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### Authors

Alamar, B C

Glantz, Stanton A., Ph.D.

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# SMOKE-FREE ORDINANCES INCREASE RESTAURANT PROFIT AND VALUE

BENJAMIN C. ALAMAR and STANTON A. GLANTZ

*This study estimates the value added to a restaurant by a smoke-free policy using regression analysis of the purchase price of restaurants as a function of the presence of a smoke-free law and other control variables. There was a median increase of 16% (interquartile range 11% to 25%) in the sale price of a restaurant in a jurisdiction with a smoke-free law compared to a comparable restaurant in a community without such a law. This result indicates that contrary to claims made by opponents of smoke-free laws, these laws are associated with an increase in restaurant profitability. (JEL I120, H000, D780)*

## I. INTRODUCTION

Hundreds of U.S. communities and several states and provinces inside and outside the United States have enacted policies ending smoking in restaurants and bars. The tobacco industry, working through the hospitality industry, opposes these policies using the claim that smoke-free policies will harm the hospitality industry (Dearlove et al., 2002; Ritch and Begay, 2001). In a world of perfect information and efficient markets operating with no externalities, this claim of harm to the industry would make economic sense, because any regulation that restricts an owner's choice set would at best have no effect on profitability. In the real world of imperfect information, external effects on consumers and employees, or other forms of market failure, however, a restriction on the choice set could increase profitability. This situation of imperfect information exists in the hospitality industry with regard to smoking restrictions because the tobacco industry has repeatedly provided inaccurate information to the hospitality industry asserting that smoking restrictions hurt the hospitality industry (Dearlove et al., 2002; Ritch and Begay, 2001). Previous

studies, reviewed by Scollo et al. (2003), have demonstrated that all studies of high quality in fact find that smoke-free laws have no effect or a positive effect on restaurant and bar revenues, tourism, and employment. The present study furthers the analysis of these laws by investigating whether there is an economic benefit to restaurant owners in terms of restaurant profitability, as reflected in the value of the business, from smoke-free policies.

Even if smoke-free policies do not affect revenues, they may reduce costs. Labor costs should decrease because smoking is linked to increases in days lost due to illness and higher worker compensation costs (Musich et al., 2001). A smoke-free policy will not only reduce employee exposure to secondhand smoke (SHS) and improve pulmonary (Eisner et al., 1998) and cardiac (Glantz and Parmley, 2001) health but will also encourage employees to stop smoking (Fichtenberg and Glantz, 2002), increasing employee productivity because fewer days are lost to illness. Capital costs should also decrease. SHS is absorbed by everything from carpets to walls to stainless

*Alamar:* Postdoctoral fellow, Center for Tobacco Control Research and Education, University of California at San Francisco, 530 Parnassus Ave., #366, San Francisco, CA 94114. Phone 1-415-476-3139, Fax 1-415-514-9345, E-mail bala7450@jitsa.ucsf.edu

*Glantz:* Professor of Medicine, Center for Tobacco Control Research and Education, University of California at San Francisco, Box 1390, San Francisco, CA 94143. Phone 1-415-476-3893, Fax 1-415-514-9345, E-mail glantz@medicine.ucsf.edu

### ABBREVIATIONS

BEA: Bureau of Economic Analysis  
BLS: Bureau of Labor Statistics  
CI: Confidence Interval  
GSP: Gross State Product  
SDCF: Sellers Discretionary Cash Flow  
SHS: Secondhand Smoke  
WLS: Weighted Least Squares

steel, causing discoloration (Daisey, 1999). Smoke is reemitted, causing upholstery to smell (Daisey, 1999), necessitating more frequent cleaning. Equipment and furnishings are degraded from cigarette burns and ashes that do not always find their way into ashtrays. Of course, smoke-free policies may increase revenues if they induce people who would not eat in restaurants because of SHS to patronize smoke-free restaurants.

These two effects (no or a positive effect on revenues and lower costs) mean that restaurants in places that prohibit smoking should be more profitable on both a gross (total profits) and margin (profits as a percentage of sales) basis than comparable restaurants that are not in smoke-free jurisdictions. In a competitive market, the restaurant that achieves higher margins will be sold for a higher price. This difference in price between equivalent businesses in locations that restrict and permit smoking is called the smoke-free premium.

Using a database that records the purchase price of restaurants that are sold, the authors found that restaurants in localities with smoke-free ordinances sell for a higher price than comparable businesses in areas with no restrictions on smoking. After controlling for relevant economic variables, there is a median increase of 16% in the sale price of a restaurant directly attributable to the existence of a smoke-free law. Thus, smoke-free ordinances substantially increase profitability of restaurants.

## II. DATA

The authors obtained data on sales of restaurants and bars from the BizComps database (Sanders, 2003) for transactions by Standard Industrial Classification codes (defined by the Statistical Policy Division of the U.S. Office of Management and Budget to classify all industries in the U.S. economy) 5812 (Eating and Drinking Establishments) and 5813 (Drinking Places). BizComps is a proprietary database that contains information about businesses that are sold and is used extensively by business valuation professionals. The details of each transaction are submitted by a certified business intermediary who in turn receives a survey report of all transactions in his or her region using standard definitions for each data field (Sanders, 2003). BizComps provides the details of each transaction, including sale price, sellers discretionary cash flow (SDCF, defined as the

reported pretax cash received by the owner from the operation of the restaurant not including all noncash costs, such as depreciation from the year of the sale), annual gross revenues, geographic location, and date of transaction. The database contains over 7000 transactions from many types of business, including restaurants, manufacturers, and distributors.

The principle use of the database is to provide certified business appraisers a statistical sample of businesses similar to that of one they are trying to appraise. These appraisals have an array of uses, including evidence in court, tax filings, and general business decisions. Because there is such a broad set of uses for the samples of businesses, there is no reason to believe that the samples are biased up or down. Should an unrecognized bias exist, however, it would be consistent across all data points and not correlated to smoke-free policies because the database was established for other purposes. The authors searched the online version of the database ([www.bvmarketdata.com](http://www.bvmarketdata.com)) on 10 February 2003. This search produced 1146 transactions within the restaurant and bar industry between 31 January 1991 and 19 August 2002 (Sanders, 2003).

Transactions in which the business was described as catering, carry-out (only), drive-thru (only), drive-in (only), espresso stand, take-out, or mobile concessions (417) were eliminated because they would not be affected by a smoke-free law because they provide food for consumers to eat away from the business. An additional 48 transactions were eliminated that had incomplete data. Seventy-three of the remaining transactions were standalone bars and were segregated from the restaurant data, leaving a sample size of 608 restaurants with 118 being in smoke-free locations. Table 1 summarizes these data.

The authors used the American Non-smokers' Rights Foundation Local Ordinance Database (as of 2 February 2003) to determine which businesses were covered by local 100% smoke-free restaurant ordinances. An ordinance was deemed to be 100% smoke-free only if it does not allow smoking in attached bars, does not allow smoking in separately ventilated rooms, and has no exemptions based on the size of the restaurant. Statewide smoke-free restaurant laws were enacted in California (1994) and Utah (1995) during the time period spanned by the data. The date the laws were enacted, as opposed to the date of

**TABLE 1**  
Summary of Restaurant Transaction  
Data

	Smoke-Free	Smoking
<i>N</i>	118	490
Median price (\$'000s)	95 (67–140) <sup>a</sup>	95 (50–157) <sup>a</sup>
Gross sales (\$'000s)	292 (186–418) <sup>a</sup>	277 (170–465) <sup>a</sup>
Median <i>SDCF</i> /sales	0.23 (0.16–0.30) <sup>a</sup>	0.18 (0.13–0.25) <sup>a</sup>
Median <i>P/S</i>	0.35 (0.26–0.48) <sup>a</sup>	0.34 (0.25–0.47) <sup>a</sup>
Family restaurants Percentage	6 5%	51 10%
Fast food restaurants Percentage	80 68%	238 49%

<sup>a</sup>Interquartile range.

implementation, was used because any prospective buyer would know that the law was to come into effect. This information would be factored into the sale price agreed to by the buyer and seller of the restaurant. A dummy variable was defined to indicate the presence of a smoke-free restaurant law that was 1 when a smoke-free law had been enacted prior to the transaction date and 0 otherwise.

To control for the economic differences across time and geographic region, the authors obtained the per capita gross state product (GSP) and annual percentage GSP growth for all states for all years in which transactions occurred from the Bureau of Economic Analysis (BEA) and unemployment rates by state and by year from the Bureau of Labor Statistics (BLS 2003; BEA 2003). GSP is reported in real terms with a base year of 2003 using the standard inflators of the BEA. All variables reported in dollars were adjusted to real terms using the standard inflators of the BEA and a base year of 2003. To further control for any variance across time, a year variable was used with 1992 counted as year 0.

### III. ECONOMETRIC MODEL

The ratio of the transaction price to gross revenue (*P/S*) is a standard valuation measure to compare transactions. Dividing the price of the restaurant by its annual total gross sales allows for a standardization across restaurants of various sizes. This is a particularly good

**TABLE 2**  
Determinates of the Price-to-Sales Ratio  
(*P/S*) (ordinary text squares)

	Coefficient	SE	P
Smoke-Free	0.059	0.021	0.006
Constant	0.398	0.047	<0.001
<i>SDCF</i> /sales	0.708	0.067	<0.001
Per capita GSP (\$)	–0.003	0.002	0.152
GSP growth rate (% per year)	1.089	0.549	0.048
Unemployment (%)	–1.388	0.517	0.008
Fast food	0.067	0.018	0.000
Family	–0.036	0.012	0.048
Time	–0.018	0.004	<0.001
Weighted <i>R</i> <sup>2</sup>	0.824		

measure of comparative value in service industries that are not capital-intensive (Pratt and Schweih, 2000). *P/S* was regressed on the smoke-free dummy variable; the ratio of the *SDCF* to sales (*SDCF/S*), which represents the profit margin of the business; per capita GSP in dollars; GSP percentage growth rate; statewide unemployment percentage; dummy variables for fast food and family-style restaurants; and time.

White's test (White, 1980) on the residuals from ordinary least squares regression indicated the presence of heteroscedasticity. To correct for this problem a weighted least squares (WLS) regression was used with *SDCF* as the weight. This procedure assumes that the variance in the error terms is inversely proportional to *SDCF*, thus the larger (higher *SDCF*) restaurants are weighted more heavily. White's test on the weighted residuals did not reject homoscedasticity, and the WLS regression results are reported.

### IV. RESULTS

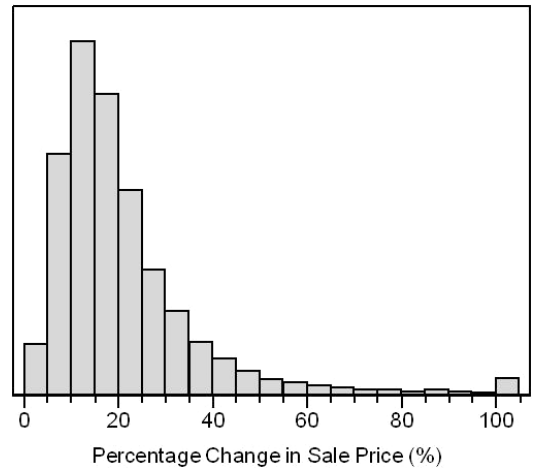
Table 2 presents the WLS regression results. The positive and statistically significant coefficient for the smoke-free variable indicates that restaurants that operate under smoke-free regulations have a *P/S* ratio that is  $0.059 \pm 0.021$  (SE) higher than in comparable restaurants not in smoke-free locations. A restaurant in a smoke-free location sold for a higher price (thus the higher *P/S* ratio) than a restaurant with the same sales in a smoking location. This smoke-free premium indicates that businesses in smoke-free locales operate at a higher margin (i.e., more profits).

Of the control variables, *SDCF/S*, GSP growth rate, unemployment, the fast food and the family dummy variables, and time were also significant. The positive and significant coefficients for GSP growth and fast food are not surprising because high growth rates indicate businesses are growing and thus more profitable, and fast food restaurants are low-cost, high-turnover establishments that tend to be highly profitable. The negative coefficient for the unemployment rate suggests that as unemployment rises restaurant values decline, presumably because as more people become unemployed, fewer go out and spend money in restaurants. The negative coefficient for the family restaurant dummy suggests that family-style restaurants are less profitable than other restaurants. The negative coefficient for time suggests that real restaurant values have been falling over time, which indicates that the market has become more competitive over time. The coefficient on per capita GSP was not significant.

The authors further tested the robustness of the model by adding a quadratic time factor. The quadratic time coefficient was not significant, and its inclusion had no effect on the smoke-free coefficient.

The authors did a Monte Carlo simulation (20,000 iterations) to estimate the additional value a restaurant owner could expect from the enactment of a smokefree ordinance. Price and *P/S* ratios were randomly drawn from the 490 smoking restaurants in the sample. A random value of the increase in *P/S* ratio, the coefficient for the smoke-free dummy variable in the regression analysis (Table 2), was drawn from a normal distribution with mean 0.059 and SD 0.021. The ratio of the smoke-free coefficient to the *P/S* ratio represents the expected percentage increase in value the smoking restaurant would experience should a local smoke-free ordinance be enacted (Figure 1). The authors multiplied this percentage increase in value by the corresponding sale price of the smoking restaurant to determine the absolute increase in value of the restaurant (in dollars) associated with the smoke-free law (Figure 2). This procedure yielded a median percentage increase in the sale price of restaurants in smoke-free communities of 16% (interquartile range of 11% to 25%), corresponding to a median dollar value increase of \$15,300 (interquartile range of \$9,000 to \$27,000) for restaurants that were worth a median of

**FIGURE 1**  
Distribution of Percentage Change in Sales Price for Restaurants in Smoke-Free Communities Compared to Comparable Restaurants in Communities that Permitted Smoking



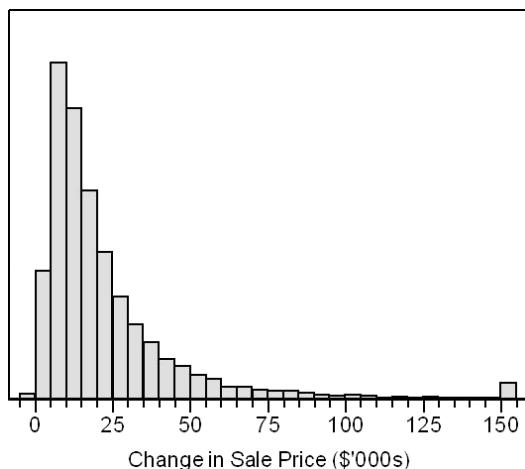
*Notes:* The median increase is 16% (interquartile range 11% to 25%). All values over 100% are included in the top bin.

\$95,000 (interquartile range \$50,000 to \$157,000) where smoking is permitted.

A potential source of bias in the parameter estimates is that enforcement of the smoke-free ordinance may vary across the sample. Whereas studies of the enforcement of the ordinances tend to reject this hypothesis (Cancer Prevention and Control Program, 2001; Weber et al., 2003), unequal enforcement would bias the estimates of the effects of the smoke-free policy (smoke-free in Table 2) toward the null. The average profitability of the restaurants included in the smoke-free sample is higher than that of the control group of restaurants that do not operate under a smoke-free ordinance. Incorrectly including a restaurant that ignores a smoke-free ordinance would then have the effect of lowering the average profitability of the sample of restaurants under smoke-free ordinances, thus reducing the estimates of smoke-free. Thus, even if enforcement does vary, it is unlikely that the present findings would be adversely effected.

A similar analysis performed for the 73 bars (including 5 that were in places with smoke-free laws) revealed a positive and significant effect

**FIGURE 2**  
 Distribution of Dollar Value of Changes  
 in Sale Price of Restaurants in  
 Communities with Smoke-Free Laws  
 over Comparable Restaurants in  
 Communities with no Restrictions



*Notes:* The median increase in value \$15,300 (interquartile range of \$9,000 to \$27,000) for restaurants that worth a median of \$95,000 (interquartile range \$50,000 to \$157,000) where smoking is permitted (Table 1). All values below \$0 and above \$150,000 are lumped into the top and bottom bins.

of 100% smoke-free bar laws on the value of the bars. The coefficient for the smoke-free dummy variable was  $0.24 \pm 0.12$  ( $P = 0.049$ ). The ratio of this value and the median *P/S* ratio for the smoking bars of 0.38 suggests that the typical bar will experience an increase of 63% in value following the enactment of a smoke-free ordinance. The sample size for bar data set was small (only 5 smoke-free bars out of 78 transactions), so this result should only be considered preliminary.

#### *Comparison with Previous Literature*

Scollo et al. (2003) reviewed 97 studies on the economic effects of smoke-free laws on the hospitality industry available as of 31 August 2002. They assessed the quality of the studies based on four criteria: use of objective data, inclusion of all data points after the law was implemented and several years before, use of regression or other statistical methods that control for secular trends and random fluctuation in the data, and appropriate control for overall economic trend. Of these 97 studies, 21 met all four

quality criteria; all 21 concluded that smoke-free policies had no effect or a positive effect on the hospitality industry. Thirty-five of the studies concluded that smoke-free policies had a negative impact on the hospitality industry; all of them were funded by the tobacco industry or organizations affiliated with the tobacco industry. In studies concluding a negative impact, the odds of using a subjective outcome measure was 4.0 times (95% confidence interval [CI] 1.4 to 9.6;  $p = 0.007$ ) and the odds of not being peer reviewed was 20 times (95% CI 2.6 to 166.7;  $p = 0.004$ ) that of studies concluding no such negative impact. All of the best designed studies report no impact or a positive impact of smoke-free restaurant and bar laws on sales or employment.

One example of the low-quality studies, as defined in Scollo et al. (2003), and funded by the tobacco industry from the economics literature is the work of Dunham and Marlow (2000) previously published in this journal. Their article was funded by Philip Morris (now Altria), the largest cigarette manufacturer in the United States and coauthored by John Dunham, “manager of fiscal issues” at Philip Morris Management. The Dunham and Marlow study presents an economic model based on a misapplication of the Coase theorem that is then “validated” through use of data from a poll that was funded by a close ally of the tobacco industry (American Tobacco, 1990). The economic model assumes that the “interested parties” are the smoking and nonsmoking patrons of the restaurant. This definition ignores the staff of the restaurant, which has a considerable interest in a smoke-free workplace due to the health risks of SHS. Dunham and Marlow assume that negotiation costs are low because the owner of the restaurant can act as a intermediary between these two groups. In contrast to the assumptions of the Coase theorem, smokers and nonsmokers are not two well-defined and distinct groups but are rather numerous individuals with varied tolerances for smoke and willingness to refrain from smoking or to go outside to smoke. Even if the staff of the restaurant is ignored, the number of interested parties is very large with greatly varied preferences in regard to the externality. The large number of interested parties would cause negotiation costs to be high, which violates the assumption of low costs in the Coase theorem. Furthermore, the externality is not well defined in the model, because

its effect on the restaurant staff is ignored. The Coase theorem is therefore not applicable.

The data that Durham and Marlow used to validate the predictions of their "economic" model is a poll conducted by Roper Starch for the National Licensed Beverage Association, a regular political ally and recipient of money from the tobacco industry (American Tobacco, 1990). It is a survey of restaurant and bar owner's *predictions* of the outcome of smoking restrictions, rather than hard data on *actual* economic outcomes. It is not surprising that the survey found that restaurant owners were fearful of smoking restrictions, because it is well documented that the tobacco industry regularly feeds misinformation to the hospitality industry to fight smoke-free ordinances (Dearlove et al., 2002).

In contrast to the work of Dunham and Marlow, the present study has a clearly defined and simple economic model (no change to revenues plus lower costs imply higher profits) and uses objective data to estimate the effects of smoke-free policies on restaurant profitability.

## V. CONCLUSION

This study is the first to examine the impact of smoke-free ordinances on the value and profitability of restaurants. The tobacco industry has argued that restaurant owners would be financially burdened by smoke-free policies (Dearlove et al., 2002; Ritch and Begay, 2001). All previous high-quality studies, however, have shown that revenues and employment are unaffected or positively affected by such policies; this study shows that, far from hurting restaurant owners, smoke-free ordinances add value to their establishments. These results add to the growing body of literature that should give restaurant and bar owners a real economic incentive to support smoke-free laws. Despite the rhetoric that smoke-free laws hurt the restaurant business, the marketplace indicates that these laws increase the profits and the values of restaurants and bars and are good for these businesses.

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