

---

# Addressing the revenue impact of smoking ordinances

Benjamin T. Parker<sup>a</sup> and Eric P. Chiang<sup>b,\*</sup>

<sup>a</sup>*Graduate College of Business, New Mexico State University, Las Cruces, NM 88003-8001, USA*

<sup>b</sup>*Department of Economics, Florida Atlantic University, 777 Glades Road, Boca Raton, FL 33431, USA*

---

The need for accurate assessment of the revenue impact of smoking ordinances is rising as more state and local governments consider their implementation. This article provides a concise model demonstrating the effect of smoking ordinances on taxable restaurant and bar revenues in the State of California.

## I. Introduction

Public health initiatives applied to civic ordinances have become increasingly common, splitting public thought into those who support public health laws and those who fear their results on economic welfare and freedom. The most prevalent example is the continuing emergence of smoke-free ordinances. While proponents point to health concerns of second-hand smoke, opponents fear a costly impact on revenues of affected businesses.

The California legislature was the first large legislative body to implement a smoke-free ordinance, when in 1994 the state passed Labour Code 6404.5, limiting smoking in virtually all places of employment. The Federal Government, via Executive Order, enacted its own universal smoke-free workplace policy in 1997. These actions resulted in many municipalities following suit with the common exception of restaurants and bars.

But California took the scope of smoking ordinances one step further by mandating all public places to be smoke-free. Most restaurants became smoke-free in 1995, and the more controversial measure of prohibiting smoking in bars and casinos followed in 1998. Naturally, these ordinances were subject to sharp criticism, especially by restaurant and bar owners who feared they would reduce

revenues and force the industry downwards. The purpose of this article is to assess how restaurant and bar revenues have fared since the implementation of the statewide ordinances.

## II. Background Literature

While studies of the economic effects of smoke-free ordinances are not unique, most are limited in scope. Glantz and Smith (1994) provided the first major study of the economic impact of smoke-free ordinances by comparing restaurant revenues of 15 cities in California and Colorado with smoke-free ordinances to cities without ordinances; controlling for income, population and other variables, they found no significant impact. Similar findings were shown by Sciacca and Ratliff (1998) and Hyland *et al.* (1999), who compared restaurant and retail sales revenues before and after smoke-free ordinances in Flagstaff and New York City, respectively. In Massachusetts, a statewide study by Bartosch and Pope (2002) comparing restaurant sales between 1992 and 1998 for 279 towns with and without smoke-free ordinances found that towns with ordinances did not exhibit lower revenues. Lastly, a statewide survey of restaurant and bar owners in Wisconsin

\*Corresponding author. E-mail: [chiang@fau.edu](mailto:chiang@fau.edu)

by Dunham and Marlow (2003) found that owners who do not face smoking restrictions predict larger profit losses from smoke-free ordinances than those who do face restrictions, suggesting a possible fear factor among establishments yet to be subject to such laws. However, the authors suggest that municipalities with smoke-free ordinances are those with fewer smokers, and thus implementing smoke-free ordinances in locations with more smokers may in fact affect revenues.

### III. Empirical Model

In the present article, we address the effect on restaurant and bar revenues resulting from the implementation of smoke-free ordinances in California. One of the limitations of previous empirical studies is the qualitative nature of the data; for example, those based on surveys. This article seeks to augment existing studies by providing a comprehensive study of California's smoke-free ordinances using a rich data set collected at the city-level between 1991 and 2003. In addition, economic controls are included to isolate the smoking ban on restaurant and bar revenues. To determine whether California's smoke-free ordinances benefited or hurt business owners, we analyse annual revenues from restaurants and bars from the largest 298 cities, representing approximately 86% of total revenues. We focus on the impact of the statewide ordinances implemented in 1995 and 1998 on restaurants and bars, respectively. The goal is to provide policy-makers a tool for assessing the impact of smoke-free ordinances in their own municipalities or states.

Table 1 shows a comparison of total annual restaurant and bar revenues (in constant 1995 \$US)

between the state of California and the United States from 1991 and 2003. On simple observation, revenues in California continued to rise after the implementation of its smoke-free ordinance, and the increase was mostly higher compared to the nation as a whole.

However, one can argue that the increase in revenue over this time period can be attributed to a number of factors such as population growth, income levels and changes in demographics. Thus, we create a panel model to estimate restaurant and bar revenues at the city-level for each year from 1991 to 2003. The equation is written as follows:

$$\begin{aligned} \text{PCSALES}_{it} = & \alpha_0 + \alpha_t + \alpha_1 \text{INCOME}_{it} \\ & + \alpha_2 \text{UNEMPL}_{it} + \alpha_3 \text{AGE}_{it} \\ & + \alpha_4 \text{INCOME} \times \text{AGE}_{it} \\ & + \alpha_5 \text{RESTBAN}_{it} + \alpha_6 \text{BARBAN}_{it} + \varepsilon_{it} \end{aligned} \quad (1)$$

where subscripts  $i$  and  $t$  represent city  $i$  and year  $t$ , respectively. The dependent variable,  $\text{PCSALES}_{it}$ , represents restaurant and bar revenues for city  $i$  divided by its population;  $\text{INCOME}_{it}$  represents median household income;  $\text{UNEMPL}_{it}$  represents the unemployment rate;  $\text{AGE}_{it}$  is the percentage of residents between ages 25 and 44;  $\text{INCOME} \times \text{AGE}_{it}$  is an interaction variable;  $\text{RESTBAN}_{it}$  and  $\text{BARBAN}_{it}$  are binary variables (1 = yes) indicating the existence smoke-free ordinances,  $\alpha_t$  are time dummies and  $\varepsilon_{it}$  is a random error term accounting for uncontrolled variables. Table 2 provides descriptions and summary statistics for each variable.

We expect Income to positively influence revenues under the assumption that dining out is a normal good. Under a similar notion, we expect Unemployment to deter willingness to frequent restaurant and bars, reducing revenues. The variable

**Table 1. Total annual restaurant and bar revenues in California and US (in millions)**

Year	California sales	% Change	US sales	% Change
1991	\$26 694.78		\$208 894.76	
1992	\$24 750.72	-7.28	\$213 827.74	2.36
1993	\$24 489.27	-1.06	\$222 931.61	4.26
1994	\$24 595.48	1.92	\$229 565.30	2.98
1995	\$25 461.37	2.01	\$233 625.00	1.77
1996	\$26 255.27	3.12	\$237 998.90	1.87
1997	\$26 836.56	2.21	\$245 095.97	2.98
1998	\$27 796.39	3.58	\$252 232.15	2.91
1999	\$29 392.38	5.74	\$258 888.28	2.64
2000	\$31 411.42	6.87	\$271 430.70	4.84
2001	\$32 137.55	2.31	\$274 122.03	0.99
2002	\$32 690.03	1.72	\$277 183.76	1.12
2003	\$34 115.40	4.36	\$291 228.16	5.07

*Note:* California sales data obtained from the California State Board of Equalization (1991–2003) and US sales data obtained from the Bureau of the Census (2004).

Age, representing those between ages 25 and 44, is predicted to positively influence revenues as it represents the 'prime' age of eating and entertaining outside of the home. The same reasoning applies to the Age  $\times$  Income variable, where income elasticity within this age group is likely to differ from the average. Finally, we test whether Restban and Barban have an impact on revenues.

#### IV. Data

All revenue data was collected from the California State Board of Equalization, which publishes revenues annually from various industries throughout the state. For this article, we collected annual revenues from restaurant and bar sales from 1991 to 2003 for the 298 largest listed cities within the report.

The Bureau of the census (1990a, 2000a, 1990b, 2000b) provides detailed data on population, median household income and percentage of population

between ages 25 and 44 for all cities in the study. Data were gathered from the 1990 and 2000 census, with projections data used for noncensus years. Annual unemployment data were obtained from the California Employment Development Department (1991–2003). The Bureau of Labor Statistics (1991–2003) provided consumer price indices for the 'west urban areas, food away from home' category from 1991 to 2003. All monetary data are adjusted to constant 1995 \$US. Finally, implementation dates of ordinances prior to the 1995 and 1998 statewide bans were provided by the American Nonsmokers' Rights Foundation (2004). Because missing data occurred for certain cities, the maximum number of observations is 3495.

#### V. Results

Table 3 provides standard regression results for the model described earlier. Regression 3.1 is the baseline model including all independent variables.

**Table 2. Variable definitions and summary statistics (representing city  $i$  in year  $t$ )**

Variable	Description	Mean	SD	Min	Max
SALES	Revenues from restaurants/bars (in thousands, constant \$US)	85 295	215 356	5906	3 290 849
POP	Population	82 987	233 866	646	3 715 762
PCSALES	SALES/POP = per capita real taxable revenues (in thousands)	1.22	1.10	0.14	15.25
INCOME	Median household income (in constant \$US)	47 577	16 886	17 519	136 388
UNEMPL	Unemployment rate	6.95	4.94	0.90	39.60
AGE	Percentage of total population between the ages of 25 and 44	32.58	4.50	17.75	56.53
INCOME $\times$ AGE	Interaction variable between income and age (in thousands)	1 580.07	635.80	412.90	4757.2
RESTBAN	=1 indicating existence of restaurant smoking ban	0.65	0.48	0.00	1.00
BARBAN	=1 indicating existence of bar smoking ban	0.37	0.48	0.00	1.00

Note: SALES and POP are used solely to calculate PCSALES and are provided for descriptive purposes.

**Table 3. Ordinary least squares estimation of restaurant and bar revenues (13 annual time intervals for 298 cities)**

Regression #	3.1	3.2	3.3	3.4	3.5
Dependent variable: PCSALES = Taxable per capita revenues for city $i$ in year $t$					
INCOME	0.186 (0.44)	0.149 (0.35)	0.186 (0.44)	0.414 (1.00)	0.083 (0.93)
UNEMPL	-0.989 (-3.07)***	-1.024 (-3.18)***	-0.989 (-3.07)***		-0.994 (-3.09)***
AGE	2.711 (3.35)***	2.616 (3.23)***	2.711 (3.35)***	2.813 (3.54)***	2.523 (8.81)***
RESTBAN	0.097 (0.01)	6.077 (0.53)		1.001 (0.09)	-0.010 (-0.01)
BARBAN	30.066 (2.11)**		30.094 (2.18)**	31.564 (2.23)**	29.954 (2.10)**
INCOME $\times$ AGE	-0.003 (-0.25)	-0.002 (-0.18)	-0.003 (-0.25)	-0.005 (-0.39)	
Constant	7.899 (1.96)**	7.516 (1.81)*	7.899 (1.96)**	9.661 (2.83)***	7.306 (4.19)***
# Observations	3457	3457	3457	3495	3457
Pseudo $R^2$	0.7221	0.7220	0.7222	0.7217	0.7226

Notes:  $t$ -statistics in parentheses.

\*, \*\*, \*\*\* represent significance levels at the 10%, 5% and 1% levels, respectively.

Time dummies are included in each regression. Observations with incomplete data are omitted including 417 observations (11% of sample) except for Regression 3.4 with 379 observations (10% of sample) omitted.

Regressions 3.2 and 3.3 isolate the restaurant and bar ban variables, respectively. Regression 3.4 omits the unemployment variable to account for possible correlation with income, while Regression 3.5 tests the baseline model without the interaction variable.

Overall, key variables reveal the expected signs, though with varying levels of significance. Results show that the restaurant smoking ban, after controlling for all other variables, resulted in a slightly positive effect on revenues. Furthermore, results of the bar smoking ban reveal a significantly positive effect on restaurant and bar revenues. Supporting the findings of previous studies, our results suggest that the statewide smoking ordinances in restaurants and bars did not negatively affect revenues.

In all equations, INCOME had a positive effect, and UNEMPL had a highly significant negative effect on restaurant and bar revenues as expected. The significance of the unemployment variable suggests that individuals respond more to job loss than changes in income; this makes sense as job loss indicates dramatic changes in income. Finally, the AGE variable, which represents the percentage of city residents between ages 25 and 44, shows a significantly positive effect on revenues, suggesting individuals in their 'prime' frequent restaurants and bars more than other age groups. This result is robust after including the interaction variable  $\text{INCOME} \times \text{AGE}$ . The interaction variable itself is insignificant though, suggesting that income differences within this age category does not indicate more or less restaurant and bar spending compared to income differences in other age groups.

California has one of the lowest percentages of smokers (16.2%) in the nation, to an extent motivated by its aggressive smoke-free ordinances (Tobacco Control Section, 2004). A conclusion, therefore, is that if smoke-free ordinances in fact reduce the population of smokers, then some of the concerns by restaurant and bars owners catering to larger populations of smokers (as discussed by Dunham and Marlow, 2003) should subside. Thus, smoke-free ordinances can be argued as a positive measure, not only for nonsmokers, but also as an impetus for smokers to quit. Even if the minority smoking population reduces their restaurant and bar expenditures, it may be offset by nonsmokers (of which are likely to increase in number) more willing to frequent nonsmoking establishments.

## VI. Conclusion

Public health policy implementation has become a controversial topic, with fears of infringed personal rights and loss of economic welfare. Using detailed data on restaurant and bar revenues, we find the fears of revenues losses to be unfounded. In fact, since California enacted its statewide ban in 1995 with extension in 1998, total restaurant and bar revenues have increased. Although one can point to rising incomes during the economic expansion of the late 1990's, even after adjusting for income, revenues following the bans increased. The findings of this study support the notion that smoke-free initiatives pose little to no threat on business revenues. Therefore, municipalities should focus on other positive externalities resulting from smoke-free ordinances, such as reduced health care costs and second-hand smoke as more smokers choose to quit.

## Acknowledgements

This article benefitted from valuable comments by Djeto Assane, Jack Hou, Jeremy Brown, and seminar participants at New Mexico State University, Florida Atlantic University and the 2004 Western Economic Association International Meetings.

## References

- American Nonsmokers' Rights Foundation (2004) *Municipalities with Local 100% Smokefree Laws*, Americans Nonsmokers' Rights Foundation, Berkeley, CA.
- Bartosch, W. J. and Pope, G. C. (2002) Economic effect of restaurant smoking restrictions on restaurant business in Massachusetts, 1992 to 1998, *Tobacco Control*, **11**, ii38–42.
- Bureau of the Census (1990a, 2000a) *Age, Sex, and Group Quarters, Census Summary File 1 (STF 1): California*, US Department of Commerce, Washington, DC.
- Bureau of the Census (1990b, 2000b) *Income and Poverty, Census Summary File 3 (SF 3): California*, US Department of Commerce, Washington, DC.
- Bureau of the Census (2004) *Unadjusted and Adjusted Estimates of Monthly Retail and Food Services Sales by Kinds of Business*, US Department of Commerce, Washington, DC.
- Bureau of Labor Statistics (1991–2003) *Consumer Price Index – West Urban Consumers – Food Away From Home*, Series ID CUUR0400SEFV, Bureau of Labor Statistics, Washington, DC.

- California Employment Development Department (1991–2003) *Labor Force Data for Sub-County Areas*, Employment Development Department, Sacramento, CA.
- California State Board of Equalization (1991–2003) *Taxable Sales in California, Sales and Use Tax*, State Board of Equalization, Sacramento, CA.
- Dunham, J. and Marlow, M. L. (2003) The economic incidence of smoking laws, *Applied Economics*, **35**, 1935–42.
- Glantz, S. A. and Smith, L. R. A. (1994) The effect of ordinances requiring smoke-free restaurant on restaurant sales, *American Journal of Public Health*, **84**, 1081–85.
- Hyland, A. K., Cummings, M. and Nouenber, E. (1999) Analysis of taxable sales receipts: was New York City's smoke-free air act bad for business?, *Journal of Public Health Management Practice*, **5**, 14–21.
- Sciacca, J. P. and Ratliff, R. I. (1998) Prohibiting smoking in restaurants: effects on restaurant sales, *American Journal of Health Promotion*, **12**, 176–84.
- Tobacco Control Section (2004) *Adult Smoking Prevalence*, California Department of Health Services, Sacramento.