Economic Analysis of Tobacco Control Issues in Illinois

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Executive Summary

This report consists of three chapters containing economic analyses of tobacco control issues in Illinois. The first chapter focuses on the impact of the July 2002 forty cent increase in the state cigarette excise tax. As expected, the tax increase was fully passed on to cigarette smokers in Illinois, with the combination of the state tax increase, a modest five cent federal tax increase, and industry initiated price increases accounting for nearly all of the observed change in Illinois cigarette prices between 2001 and 2002. Overall, the tax increase raised average cigarette prices in Illinois by approximately eleven percent. Consistent with economic theory and well over one hundred econometric analyses of cigarette demand, the price increase resulting from the tax increase and other factors led to a significant decline in cigarette sales in Illinois. Overall sales fell by 10.5 percent from calendar year 2001 to calendar year 2003, about what would be expected based on the price elasticity estimates produced in econometric studies of cigarette demand coupled with the underlying downward trend in cigarette smoking in Illinois. This reduction in sales is expected to result from the combination of drop in the numbers of youth taking up smoking and former smokers reinitiating smoking, an increase in the number of smokers who quit smoking, and fewer cigarettes being consumed by continuing smokers. The sharp rise in calls to the Illinois Quitline following the tax increase provides some evidence that the tax increase significantly increased Illinois smokers' interests in cessation. In addition, the steady decline in cigarette sales in neighboring states suggests that there were few, if any, cross-border purchases of cigarettes by Illinois smokers in these states, implying that the observed drop in cigarette sales in Illinois reflects a real decline in overall cigarette consumption in the state. Finally, the tax increase generated a significant increase in cigarette excise tax revenues in Illinois, although tax avoidance by wholesalers and retailers shortly before the tax increase became effective reduced the revenue the state could have obtained.

The second chapter contains an economic analysis of the impact of local restrictions on smoking in restaurants on restaurant revenues. Using the extensive data that is available from the State of Illinois, we find that these regulations are associated with statistically significant increases in restaurant industry performance, in contrast to the arguments raised by opponents of these restrictions. Our first point estimate of the impact of mandated, as opposed to voluntary, no-smoking sections on an affected local Illinois restaurant industry predicts a mean increase over 4% in annual revenues. Ours is the first study that we are aware of that focuses on no-smoking sections as opposed to outright smoking bans. We hypothesize that result may be largely driven by the effect no-smoking sections have had on smoking norms – influencing smokers to be more considerate and circumspect about smoking in public. Our analysis of the Skokie and Wilmette smoking bans is inconclusive. The Wilmette ban was not implemented until after the data collection for this study had been completed. Only two quarters of post-ban data were available for Skokie and, because of the phasing in of compliance requirement for that ban, these two quarters of data reflect only partial implementation. What we see in this data is no noticeable departure from existing trends.

The final chapter contains an analysis of the impact of local tobacco control policies and programs on youth and adult smoking, based on data taken from the 2002 Illinois Youth Tobacco Survey and the 2003 Illinois Adult Tobacco Survey. These analyses indicate that local tobacco control policies that target youth access to and possession of tobacco products are effective in reducing youth tobacco use. Similarly, we find that school-based programs, supported by funding from the state's tobacco control program, that teach youth about the dangers of using tobacco discourage youth from taking up smoking. With respect to adult smoking, we find that restrictions on smoking, particularly restrictions on smoking in the workplace, are effective in reducing cigarette smoking among adults. Finally, we find that both youth and adults living near the Kentucky border (where low priced cigarettes are readily available) are more likely to smoke and to consume more cigarettes than those living elsewhere in the state, confirming that youth and adult smoking is responsive to the price of cigarettes.

The Impact of the 2002 Cigarette Excise Tax Increase

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I. Introduction

Economic theory and past experience suggests that an increase in a state's cigarette excise tax will raise cigarette prices in the state, leading to reductions in overall cigarette smoking. These reductions in overall smoking will result from reduced smoking initiation among youth, increased cessation among adults, and lower cigarette consumption by continuing smokers, which together will be seen in reduced cigarette sales. The reductions in smoking will generate improvements in public health, resulting from fewer premature deaths from smoking-attributable diseases, and reductions in health care costs, including those that are publicly financed. At the same time, cigarette excise tax revenues will increase. Some, however, suggest that higher cigarette taxes will have a limited impact on smoking and its consequences, as smokers will seek out other sources of lower priced cigarettes, including nearby states with lower taxes and prices.

This report describes the impact of the 40 cent per pack increase in the Illinois cigarette excise tax, effective July 1, 2002. Section II briefly discusses the impact of the tax increase on cigarette prices in Illinois, based on state level price data from the annual *Tax Burden on Tobacco*. These data clearly indicate that the increase in the state cigarette tax was passed on fully to smokers, resulting in a comparable increase in cigarette prices. Section III describes the impact of the tax increase on cigarette sales in Illinois, based on wholesale-level monthly tax paid cigarette sales data collected by Orzechowski and Walker and provided by the U.S. Department of Agriculture. As expected, the cigarette tax increase and the resulting price increase led to a sharp reduction in tax paid cigarette sales in Illinois. Section IV provides some evidence that the reduction in sales was, in part, the result of increased cessation among continuing smokers, based on data from Illinois Quitline, provided by the Illinois Department of Public Health. Section V describes the impact of the tax increase on cigarette excise tax revenues in Illinois. Section VI provides additional support for the hypothesis that the tax increase produced real reductions in cigarette smoking rather than simply displacing cigarette sales from Illinois to neighboring states, based on the wholesale-level monthly tax paid cigarette sales data from Indiana, Iowa, Kentucky, Missouri, and Wisconsin. Section VII contains conclusions and suggestions for future research.

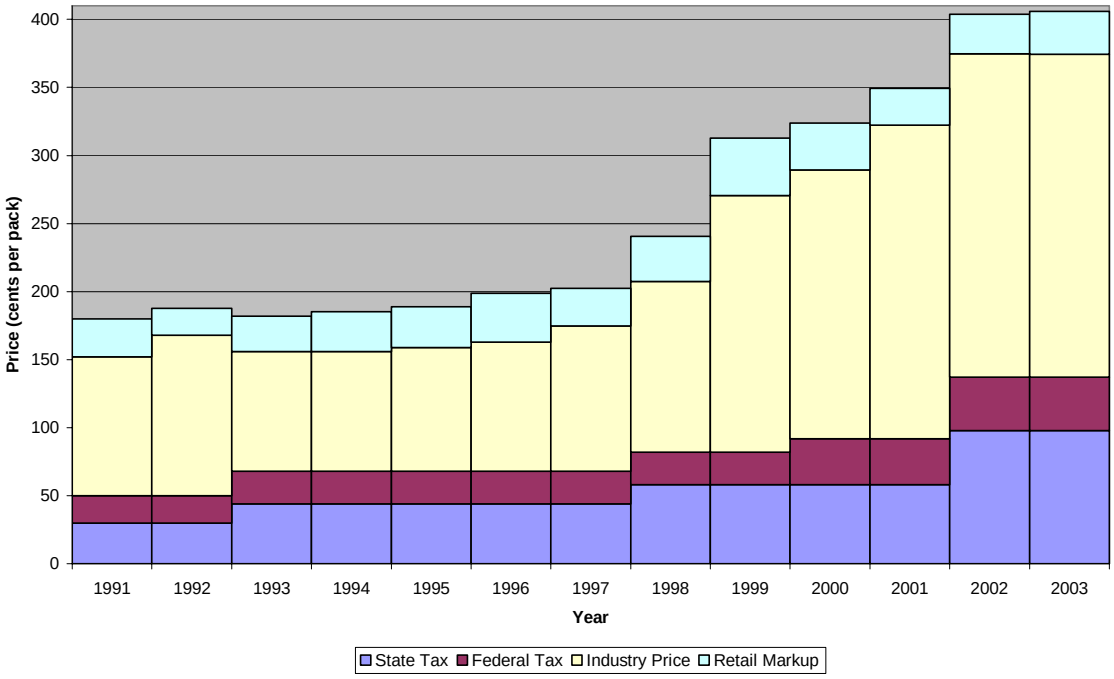
II. Cigarette Taxes and Cigarette Prices

Over the past two decades, economists have produced several studies examining the impact of state and federal cigarette excise tax rates on retail cigarette prices (see Chaloupka, et al., 2000, and U.S. Department of Health and Human Services (USDHHS) 2000, for a more detailed review of these studies. In general, these studies conclude that

increases in both state and federal cigarette taxes result in comparable increases in cigarette prices. Figure One illustrates this for cigarette prices in Illinois over the 1991 through 2003 period.

Figure One

Cigarette Prices in Illinois, 1991-2003



Sources: Orzechowski and Walker, 2004; U.S. Department of Agriculture, 2004; and authors' calculations.
Notes: Prices and taxes are as of November 1 each year; prices include generic brands.

During the period covered in Figure One, there were three increases in the Illinois cigarette excise tax: from 30 cents to 44 cents per pack on July 14, 1993; from 44 cents to 58 cents per pack on December 16, 1997; and, most recently, from 58 cents to 98 cents per pack on July 1, 2002. In each case, the primary motivation for the tax increase appeared to be for the revenues that it would generate, although the public health benefits from the tax seemed to become increasingly important over time. Similarly, the federal cigarette tax increased three times during this period, from 20 cents to 24 cents per pack in January 1993, then to 34 cents per pack in January 2000, and, finally, to 39 cents per pack in January 2002. Contrary to expectations, the combined state and federal tax increases of 1993 resulted in a decline in average retail cigarette prices, due to the large decline – 25 percent – in the wholesale prices for premium brand cigarettes initiated by Philip Morris and followed by other manufacturers. Nevertheless, cigarette prices in Illinois were higher than they would have been in the absence of the state tax increase, as can be seen by the larger declines in retail cigarette prices in states that did not increase their tax.

After remaining relatively stable for the next several years, cigarette prices increased sharply beginning in 1998 and 1999, in part the result of the late 1997 state cigarette excise tax increase, as well as several significant industry-initiated price increases resulting from the settlement of state lawsuits against major tobacco companies. Cigarette prices increased modestly from 1999 through 2001, with over thirty percent of the increase the result of the ten cent per pack increase in the federal cigarette tax, and the remainder caused by a few small increases in industry prices.

The forty cent increase in the Illinois cigarette excise tax, effective July 1, 2002, led to a sharp rise in Illinois cigarette prices. Average prices rose from $3.49 per pack in November 2001 to $4.04 per pack in November 2002. The 55 cent increase in price is almost completely explained by the increase in the state cigarette tax, the five cent, January 2002, increase in the federal cigarette tax, and a seven cent increase in industry prices in April 2002. Given the timing of the industry price increase and the federal tax increase, it is estimated that the state tax increase resulted in an eleven percent increase in average cigarette prices in Illinois.

III. Cigarette Taxes, Prices, and Cigarette Sales

Extensive economic research has demonstrated that increases in cigarette taxes and prices lead fewer youth to take up smoking, encourage adult smokers to quit smoking, prevent former smokers from restarting, and cause continuing smokers to reduce cigarette consumption (see Chaloupka and Warner, 2000, Chaloupka, et al., 2000 and USDHHS, 2000, for more detailed reviews of this literature). These studies produce relatively consistent estimates of the price elasticity of cigarette demand, with most falling in the range from 0.25 to 0.50, where the price elasticity of demand is defined as the percentage reduction in overall cigarette consumption resulting from a one percent increase in cigarette prices. Reductions in smoking initiation and reinitiation and increases in smoking cessation account for about half of the reductions in overall smoking, while the remainder results from continuing smokers smoking fewer cigarettes. Estimates from studies focused on subgroups of the population generally find that youth and young adults, racial/ethnic minority populations, and lower income/less educated populations are most responsive to price.

Given these estimates, the eleven percent increase in cigarette prices resulting from the forty cent increase in the state cigarette tax would be expected to reduce overall cigarette smoking in Illinois by between 2.75 and five percent. The prevalence of smoking in Illinois is expected to fall by about two percent, with larger reductions in prevalence among youth and young adults, racial/ethnic minorities, and lower income/less educated populations.

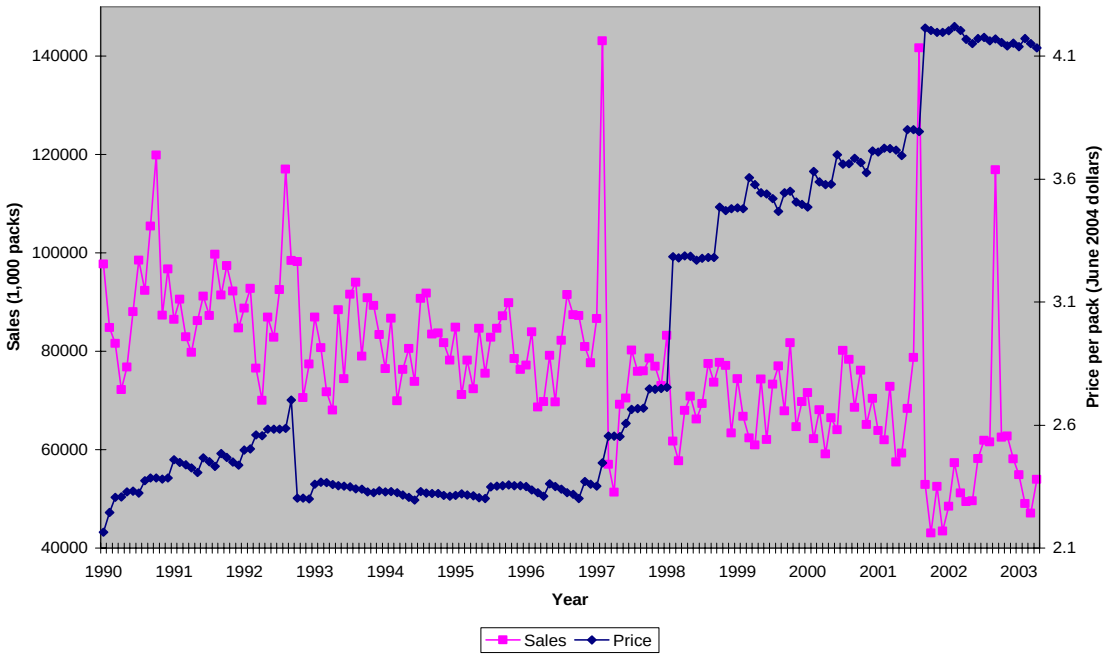
To examine the actual impact on cigarette smoking in Illinois, we employ data on monthly tax paid cigarette sales at the wholesale level. These data were obtained from the U.S. Department of Agriculture and are originally collected by the Orzechowski and Walker consulting firm. At the time of this analysis, data were available through February 2004. Since the data reflect wholesale rather than retail sales, they do not fully

reflect the timing of smokers' purchase decisions, given the lags between wholesalers' sales to retailers and retailers' subsequent sales to smokers. Similarly, since they reflect tax paid sales in Illinois, they do not fully capture cigarette consumption by smokers in Illinois. To the extent that out-of-state smokers purchase cigarettes in Illinois, these data would overstate cigarette consumption in Illinois; alternatively, to the extent that Illinois smokers purchase cigarettes from non-Illinois sources (e.g. retailers in bordering states and Internet vendors), these data will understate cigarette consumption in Illinois).

Figure Two illustrates the relationship between monthly cigarette sales and inflation adjusted cigarette prices, based on the wholesale sales data. Monthly prices are estimated based on the November price data contained in the *Tax Burden on Tobacco*, the timing of federal and state cigarette excise tax changes, and the timing of industry initiated price changes.

Figure Two

Monthly Cigarette Prices and Cigarette Sales, Nov. 1990 through February 2004



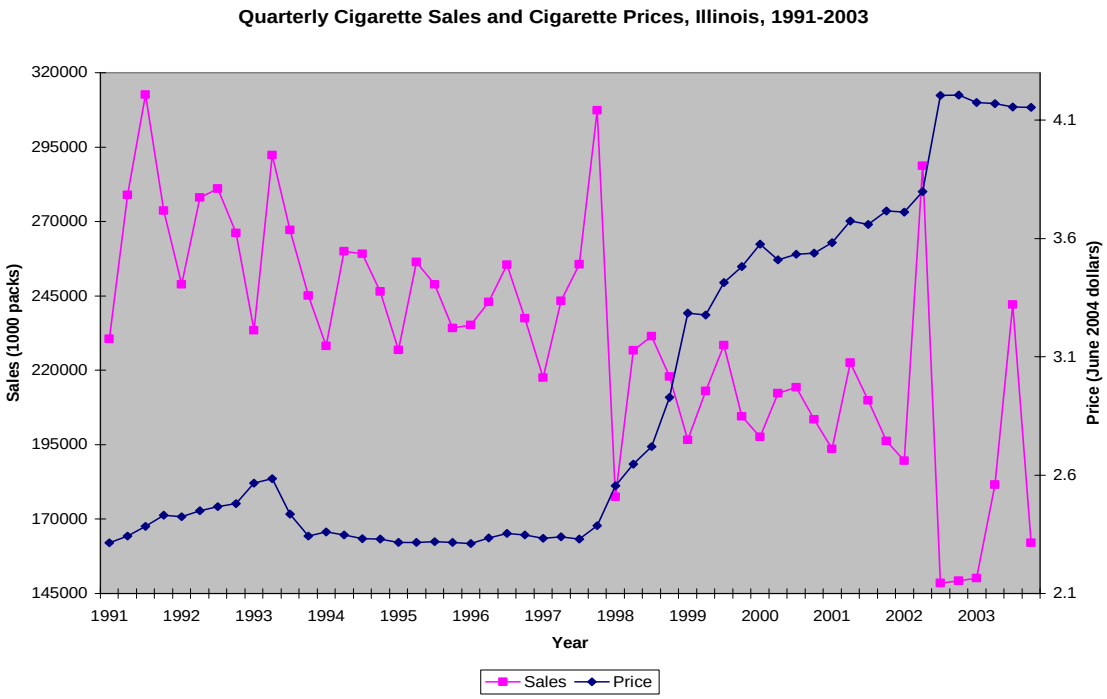
Sources: Monthly cigarette sales data obtained from US Department of Agriculture; monthly cigarette prices based on authors' calculations using price and tax data contained in Orzechowski and Walker, 2004, and industry price data contained in US Department of Agriculture, 2004.

As seen in Figure Two, the monthly cigarette sales data are relatively 'noisy', in part because they reflect the timing of wholesaler and retailer sales/purchase decisions which are guided by a variety of factors, in addition to those driving smokers' purchase decisions. Of particular importance for this analysis, Figure Two clearly illustrates that the timing of changes in the state cigarette excise tax can have a significant impact on the timing of wholesale cigarette sales activity. Since the tax is paid at the wholesale level, there is an incentive for higher than normal shipments prior to a tax increase; given that cigarettes can be stored for a short time without affecting their quality, there is an

incentive to avoid the tax increase by purchasing before the higher tax goes into effect. As seen in Figure Two, there is a sharp spike upwards in sales in June 1993, just prior to the fourteen cent July 1993 increase in the state tax, and a similar spike in December 1997, likely accounted for by a rise in sales just prior to the fourteen cent December 16, 1997 tax increase. This tax avoidance is most pronounced in anticipation of the July 2002 tax increase. After averaging fewer than 70 million packs per months for the first five months of the year, sales rose to just over 141 million packs in June 2002, once it was clear that the forty cent tax increase was imminent. Sales fell sharply in the first few months after the July 2002 tax increase, as retailers sold from the inventories they accumulated prior to the tax increase. The federal government, several states, and other jurisdictions have effectively avoided this type of tax avoidance associated with the implementation of a tax increase by imposing a 'floor tax' on cigarettes held by wholesalers, retailers, and others on which the lower cigarette excise tax had already been paid but which had not yet been sold at the retail level.

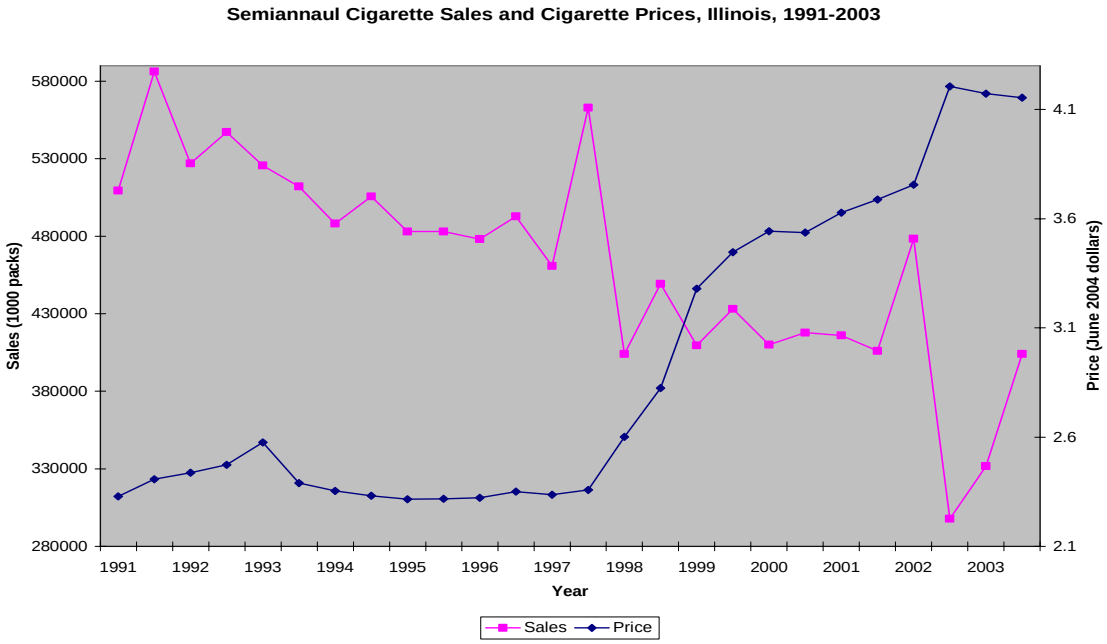
When aggregated over time, however, the noise associated with the discontinuity between wholesale cigarette sales and actual cigarette consumption is significantly reduced. This is illustrated in Figures Three, Four, and Five which graph the relationship between cigarette sales and prices based on quarterly, semiannual, and annual aggregations of the monthly cigarette sales data.

Figure Three



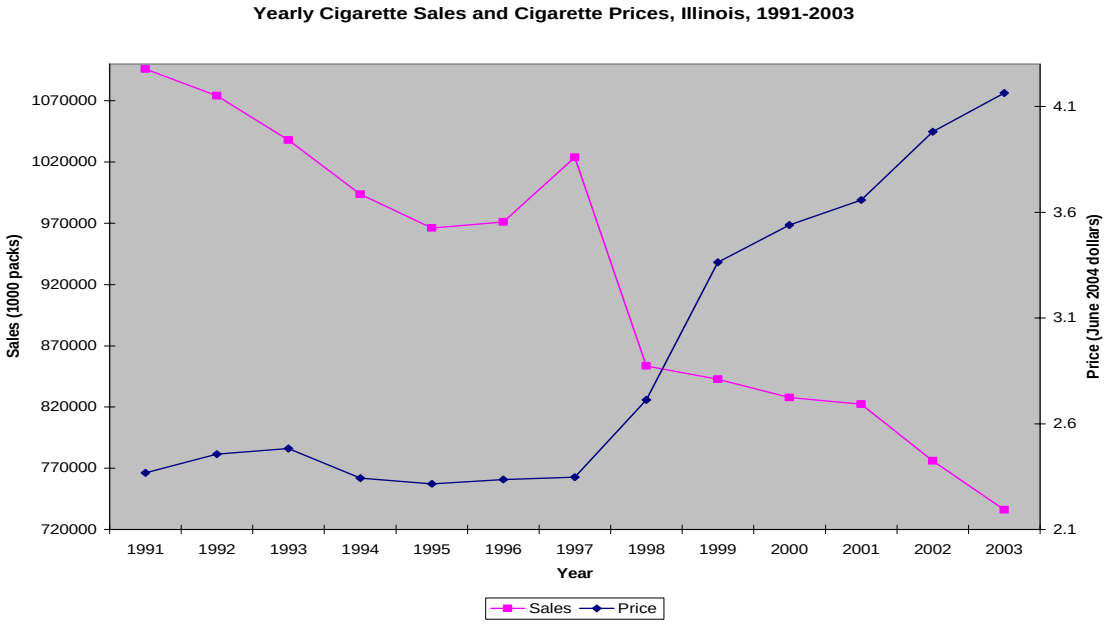
Sources: Monthly cigarette sales data obtained from US Department of Agriculture; monthly cigarette prices based on authors' calculations using price and tax data contained in Orzechowski and Walker, 2004, and industry price data contained in US Department of Agriculture, 2004.

Figure Four



Sources: Monthly cigarette sales data obtained from US Department of Agriculture; monthly cigarette prices based on authors' calculations using price and tax data contained in Orzechowski and Walker, 2004, and industry price data contained in US Department of Agriculture, 2004.

Figure Five



Sources: Monthly cigarette sales data obtained from US Department of Agriculture; monthly cigarette prices based on authors' calculations using price and tax data contained in Orzechowski and Walker, 2004, and industry price data contained in US Department of Agriculture, 2004.

As the monthly sales data are aggregated and the noise associated with differences between the timing of wholesale/retail activity and smokers' consumption decisions is reduced, the relationship between cigarette prices and cigarette consumption becomes clearer. Specifically, these graphs clearly show what has been demonstrated in numerous econometric studies – that increases in the price of cigarettes will result in significant reductions in cigarette smoking. For much of the early 1990s, as inflation-adjusted cigarette prices remained relatively constant in Illinois, cigarette sales in Illinois were falling slowly. This reflected the underlying downward trend in cigarette smoking attributable to increasing social norms against smoking, growing evidence on the health consequences of smoking, and related factors. When prices increased sharply in the late 1990s, in part the result of the 1997 state cigarette excise tax increase and the industry-initiated price increases associated with the 1998 Master Settlement Agreement and settlements of other litigation, cigarette sales in Illinois declined sharply. Similarly, the forty cent cigarette tax increase in July 2002 led to an acceleration in the decline in cigarette sales in Illinois.

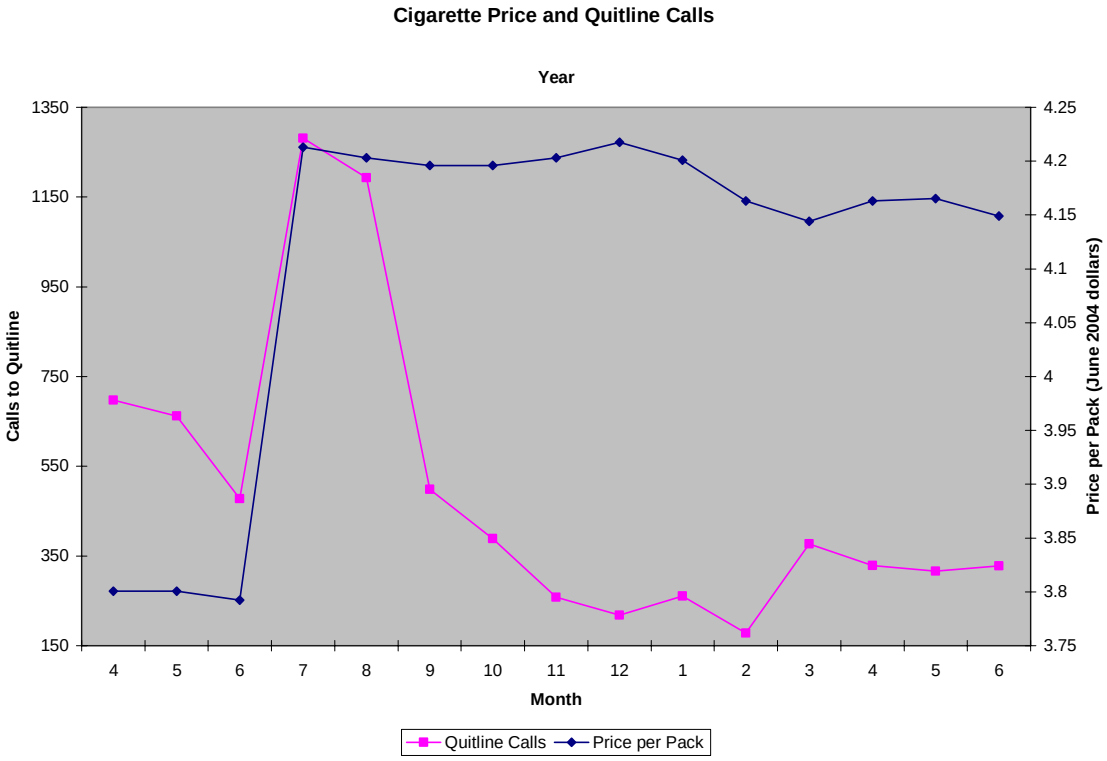
In order to assess the effects of the increase in the state cigarette excise tax on cigarette sales in Illinois, sales for one year prior to the tax increase and for one year after the tax increase were compared. Given the tax avoidance in the month immediately preceding the tax increase and the months shortly after the tax increase that is reflected in the monthly sales data, the last full calendar year prior to the tax increase – 2001 – was compared to the first full calendar year after the tax increase – 2003 (comparisons of other twelve month periods around these periods produced similar conclusions). During this period, inflation adjusted cigarette prices rose by just over seventeen percent, largely due to the forty cent increase in the state cigarette tax, but also the result of an industry initiated price increases and an increase in the federal cigarette excise tax. At the same time, cigarette sales fell by approximately 10.5 percent. This reduction in sales is very consistent with the underlying trend in smoking in Illinois and the elasticity estimates produced by econometric studies of cigarette demand described above. Based on the price elasticity estimates, the over seventeen percent increase in cigarette prices was expected to reduce cigarette consumption by between 4.4 and 8.7 percent. The decline in sales beyond this reflects the underlying downward trend in cigarette consumption in Illinois (one to two percent a year) and the limited, if any, shifting of some sales to neighboring states and other sources (described below).

IV. Cigarette Taxes, Prices, and Smoking Cessation

Part of the reduction in overall cigarette smoking that is caused by increases in cigarette taxes and cigarette prices results from increased smoking cessation among smokers. Estimates from econometric studies of smoking cessation suggest that a ten percent increase in the price of cigarettes increases the number of smokers who try to quit smoking by about ten percent, and results in up to a 3.5 percent increase in the number who successfully quit smoking (Tauras, 2004; Tauras and Chaloupka, 2001).

Monthly data on calls to the Illinois Quitline were used to examine the impact of the July 2002 cigarette excise tax increase on smoking cessation in Illinois. These data are presented graphically in Figure Six.

Figure Six



Sources: Monthly calls to the Illinois Quitline were provided by the Illinois Department of Public Health; monthly cigarette prices based on authors' calculations using price and tax data contained in Orzechowski and Walker, 2004, and industry price data contained in US Department of Agriculture, 2004.

As expected, the significant increase in average cigarette prices in Illinois that followed the forty cent increase in the state cigarette excise taxes generated significant interest in smoking cessation among Illinois smokers. During the three months leading up to the tax increase, the Illinois Quitline averaged just over six hundred calls per month. In the two months immediately following the tax increase, calls to the Quitline were about double this volume – 1,281 in July and 1,193 in August – suggesting that the higher tax prompted a number of smokers to try to quit smoking.

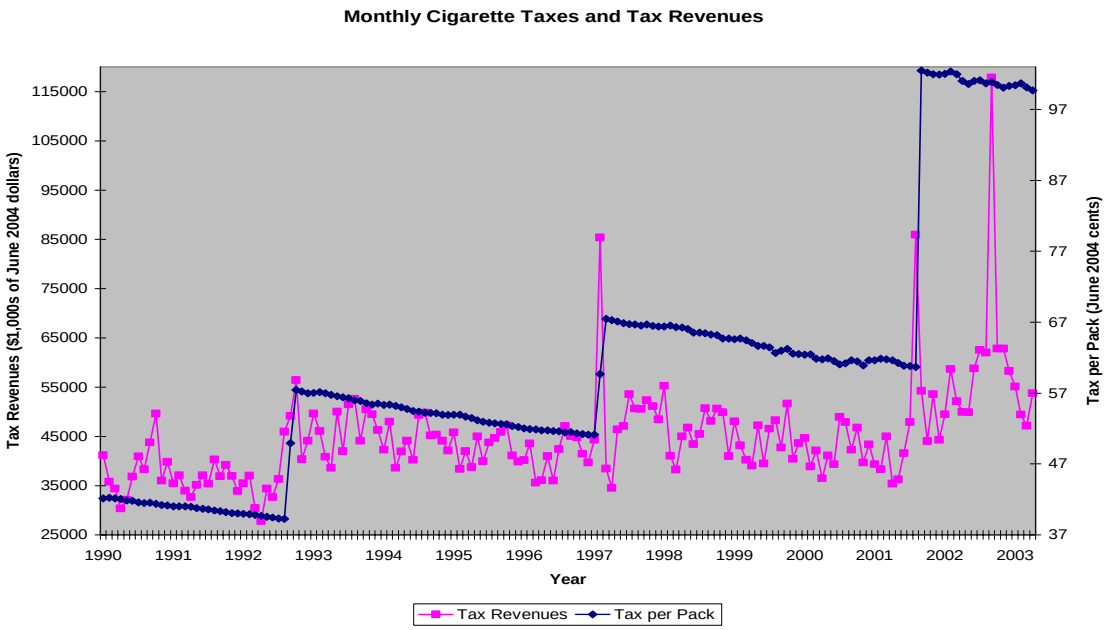
V. Cigarette Taxes and Cigarette Tax Revenues

Historically, the primary rationale for cigarette and other tobacco taxation was to generate revenues. This was in large part due to the relative ease with which these taxes could be administered and because of the relatively inelastic demand for tobacco products. Over time, however, the use of higher cigarette taxes to discourage smoking, particularly among youth, and to improve public health has become increasingly important. Nevertheless, the impact of these taxes on revenues remains an important consideration. This section examines the impact of the July 2002 cigarette tax on

cigarette tax revenues in Illinois, based on the monthly tax paid sales data described above. Estimates of cigarette excise tax revenues are based on the value of the tax each month applied to sales that month.

Figures Seven and Eight graphically illustrate the relationship between the inflation adjusted value of the Illinois cigarette excise tax and the gross revenues it generates, based on monthly and annual cigarette sales.

Figure Seven



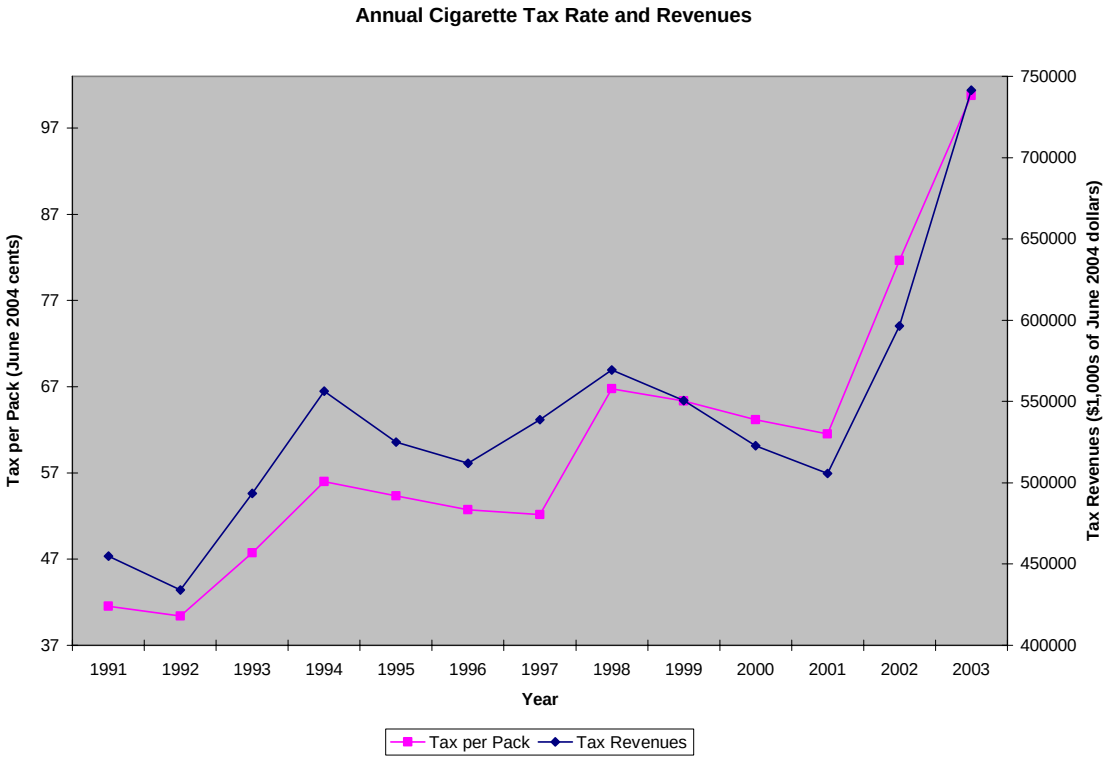
Sources: Monthly cigarette sales data obtained from US Department of Agriculture; monthly cigarette tax revenues are based on monthly sales multiplied by the tax rate.

As expected, both graphs clearly illustrate the very high correlation between the inflation adjusted value of the cigarette excise tax and the monthly revenues that are generated by the tax. As inflation erodes the value of the tax over time, the inflation adjusted value of the revenues it generates falls at about the same rate. When the tax is increased, the revenues it generates increase. The increase in revenues is not proportionate, however, to the increase in the tax rate, given that the price increase caused by the tax increase results in a reduction in cigarette sales.

In addition to changes in the state tax rate, other factors affect the state's cigarette excise tax revenues. Specifically, factors other than state cigarette taxes that result in increased cigarette prices will lead to reductions in state cigarette excise tax revenues. Particularly important during the period covered by these data are the industry-initiated increases in cigarette prices and, to a lesser extent, increases in the federal cigarette excise tax rate. For example, the 14 cent increase in the Illinois cigarette tax in July 1993 (about a 47 percent increase in the tax rate) resulted in an increase in state cigarette excise tax revenues of just over thirty percent. In contrast, the 14 cent increase in the Illinois

cigarette tax in December 1997 (about a 32 percent increase) generated less than a 15 percent increase in cigarette excise tax revenues. The smaller impact of the 1997 tax increase on revenues was caused by the significant industry initiated price increases that took place over the year following the 1997 tax increase which resulted in significant declines in cigarette demand beyond those caused by the tax increase.

Figure Eight



Sources: Annual cigarette sales are based on the monthly sales data obtained from US Department of Agriculture; annual cigarette tax revenues are based on monthly sales multiplied by the tax rate and aggregated to the calendar year.

Consistent with the sharp increase in wholesale cigarette sales activity just prior to the tax increase, cigarette excise tax revenues rise sharply in the month leading up to the tax increase, reflecting the tax avoidance described above. This tax avoidance results in the state failing to collect substantial cigarette excise tax revenues that could be accrued through the type of 'floor tax' used in other states to tax existing, tax paid stocks of cigarettes.

With respect to the July 2002 cigarette excise tax increase, the new revenues generated were consistent with those generated by previous tax increases. Comparing the first full calendar year after the tax increase to the last full calendar year prior to the tax increase, the forty cent increase in the state tax (an almost 69 percent increase), generated an almost 47 percent increase in revenues.

Finally, some have questioned the stability of cigarette excise tax revenues over time. As described above, there are many factors that will influence cigarette sales and,

consequently, the revenues generated by cigarette excise taxes, including federal cigarette taxes and industry-initiated price changes. Nevertheless, cigarette excise tax revenues tend to be a stable source of revenues for most states, including Illinois. Figure Nine illustrates this by graphing the nominal state excise tax rate and semiannual nominal excise tax revenues. As can be clearly seen from this graph, the revenues generated by the tax are very stable in nominal (not inflation adjusted) terms.

Figure Nine

Sources: Semiannual cigarette tax revenues are based on monthly sales multiplied by the tax rate and aggregated semiannual, where the monthly sales data were obtained from the US Department of Agriculture.

VI. Illinois Cigarette Taxes and Prices and Cross Border Cigarette Sales

Some opponents of state cigarette excise tax increases argue that the increased tax will have little impact on cigarette smoking and its consequences and will cost the state significant revenues by simply shifting sales that would have occurred within a state to other outlets, including retail outlets in neighboring states where taxes and prices are lower and to the Internet. While Internet sales have yet to emerge as a significant source of cigarettes, cross-border sales are of particular concern in Illinois, where much of the population lives within a short distance of another state and, after the July 2002 Illinois tax increase, where all neighboring states have lower cigarette excise taxes, as shown Table One. This potential is exacerbated by the city and county cigarette excise taxes imposed in Chicago and Cook County and the large population that resides there.

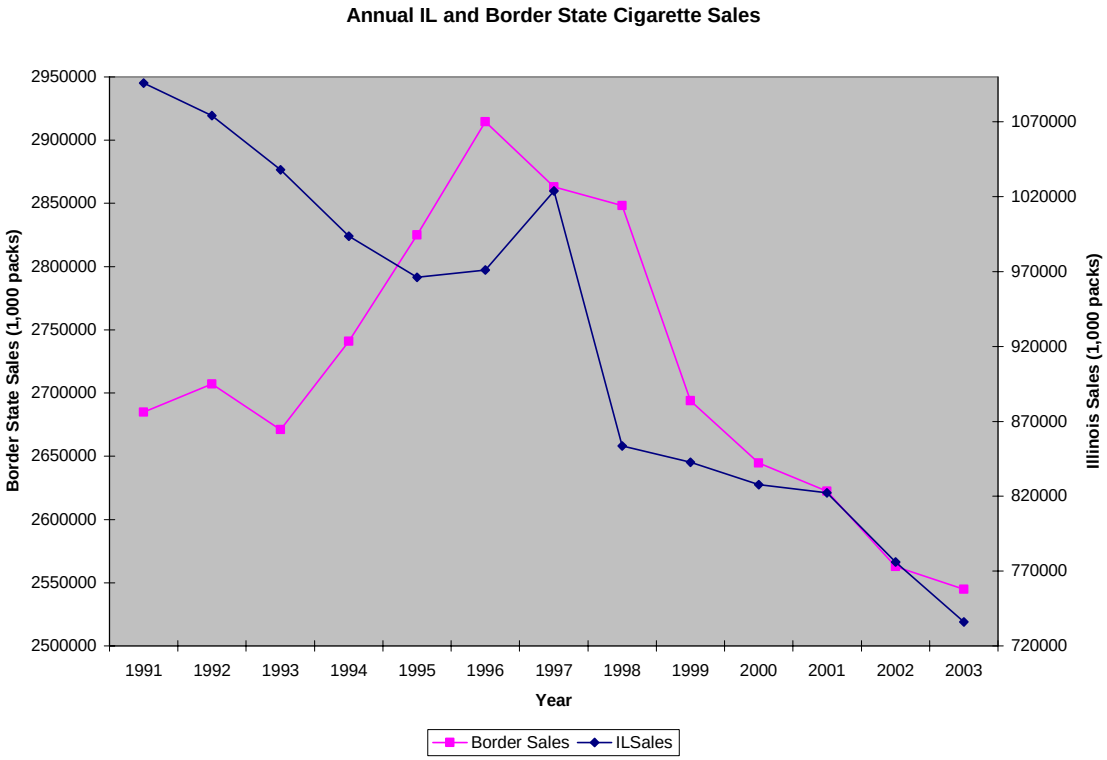
Table One
Cigarette Excise Taxes in States Bordering Illinois

State	Tax, 6/30/02	Tax, 6/30/04
Indiana	15.5	55.5
Iowa	36	36
Kentucky	3	3
Missouri	17	17
Wisconsin	77	77

Note: Taxes are in cents per pack; Indiana's tax increase also took effect on July 1, 2002.

To examine whether or not a significant share of the decline in cigarette sales in Illinois after the July 2002 tax increase was the result of shifting of sales to nearby states, sales in the five bordering states were compared to sales in Illinois. For the past several years, as shown in Figure Ten, sales in bordering states followed the same pattern as sales in Illinois, providing no evidence that the increase in the Illinois cigarette tax led to significant tax avoidance resulting from Illinois smokers buying cigarettes in neighboring lower tax and price states for consumption in Illinois.

Figure Ten



Sources: Annual cigarette sales are based on the monthly sales data obtained from US Department of Agriculture; border states include Indiana, Iowa, Kentucky, Missouri, and Wisconsin.

The data presented in Figure Ten suggest that cross-border purchases of cigarettes by Illinois smokers may have been more of a factor in the mid-1990s. In more recent years,

however, the increases in prices in all states, resulting from sharp industry-initiated price increases and modest federal cigarette tax increases, coupled with the increasing gas prices and other transportation costs, have reduced the incentives for Illinois smokers to purchase cigarettes in other states.

VII. Conclusions

This report provides some descriptive evidence on the impact of the July 2002 forty cent increase in the Illinois cigarette excise tax. As expected, the tax increase was fully passed on to cigarette smokers in Illinois, with the combination of the state tax increase, a modest five cent federal tax increase, and industry initiated price increases accounting for nearly all of the observed change in Illinois cigarette prices between 2001 and 2002. Overall, the tax increase raised average cigarette prices in Illinois by approximately eleven percent. Consistent with economic theory and well over one hundred econometric analyses of cigarette demand, the price increase resulting from the tax increase and other factors led to a significant decline in cigarette sales in Illinois. Overall sales fell by 10.5 percent from calendar year 2001 to calendar year 2003, about what would be expected based on the price elasticity estimates produced in econometric studies of cigarette demand coupled with the underlying downward trend in cigarette smoking in Illinois. This reduction in sales is expected to result from the combination of drop in the numbers of youth taking up smoking and former smokers reinitiating smoking, an increase in the number of smokers who quit smoking, and fewer cigarettes being consumed by continuing smokers. The sharp rise in calls to the Illinois Quitline following the tax increase provides some evidence that the tax increase significantly increased Illinois smokers' interests in cessation. In addition, the steady decline in cigarette sales in neighboring states suggests that there were few, if any, cross-border purchases of cigarettes by Illinois smokers in these states, implying that the observed drop in cigarette sales in Illinois reflects a real decline in overall cigarette consumption in the state. Finally, the tax increase generated a significant increase in cigarette excise tax revenues in Illinois, although tax avoidance by wholesalers and retailers shortly before the tax increase became effective reduced the revenue the state could have obtained.

Further research would be useful in more fully understanding the impact of recent and future increases in state cigarette excise taxes. Given that smoking prevalence changes slowly over time, the accumulation of several years of post-tax increase survey data on youth, young adult, and adult smoking prevalence and cigarette consumption could be used to examine the impact of the tax increase on smoking prevalence, particularly in high-risk populations. Ideally, these survey data would include a longitudinal component that could be used to assess the impact of the tax increase on smoking initiation and cessation. In addition, surveys of continuing smokers would be useful for understanding how their cigarette purchasing and smoking behavior has changed in response to the tax increase, as well as to help in the development of efforts that would support successful cessation by smokers prompted to quit smoking in response to future tax increases.

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Economic Impact of Local Smoke-Free Air Policies on Restaurants

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Introduction

This project discusses and evaluates the economic impact of local smoke-free air policies in Illinois. Data to support this analysis come from archival sources in the Illinois Department of Revenue. These are historical, 1984-1999, data on the economic impact of the imposition of nonsmoking areas in restaurants that came into place largely in the late 1980s (Section 3). These are also more recent, 2000-2003, data that we use to attempt to measure if the phasing in of the Skokie smoking ban and the anticipated imposition of the Wilmette ban on smoking in restaurants are having any economic impact on restaurant revenues in those municipalities (Section 4). Our estimations find that ordinances in the state of Illinois that required no-smoking sections in restaurants are associated with a measurable, statistically significant increase in restaurant revenues for those communities that implemented such regulations. Because neither of the more stringent Skokie and Wilmette 100% smoke-free air laws had been fully implemented at the time this project was undertaken, it is not surprising that we were unable to draw any conclusions from our statistical analysis of those ordinances.

We attempt to compensate for the lack of data on these complete bans of smoking by referencing recent studies of smoking bans in other jurisdictions for which data are available (Section 2). The conclusion reached by these existing studies is that smoke-free air laws, where they have previously been implemented in the U.S., have had no measurable impact on restaurant sales revenues. Estimates of the expected value of the restaurant revenue impact of a ban vary from study to study, but these estimates tend to be slightly greater than zero, indicating relative increases in revenues after ban implementation, with estimation variances indicating that the true value of these impacts could be either positive or negative.

Opponents of strong local smoking restrictions argue that these restrictions will lead to reductions in restaurants revenues, as smokers abandon restaurants in affected communities to take their business to restaurants that don't have smoking restrictions. These predictions are based on the theoretical argument that, if smoking bans were good for the restaurant business, restaurant managers would have already implemented them. These predictions, however, are not borne out by the above-mentioned existing research. We thus start our analysis with a brief discussion of theoretical perspectives on the economic efficiency or inefficiency of smoking bans (Section 1). This discussion explains the indeterminacy of the theoretical arguments in this debate. In other words, it explains how it is possible that a smoking ban could either hurt or help the restaurant industry in any given municipality.

1. Theoretical Perspectives

This report documents the results of our efforts to examine the economic impact of local smoke-free air policies in Illinois that restrict smoking in restaurants. We start off with a discussion of the theoretical debate over such smoking restrictions. In this discussion we attempt to capture the logic of both sides to this debate and to explain the role of scientific research projects, such as this present effort, in addressing this smoke-free-air policy issue.

From what we have seen in our research, the argument most often used for banning smoking in restaurants derives from the public health consequences of second-hand smoke. The idea is that, since asking employees to work in the presence of a toxic gas would normally be considered inappropriate if not illegal (a violation of OSHA laws, for example), why should restaurant employees be forced to work in the presence of tobacco smoke? Similarly, it is seen as appropriate that, just as government regulates the food safety of the restaurant industry it should regulate the safety of the air that customers breath inside restaurants. [1]

A nice articulation of the anti-ban argument is provided by Dwight R. Lee in his 1991 article for the CATO Journal

> "The owner of the restaurant has a strong incentive to assess the resulting benefits and costs associated with smoking in his restaurant and respond appropriately. In some cases, the appropriate response is to prohibit smoking entirely; in other cases, it is to do nothing to prohibit smoking; and in still others, it is to provide smoking and nonsmoking sections. The owner benefits from choosing the response that is best for his restaurant, and the costs of ETS are internalized to him as a residual claimant."[2]

The logic of this argument is that policies over how to regulate Environmental Tobacco Smoke (ETS), to the extent it is a toxin, are best decided and implemented by individual restaurant managers. The idea is that, unlike many situations where resource allocation is complicated by diffuse interests and the need for multiple parties to agree on decisions, in the case of restaurant smoking bans, the restaurant manager has strong and properly aligned incentives to define the socially optimal smoking policy for his or her restaurant. Thus, if the restaurant manager were allowed to decide what his or her restaurant's policy will be, he would be expected to pick the optimal policy. This is because the best policy for all potential patrons and employees, multiplied by the value of each of these potential

[1] The commonly referenced study of the health effects of environmental tobacco smoke (ETS) is, U.S. Environmental Protection Agency, 1992, *Respiratory Health Effects of Passive Smoking: Lung Cancer and Other Disorders*, Publication No. EPA 600/6-90/006F, Washington, D.C., Office of Atmospheric and Indoor Air Programs. Among other effects of ETS, the EPA estimates that it causes or exacerbates and estimated 300,000 cases of respiratory distress, such as asthma, per year in the United States.

[2] From page 158 of Lee, Dwight R., 1991, "Government v. Coase: The case of smoking," Cato Journal, Vol. 11, number 1, Spring/Summer 1991, pp 151-164. The CATO Journal, like the CATO Institute, is commonly thought to support libertarian causes and to oppose what many view as the excessive regulation of the marketplace in the U.S. economy. A presentation of this thesis in a scholarly economics journal can be found in Boyes, William J. and Michael L. Marlow, 1996, *Public Choice*, Vol. 88, pp. 57-67.

patrons and employees to restaurant profitability (in higher revenues or reduced labor costs), should maximize restaurant profitability.

Despite its appeal, there are several reasons why we might not expect the above free-market logic, applied through the economic incentives of the restaurant manager, to fully work in the context of restaurant smoking bans. The first of these reasons is that, in the case of restaurant smoking bans, social norms may play a role in defining restaurant profitability. The logic for this goes back to a classic paper in economic theory by Harvey Leibenstein, written in 1950.[3] This says that, since going to a restaurant is a social activity, norms of behavior will influence the way people react to smoking in restaurants and the impact that an individual restaurant manager's decision to ban smoking may have on restaurant patronage. Just as nobody smokes or even expects to smoke in church, if a norm of no smoking were established in restaurants, it's possible that almost no one would miss not being able to smoke in restaurants. If, however, as now tends to be the case, the norm is to allow for smoking, then politeness implies that we will expect restaurants to allow for smoking. Unless some social movement or organization emerges to change the norm (or anti-smoking preferences are expressed by colleagues, friends, and business associates), the normal consumer will expect restaurants to allow smoking. Furthermore, the possible albeit small consequences of being perceived as inconsiderate or odd for violating a norm may outweigh the patron or employee's preference for smoke-free air.

Another, logic for a marketplace failure comes from a consideration of the nature of restaurant competition in many communities. Although Chicago may have many nonsmoking restaurants even without an ordinance banning restaurant smoking, smaller communities and neighborhoods may have more diffuse marketplaces and will have less competition. In such marketplaces, a choice between beef or fish may outweigh the importance of a smoke-free environment for some nonsmokers. If the choice between fish in a smoke-free restaurant at a nearby location were available, it might be preferred. Given that this option is not available, however, the restaurateur might generate higher profits serving the single smoker whose smoking preference outweighs his food choice in lieu of the many nonsmokers whose preferences for a smoke-free environment are not strong enough to induce any one of them to choose their next best option.[4] Assuming the sum of nonsmoking preferences of the majority for smoke-free air outweighs the stronger pro-smoking preference of the smoking minority, this implies inefficiency.[5] These kinds of inefficiencies can be observed whenever "yes-no" or "discrete" decisions must be made.[6] Restaurant workers, who may face only a small number of employment

[3] Leibenstein, H., 1950, "Bandwagon, snob and Veblen effects in the theory of consumer demand," Quarterly Journal of Economics, Vol. 64, pp. 183-207.

[4] This is an application of the logic of indivisibilities, nicely articulated by Thomas C. Schelling in his book *Choice and Consequence: Perspectives of an errant economist*, 1984, Harvard University Press.

[5] If a community had many smokers whose preference for smoking was very slight and a small number of nonsmokers who would choose their restaurant based on its smoking policy, then it is possible that the inefficiency would go in the other direction.

[6] We use the word discrete as opposed to continuous. The idea is that a "continuous" decision can be refined until it is optimal. An example of a continuous decision is the decision of how much space to

alternatives, can be observed to have similar problems. After all, one supposes that relatively few workers have the option of choosing between a smoke-free versus smoke-permitting employer when they accept table-waiting or bussing jobs.

A third and very standard argument for why the free-market logic may not lead to efficient or profit-maximizing decisions by restaurateurs in their choice of smoking polices comes from the possibility of information failures. This is because, although restaurant managers may receive lots of communication from the national restaurant association or other groups arguing that smoking restrictions will hurt business,[7] they may get almost no feedback from customers. After all, in any community where smoking in restaurants is commonly accepted, complaining to a restaurant manager about other clients' smoking would be abnormal and would indeed appear confrontational. Furthermore, patrons and employees may not be aware of the health consequences of ETS and may not even know what it would be like to eat in a nonsmoking restaurant. After the publicity of a smoke-free air ordinance helps make them more aware of the health consequences of ETS and after having experienced eating in a smoke-free restaurants, the value patrons place on smoke-free air may go up. An increase in employee awareness of hazards of ETS might also reduce their willingness to continue working in smoky restaurants.

Another fundamental and important argument for why the logic of the free-market may not lead to the optimal smoking policy in restaurants, an argument which we have not yet seen applied in this context, comes from the possibility that communities may want to implement smoking bans as a way of "denormalizing" smoking. The idea is that, if smoking in public is commonly observed, then it is more likely to be seen as a reasonable and natural thing to do. Those who wish to discourage smoking, either to protect their children or to promote public health, may thus wish to denormalize it.[8] From this perspective, some of the benefits of a restaurant smoking ban may be observed outside of the effects such a ban has on the restaurant industry.

We see from this above discussion that theory gives us one reason why we would expect restaurant smoking bans to be inefficient and several reasons why they may efficient. In aggregate, theoretical reasoning is thus indeterminate on this point. What evidence could help us resolve the above conflict in theoretical arguments in a way that would help

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allocate to a nonsmoking section in a restaurant. An example of a discrete decision is whether or not a restaurant will be smoke free.

[7] See Dearlove, J.V., S.A. Bialous and S.A. Glantz, 2002, "Tobacco industry manipulation of the hospitality industry to maintain smoking in public places," Tobacco Control, Vol. 11, pp. 94-104. See also Glantz, Stanton A., 1999, "Smoke-free air laws do not affect restaurant business. Period." *Journal of Public Health Management and Practice*, Vol. 5(1), pp. vi-ix.

[8] In the language of economics, we would say that smoking exhibits externalities in consumption. Consumption by one person tends to increase the odds that his peers or fellows in his community may smoke as well. Among numerous denouncements of this "denormalizing" strategy made by "smokers' rights groups, an article by Goldman and Glantz (1998) provides a nice example of denormalization being discussed as a strategy by those associated with tobacco control. [Goldman, Lisa K., Glantz, Stanton A., "Evaluation of Antismoking Advertising Campaigns," Journal of the American Medical Association, Volume 279(10), 11 March 1998, pp 772-777.] This motivation for a smoking ban was mentioned in neither the Skokie nor the Wilmette ordinances.

determine whether or not smoke-free air laws are good policy? It would seem that most of these arguments should be reflected in restaurant revenues.[9] If, following the free-market argument, smoking bans prevent restaurant managers from providing better service to their patrons, then smoking bans should adversely affect restaurant revenues. If, on the other hand, a shift in norms regarding restaurant smoking made the prospect of eating out more attractive, then restaurant revenues would increase after a smoking ban. If current smoking policies suffer from information failures, then a smoking ban could also lead to an increase in restaurant revenues.

The other two theoretical arguments for why current levels of smoking in restaurants may be inefficient, those associated with the limited number of choices that may exist in some communities (an effect that we expect could impose only a small bias in restaurant revenue measures) and the arguments for "denormalizing" smoking, are not well evaluated using restaurant revenues as a measure of efficiency. A test of the validity and/or importance of these arguments would depend on knowing the policy preferences of the public in ways that are independent of restaurant sales. These factors could be measured, for example, using survey analysis of restaurant patrons and the general public.

2. Review of prior empirical work:

Several empirical research papers, written on studies that were conducted to address this debate, have been published.[10] This literature draws on data from two fundamental sources, archival data on the economic impacts of smoke-free air laws, and survey data, taken from both restaurant patrons and restaurant managers. Reference to the first body of work, those papers using archival data on restaurant sales tax receipts and restaurant employment, gives us much evidence, from other communities, on which to form expectations about the likely impact of smoking bans on Illinois restaurant revenues. The previous work based on informational surveys of restaurant patrons and managers, can be used to supplement these analyses of archival data. Unfortunately, the survey work does not, however, address either the denormalization and "limited choice" arguments. The exploration and evaluation of those arguments will thus need to be left for future research.

2.1 Prior work using archival data

Published studies done to measure the impact of restaurant smoking bans on restaurant sales receipts have been done for the state of Massachusetts (Bartosch and Pope, 1999, this is a nicely done study and 2002),[11] for California and Colorado (Glanz and Smith,

[9] Another effect that would not be captured by a comparison of restaurant revenues is the cost to restaurant managers of responding to a policy change. This would consist primarily of the costs of facilities modification. An assessment of these costs, which actually tend to be quite small, is provided by Crémieux and Ouellette (2001).

[10] See Scollo et al. (2003) for an extensive survey. [M Scollo, A Lal, A Hyland, S Glantz, "Review of the quality of studies on the economic effects of smoke-free policies on the hospitality industry," *Tobacco Control*, Vol. 12:13–20]

[11] William J. Bartosch and Gregory C. Pope, 1999, "The economic effect of smoke-free restaurant policies on restaurant business in Massachusetts" Journal of Public Health Management Practice, Vol. 99, pp. 53-

1994a and 1994b),[12] for New York City (Hyland, et al., 1999),[13] for North Carolina (Goldstein and Sobel, 1998),[14] for Flagstaff, Arizona (Sciacca and Ratliff, 1998),[15] and for West Lake Hills, Texas (Huang, P., et al., 1995).[16]

None of these studies find any systematic negative impact of 100% smoking bans on restaurant revenues.[17] They find that, at the level of the community, the relative performance of restaurant revenues in municipalities that implement smoking bans, as compared to control municipalities, tends to be unaffected or to slightly increase following the imposition of these bans. Our favorites of these, for reasons of the data and methodologies used, are the two studies by Bartosch and Pope (1999,2002), reviewing the Massachusetts experience. Using a sample of 239 Massachusetts cities and towns with 32 of these adopting smoke-free restaurant regulations, Bartosch and Pope estimate that the effect of smoking restrictions on restaurant sales growth was small and positive, but not "statistically significant." Restricting their analysis to only restaurants that served alcohol, a restriction that reduced their sample to a pool of 79 communities,[18] yielded similar results of a slightly higher growth rate at the mean for restaurant sales in smoke-

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62., This nicely done study uses panel-data analysis techniques to investigate the impact on restaurant revenues of smoke-free air laws enacted in 35 Massachusetts communities over the 4 years from 1992 through 1995. It finds point estimates of the impact of these laws that are greater than zero but not statistically significant. The 2002 follow-up study using 3 more years of data, confirmed their 1999 result. W J Bartosch and G C Pope, 2002, "Economic effect of restaurant smoking restrictions on restaurant business in Massachusetts, 1992 to 1998," Tobacco Control, Vol. 11, pp. ii38-ii42.

[12] (Glantz and Smith, "The Effect of Ordinances Requiring Smoke-Free Restaurants and Bars Revenues: A Followup," *American Journal of Public Health*, 87(10):1687-1693, October 1997.) and Glantz and Smith, "The Effect of Ordinances Requiring Smokefree Restaurants on Restaurant Sales," *American Journal of Public Health* 1994; 84:1081-1085

[13] [Andrew Hyland, K. Michael Cummings, and Eric Nauenberg, 1999, "Analysis of taxable sales receipts: was New York City's smoke-free air act bad for restaurant business?" Journal of Public Health Management Practice, Vol. 99, pp. 14-21. Study aggregates the 5 NYC counties which did a ban, with 2 more upstate and compares them with the rest, which did not do a ban. Finds a positive but not significant jump in restaurant sales for the counties that did implement a ban.]

[14] [Goldstein, A. and R. Sobel, 1998, "Environmental tobacco smoke regulations have not hurt restaurant sales in North Carolina," North Carolina Medical Journal, Vol. 59, pp 284-287.]

[15] (Sciacca, J. and M. Ratliff, 1998, "Prohibiting Smoking in Restaurants: Effects on Restaurant Sales," *American Journal of Health Promotion*, Vol. 12, pp. 176-184.)

[16] Huang P, Tobias S, Kohout S, et al., 1995, "Assessment of the impact of a 100% smoke-free ordinances on restaurant sales - West Lake Hills, Texas, 1992-1994," *Morbidity and Mortality Weekly Reports*, Vol. 44, pp. 370–372.

[17] Glantz and Smith (1994) compare 15 pairs of cities, each pair consisting of one city that passed a smoke-free restaurants law and another, otherwise comparable, that didn't. They find a statistically significant increase in sales relative to the comparison city for one city that went smoke-free and one that did not go smoke free. These are the only comparison results that show up as statistically significant in the literature. Since, 15 comparisons were made, as Glantz and Smith explain, the laws of probability in statistical sampling indicate that at least one or two of these comparisons should have shown up as statistically significant even without any underlying phenomenon. Thus, as their pooled (panel data) rather than paired analysis shows, their results should be properly interpreted as showing no measurable impact of the ordinances on restaurant sales that can be interpreted, with any confidence, as being either positive or negative.

[18] This is because, for reasons of confidentiality, the state would provide tax revenue data only for those communities in which more than 10 restaurants would be included in the pool of reporting establishments.

free communities relative to control communities, but no statistically significant measurable difference between treatment and control.

2.2 Prior work using surveys

As for the above analysis of tax data, many studies have also been done that use survey data to try to estimate the reactions of restaurant patrons and managers more directly. An advantage of the above research, which used objective tax revenue data as a basis for analysis, is that the data are more reliable. They are less likely to be influenced by respondent bias, respondent prejudice, or bias in the wording of a survey questionnaire. One reason to conduct survey-based studies, despite these potential biases that may exist in survey data, is that survey data allow the researcher to present specific questions to respondents. This allows for finer interpretation and richer insight into the effects of smoke-free air laws. It may also allow for finer analysis of the alternatives available in smoke-free air legislation and of the distribution of impacts from that legislation.

We are aware of only five surveys of restaurant patrons and the general public, attempting to assess reactions to restaurant smoking bans, that have been published in peer-reviewed academic journals.[19] These are Biener and Fitzgerald (1999), Biener and Siegel (1997), Corsun et al. (1996), Hyland and Cummings (1999a), and Wakefield et al. (1999). All of these studies focused on predicting the revenue impact of a smoking ban on the restaurant business and on identifying the demographics and smoking status of potential restaurant patrons who said they would either increase or decrease their restaurant patronage. Additional issues addressed by these studies are the extent to which smoking bans are enforced or violated (Corsun et al., 1996, and Hyland and Cummings, 1999a) and the motivations consumers have for avoiding smoky restaurants (various). The general conclusion reached by these studies is that smoking bans, although they may reduce the restaurant patronage of smokers, will tend to increase the restaurant patronage of nonsmokers. All of these studies predict that the aggregate effect of a smoking ban will be either negligible or positive for the restaurant industry.

As for surveys of restaurant managers, of the six articles we are aware of that have been published in peer-reviewed journals, we were able to obtain copies of only four. These are Dunham and Marlow (2000), Hyland and Cummings (1999b), Crémieux and Ouellette (2000), and Jones et al. (1999, extent to which restaurateurs respond to drive for voluntary smoking restrictions and their attitudes toward mandatory restrictions). The first of these (Dunham and Marlow, 2000) uses data from a survey of restaurant managers that had been conducted by the National Restaurant Association to test what is essentially the free-market hypothesis that we cited at the beginning of this report. They aggregate survey respondents into two categories, those from states that have restaurant smoking laws and those from states that don't. Then, using a chi-square test, they fail to reject the hypothesis that the mean percentage of restaurant floor space allocated to no-smoking sections aggregated across all "with-law" states is different than the mean percentage of floor space allocated to no-smoking sections aggregated across all without-law states. They further find that states with fewer smokers are more likely to have laws that require no-smoking sections than other states. Since the authors of this study do not

[19] We found reference to these in Scollo et al. (2003).

link their study to a comparative assessment of restaurant industry performance, it is unclear what their failure to observe much differentiation in restaurant square footage allocated to no-smoking sections implies for the literature. Although their result could be interpreted as supporting the free-market perspective of theory, it does not seem to help resolve the above-described ambiguity of theoretical implications for policy.

The Hyland and Cummings study (1999b), assesses changes in restaurant profitability, both inside and outside New York City, during and shortly after the imposition of the New York City smoking ban. They see no significant difference in restaurant profitability trends across communities. Of note, the Hyland and Cummings survey also finds a significant level of New York City restaurant managers reporting that they do not comply with ordinance requirements to keep their restaurants smoke-free. Crémieux and Ouellette (2000), interestingly, use their survey data to address questions that cannot be observed in the restaurant revenues data commonly available from archival sources. These are, the preferences of restaurateurs for smoke-free ordinances that allow for the construction of separately ventilated smoking areas and the approximate cost of the facility modifications thereby required. They find that the 65% of restaurant owners in the province of Quebec preferred a law allowing them to build closed separately ventilated smoking areas within their restaurants rather than an outright ban on smoking in restaurants.[20] They also found that, although restaurateurs anticipated that the costs of infrastructure modifications to implement such separate smoking areas would equal 0.41% of the typical restaurant's annual revenues, the costs of those who had implemented such modifications were reported to be, on average at the median, only 0.15% of the same annual revenue number. These authors thus expect that restaurant managers may substantially overestimate the costs of the facility modifications necessary to provide separately ventilated smoking sections.

Jones et al (1999) use data from a survey of restaurateurs in Adelaide, Australia to assess the effect of voluntary program, supported by the local hospitality industry, labor unions, and representatives of the public health community, was effective in changing the norms of restaurant practice. They find that, despite broad publicity, this program designed to change smoking norms in area restaurants had almost no measurable effect. Indeed, of the 267 restaurateurs surveyed, they found that only 15.1% used the suggested policy as a guide for designing the no-smoking policy in their restaurant and, of these, only 50% were in compliance with said guidelines.

3. Measurement of the impact of ordinances requiring no-smoking sections in Illinois municipalities.

The objective of this study is to attempt to measure, using data available from archival sources, the economic impact of local smoke-free air policies in Illinois. The policy changes that are most of interest are, of course, the bans that have been enacted in the Villages of Skokie and Wilmette. Section 4 of this report is devoted to an analysis of those policies. We devote this section to the analysis of prior restaurant smoking regulations that have been enacted in Illinois. These are the municipal ordinances, mostly

[20] Based on responses provided by 401 randomly selected restaurants.

enacted in the second half of the 1980s, that required the establishment of nonsmoking sections in Illinois restaurants.

To do this analysis, we obtained data on restaurant revenue by municipality from the Freedom of Information Office of the Illinois Department of Revenue. These data are reported on an annual basis from 1984 through 1999.[21] The statistics we analyze are an aggregation of three 4-digit SIC codes that is referred to as sales tax collections from Drinking and Eating Places, and a reporting of total sales tax receipts by municipality.[22] The revenue totals from Drinking and Eating Places correlate closely with total restaurant revenue by municipality whereas the total sales numbers provide a good measure of total economic activity or "GDP" by municipality. That category of tax revenues for which we compare these two quantities is the municipal tax, which remains at a constant 1% ratio to total reported sales revenues throughout the 1984-1999 period.

This above data give us series, by municipality, that approximate gross restaurant revenue by municipality and total economic activity by municipality. Although the series we have for Drinking and Eating Places includes all Illinois municipalities with May 2004 populations of over 25,000 persons as well as all northeastern Illinois municipalities with populations above 20,000, limitations in the staff time we had available for data entry forced us to restrict our coding of total economic activity data to only those communities, above 20,000 in population, that are in northeastern Illinois.[23] Of these communities, because some municipalities had relatively small populations in the early years of our sample, and thus exhibit unstable restaurant revenue and total revenue trends, we deleted the series for the municipalities of Bartlet, Buffalo Grove, Grayslake, Home Glen, Lake in the Hills, Plainfield, Roselle, and St. Charles.

[21] The data are available in an annually published Illinois Department of Revenue document entitled, Report of Sales Tax Receipts by Standard Industrial Classification. The year 1984 is the first year for which these data at are available at the municipal level. Data for more recent years is available, but most of the variation in policy for the imposition of nonsmoking sections occurred in the 1980s and 90s. The more recent data is also available on a quarterly basis.

[22] The "Eating and Drinking Places" category combines revenues reported under SIC 5812 (Eating Places), SIC 5813 (Drinking Places) and SIC 7011 (Hotels and Motels). For the years 2000-2003 we were able to obtain reports of sales tax revenues attributable only to SIC 5812. Comparing the ratio of reported revenues for the combined "Eating and Drinking Places" category to those from SIC 5812, across six communities showed that the ratio of SIC 5812 revenues to combined revenues tends to be very constant.

Table 2: Combined "Drinking and Eating Places" Category Divided by SIC 5812 Total, for 6 Municipalities, 2000-2003

	2000	2001	2002	2003
Evanston	1.01	1.01	1.03	1.03
Glenview	1.08	1.10	1.09	1.07
Morton Grove	1.10	1.10	1.10	1.10
Oak Park	1.00	1.00	1.00	1.00
Skokie	1.09	1.09	1.08	1.08
Wilmette	1.00	1.00	1.00	1.00

[23] We define northeastern Illinois as Cook, DuPage, Kane, Lake, and Will counties.

Data on the regulation of smoking in Illinois restaurants by municipality came from 2000 through 2003 databases provided to our project by the Americans for Nonsmokers Rights Foundation (ANRF). These ANRF data were then crosschecked and supplemented by reference to the original ordinances for these regulations, as provided to us by the Illinois Department of Public Health.

Table 1: Illinois Ordinances Requiring Nonsmoking Sections

	Enact-ment Date		Min No-Smoke Area
Arlington Heights	Feb-89		0%
Champaign	Jul-01		0%
Chicago	Jul-97	*	30%
DeKalb	Aug-88		50%
Des Plaines	Mar-88	**	30%
Downers Grove	Dec-79		50%
Elgin	Jun-89		50%
Elmhurst	Feb-96		20%
Evanston	Apr-88		20%
Highland Park	Apr-79		0%
Hoffman Estates	May-88		0%
Northbrook	Nov-77		0%
Oak Park	Mar-89		25%
Orland Park	Sep-88		0%
Park Ridge	Sep-89		0%
Rockford	Oct-88		0%
Schaumburg	Aug-86		0%
Skokie	Jun-87	***	?%
Urbana	Jan-76		0%
Wilmette	Dec-88	***	?%

*Prior ordinance may have existed.
**Ordinance updated in 89 but no change in required seating percentage.
***Uncertain of required seating percentage; ordinance updated in 2003.

The empirical strategy was as follows. If restaurateurs choose the revenue maximizing smoking policy for their restaurants, then the imposition of regulations mandating that nonsmoking sections be provided in restaurants should either reduce restaurant revenues, if such regulations alter behavior, or leave them unchanged, if such regulations are redundant to existing restaurant policies. If restaurant revenues are increased by the imposition of restrictions, this implies either that restaurateurs were not choosing sufficiently strict smoke-free air policies to suit their patrons' tastes or that the change in smoke-free air policy had sufficient influence on the norms of smoking in restaurants as to make eating out more desirable for patrons.

To test whether or not restaurant revenue was affected by changes in policy, we used panel data analysis on above-described data for municipalities in the 5 counties of northeastern Illinois. With the notable exception of Rockford and DeKalb (the Champaign and Urbana ordinances pre and post-dated the study period), most of the policies that had been enacted during the 1984 through 1999 timeframe were enacted within this area of the state. The panel-data technique assumes that different communities might have different unobserved characteristics, which make them act differently. This is accounted for by allowing for each community to have a fixed effect, or shift parameter, that allows for this cross-community variation. The key assumption is that this difference between communities remains fixed, or unchanging, during the time-frame of the analysis. Thus, for example, whatever makes Chicago different from Evanston, in the way restaurant revenues in each of these communities might respond to policy shifts, is assumed to continue to differentiate these two communities in the same way throughout the 1984 through 1999 period. Our application of panel data analysis also allows for the possibility of shifts in the general relationship between restaurant revenues and our "predictors" of restaurant revenues that occur across time. This is done by introducing a shift or time dummy for each year of data in the analysis.[24]

Applying these techniques, we estimate three different models that attempt to capture the influence of restaurant smoking regulation policy on restaurant revenues. The first of these predicts the natural logarithm (LN) of restaurant revenues for each municipality at each year as a function of the LN of total revenues for that municipality less restaurant revenues and a dummy variable that was set to 1 for each year (or a fraction of 1 for a fractional year) that a restaurant smoking ordinance was in place.

$$\ln(rest\ rev)_{i,t} = \alpha + \beta_1 \ln(total\ rev - rest\ rev)_{i,t} + \beta_2 Pol_{i,t} + \varepsilon_{i,t}$$

We use logs in this equation to even out the influence of variations in sales levels across the communities included in our data. Had we not done this, variations in sales levels for larger communities would have drowned out the variations occurring in smaller communities, and we would thereby have reduced the statistical power of our test.[25] The results of this estimation are presented below. Note that the value of the coefficient of the variable representing policy in this estimation is positive. Furthermore, assuming the estimation equation used is a valid one, the true value of this coefficient is estimated to be greater than zero with 90% confidence (just under 95% confidence). The estimation says that, controlling for changes in the overall level of economic activity across communities, the adoption of restaurant smoking ordinances was associated with slightly over a 4% increase in restaurant and hospitality sales, on average, across these five Illinois counties. As one would expect, we also see a strong relationship between the level of overall economic activity excluding hospitality and hospitality revenues. A 10% increase in the former, all else equal, is associated with almost a 4.4% increase in the latter.

[24] We do this by subtracting the mean from all left-hand and right-hand side variable, except the policy dummies, that are used in the analyses.

[25] Without taking logs, there would have be heteroskedasticity, across municipalities, in the error term of this estimation.

```
Fixed-effects (within) regression               Number of obs      =      1200
Group variable (i): muni                        Number of groups   =        75

R-sq:  within  = 0.3158                         Obs per group: min =        16
       between = 0.8464                                        avg =      16.0
       overall = 0.8165                                        max =        16

                                                F(2,1123)          =    259.11
corr(u_i, Xb)  = 0.7412                         Prob > F           =    0.0000

------------------------------------------------------------------------------
       ln_rr |      Coef.   Std. Err.      t    P>|t|     [95% Conf. Interval]
-------------+----------------------------------------------------------------
       ln_tr |   .4369442   .0191953    22.76   0.000     .3992816    .4746068
         pol |   .0435172   .0225938     1.93   0.054    -.0008135     .087848
       _cons |  -.0047666   .0047266    -1.01   0.313    -.0140405    .0045073
-------------+----------------------------------------------------------------
     sigma_u |  .51402615
     sigma_e |   .1394966
         rho |  .93140457   (fraction of variance due to u_i)
------------------------------------------------------------------------------
F test that all u_i=0:     F(74, 1123) =    97.87            Prob > F = 0.0000
```

The second model we estimated predicts the ratio of restaurant sales to total economic activity in a community as a function of whether or not the community has a restaurant smoking policy. Results of this estimation show an impact of these restaurant smoking policies that is positive and statistically significant at the 99% confidence level.

```
Fixed-effects (within) regression               Number of obs      =      1200
Group variable (i): muni                        Number of groups   =        75

R-sq:  within  = 0.0110                         Obs per group: min =        16
       between = 0.0072                                        avg =      16.0
       overall = 0.0013                                        max =        16

                                                F(1,1124)          =     12.49
corr(u_i, Xb)  = -0.1269                        Prob > F           =    0.0004

------------------------------------------------------------------------------
         rat |      Coef.   Std. Err.      t    P>|t|     [95% Conf. Interval]
-------------+----------------------------------------------------------------
         pol |   .0090654   .0025655     3.53   0.000     .0040316    .0140992
       _cons |   -.000993   .0005378    -1.85   0.065    -.0020481    .0000622
-------------+----------------------------------------------------------------
     sigma_u |  .03231754
     sigma_e |  .01588286
         rho |  .80545421   (fraction of variance due to u_i)
------------------------------------------------------------------------------
F test that all u_i=0:     F(74, 1124) =    65.18            Prob > F = 0.0000
```

Clearly, when one reviews the results from both of these estimations, the question to ask is whether or not this apparent strong association says anything about causality. Did the municipal ordinances enacted in northeastern Illinois that required restaurants to implement and maintain nonsmoking sections lead to a vitalization of the restaurant industry in those communities, relative to those communities that did not impose ordinances? There are various possibilities. One possibility is that, yes, this is exactly what happened. Perhaps the attention to nonsmokers' rights that these ordinances may

have brought about lead to an invigoration of the restaurant industry in enacting communities that was not shared by this industry in communities that did not enact. This effect could also have worked through the above-described process of changing smoking norms in a way that made dining out more attractive to those who prefer to avoid breathing tobacco smoke.

Another possibility is that there is some other variable that influences both the probability that a municipality will enact a restaurant ordinance and either the rate of growth of restaurant sales (in a positive way) or the rate of growth in economic activity (in a negative way). This could be, for example, an activist community development agenda, in the former case, or the fact that dynamically growing communities might not get around to issues such as restaurant smoking ordinances, in the later case. Clearly, one does not know if the effect is real, or if it would go away once data on other, potential confounding, variables were made available.

To test for the robustness of these effects, we estimated one additional model of these relationships. This third model takes into account not just the existence of an ordinance, but also the required percentage of nonsmoking seating required. A value of .5 is given to the policy dummy for a municipality that has a regulatory ordinance in place. We then add .5 times the percentage of the floor space area required to be nonsmoking to determine the total value of the policy dummy. Results of this test were similar to those of the first model, but slightly less statistical significance.

```
Fixed-effects (within) regression               Number of obs      =      1200
Group variable (i): muni                        Number of groups   =        75

R-sq:  within  = 0.3155                         Obs per group: min =        16
       between = 0.8466                                        avg =      16.0
       overall = 0.8167                                        max =        16

                                                F(2,1123)          =    258.85
corr(u_i, Xb)  = 0.7418                         Prob > F           =    0.0000

------------------------------------------------------------------------------
       ln_rr |      Coef.   Std. Err.      t    P>|t|     [95% Conf. Interval]
-------------+----------------------------------------------------------------
       ln_tr |   .4370183   .0192071    22.75   0.000     .3993325    .4747041
       h_pol |   .0695011   .0379792     1.83   0.068     -.005017    .1440193
       _cons |  -.0044573   .0047068    -0.95   0.344    -.0136925    .0047778
-------------+----------------------------------------------------------------
     sigma_u |  .51415315
     sigma_e |  .13951895
         rho |  .93141567   (fraction of variance due to u_i)
------------------------------------------------------------------------------
F test that all u_i=0:     F(74, 1123) =    97.74            Prob > F = 0.0000
```

To our knowledge, this is the first study that has attempted to evaluate the association between the imposition of no-smoking sections and restaurant industry performance. Our results show that, in the State of Illinois, there was a strong association between the imposition of nonsmoking sections and increases in the relative performance of the restaurant industry in affected communities. Since we expect this is the first study examining this issue, we suggest that our results should be viewed with caution.

Verification of this result in other states and the careful checking of the potential impact of omitted variables in this analysis would support stronger conclusions of whether of not causality exists in this relationship.

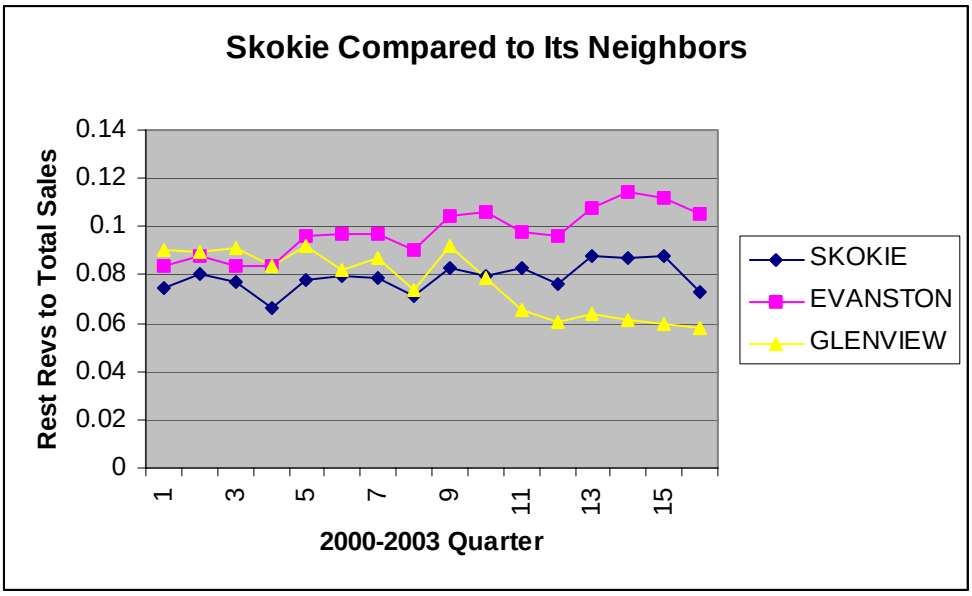
4. Attempts to measure the impact of recent restaurant smoking bans

This last section of our analysis reviews quarterly data that were made available to us from the Illinois Department of Revenue on Illinois restaurant revenues by municipality for the years 2000 through 2003.[26] We use these data to test whether or not the recent enactment of a restaurant smoking ban in the Villages of Skokie and Wilmette had any discernable impact on the aggregate performance of the restaurant industries of those municipalities.[27]

Since the latest data we have for this analysis are for the fourth calendar quarter of 2003, we suffer from a lack of data with which to perform this analysis. The Skokie ordinance, although enacted on 7 July 2003, was phased in its implementation. The non-bar seating areas of restaurants, and restaurants without bar sections, were required to comply with the ordinance immediately. The bar areas of restaurants were, however, not required to come into compliance with the Skokie ordinance until 7 July 2004. The Wilmette ordinance, although passed in late 2003, did not go into effect until July 1, 2004, a full 6 months beyond the time span of our data.

To provide the reader with what we have in the way of data for this analysis, we have prepared the following two charts. The first compares the Village of Skokie to two of its more important neighboring communities – communities which might interchange restaurant patrons with the village of Skokie. These are the communities of Evanston and Glenview, both of which, in addition to being close to Skokie, are comparable to Skokie in size and ethnic composition.

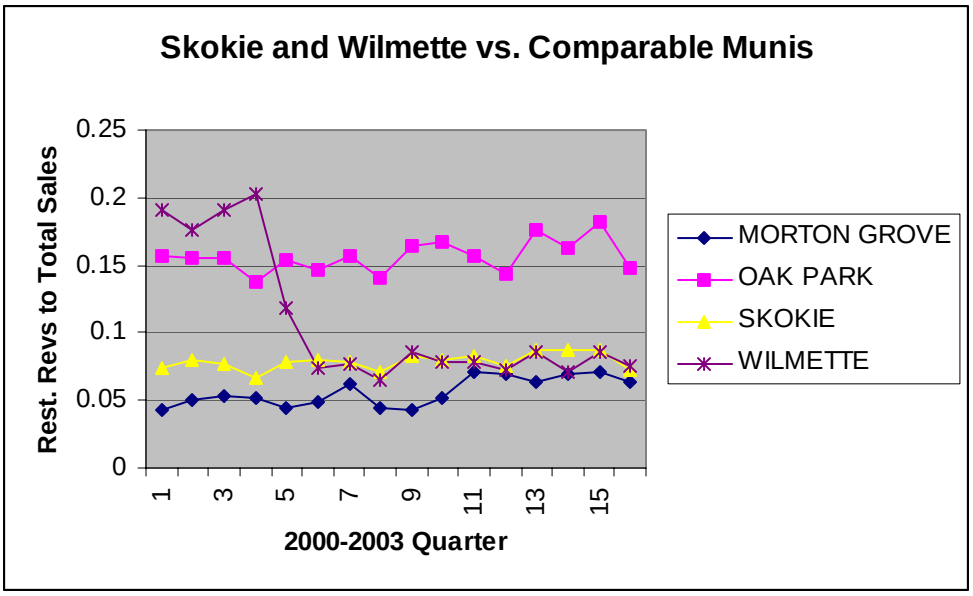
[26] This covers 119 Illinois municipalities including all northeastern municipalities with May 2004 populations over 20,000 and other Illinois municipalities with May 2004 populations over 25,000.
[27] A summary of these two ordinances is provided in the Appendix.



What we see in this graph is perhaps a slight upward trend in the proportion of total economic activity attributable to the restaurant industry in Evanston. We also observe a recent decline in restaurant activity in Glenview and an approximately constant ratio for Skokie. Skokie and Evanston both seem to have some consistent seasonal variation in restaurant activity, with both normally experiencing lower sales in their fourth quarters. In looking for significant evidence of a impact from the Skokie smoking ban, we would be looking to see something like a change in the Skokie trend, so that it started an upward climb, like that of Evanston, or a downward adjustment as seems to be observable for Glenview. We see no such change for Skokie, occurring in response to or in anticipation of its smoke-free air ordinance.

Our second chart compares Skokie and Wilmette to comparison communities that are removed from them geographically, but are otherwise comparable. These are the villages of Morton Grove and Oak Park. We see that Oak Park, like Skokie, experiences a regular seasonal variation in restaurant revenue performance. We also see that the restaurant industry in Wilmette suffered a dramatic decline during the first half of 2001. The comparison gives us no reason to expect that the 2003 and 2004 smoking bans had a major impact on the Skokie and Wilmette restaurant industries relative to these comparison communities.[28]

[28] These two graphs that are here displayed were the only two graphs generated for comparison. We did no "shopping around" for comparison communities intended to make any specific points.



To augment this above graphical analysis, we have designed a statistical analysis that more formally compares trends to see if affects of the Skokie and Wilmette bans can be identified. Since the bans occurred only recently, we have designed this analysis with an eye toward identifying possible revenue effects that might anticipate the implementation of the Skokie and Wilmette ordinances. To do this, we used an estimation approach traditional to time-series and forecasting analysis, with lags and leads of the policy variable, that is appropriate for estimating the timing as well as magnitude of policy effects.

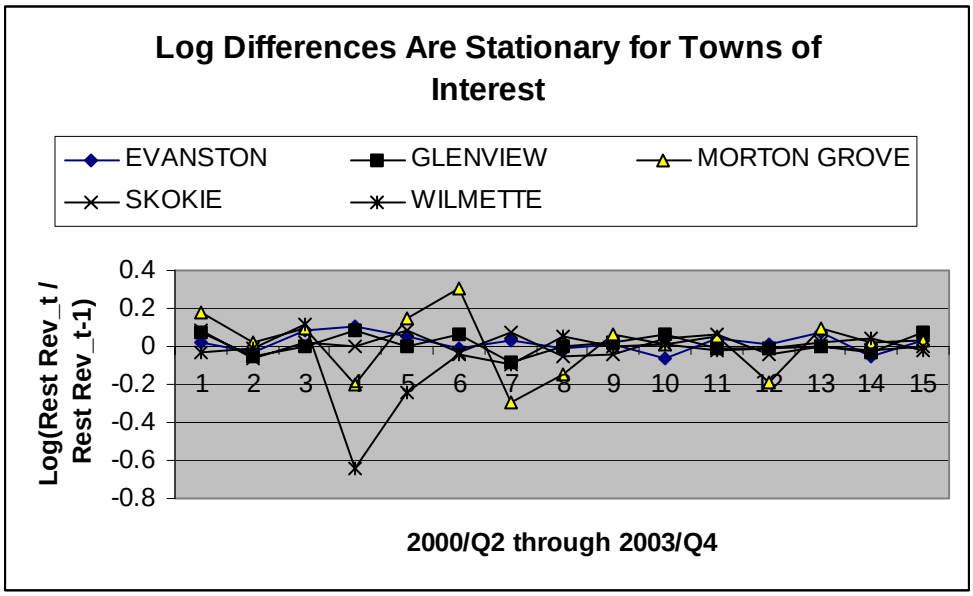
The first model we estimated was the following:

$$\ln\left(\frac{rest\ rev_{i,t}}{rest\ rev_{i,t-1}}\right) = \alpha + \beta_1 Del\_Pol_{i,t-1} + \beta_2 Del\_Pol_{i,t} + \beta_3 Del\_Pol_{i,t+1} + \beta_4 Del\_Pol_{i,t+2} + \beta_5 Del\_Pol_{i,t+3} + \varepsilon_{i,t}$$

The log of the ratio of restaurant revenues for community *i* at time *t* versus the lag of these revenues is simple the difference in logs, $\ln(rest\ rev)_{i,t} - \ln(rest\ rev)_{i,t-1}$. Thus, this model estimates the percent change in the growth rate of restaurant revenues, measured as quarter-to-quarter ratio, attributable to anticipation of a policy change three quarters in advance (the only place the Wilmette policy will show up), two quarters in advance, and so on, up to the one-quarter lag of the policy change.

As shown on the below diagram, after applying time dummies, the ratio of log differences that is here being estimated is a stationary variable. Thus, implying that this analysis, although suffering from a lack of variation in policy, is at least theoretically appropriate. We implemented this estimation using the standard panel-data techniques of

controlling for fixed effects and providing for time dummies by subtracting the means from the right-hand side log of the revenue ratio.



Results of the analysis are as follows

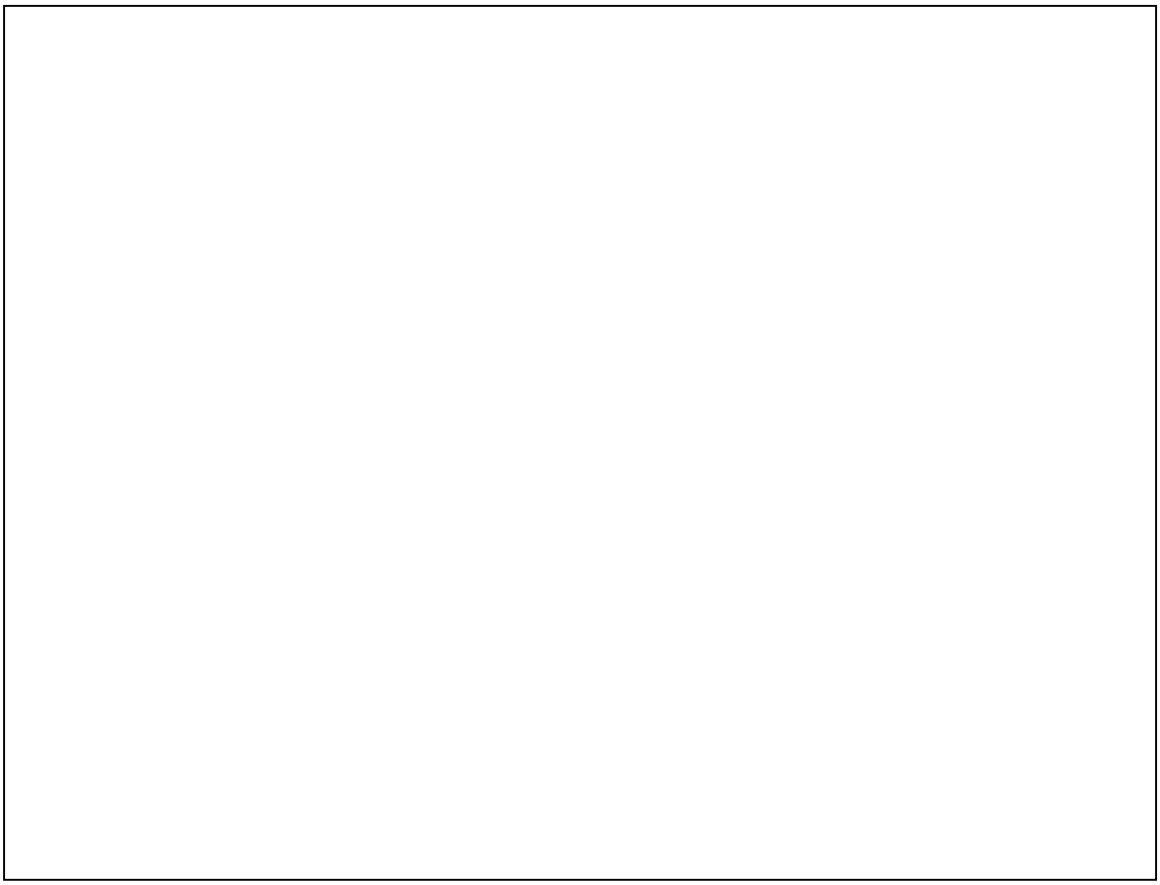
```
Fixed-effects (within) regression               Number of obs      =      1785
Group variable (i): muni                        Number of groups   =       119

R-sq:  within  = 0.0007                         Obs per group: min =        15
       between = 0.0411                                        avg =      15.0
       overall = 0.0003                                        max =        15

                                                F(5,1661)          =      0.24
corr(u_i, Xb)  = -0.0582                        Prob > F           =    0.9426

------------------------------------------------------------------------------
      lograt |      Coef.   Std. Err.      t    P>|t|     [95% Conf. Interval]
-------------+----------------------------------------------------------------
      l1_pol |  -.0163559   .0930696    -0.18   0.861    -.1989021    .1661902
         pol |  -.0394461   .0930696    -0.42   0.672    -.2219923       .1431
      f1_pol |  -.0160702   .0930696    -0.17   0.863    -.1986164     .166476
      f2_pol |  -.0598309   .0930696    -0.64   0.520    -.2423771    .1227153
      f3_pol |   .0481263   .0655131     0.73   0.463    -.0803706    .1766232
       _cons |   .0000199   .0021098     0.01   0.992    -.0041182    .0041579
-------------+----------------------------------------------------------------
    sigma_u |  .01638426
    sigma_e |  .08892477
        rho |  .03283294   (fraction of variance due to u_i)
------------------------------------------------------------------------------
F test that all u_i=0:     F(118, 1661) =     0.51                 Prob > F = 1.0000

. test l1_pol + pol + f1_pol + f2_pol + f3_pol = 0

 ( 1)  l1_pol + pol + f1_pol + f2_pol + f3_pol = 0

       F(  1,  1661) =    0.14
            Prob > F =    0.7117
```

As one would expect, the F-test at the bottom of this table shows that, even when all leads and lags are combined, the effect of the policy variables on restaurant revenues was far from being statistically significant. Relative to their absolute magnitudes, the variances on these policy coefficients are enormous. Thus, the most that can be said of these trends is that the interpretation of such trends will be an interesting phenomenon to look for once more data are available for analysis.

We made a second attempt at this analysis using data for only 10 northeastern Illinois municipalities. These were Berwyn, Cicero, Des Plaines, Evanston, Glenview, Morton Grove, Oak Park, Skokie, Streamwood, and Wilmette. These communities were selected as being appropriate comparison communities for Skokie and Wilmette. In this analysis, we used the same techniques borrowed from time-series analysis applied to a model that controls for overall economic activity by community. The equation we estimated, including time dummies and fixed effects that we omit from our notation, was

$$\left(\frac{rest\ rev}{tot\ rev}\right)_{i,t} - \left(\frac{rest\ rev}{tot\ rev_{i,t-1}}\right)_{i,t-1} = \alpha + \beta_1 Del\_Pol_{i,t-1} + \beta_2 Del\_Pol_{i,t} + \beta_3 Del\_Pol_{i,t+1} + \beta_4 Del\_Pol_{i,t+2} + \beta_5 Del\_Pol_{i,t+3} + \varepsilon_{i,t}$$

Results of this estimation, again finding no statistically significant coefficients, are below.



```
Fixed-effects (within) regression               Number of obs      =       150
Group variable (i): municip                     Number of groups   =        10

R-sq:  within  = 0.0036                         Obs per group: min =        15
       between = 0.1954                                        avg =      15.0
       overall = 0.0019                                        max =        15

                                                F(5,135)           =      0.10
corr(u_i, Xb)  = -0.0715                        Prob > F           =    0.9923

------------------------------------------------------------------------------
     del_rat |      Coef.   Std. Err.      t    P>|t|     [95% Conf. Interval]
-------------+----------------------------------------------------------------
      l1_pol |  -.0056852   .0118041    -0.48   0.631    -.0290301    .0176597
         pol |  -.0038197   .0118041    -0.32   0.747    -.0271646    .0195252
      f1_pol |   .0000665   .0118041     0.01   0.996    -.0232784    .0234114
      f2_pol |   .0032253   .0118041     0.27   0.785    -.0201196    .0265702
      f3_pol |   .0018348   .0083091     0.22   0.826     -.014598    .0182676
       _cons |    .000017   .0009466     0.02   0.986    -.0018551     .001889
-------------+----------------------------------------------------------------
     sigma_u |  .00263675
     sigma_e |  .01127841
         rho |  .05182413   (fraction of variance due to u_i)
------------------------------------------------------------------------------
F test that all u_i=0:     F(9, 135) =     0.80              Prob > F = 0.6159

. test l1_pol + pol + f1_pol + f2_pol + f3_pol = 0

 ( 1)  l1_pol + pol + f1_pol + f2_pol + f3_pol = 0

       F(  1,   135) =    0.02
            Prob > F =    0.8789
```

Once again, this analysis gives us only very small estimation coefficients with relatively larger variances and results that are almost neutral to zero in terms of statistical significance. Clearly, there is not yet enough archival data available for an analysis of the effects of these recent smoking ordinances. Small coefficients with smaller variances, would lead us to argue that the observed effect seems to be neutral. What we see here however, are small coefficients with larger variances.

5. Conclusions

Although evidence is accumulating that the public health benefits of restaurant smoking bans are unambiguous, economic theory does not give us any clear predictions for whether or not such bans will help or hurt local restaurant industries. This study was conducted to help shed light on this issue as it applies to the State of Illinois. Will the restaurant industry be disproportionately impacted by public health regulations that extend workplace-smoking restrictions to restaurants?

Opponents of restaurant smoking bans say that it should be up to restaurant owners and managers to decide on these policies. The logic for this is that, if the public prefers smoke-free restaurants, then restaurant owners will want to provide them. Proponents of restaurant smoking bans argue that restaurant employees, not just clientele, should be given consideration and that the restaurant industry seems to be misinformed or perhaps even mislead about the revenue impact of prohibiting smoking. These proponents of

regulation use historical data to show that bans do not seem to have had much if any effect on local restaurant industries.

We argue that one important reason why revenues may not be affected by smoking bans is that bans may work to change norms. Once norms are changed, customer expectations change in ways that can actually help the restaurant industry. This desire to change norms also provides additional rationale for why public health advocates would want to restrict restaurant smoking. Benefits may accrue not just directly, through reduced workplace and leisure exposure, but indirectly, through reduced uptake of the habit as it becomes less frequently observed in public. Despite our interest in this argument, in the conduct of this study, we restrict our attention our attention to the restaurant industry and the measurement of the revenue impacts of smoking regulation on this industry.

Our review of the existing literature on the impact of smoking bans to the restaurant industry shows us that these bans seem not to have any measurable impact. Studies done for the New York City ban, various bans in California and Colorado, bans in North Carolina, and numerous bans in Massachusetts have all failed to find any significant impacts. Surveys of restaurant owners have shown that estimates of the expected cost of compliance with clean-air restrictions tend to be overly pessimistic and that much of the lost business that owners like to attribute to smoking regulation could be attributable to normal business fluctuations that are typical in this difficult and volatile industry.

Using the extensive data that is available from the State of Illinois for an assessment of the impact of municipal ordinances mandating no-smoking sections, we find that these regulations are indeed associated with statistically significant increases in restaurant industry performance. Our first point estimate of the impact of mandated, as opposed to voluntary, no-smoking sections on an affected local Illinois restaurant industry predicts a mean increase over 4% in annual revenues. Ours is the first study that we are aware of that focuses on no-smoking sections as opposed to outright smoking bans. We hypothesize that result may be largely driven by the effect no-smoking sections have had on smoking norms – influencing smokers to be more considerate and circumspect about smoking in public.

Our analysis of the Skokie and Wilmette smoking bans is inconclusive. The Wilmette ban was not implemented until after the data collection for this study had been completed. Only two quarters of post-ban data were available for Skokie and, because of the phasing in of compliance requirement for that ban, these two quarters of data reflect only partial implementation. What we see in this data is no noticeable departure from existing trends.

Because of the relatively small number of communities available for study, we suggest that future research on the impact of these complete bans on smoking in Illinois make use of consumer and perhaps restaurateur surveys. This would allow for analysis at the level of the individual consumer and restaurant, and would give more scope for comparison and statistical analysis. Future studies of revenue impacts of these bans would also benefit from more quarters of revenue data, allowing these studies to look at post-implementation in addition to pre-implementation impacts.

Appendix:

Ordinances:

Village of Skokie, ordinance number 03-7-C-3188, "An ordinance amending Article III, Chapter 54, of the Skokie Village Code prohibiting smoking in workplaces and public places."

Smoking is prohibited in all public places **except** bars, private residences, retail tobacco stores, bowling alleys (except smoking is prohibited in bowling alleys when minors are invited to attend without parent or guardian), hotel and motel rooms designated as smoking, restaurants and other conference or meeting rooms when they are being used for private functions, private or semi-private rooms in nursing homes (if all are smokers), outdoor areas, in theatrical productions, and in the **bar areas of restaurants under the following conditions:**

a) Rest must have a physical bar where alcoholic beverages are consumed for immediate consumption
b) Bar is separated from nonsmoking areas by a floor-to-ceiling solid wall that doesn't let smoke pass, with closed entrances
c) Separate ventilation
d) No client needs to pass through smoking area (such as to enter restaurant)
e) No more than 50% of restaurant's total public floor space
f) Phase: Must comply with the physical barrier and separate ventilation for a smoking area in a bar by July 7, 2004.
g) No minors allowed in designating smoking areas.

Village of Wilmette: ORDINANCE NO. 2003-O-75, modifying Municipal Code, Chapter 12, Section 23**. Ordinance goes into full force on July 1, 2004.**
Ordinance says that no smoking is permitted in any enclosed public place or enclosed place of employment except tobacco dealers.

Public Policies, Tobacco Programs, and Cigarette Smoking in Illinois

John A. Tauras
Frank, J. Chaloupka
Fritz Laux

Introduction

Cigarette smoking continues to be the single most preventable cause of death and disability in the United States (US), responsible for more than 400,000 premature deaths each year (Centers for Disease Control and Prevention (CDC), 2002). Currently, more than one in five Americans continues to smoke in the face of such detrimental health consequences. A goal of a major health initiative, Healthy People 2010, is to reduce smoking prevalence among adults to 12 percent by the year 2010 and to reduce youth prevalence to 16% within the same timeframe.

In the state of Illinois, approximately 22.8% of the population smoked cigarettes in 2002 (CDC, 2004). This represents a 3.39% (0.8 percentage point) decline in smoking prevalence in the state of Illinois over the past decade. While some progress has been made in curtailing cigarette smoking in Illinois, much more progress must be made to reach the Healthy People 2010 goal.

Numerous studies have concluded that tobacco control policies are effective in reducing cigarette smoking, including the significant increases in cigarette taxes and prices in recent years (Chaloupka in press), stronger state and local restrictions on cigarette smoking (Fitchenberg and Glantz 2002), and the growth of comprehensive state tobacco control programs (Farrelly, Pechacek, and Chaloupka 2003 and Tauras et al., in press).

To our knowledge, no previous peer reviewed study has examined the impact of local level tobacco control policies and programs on smoking prevalence and average consumption of cigarettes among both adolescents and adults in the state of Illinois. This report is an attempt to fill that void.

Methods

Survey Data

The data for this study were extracted from the Illinois 2002 Youth Tobacco Survey (IYTS) and the Illinois 2003 Adult Tobacco Survey (IATS).

Illinois 2002 Youth Tobacco Survey

The purpose of the IYTS was to collect information on tobacco use, attitudes toward tobacco, and general tobacco knowledge among high school (grades 9-12) and middle

school (grades 6-8) students statewide. Specially trained field staff administered a paper and pencil questionnaire to selected high school and middle school students between April 12 and May 31, 2002. Student participation was voluntary and respondents were assured of confidentiality.

Data on each individual's monthly cigarette usage were used to construct two alternative dependent variables: prevalence of cigarette smoking and average monthly cigarette consumption among smokers. Prevalence of cigarette use was a dichotomous indicator equal to one for youths who indicated that they smoked cigarettes in the 30 days before the survey; and otherwise, equal to zero. The second dependent variable was a continuous measure of monthly cigarette consumption among smokers. This variable was constructed by multiplying the number of days cigarettes were smoked during the 30 days prior to the administration of the survey by the average number of cigarettes smoked on days smoked during the 30 days prior to the survey. 7.8% of the middle school students and 26.3% of the high school students that were sampled were current smokers. Among current smokers, middle school students smoked an average of 74.54 cigarettes per month and high school students smoked 130.75 cigarettes per month.

Variables that were used to control for other factors thought likely to affect cigarette demand included: the age of the respondent in years; gender (male and female–reference category); separate indicators for school grade with twelfth grade as the reference category; and indicators of race/ethnicity (Black, Hispanic, Asian, Native American, Native Hawaiian or other Pacific Islander, and White–reference category).

As numerous studies of cigarette demand have described, differences in cigarette prices across states may be important determinants of demand, particularly for individuals residing within close proximity of a state with lower cigarette prices. To account for this, we created separate dichotomous indicators for respondents whose school was located within 25 miles of Kentucky, Indiana, Missouri, and Iowa – states that had lower average cigarette prices than Illinois during the second quarter of 2002.

We also created several dichotomous indicators for students who participated in school and community programs designed to discourage tobacco use including: a dichotomous indicator for students who were taught about the dangers of either tobacco or more specifically, cigarettes and chewing tobacco, in the classroom during the current academic year; a dichotomous indicator for students who practiced saying "no to tobacco" in the classroom during the current academic year; and a dichotomous indicator for students who participated in community activities to discourage tobacco use.

In addition, we created several variables that capture individual students' exposure to antismoking advertising during the 30 days prior to the survey being administered including: the number of commercials on TV, radio, and internet that discuss the dangers of smoking; the number of commercials on TV encouraging not smoking; the number of commercials on radio encouraging not smoking; and the number of billboards with antismoking messages observed. The response alternatives and their coded values for each of the exposure variables were not in the past 30 days (0), one to three times in the

past 30 days (2), 1-3 times per week (8), daily or almost daily (25), and more than once a day (60).

Using city identifiers, local level tobacco control policies were merged with the survey data. The local level policies were obtained from the Illinois Department of Public Health (IDPH) and appended with information from the American for Nonsmokers' Rights Foundation (ANR). The tobacco control policy variables include: a dichotomous indicator for cities that restrict tobacco vending machines to adult only locations; a dichotomous indicator for cities that make youth possession of tobacco unlawful; a dichotomous indicator for cities that impose a penalty for sale of tobacco to minors; a dichotomous indicator for cities that require tobacco vendors to obtain a license; a dichotomous indicator for cities that require lock out devices on vending machines; a dichotomous indicator for cities that prohibit free tobacco sampling; and a dichotomous indicator for cities that prohibit smoking within 100 feet of any educational or recreational facility for youth under 18 years of age.

Finally we merged information on school tobacco education programs and a community tobacco program with the survey data. Using school identifiers, we merged with the surveys a dichotomous indicator if the student attended a school in which either the Not On Tobacco or Smoke Free – That's Me! tobacco education programs were held during the first quarter of 2002. We also merged with the survey data a dichotomous indicator if the Freedom From Smoking cessation support program was being conducted in the respondent's city of residence during the first quarter of 2002.

Illinois 2003 Adult Tobacco Survey

The purpose of the IATS was to collect information on adult tobacco use, knowledge about tobacco, and attitudes toward tobacco among adults living in Illinois. The IATS was a computer assisted telephone interview survey. The survey was conducted between May - August 2003 and the sample was randomly drawn from a list of residential telephone numbers throughout the state.

Data on each individual's monthly cigarette usage were used to construct two alternative dependent variables: prevalence of cigarette smoking and average monthly cigarette consumption among smokers. Prevalence of cigarette use was a dichotomous indicator equal to one for adults who indicated that they smoked at least 100 cigarettes in their lifetime and currently smoke either everyday or smoke day and otherwise, equal to zero. The second dependent variable was a continuous measure of monthly cigarette consumption among smokers. For everyday smokers, this variable was constructed by multiplying the average number of cigarette smoked per day by 30. For some day smokers, this variable was constructed by multiplying the average number of cigarette smoked per day on days smoked by the number of days cigarettes were smoked during the 30 days prior to the survey. 17.57% of adults that were sampled were current smokers. Current smokers averaged 444.34 cigarettes per month.

Variables that were used to control for other factors thought likely to affect cigarette demand included: the age of the respondent in years; gender (male and female–reference category); indicators of race/ethnicity (Black, Asian, Native American, Native Hawaiian or other Pacific Islander, and White–reference category); indicators of marital status (married, divorced, widowed, separated, living as a couple, and single – reference category); indicator of whether or not the individual graduated from college; and respondent's household income. Given the sensitive nature of the question, approximately 19% of the respondents did not provide income information. So as not to lose nearly 1/5th of our sample, the missing income values were imputed using the predictions from observations that did not have missing data. Moreover, we created a dichotomous indicator equal to one for individuals who work in an environment in which the employer banned smoking in all work places and/or all public areas and is equal to zero for individuals who do not work or who work but the employer does not ban smoking in either all work places or all public areas.

To account for access to less expensive cigarettes, we created separate dichotomous indicators for respondents who resided within 25 miles of Kentucky, Indiana, Missouri, Wisconsin, and Iowa - adjacent states that had lower average cigarette prices than Illinois during 2003.

Using city identifiers, local level smoke-free air laws were merged with the survey data[29]. The smoke-free air laws were obtained from the American for Nonsmokers' Rights Foundation (ANR). We created a dichotomous indicator for individuals who resided in cities that restricted smoking in both private and public worksites. We interacted that variable with individual who were employed, so that only employed individuals could be affected by the policies. Moreover, to account for the magnitude of additional smoke free air laws, we created a smoke-free air index. The index is derived by summing up separate dichotomous indicators for smoking restrictions in restaurants, theaters, bowling alleys, retail stores, food stores, public transit facilities, bingo halls, daycare centers, and multi dwelling units.[30]

Finally, we merged information on community programs aimed to promote quitting. Using county identifiers, we merged with the surveys a dichotomous indicator for individuals who resided in counties in which programs aimed to aid smoking cessation were taking place and advertised on either TV, radio, newspaper, billboards, or other media avenues during the second quarter 2003. The following programs were included in the creation of the indicator: Freedom From Smoking, Illinois Tobacco QuitLine, Cook County Quitnet, Make Yours a Fresh Start Family, Quit Smoking, and Break the Habit Smoking Cessation Program.

[29] In 1990, The Illinois General Assembly passed the Illinois Clean Indoor Air Act (ICIAA). The ICIAA contains a preemption clause which prevents the majority of Illinois communities from passing stronger smoke free air laws. However, the ICIAA grandfathered in less than two dozen communities with existing ordinances in place at the time the state law was passed – these municipalities are allowed to pass stronger ordinances.

[30] An attempt was made to include separate indicators for each restriction, but the results were severely confounded by multicollinearity.

Statistical Methods

Given the limited nature of the dependent variables, ordinary least squares techniques are not appropriate. Instead, we employ a model developed by Cragg (1971) to estimate a two-part model of cigarette demand. In the first step, we used probit methods to estimate a cigarette smoking prevalence equation. In the second step, we used ordinary least squares methods to estimate average daily cigarette smoking by smokers, where the dependent variable is the natural logarithm of the continuous monthly consumption measure. Both equations employed a robust method of calculating the variance covariance matrix developed by Huber (1967).

Results - ***Illinois 2002 Youth Tobacco Survey***

Two sets of models were estimated. The first set examined the impact of local level tobacco control policies on smoking prevalence (Table 1) and average smoking (Table 2). The second set examined the impact of school and community tobacco education programs and exposure to anti-smoking advertising on smoking prevalence (Table 3) and average smoking (Table 4).

For the set that examined the local level policies, we estimated eight alternative models for both smoking prevalence and average smoking by smokers. The first model for each dependent variable contained estimates from a model specification that included indicators for cities that: require tobacco vendors to obtain a license; make youth possession of tobacco unlawful; restrict tobacco vending machines to adult only locations; impose a penalty for sale of tobacco to minors; require lock out devices on vending machines; prohibit smoking within 100 feet of any educational or recreational facility for youth under 18 years of age; and prohibit free tobacco sampling. In addition the first model also includes separate dichotomous indicators for schools that are located within 25 miles of a lower cigarette price state and several demographic factors including: age, gender indicators, grade indicators, and race/ethnicity indicators. The models estimated in columns 2 through 8 are identical to model 1, except models 2 through 8 include at most one tobacco control policy. These models are specifically designed to decrease the collinearity associated with including highly correlated local level policies.

For the set that examined school and community tobacco education programs and exposure to anti-smoking advertising, we estimated nine alternative models for both smoking prevalence and average smoking by smokers. The first model for each dependent variable contained estimates from a model specification that included an indicator for students who were taught about the dangers of tobacco in the classroom during the academic year, separate dichotomous indicators for schools that are located within 25 miles of a lower cigarette price state, and several demographic factors including: age, gender indicators, grade indicators, and race/ethnicity indicators. The models estimated in columns 2 through 9 are identical to model 1, except models 2, 3, 4, 5, 6, 7, 8, and 9 replaced the indicator for students who were taught about the dangers of tobacco in the classroom with the following variables, respectively: indicator reflecting

students who practiced saying "no to tobacco" in the classroom; students who attended schools in which either the Not On Tobacco or Smoke Free – That's Me! Programs were held; Students who participated in community activities to discourage tobacco use; students who lived in communities where the Freedom From Smoking cessation program was being conducted; exposure to commercials on dangers of smoking; exposure to antismoking billboards; exposure to TV commercials encouraging no smoking; and exposure to radio commercials encouraging no smoking. The models are designed to decrease the collinearity associated with including highly correlated school and community program activities.

Tobacco control policy results

When all the tobacco control policies were included simultaneously in a single model, only the policies that make youth possession of tobacco unlawful and allow vending machine sales of tobacco products to take place solely in adult facilities were found to have a negative and significant impact on smoking propensity of middle and high school students in Illinois. However, as discussed above, these models likely suffer from multicollinearity. A high degree of collinearity among the explanatory variables will generally result in unstable coefficient estimates and disproportionately large standard errors of the regression coefficients. The impact of such multicollinearity is to accept the null hypothesis that the coefficient is not significantly different from zero when in fact the associated variable is indeed important in explaining some of the variation in smoking.

When the tobacco control policies are included in the models one at a time, not only were the policies reflecting youth possession of tobacco being unlawful and vending machine sales in adult only facilities found to have an negative and significant impact on smoking prevalence, but tobacco licensing policies and penalties for sales to minors were found to have a negative and significant impact on smoking prevalence. While vending machine lock-out policies, policies that prohibit smoking near youth facilities, and policies that prohibit free sampling were also found to have a negative impact on smoking prevalence, they were not statistically different from zero at conventional significance levels.

When all the tobacco control policies were included simultaneously in a single model, none of the policies were found to be statistically significant predictors of average smoking by middle and high school smokers in Illinois. These results are likely affected by collinearity. When the policies are included one at a time, licensing requirements and prohibitions on distribution of free tobacco samples are found to have a negative and significant impact on average consumption among smokers.

Tobacco education programs and exposure to anti-smoking advertising results

Students who were taught about the dangers of tobacco, or taught about just the dangers of cigarettes and chewing tobacco, in the classroom during the 2002 academic year were significantly less likely to smoke and smoke significantly less on average than individuals who were not taught about the dangers of smoking in the classroom. None of the other

tobacco education programs had a statistically significant impact on smoking propensity or intensity at conventional levels.

Somewhat unexpected, all four measures of anti-smoking advertising exposure were found to be positively related to smoking prevalence among middle and high school students in Illinois. These anomalous results likely stem from smokers being more aware of anti-smoking messages and paying more attention to anti-smoking messages than non smokers. No significant results are found between anti-smoking advertising exposure and the number of cigarettes smoked on average by smokers.

Other Results

Individuals that attend schools that are 25 miles or less from the Kentucky border are significantly more likely to smoke and smoke more on average than individuals who do not attend school that close to Kentucky. Since the price difference for cigarettes between Illinois and Kentucky is the largest among any of the adjacent states, this finding supports the notion that cigarette prices are important determinants of adolescent demand. A somewhat unexpected result in a majority of the models estimated was that students who attend schools that are 25 miles or less from the Indiana border were found less likely to smoke than were individuals who did not attend school that close to Indiana.

With respect to individual characteristics, holding all other covariates constant, students who were older were more likely to smoke and smoke more on average than their younger counterparts. Males were less likely to smoke than their female counterparts. Asians and African Americans were less likely to smoke whereas Hispanics were more likely to smoke than were their white counterparts. Conditional on being a smoker, African Americans and Hispanic smokers were found to smoke less on average than their white counterparts.

Results - *Illinois 2003 Adult Tobacco Survey*

We estimated six alternative models for both smoking prevalence and average smoking by smokers. The adult prevalence equations can be found in Table 5 with the corresponding average smoking by adult smoker equations found in Table 6. The first model for each dependent variable contained estimates from a model specification that included the following variables: employer smoking ban, smoke-free air index, community cessation programs, separate dichotomous indicators for cities that are located within 25 miles of a lower cigarette price state, and several demographic factors including: age, gender indicators, race/ethnicity indicators, marital status indicators, income, and college education indicator. Model 2 is identical to model 1, except model 2 replaces the employer smoking ban with the interacted city workplace restriction law. Models 3 and 4 are identical to models 1 and 2, respectively, except models 3 and 4 are estimated only for individuals who are employed. Similarly, models 5 and 6 are identical to models 1 and 2, respectively, except models 5 and 6 are estimated for individuals who work indoors most of the time.

Employer smoking bans were found to have a negative and significant impact on average smoking among adult smokers in all the models that were estimated. As was expected, the magnitude of the impact increased as the risk pool was narrowed to only workers and then again to workers who worked mainly indoors. Employer smoking bans were also found to have a negative impact on smoking prevalence among individuals who were employed and employed and worked mainly indoors. Similar to the average smoking results, the magnitude of the impact on smoking prevalence increased as the risk pool was narrowed to only workers and then again to workers who worked mainly indoors. These estimates clearly indicate that workplace smoking bans are an effective means to reduce both the propensity and intensity with which adult smokers smoke. The estimates also suggest that the effectiveness of workplace smoking bans increases the greater the amount of time spent in the jurisdiction of the ban.

City worksite restrictions are found to have a negative and significant impact on average smoking when all adults enter the risk pool, however, the city worksite restriction fails to meet conventional significance levels when the risk pool is narrowed to employed individuals and employed individuals that mainly work inside. Moreover, while the city worksite restrictions were found to have a negative impact on smoking prevalence in all the equations, the coefficients fail to come close to conventional significance levels in any of the models. The somewhat disappointing city worksite results are not surprising given that it is likely that a relatively large fraction of the employed individuals work in different towns than they reside.

Both the clean indoor air index and the county smoking cessation program variables were found to be insignificant determinants of adult smoking prevalence and average consumption. The insignificant clean indoor air results could likely be a result of adults spending small amounts of time in the restricted areas covered by the index and having a plethora of options in nearby cities that are not covered by the bans. Given our lack of knowledge on whether or not individuals attended any of the cessation programs and whether or not they were even aware that the cessation programs existed, it is not surprising that we found insignificant results for these programs.

Adult smokers residing within 25 miles of the Kentucky border were found to smoke more on average than individuals not living that close to Kentucky. Since the price difference for cigarettes between Illinois and Kentucky is the largest among any of the adjacent states, this finding supports the notion that cigarette prices are important determinants of average smoking among adult smokers. The results for individuals residing within 25 miles of other states were generally found to be insignificant.

With respect to demographic and socio-economic variables, holding all other covariates constant, age and smoking propensity were found to have a negative and significant relationship, whereas, age and average smoking among smokers were found to have a positive relationship. African Americans were found to have significantly lower smoking prevalence rates than whites in all the equations that were estimated, and individuals of other races were found to have significantly lower prevalence and intensity rates than Whites in all the equations that were estimated.

Divorced individuals were significantly more likely to smoke than single individuals, and individuals living as couple (not married) were more likely to smoke and smoke more frequently than single individuals in all the equations that were estimated. Adult males are more likely to smoke and smoke more on average than their female counterparts.

Finally college educated individuals are less likely to smoke and smoke fewer cigarettes on average than do individuals who have less education. Moreover, individuals with higher family incomes are less likely to smoke than are individuals with lower family incomes. These results suggest that smoking is an economically inferior behavior among adults in the state of Illinois.

Conclusion

This chapter employed the Illinois 2002 Youth Tobacco Survey and the Illinois 2003 Adult Tobacco Survey to examine the impact of local level tobacco control policies and programs on smoking prevalence and average consumption of cigarettes among both adolescents and adults in the state of Illinois.

Local policies that make youth possession of tobacco unlawful, that restrict vending machine sales of tobacco products to adult only facilities, that require tobacco licensing of retailers, and that impose penalties for sales to minors were found to significantly decrease the smoking prevalence among youth. Policies that require vending machine lock-out, policies that prohibit smoking near youth facilities, and policies that prohibit free sampling were also found to have a negative impact on smoking prevalence, however, they were found not to be statistically different from zero at conventional significance levels. Moreover, retailer licensing requirements and prohibitions on distribution of free tobacco samples were found to have a negative and significant impact on average smoking by young smokers.

Students who were taught about the dangers of tobacco, or taught about just the dangers of cigarettes and chewing tobacco, in the classroom during the 2002 academic year were significantly less likely to smoke and smoke significantly less on average than individuals who were not taught about the dangers of smoking in the classroom. None of the other tobacco education programs were found to have a statistically significant impact on smoking propensity or intensity at conventional levels.

Employer smoking bans were found to have a negative and significant impact on average smoking among adult smokers in all the models that were estimated. As was expected, the magnitude of the impact increased as the risk pool was narrowed to only workers and then again to workers who worked mainly indoors. Employer smoking bans were also found to have a negative impact on smoking prevalence among individuals who were employed and employed and worked mainly indoors. We found some evidence that City worksite restrictions have a negative impact on smoking prevalence and average smoking among adults, however, the results were not nearly as robust and meaningful as the employer smoking bans.

Finally, youths who attended a school within 25 miles of the Kentucky border were not only more likely to smoke cigarettes, but contingent on smoking, smoked more on average than individuals who did not live so close to Kentucky. Similarly, adult smokers who resided within 25 mile of Kentucky were found to smoke significantly more cigarettes per month than adult smokers who lived further away from Kentucky. Given the large difference in cigarette prices between Illinois and Kentucky, these results suggest that price is likely to be a very important determinant of both youth and adult tobacco demand.

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Table 1

Youth Smoking Prevalence Equations
(Local Level Policies)

	Model 1	Model 2	Model 3	Model 4	Model 5	Model 6	Model 7	Model 8
License Required	-0.128 (-1.07)	-0.167 (-2.41)	-	-	-	-	-	-
Youth Possession	-0.335 (-2.84)	-	-0.261 (-4.17)	-	-	-	-	-
Adult Vending	-0.219 (-1.68)	-	-	-0.338 (-3.00)	-	-	-	-
Penalty for Sale to Minors	0.149 (1.59)	-	-	-	-0.101 (-1.69)	-	-	-
Lock-out Devices on Vending	0.124 (1.30)	-	-	-	-	-0.081 (-1.22)	-	-
Prohibit Smoking Youth Facilities	0.143 (0.92)	-	-	-	-	-	-0.077 (-0.69)	-
Prohibit Free Samples	0.009 (0.09)	-	-	-	-	-	-	-0.111 (-1.53)
KY25	0.545 (3.11)	0.613 (3.52)	0.558 (3.21)	0.650 (3.79)	0.654 (3.79)	0.663 (3.84)	0.682 (3.98)	0.660 (3.84)
IN25	-0.105 (-1.18)	-0.174 (-2.12)	-0.210 (-2.86)	-0.157 (-1.98)	-0.219 (-2.89)	-0.262 (-3.59)	-0.269 (-3.65)	-0.202 (-2.39)
IA25	0.277 (1.23)	0.048 (0.27)	0.086 (0.49)	-0.080 (-0.46)	-0.077 (-0.44)	-0.066 (-0.38)	-0.048 (-0.28)	-0.073 (-0.42)
MO25	-0.022 (-0.16)	0.044 (0.33)	-0.018 (-0.13)	0.102 (0.77)	0.087 (0.66)	0.085 (0.65)	0.105 (0.81)	0.080 (0.61)
Age	0.263 (5.20)	0.264 (5.26)	0.273 (5.37)	0.266 (5.29)	0.270 (5.33)	0.272 (5.35)	0.269 (5.33)	0.266 (5.29)
Male	-0.175 (-3.13)	-0.191 (-3.45)	-0.187 (-3.35)	-0.179 (-3.22)	-0.191 (-3.44)	-0.194 (-3.49)	-0.192 (-3.46)	-0.188 (-3.38)
Grade6	0.193 (0.59)	0.191 (0.60)	0.313 (0.97)	0.124 (0.39)	0.249 (0.77)	0.244 (0.76)	0.238 (0.74)	0.211 (0.66)
Grade7	0.151 (0.55)	0.148 (0.56)	0.267 (0.99)	0.107 (0.40)	0.224 (0.84)	0.220 (0.82)	0.203 (0.76)	0.176 (0.66)
Grade8	0.158 (0.68)	0.140 (0.63)	0.252 (1.11)	0.080 (0.36)	0.182 (0.81)	0.186 (0.83)	0.169 (0.75)	0.149 (0.66)
Grade9	0.238 (1.34)	0.274 (1.56)	0.276 (1.55)	0.253 (1.43)	0.289 (1.63)	0.294 (1.66)	0.290 (1.64)	0.278 (1.58)
Grade10	0.143 (1.04)	0.155 (1.15)	0.210 (1.55)	0.118 (0.87)	0.174 (1.29)	0.185 (1.36)	0.170 (1.26)	0.148 (1.10)
Grade11	0.079 (0.68)	0.077 (0.67)	0.108 (0.93)	0.055 (0.47)	0.086 (0.75)	0.094 (0.82)	0.083 (0.73)	0.063 (0.54)

Indian	0.237 (1.15)	0.256 (1.24)	0.246 (1.19)	0.253 (1.23)	0.257 (1.25)	0.256 (1.25)	0.258 (1.26)	0.260 (1.26)
Asian	-0.574 (-3.20)	-0.595 (-3.37)	-0.577 (-3.26)	-0.641 (-3.65)	-0.620 (-3.52)	-0.626 (-3.59)	-0.635 (-3.63)	-0.612 (-3.47)
Black	-0.412 (-3.00)	-0.454 (-3.41)	-0.431 (-3.16)	-0.427 (-3.14)	-0.454 (-3.39)	-0.453 (-3.37)	-0.456 (-3.40)	-0.451 (-3.38)
Hispanic	0.216 (2.58)	0.179 (2.20)	0.186 (2.33)	0.149 (1.88)	0.145 (1.83)	0.127 (1.60)	0.145 (1.80)	0.167 (2.05)
Hawaiian	0.239 (0.78)	0.244 (0.80)	0.254 (0.83)	0.237 (0.79)	0.245 (0.82)	0.249 (0.83)	0.253 (0.84)	0.249 (0.82)
Intercept	-4.743 (-5.30)	-4.826 (-5.42)	-4.941 (-5.49)	-4.882 (-5.48)	-4.967 (-5.54)	-5.013 (-5.58)	-4.980 (-5.58)	-4.896 (-5.50)

z - statistics are in parentheses. The critical values for the z - statistics are 2.58 (2.33), 1.96 (1.64), 1.64 (1.28) at the 1, 5, and 10% significance levels, respectively, based on a two-tailed (one-tailed) test.

Table 2

Average Smoking by Youth Smokers
(Local Level Policies)

	Model 1	Model 2	Model 3	Model 4	Model 5	Model 6	Model 7	Model 8
License Required	-0.206 (-0.45)	-0.404 (-1.77)	-	-	-	-	-	-
Youth Possession	-0.188 (-0.45)	-	-0.298 (-1.45)	-	-	-	-	-
Adult Vending	-0.231 (-0.51)	-	-	-0.498 (-1.47)	-	-	-	-
Penalty for Sale to Minors	0.102 (0.32)	-	-	-	-0.203 (-0.96)	-	-	-
Lock-out Devices on Vending	0.134 (0.31)	-	-	-	-	0.013 (0.06)	-	-
Prohibit Smoking Youth Facilities	-0.238 (-0.42)	-	-	-	-	-	-0.418 (-1.25)	-
Prohibit Free Samples	-0.349 (-0.82)	-	-	-	-	-	-	-0.537 (-2.27)
KY25	1.029 (2.83)	1.083 (3.03)	1.132 (3.20)	1.211 (3.51)	1.192 (3.41)	1.260 (3.64)	1.222 (3.55)	1.120 (3.21)
IN25	0.345 (1.09)	0.292 (1.03)	0.162 (0.63)	0.215 (0.80)	0.176 (0.64)	0.070 (0.28)	0.005 (0.02)	0.275 (1.00)
IA25	-0.341 (-0.41)	-0.262 (-0.44)	-0.313 (-0.53)	-0.530 (-0.91)	-0.553 (-0.95)	-0.480 (-0.83)	-0.526 (-0.91)	-0.642 (-1.11)
MO25	0.067 (0.11)	0.139 (0.23)	0.169 (0.28)	0.295 (0.50)	0.258 (0.44)	0.307 (0.51)	0.276 (0.47)	0.119 (0.20)
Age	0.679 (5.29)	0.704 (5.62)	0.727 (5.75)	0.715 (5.72)	0.723 (5.71)	0.713 (5.68)	0.710 (5.73)	0.680 (5.46)
Male	0.227 (1.21)	0.193 (1.04)	0.195 (1.05)	0.202 (1.08)	0.178 (0.96)	0.180 (0.97)	0.187 (1.01)	0.208 (1.12)
Grade6	2.037 (2.64)	2.205 (3.08)	2.481 (3.47)	2.241 (3.14)	2.436 (3.40)	2.366 (3.33)	2.336 (3.34)	2.133 (2.99)
Grade7	0.786 (1.08)	0.963 (1.39)	1.240 (1.81)	1.055 (1.54)	1.178 (1.72)	1.143 (1.67)	1.076 (1.59)	0.875 (1.26)
Grade8	1.535 (2.48)	1.671 (2.78)	1.822 (3.02)	1.627 (2.70)	1.755 (2.92)	1.705 (2.81)	1.661 (2.80)	1.583 (2.63)
Grade9	1.543 (3.07)	1.617 (3.21)	1.706 (3.41)	1.678 (3.37)	1.698 (3.39)	1.696 (3.39)	1.685 (3.39)	1.556 (3.11)
Grade10	0.796 (2.06)	0.883 (2.39)	0.998 (2.72)	0.889 (2.44)	0.955 (2.61)	0.932 (2.52)	0.942 (2.60)	0.799 (2.16)
Grade11	0.418 (1.31)	0.500 (1.60)	0.566 (1.82)	0.510 (1.64)	0.527 (1.69)	0.520 (1.66)	0.503 (1.61)	0.399 (1.26)

Indian	0.550 (0.86)	0.487 (0.75)	0.451 (0.67)	0.447 (0.66)	0.470 (0.71)	0.435 (0.64)	0.458 (0.68)	0.556 (0.87)
Asian	-0.200 (-0.23)	-0.137 (-0.17)	-0.141 (-0.17)	-0.279 (-0.33)	-0.186 (-0.22)	-0.256 (-0.30)	-0.244 (-0.28)	-0.243 (-0.28)
Black	-0.919 (-1.65)	-0.990 (-1.76)	-0.949 (-1.66)	-0.948 (-1.70)	-0.988 (-1.74)	-0.984 (-1.73)	-0.959 (-1.67)	-0.947 (-1.73)
Hispanic	-0.557 (-2.03)	-0.759 (-3.01)	-0.797 (-3.14)	-0.847 (-3.45)	-0.862 (-3.48)	-0.872 (-3.50)	-0.776 (-2.94)	-0.671 (-2.62)
Hawaiian	-0.598 (-0.70)	-0.660 (-0.82)	-0.665 (-0.85)	-0.700 (-0.93)	-0.669 (-0.86)	-0.696 (-0.93)	-0.690 (-0.91)	-0.566 (-0.68)
Intercept	-8.217 (-3.62)	-8.715 (-3.92)	-9.205 (-4.14)	-9.049 (-4.10)	-9.165 (-4.12)	-9.069 (-4.11)	-8.971 (-4.11)	-8.303 (-3.76)

z - statistics are in parentheses. The critical values for the z - statistics are 2.58 (2.33), 1.96 (1.64), 1.64 (1.28) at the 1, 5, and 10% significance levels, respectively, based on a two-tailed (one-tailed) test.

Table 3

Youth Smoking Prevalence Equations
(Tobacco Education and Advertising Exposure)

	Model 1	Model 2	Model 3	Model 4	Model 5	Model 6	Model 7	Model 8	Model 9
Tobacco Dangers Classroom	-0.117 (-1.98)	-	-	-	-	-	-	-	-
Practice No to Tobacco	-	-0.005 (-0.08)	-	-	-	-	-	-	-
School Tobacco Program	-	-	-0.119 (-1.11)	-	-	-	-	-	-
Participated in Community Prog.	-	-	-	-0.143 (-1.53)	-	-	-	-	-
Freedom From Smoking	-	-	-	-	0.033 (0.46)	-	-	-	-
Commercials on Smoking Dangers	-	-	-	-	-	0.003 (1.87)	-	-	-
Billboards	-	-	-	-	-	-	0.007 (4.35)	-	-
TV commercial No Smoking	-	-	-	-	-	-	-	0.003 (2.02)	-
Radio commercial No Smoking	-	-	-	-	-	-	-	-	0.005 (2.86)
KY25	0.673 (3.94)	0.592 (2.92)	0.666 (3.86)	0.594 (2.82)	0.695 (4.05)	0.579 (3.26)	0.609 (3.42)	0.653 (3.60)	0.628 (3.58)
IN25	-0.280 (-3.78)	-0.239 (-3.01)	-0.271 (-3.66)	-0.217 (-2.51)	-0.272 (-3.51)	-0.259 (-3.47)	-0.272 (-3.58)	-0.270 (-3.56)	-0.259 (-3.45)
IA25	-0.051 (-0.29)	-0.118 (-0.63)	-0.064 (-0.37)	-0.129 (-0.66)	-0.035 (-0.20)	-0.067 (-0.38)	-0.088 (-0.50)	-0.031 (-0.17)	-0.059 (-0.33)
MO25	0.118 (0.91)	0.005 (0.03)	0.103 (0.79)	-0.091 (-0.51)	0.119 (0.90)	0.055 (0.41)	0.010 (0.07)	0.104 (0.77)	0.076 (0.57)
Age	0.264 (5.27)	0.223 (4.03)	0.270 (5.35)	0.204 (3.49)	0.270 (5.33)	0.282 (5.85)	0.275 (5.65)	0.247 (4.64)	0.259 (5.03)
Male	-0.193 (-3.47)	-0.232 (-3.87)	-0.193 (-3.48)	-0.227 (-3.51)	-0.193 (-3.47)	-0.192 (-3.42)	-0.198 (-3.48)	-0.170 (-2.99)	-0.187 (-3.32)
Grade6	0.251 (0.79)	-0.042 (-0.12)	0.215 (0.67)	-0.077 (-0.20)	0.237 (0.74)	0.249 (0.80)	0.137 (0.43)	0.066 (0.19)	0.131 (0.40)
Grade7	0.231 (0.87)	-0.023 (-0.08)	0.187 (0.70)	-0.167 (-0.54)	0.212 (0.79)	0.253 (0.98)	0.228 (0.87)	0.096 (0.34)	0.165 (0.60)
Grade8	0.181 (0.81)	-0.026 (-0.11)	0.147 (0.65)	0.003 (0.01)	0.171 (0.76)	0.201 (0.93)	0.179 (0.82)	0.069 (0.29)	0.116 (0.50)
Grade9	0.301 (1.71)	0.167 (0.86)	0.275 (1.55)	0.118 (0.56)	0.294 (1.66)	0.309 (1.75)	0.283 (1.59)	0.224 (1.21)	0.284 (1.57)
Grade10	0.200 (1.48)	0.126 (0.86)	0.145 (1.07)	0.105 (0.68)	0.170 (1.26)	0.197 (1.48)	0.190 (1.42)	0.139 (0.99)	0.154 (1.12)
Grade11	0.091 (0.80)	0.049 (0.40)	0.074 (0.64)	-0.013 (-0.10)	0.082 (0.72)	0.114 (1.00)	0.121 (1.05)	0.092 (0.78)	0.102 (0.87)

Indian	0.247 (1.20)	0.105 (0.43)	0.256 (1.25)	0.422 (1.81)	0.257 (1.25)	0.293 (1.43)	0.279 (1.35)	0.287 (1.36)	0.274 (1.30)
Asian	-0.626 (-3.61)	-0.802 (-3.94)	-0.634 (-3.63)	-0.698 (-3.45)	-0.636 (-3.64)	-0.707 (-3.91)	-0.720 (-4.00)	-0.702 (-3.90)	-0.782 (-4.16)
Black	-0.464 (-3.45)	-0.478 (-3.17)	-0.463 (-3.45)	-0.716 (-3.75)	-0.458 (-3.40)	-0.436 (-3.17)	-0.477 (-3.33)	-0.510 (-3.58)	-0.444 (-3.24)
Hispanic	0.137 (1.73)	0.122 (1.40)	0.129 (1.62)	0.097 (1.04)	0.129 (1.61)	0.123 (1.51)	0.079 (0.95)	0.129 (1.58)	0.123 (1.50)
Hawaiian	0.250 (0.83)	-0.045 (-0.10)	0.260 (0.87)	-0.275 (-0.62)	0.249 (0.83)	0.268 (0.87)	0.297 (0.95)	0.293 (0.94)	0.283 (0.91)
Intercept	-4.857 (-5.46)	-4.165 (-4.23)	-4.974 (-5.56)	-3.703 (-3.56)	-5.012 (-5.58)	-5.259 (-6.13)	-5.160 (-5.97)	-4.673 (-4.94)	-4.872 (-5.33)

z - statistics are in parentheses. The critical values for the z - statistics are 2.58 (2.33), 1.96 (1.64), 1.64 (1.28) at the 1, 5, and 10% significance levels, respectively, based on a two-tailed (one-tailed) test.

Table4

Average Smoking by Youth Smokers
(Tobacco Education and Advertising Exposure)

	Model 1	Model 2	Model 3	Model 4	Model 5	Model 6	Model 7	Model 8	Model 9
Tobacco Dangers Classroom	-0.455 (-2.36)	-	-	-	-	-	-	-	-
Practice No to Tobacco	-	-0.357 (-1.52)	-	-	-	-	-	-	-
School Tobacco Program	-	-	0.031 (0.10)	-	-	-	-	-	-
Participated in Community Prog.	-	-	-	-0.329 (-1.18)	-	-	-	-	-
Freedom From Smoking	-	-	-	-	-0.145 (-0.59)	-	-	-	-
Commercials on Smoking Dangers	-	-	-	-	-	-0.001 (-0.33)	-	-	-
Billboards	-	-	-	-	-	-	-0.002 (-0.45)	-	-
TV commercial No Smoking	-	-	-	-	-	-	-	0.000 (-0.04)	-
Radio commercial No Smoking	-	-	-	-	-	-	-	-	0.005 (0.81)
KY25	1.157 (3.44)	1.110 (2.66)	1.263 (3.63)	1.174 (2.83)	1.232 (3.58)	1.199 (3.24)	1.241 (3.39)	1.098 (2.98)	1.145 (3.19)
IN25	-0.022 (-0.09)	0.140 (0.51)	0.074 (0.29)	0.351 (1.31)	0.124 (0.45)	0.110 (0.43)	0.118 (0.45)	0.146 (0.56)	0.080 (0.31)
IA25	-0.484 (-0.82)	-0.456 (-0.71)	-0.477 (-0.82)	-0.160 (-0.24)	-0.503 (-0.86)	-0.474 (-0.82)	-0.448 (-0.77)	-0.462 (-0.79)	-0.516 (-0.89)
MO25	0.338 (0.57)	0.129 (0.21)	0.304 (0.51)	0.836 (1.06)	0.262 (0.44)	0.177 (0.31)	0.055 (0.09)	0.275 (0.46)	0.123 (0.21)
Age	0.681 (5.55)	0.640 (3.63)	0.714 (5.72)	0.642 (3.43)	0.710 (5.69)	0.796 (6.41)	0.777 (6.27)	0.692 (5.10)	0.735 (5.93)
Male	0.177 (0.96)	0.191 (0.94)	0.181 (0.98)	0.262 (1.23)	0.184 (0.99)	0.136 (0.73)	0.148 (0.78)	0.197 (1.04)	0.119 (0.63)
Grade6	2.378 (3.48)	2.064 (1.90)	2.377 (3.39)	1.486 (1.37)	2.379 (3.41)	2.870 (4.16)	2.826 (4.06)	2.254 (2.86)	2.513 (3.62)
Grade7	1.143 (1.71)	0.783 (0.83)	1.155 (1.70)	0.413 (0.42)	1.148 (1.69)	1.508 (2.21)	1.435 (2.11)	0.943 (1.27)	1.202 (1.77)
Grade8	1.670 (2.84)	1.609 (2.02)	1.717 (2.88)	1.158 (1.40)	1.726 (2.92)	2.109 (3.50)	2.059 (3.42)	1.755 (2.73)	1.719 (2.84)
Grade9	1.728 (3.47)	1.479 (2.36)	1.700 (3.43)	1.511 (2.30)	1.712 (3.48)	1.865 (3.68)	1.855 (3.66)	1.717 (3.19)	1.770 (3.55)

Grade10	1.074 (2.94)	0.864 (1.91)	0.941 (2.59)	0.868 (1.92)	0.929 (2.55)	1.133 (3.09)	1.093 (2.99)	0.927 (2.42)	0.996 (2.73)
Grade11	0.559 (1.80)	0.557 (1.61)	0.524 (1.68)	0.573 (1.60)	0.544 (1.75)	0.646 (2.06)	0.637 (2.02)	0.578 (1.80)	0.564 (1.80)
Indian	0.341 (0.53)	0.692 (0.73)	0.437 (0.65)	0.654 (0.94)	0.413 (0.61)	0.439 (0.66)	0.452 (0.69)	0.467 (0.70)	0.498 (0.74)
Asian	-0.335 (-0.40)	-1.222 (-1.32)	-0.252 (-0.30)	-0.866 (-0.98)	-0.258 (-0.31)	-0.503 (-0.56)	-0.466 (-0.51)	-0.508 (-0.56)	-1.105 (-1.32)
Black	-1.018 (-1.78)	-1.051 (-1.67)	-0.980 (-1.72)	0.498 (0.88)	-0.980 (-1.73)	-1.112 (-1.95)	-0.957 (-1.68)	-0.799 (-1.28)	-0.878 (-1.56)
Hispanic	-0.841 (-3.39)	-0.925 (-3.48)	-0.873 (-3.51)	-0.628 (-2.20)	-0.859 (-3.45)	-0.849 (-3.40)	-0.824 (-3.27)	-0.835 (-3.28)	-0.839 (-3.37)
Hawaiian	-0.648 (-0.83)	-0.641 (-0.42)	-0.698 (-0.93)	-1.097 (-1.00)	-0.691 (-0.91)	-0.805 (-1.15)	-0.747 (-1.06)	-0.635 (-0.81)	-0.669 (-0.94)
Intercept	-8.332 (-3.83)	-7.728 (-2.50)	-9.089 (-4.13)	-7.921 (-2.41)	-8.999 (-4.08)	-10.523 (-4.79)	-10.208 (-4.68)	-8.748 (-3.66)	-9.480 (-4.33)

z - statistics are in parentheses. The critical values for the z - statistics are 2.58 (2.33), 1.96 (1.64), 1.64 (1.28) at the 1, 5, and 10% significance levels, respectively, based on a two-tailed (one-tailed) test.

Table 5

Adult Smoking Prevalence Equations

	All Individuals		Employed Individuals		Employed Individuals Who Work Indoors	
	Model 1	Model 2	Model 3	Model 4	Model 5	Model 6
Employer smoking ban	-0.041 (-0.80)		-0.142 (-2.10)		-0.286 (-3.33)	
City Worksite Ban		-0.067 (-0.72)		-0.130 (-0.91)		-0.036 (-0.18)
Smoke-Free Air Index	0.012 (1.31)	0.017 (1.51)	0.012 (1.02)	0.025 (1.31)	0.006 (0.44)	0.009 (0.31)
Cessation Program	0.051 (0.79)	0.053 (0.83)	0.030 (0.36)	0.041 (0.51)	0.036 (0.40)	0.052 (0.57)
IN25	0.001 (0.01)	0.002 (0.02)	0.000 (0.00)	0.003 (0.04)	0.015 (0.17)	0.024 (0.26)
KY25	-0.054 (-0.15)	-0.047 (-0.13)	0.860 (0.91)	0.827 (0.87)	0.865 (0.91)	0.819 (0.86)
MO25	0.093 (0.92)	0.096 (0.94)	0.032 (0.24)	0.040 (0.30)	0.096 (0.66)	0.113 (0.79)
IA25	-0.122 (-0.89)	-0.120 (-0.87)	-0.219 (-1.21)	-0.208 (-1.15)	-0.270 (-1.32)	-0.250 (-1.23)
WI25	-0.037 (-0.42)	-0.036 (-0.40)	-0.035 (-0.33)	-0.032 (-0.30)	-0.018 (-0.15)	-0.025 (-0.21)
Age	-0.016 (-9.60)	-0.016 (-9.68)	-0.009 (-3.37)	-0.009 (-3.39)	-0.009 (-3.26)	-0.010 (-3.39)
Black	-0.175 (-2.03)	-0.180 (-2.09)	-0.335 (-2.91)	-0.337 (-2.93)	-0.384 (-2.95)	-0.394 (-3.04)
Asian	0.013 (0.08)	0.011 (0.07)	-0.060 (-0.32)	-0.075 (-0.40)	-0.225 (-1.07)	-0.252 (1.20)
Hawaiian	0.262 (0.58)	0.258 (0.57)	0.461 (0.93)	0.451 (0.90)	0.563 (1.01)	0.534 (0.95)
American Indian	0.495 (2.39)	0.499 (2.40)	0.258 (0.87)	0.279 (0.93)	-0.184 (-0.46)	-0.167 (-0.43)
Other race	-0.245 (-2.00)	-0.241 (-1.97)	-0.414 (-2.61)	-0.408 (-2.56)	-0.409 (2.40)	-0.399 (-2.36)
Married	-0.069 (-0.97)	-0.072 (-1.01)	-0.150 (-1.77)	-0.161 (-1.90)	-0.144 (-1.54)	-0.162 (-1.73)
Divorced	0.366 (4.35)	0.361 (4.32)	0.239 (2.36)	0.231 (2.28)	0.245 (2.20)	0.230 (2.08)
Widowed	0.042 (0.37)	0.041 (0.37)	-0.007 (-0.04)	-0.021 (-0.11)	-0.037 (-0.18)	-0.065 (-0.31)
Separated	0.205 (1.16)	0.201 (1.15)	0.184 (0.87)	0.180 (0.85)	0.161 (0.67)	0.157 (0.66)
Couple	0.358 (2.59)	0.356 (2.57)	0.379 (2.44)	0.370 (2.38)	0.486 (2.88)	0.463 (2.75)
Income	-0.000 (-4.07)	-0.000 (-4.20)	-0.000 (-2.91)	-0.000 (-3.07)	-0.000 (-2.25)	-0.000 (-2.51)
Male	0.220 (4.58)	0.224 (4.71)	0.143 (2.32)	0.175 (2.98)	0.190 (2.85)	0.216 (3.29)

College Degree	-0.456 (-8.07)	-0.461 (-8.23)	-0.457 (-6.82)	-0.482 (-7.31)	-0.467 (6.42)	-0.497 (-6.89)
Intercept	0.084 (0.84)	0.066 (0.68)	-0.024 (-0.18)	-0.109 (-0.87)	0.107 (0.72)	-0.083 (-0.61)

z - statistics are in parentheses. The critical values for the z - statistics are 2.58 (2.33), 1.96 (1.64), 1.64 (1.28) at the 1, 5, and 10% significance levels, respectively, based on a two-tailed (one-tailed) test.

Table 6

Average Smoking by Adult Smokers

	All Individuals		Employed Individuals		Employed Individuals Who Work Indoors	
	Model 1	Model 2	Model 3	Model 4	Model 5	Model 6
Employer smoking ban	-0.290 (-2.78)		-0.420 (-3.37)		-0.519 (-4.07)	
City Worksite Ban		-0.067 (-0.72)		-0.130 (-0.91)		-0.036 (-0.18)
Smoke-Free Air Index	0.006 (0.29)	0.036 (1.67)	-0.019 (-0.80)	0.018 (0.46)	-0.029 (-1.09)	0.002 (0.02)
Cessation Program	0.141 (1.15)	0.160 (1.31)	0.140 (0.96)	0.195 (1.34)	0.090 (0.53)	0.140 (0.81)
IN25	-0.249 (-1.77)	-0.239 (-1.70)	-0.149 (-0.86)	-0.152 (-0.86)	-0.158 (-0.82)	-0.150 (-0.78)
KY25	0.708 (4.83)	0.721 (5.00)	0.558 (3.78)	0.450 (3.06)	0.442 (2.74)	0.339 (2.10)
MO25	0.130 (0.74)	0.142 (0.80)	0.107 (0.45)	0.106 (0.44)	0.050 (0.19)	0.064 (0.24)
IA25	0.134 (0.52)	0.170 (0.67)	0.403 (1.75)	0.459 (2.09)	0.329 (1.53)	0.343 (1.89)
WI25	-0.092 (-0.56)	-0.078 (-0.48)	-0.011 (-0.06)	-0.028 (-0.16)	0.072 (0.37)	0.055 (0.27)
Age	0.006 (1.53)	0.007 (1.76)	0.016 (2.99)	0.016 (3.05)	0.023 (3.74)	0.023 (3.71)
Black	-0.246 (-1.50)	-0.295 (-1.83)	-0.214 (-0.94)	-0.246 (-1.08)	-0.100 (-0.39)	-0.161 (-0.65)
Asian	-0.690 (-1.72)	-0.689 (-1.72)	-0.712 (-1.29)	-0.749 (-1.36)	-0.851 (-1.16)	-0.933 (-1.34)
Hawaiian	-0.925 (-1.23)	-0.843 (-1.10)	-0.725 (-0.82)	-0.724 (-0.84)	-0.543 (-0.61)	-0.496 (-0.58)
American Indian	0.348 (0.93)	0.396 (1.05)	-0.316 (-0.43)	-0.189 (-0.25)	-0.269 (-0.19)	-0.192 (-0.13)
Other Race	-1.122 (-3.40)	-1.092 (-3.33)	-1.165 (-2.58)	-1.181 (-2.62)	-0.958 (-2.16)	-0.962 (-2.15)
Married	0.125 (0.87)	0.107 (0.75)	0.174 (1.03)	0.132 (0.77)	0.109 (0.55)	0.060 (0.30)
Divorced	0.211 (1.32)	0.190 (1.17)	0.107 (0.54)	0.084 (0.42)	-0.010 (-0.04)	-0.039 (-0.17)
Widowed	0.139 (0.61)	0.125 (0.56)	0.218 (0.62)	0.143 (0.41)	0.080 (0.19)	-0.028 (-0.07)
Separated	0.523 (2.42)	0.470 (2.08)	0.575 (2.18)	0.551 (2.07)	0.337 (1.04)	0.281 (0.91)
Couple	0.597 (2.86)	0.542 (2.58)	0.734 (3.06)	0.662 (2.78)	0.820 (3.16)	0.733 (2.86)
Household Income	0.000 (0.48)	0.000 (0.13)	0.000 (0.04)	-0.000 (-0.24)	0.000 (0.47)	0.000 (0.20)

Male	0.205 (1.98)	0.229 (2.25)	0.130 (0.96)	0.208 (1.63)	0.016 (0.11)	0.053 (0.35)
College Degree	-0.538 (-3.79)	-0.572 (-3.97)	-0.616 (-3.60)	-0.694 (-4.04)	-0.556 (-3.15)	-0.626 (-3.46)
Constant	5.401 (27.20)	5.281 (26.64)	5.235 (20.91)	5.002 (20.06)	5.097 (18.64)	4.775 (17.21)

z - statistics are in parentheses. The critical values for the z - statistics are 2.58 (2.33), 1.96 (1.64), 1.64 (1.28) at the 1, 5, and 10% significance levels, respectively, based on a two-tailed (one-tailed) test.