

The economic impact of state cigarette taxes and smoke-free air policies on convenience stores

Jidong Huang,¹ Frank J Chaloupka²

¹Health Policy Center, Institute for Health Research and Policy, University of Illinois at Chicago, Chicago, Illinois, USA

²Department of Economics, College of Liberal Arts & Sciences, Division of Health Policy and Administration, School of Public Health, University of Illinois at Chicago, Chicago, Illinois, USA

Correspondence to

Dr Jidong Huang, Health Policy Center, University of Illinois at Chicago, 1747 West Roosevelt Road, Room 422, Chicago, IL 60608, USA; jhuang12@uic.edu

Received 12 August 2011
Accepted 29 September 2011

Published Online First
1 November 2011

ABSTRACT

Objectives To investigate whether increasing state cigarette taxes and/or enacting stronger smoke-free air (SFA) policies have negative impact on convenience store density in a state, a proxy that is determined by store openings and closings, which reflects store profits.

Methods State-level business count estimates for convenience stores for 50 states and District of Columbia from 1997 to 2009 were analysed using two-way fixed effects regression techniques that control for state-specific and year-specific determinants of convenience store density. The impact of tax and SFA policies was examined using a quasi-experimental research design that exploits changes in cigarette taxes and SFA policies within a state over time.

Results Taxes are found to be uncorrelated with the density of combined convenience stores and gas stations in a state. Taxes are positively correlated with the density of convenience stores; however, the magnitude of this correlation is small, with a 10% increase in state cigarette taxes associated with a 0.19% ($p < 0.05$) increase in the number of convenience stores per million people in a state. State-level SFA policies do not correlate with convenience store density in a state, regardless whether gas stations were included. These results are robust across different model specifications. In addition, they are robust with regard to the inclusion/exclusion of other state-level tobacco control measures and gasoline prices.

Conclusions Contrary to tobacco industry and related organisations' claims, higher cigarette taxes and stronger SFA policies do not negatively affect convenience stores.

INTRODUCTION

Raising tobacco taxes/prices and implementing comprehensive smoke-free air (SFA) policies have been shown to be effective in reducing tobacco use, as well as non-smokers' exposure to tobacco smoke.^{1–6} Indeed, in the USA, inflation-adjusted state cigarette excise taxes have more than tripled since the early 1980s, and significant taxes have been adopted in several localities. Since 2002, 47 states, the District of Columbia and several US territories have increased their tax rates a total of >100 times.⁷ In addition, since mid-1990s, a total of 35 states and District of Columbia have adopted laws that require 100% smoke-free workplaces and/or restaurants and/or bars (26 of these states had laws in effect that require 100% smoke-free workplaces, restaurants and bars as of 31 December 2010).⁸ Moreover, according to Americans for Non-smokers' Rights, 949 municipalities currently have a 100% SFA provision in effect at the local level in workplaces and/or restaurants and/or bars (468

municipalities require workplaces, restaurants and bars to be 100% smoke-free as of 1 July 2011).⁹

While tobacco products are sold in a wide variety of retail establishments in the USA,¹⁰ in 2002, approximately 51% of the annual total retail sales of tobacco products, or about US\$26 billion, occurred in convenience stores.¹¹ Vast majority of convenience stores (95%) sell tobacco products.^{11 12} Sales of tobacco products represented 12.4% of the total sales in convenience stores in 2002.¹¹ The reduction in cigarette consumption has economic implications for the retail establishments that sell cigarettes and other tobacco products. Not surprisingly, retailers and tobacco-backed retail organisations have often argued against higher cigarette taxes, stronger SFA policies and other tobacco control policies. The anti-cigarette tax rhetoric intensified recently as a number of states and localities were considering increasing tobacco taxes to curb youth smoking and generate additional tax revenues to fill budget gaps.^{13–15} Indeed, a simple Google search using keywords 'cigarette tax hurt convenience store' generated >60 000 results as of 10 June 2011. The central thesis of this argument is that higher cigarette taxes reduce the sales of cigarettes and therefore negatively affect the business of convenience stores.

In the context of this debate, it is important to empirically investigate the economic impact of state cigarette taxes and SFA policies on convenience stores. In a seminal study, Ribisl and colleagues¹¹ examined the economic implications of the reduction in cigarette consumption in the USA for the retail establishments that sell tobacco products. Using data from the Census of Employment and Wages, they found that cigarette sales affect neither the employment nor the number of establishments of convenience stores. In addition, they found that decreasing consumption of cigarettes does not negatively influence the overall employment and number of retail establishments in the retail sector, and the decline in employment in tobacco stores are offset by the increase in employment in beer, wine and liquor stores.¹¹

In this study, we investigate how state cigarette taxes and SFA policies affect convenience store density by examining their impact on the number of convenience stores per million people in a state. Convenience store density is determined by the entry of new stores and exit of existing stores, both of which are ultimately determined by the profits of convenience stores. Our research builds on Ribisl and colleagues' study and improves the literature in a number of ways. First, we use panel data of the estimates of convenience stores for 50 states and District of Columbia during the time period

Research paper

between 1997 and 2009, examining the impact of state cigarette taxes by taking advantage of the significant within-state variations in taxes over this time period. Second, in addition to taxes, we investigate the economic impact of state SFA policies on convenience stores, a topic that has not been examined by previous literature. Furthermore, our estimates of convenience store establishments are based on a commercial database that has been validated by a number of studies using direct field observations. It helps capture the convenience store establishments that may have been overlooked by the Census of Employment and Wages, which does not collect data on establishments that are not covered by State Unemployment Insurance laws—usually small business or self-employed, a segment which may be important to the analysis of convenience stores. Our research thus provides new empirical evidence to inform the current debate.

METHODS

Data

The dependent variable in our analysis—convenience store density or the number of convenience stores per million people in a state—is constructed using Dun & Bradstreet (D&B) Marketplace data. D&B Marketplace data provide the estimates of the number of business establishments in a specific industry using a variety of sources including yellow pages, government registries, payment data, verified company financial information, courts and legal filing offices, trade references, newspapers and publications, telephone interviews, direct investigations and more. The completeness and accuracy of the commercial database such as D&B have been validated by a number of recent studies using direct field observations.^{16 17} The classification of industry in D&B Marketplace data is based on standard industrial classification (SIC) codes. A business is self-classified into a primary SIC category in D&B Marketplace data. Several secondary SIC categories can be specified for a business in addition to its primary SIC category in situations when a business participates in additional industries. Primary SIC category was used to estimate convenience store counts for 50 states and DC. Annual state-level estimates were constructed for the time period from 1997 to 2009. Our analytical panel data thus consist of 663 observations, 13 years of data for 50 states and District of Columbia.

To accurately measure convenience store density, we use two variables to capture the number of convenience stores in a state. The first one only captures convenience stores (eg, 7–Eleven, White Hen, ampm), both chain and independent. The second one broadens the first to include gas stations (both gas service and gas filling stations) and gas stations with convenience stores. In addition, we also conducted analyses that look only at gas stations. The total number of stores in a state in a given year was then divided by the total population in that state and year, multiplied by 1 million, to generate store density variables.

The key explanatory variables in this study are state cigarette excise taxes and SFA policies. These data are taken from the Bridging the Gap/ImpacTeen project's State Tobacco Control Policy Surveillance system which tracks state-level tobacco control policies, such as price/tax, tobacco control funding, youth access laws, SFA laws and SFA pre-emption laws, as well as state smoking prevalence.

State tax is the annual average of cigarette excise tax rates in a state. If the tax rate changed in a given year, we used the average of the old and new rate, weighed by the period of months each rate was in effect. State tax as well as other income

and price variables were adjusted by the Consumer Price Index published by the Bureau of Labor Statistics to account for inflation and were expressed in 2009 dollars.

State SFA policies are measured by two SFA indices. The first SFA index captures state SFA laws and pre-emption laws at private workplaces, restaurants and bars. The second SFA index broadens the first one to include state SFA laws and pre-emption laws at government buildings or workplaces, childcare centres, healthcare facilities, recreational facilities, public transit, shopping malls, hotels, and public and private schools. For SFA laws, each venue was coded using a value from 0 to 3, with 0 indicating no SFA laws, 1 indicating restrict smoking to designated smoking areas or require separate ventilation with exemptions for locations of a certain size, 2 indicating that smoking was restricted to separately ventilated areas or a ban with exemptions for certain locations where only a restriction applies and 3 indicating a comprehensive smoke-free policy that bans smoking at all times. In addition, to account for state pre-emption of stronger local policies, a dichotomous variable was used for each venue with 0 indicating no pre-emption laws and 1 indicating having pre-emption laws. The SFA index was constructed by summing up the values of SFA laws, subtracting the total values of pre-emption laws, in all venues. The effective dates of SFA and pre-emption laws were taken into account when constructing the SFA and pre-emption indices; as a result, the actual value of these indices may not be an integer.

In order to capture the impact of gasoline prices on convenience stores, we used the state-level motor gasoline price estimates in the transportation sector from the State Energy Data System, which is provided by the US Energy Information Administration. Prices are retail prices (usually service station prices). Prices are expressed using Btu prices, which are computed by converting the physical unit prices in dollars per gallon to dollars per barrel (42 gallons per barrel). The prices are then converted to dollars per million Btu by using a variable annual factor. More details on the gasoline price variable can be found at the US Energy Information Administration's website.¹⁸

State economic indicators, such as per capita personal income and unemployment rates, were obtained from the Federal Reserve Bank of St Louis's FRED database.¹⁹ Finally, we created mutually exclusive but all-inclusive dichotomous indicators for each state and each year. The dichotomous state indicators capture all time-invariant state-level unobserved heterogeneity. The year indicators account for overall time trend and year-specific heterogeneity.

Statistical methods

This quasi-experimental study used two-way fixed effects regression techniques that control for state-specific and year-specific determinants of convenience store density in a state. The state effects control for state characteristics that are constant over time within a state but vary across states. The year effects capture the influences on convenience store density that are common to all states but vary over time. Specifically, we estimate the following pooled cross-sectional time series multivariate equation:

$$Y_{it} = \text{TAX}_{it}\beta + \text{SFA}_{it}\lambda + \text{ECONOMIC}_{it}\delta + s_i + y_t + e_{it}.$$

Y represents one of the three dependent variables (the density of convenience stores, gas stations, and combined convenience stores and gas stations) for state i in year t . TAX is the state cigarette excise tax rate in state i and in year t . SFA represents the value of comprehensive SFA index in state i and year t . ECONOMIC are economic indicators, such as inflation adjusted

per capita personal income, unemployment rate or gasoline prices, in state i , in year t . Finally, s represents the state fixed effects and y the year fixed effects. e is the idiosyncratic error term.

Given the nature of the dependent variables, which are count variables, the appropriate statistical methods to estimate the parameters in the models are Poisson and negative binomial regressions.²⁰ Negative binomial regression is used for overdispersed count data. It can be considered as a generalisation of Poisson regression given it has the same mean structure as Poisson regression and has an extra parameter to model the overdispersion. A likelihood ratio test can be performed to determine whether negative binomial or Poisson regression should be used. Based on the likelihood ratio tests, models analysing convenience stores were estimated using negative binomial regression. Models analysing gas stations and combined stores were estimated using Poisson models. Finally, the SEs in all the models were constructed so as to allow for arbitrary correlations in errors within a state over time and across states in a given year.

RESULTS

Summary statistics are presented in table 1. The average density of convenience stores in a state was 220 stores per million people for the period from 1997 to 2009. Figure 1 shows the time trend of convenience store density. Despite declines around 2000 and 2007, the overall trend was upward, with the average convenience store density in a state increasing from 207 in 1997 to 230 in 2009. The average density of gas stations in a state in our study period was 259 stations per million people. Average inflation-adjusted state tax rates were 79 cents (in 2009 dollar), and the average comprehensive SFA index was 11. Average state tax rates have gone up from 47 cents in 1997 to 127 cents in 2009 (figure 2), reflecting the tax increases in states since 1997. The comprehensive SFA index increased from 5 in 1997 to 22 in 2009 (figure 3), reflecting the increasingly stronger SFA policies across states. In addition, during the same time period, gasoline prices saw significant increases (figure 4). Inflation-adjusted gasoline price has gone up from \$13 per million Btu in 1997 to \$26 per million Btu in 2008.

Regression results are summarised in table 2. The top panel in table 2 presents the estimated coefficients from the analysis of convenience stores using negative binomial regressions. The middle panel presents the estimated coefficients for the analysis of gas stations using Poisson regressions. The bottom panel presents the results for the combined convenience stores and gas

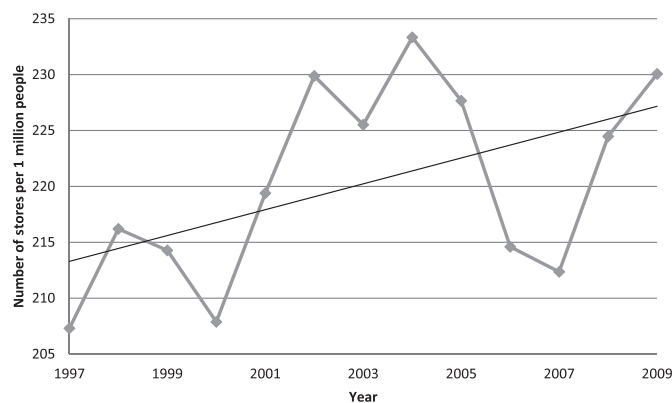


Figure 1 Average number of convenience stores in a state.

stations from Poisson regressions. Each set of analyses consists of four different models. Model 1 looks at the impact of state tax alone, and model 2 looks at the impact of state tax and SFA policies. Model 3 is similar to model 1, and model 4 is similar to model 2, with the differences being that the last two included the gasoline price in the analysis.

Results in the top panel of table 2 indicate that state taxes are positively associated with convenience store density in a state. This association is marginally significant ($p < 0.05$) in all four model specifications. The magnitude of the estimated coefficients is fairly stable across different models. The estimated coefficients of negative binomial models can be interpreted as the difference in the logs of expected counts of the response variable caused by a one-unit change in the predictor variable. Given the tax variable is also in log form, the estimated coefficient can be interpreted as the tax elasticity. In the models without SFA policies, the estimated coefficients imply that a 1% increase in state tax is associated with a 0.017% increase in convenience store density. In the models with SFA policies, a 1% increase in state tax is associated with a 0.019% increase in convenience store density.

SFA policies do not appear to be correlated with convenience store density. The estimated coefficient of SFA index is positive; however, it is only statistically significant in model 2. The estimated coefficients for the state per capita personal income variable are also positive but statistically insignificant. Gasoline price is found to be negatively associated with convenience store density. The estimated coefficients for the gasoline variables are highly significant ($p < 0.001$).

Table 1 Summary statistics

Variable name	Number of observation	Mean	SD	Min	Max
Number of convenience stores per million people in a state	663	220	81	84	441
Number of gas stations per million people in a state	663	259	69	102	515
Combined number of gas stations and convenience stores per million people	663	480	124	241	801
Inflation-adjusted state per capita personal income, in 2009 dollars	663	37 070	6245	25 234	66 268
State unemployment rate	663	5	2	2	14
Inflation-adjusted gasoline price, dollars per million Btu, in 2009 dollars	612	17	5	9	29
Inflation-adjusted state cigarette excise tax, in 2009 cents	663	79	59	3	318
Comprehensive smoke-free air policy index	663	11	12	-9	39

Research paper

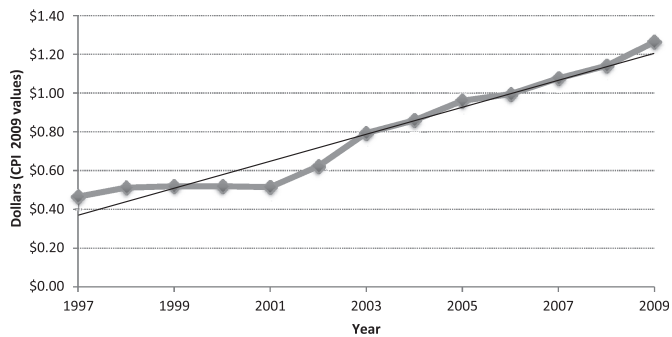


Figure 2 Average state inflation adjusted cigarette tax rates. CPI, Consumer Price Index.

The second panel of table 2 presents the results for the analysis of gas stations. Unlike the analysis for convenience stores, models analysing gas stations were estimated using Poisson regressions. Neither state taxes nor SFA policies are correlated with the number of gas stations, as neither of their estimated coefficients are statistically significant. The estimated coefficients for gasoline price are negative but not statistically significant. State per capita personal income is found to be negatively correlated with gas station density. The estimated coefficients for state per capita personal income are marginally significant ($p < 0.05$) in models 3 and 4.

The last panel in table 2 summarises the analysis for the combination of convenience stores and gas stations. State taxes and SFA policies are found to be positively, but not significantly, correlated with the number of these stores. Given the quasi-experimental research design, it indicates that neither state taxes nor SFA policies negatively affects the combined number of convenience stores and gas stations in a state. Similarly, state per capita personal income is also found to be uncorrelated with these stores. Gasoline prices, however, are found to be negatively correlated with the number of these stores, with a 1% increase in gasoline price associated with a 0.18% decrease in the number of stores per million people in a state.

To assess the robustness of the results presented in table 2, we employed alternative modelling techniques such as linear regressions. In addition, the comprehensive SFA index was replaced with a narrowly defined SFA index that only captures the SFA policies at private workplaces, restaurants and bars. Furthermore, a measure of state tobacco control funding was included in all the models. Finally, state unemployment rates were added to the models to capture the aspects of state economic environment that were not captured by state per capita personal income. None of those changes altered the signs

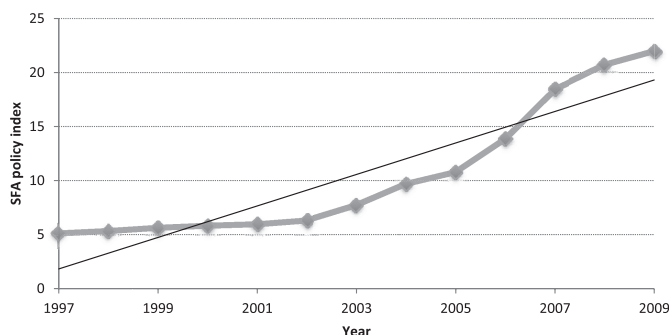


Figure 3 Average state-level smoke-free air (SFA) policy index.

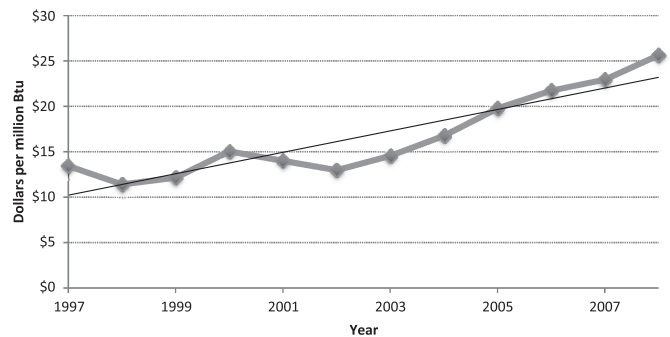


Figure 4 Average state-level gasoline price, dollars per million Btu.

and magnitude of the estimated coefficients for the variables presented in table 2 in a substantial way (all results mentioned above are available upon request).

Our analyses indicate that state taxes are not correlated with the number of gas stations and the combined number of convenience stores and gas stations. State taxes are positively correlated with the number of convenience stores; however, the magnitude of this correlation is small, with a 10% increase in state taxes associated with a 0.19% increase in the number of convenience stores per million people in a state and is significant only at the 0.05 level. Our results also show that state SFA policies do not correlate with convenience store and gas station densities, regardless examined as separate categories or in combination. Our finding that state cigarette excise taxes and SFA policies do not negatively affect convenience store density in a state is robust across different model specifications. It is not sensitive to whether gas stations were included as convenience stores. In addition, it is robust with regard to the inclusion/exclusion of other state-level tobacco control measures and gasoline prices.

DISCUSSIONS AND CONCLUSIONS

The results of our study clearly demonstrated that higher state taxes and stronger SFA policies have had no negative impact on gas stations and convenience stores, examined as separate categories and in combination. Our results are consistent with the study done by Ribisl *et al*, who found that the reduction in cigarette consumption has had no impact on overall employment and the number of establishments in the retail sector in the USA between the time period 1990 and 2004. While we found a positive correlation between state taxes and convenience store density, as discussed earlier, this positive correlation is weak both in terms of statistical power and its magnitude. Given that, we cannot conclusively demonstrate that higher state taxes increase convenience store density in a state. More studies are needed to better assess the implications of the policies that complement cigarette tax increase and limit tobacco retailer density.

There are a number of possible explanations that can explain why higher taxes and stronger SFA policies do not negatively affect convenience stores. It is well documented that tobacco industry price discounting strategies, price-reducing marketing activities and lobbying efforts mitigate the impact of tobacco excise tax increases.²¹ According to a recent Federal Trade Commission report,²² in 2006, tobacco industry spent \$12.5 billion (down from \$13.1 billion in 2005) on advertising and promotions, among which the largest single category was price discounts paid to cigarette retailers or wholesalers in order to reduce the price of cigarettes to consumers. This one category

Table 2 The impact of state cigarette tax and SFA policy on convenience stores

	Model 1	Model 2	Model 3	Model 4
Number of narrowly defined convenience stores per million people (estimated coefficients from negative binomial regression)				
Log inflation-adjusted state cigarette tax	0.017* (0.007)	0.019* (0.007)	0.017* (0.008)	0.019* (0.008)
SFA policy index		0.001* (0.0005)		0.001 (0.001)
Log inflation-adjusted per capita personal income	0.203 (0.109)	0.165 (0.116)	0.151 (0.124)	0.123 (0.131)
Log inflation-adjusted gas price			-0.703*** (0.130)	-0.684*** (0.130)
Number of gas stations per million people (estimated coefficients from Poisson regression)				
Log inflation-adjusted state cigarette tax	-0.004 (0.005)	-0.005 (0.005)	-0.002 (0.005)	-0.002 (0.005)
SFA policy index		-0.0003 (0.0004)		0.0006 (0.0004)
Log inflation-adjusted per capita personal income	-0.252** (0.078)	-0.244** (0.078)	-0.205* (0.083)	-0.204* (0.085)
Log inflation-adjusted gas price			-0.003 (0.077)	-0.005 (0.077)
Number of broadly defined convenience stores (including gas stations) per million people (estimated coefficients from Poisson regression)				
Log inflation-adjusted state cigarette tax	0.003 (0.005)	0.004 (0.005)	0.004 (0.005)	0.004 (0.005)
SFA policy index		0.0004 (0.0003)		0.0004 (0.0003)
Log inflation-adjusted per capita personal income	-0.089 (0.067)	-0.099 (0.070)	-0.075 (0.077)	-0.087 (0.080)
Log inflation-adjusted gas price			-0.188** (0.062)	-0.179** (0.061)
Number of observation	663	663	612	612

The gasoline price variable is included in models 3 and 4 but not in models 1 and 2. Models 3 and 4 cover only the time period 1997-2008, as gasoline price data in 2009 were not available at the time of this study. As a result, the number of observations in models 3 and 4 are 612 (51*12). SFA policy index is included in models 2 and 4 but not in models 1 and 3. All four models include state fixed effects and year fixed effects. The likelihood ratio tests were performed to examine whether Poisson or negative binomial regressions should be used. For the analysis of narrowly defined convenience stores, the probability that the estimated overdispersion coefficients differ from zero was less than 0.001 for all four models, hence, negative binomial models were used. For the analysis of gas stations and broadly defined convenience stores, the likelihood ratio tests indicated that the overdispersion coefficients do not differ from zeros; as a result, Poisson models were used. Missing cells represent the variables are not included in the model. SEs in parentheses. The SEs in all the models were constructed so as to allow for arbitrary correlations in errors within a state over time and across states in a given year. Significance levels: *** $p < 0.001$, ** $p < 0.01$, * $p < 0.05$. Inflation was adjusted to 2009 dollars. SFA, smoke-free air.

accounted for \$9.2 billion (or 73.7%) of the total advertising and promotional expenditures by tobacco industry in 2006. To put this into context, the total revenue states received from cigarette excise taxes in 2006 was \$13.8 billion, up from \$12.2 billion in 2005. Thus, tobacco industry's marketing spending on reducing cigarette prices was equivalent to two thirds of the total cigarette tax revenues states received. It outweighed and offset the \$1.6 billion tax increase, which largely resulted from the increase of cigarette tax rates in a number of states between 2005 and 2006. Because the price-reducing promotions and discounts were used to soften the impact of state and federal tax increases, the impact of higher state cigarette taxes on cigarette prices was mitigated, so did their impact on the sale of cigarettes.

Additionally, while higher cigarette taxes that increase prices reduce cigarette consumption, and hence the sales of cigarettes, it does not mean that higher cigarette taxes reduce the total sales in a convenience store. Money previously spent on tobacco products will be spent on other goods and services, such as gasoline and coffee, creating alternative sales. As a result, total sales in a convenience store may or may not be affected by higher cigarette tax.

Furthermore, as standard economic theory predicts, the success of a convenience store depends on its profits, not sales. The profits of a convenience store may well be increased when a cigarette tax increase was over-shifted to consumers, meaning that the tax increase was passed through to consumer prices at a rate higher than one-for-one. For instance, when a state increased its cigarette excise tax rate, a convenience store might sell fewer packs per day because of smokers quitting and curtailing consumption. However, the profits of the store may not be affected if the store raises prices to make up for the unsold packs. And if the percent increase in price is bigger than the percent decrease in sales, the profits may even go up. Indeed, substantial evidence from the studies that examine the relationship between cigarette taxes and retail prices points to this direction.²³⁻²⁷ For example, a recent study in 2008 estimated that a \$1 increase in state cigarette excise tax increases cigarette prices by \$1.10-\$1.13.²⁷ With over-shifting of cigarette taxes,

the profits of a convenience store could increase, despite of the decline in cigarette sales. This implies higher cigarette tax may have a positive impact on convenience store profits.

Similar arguments can be made regarding adopting stronger SFA policies. After SFA policies were enacted, money that used to be spent on cigarettes does not disappear from the economy, instead, it will be spent on other goods and services in convenience stores. As a result, enacting stronger SFA policies may not have a substantial impact on a convenience store's total sales and profits. Indeed, a number of previous studies found that reduction in tobacco use leads to no or small net positive impact on state employment and income, as money once spent on tobacco products would be spent on other goods and services, which leads to increased economic activity and employment in other sectors.²⁸⁻²⁹ In addition, when stronger SFA policies become effective, convenience stores can make up for the reduction in cigarette sales by raising cigarette prices. The findings from our study showing stronger SFA policies have had no negative impact on convenience store density support these hypotheses.

Our study is subject to at least two limitations. We were unable to examine store-level sales and profits directly and unable to investigate variations in convenience store profits within a state (eg, the profits of convenience stores that are close to state borders may be more affected by cigarette tax differentials between states than stores far away from state borders) due to lack of such data. Future researches can improve the analysis by incorporating store-level sales and profits data. Despite these limitations, our study provide new evidence that shows higher cigarette taxes and stronger SFA policies do not negatively affect convenience store density in a state, a proxy that reflects the entry of new stores and exit of existing stores, which are ultimately determined by convenience store profits.

These findings from our study clearly counter tobacco industry and related organisations' claims that higher cigarette taxes and stronger comprehensive smoke-free policies have a negative economic impact on convenience stores. Our results provide new evidence to state and local policymakers on the economic benefits of raising cigarette taxes and enacting SFA

Research paper

What this paper adds

- ▶ Very limited research has been conducted on the economic impact of cigarette taxes and smoke-free air policies on convenience stores.
- ▶ Results show, contrary to what tobacco industry and related organisation claim, neither higher cigarette taxes nor stronger smoke-free air policies has a negative economic impact on convenience stores.

policies. In addition, our study also helps inform policymakers in other countries where the opposition of enacting stronger tobacco control policies are based in part on the fears of the negative economic impact on their retail sectors.

Acknowledgments The authors would like to thank the editors and reviewers of Tobacco Control and Dr Kurt Ribisl for their helpful and constructive comments and suggestions. In addition, the authors are grateful to Cezary Gwarnicki and Oksana Pugach for their excellent research assistance. Support for this project was provided by the Robert Wood Johnson Foundation as part of Bridging the Gap: Research Informing Practice and Policy for Healthy Youth and ImpacTeen: A Policy Research Partnership for Healthier Youth Behaviour.

Competing interests None.

Contributors This study was designed by FJC and JH; the analysis was done by JH; JH and FJC wrote the analysis and final draft.

Provenance and peer review Not commissioned; externally peer reviewed.

REFERENCES

1. **Jha P**, Chaloupka FJ. *Curbing the Epidemic: Governments and the Economics of Tobacco Control*. Washington DC: The International Bank for Reconstruction and Development/The World Bank, 1999.
2. **Jha P**, Chaloupka FJ, eds. *Tobacco Control in Developing Countries*. Oxford: Oxford University Press, 2000.
3. **National Cancer Institute**. *Population Based Smoking Cessation: Proceedings of a Conference on What Works to Influence Cessation in the General Population. Smoking and Tobacco Monograph 10*. Bethesda, MD: U.S. Department of Health and Human Services, National Institutes of Health, National Cancer Institute, 2000.
4. **Task Force on Community Preventive Services**. The guide to community preventive services: tobacco use prevention and control. *Am J Prev Med* 2001;**20**:1–88.
5. **Task Force on Community Preventive Services**. *The Guide to Community Preventive Services: What Works to Promote Health?* New York: Oxford University Press, 2005.
6. **U.S. Department of Health and Human Services**. *The Health Consequences of Involuntary Exposure to Tobacco Smoke: A Report of the Surgeon General*. Atlanta, GA: U.S. Department of Health and Human Services, Centers for Disease Control and Prevention, Coordinating Center for Health Promotion, National Center for Chronic Disease Prevention and Health Promotion, Office on Smoking and Health, 2006.
7. **Campaign for Tobacco Free Kids**. *State Cigarette Excise Tax Rates and Rankings*. 2010. <http://www.tobaccofreekids.org/research/factsheets/pdf/0097.pdf>
8. **Centers for Disease Control and Prevention**. State smoke-free laws for worksites, restaurants, and bars—United States, 2000–2010. *MMWR Morb Mortal Wkly Rep* 2011;**60**:472–5.
9. **American Nonsmokers' Rights Foundation**. *Overview List—How Many Smoke-free Laws, as of July 1, 2011*. 2011. <http://www.no-smoke.org/pdf/mediaordlist.pdf>
10. **Ribisl KM**. Retailing. In: Goodman J, Norton M, Parascandola M, eds. *Tobacco in History and Culture: An encyclopedia* (Scribner Turning Points Library). Farmington Hills, MI: Charles Scribner's Sons, 2004:496–504.
11. **Ribisl KM**, Evans WN, Feighery EC. Falling cigarette consumption in the U.S. and the impact upon tobacco retailer employment. In: Bearman P, Neckerman K, Wright L, eds. *Social and Economic Consequences of Tobacco Control Policy*. New York: Columbia University Press, 2011.
12. **U.S. Department of Commerce**. *2002 Economic Census Retail Trade Geographic Area Series*. <http://www.census.gov/prod/ec02/ec0244a1us.pdf> (accessed 17 Jun 2011).
13. **National Association of Convenience Stores (NACS online)**. *NY Tobacco Tax Hike Will Hurt Convenience Stores*. <http://www.nacsonline.com/NACS/News/Daily/Pages/ND0623104.aspx> (accessed 20 Feb 2011).
14. **Convenience Store News**. *Texas Cigarette Tax Hurts Retailers*. http://www.csnews.com/top-story-texas_cigarette_tax_hurts_retailers-42575.html (accessed 20 Feb 2011).
15. **Cigarettereview.com**. *Cigarette Tax Hikes Hurt Small Businesses More Than Smokers*. <http://www.cigaretteresreviews.com/cigarette-tax-hikes-hurt-small-businesses-more-than-smokers> (accessed 20 Feb 2011).
16. **Powell LM**, Han E, Zenk SN, et al. Field validation of secondary commercial data sources on the retail food outlet environment in the U.S. *Health Place* 2011;**17**:1122–31.
17. **Liese AD**, Colabianchi N, Lamichhane AP, et al. Validation of three food outlet databases: Completeness and geospatial accuracy in rural and urban food environments. *Am J Epidemiol* 2010;**172**:1324–33.
18. **U.S. Energy Information Administration**. *State Energy Data 2008: Prices and Expenditures*. http://www.eia.doe.gov/emeu/states/sep_prices/notes/pr_petrol.pdf
19. **Federal Reserve Bank of St Louis**. *Federal Reserve Economic Data (FRED) database*. <http://research.stlouisfed.org/fred2/>
20. **Cameron Colin A**, Trivedi PK. *Regression Analysis of Count Data, Econometric Society Monograph No.30*. Cambridge: Cambridge University Press, 1998.
21. **Chaloupka FJ**, Straif K, Leon ME. Effectiveness of tax and price policies in tobacco control. *Tob Control* 2011;**20**:235–8.
22. **Federal Trade Commission**. *Cigarette Report for 2006*. Washington DC: Federal Trade Commission, 2009.
23. **Delipalla S**, O'Donnell O. Estimating tax incidence, market power and market conduct: The European cigarette industry. *Int J Ind Organ* 2001;**19**:885–908.
24. **Hanson A**, Sullivan R. The incidence of tobacco taxation: evidence from geographic micro-level data. *Natl Tax J* 2009;**62**:677–98.
25. **Keeler TE**, Hu TW, Barnett PB, et al. Do cigarette producers price-discriminate by State? An empirical analysis of local cigarette pricing and taxation. *J Health Econ* 1996;**15**:499–512.
26. **Sumner MT**, Ward R. Tax changes and cigarette prices. *J Polit Econ* 1981;**89**:1261–5.
27. **Sullivan R**. *The Effect of Cigarette Taxation on Prices: An Empirical Analysis using City-Level Data*. (13 July 2011). <http://ssrn.com/abstract=1916764>
28. **Warner KE**, Fulton GA. The economic implications of tobacco product sales in a nontobacco state. *JAMA* 1994;**271**:771–6.
29. **Warner KE**, Fulton GA, Nicolas P, et al. Employment implications of declining tobacco product sales for the regional economies of the United States. *JAMA* 1996;**275**:1241–6.



The economic impact of state cigarette taxes and smoke-free air policies on convenience stores

Jidong Huang and Frank J Chaloupka

Tob Control 2013 22: 91-96 originally published online November 1, 2011
doi: 10.1136/tobaccocontrol-2011-050185

Updated information and services can be found at:
<http://tobaccocontrol.bmj.com/content/22/2/91>

These include:

References

This article cites 11 articles, 2 of which you can access for free at:
<http://tobaccocontrol.bmj.com/content/22/2/91#BIBL>

Email alerting service

Receive free email alerts when new articles cite this article. Sign up in the box at the top right corner of the online article.

Notes

To request permissions go to:
<http://group.bmj.com/group/rights-licensing/permissions>

To order reprints go to:
<http://journals.bmj.com/cgi/reprintform>

To subscribe to BMJ go to:
<http://group.bmj.com/subscribe/>