the Smoking Habit." *Economic Inquiry* XXXVI (January): 49-64.

Drea, Kathy. 2003. "Revenues from Illinois Cigarette Tax Hike Disappoint." Boston University School of Public Health (January 2). At www.jointogether.org.

Economic Research Services. 1997. *Tobacco and the Economy* (AER-789). "Tobacco Growing Regions." Washington D.C.: U.S. Department of Agriculture, 37-39.

Economic Research Services. 2000. *Tobacco Situation & Outlook*. Washington D.C.: U.S. Department of Agriculture.

Economic Report of the President. 2003. Washington D.C.: U.S. Government Printing Office.

Evans, William N., Jeanne S. Ringel and Diana Stech. 1999. "Tobacco Taxes and Public Policy to Discourage Smoking." In J. Porterba (ed.), *Tax Policy and the Economy*. Cambridge, MA: MIT Press.

Farrelly, Matthew C. and J.W. Bray. 1998. "Response to Increases in Cigarette Prices by Race/Ethnicity, Income, and Age Groups-United States, 1976-1993." Research Triangle Institute, Research Triangle Park, N.C. for the Office on Smoking and Health, National Center for Chronic Disease Prevention and Health Promotion, CDC, reported in U.S. Department of Health and Human Services, *Morbidity and Mortality Weekly Report* 47(29), July 31.

Farrelly, Matthew C., J.W. Bray, T. Pechacek, and T. Woollery. 2001. "Response by Adults to Increases in Cigarette Prices by Sociodemographic Characteristics." *Southern Economic Journal* 68(1):156-65.

Farrelly, Matthew C.,Christian T. Nimsch, K.C. Davis, T, Woollery and T. Pechacek. 2002. "Cigarette Smuggling Revisited." Working paper. Research Triangle Park, N.C.: Research Triangle Institute.

Farrelly, Matthew C., Christian T. Nimsch and Joshua James. 2003. *State Cigarette Excise Taxes: Implications for Revenue and Tax Evasion*. Prepared for Tobacco Technical Assistance Consortium, Emory University, Rollins School of Public Health. Research Triangle Park, NC: RTI International.

Federation of Tax Administrators. 2003. "State Excise Tax Rates on Cigarettes." Washington D.C.: FTA.

Fleenor, P. 2003. "Cigarette Taxes, Black Markets, and Crime-Lessons from New York's 50-Year Losing Battle." *Policy Analysis* #468.

Fox, William F. 1986. "Tax Structure and the Location of Economic Activity." *National Tax Journal* XXXIX (4): 387-402.

Fujii, Edwin T. 1980. "The Demand for Cigarettes: Further Empirical Evidence and its Implications for Public Policy." *Applied Economics* 12 (4): 479-89.

GAO (U.S. General Accounting Office). 2002. *Internet Cigarette Sales: Giving the ATF Investigative Authority May Improve Reporting and Enforcement*. Report to Congressional Requesters, GAO-02-743, August.

Georgia Department of Human Resources. 1999. *Georgia Youth Tobacco Survey, Summary Report*. Atlanta GA: GDHR.

Georgia Department of Human Resources. 2003. "Cancer Death Rates." Division of Public Health, Office of Health Information and Policy, at http://oasis.state.ga.us/webquery/death.html.

Georgia Division of Public Health. 2002. *Georgia Behavioral Risk Fact Surveillance System*. Atlanta GA: GDPH. At http://www.ph.dhr.state.ga.us/epi/brfss/smoking/shtml.

Georgia Economic Indicators. 2003. Atlanta GA: Georgia Department of Labor.

Georgia Lottery Corporation. 2002. *2002 Annual Report.*

Gruber, Jonathan and Botand Koszegi. 2002. "A Theory of Government Regulation of Addictive Bads: Optimal Tax Levels and Tax Incidence for Cigarette Taxation." NBER Working Paper No. 8777, February, Cambridge, MA: National Bureau of Economic Research.

Gruber, Jonathan and Sendhil Mullainathan. 2002. "Do Cigarette Taxes Make Smokers Happier?" NBER Working Paper No. 8872, Cambridge, MA: National Bureau of Economic Research.

Guhl, Nils. 2003. "An Econometric Analysis of West Virginia's Cigarette Tax Hike." *State Tax Notes* 28 (9): 813-21.

Holland Sentinel (online). 2003. "State's Cigarette Tax Revenues are Higher Than Anticipated." At http://www.hollandsentinel.com/cgi-bin/printme.pl.

Keeler, T.E., T.W. Hu, P.G. Barnett, et al. 1994. "Do Cigarette Producers Price-Discriminate by State? An Empirical Analysis of Local Cigarette Pricing and Taxation." *Journal of Health Economics* 15: 499-512.

Lav, Iris J. 2002. "Cigarette Tax Increases: Cautions and Considerations." *State Tax Notes* 25 (10): 711-20.

Lewit, E.M. and D. Coate. 1982. "The Potential for Using Excise Taxes to Reduce Smoking." *Journal of Health Economics* 1:121-45.

Lewit, E.M., D. Coate and M. Grossman. 1981. "The Effects of Government Regulation on Teenage Smoking." *Journal of Law and Economics* 4:545-69.

Liang, Lan, Frank Chaloupka, Mark Nichter and Richard Clayton. 2003. "Prices, Policies and Youth Smoking, May 2001." *Addiction* 98(Suppl 1): 105-22.

Libertarian Party Online. 1998. "New Cigarette Tax Could Trigger Deadly Crime Wave in USA, Warn Libertarians." April 2, at http://www.lp.org/press/releasetools.php.

Licari, M.J. and K.J. Meier. 1997. "Regulatory Policy When Behavior Is Addictive: Smoking, Cigarette Taxes and Bootlegging." *Political Research Quarterly* 50: 5-24.

Lindblom, Eric. 2003. "Benefits from a Cigarette Tax Increase in Georgia." Campaign for Tobacco-Free Kids. April 20,2002.

Lyon, Herbert L. and Julian L. Simon. 1968. "Price Elasticity of Demand for Cigarettes in the United States." *American Journal of Agricultural Economics* 50 (4):881-93.

Macon Telegraph. 2003. "Cigarette Tax Increase Goes Into Effect, But Smokers, Most Retailers Expect Little Change." July 2.

Mathews, Don. 2003. "The Economics of Cigarette Taxes." *Free Market* 21(6). July 9.

Merriman, David. 1994. "Do Cigarette Excise Tax Rates Maximize Revenue?" *Economic Inquiry* 32 (3): 419-29.

Mikesell, John L. 1970. "Central Cities and Sales Tax Differentials." *National Tax Journal* XXXIII (2): 206-13.

National Association of Convenience Stores (NACS). 2002. "Impact of Higher State Cigarette Taxes." December, at NACS on-line.

National Association of Convenience Stores (NACS). 2003. "Georgia Cigarette Tax Increase Defeated-For Now." March 28, at NACS on-line.

Ohsfeldt, Robert L, Raymond G. Boyle and Eli Capilouto. 1997. "Effects of Tobacco Excise Taxes on the Use of Smokeless Tobacco Products in the USA." *Health Economics Letters* 6:525-31.

Orzechowski and Walker. 2001. "The Tax Burden on Tobacco: An Historical Compilation." Vol. 36. Washington, D.C.: Centers for Disease Control and Prevention, National Center for Chronic Disease Prevention and Health Promotion, Office of Smoking and Health.

Orzechowski and Walker. 2002. "The Tax Burden on Tobacco." Media Reports, Economic Research Services, U.S. Department of Agriculture (September 10). At http://www.ers.usda.gov/briefing/tobacco.

Rubin, R., C. Charron and M. Dorsey. 2001. "Online Tobacco Sales Grow, States Lose." Forrester Research, Inc.

Saba, Richard P., T. Randolph Beard, Robert B. Ekelund, Jr., and Rand W. Ressler. 1995. "The Demand for Cigarette Smuggling." *Economic Inquiry* 33(2): 189-203.

Stathopoulos, Peter. 2003. "Governor Calls for Hikes in Cigarette, Alcohol Taxes." *State Tax Notes* 27 (4): 251.

Statistical Abstract of the United States. 2001, 1999, 1997, 1996. "Health and Nutrition." Section. Washington, D.C.: U.S. Department of Commerce, U.S. Bureau of the Census.

Statistical Abstract of the United States. 2001. "Current Cigarette Smoking: 1985-1998." Table 191, p. 124. Washington, D.C.: U.S. Department of Commerce, U.S. Bureau of the Census.

St. Louis Post-Dispatch. 2002. "Cigarette Tax Revenues Fall Short." December 21.

Sumner, Daniel A. 1981. "Measurement of Monopoly Behavior: An Application to the Cigarette Industry." *Journal of Political Economy* 89 (December): 1010-19.

Tax Foundation. 1996. *The Effect of Excise Tax Differentials on Smuggling and Cross-Border Cigarette Sales*. Washington, D.C.: Tax Foundation.

Thursby, Jerry G. and Marie C. Thursby. 1994. "Interstate Cigarette Bootlegging: Extent, Revenue Losses, and Effects of Federal Intervention." NBER Working Paper Series, No. 4763, Cambridge, MA: National Bureau of Economic Research.

UGA Tobacco. 2003. "Some Economic Effects of Tobacco in Georgia." At http://www.griffin.peachnet.edu/caes/tobacco/econ-effects.htm.

U.S. Centers for Disease Control and Prevention. 2003. *Morbidity and Mortality Weekly Report*. Atlanta GA.

U.S. Department of Health and Human Services. 2000. "Reducing Tobacco Use: A Report of the Surgeon General." Centers for Disease Control and Prevention, National Center for Chronic Disease Prevention and Health Promotion, Office of Smoking and Health, Atlanta, GA. At http://www.cdc.gov/tobacco/sgr_tobacco_use.htm (August 20).

U.S. National Center for Health Statistics. 2000. *Health, United States 2000*. Hyattsville, MD: USNCHS.

U.S. Substance Abuse and Mental Health Services Administration. 1999. *National Household Survey on Drug Abuse*. Washington, D.C.

Warner, Kenneth E. 1982. "Cigarette Excise Taxation and Interstate Smuggling: An Assessment of Recent Activity." *National Tax Journal* XXXV: 483-90.

Wasserman, J. W., G. Manning, J.P. Newhouse, and J.D. Winkler. 1991. "The Effects of Excise Taxes and Regulations on Cigarette Smoking." *Journal of Health Economics* 10:43-64.

Appendix A
A Detailed Description of the West Virginia Study

An excellent recent example of the price elasticity approach to tobacco tax revenue estimation is provided in Guhl (2003), who examines the 38 cent per pack West Virginia tax increase (from 17 to 55 cents) that became effective May 1, 2003. Despite Georgia having about 4.5 times the population of West Virginia, this attempt to develop a model to predict the likely effects of the West Virginia increase is especially apt for Georgia for two reasons:

1. West Virginia had also gone many years (25) without any cigarette tax increase (versus 32 in Georgia), and its 223.5 percent increase is roughly comparable to Georgia's 208 percent change, although the resulting tax of 55 cents per pack is almost 50 percent higher than Georgia's 37 cents;

2. Two of West Virginia's neighboring states (Virginia and Kentucky) and one near neighbor (North Carolina) have the three lowest tax rates in the country at 2.5, 3 and 5 cents, respectively (although Virginia allows municipalities to also levy the tax, some as high as 60 cents; Table 1), causing concerns that West Virginia will further encourage "outside bootlegging" to those states. By contrast, starting about 1990 but dramatically increasing in 2002 due to tax increases, higher cigarette prices in Ohio, Maryland, and Pennsylvania had created enhanced incentives for "inside bootlegging" (Guhl 2003, Figure 1, p.816). Thus, concern existed that West Virginia would lose cigarette revenues from both forms of bootlegging following the tax hike. In Georgia, the tax increase gave it the highest cigarette tax among all its neighbors, with the largest differential being the 30 cents relative to South Carolina (the smallest is 3.1 cents compared to Florida), the focal point of the opposition by Georgia convenience store interests.

Building on previous cigarette demand models, especially those focusing special attention on both organized smuggling and more informal bootlegging,[1] Guhl uses 30 years of time series data (1970-2000) to estimate a demand function for in-state

---

[1] Licari and Meier (1997), Coats (1995), Saba et al. (1995), the Advisory Committee on Intergovernmental Relations (1977) are cited by Guhl as especially important for his own model. Many studies include some attempt to address smuggling or "spillover" effects. See Brown (1995); Benjamin and Dougan (1997), Merriman (1994); Thursby and Thursby (1994); Chiles and Sollars (1993); and Warner (1982).

cigarettes, with the dependent variable defined as "annual per capita packs of cigarettes sold in West Virginia." His key independent variables (and their expected effects) are the real cigarette price per pack in West Virginia (negative), real annual per capita income in the state (positive), the percentage of the state population older than 65 (negative), a time trend variable (negative), an "into the state bootlegging" variable constructed to incorporate both higher bordering state relative cigarette prices and bordering county populations relative to West Virginia (positive), a proxy for tourist cigarette purchases (positive), an "outside the state bootlegging" variable constructed similarly to the "inboot" variable but reflecting higher relative West Virginia prices (negative),[2] and an "organized smuggling" variable constructed as an index of the relative cigarette tax rate in West Virginia relative to tax rates in Kentucky, Virginia and North Carolina (negative).

Two of Guhl's econometric results are particularly important: (1) the interpretation of his price variable coefficient (-0.1778) suggests that an increase in the real price per pack by 10 cents reduces the taxable quantity of cigarette packs by 1.78 per capita, a result that can be used to derive price elasticities of demand that increase with prices (see below), and (2) neither of his bootlegging variables is found to be statistically significant, suggesting that "the amount of bootlegged cigarettes does not significantly change the match between in-state cigarette sales and West Virginia consumption" (p. 819). His similar finding that organized smuggling has also not been a substantial determinant of in-state cigarette sales, despite the frequently high tax differentials relative to tobacco state neighbors is also suggestive, but as he indicates, must be interpreted cautiously due to West Virginia's relatively small population (1.8

---

[2] Since he uses a binary variable equal to zero when the West Virginia price exceeds neighboring state prices in the "inboot" variable, and equal to zero when the neighboring state prices exceed West Virginia's in the "outboot" variable, there is no redundancy in the inclusion of both variables, and the effects of both forms of bootlegging can be independently isolated.

million) and lack of large metropolitan areas. This result, thus, is potentially not representative of other types of states, including Georgia.

The importance of the -0.1778 coefficient on the price variable is its implication for the critical price elasticity of demand. A price elasticity is defined as the (percent change in quantity / percent change in price), which is the equivalent of [(change in quantity / change in price) x (price/quantity)]. The price coefficient -0.1778 is the equivalent of (change in quantity / change in price) which must be multiplied by a particular price/quantity ratio to generate the price elasticity of demand. While it is often assumed that over small ranges of price changes a price elasticity of demand can be constant, this alternative formulation is consistent with the more general understanding that demand becomes more price elastic at higher prices. This is a useful cautionary result for studies of the revenue effects of higher cigarette taxes, since it implies that ever increasing taxes can have quite different effects as prices increase, although such effects would further enhance the smoking deterrence and health benefit effects of cigarette taxation.

As applied to the West Virginia data, where the real price (in 2002 dollars) as of 2000 was $2.805 (280.5 cents)[3] and the 2000 annual per capita consumption was 107.9 packs, the resulting price elasticity of demand as of 2000 was -0.46 (i.e. -0.1778 x (280.5 / 107.9)). The next step is to calculate the effect of the tax increase on the retail price of cigarettes. While the general theory of excise tax incidence does not suggest that every one cent tax increase generates a one cent price increase, there is reasonable evidence that this simple "pass-through" is common in the case of cigarettes (Barnett et al., 1995; Keeler et al., 1994; and Coats, 1995). Furthermore, Sumner's (1981) finding

---

[3] This price is defined by Guhl to be the retail price plus the general sales tax, with the federal and state excise tax included in the retail price. The price as of 2000 of $2.805 is modestly lower than the implied pre-tax increase price of $2.99 reported in Table 2 (i.e. tax inclusive price of $3.37, which includes the 38 cents, suggests a pre-tax increase price of about $2.99 assuming full forward shifting of the tax). Note that in Georgia, the general state sales tax of 4 percent is not added to that portion of the retail price that represents the state excise tax (see the notes to Table 1).

of a sufficiently high price elasticity of demand for any one cigarette manufacturer (i.e. -20.0) can be interpreted as implying a nearly horizontal supply curve of cigarettes to any state such that any state's excise tax will be fully shifted to consumers. For most states (but not Georgia, see the notes to Table 1), a further retail price increase will occur because any applicable sales tax is applied to the excise tax portion of the retail price.

Thus, in West Virginia the 38 cent tax increase is presumed to generate a 40.1 cent retail price increase (including the 6 percent x 38 = 2.28 cent change). Since a 40.1 cent price increase represents a 14.295 percent change, the resulting reduction in the quantity of per capita cigarette packs consumed is 6.576 percent (- 0.46 x 14.295). West Virginia consumption would thus be predicted to fall from 107.9 packs per capita to 100.8 (a reduction of 7.09 representing 6.576 percent of 107.9). The final step is then to translate this reduction into revenue terms. With a population of 1.808 million, the original 107.9 packs per capita translates into 195.083 million packs taxed at 17 cents yielding $33.164 million state revenue. Following the tax increase, the 1.808 million population generates 182.246 million packs consumed, taxed at 55 cents to yield $100.235 million-an increase of 202.2 percent.

Appendix B
A Survey of the Literature Regarding Tobacco Tax Evasion

A summary of a representative sample of the critical research (organized chronologically and focused where possible on results involving Georgia) on the various forms of tax evasion provides potentially important additional evidence on this important issue.

1. Mikesell (1970) focused on cities rather than states and general sales tax differentials rather than cigarette tax differentials. Nevertheless, he provided evidence that a positive sales tax rate differential exerts a significant negative effect on per capita city retail sales, deriving the result of a 95 percent probability that a 1 percent increase in the sales tax rate would generate a loss in per capita city sales of between 1.69 and 10.97 percent. Of course, this applied to general sales taxes, not just the tax on a single product like cigarettes, and proximity to competing tax jurisdictions is especially high at the city level. This early research set the stage for later results that stressed the role of geographic proximity and the nature and scope of the tax differential, i.e. general sales versus selective excise taxes;

2. The potential for cross-border relocations of economic activity as a result of tax variations has always been great in Tennessee, which borders eight states. Hence the Fox (1986) study of three Tennessee metro areas bordering three different states (including Georgia via Chattanooga) is especially noteworthy. His key findings are: (1) there is "only limited evidence that taxes other than the general sales tax have an effect on total retail activity;" (2) "the effect of selective sales taxes was small ... or zero on overall retail activity;" (3) "selective sales taxes on cigarettes and alcohol may have a greater effect on retail activity in more defined groups than were addressed in this study" [total sales, furniture, food at home, apparel, food away from home]; (4) "lost employment induced by a tax rate increase is generally of about the same magnitude as the lost sales;" and (5) the employment losses from changes in taxes other than the general sales tax are very small" (all quotations are from p. 399). While there were significant tax differentials regarding some of the taxes and regions in the Fox study, it is not surprising that "no fiscal variables were significant in the Chattanooga area," since tax differentials were the smallest in that region. The specific cigarette tax differential between Georgia and Tennessee over the 1962-1985 period of the data never exceeded one cent. Thus, while the conclusions of only mild cross-border effects beyond general sales taxes are important, and his estimates of employment losses relative to revenue losses are especially useful, the

study provided no relevant specific evidence on cigarette tax evasion related to Georgia;

3. Another study with Georgia included in the database is Chiles and Sollars (1993), which found that over the period 1955 to 1990 the demand for cigarettes in Alabama was relatively price inelastic, with only small "spillover" effects between Alabama and bordering states. During that period, Alabama's average nominal cigarette retail price differential with Georgia was 3.6 cents, ranging from a low of 1.2 cents in 1960 to a high of 6.8 cents in 1990. The biggest price differentials were with Florida, where retail prices were as much as 11 cents higher than in Alabama (about an 8 percent difference). While they concluded that cigarette taxes were still a source of new revenues, the revenue complications were indeed greater as price differentials grew, and they warned that cigarette tax revenues as a long run fiscal strategy are questionable in the face of stagnant and declining sales;

4. Baltagi and Levin (1986) estimated a dynamic demand model for cigarettes based on panel data for 46 states (including Georgia) from 1963 to 1988. While a key focus of their research is to clarify some of the biases in cross-sectional versus time series analysis of cigarette demand, their most important findings for tax policy are that there is: (1) a small but statistically significant "border purchasing" effect; (2) an inelastic price elasticity; (3) a small income effect; and (4) a significant "habit persistence" effect, confirming the usual expectations about the difficulties of changing smoking behavior;

5. An especially interesting study of cigarette smuggling was conducted by Saba et al. (1995), concluding that "border crossing is a significant determinant of cigarettes sales in at least some states," but that the "extent of border-crossing activity is typically small (less than 1 percent of total sales)." This particular finding is nearly identical to a similar study of cross-border sales of alcohol by some of the same authors (Beard et al., 1997), who found usually small, but in some jurisdictions "quite significant" effects. The Saba et al.(1995) specific findings regarding Georgia are of particular interest. For 1973, Georgia had 0.56 percent of consumers going outside the state for cheaper cigarettes, while only 0.21 percent of its cigarette sales were imported from other states. By 1986, imports remained fairly stable at 0.26 percent of sales, but consumers shopping outside the state had dropped to only 0.13 percent. Important related results deal with the estimated price elasticities of demand for cigarettes in Georgia. Both a "naive" (restricting the model to zero cross-border effects) and an "unrestricted" (allowing cross-border effects) elasticity was estimated for both years. In 1973 the naive price elasticity was -0.79 compared to the unrestricted elasticity of -1.15. But by 1986, these two elasticities had fallen respectively to -0.69 and -0.9;

6. Note that the price elasticity approach results in Table 6 utilized a price elasticity of demand of -0.68 (derived from the recent West Virginia study) in analyzing the 25 cent 2003 tax increase, and -0.77 for a possible future increase of 21 cents. Therefore, the projections derived in Table 6 are reasonably consistent with the Saba et al. (1995) findings, even when specifically adjusting for cross-border effects. This is especially the case given the ever declining inflation adjusted real cigarette tax and the low Georgia cigarette prices relative to the national average. Both of those factors would have suggested that the decline in the price elasticities found by Saba et al. between 1973 and 1986 would have continued to 2003. Nevertheless, had the -0.98 price elasticity been used to project revenues from the 25 cent tax increase, the projected revenue increase during the first fiscal year would have been $157.97 million rather than $163.91 million, a downward adjustment of 3.6 percent.[4] Since the analysis of any subsequent 21 cent increase had already utilized a higher price elasticity of -0.77, a similar further upward adjustment in light of the "unrestricted" Saba et al. estimates would have generated a similarly modest downward adjustment;

7. The study finding the greatest magnitude of cross-border cigarette sales effects is Coats (1995), whose results rival and even exceed the 1977 ACIR study. He attempts to integrate past estimates of the response of state cigarette sales to state cigarette taxes, with other studies focusing more generally on individual consumer reactions to cigarette price changes, whatever their cause. He claims that by measuring both responses in the same regression, he obtains more accurate results, which differ surprisingly from the seeming consensus of most of the studies discussed above - that cross-border effects can be significant in selected cases, but are generally small. By contrast, Coats concludes that "about four-fifths of the sales response to state cigarette taxes is due to cross-border sales," based on a pooled time-series and cross-section database from 1964-1986. Note that this result is not inconsistent with states generating net positive revenues from higher cigarette excise taxes. But it does suggest that the beneficial health claims from such taxes would be limited since little of the reduction in state cigarette sales can be linked to reduced smoking;

8. Perhaps the Coats (1995) finding reflects a fraying in the more optimistic consensus that can only grow in the face of increasing interstate tax differentials. For example, Farrelly et al. (2002 and 2003) continue to find

---

[4] With the higher price elasticity, the 7.55 percent price change per pack would have translated into a 7.60 percent drop in packs consumed per capita to 80.27, for a state-wide sale of 657.09 million packs and tax revenue of $243.12 million compared to $85.15 million per year.

small smoker bootlegging effects, although much larger tax evasion effects via organized smuggling to supplement the increasing threat of internet sales, but with the net effect still being large positive revenue benefits to states that significantly increase their cigarette tax rates. Meanwhile, Fleenor (2003), provides a much more sober assessment. While focused on the clearly special case of New York, the lengthy time period means that New York's more recent dramatic tax increases cannot be the full explanation for the problems identified;

9.   Coats (1995, Table 1) also draws particular attention to a few other studies in addition to those discussed in more detail above. While these studies generated numerous results, it is sufficient to cite only the important cigarette price elasticity of demand findings. Lyon and Simon (1968) used cross-sectional and quasi-experimental data from 1954-1965 across states to derive a price elasticity of -0.511. Fujii (1980) used time series data from 1929-1973 at the national level and found a price elasticity of -0.624, an important finding since national data does not focus on variations in state tax rates, which suggests that the consumption effects are primarily the result of reduced smoking. Bishop and Yoo (1985) did a similar study but over the period 1954-1980, deriving a price elasticity of -0.454. By contrast, Wasserman et al. (1991) studied individual smoking decisions using cross section data from 1970-1988, and were not able to find a statistically significant price elasticity of demand for cigarettes different from zero. This latter result, if generalized, would maximize any state revenues from higher tobacco taxes but would provide no health benefits.

About the Author

Bruce A. Seaman is an Associate Professor of Economics and Senior Associate in the Policy Research Center of the Andrew Young School of Policy Studies at Georgia State University. He has a Ph.D. in Economics from the University of Chicago, has worked as an antitrust economist for the Federal Trade Commission, is a former Chair of the Economics Department at GSU, and is Immediate-Past President of the Association for Cultural Economics, International. His research includes industrial organization and antitrust economics, cultural and sports economics, and public finance and impact study methodology. He has previously provided expert assistance to the State of Georgia regarding the issues of severance taxes, an excise tax on auto rentals and the regional impact of the Phillips arena, public services and taxation in Atlanta-in-DeKalb, and financing options for the Fernbank Museum of Natural History.

About the Fiscal Research Center

The Fiscal Research Center provides nonpartisan research, technical assistance, and education in the evaluation and design of state and local fiscal and economic policy, including both tax and expenditure issues. The Center's mission is to promote development of sound public policy and public understanding of issues of concern to state and local governments.

The Fiscal Research Center (FRC) was established in 1995 to provide a stronger research foundation for setting fiscal policy for state and local governments and for better informed decision making. The FRC, one of several prominent policy research centers and academic departments housed in the Andrew Young School of Policy Studies, has a full-time staff and affiliated faculty from throughout Georgia State University and elsewhere who lead the research efforts in many organized projects.

The FRC maintains a position of neutrality on public policy issues in order to safeguard the academic freedom of authors. Thus, interpretations or conclusions in FRC publications should be understood to be solely those of the author.

FISCAL RESEARCH CENTER STAFF

David L. Sjoquist, Director and Professor of Economics
Margo Doers, Administrative Support
Alan Essig, Senior Research Associate
John W. Matthews, Research Associate
Lakshmi Pandey, Senior Research Associate
William J. Smith, Senior Research Associate
Dorie Taylor, Associate to the Director
Jeanie J. Thomas, Senior Research Associate
Arthur D. Turner, Microcomputer Software Technical Specialist
Sally Wallace, Associate Director and Associate Professor of Economics

ASSOCIATED GSU FACULTY
James Alm, Chair and Professor of Economics
Roy W. Bahl, Dean and Professor of Economics
Kelly D. Edmiston, Assistant Professor of Economics
Martin F. Grace, Professor of Risk Management and Insurance
Shiferaw Gurmu, Associate Professor of Economics
Amy Helling, Associate Professor of Public Administration and Urban Studies
Julie Hotchkiss, Associate Professor of Economics
Ernest R. Larkin, Professor of Accountancy
Gregory B. Lewis, Professor of Public Administration and Urban Studies
Jorge L. Martinez-Vazquez, Professor of Economics
Theodore H. Poister, Professor of Public Administration and Urban Studies
Michael J. Rushton, Associate Professor of Public Administration and Urban Studies
Benjamin P. Scafidi, Assistant Professor of Economics
Bruce A. Seaman, Associate Professor of Economics
Geoffrey K. Turnbull, Professor of Economics
Mary Beth Walker, Associate Professor of Economics
Katherine G. Willoughby, Professor of Public Administration and Urban Studies

PRINCIPAL ASSOCIATES
Mary K. Bumgarner, Kennesaw State University
Richard W. Campbell, University of Georgia
Gary Cornia, Brigham Young University
Dagney G. Faulk, Indiana University Southeast
Catherine Freeman, U.S. Department of Education
Richard R. Hawkins, University of West Florida
L. Kenneth Hubbell, University of Missouri
Julia E. Melkers, University of Illinois-Chicago
Jack Morton, Morton Consulting Group
Ross H. Rubenstein, Syracuse University
Francis W. Rushing, Independent Consultant
Saloua Sehili, Centers for Disease Control
Stanley J. Smits, Workplace Interventions, Inc.
Kathleen Thomas, University of Mississippi
Thomas L. Weyandt, Atlanta Regional Commission
Laura Wheeler, Independent Consultant

GRADUATE RESEARCH ASSISTANTS
Manish Saxena •Xiang Sun

RECENT PUBLICATIONS

(All publications listed are available at http://frc.aysps.gsu.edu or call the Fiscal Research Center at 404/651-2782, or fax us at 404/651-2737.)

***The Economics of Cigarette Taxation: Lessons for Georgia* (Bruce A Seaman)**

This report provides estimates of the fiscal effects of increasing taxes on cigarettes. <u>FRC Report 89</u> (December 2003).

***Single Factor Sales Apportionment Formula in Georgia. What Is the NET Revenue Effect?* (Kelly D. Edmiston)**

This report computes the net revenue effect of changing Georgia's corporate income tax apportionment formula to a sales only formula, considering both corporate income tax and personal income tax revenue implications. <u>FRC Report 88</u> (October 2003)

***Financing Georgia's Schools: A Primer* (Ross Rubenstein and David L. Sjoquist)**

This report provides an explanation of how K-12 education is financed in Georgia. <u>FRC Report 87</u> (October 2003)

***Getting Serious About Property Tax Reform in Georgia* (David L. Sjoquist)**

This report lists problems with the property tax in Georgia and outlines a set of policy options for reforming the property tax. <u>FRC Report 86</u> (August 2003)

***The Commercial Music Industry in Atlanta and the State of Georgia: An Economic Impact Study* (Kelly D. Edmiston and Marcus X. Thomas)**

This report measures the commercial music industry's economic impact on Atlanta and the State of Georgia. <u>FRC Report/Brief 85</u> (August 2003)

***Twelve Years of Budget Growth: Where Has the Money Gone?* (Alan Essig)**

This report analyzes the growth in the state budget over the past 12 years and identifies specific policy decisions that caused and resulted in changes in the budget. <u>FRC Report/Brief 84</u> (July 2003)

***Local Government Competition for Economic Development* (Kelly D. Edmiston and Geoffrey D. Turnbull)**

This report examines the factors driving community tax incentives for industry recruitment. <u>FRC Report 83</u> (July 2003)

***State Health Grants-In-Aid to Counties.* (John Matthews)**

This report looks at current aid alternative methods of disbursing state funds to county health departments. <u>FRC Report/Brief 82</u> (July 2003).

***An Analysis of a Proposed New Economic Development Incentive.* (Kelly D. Edmiston, David L. Sjoquist and Jeanie Thomas)**

This report evaluates the likely impact of changing Georgia's economic development tax incentive program. <u>FRC Report/Brief 81</u> (January 2003)

The Bush Economic Stimulus Plan: What Does It Mean for Georgia. **(Sally Wallace)**

This brief provides a summary of the President's economic stimulus proposal. <u>FRC Brief 80</u> (January 2003)

The Effect of State Income Tax Structure on Interstate Migration. **(Sally Wallace)**

This report analyzes the effect of state income taxes on individual migration among states. <u>FRC Report/Brief 79</u> (December 2002)

Georgia's Corporate Income and Net Worth Taxes. **(Martin F. Grace)**

This report examines the Georgia Corporate Income tax and Net Worth Tax and examines some possible reforms. <u>FRC Report/Brief 78</u> (December 2002)

Racial Segregation in Georgia Public Schools, 1994-2001: Trends, Causes and Impact on Teacher Quality. **(Catherine Freeman, Benjamin Scafidi and David L. Sjoquist)**

This report looks at recent trends in segregation and its impact on teacher quality in the state of Georgia. <u>FRC Report/Brief 77</u> (November 2002)

Job Creation by Georgia Start-Up Businesses. **(Lakshmi Pandey and Jeanie Thomas)**

This report examines the success rate of start-up companies in Georgia by industry and by region between 1986 and 2000. <u>FRC Report 76</u> (November 2002)

Local Tax Base Sharing: An Incentive for Intergovernmental Cooperation. **(Geoffrey Turnbull)**

This report develops and explains the principles for designing effective tax base sharing among local governments as a means of coordinating development incentives. <u>FRC Report/Brief 75</u> (October 2002)

Firm-Level Effects of Apportionment Formula Changes. **(Kelly D. Edmiston and F. Javier Arze)**

This report utilizes Georgia corporate income tax returns from 1992 - 1998 to examine the effects of its 1995 change in apportionment formula on the levels of sales, payroll, and property in the state. <u>FRC Report/Brief 74</u> (October 2002)

Local Land Use Policy and Investment Incentives. **(Geoffrey Turnbull)**

This report discusses how the threat of land use regulation affects the pace and pattern of urban development and how legal constraints on policymakers can alter the intended effects of land use controls. <u>FRP Report 73</u> (June 2002)

(All publications listed are available at http://frc.aysps.gsu.edu or call the Fiscal Research Center at 404/651-2782, or fax us at 404/651-2737.)

The Economics of Cigarette Taxation: Lessons for Georgia

Publisher(s): Fiscal Research Center of the Andrew Young School of Policy Studies

Author(s): Bruce A. Seaman

Date Published: 2003-12-01

Rights: Copyright 2003 Fiscal Research Center of the Andrew Young School of Policy Studies

Subject(s): General