



The Economic Impact of the Laramie and Cheyenne Smokefree Ordinances: Second Biannual Report FY 2007

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The Economic Impact of the Laramie and Cheyenne Smokefree Ordinances: Second Biannual Report FY 2007

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Table of Contents

1. Executive Summary.....	4
2. Introduction	5
3. Literature Review.....	5
4. The Economic Impact.....	6
4.1. Restaurant and Bar Analyses	9
4.2. Industry Group Analyses.....	10
4.3. Other Factors	11
5. Conclusions and Limitations.....	12
6. References.....	13
7. Appendices	15
Appendix A. Analysis Overview	15
Appendix B. Regression Analysis	17

List of Tables

Table 1. Albany County Tax Receipts by Industry Group	11
Table 2. Laramie County Tax Receipts by Industry Group	11
Table 3. Albany County Regression Analysis	19
Table 4. Laramie County Regression Analysis.....	20
Table 5. Albany County Regression Analysis by Industry Group	21
Table 6. Laramie County Regression Analysis by Industry Group	22

List of Figures

Figure 1. Albany County Restaurant and Bar Activity	8
Figure 2. Laramie County Restaurant and Bar Activity.....	8
Figure 3. Wyoming Restaurant and Bar Activity.....	10

The Economic Impact of Laramie and Cheyenne's Smokefree Ordinances: Second Biannual Report FY 2007

1. Executive Summary

The city of Laramie (located in Albany County) implemented Wyoming's first smokefree ordinance on April 6, 2005. Ordinance 1650 expanded previous smoking prohibitions to include restaurants, bars, and private clubs, making virtually all public places in Laramie smokefree. On August 15, 2006 the city of Cheyenne (located in Laramie County) implemented a similar smokefree ordinance (Ordinance 3705). This study analyzes the economic impact of the Laramie and Cheyenne smokefree ordinances on the restaurant and bar industries in Albany County and Laramie County, respectively. We only examine aggregate impacts to the restaurant and bar industry; *we do not consider impacts on individual establishments, as these data are not available for analysis purposes*. Our methodology parallels that of the economic-impact studies cited in the U.S. Surgeon General's report on the health consequences of second hand smoke (U.S. Department of Health and Human Services, USDHHS, 2006).

WYSAC used state sales tax receipts in Albany and Laramie Counties (tax data is not publicly available at the city level), which contain Laramie and Cheyenne, respectively, to measure economic activity from June 2003 to July 2007. The loss in precision from using county data to measure city effects should not be great because 65% of the Laramie County population resides in Cheyenne, and 88% of Albany County resides in Laramie. The statistical analysis accounts for population, time trends, seasonality, inflation, and local and statewide economic conditions. The analysis also considers economic activity in restaurants and bars both separately and as a whole.

- Based on information available through July 2007, Laramie's smokefree ordinance has had no net economic impact, either positive or negative, on the Albany County restaurant or bar industries.
- Based on information available through July 2007, Cheyenne's smokefree ordinance has had no net economic impact, either positive or negative, on the Laramie County restaurant or bar industries.

These findings are consistent with ample scientific evidence that smokefree ordinances have no aggregate impact on economic activity in the restaurant and bar industry (Scollo, Lal, Hyland, & Glantz, 2003; USDHHS, 2006). The impact of the Laramie and Cheyenne smokefree ordinances on individual establishments is unknown. We also do not know the impact of the smokefree ordinances on the location of business activity (i.e., within the city limits and subject to the ordinance, or outside the city limits but within the county and not subject to the ordinance).

2. Introduction

The city of Laramie implemented Wyoming's first smokefree ordinance on April 6, 2005. Ordinance 1650 expanded previous smoking prohibitions to include restaurants, bars, and private clubs, making virtually all public places in Laramie smokefree. On August 15, 2006, the city of Cheyenne adopted a similar smokefree ordinance (Ordinance 3705). Although only two cities in the state of Wyoming have implemented a comprehensive smokefree ordinance (the city of Evanston has adopted a smokefree ordinance that will take effect on September 4, 2007), the number of similar ordinances has grown steadily nationwide. The American Nonsmokers' Rights Foundation (ANRF) (n.d.) provides the following data on smokefree ordinances:

- No smokefree ordinances existed in the United States before 1990.
- As of July 2007, 10 states and the District of Columbia and 217 municipalities require completely smokefree workplaces, restaurants, and bars.
- Twenty four states/commonwealths and the District of Columbia and 619 municipalities have ordinances that require completely smokefree workplaces and/or restaurants and/or bars.
- Smokefree ordinances now affect more than 57.5% of the U.S. population.

3. Literature Review

Researchers have studied numerous issues related to the impact of secondhand smoke (i.e., involuntary smoking). A recent report by the U.S. Surgeon General (USDHHS, 2006) includes a comprehensive review of this research. Of their several important conclusions, the following are particularly relevant to this study:

- **Secondhand smoke is a major cause of disease.** The USDHHS (2006) report states "massive and conclusive scientific evidence documents adverse effects of involuntary smoking on children and adults, including cancer and cardiovascular diseases in adults, and adverse respiratory effects in both children and adults" (p. iii). The Centers for Disease Control and Prevention (CDC) (2005) reports that an estimated 3,000 lung cancer deaths and 35,000 coronary heart disease deaths occur annually among adult nonsmokers in the United States from exposure to secondhand smoke.
- **Bans on indoor smoking eliminate exposure to secondhand smoke in impacted environments (assuming full compliance).** An Americans for Nonsmokers' Rights (2005) summary of eight Indoor Air Quality (IAQ)/cotinine studies showed that smokefree ordinances dramatically improved air quality in restaurants and bars for the eight municipalities examined; WYSAC (2005b) found the same result for Laramie, Wyoming.
- **Smokefree policies do not have an adverse net economic impact on the hospitality industry.** We discuss the research supporting this conclusion below.

Scollo and Lal (2005) reviewed all 123 English-language economic impact studies published through July 2005, and found that all legitimate studies concluded no negative net economic impact from smokefree ordinances (the criteria for a legitimate study are given below). All of the studies in the review analyzed aggregate impacts to the restaurant and bar industry; *the studies do not consider impacts on individual establishments*. Though most of the 123 studies found that smokefree ordinances had no negative economic impact on restaurants and bars, 38 studies did find a negative impact. Scollo and Lal used Siegel's (1992) criteria for higher-quality studies to evaluate each study's legitimacy. To meet these criteria, a study must

- use objective, rather than subjective, outcome measures.
- use all available data after the ordinance's implementation and for several years before.
- use regression or other statistical methods to draw inferences.
- include controls for overall economic conditions.

We feel that Siegel's four criteria provide minimal standards for acceptable research. A study that does not meet these standards has very little credibility, regardless of its conclusion. After applying Siegel's criteria to the characteristics of each study, Scollo and Lal concluded the following:

- "No negative economic impact from the introduction of smoke-free policies in restaurant and bars is indicated by the 21 studies where findings are based on an objective measure such as taxable sales receipts, where data points several years before and after the introduction of smoke-free policies were examined, where changes in economic conditions are appropriately controlled for, and where appropriate statistical tests are used to control for underlying trends and fluctuations in data. Just a few studies using objective measures have found negative effects. Each of these is methodologically flawed." (p. 3)
- "Studies concluding a negative economic impact have predominantly based findings on outcomes predicted before introduction of policies, or on subjective impressions or estimates of changes rather than actual, objective, verified, or audited data. These studies were funded predominantly by the tobacco industry or organizations allied with the tobacco industry. Almost none of the studies finding a negative impact are published in peer-reviewed journals." (p. 3)

We, too, used Siegel's four criteria to guide our own analysis and to identify higher-quality studies to review (e.g., Bartosch & Pope, 1999; Dai, Densolow, Hyland, & Lotfinia, 2004; Glantz & Smith, 1994; Glantz & Charlesworth, 1999; Goldstein & Sobel, 1998). See Appendix A for details.

One recent study that satisfies Siegel's four criteria (Adams and Cotti, 2007) did find that employment in bars falls by about 4% following smoking bans, but found no effect for restaurants. In summary, none of the 22 quality studies reviewed has found a negative economic impact of smoking bans on restaurants, and 1 has found a negative economic impact of smoking bans on bars. The preponderance of empirical evidence is that smoking bans have no negative economic impact on the restaurant or bar industry.

4. The Economic Impact

This section analyzes the economic impact of the Laramie and Cheyenne smokefree ordinances on the restaurants and bars in Albany County and Laramie County, respectively. We focus the analysis on restaurants and bars because we expect the ordinances to have the greatest economic impact on them: previous legislation had already prohibited smoking in most other public places in Laramie and many public places in Cheyenne including government buildings and retail stores were already smokefree. We only examine aggregate impacts to the restaurant and bar industry; *we do not consider impacts on individual establishments*. Our methodology parallels that of the economic-impact studies cited in the U.S. Surgeon General's report on the health consequences of second hand smoke (USDHHS, 2006).

Total monthly state sales tax receipts from Food Services and Drinking Places, a formal category in the North American Industry Classification System (NAICS) system, measure economic activity. The Wyoming state sales tax rate was 4% over the sample period, so tax receipts are directly

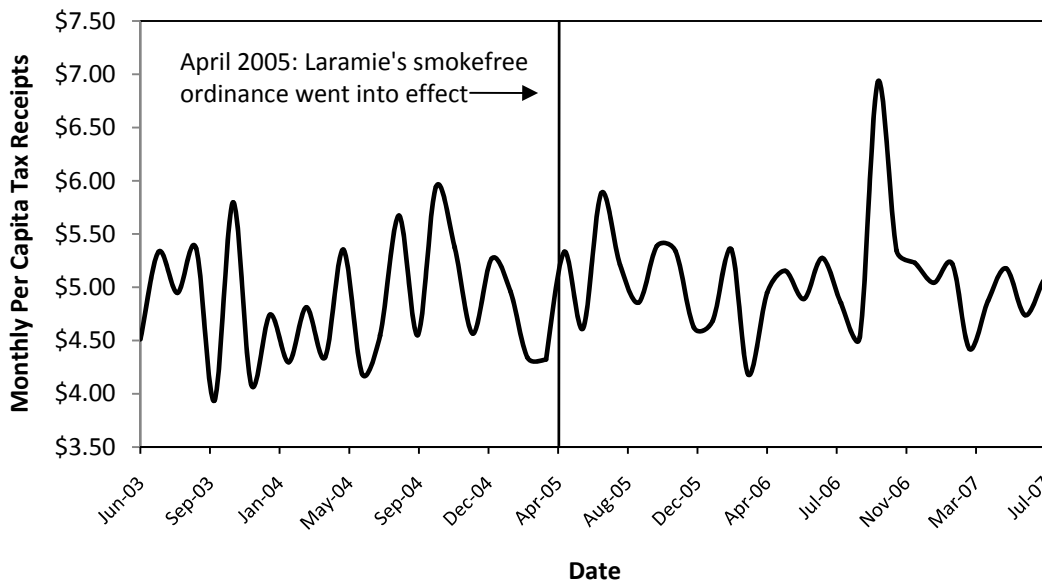
proportional to taxable sales receipts. Taxable sales receipts from restaurants and bars provide the most common objective measure in the studies reviewed by Scollo et al. (2003). Variations in county and city sales taxes do not affect state sales tax receipts and are thus a measure of economic activity comparable across municipalities. Because sales tax receipts are only available on a county level, the analysis uses data for Albany County and Laramie County, which contain Laramie and Cheyenne, respectively. The loss in precision from using county data should not be large as most businesses and individuals in these two counties reside in the two cities (65% of the Laramie County population resides in Cheyenne, and 88% of Albany County resides in Laramie (U.S. Census Bureau, 2007a, U.S. Census Bureau 2007b)). Further, because cities are wholly contained within counties, any change in city economic activity results in an equal change in county economic activity. For example, if retail sales in Cheyenne increase by \$1,000, retail sales in Laramie County will also increase by \$1,000. Consequently, statistical inferences remain valid even though we measure city effects with county data. However, we cannot analyze the impact of the smokefree ordinances on the location of business activity (i.e., within the city limits and subject to the ordinance, or outside the city limits but within the county and not subject to the ordinance) when only county data are available.

WYSAC analyzed monthly data from the Wyoming Department of Revenue and covered the period from June 2003 through July 2007 (the first and last dates data are available; $n=50$). The data in the Department of Revenue reports relates to economic activity in the previous month. For example, the data for July 2007 are contained in the August 2007 report. We convert the data to a per capita basis to account for variations in populations. Figure 1 presents a plot of the Albany County per capita sales tax receipt data and Figure 2 presents a plot of the Laramie County per capita sales tax receipt data.

An examination of Figure 1 shows no obvious change after the smokefree ordinance's implementation. Average per capita monthly sales tax receipts before (June 2003 – March 2005) and after (April 2005 – July 2007) the city of Laramie enacted the ordinance are \$4.85 and \$5.06, respectively, for a \$0.21 increase. Less data ($n=12$ months) are available after Cheyenne adopted their smokefree ordinance (Figure 2). The average per capita monthly sales tax receipts before (June 2003 – July 2006) and after (August 2006 – July 2007) Cheyenne enacted the ordinance are \$5.28 and \$5.03, for a decrease of \$0.25.

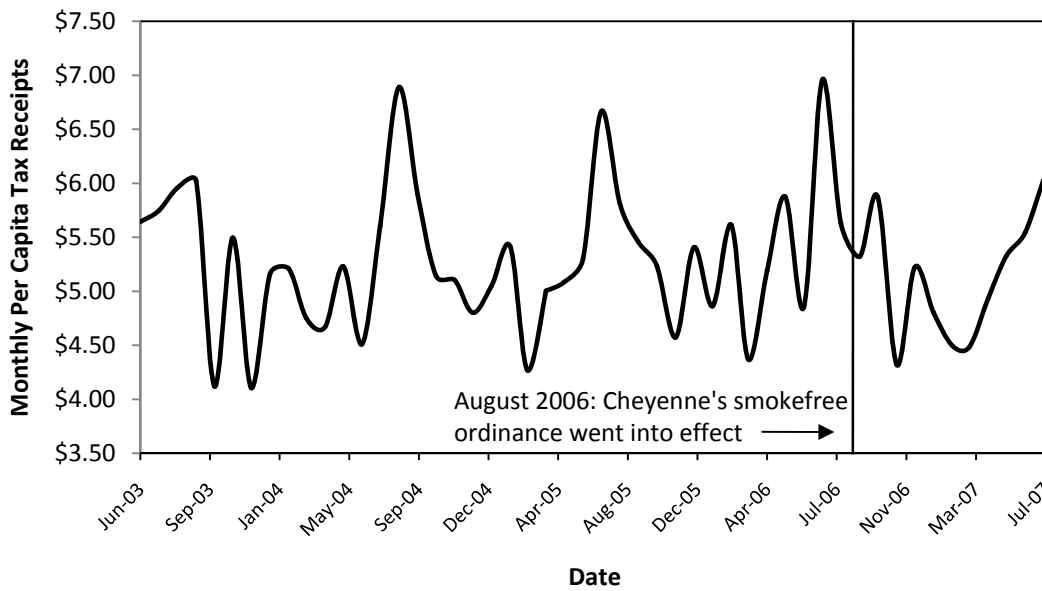
Many factors (e.g., general economic conditions, time of year, natural variability, etc.) influence sales in restaurants and bars. The statistical problem is to determine whether the observed changes in average tax receipts (a \$0.21 increase in Albany County and a \$0.25 decrease in Laramie County) are a result of the aforementioned factors or are a result of the smokefree ordinances. To solve this statistical problem, we use regression analysis. Regression analysis investigates the relationship between a response variable (e.g., state sales tax receipts) and multiple explanatory variables (e.g., smokefree ordinance, general economic conditions, time of year, natural variability, etc.). Our regression analyses provide no evidence of a net economic impact to the restaurant and bar industry due to the Laramie or Cheyenne smokefree ordinances.

Figure 1. Albany County Restaurant and Bar Activity



Source: Wyoming Department of Revenue (n.d.)

Figure 2. Laramie County Restaurant and Bar Activity



Source: Wyoming Department of Revenue (n.d.)

4.1. Restaurant and Bar Analyses

Our regression model explains restaurant and bar activity using smokefree ordinance, inflation, seasonality, trends, the overall level of economic activity in the county, and the general pattern of consumption in restaurants and bars. By accounting for the other factors that influence tax receipts in the regression analysis, we obtain a more precise estimate of the smokefree ordinance's impact.

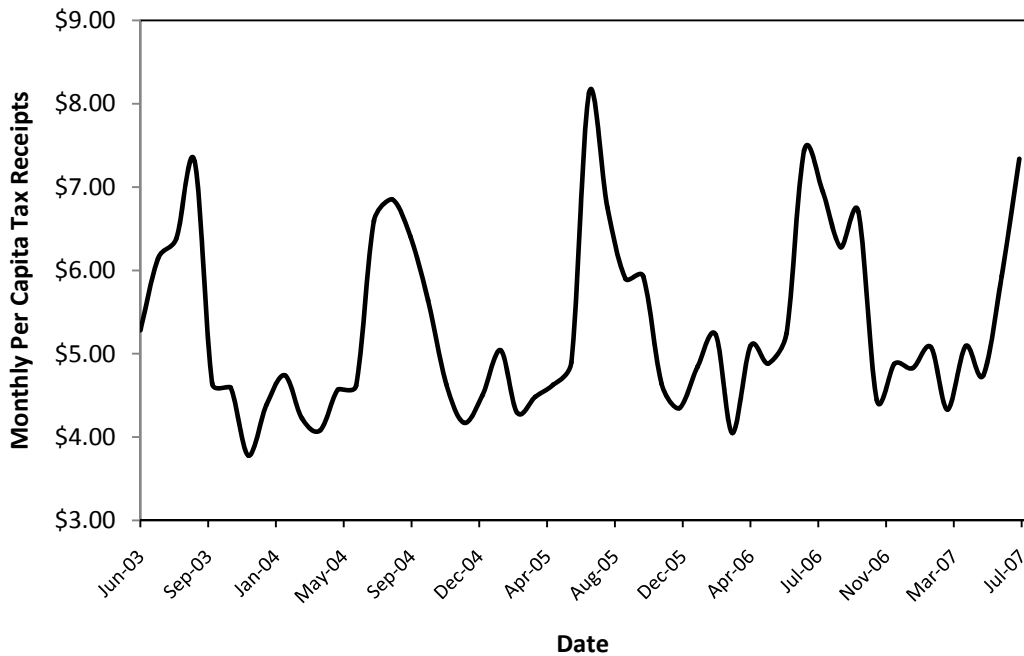
We summarize the model's explanatory variables here and give further details in Appendix B. One explanatory variable, "Smokefree," accounts for the potential impact of the smokefree ordinance. To account for inflation, we deflate tax receipts by the Consumer Price Index (U.S. Department of Labor, n.d.). Explanatory variables for the first (January, February, and March), second (April, May, and June), third (July, August, and September), and fourth (October, November, and December) quarters account for seasonality. We account for trends using an explanatory variable that represents time.

All businesses will experience the effects of general improvements or declines in the local economy. WYSAC accounts for these local economic effects by including an explanatory variable constructed as the monthly tax receipts for all business in the county other than those categorized under Food Services and Drinking Places. Tax receipts from grocery stores are excluded from this variable because grocery food was exempted from state sales tax beginning in July 2006.

WYSAC accounts for the general pattern of consumption in restaurants and bars by including an explanatory variable constructed as Food Services and Drinking Places tax receipts for all of Wyoming minus the receipts of the county for which the model is being estimated (e.g., Albany County or Laramie County). Figure 3 shows tax receipts for Food Services and Drinking Places for the state minus Laramie County's tax receipts (the graph for Albany County is nearly identical). The figure shows a strong seasonal component to restaurant and bar activity with the highest sales occurring in July and August and the lowest sales occurring in the winter months. This seasonal pattern is not as distinct at the county level (see Figures 1 and 2) because each county has a unique set of factors (e.g., the schedule of the University of Wyoming, located in Laramie) that influence local economic activity.

WYSAC fit the regression model described above to both Albany County and Laramie County monthly data from June 2003 to July 2007 (n=50). These data showed no evidence that the Laramie or Cheyenne smokefree ordinances had any net economic impact on the restaurant and bar industry (see Appendix B, Tables 3 and 4 for more details). These findings are consistent with ample scientific evidence that smokefree ordinances do not have a consistently negative net economic effect on restaurants and bars (Scollo, Lal, Hyland, & Glantz, 2003; USDHHS, 2006).

Figure 3. Wyoming Restaurant and Bar Activity



Source: Wyoming Department of Revenue (n.d.)

4.2. Industry Group Analyses

The analyses in the previous section use total Food Services and Drinking Places tax receipts as a measure of economic activity. We compute the total for Food Services and Drinking Places tax receipts by summing all tax receipts from four industry groups defined by NAICS. The definition of these industry groups (U.S. Census Bureau, n.d.) are as follows:

- **Full-Service Restaurants:** This industry group comprises establishments primarily engaged in providing food services to patrons who order and are served while seated (i.e., waiter/waitress service) and pay after eating. Establishments that provide these types of food services to patrons with any combination of other services, such as carryout services are classified in this industry.
- **Limited-Service Eating Places:** This industry group comprises establishments primarily engaged in providing food services where patrons generally order or select items and pay before eating. Most establishments do not have waiter/waitress service, but some provide limited service, such as cooking to order (i.e., per special request), bringing food to seated customers, or providing off-site delivery.
- **Special Food Services:** This industry group comprises establishments primarily engaged in providing one of the following food services: (1) at the customers' location; (2) a location designated by the customer; or (3) from motorized vehicles or non-motorized carts.
- **Drinking Places:** This industry group comprises establishments primarily engaged in preparing and serving alcoholic beverages for immediate consumption.

The Wyoming Department of Revenue began using these four industry groups to report tax receipts in June 2004 (before June 2004, the Wyoming Department of Revenue only reported the total tax receipts for all Food Services and Drinking Places). Tables 1 and 2 give average tax receipts for Albany County and Laramie County, respectively, by the four industry groups.

Table 1. Albany County Tax Receipts by Industry Group

Industry Group	Average Per Capita Tax Receipts	Percent of Total Food Services and Drinking Places Tax Receipts
Full-Service Restaurants	\$2.53	50%
Limited-Service Eating Places	\$1.82	36%
Special Food Services	\$0.04	1%
Drinking Places	\$0.63	13%

Source: Wyoming Department of Revenue (n.d.)

Table 2. Laramie County Tax Receipts by Industry Group

Industry Group	Average Per Capita Tax Receipts	Percent of Total Food Services and Drinking Places Tax Receipts
Full-Service Restaurants	\$2.85	54%
Limited-Service Eating Places	\$1.81	35%
Special Food Services	\$0.12	2%
Drinking Places	\$0.47	9%

Source: Wyoming Department of Revenue (n.d.)

To investigate the possibility that the smokefree ordinance might affect these industry groups in different ways, the regression analysis was conducted using tax receipts from each of the four industry groups as the response variable for Albany County and for Laramie County (we give the details in Table 5 and Table 6 in Appendix B). Evidence of a positive economic impact was found for Special Food Services in Albany County, with an estimated \$0.03 increase in monthly per capita tax receipts resulting from the Laramie City smokefree ordinance. There was no evidence of a net economic impact in the other seven analyses.

4.3. Other Factors

A total of ten analyses were conducted: tax receipts in five categories (Food Services and Drinking Places, Full-Service Restaurants, Limited-Service Eating Places, Special Food Services, and Drinking Places) were examined for Albany County and for Laramie County. In each analysis we included measures for local and for statewide economic activity. At least one of the two measures (i.e., local economic activity and/or statewide economic activity) was significant in eight of the ten analysis; neither was significant for Special Food Services and for Drinking Places in Laramie County. These results suggest that the nature of the general economic activity (i.e., local vs. statewide) affecting sales differs between business types and between counties. The regression models also included measures allowing for time trends and seasonal variation. However, the time trend and seasonal variation variables were not usually significant.

5. Conclusions and Limitations

In this report, we considered the impact of smokefree ordinances on aggregate economic activity in restaurants and bars, both separately and as a whole, in Albany County and Laramie County. The analyses we completed gave no evidence of any county-level, net economic impact to the restaurant and bar industry as a whole, the restaurant industry, or the bar industry arising from the smokefree ordinances adopted in Laramie or Cheyenne. This report confirms findings from WYSAC's previous analyses (WYSAC, 2005a, 2006a, 2006b, 2006c, and 2006d) that there has been no net economic impact from the Albany smokefree ordinance, and extends this result to the Cheyenne smokefree ordinance. These results are consistent with the results of similar high-quality studies conducted in other states and cities.

A limitation that should be recognized when interpreting these results is that we were not able to examine specific businesses that were nonsmoking/smoking before the ban and we were not able to track revenues for individual businesses (we do not examine individual businesses because these data are not available for analysis). Analyzing net economic impacts aggregated over individual businesses, as we do here, is the accepted norm in the analysis of smokefree ordinances (Bartosch & Pope, 1999; Dai, Densolow, Hyland, & Lotfinia, 2004; Glantz & Smith, 1994; Glantz & Charlesworth, 1999; Goldstein & Sobel, 1998). Also, we cannot (and no study can) control for every possible variable that may have come into play with regard to the revenue patterns in each county. However, the controls we apply are comparable to those used in other rigorous studies of smokefree ordinances.

Our analyses also simultaneously account for local (i.e., businesses other than restaurants and bars in the county of interest) and statewide (i.e., restaurants and bars across the state but excluding the county of interest) economic activity in the analysis. We found that both local and statewide activity were important for explaining restaurant and bar sales in Laramie County, but only statewide activity was important for Albany County. Many studies (e.g., Bartosch & Pope, 1999; Dai et al., 2004; Glantz & Smith, 1994; Goldstein & Sobel, 1998) only consider local economic activity and do not statistically test the validity of that measure. Our findings are important for future analyses of the impact of smokefree ordinances because they demonstrate that researchers must consider multiple measures of economic conditions.

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7. Appendices

Appendix A. Analysis Overview

WYSAC carefully examined high-quality studies (Bartosch & Pope, 1999; Dai et al., 2004; Glantz & Smith, 1994; Glantz & Charlesworth, 1999; Goldstein & Sobel, 1998) as determined by Siegel's four criteria to help guide our own analysis.

The first Siegel criterion is that the studies use objective outcome measures. The vast majority of studies we examined used taxable sales receipts from restaurants and bars as their objective outcome measure. Taxable sales receipts are the best objective outcome measure available, and, therefore, we adopted it as the measure for this study. Other possible outcome measures include employment levels, number of establishments, and bankruptcies. Only a handful of studies used these measures. A deficiency of these measures is that one would expect a substantial delay before a smokefree ordinance impacted these measures. It takes time for businesses to adjust workforce levels or declare bankruptcy in response to a smokefree ordinance. In contrast, taxable sales receipts should immediately reflect any impact of the smokefree ordinance.

The second Siegel criterion is that studies make use of all available data. All of the high-quality studies did so, and ours does as well. The third Siegel criterion is that studies use regression or other statistical methods to draw inferences. All of the high-quality studies we examined used regression analyses. We feel that regression analysis is the best statistical methodology for analyzing the impact of a smokefree ordinance, and as such, is the method we used (see Appendix B).

The fourth Siegel criterion is that studies include controls for economic conditions. The high-quality studies satisfied this criterion in substantially different ways. Some studies account for economic conditions using income. Income data at the county level (which are required in this study) are available only on an annual basis (i.e., one observation per year) and are model-based estimates containing substantial errors. We feel these problems make per-capita income a poor measure of economic conditions.

Many analyses (Bartosch & Pope, 1999; Dai et al., 2004; Glantz & Smith, 1994; Goldstein & Sobel, 1998) account for economic conditions using taxable sales receipts (henceforth referred to as sales) for all businesses, not just restaurants and bars, in the region subject to the smokefree ordinance. Their logic is that economic conditions will affect all businesses in a given region in a similar way. Other analyses (Glantz & Smith, 1994; Goldstein & Sobel, 1998; Glantz & Charlesworth, 1999) account for economic conditions using restaurant and bar sales from other, economically similar regions or from the United States as a whole. Their logic is that economic conditions will affect restaurants and bars in similar regions or across the entire country in a similar way. The studies account for economic activity by computing the ratio of restaurant and bar sales in the region of interest either to total sales in that region or to restaurant and bar sales in economically similar regions. The studies use that ratio as the dependent variable in regression analyses. Their logic is that variation due to economic conditions will appear in both the numerator and denominator of the ratio and will therefore cancel out.

We agree that total sales in the region of interest or restaurant and bar sales from economically similar regions are good potential measures of economic activity and we use both in our analyses. However, we do not agree the ratio methodology of accounting for variations in economic activity.

Rather, we feel these measures should be included as explanatory variables in the model. By using the ratio as the dependent variable, the explanatory variables in the regression model should include variables that explain the denominator in the ratio (i.e., either total sales or sales in economically similar counties). Adding these variables, however, would greatly increase the complexity of the model, and none of the studies we examined did so. Further, by computing the ratio, one misses the opportunity to test the hypothesis that total sales or sales in economically similar regions measure economic activity and one is restricted to using a single measure of economic activity. In our study, we include both sales from businesses other than restaurants and bars in the county of interest and statewide restaurant and bar sales as explanatory variables in the model. In our analysis, the measure of local economic activity (sales from businesses other than restaurants and bars) is statistically significant for Laramie County but is not statistically significant for Albany County, while the measure of statewide economic activity (statewide restaurant and bar sales) is significant for both Albany County and Laramie County. The implication is that the proper adjustment for economic conditions is different for different counties, and may require measures at both the state and local levels.

Appendix B. Regression Analysis

To statistically test whether a smokefree ordinance has a real effect on economic activity in bars and restaurants, we estimate two models: one for Albany County (to analyze the impact of Laramie's smokefree ordinance) and one for Laramie County (to analyze the impact of Cheyenne's smokefree ordinance). The response variable in both models is Food Services and Drinking Places state sales tax receipts per capita in the county being modeled.

The key explanatory variable in this analysis is Smokefree because we use it to determine whether the smokefree ordinance has an economic impact. "Smokefree" is defined as follows:

- Albany County:
Smokefree = 0 before April 2005
Smokefree = 25/30 on April 2005 (because the Laramie smokefree ordinance took effect on the fifth day of the month)
Smokefree = 1 after April 2005.
- Laramie County:
Smokefree = 0 before August 2006
Smokefree = 17/31 on August 2006 (because the Cheyenne smokefree ordinance took effect on the fifteenth day of the month)
Smokefree = 1 after August 2006.

The coefficient on Smokefree is the change in tax receipts due to the smokefree ordinance. We also acknowledge other factors such as economic conditions, inflation, and seasonality, which give us a more precise estimate of the smokefree ordinance's economic impact. These additional explanatory variables include the following:

- Time = 1, 2, 3 ... 48 (Time runs through 48 because there are 48 months in the sample.)

We include a simple time trend to account for slowly changing tastes, preferences, and populations. Preferably, we would utilize actual population data, but these data are not available.

- Qtr. 1 = 1 in January, February, and March, and 0 otherwise
- Qtr. 2 = 1 in April, May, and June, and 0 otherwise
- Qtr. 3 = 1 in July, August, and September, and 0 otherwise
- Qtr. 4 = 1 in October, November, and December, and 0 otherwise

These dummy variables account for seasonality. We use Qtr 1 as the reference category and, therefore, do not include it in the regression analysis (all four quarterly dummy variables and the model intercept are mathematically redundant). The exclusion of the first quarter from the model is an arbitrary decision that does not affect the conclusions regarding of the analysis .

Finally, the model accounts for two economic conditions. The first is the state of the local economy, measured by the variable:

- Other Tax = monthly tax receipts for all businesses in the county of interest minus tax receipts for Food Services and Drinking Places and minus tax receipts for grocery stores

Tax receipts for grocery stores are excluded from Other Tax because food bought for home consumption was exempted from state sales tax beginning July 2006. This change in policy could confound our analysis of the economic effect of a smokefree ordinance.

The second economic condition is the general pattern of consumption in restaurants and bars. We account for this factor by including Food Services and Drinking Places tax receipts for Wyoming minus the tax receipts from the county being modeled (i.e., Albany County or Laramie County). We conjectured that the tendency to frequent restaurants or bars in a particular county would be similar to the state as a whole, and we measure this tendency by the variable:

- Wyoming R&B Tax = monthly tax receipts for Food Services and Drinking Places (i.e., restaurants and bars) in Wyoming minus the tax receipts for the county for which the regression is being estimated

In addition, the model should account for any possible data discrepancy resulting from a change in tax receipt measurement that occurred during the sample period. Tax receipts were classified according to the Standard Industrial Classification (SIC) system through June 2004. Starting in June 2004, tax receipts were classified according to the North American Industry Classification System (NAICS). While we matched the two data series very carefully, a discrepancy may exist between them. The inclusion of explanatory variables that account for these factors gives a conceptually superior regression model. The following independent variable accounts for the change in measurement from the SIC to the NAICS:

- NAICS = 1 for time periods on or after June 2004, and 0 otherwise

To account for inflation, we deflated all tax receipt variables by the Consumer Price Index (U.S. Department of Labor, n.d.).

Table 3 and Table 4 report the results of fitting the regression model with Smokefree and the other independent variables described above for Albany County and Laramie County, respectively. Smokefree is not significant at the 0.05 level in either SIC model, so we found no statistical evidence of a change in tax receipts after the implementation of the smokefree ordinance in Laramie or Cheyenne.

The variable that accounts for the general pattern of consumption in restaurants and bars statewide (Wyoming R&B Tax) and serves as a proxy for economic conditions is significant for both Albany County and Laramie County. The measure of local economic conditions (all other business not classified as Food Services and Drinking Places minus grocery stores tax receipts (Other Tax)) is significant only in the Laramie County model. These results suggest that the nature of the general economic activity affecting restaurants and bar sales (i.e., statewide restaurant and bar vs. local other business) differs from county to county.

The smokefree ordinance may differentially impact the four industries (i.e., Full-Service Restaurants, Limited-Service Eating Places, Special Food Services, and Drinking Places) that make up the Food Services and Drinking Places classification. We explored this possibility by modeling the four industries that make up this classification separately. Results for Albany County and Laramie County are presented in Table 5 and Table 6, respectively. Evidence of an positive economic impact was

found for Special Food Services in Albany County, with an estimated \$0.03 increase in monthly per capita tax receipts resulting from the Laramie City smokefree ordinance. There was no evidence of a net economic impact in the other seven analyses.

Table 3. Albany County Regression Analysis

The dependent variable is Albany County Food Services and Drinking Places state sales tax receipts per capita, June 2003–July 2007 (n = 50).			
<i>Variable</i>	<i>Coefficient</i>	<i>t-stat</i>	<i>P > t</i>
Intercept	1.932	3.350	0.002
Smokefree	0.018	0.070	0.944
Time	0.001	0.060	0.950
Qtr. 2	-0.134	-0.720	0.474
Qtr. 3	-0.854	-2.440	0.019
Qtr. 4	0.321	1.730	0.090
Wyoming R&B Tax	0.529	3.370	0.002
Other Tax	0.008	0.650	0.516
NAISC	0.010	0.050	0.964
R-squared	0.47		
Adj. R-squared	0.36		
Durbin-Watson	2.69		

Table 4. Laramie County Regression Analysis

The dependent variable is Laramie County Food Services and Drinking Places state sales tax receipts per capita, June 2003–July 2007 (n = 50).

<i>Variable</i>	<i>Coefficient</i>	<i>t-stat</i>	<i>P > t</i>
Intercept	1.772	4.030	0.000
Smokefree	-0.127	-0.590	0.560
Time	-0.001	-0.140	0.889
Qtr. 2	0.204	1.490	0.144
Qtr. 3	0.184	0.730	0.467
Qtr. 4	0.019	0.130	0.896
Wyoming R&B Tax	0.325	2.950	0.005
Other Tax	0.037	3.440	0.001
NAISC	-0.028	-0.140	0.890

R-squared	0.78
Adj. R-squared	0.74
Durbin-Watson	2.75

Table 5. Albany County Regression Analysis by Industry Group

The dependent variable is Albany County state sales tax receipts per capita, June 2004–July 2007 (n = 38).

Variable	Full-Service Restaurants			Limited-Service Eating Places			Special Food Services			Drinking Places		
	Coefficient	t-stat	P > t	Coefficient	t-stat	P > t	Coefficient	t-stat	P > t	Coefficient	t-stat	P > t
Intercept	1.609	4.660	0.000	0.415	1.120	0.272	0.055	2.150	0.040	0.178	1.520	0.139
Smokefree	0.053	0.400	0.691	0.120	0.670	0.508	0.030	2.320	0.027	-0.066	-1.260	0.217
Time	-0.006	-1.080	0.290	-0.003	-0.330	0.741	-0.002	-4.030	0.000	-0.002	-0.930	0.357
Qtr. 2	-0.131	-1.250	0.219	-0.181	-1.190	0.243	-0.023	-2.260	0.031	0.045	1.080	0.290
Qtr. 3	-0.152	-0.710	0.484	-0.476	-2.480	0.019	-0.032	-3.050	0.005	-0.098	-1.850	0.074
Qtr. 4	0.206	1.950	0.060	0.064	0.430	0.671	-0.015	-1.420	0.166	0.047	1.100	0.280
Wyoming R&B Tax	0.105	0.790	0.434	1.464	4.390	0.000	0.317	4.590	0.000	0.517	2.160	0.039
Other Tax	0.017	2.690	0.011	-0.012	-1.330	0.194	0.000	-0.080	0.940	0.005	1.500	0.144
R-squared	0.51			0.53			0.64			0.49		
Adj. R-squared	0.40			0.42			0.56			0.37		
Durbin-Watson	1.94			2.71			2.11			2.56		

Table 6. Laramie County Regression Analysis by Industry Group

The dependent variable is Albany County state sales tax receipts per capita, June 2004–July 2007 (n = 38).

Variable	Full-Service Restaurants			Limited-Service Eating Places			Special Food Services			Drinking Places		
	Coefficient	t-stat	P > t	Coefficient	t-stat	P > t	Coefficient	t-stat	P > t	Coefficient	t-stat	P > t
Intercept	1.012	3.600	0.001	0.505	1.820	0.078	-0.100	-0.540	0.593	0.194	1.990	0.056
Smokefree	-0.116	-1.010	0.321	-0.095	-0.710	0.480	-0.017	-0.190	0.854	0.034	0.740	0.463
Time	-0.004	-0.900	0.373	0.004	0.660	0.515	0.000	0.040	0.970	-0.003	-1.850	0.074
Qtr. 2	0.190	2.330	0.027	-0.062	-0.610	0.545	-0.038	-0.580	0.563	0.015	0.470	0.641
Qtr. 3	0.085	0.500	0.623	-0.028	-0.220	0.830	0.118	1.580	0.126	-0.026	-0.630	0.532
Qtr. 4	0.060	0.700	0.489	-0.024	-0.230	0.819	-0.032	-0.490	0.629	0.014	0.430	0.674
Wyoming R&B Tax	0.202	1.990	0.056	0.984	4.410	0.000	-0.251	-0.580	0.565	0.261	1.470	0.151
Other Tax	0.027	5.020	0.000	-0.002	-0.280	0.778	0.005	1.140	0.261	0.004	1.480	0.149
R-squared	0.82			0.63			0.33			0.41		
Adj. R-squared	0.77			0.54			0.17			0.28		
Durbin-Watson	2.84			2.82			2.54			2.52		