



Impact of Cigarette Excise Tax Increases in Low-Tax Southern States on Cigarette Sales, Cigarette Excise Tax Revenue, Tax Evasion, and Economic Activity

Final Report

September 2003

Prepared for

Tobacco Technical Assistance Consortium

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EXECUTIVE SUMMARY

This report examines the impact on cigarette sales and revenues of raising the cigarette excise tax in low-tax southern states to the national average of 70 cents per pack (as of July 1, 2003).

Understanding the implications of higher cigarette taxes on low-tax southern states is particularly important because these states produce the majority of the U.S. tobacco leaf and because several of these states are the main source of smuggled cigarettes in the United States. The nine low-tax southern states in this study are Alabama, Georgia, Kentucky, Mississippi, North Carolina, South Carolina, Tennessee, Virginia, and West Virginia. Key findings are as follows:

1. Low-tax southern states that increase their tobacco tax rates to the national average of 70 cents per pack (as of July 1, 2003) gain tobacco tax revenue, despite related consumption declines and tax evasion. These gains total roughly \$2 billion across all states.
2. Cigarette sales typically decline sharply immediately after a cigarette tax increase and then rise to settle on a new sales level lower than the sales level before the increase. This pattern likely reflects a surge in tax avoidance efforts around the date of the tax increase, which subsequently subsides.
3. Raising taxes in the lowest-tax states (North Carolina, Kentucky, and Virginia) to the national average would likely eliminate much of the illegal cigarette trade in the United States, while also prompting declines in cigarette sales.
4. Sales would have to decline by an average of 85 percent following a tax increase to 70 cents per pack before states would lose cigarette excise tax revenue. Even using most tax-evasion friendly assumptions, it is very unlikely that sales would decline enough for states to actually lose tax revenue following an increase in the cigarette excise tax.
5. Declines in demand for cigarettes following tax increases in the nine southern states will not have a significant impact on tobacco farming and cigarette manufacturing.
6. Smoking declines prompted by the cigarette tax increase will likely reduce each state's public and private smoking-related costs and improve public health, including potential improvements to the productivity of many workforce members who currently smoke.

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1. INTRODUCTION

This report examines the impact on sales, revenue, tax evasion, and economic activity of raising the cigarette excise taxes to the national average of 70 cents per pack (as of July 1, 2003) in low-tax southern states. Understanding the implications of higher cigarette taxes for low-tax southern states is particularly important because these states produce the majority of the U.S. tobacco leaf and because several of these states serve as the main sources of smuggled cigarettes in the United States. We examine nine low-tax southern states: Alabama, Georgia, Kentucky, Mississippi, North Carolina, South Carolina, Tennessee, Virginia, and West Virginia.

Although Georgia and West Virginia have recently raised their cigarette tax rates to 37 and 55 cents per pack, respectively, these rates still lag behind the national average. The situation in the other southern states is even more extreme, with per-pack cigarette taxes ranging from 2.5 cents in Virginia and 3 cents in Kentucky (the lowest rates in the nation) to 20 cents in Tennessee (after a 2002 increase). Kentucky and South Carolina have not increased cigarette excise taxes in more than 30 years, and Mississippi has not increased cigarette excise taxes since the mid-1980s. This analysis focuses on implications of raising state cigarette excise taxes to 70 cents per pack on state-level cigarette sales, tax revenue, and tax evasion. It also examines the impact on tobacco farming, cigarette manufacturing, and the overall economies in these low-tax southern states.

The impact of increasing cigarette excise taxes in the nine southern states can be illustrated with two approaches. The first is a simple approach that answers three questions: what would revenue be with a 70 cent tax, assuming sales did not decline; how would revenue change assuming a typical decline in sales following a price increase; and how far would sales have to decline before states would lose revenue. The second approach involves more sophisticated methods that use historical data on cigarette sales and excise tax rates from the entire country to understand the impact of excise tax increases on cigarette sales and revenue. Smoking

declines prompted by the increases and any related tax evasion¹—such as interstate cigarette smuggling and smokers traveling across state borders or using the Internet to purchase cheaper cigarettes—are accounted for in such an analysis. To understand the history and context of changes in excise taxes, we first provide an overview of tax increases and evasion in Section 2.

2. BACKGROUND ON CIGARETTE EXCISE TAXES AND TAX EVASION

State cigarette excise taxes have long been used to raise revenue, curb smoking, and fund tobacco prevention and smoking cessation programs. However, cigarette tax increases rarely get passed without opponents expressing a number of concerns. Opponents of cigarette excise taxes typically ignore the economic and public health benefits and often argue that increases only promote tax evasion and do not increase tax revenue. In fact, every state that implemented a significant tax increase between 1990 and 2001 realized a significant increase in total annual cigarette excise tax revenue (Farrelly et al., 2003a). Table 1 provides examples from five U.S. states that increased their cigarette tax rate by 25 cents per pack or more during this period. In every case, the state’s cigarette excise tax revenue increased substantially in response to the tax increase.

Table 1. Examples of State-Level Sales and Cigarette Excise Tax Revenue in Response to Cigarette Excise Tax Increases

Date	State	Tax Increase Per Pack (\$)	New State Tax Per Pack (\$)	State Sales Decline (%)	Revenue Increase (%)	Revenue Increase (in millions \$)
7/1/97	Utah	\$0.25	\$0.515	–20.7%	86.2%	\$21.5
7/1/99	Maryland	\$0.30	\$0.66	–15.3%	52.6%	\$68.2
1/1/99	California	\$0.50	\$0.87	–18.9%	90.7%	\$555.4
5/1/94	Michigan	\$0.50	\$0.75	–20.8%	139.9%	\$341.0
3/1/00	New York	\$0.55	\$1.11	–20.2%	57.4%	\$365.4

¹We define tax evasion as including acts that are legal (e.g., crossing state boundaries to purchase limited amounts of cigarettes for personal use), illegal (e.g., smuggling large quantities of cigarettes from low-tax states to high-tax states, purchasing on Native American reservations), and questionably legal (e.g., Internet) sales.

Even in New York City, where the combined state and local cigarette tax rate has increased to \$3.00 per pack, the city's tax increase from 8 cents to \$1.50 per pack is on track to bring in \$0.25 billion in new revenue over the first year, despite sharp declines in cigarette sales (NYSDTF, 2003). Put simply, states that increase their cigarette tax rate gain more new revenue from the increased cigarette tax per pack sold than they lose from the related declines in taxable pack sales.

Pack sales decline after cigarette tax increases because higher cigarette tax rates provide an increased incentive for smokers to reduce their spending. A significant number of smokers reduce their spending by quitting or reducing their consumption, whereas others switch to lower-priced brands or find stores with the lowest prices, and some seek ways to avoid paying their state's cigarette taxes (Chaloupka and Warner, 2000). Continuing smokers who do not cut back may try to find other ways to reduce their spending. For example, smokers living near a border with a low-tax neighboring state may start purchasing their cigarettes in the neighboring state. Similarly, those living near a store on a Native American reservation that sells cigarettes free of any state tax may take advantage of this opportunity. In addition, smokers with Internet access can purchase cigarettes from Internet vendors that are free of state and sometimes federal excise and sales taxes, violating the federal Jenkins Act and possibly state law.

For example, Kentucky has a 3 cent per pack tax, which is the second lowest cigarette excise tax in the country (after Virginia at 2.5 cents), and shares a border with Illinois, which has a 98 cent per pack tax. By purchasing cigarettes in Kentucky, a smoker in Illinois would save 95 cents per pack or \$9.50 per carton, which equates to a savings of more than \$340 per year for a smoker with a one pack-a-day habit. Alternatively, a smoker in New York City can save more than \$30 per carton by ordering online.

Whether or not a smoker will purchase cheaper cigarettes in a lower-price state depends on the distance the smoker would have to travel. In the above example, Illinois's border regions with Kentucky are not very populated, and most smokers would have to travel a considerable distance to purchase lower-price cigarettes in Kentucky. A California study, for example, found that soon after the state's 50 cent cigarette tax increase went into effect in 1999, about

5 percent of all continuing smokers were purchasing cigarettes in nearby states, from Indian reservations, military bases, or via the Internet or were otherwise trying to avoid the state's cigarette tax (Emery et al., 2002). Other studies have found that cross-border sales and other smoker tax evasion strategies account for a relatively small amount of all cigarette sales (Farrelly et al., 2003b).

Indeed, there are significant transactions or inconvenience costs associated with traveling to neighboring states or Native American reservations or with buying cartons of cigarettes via the Internet. Most smokers purchase their cigarettes one or two packs at a time (Quinn, 1999), usually from readily available stores—either because they value convenience or perhaps because buying cigarettes by the carton may constitute an admission that they are addicted and contradict any future plans to quit. There is also evidence that initial increases in tax avoidance prompted by state cigarette tax increases soon decline as smokers either return to their usual smoking patterns or even quit or cut back (Farrelly et al., 2003a). For example, that same Illinois smoker described above with a one pack-a-day habit, who could save \$340 per year by traveling to Kentucky to avoid paying the higher prices caused by his state's cigarette tax increase, would end up saving more than \$1,000 per year just in reduced cigarette costs if he quit instead.²

Nevertheless, it is clear that many smokers will not quit and some will look for cheaper cigarettes, especially if they are conveniently available. Therefore, large differences between the tax rates in the highest- and lowest-tax states (and between the cigarette prices in the highest-tax states and Native American reservations) also prompt both informal and organized cigarette smuggling operations. A December 27, 2002, article in the *Wall Street Journal*, for example, reports that smugglers purchased cigarettes in Virginia, where the cigarette tax is 2.5 cents per pack, or in North Carolina, where it is 5 cents per pack. The street value of the smuggled cigarettes nearly doubles when the cigarettes cross into Manhattan, where taxes are \$3 a pack (Fairclough, 2002).

One way to illustrate tax evasion is to compare cigarette sales in low-tax states with the rest of the United States. For example, in

²Savings from quitting = # of packs smoked per year * price per pack (Savings = 365 * \$2.93). The per-pack price of cigarettes in Kentucky is based on 2002 data from Orzechowski and Walker (2002).

2001, per capita sales in Kentucky were roughly 90 percent higher than the U.S. average, whereas smoking prevalence in Kentucky was only 35.5 percent higher than the U.S. average in 2001.³ Even after accounting for Kentucky smokers consuming more cigarettes per day than the national average, this analysis suggests that in fiscal year 2001, about 15.3 percent of all cigarette sales in Kentucky were destined for higher-tax states.⁴ Similarly, per capita sales in New York (a high-tax state) for fiscal year 2001 were 40 percent below the national average, whereas smoking prevalence in New York was actually slightly higher than the U.S. average (CDC, 2003). Although New York smokers consume 10 percent fewer cigarettes per day compared to the national average, this does not completely explain the dramatically lower per capita cigarette sales in New York.⁵ These data imply that some New York smokers purchase cigarettes elsewhere. Figure 1 illustrates that per capita pack sales in the three lowest-tax states are considerably higher than the U.S. average. We estimate that Kentucky, North Carolina, and Virginia exported a combined 356 million packs in fiscal year 2001.⁶ This represents 1.7 percent of total U.S. sales in 2001.

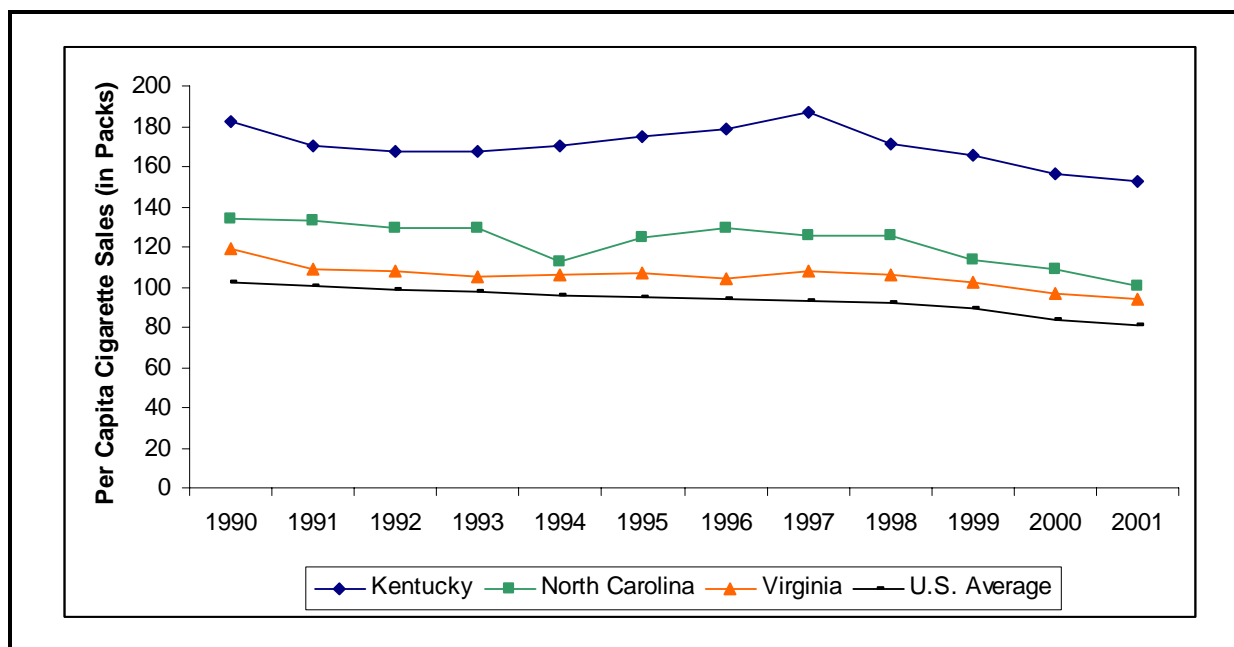
³2001 smoking participation rate in Kentucky = 30.9 percent vs. 22.8 percent in the United States (CDC, 2003).

⁴Based on the difference between total consumption in Kentucky and total sales for Kentucky in 2000. Total consumption is based on self-reported smoking participation and smoking intensity data in the 2000 Behavioral Risk Factor Surveillance System (BRFSS).

⁵On average, smokers consumed 13.16 cigarettes per day in New York in 2000 compared to the national average of 14.59 cigarettes per day. Average consumption rates are based on smoking participation and intensity information contained in the 2000 BRFSS.

⁶Exports for the three lowest-tax states are based on the difference in state-level consumption and state-level sales. State-level consumption is based on smoking prevalence and smoking intensity data in the 2000 BRFSS. The 2000 BRFSS covers 6 months of fiscal year 2001.

Figure 1. Per Capita Sales (in Packs)



These data suggest that some fraction of all cigarettes sold in these lowest-tax states are likely being consumed in relatively high-tax states. Raising the cigarette tax rates in these supplier states to the national average would likely eliminate much of these sales, while also prompting smoking declines and decreased tax evasion. Parallel cigarette tax increases in the other southern states would similarly reduce their pack sales. The goal of this report is to provide more detail on how increasing the cigarette excise tax to 70 cents per pack would affect state cigarette tax revenues, with additional information on the effect on cigarette manufacturing, tobacco farming, and retail outlets that sell cigarettes and on each of the nine state's economies.

3. A SIMPLE ILLUSTRATION OF THE POTENTIAL IMPACT OF RAISING CIGARETTE TAXES IN SOUTHERN STATES

We begin our analyses of the impact of raising the cigarette excise tax in southern states to 70 cents with a simple analysis that answers three questions: (1) how would revenue increase after increasing the excise tax to 70 cents, assuming sales did not decline; (2) how would revenue change, assuming a typical decline in sales

following a price increase based on economic literature; and (3) how far would sales have to decline before states would lose revenue.

Specifically, we calculate revenue following a tax increase to 70 cents per pack in each of the nine southern states by multiplying 2001 sales for each state by 70 cents per pack, assuming no change in sales. The resulting dollar increase in revenue is the difference between the revenue under the new and old tax rates (Table 2). We assume that sales do not decline to illustrate the maximum potential revenue gain, which amounts to a combined increase in revenue of more than \$2.9 billion. When we factor in a “standard” decline in sales in response to the price increase, caused by smoking reductions prompted by the cigarette tax increases, revenue increases by \$2.6 billion (see Table 2).

Table 2. State Cigarette Excise Tax Revenue Before and After the Tax Increase

State	Tax Rates (as of 12/2001)	Revenue at 2001 Tax Rates (millions \$)	Revenue with 70 Cent Tax (no Declines in Sales) (millions \$)	Revenue with 70 Cent Tax and Declines in Sales (millions \$)	Total Decline in Sales Before States Lose Revenue
Alabama	\$0.165	\$67.5	\$286.4	\$260.5	76.4%
Georgia	\$0.120	\$78.8	\$459.7	\$414.5	82.9%
Kentucky	\$0.030	\$17.9	\$418.9	\$365.9	95.7%
Mississippi	\$0.180	\$48.3	\$188.0	\$171.0	74.3%
North Carolina	\$0.050	\$39.7	\$555.6	\$491.9	92.9%
South Carolina	\$0.070	\$27.8	\$277.9	\$247.2	90.0%
Tennessee	\$0.130	\$80.3	\$432.6	\$389.8	81.4%
Virginia	\$0.025	\$16.5	\$462.7	\$407.3	96.4%
West Virginia	\$0.170	\$35.1	\$144.6	\$131.1	75.7%
Total		\$344.6	\$2,939.9	\$2,618.7	Average: 85.1%

We estimate sales declines following the tax increase by assuming that sales would decline by 4 percent for every 10 percent increase in price. This assumption is based on an extensive economic literature of the impact of cigarette excise taxes and price on

cigarette sales (Chaloupka and Warner, 2000; U.S. DHHS, 2000). This simple approach does not explicitly take into account that sales in southern states are influenced by tax evasion (e.g., cigarettes purchased in the state and shipped elsewhere).

We therefore calculate the necessary decline in sales before states would lose revenue following the tax increase.⁷ Our analysis indicates that sales would have to decline by an average 85 percent before states will lose revenue (see Table 2).

It is very unlikely that sales would decline enough for states to actually lose tax revenue following an increase in the cigarette excise tax. For example, even after New York City increased its cigarette excise tax from 8 cents per pack to \$1.50 per pack in addition to the state excise tax of \$1.50, sales dropped by 50 percent while revenue increased by \$26.7 million in the month following the tax increase compared to the month before the tax increase (NYSDTF, 2003). The steep decline in sales in New York City following the tax increase can be largely explained by the close proximity to lower-tax areas, such as the remainder of New York State. A New York City smoker would only have to leave the city to purchase cheaper cigarettes.

While it is clear that tax evasion and lost supplier sales will not reduce state pack sales enough to sharply reduce the size of the state revenue increases following a tax increase, it is important to determine the extent of their influence on net state revenues. We therefore apply more sophisticated methods to determine the impact of taxes on sales by accounting for tax evasion.

4. COMPREHENSIVE ANALYSIS OF THE IMPACT OF CIGARETTE EXCISE TAXES ON SALES AND REVENUE

This section presents a thorough analysis of the impact of increasing the cigarette excise tax to 70 cents in the nine southern states, accounting for tax evasion. We explore the effect of taxes on revenue under two scenarios: one where all nine states increase cigarette taxes simultaneously and another where only one state

⁷Necessary Decline in Sales (%) = (2001 Sales – Revenue at Current Tax Rate / \$0.62 / 2001 Sales).

increases taxes and the others do not. We repeat the latter analysis for each of the nine states. In the first scenario, the incentive for smokers to travel to neighboring states to purchase cigarettes would be minimized because the difference in cigarette excise taxes between most neighboring states would be zero. In the second scenario, smokers would have an incentive to travel to lower-tax neighboring states because the neighboring states do not increase their cigarettes excise tax. Section 4.1 provides a detailed description of the analytic methods, and Section 4.2 presents the results of this approach.

4.1 Methods

The impact of taxes on sales and consequently revenue can be broken down into two components: tax evasion and decreased consumption. In this section, we introduce the underlying methods for our comprehensive analysis. Our approach uses historical data on cigarette sales and cigarette excise taxes from all states from 1983 to 2001 to develop estimates of the impact of changes in cigarette excise taxes on cigarette sales. In these analyses, we also account for tax evasion. Based on these results, we are able to make projections of the likely impact of changes in excise taxes in the nine low-tax southern states under two scenarios: one where all states increase their excise tax to 70 cents and another where only one state increases its tax. These scenarios are important because they reflect how differences in relative tax rates can influence tax evasion.

4.1.1 Analytic Model Specifications

Using historical data on cigarette sales and excise tax rates from the entire country, we estimate a model that describes how taxes and other factors influence cigarette sales for the years 1983 through 2001. The model is specified as follows:

$$Y_{it} = \beta T_{it} + \delta I_{it} + \varepsilon E_{it} + \phi L_{it} + \varphi LE_{it} + \gamma D + \eta U_{it} + S_i + Y_t + \mu_{it} \quad (1)$$

where Y_{it} is per capita annual cigarette sales in state i at time t , T is the average real tax (2001 dollars) of cigarettes in the state, and S and Y are vectors of state and year indicator variables. The state effects control for unobserved state characteristics that are constant over time (e.g., tobacco-producing state).

In addition to controls for taxes, we account for cross-border sales (I = Import; E = Export), long-distance smuggling (LI = Long-Distance Imports; LE = Long-Distance Exports), and several measures of overall economic activity and well-being that influence cigarette sales (e.g., state unemployment rate [U], per capita disposable income [Y] [real 2000 dollars], and the high school dropout rate [U]). μ is a random disturbance.⁸ Formulas for the constructs that capture cross-border sales and smuggling are provided in Appendix B.

4.1.2 Methods to Estimate Cross-Border Sales

For every state, we estimate the number of packs that are sold in a low-tax state to neighboring states with higher taxes. We refer to this situation as cigarette “exports.” We estimate the potential for a low-tax state to export to a higher-tax neighboring state in the following way. We first predict sales in the low-tax state using our basic model (equation 1). We then predict what sales would have been in the exporting state in the absence of exports to the higher-tax neighboring state. The difference in sales under these two scenarios is the estimated number of packs exported to the higher-tax neighboring state. We repeat this process for every neighboring state with higher taxes. We take the sum of all exports to higher-tax neighboring states to calculate total exports under the current tax rate for the lower-tax exporting state. We follow the same strategy to estimate exports in the wake of a tax increase. We determine the impact of the tax increase on exports by taking the difference in exports before and after the tax increase. We use an analogous method to estimate the fraction of total cigarettes consumed in a relatively high-tax state that come from lower-tax states.

⁸Following Kamenta (1997), we calculate variance inflation factors (VIFs) that are equal to $1/(1 - R_k^2)$, where k is the k th explanatory in our model and R_k^2 refers to the regression of the k th explanatory variable as a function of all other variables in the model. We consider the explanatory variables to have a high degree of collinearity, if the VIF is roughly greater than 10. This indicates that more than 90 percent of the variation in that variable is explained by other variables (Kleinbaum, Kupper, and Muller, 1988). Based on this criterion, we excluded per capita disposable income (VIF = 56) and kept the dropout rate (VIF = 12.7). All other variables did not exceed 10. We also chose to use cigarette excise taxes rather than prices because they are the relevant policy tool, and 95 percent of the variation in prices from 1983 to 2001 is explained by taxes and state and year effects (Farrelly et al., 2003b).

4.1.3 Methods to Estimate Long-Distance Smuggling

In addition to cross-border sales, we also account for cigarettes purchased in the lowest-tax states—Kentucky (3 cents per pack), North Carolina (5 cents), and Virginia (2.5 cents)—and illegally smuggled to other states. We assume that only the three lowest-tax states engage in such long-distance exports.⁹ We estimate long-distance smuggling for every state by first predicting sales, using our basic model. We then predict what sales would have been in the absence of long-distance smuggling. The difference in sales between these two scenarios is the estimated number of packs “imported” by high-tax states from one of the three low-tax exporting states. We follow the same strategy to estimate long-distance imports in the wake of a tax increase for a given state. We determine the impact of the tax increase on long-distance imports by taking the difference in exports before and after the tax increase. Again, an analogous approach is used to reflect long-distance smuggling in measuring cigarette consumption (as opposed to sales) in the states that are the primary source of smuggled cigarettes. Internet sales from the three lowest-tax states are captured by our long-distance smuggling measures, as those sales are part of the difference between state-level sales and state-level consumption in the three lowest-tax states. We are currently not able to capture Internet sales that originate in states other than Kentucky, North Carolina, and Virginia.

4.1.4 Native American Reservations

We are currently not able to estimate sales from Native American reservations. Data on such sales are not available to us at this time. We believe that person to person sales are relatively minor and will only affect areas in close vicinity to Native American reservations (i.e., surrounding counties). A survey of Internet retailers in 2000 found that more than 50 percent of all Internet retailers in the United States were located on Native American reservations (Ribisl et al., 2001). The same survey found that almost half of all Internet retailers were located in New York. Again, our long-distance smuggling measures capture Internet sales that occur within Kentucky, North Carolina, or Virginia. We are unable to capture

⁹For the three lowest-tax states—Kentucky, North Carolina, and Virginia—long-distance smuggling is estimated in addition to cross-border sales.

Internet sales on Native American reservations that occur outside of the three lowest tax states.

4.2 Results

As noted above, we estimate the impact of the increase to a 70 cent tax on sales and revenues using two scenarios: one that assumes that all states change to 70 cents simultaneously and the other where only one state changes. We repeat the latter scenario for each of the nine states. Under the first scenario, the effects of cross-border sales would be minimized as smokers would have little incentive to purchase cigarettes in neighboring states. In the second scenario, although smokers in states that increase excise taxes unilaterally have an incentive to purchase cigarettes in lower-tax neighboring states, this does not result in a significant reduction in additional revenue resulting from the tax increase.

4.2.1 Results from Simultaneous Tax Increase

When the nine states increase taxes simultaneously, the incentive for cross-border cigarette sales is minimized because the difference in cigarette excise taxes with most neighboring states will be zero. Accordingly, in this scenario, we assume that all nine states increase cigarette excise taxes to the current national average of 70 cents per pack simultaneously. We estimate the impact of the tax increases on revenue, accounting for tax evasion effects and declining consumption in each state. Table 3 shows that total revenue across all nine states would increase by \$2.2 billion. This increase in revenue ranges from more than \$80 million in West Virginia to \$386 million for North Carolina. Revenue gains in West Virginia are less than gains in North Carolina, because sales in West Virginia are less than sales in North Carolina. In addition, West Virginia has to increase taxes by only 53 cents to reach 70 cents per pack, compared to 65 cents in North Carolina.

Table 3. Revenue Gains when States Increase Cigarette Excise Taxes Simultaneously

State	Tax Rates (as of 12/2001)	Revenue at 2001 Tax Rates (millions \$)	Revenue with 70 Cent Tax (millions \$)	Increase in Revenue (millions \$)	Increase in Revenue (%)
Alabama	\$0.165	\$67.5	\$260.6	\$193.07	286%
Georgia	\$0.120	\$78.8	\$416.0	\$337.16	428%
Kentucky	\$0.030	\$18.0	\$289.6	\$271.65	1513%
Mississippi	\$0.180	\$48.3	\$163.1	\$114.76	237%
North Carolina	\$0.050	\$39.7	\$426.1	\$386.45	974%
South Carolina	\$0.070	\$27.8	\$247.3	\$219.51	790%
Tennessee	\$0.130	\$80.3	\$385.0	\$304.64	379%
Virginia	\$0.025	\$16.5	\$313.1	\$296.54	1795%
West Virginia	\$0.170	\$35.1	\$114.7	\$79.53	226%
Total		\$412.1	\$2,615.4	\$2,203	

Table 4 illustrates the effect of the tax increase on overall sales and, more specifically, on tax evasion and consumption. Overall, total pack sales would decline by 14 percent or less in Alabama, Georgia, Mississippi, South Carolina, and Tennessee, with most of the decline from reduced smoking levels (see Table 4). West Virginia sales would decline by 21 percent, and pack sales would decline by more than 30 percent for Kentucky and Virginia, the two states with the lowest tax rates. Sales would decline by 23 percent for North Carolina. Sales declines would be largest in Kentucky, North Carolina, and Virginia because they are the biggest suppliers of low-cost cigarettes for interstate smugglers and Internet sales. We assume that all cigarette sales in those states to Internet sellers and long-distance smugglers would disappear completely if they raised their cigarette tax rate to the national average. We make this extreme assumption because we are not able to accurately predict the impact of higher taxes on Internet and long-distance sales. A detailed breakdown of import and export figures for each of the nine states is provided in Appendix A.

Table 4. Impact of the Tax Increase to 70 Cents per Pack on Sales

State	Decline in Consumption (Packs)	Net Effect of Cross-Border Sales	Total Decline in Sales (Packs)	Total Decline in Sales (%)
Alabama	-36,909,540	12,982	-36,896,558	-9.0%
Georgia	-64,223,452	1,782,520	-62,440,932	-9.5%
Kentucky	-63,694,467	-121,000,871	-184,695,339	-30.9%
Mississippi	-22,627,622	-12,957,313	-35,584,935	-13.2%
North Carolina	-78,777,743	-106,119,506	-184,897,249	-23.3%
South Carolina	-43,750,761	20,036	-43,730,725	-11.0%
Tennessee	-60,773,677	-7,199,854	-67,973,531	-11.0%
Virginia	-60,527,190	-153,187,429	-213,714,619	-32.3%
West Virginia	-18,329,748	-24,500,714	-42,830,462	-20.7%
Total	-449,614,200	-423,150,150	-872,764,350	

Despite the significant declines in pack sales from smoking declines and tax evasion, Table 3 shows that tobacco tax revenue would increase dramatically for each of the nine states after a simultaneous increase of their tax rates to the national average. This highlights the fact that any decline in sales due to cross-border sales and declines in consumption is outweighed by higher cigarette tax revenue.

4.2.2 Results from Separate, Single State Tax Increases

Because it is unlikely that all southern states will simultaneously raise their tax rates to the national average, this section presents estimates of the consumption, tax evasion, and revenue effects for each state if it raised its own cigarette tax rate to the national average, while the other states' taxes remained unchanged. In each case, the state that increases cigarette excise taxes will see a reduction in sales to residents of other states and at the same time experience increased tax evasion from in-state smokers, compared to the previous scenario under which all states increased taxes simultaneously. In the present scenario, their neighboring states will still have substantially lower cigarette tax rates. Consequently, residents in the tax-increasing state will be able to purchase

significantly cheaper cigarettes from the lower-tax neighboring states. Similarly, any smugglers, Internet sellers, or neighboring-state smokers who used to go to the tax-increasing state for low-cost cigarettes would either simply stop or switch to making their purchases in one of the remaining low-tax states. Despite these effects, each of the nine states would experience dramatically higher revenues if they unilaterally increased their cigarette tax rate to the national average (Table 5).

Revenue increases range from \$72.7 million in West Virginia (207 percent) to \$366 million in North Carolina (922 percent). Table 6 illustrates that total sales decline by between 16 and 24 percent for Alabama, Georgia, Mississippi, South Carolina, Tennessee, and West Virginia. As in the previous scenario, pack sale declines in Kentucky, North Carolina, and Virginia would be higher, ranging from 27 to 36 percent, because of their current roles as major suppliers for long-distance smuggling. Despite the greater tax evasion effects for single-state cigarette tax increases, smoking declines would be considerable in each state and would be larger than the tax evasion impact on pack sales in South Carolina and Tennessee.

Table 5. State-Level Revenue When Only One State Increases Cigarette Excise Taxes

State	Tax Rates as of 12/2001	Revenue at 2001 Tax Rates (millions \$)	Revenue with 70 Cent Tax (millions \$)	Increase in Revenue (millions \$)	Increase in Revenue (%)
Alabama	\$0.17	\$67.51	\$240.27	\$172.76	256%
Georgia	\$0.12	\$78.80	\$360.54	\$281.74	358%
Kentucky	\$0.03	\$17.95	\$281.23	\$263.28	1467%
Mississippi	\$0.18	\$48.35	\$142.93	\$94.58	196%
North Carolina	\$0.05	\$39.68	\$405.53	\$365.85	922%
South Carolina	\$0.07	\$27.79	\$230.08	\$202.29	728%
Tennessee	\$0.13	\$80.33	\$356.63	\$276.30	344%
Virginia	\$0.025	\$16.52	\$295.95	\$279.42	1691%
West Virginia	\$0.17	\$35.13	\$107.81	\$72.68	207%
Total		\$344.55	\$2,180.69	\$1,836.14	

Table 6. Impact of the Tax Increase on Sales

State	Decline in Consumption (Packs)	Net Effect of Cross-Border Sales (Packs)	Total Decline in Sales (Packs)	Total Decline in Sales (%)
Alabama	-36,909,540	-28,989,171	-65,898,710	-16.11%
Georgia	-64,223,452	-77,397,370	-141,620,822	-21.57%
Kentucky	-63,694,467	-132,955,399	-196,649,867	-32.86%
Mississippi	-22,627,622	-41,785,802	-64,413,424	-23.98%
North Carolina	-78,777,743	-135,547,137	-214,324,881	-27.00%
South Carolina	-43,750,761	-24,586,532	-68,337,294	-17.21%
Tennessee	-60,773,677	-47,685,851	-108,459,528	-17.55%
Virginia	-60,527,190	-177,637,312	-238,164,502	-36.03%
West Virginia	-18,329,748	-34,275,559	-52,605,307	-25.46%
Total	-412,704,660	-671,870,963	-1,084,575,624	

5. THE IMPACT OF TAX INCREASE ON TOBACCO FARMING, MANUFACTURING, AND RETAIL

Tobacco farming in the United States has been declining for several decades. Reduced domestic demand for cigarettes only partially explains the overall decline in demand for U.S. grown tobacco. Among the contributing factors in declining demand for U.S. grown tobacco is (1) a general decline in domestic smoking levels, (2) shifting of cigarette manufacturing to overseas, (3) reduced exports of U.S. tobacco due to improved quality in foreign grown tobacco as well as artificially high prices of U.S. tobacco, and (4) substitution of both quality and quantity of tobacco in cigarettes due to technological changes in cigarette manufacturing (Brown and Snell, 2001). In the United States, the tobacco industry is protected by a federal Tobacco Program aimed at stabilizing prices for domestically grown tobacco. In recent years, several proposals have been introduced to eliminate the Tobacco Program to ensure the competitiveness of U.S. grown tobacco on the world market. The elimination of the federal Tobacco Program is likely to cause a major restructuring in the tobacco farming community. Changes in

tobacco policy can potentially dwarf the impact of higher taxes and consequently lower demand for cigarettes on tobacco farming and manufacturing. In addition to a significant decrease in price and an increase in output of U.S. grown tobacco (Brown, 1997, 1998; Brown, Snell, and Tiller, 1999; Gardner, 1997; Sumner and Alston, 1985, as cited in Gale, Foreman, and Capehart, 2000), among the consequences of eliminating the Tobacco Program is that small high-cost growers would no longer be competitive and that low-cost producers would expand tobacco production. In addition, it is possible that farmers may start growing tobacco in other parts of the country. As reported in Gale, 1999, any negative impact of changing tobacco policies will likely be limited to relatively few geographic areas in the South. Southern economies have been adjusting to declining demand for tobacco for decades and most tobacco growing areas are well-positioned to absorb the loss of tobacco income (Gale, 1999).

Increasing cigarette excise taxes in the nine southern states will not have a significant impact on farming and manufacturing. Although total sales decline by almost 900 million packs when all nine states increase taxes, the decline in sales is in large part due to a loss in sales to residents of relatively high-tax states, not a loss in consumption by U.S. smokers. We estimate that in response to each of the nine states increasing cigarette taxes to 70 cents per pack, consumption in those states will decline by a combined 450 million packs.¹⁰ This represents a decline of 2.2 percent of total U.S. cigarette sales in 2001. The total decline is of consumers purchasing cigarettes elsewhere, not necessarily of consumers quitting smoking or reducing consumption. It is unlikely that consumption in other parts of the country will significantly decline as a result of the tax increase in the southern states for two reasons. First, many of the cigarettes smuggled from southern states to higher-tax states are being sold at higher prices in the high-tax states. In other words, the smuggler benefits from commercial smuggling, not the smoker. Second, consumers who previously purchased cigarettes in low-tax southern states are likely to either purchase cigarettes in their own state or from alternative sources of

¹⁰We estimate the impact of tax increases on farming and manufacturing by taking the sum of the total decline in consumption in the southern states due to the tax increase under scenario 1, in which all nine states implemented the tax increase simultaneously.

low-price cigarettes, such as Internet cigarette vendors or Native American reservations. In either case, the net loss to farmers and manufacturing is fairly small since on net the decline in sales in the southern states is in part due to a decline in smuggling and not in actual smoking. In addition, the decline in smoking makes up only a small fraction of total U.S. cigarette production.

With regard to the impact of higher taxes on sectors other than tobacco farming and cigarette manufacturing, smokers who quit or decreased consumption following a tax increase will simply spend the money they once spent on tobacco products on other goods and services or save/invest the money.

With regard to the impact of higher taxes on retailers, it is unlikely that lower demand for cigarettes following a tax increase will significantly impact cigarette retailers. A recent study finds that retailer gross revenues in Maryland were not affected by increases in tobacco taxes (Schafer, 2003). Convenience stores and cigarette outlets, which benefit from cross-border cigarette shopping and organized smuggling, however, are likely to see a steep decline in cigarette sales. The decline in sales for those retailers may be exacerbated by the loss of potential sales other than cigarettes to cross-border shoppers. The effect of higher taxes will be less for retailers that did not benefit directly from cross-border shopping and smuggling activities.

Finally, reduced cigarette consumption will likely reduce public and private smoking-related costs and potentially improve the productivity of many workforce members who currently smoke, which will further strengthen and increase the state's economy.

6. CONCLUSION

Increasing cigarette excise taxes to 70 cents per pack in Alabama, Georgia, Kentucky, Mississippi, North Carolina, Tennessee, South Carolina, Virginia, and West Virginia would increase cigarette excise tax revenue in all of these states. Sales would have to decline by an average of 85 percent before these states would lose cigarette excise tax revenue following the tax increase. But even under extreme assumptions, the steepest decline in sales in these states would be no more than 35.5 percent with an increase to 70 cents.

When we factor in that sales will decline following the tax increase due to declining consumption and tax evasion, we find that the states can increase cigarette excise tax revenue by as much as a combined \$2.6 billion when they all increase taxes simultaneously. This represents nearly an eight-fold average increase in revenue. If each state raised its tax rate to the national average and the other southern states took no action, we find that states' cigarette excise tax revenues would rise by 207 to 1,707 percent, depending on each state's individual characteristics. Curbing tobacco tax evasion offers states an additional opportunity to increase revenues they receive from tobacco tax increases.

All of our approaches produce fairly similar results, and these results consistently show that despite declining consumption and tax evasion, each of the southern states would substantially raise its revenue by increasing its cigarette tax rate to the current nationwide average of 70 cents per pack.

With regard to the impact of these tax increases on tobacco farming and cigarette manufacturing, we find that even if all nine southern states increased their cigarette taxes to 70 cents per pack simultaneously, it would only reduce total U.S. cigarette sales by 2.2 percent and reduce the global demand for U.S. cigarettes by only 1.6 percent.¹¹ These reductions would have only a marginal effect on state tobacco farmers or U.S. cigarette manufacturing. Although the impact on state retailers that sell cigarettes would potentially be more significant due to a loss of potential sales to cross-border shoppers, it would still be small, with much of the money no longer spent on cigarettes in the state being spent on other in-state goods and services instead.

More broadly, the new state revenue generated by the cigarette tax increases would help improve the states' budget situations. In addition, the smoking declines prompted by the cigarette tax increase will likely reduce each state's public and private smoking-related costs and improve public health, including potential improvements to the productivity of many workforce members who currently smoke.

¹¹Calculations are based on 2001 U.S. output, removals, and consumption data. Source: Bureau of Alcohol, Tobacco and Firearms, Bureau of the Census.

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**Appendix A:
Detailed Breakdown
of Import and Export
Estimates for the
Nine Low-Tax
Southern States**

Table A-1. Alabama Imports and Exports (all states increase taxes simultaneously)

Alabama Imports	Packs Imported (Baseline)	Packs Imported (70 Cent Tax)	Packs Imported as a Result of 70 Cent Tax
Florida	0	2,180,086	2,180,086
Georgia	628,909	0	-628,909
Mississippi	0	0	0
Tennessee	205,140	0	-205,140
Total	834,049	2,180,086	1,346,037
Alabama Exports	Packs Exported (Baseline)	Packs Exported (70 Cent Tax)	Packs Exported as a Result of 70 Cent Tax
Florida	1,341,465	0	-1,341,465
Georgia	0	0	0
Mississippi	86,162	0	-86,162
Tennessee	0	0	0
Total	1,427,627	0	-1,427,627
Alabama Long-Distance Imports	Packs Imported (Baseline)	Packs Imported (70 Cent Tax)	Packs Imported as a Result of 70 Cent Tax
Kentucky	1,750,801	0	-1,750,801
North Carolina	395,753	0	-395,753
Virginia	640,092	0	-640,092
Total	2,786,646	0	-2,786,646
Net Impact of the Tax Increase (in Packs)			12,982

Note: Imports = residents of high tax states purchasing cigarettes in lower tax states; Exports = cigarette sales to out of state residents.

Table A-2. Alabama Imports and Exports (single state tax increase)

Alabama Imports	Packs Imported (Baseline)	Packs Imported (70 Cent Tax)	Packs Imported as a Result of 70 Cent Tax
Florida	0	2,287,823	2,287,823
Georgia	628,909	8,105,941	7,477,032
Mississippi	0	3,435,436	3,435,436
Tennessee	205,140	3,340,856	3,135,716
Total	834,049	17,170,056	16,336,006
Alabama Exports	Packs Exported (Baseline)	Packs Exported (70 Cent Tax)	Packs Exported as a Result of 70 Cent Tax
Florida	1,341,465	0	-1,341,465
Georgia	0	0	0
Mississippi	86,162	0	-86,162
Tennessee	0	0	0
Total	1,427,627	0	-1,427,627
Alabama Long-Distance Imports	Packs Imported (Baseline)	Packs Imported (70 Cent Tax)	Packs Imported as a Result of 70 Cent Tax
Kentucky	1,750,801	8,689,159	6,938,358
North Carolina	395,753	2,236,865	1,841,112
Virginia	640,092	3,086,159	2,446,067
Total	2,786,646	14,012,183	11,225,537
Net Impact of the Tax Increase (in Packs)			-28,989,171

Note: Imports = residents of high tax states purchasing cigarettes in lower tax states; Exports = cigarette sales to out of state residents.

Table A-3. Georgia Imports and Exports (all states increase taxes simultaneously)

Imports	Packs Imported (Baseline)	Packs Imported (70 Cent Tax)	Net Imports as a Result of 70 Cent Tax
Alabama	0	0	0
Florida	0	2,295,217	2,295,217
North Carolina	435,467	0	-435,467
South Carolina	978,551	0	-978,551
Tennessee	0	0	0
Total	1,414,018	2,295,217	881,199

Exports	Packs Exported (Baseline)	Packs Exported (70 Cent Tax)	Net Exports as a Result of 70 Cent Tax
Alabama	628,909	0	-628,909
Florida	2,853,428	0	-2,853,428
North Carolina	0	0	0
South Carolina	0	0	0
Tennessee	157,423	0	-157,423
Total	3,639,760	0	-3,639,760

Long-Distance Imports	Packs Imported (Baseline)	Packs Imported (70 Cent Tax)	Net Long-Distance Imports as a result of 70 Cent Tax
Kentucky	4,138,282	0	-4,138,282
Virginia	2,165,197	0	-2,165,197
Total	6,303,479	0	-6,303,479
Net Impact of the Tax Increase (in Packs)			1,782,520

Note: Imports = residents of high tax states purchasing cigarettes in lower tax states; Exports = cigarette sales to out of state residents.

Table A-4. Georgia Imports and Exports (single state tax increase)

Imports	Packs Imported (Baseline)	Packs Imported (70 Cent Tax)	Net Imports as a Result of 70 Cent Tax
Alabama	0	11,074,597	11,074,597
Florida	0	2,295,217	2,295,217
North Carolina	435,467	4,037,405	3,601,938
South Carolina	978,551	12,310,166	11,331,615
Tennessee	0	5,634,992	5,634,992
Total	1,414,018	35,352,377	33,938,359
Exports	Packs Exported (Baseline)	Packs Exported (70 Cent Tax)	Net Exports as a Result of 70 Cent Tax
Alabama	628,909	0	-628,909
Florida	2,853,428	0	-2,853,428
North Carolina	0	0	0
South Carolina	0	0	0
Tennessee	157,423	0	-157,423
Total	3,639,760	0	-3,639,760
Long-Distance Exports	Packs Exported (Baseline)	Packs Exported (70 Cent Tax)	Net Long-Distance Exports as a Result of 70 Cent Tax
Kentucky	4,138,282	30,761,227	26,622,945
Virginia	2,165,197	15,361,503	13,196,306
Total	6,303,479	46,122,729	39,819,251
Net Impact of the Tax Increase (in Packs)			-77,397,370

Note: Imports = residents of high tax states purchasing cigarettes in lower tax states; Exports = cigarette sales to out of state residents.

Table A-5. Kentucky Imports and Exports (all states increase taxes simultaneously)

Imports	Packs Imported (Baseline)	Packs Imported (70 Cent Tax)	Net Imports as a Result of 70 Cent Tax
Illinois	0	560,320	560,320
Indiana	0	15,147,245	15,147,245
Missouri	0	1,004,286	1,004,286
Ohio	0	9,677,758	9,677,758
Tennessee	0	0	0
Virginia	25,904	0	-25,904
West Virginia	0	0	0
Total	25,904	26,389,609	26,363,705
Exports	Packs Exported (Baseline)	Packs Exported (70 Cent Tax)	Net Exports as a Result of 70 Cent Tax
Illinois	3,610,638	0	-3,610,638
Indiana	3,621,957	0	-3,621,957
Missouri	454,518	0	-454,518
Ohio	9,326,844	0	-9,326,844
Tennessee	1,138,124	0	-1,138,124
Virginia	0	0	0
West Virginia	765,655	0	-765,655
Total	18,917,737	0	-18,917,737
Long-Distance Exports	Packs Exported (Baseline)	Packs Exported (70 Cent Tax)	Net Long-Distance Exports as a Result of 70 Cent Tax
Total	75,719,430	0	-75,719,430
Net Impact of the Tax Increase (in Packs)			-121,000,871

Note: Imports = residents of high tax states purchasing cigarettes in lower tax states; Exports = cigarette sales to out of state residents.

Table A-6. Kentucky Imports and Exports (single state tax increase)

Kentucky Imports	Packs Imported (Baseline)	Packs Imported (70 Cent Tax)	Packs Imported as a Result of 70 Cent Tax
Illinois	0	565,029	565,029
Indiana	0	15,175,089	15,175,089
Missouri	0	1,006,184	1,006,184
Ohio	0	9,698,842	9,698,842
Tennessee	0	5,433,753	5,433,753
Virginia	25,904	3,497,090	3,471,186
West Virginia	0	2,968,149	2,968,149
Total	25,904	38,344,137	38,318,233
Kentucky Exports	Packs Exported (Baseline)	Packs Exported (70 Cent Tax)	Packs Exported as a Result of 70 Cent Tax
Illinois	3,610,638	0	-3,610,638
Indiana	3,621,957	0	-3,621,957
Missouri	454,518	0	-454,518
Ohio	9,326,844	0	-9,326,844
Tennessee	1,138,124	0	-1,138,124
Virginia	0	0	0
West Virginia	765,655	0	-765,655
Total	18,917,737	0	-18,917,737
Kentucky Long- Distance Exports	Packs Exported (Baseline)	Packs Exported (70 Cent Tax)	Packs Exported as a Result of 70 Cent Tax
Total	75,719,430	0	-75,719,430
Total Effect of the Tax Increase (in Packs)			-132,955,399

Note: Imports = residents of high tax states purchasing cigarettes in lower tax states; Exports = cigarette sales to out of state residents.

Table A-7. Mississippi Imports and Exports (all states increase taxes simultaneously)

Mississippi Imports	Packs Imported (Baseline)	Packs Imported (70 Cent Tax)	Packs Imported as a Result of 70 Cent Tax
Alabama	86,162	0	-86,162
Arkansas	0	2,756,734	2,756,734
Louisiana	0	10,369,038	10,369,038
Tennessee	281,502	0	-281,502
Total	367,664	13,125,772	12,758,108
Mississippi Exports	Packs Exported (Baseline)	Packs Exported (70 Cent Tax)	Packs Exported as a Result of 70 Cent Tax
Alabama	0	0	0
Arkansas	482,851	0	-482,851
Louisiana	654,555	0	-654,555
Tennessee	0	0	0
Total	1,137,406	0	-1,137,406
Mississippi Long- Distance Imports	Packs Imported (Baseline)	Packs Imported (70 Cent Tax)	Packs Imported as a Result of 70 Cent Tax
Kentucky	586,218	0	-586,218
North Carolina	131,632	0	-131,632
Virginia	220,352	0	-220,352
Total	938,201	0	-938,201
Net Impact of the Tax Increase (in Packs)			-12,957,313

Note: Imports = residents of high tax states purchasing cigarettes in lower tax states; Exports = cigarette sales to out of state residents.

Table A-8. Mississippi Imports and Exports (single state tax increase)

Mississippi Imports	Packs Imported (Baseline)	Packs Imported (70 Cent Tax)	Packs Imported as a Result of 70 Cent Tax
Alabama	86,162	3,073,102	2,986,940
Arkansas	0	2,888,561	2,888,561
Louisiana	0	10,766,947	10,766,947
Tennessee	281,502	3,209,128	2,927,626
Total	367,664	19,937,738	19,570,074
Mississippi Exports	Packs Exported (Baseline)	Packs Exported (70 Cent Tax)	Packs Exported as a Result of 70 Cent Tax
Alabama	0	0	0
Arkansas	482,851	0	-482,851
Louisiana	654,555	0	-654,555
Tennessee	0	0	0
Total	1,137,406	0	-1,137,406
Mississippi Long- Distance Imports	Packs Imported (Baseline)	Packs Imported (70 Cent Tax)	Packs Imported as a Result of 70 Cent Tax
Kentucky	586,218	2,618,439	2,032,222
North Carolina	131,632	658,158	526,526
Virginia	220,352	959,595	739,244
Total	938,201	4,236,192	3,297,991
Net Impact of the Tax Increase (in Packs)			-24,005,471

Note: Imports = residents of high tax states purchasing cigarettes in lower tax states; Exports = cigarette sales to out of state residents.

Table A-9. North Carolina Imports and Exports (all states increase taxes simultaneously)

Imports	Packs Imported (Baseline)	Packs Imported (70 Cent Tax)	Net Imports as a Result of 70 Cent Tax
Georgia	0	0	0
South Carolina	0	0	0
Tennessee	0	0	0
Virginia	340,247	0	-340,247
Total	340,247	0	-340,247
Exports	Packs Exported (Baseline)	Packs Exported (70 Cent Tax)	Net Exports as a Result of 70 Cent Tax
Georgia	435,467	0	-435,467
South Carolina	275,607	0	-275,607
Tennessee	626,660	0	-626,660
Virginia	0	0	0
Total	1,337,734	0	-1,337,734
Long-Distance Exports	Packs Exported (Baseline)	Packs Exported (70 Cent Tax)	Net Long-Distance Exports as a Result of 70 Cent Tax
Total	105,122,019	0	-105,122,019
Net Impact of the Tax Increase (in Packs)			-106,119,506

Note: Imports = residents of high tax states purchasing cigarettes in lower tax states; Exports = cigarette sales to out of state residents.

Table A-10. North Carolina Imports and Exports (single state tax increase)

Imports	Packs Imported (Baseline)	Packs Imported (70 Cent Tax)	Net Imports as a Result of 70 Cent Tax
Georgia	0	2,554,722	2,554,722
South Carolina	0	13,648,278	13,648,278
Tennessee	0	4,037,962	4,037,962
Virginia	340,247	9,186,669	8,846,422
Total	340,247	29,427,631	29,087,384
Exports	Packs Exported (Baseline)	Packs Exported (70 Cent Tax)	Net Exports as a Result of 70 Cent Tax
Georgia	435,467	0	-435,467
South Carolina	275,607	0	-275,607
Tennessee	626,660	0	-626,660
Virginia	0	0	0
Total	1,337,734	0	-1,337,734
Long-Distance Exports	Packs Exported (Baseline)	Packs Exported (70 Cent Tax)	Net Long-Distance Exports as a Result of 70 Cent Tax
Total	105,122,019	0	-105,122,019
Total Effect of the Tax Increase (in Packs)			-135,547,137

Note: Imports = residents of high tax states purchasing cigarettes in lower tax states; Exports = cigarette sales to out of state residents.

Table A-11. South Carolina Imports and Exports (all states increase taxes simultaneously)

Imports	Packs Imported (Baseline)	Packs Imported (70 Cent Tax)	Net Imports as a Result of 70 Cent Tax
Georgia	0	0	0
North Carolina	275,607	0	-275,607
Total	275,607	0	-275,607
Exports	Packs Exported (Baseline)	Packs Exported (70 Cent Tax)	Net Exports as a Result of 70 Cent Tax
Georgia	978,551	0	-978,551
North Carolina	0	0	0
Total	978,551	0	-978,551
Long-Distance Imports	Packs Imported (Baseline)	Packs Imported (70 Cent Tax)	Net Long-Distance Imports as a Result of 70 Cent Tax
Kentucky	357,056	0	-357,056
Virginia	365,924	0	-365,924
Total	722,979	0	-722,979
Net Impact of the Tax Increase (in Packs)			20,036

Note: Imports = residents of high tax states purchasing cigarettes in lower tax states; Exports = cigarette sales to out of state residents.

Table A-12. South Carolina Imports and Exports (single state tax increase)

Imports	Packs Imported (Baseline)	Packs Imported (70 Cent Tax)	Net Imports as a Result of 70 Cent Tax
Georgia	0	5,611,803	5,611,803
North Carolina	275,607	8,957,236	8,681,628
Total	275,607	14,569,038	14,293,431
Exports	Packs Exported (Baseline)	Packs Exported (70 Cent Tax)	Net Exports as a Result of 70 Cent Tax
Georgia	978,551	0	-978,551
North Carolina	0	0	0
Total	978,551	0	-978,551
Long-Distance Imports	Packs Imported (Baseline)	Packs Imported (70 Cent Tax)	Net Long-Distance Imports as a Result of 70 Cent Tax
Kentucky	357,056	5,231,462	4,874,406
Virginia	365,924	4,806,068	4,440,145
Total	722,979	10,037,530	9,314,551
Total Effect of the Tax Increase (in Packs)			-24,586,532

Note: Imports = residents of high tax states purchasing cigarettes in lower tax states; Exports = cigarette sales to out of state residents.

Table A-13. Tennessee Imports and Exports (all states increase taxes simultaneously)

Imports	Packs Imported (Baseline)	Packs Imported (70 Cent Tax)	Net Imports as a Result of 70 Cent Tax
Alabama	0	0	0
Arkansas	0	5,559,374	5,559,374
Georgia	157,423	0	-157,423
Kentucky	1,138,124	0	-1,138,124
Mississippi	0	0	0
Missouri	0	1,845,439	1,845,439
North Carolina	626,660	0	-626,660
Virginia	1,185,601	0	-1,185,601
Total	3,107,807	7,404,813	4,297,006
Exports	Packs Exported (Baseline)	Packs Exported (70 Cent Tax)	Net Long-Distance Exports as a Result of 70 Cent Tax
Alabama	205,140	0	-205,140
Arkansas	2,289,501	0	-2,289,501
Georgia	0	0	0
Kentucky	0	0	0
Mississippi	281,502	0	-281,502
Missouri	126,705	0	-126,705
North Carolina	0	0	0
Virginia	0	0	0
Total	2,902,848	0	-2,902,848
Net Impact of the Tax Increase (in Packs)			-7,199,854

Note: Imports = residents of high tax states purchasing cigarettes in lower tax states; Exports = cigarette sales to out of state residents.

Table A-14. Tennessee Imports and Exports (single state tax increase)

Imports	Packs Imported (Baseline)	Packs Imported (70 Cent Tax)	Net Imports as a Result of 70 Cent Tax
Alabama	0	3,346,806	3,346,806
Arkansas	0	5,574,339	5,574,339
Georgia	157,423	9,130,507	8,973,084
Kentucky	1,138,124	7,625,429	6,487,306
Mississippi	0	7,651,474	7,651,474
Missouri	0	1,848,928	1,848,928
North Carolina	626,660	5,091,609	4,464,950
Virginia	1,185,601	7,621,719	6,436,118
Total	3,107,807	47,890,810	44,783,003
Exports	Packs Exported (Baseline)	Packs Exported (70 Cent Tax)	Net Long-Distance Exports as a Result of 70 Cent Tax
Alabama	205,140	0	-205,140
Arkansas	2,289,501	0	-2,289,501
Georgia	0	0	0
Kentucky	0	0	0
Mississippi	281,502	0	-281,502
Missouri	126,705	0	-126,705
North Carolina	0	0	0
Virginia	0	0	0
Total	2,902,848	0	-2,902,848
Total Effect of the Tax Increase (in Packs)			-47,685,851

Note: Imports = residents of high tax states purchasing cigarettes in lower tax states; Exports = cigarette sales to out of state residents.

Table A-15. Virginia Imports and Exports (all states increase taxes simultaneously)

Imports	Packs Imported (Baseline)	Packs Imported (70 Cent Tax)	Net Imports as a Result of 70 Cent Tax
District of Columbia	0	1,269,692	1,269,692
Kentucky	0	0	0
Maryland	0	1,361,247	1,361,247
North Carolina	0	0	0
Tennessee	0	0	0
West Virginia	0	0	0
Total	0	2,630,938	2,630,938
Exports	Packs Exported (Baseline)	Packs Exported (70 Cent Tax)	Net Exports as a Result of 70 Cent Tax
District of Columbia	12,046,861	577,677	-11,469,184
Kentucky	25,904	0	-25,904
Maryland	18,034,306	1,134,894	-16,899,411
North Carolina	340,247	0	-340,247
Tennessee	1,185,601	0	-1,185,601
West Virginia	1,136,512	0	-1,136,512
Total	32,769,431	1,712,571	-31,056,860
Long-Distance Exports	Packs Exported (Baseline)	Packs Exported (70 Cent Tax)	Net Long-Distance Exports as a Result of 70 Cent Tax
Total	122,130,569	0	-122,130,569
Net Impact of the Tax Increase (in Packs)			-153,187,429

Note: Imports = residents of high tax states purchasing cigarettes in lower tax states; Exports = cigarette sales to out of state residents.

Table A-16. Virginia Imports and Exports (single state tax increase)

Imports	Packs Imported (Baseline)	Packs Imported (70 Cent Tax)	Net Imports as a Result of 70 Cent Tax
District of Columbia	0	1,295,604	1,295,604
Kentucky	0	2,640,001	2,640,001
Maryland	0	1,396,150	1,396,150
North Carolina	0	9,669,971	9,669,971
Tennessee	0	3,716,961	3,716,961
West Virginia	0	5,731,195	5,731,195
Total	0	24,449,883	24,449,883
Exports	Packs Exported (Baseline)	Packs Exported (70 Cent Tax)	Net Exports as a Result of 70 Cent Tax
District of Columbia	12,046,861	577,677	-11,469,184
Kentucky	25,904	0	-25,904
Maryland	18,034,306	1,134,894	-16,899,411
North Carolina	340,247	0	-340,247
Tennessee	1,185,601	0	-1,185,601
West Virginia	1,136,512	0	-1,136,512
Total	32,769,431	1,712,571	-31,056,860
Long-Distance Exports	Packs Exported (Baseline)	Packs Exported (70 Cent Tax)	Net Long-Distance Exports as a Result of 70 Cent Tax
Total	122,130,569	0	-122,130,569
Total Effect of the Tax Increase (in Packs)			-177,637,312

Note: Imports = residents of high tax states purchasing cigarettes in lower tax states; Exports = cigarette sales to out of state residents.

Table A-17. West Virginia Imports and Exports (all states increase taxes simultaneously)

Imports	Packs Imported (Baseline)	Packs Imported (70 Cent Tax)	Net Imports as a Result of 70 Cent Tax
Kentucky	765,655	0	-765,655
Maryland	0	308,583	308,583
Ohio	0	12,795,612	12,795,612
Pennsylvania	0	2,302,361	2,302,361
Virginia	1,136,512	0	-1,136,512
Total	1,902,167	15,406,556	13,504,389

Exports	Packs Exported (Baseline)	Packs Exported (70 Cent Tax)	Packs Exported as a Result of 70 Cent Tax
Kentucky	0	0	0
Maryland	6,458,635	0	-6,458,635
Ohio	2,751,334	0	-2,751,334
Pennsylvania	1,951,303	0	-1,951,303
Virginia	0	0	0
Total	11,161,271	0	-11,161,271

Long-Distance Imports	Packs Imported (Baseline)	Packs Imported (70 Cent Tax)	Net Long-Distance Imports as a Result of 70 Cent Tax
North Carolina	164,946	0	-164,946
Total	164,946	0	-164,946
Net Impact of the Tax Increase (in Packs)			-24,500,714

Note: Imports = residents of high tax states purchasing cigarettes in lower tax states; Exports = cigarette sales to out of state residents.

Table A-18. West Virginia Imports and Exports (single state tax increase)

Imports	Packs Imported (Baseline)	Packs Imported (70 Cent Tax)	Net Imports as a Result of 70 Cent Tax
Kentucky	765,655	3,664,206	2,898,551
Maryland	0	316,496	316,496
Ohio	0	12,823,489	12,823,489
Pennsylvania	0	2,308,279	2,308,279
Virginia	1,136,512	5,290,660	4,154,148
Total	1,902,167	24,403,130	22,500,963
Exports	Packs Exported (Baseline)	Packs Exported (70 Cent Tax)	Packs Exported as a Result of 70 Cent Tax
Kentucky	0	0	0
Maryland	6,458,635	0	-6,458,635
Ohio	2,751,334	0	-2,751,334
Pennsylvania	1,951,303	0	-1,951,303
Virginia	0	0	0
Total	11,161,271	0	-11,161,271
Long-Distance Imports	Packs Imported (Baseline)	Packs Imported (70 Cent Tax)	Net Long-Distance Imports as a Result of 70 Cent Tax
North Carolina	164,946	778,271	613,325
Total	164,946	778,271	613,325
Total Effect of the Tax Increase (in Packs)			-34,275,559

Note: Imports = residents of high tax states purchasing cigarettes in lower tax states; Exports = cigarette sales to out of state residents.

Appendix B: Short-Distance Imports and Exports

B.1 SHORT-DISTANCE IMPORTS AND EXPORTS

$$\text{IMPORT} = \sum_{b=1}^{\text{adjstates}_a} \text{taxdiff}_{ab} \times \sum_{i=1}^{\text{blocks}_b} (\text{pop}_{ia}/\text{pop}_a) \times (1/d_{iab}) \quad (\text{B.1})$$

where

- a = importing state (“own state”),
- b = neighbor state,
- adjstates_a = number of states (b) neighboring state a,
- blocks_a = number of Census block i in state a,
- pop_{ia} = population of Census block i in state a,
- pop_a = population of state a,
- taxdiff_{ab} = tax rate in state a – tax rate in state b, and
- d_{iab} = distance from Census block i in state a to border of state b.

Because this variable measures only the potential for a state to import, we set the tax differential to zero if the adjacent state tax is lower than the own-state tax. Finally, we sum the block group-level import values over all block groups within a state to obtain a measure for the entire state. The analogous exports variable takes the form:

$$\text{EXPORT} = \sum_{b=1}^{\text{adjstates}_a} \text{taxdiff}_{ab} \times \sum_{i=1}^{\text{blocks}_b} (\text{pop}_{ib}/\text{pop}_a) \times (1/d_{iba}) \quad (\text{B.2})$$

where

- a = exporting state (“own state”),
- b = neighbor state,
- adjstates_a = number of states (b) neighboring state a,
- blocks_b = number of Census block i in state b,
- pop_{ib} = population of Census block i in state b,
- pop_a = population of state a,
- taxdiff_{ab} = tax rate in state a – tax rate in state b, and
- d_{iba} = distance from Census block i in state b to border of state a.

All distance calculations and weighting used census block group centroids derived from the U.S. Census TIGER/Line files and were performed using GIS software.

B.2 LONG-DISTANCE IMPORTS AND EXPORTS

For each state i , long-distance interstate imports are expressed as follows:

$$LDImport = \sum_{j=1}^{states_j} [(Diffsls_j) \times (T_i - T_j) \times (1/d_{ij}) \times pop_i/pop_j] \quad (B.3)$$

where

- j = exporting state (NC, KY, VA),
- i = long-distance importing state,
- $states_j$ = number of long-distance exporting states (3),
- $Diffsls_j$ = difference in per capita sales and self-reported consumption in state j ,
- d_{ij} = distance from Census block i in state a to border of state b ,
- pop_i = population in the importing state,
- pop_j = population in the exporting state,
- T_j = tax in exporting state j , and
- T_i = tax in importing state i .

For the three exporting states, long-distance interstate exports are expressed as follows:

$$LDExport = \sum_{i=1}^{states_i} LDImport_i \times Diffsls_j \sum_{j=1}^{states_j} (Diffsls_j) \quad (B.4)$$

where

- j = exporting state (NC, KY, VA),
- i = long-distance importing state, and
- $Diffsls$ = difference in per capita sales and self-reported consumption in state j .