Research Replication:

“Do Workplace Smoking Bans Reduce Smoking?”

ECON 298

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Purpose

In the paper "Do Workplace Smoking Bans Reduce Smoking?" by William N. Evans, Matthew C. Farelly, and Edward Montgomery, the authors examine the effectiveness of workplace smoking bans in reducing smoking behavior among workers. The study aims to determine whether these bans, which have been implemented in various states in the U.S., lead to a reduction in smoking rates and contribute to public health improvements.

The authors use a detailed empirical analysis, employing data from the 1991 and 1993 National health interview survey focusing on smoking policies, current smoking status, average daily cigarette consumption, as well as demographic and socioeconomic information. To evaluate the impact of these bans, they utilize single equation models and multivariate regression. They also control for other factors that might influence smoking rates, such as changes in cigarette taxes, demographic trends, and health policies. Additionally, they use data from both individual-level surveys and state-level smoking statistics to ensure a robust analysis.

In their paper *"Do Workplace Smoking Bans Reduce Smoking?"* they explore not only the overall effects of workplace smoking bans but also how these effects vary across different demographic groups. They pay particular attention to factors such as age, gender, and industry type, as these aspects can influence how individuals respond to smoking bans and the resulting changes in smoking behavior. By examining demographic differences, the authors aim to better understand who benefits most from smoking bans and whether certain groups experience stronger or weaker reductions in smoking rates.

The main finding of this study was that workplace smoking bans were associated with a 5.7 percentage-point decline in smoking prevalence among workers. Additionally, workplace smoking bans were found to have led to a 10% reduction in daily cigarette consumption among smokers. The authors also provided evidence of a causal relationship between workplace smoking bans and reduced smoking by controlling for omitted variable bias and using instrumental variables.

One important demographic factor the authors examine is the industry type and the different ways smoking bans affect workers based on the nature of their work environment. Some industries had much higher rates of smoking prior to the introduction of bans, and the reduction in smoking following these bans was more pronounced.

While the paper does not delve deeply into the effects of workplace smoking bans on racial and ethnic groups, it does note that racial differences in smoking behavior may influence how smoking bans affect different populations. This replication will attempt to conduct a further analysis of the racial differences in smoking behavior with the data used from the original study between the model containing smoking bans and the model lacking smoking bans. With the given data we can make an additional analysis of the demographic differences using various methods described in the continuation of the replication.

Replications and Method

The replication data is a subset of 10,000 observations from the original data collected from the National Health Interview Survey in 1991 and 1993. In this replication we analyze the following variables in relation to smoking: smoking ban, age, high school dropout, high school graduate, some college education, college graduate, black, Hispanic,

and female. Age is measured in years, but all other variables are logical variables that are equal to 1 if it is true and equal to 0 if it is false. For example, if there is a smoking ban at a workplace the data would report a value of 1 for all of the people that work in that area.

The original study looked at similar variables such as age, education, race, and gender but also analyzed additional data such as cigarettes per day, type of work, income, and marital status. The original study also looked at average years of education while this replication looks at the maximum level of education obtained. The binary variables for education are mutually exclusive and refer to the highest level of education attained so a college graduate would have a value of 1 for that category and a value of 0 for all of the lower-level education categories.

Table 1 – Summary Statistics

Variable	Original Mean or Percentage	Replication Mean or Percentage
Smoker	24.20%	24.23%
Subject to Smoking Ban	67.30%	60.98%
Mean Age	38.30	38.69
High School Dropout	N/A	9.12%
High School Graduate	N/A	32.66%
Some College Education	N/A	28.02%
College Graduate	N/A	19.72%
Black	10.20%	7.69%
Hispanic	7.70%	11.34%
Female	45.60%	56.37%

Table 1 shows the summary statistics of the replication compared with the original study. Many of the values are approximately the same since the replication data is a subset

of the original data. The original data did not have summary statistics for the education levels but did report average years of education obtained to be 13.1 years.

Replication Results

Regression Analysis

This analysis first examined the multivariate regression results shown in table 2 below. These results show the effect of each variable on the probability of a person being a smoker. Those with negative coefficients represent the variable that reduce the probability of a person being a smoker. The results in column 1 show that those who are black, Hispanic, or female have a lower probability of being a smoker. On the other hand, variables with positive coefficients such as high school dropout represent an increase in the probability of a person being a smoker.

Table 2 – Regression Results With and Without Smoking Bans

VARIABLES	(1) smoker	(2) smoker
smkban		-0.047*** (0.009)
hsdrop	0.322*** (0.019)	0.310*** (0.019)
hsgrad	0.236*** (0.012)	0.228*** (0.012)
colsome	0.168*** (0.012)	0.163*** (0.012)
colgrad	0.049*** (0.012)	0.047*** (0.012)
black	-0.027* (0.016)	-0.026 (0.016)
hispanic	-0.098*** (0.014)	-0.097*** (0.014)
female	-0.039*** (0.009)	-0.034*** (0.009)
Constant	0.114*** (0.010)	0.145*** (0.012)
Observations	10,000	10,000
R-squared	0.050	0.053

Robust standard errors in parentheses
*** p<0.01, ** p<0.05, * p<0.1

To analyze the effect of a workplace smoking ban we first looked at the results without the smoking ban variable in column 1 and compared it with column 2 which included the workplace smoking ban variable. Including the smoking ban in our analysis reduced the impact of the other variables on the probability of being a smoker. This analysis shows that a workplace smoking ban reduces the probability of a person being a smoker by 4.7 percentage points.

Figure 1 – Change in Probability of Smoking

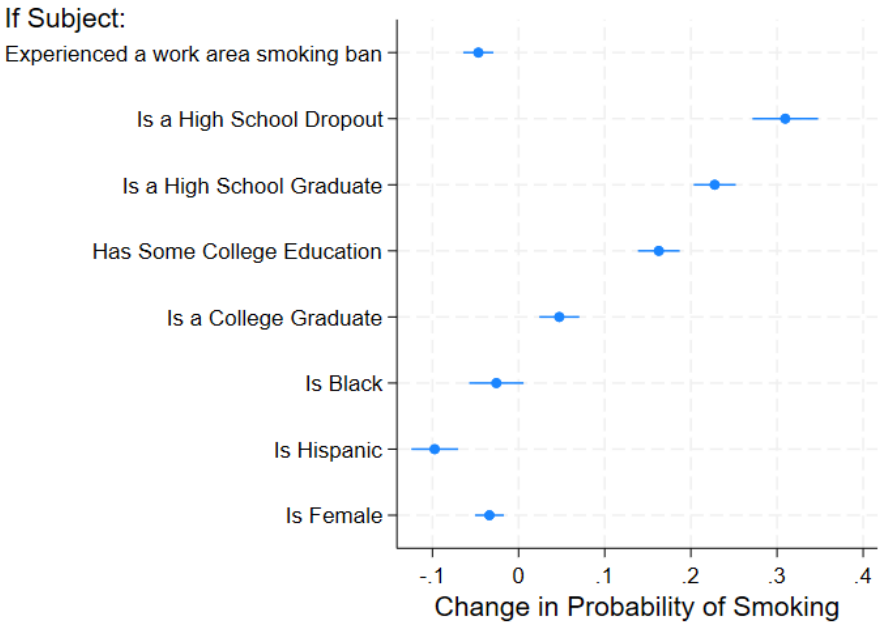


Figure 1 graphically shows the change in probability of smoking attributed to each indicator. Hispanic has the largest negative effect on smoking and reduces the probability of a person being a smoker by 9.8 percentage points. High school dropout increases the probability of a person being a smoker by the largest magnitude of 31.0 percentage points.

Education

To analyze the effect of smoking bans on the level of education we divided the observations into 4 groups depending on the number of years studying. We considered

levels of education to be high school dropout, high school graduate, some college education, and college graduate. So, we can focus on different level of education (the number of years studying) and their connection with probability of smoking.

As we see from the resulting Table 3 people with more years of education have a higher probability of being a smoker. The analysis found that there were differences in the probability of smoking between various education levels with high school dropout increasing the probability of a person being a smoker by 27.0 percentage points compared to a college graduate only have a 12.9 percentage point increase in the probability of being a smoker. The results from table 3 show a trend of decreased smoking probability as education level increases. This is consistent with findings from the original study which suggested that those with higher education levels tended to live healthier lifestyles.

Table 3 – Regression Results of Education Level

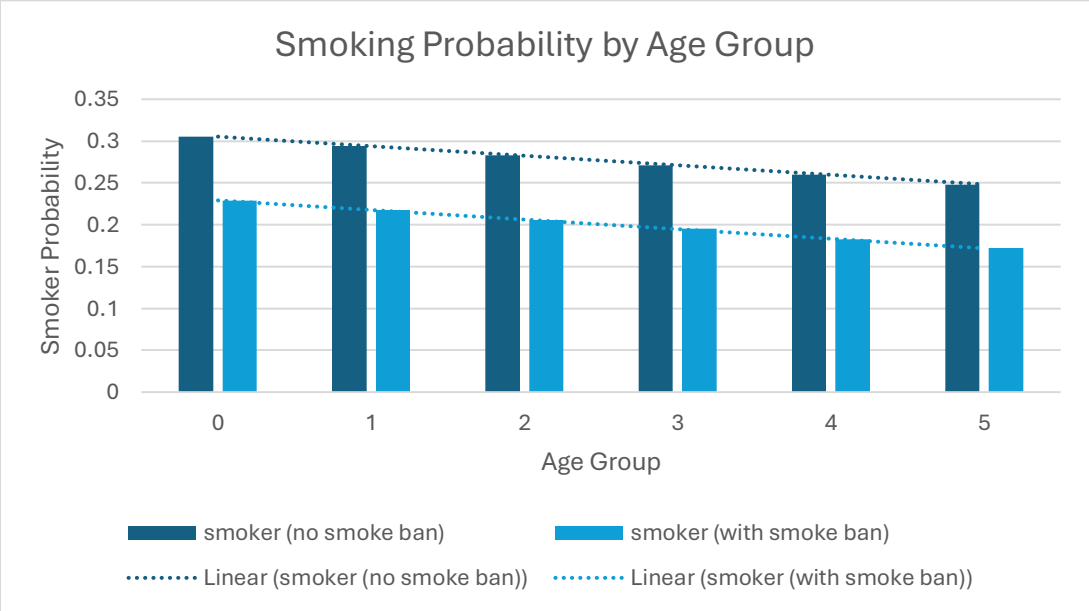
VARIABLES	(1) smoker	(2) smoker
smkban		-0.051***
		(0.009)
hsdrop	0.284***	0.270***
	(0.018)	(0.019)
hsgrad	0.222***	0.213***
	(0.012)	(0.012)
colsome	0.153***	0.148***
	(0.012)	(0.012)
colgrad	0.043***	0.042***
	(0.012)	(0.012)
Constant	0.093***	0.129***
	(0.009)	(0.011)
Observations	10,000	10,000
R-squared	0.043	0.046

Robust standard errors in parentheses
*** p<0.01, ** p<0.05, * p<0.1

Age Range

To analyze the effect of smoking bans on different age group we first divided the observations into age categories. The observations had ages ranging from 18 to 88 years. The first age group category ranged from 18 to 29 and is represented by the value 0 for the categorical variable for age group. The other age groups are defined as follows: 1 for ages 30 to 39, 2 for ages 40 to 49, 3 for ages 50 to 59, 4 for ages 60 to 69, and 5 for ages 70 to 88.

Figure 2 – Smoking Probability by Age Group



The data in figure 2 shows that younger people are more likely to smoke, and the probability declines with age. The figure also shows a negative linear relationship between

smoking probability and age regardless of whether there is a workplace smoking ban in place.

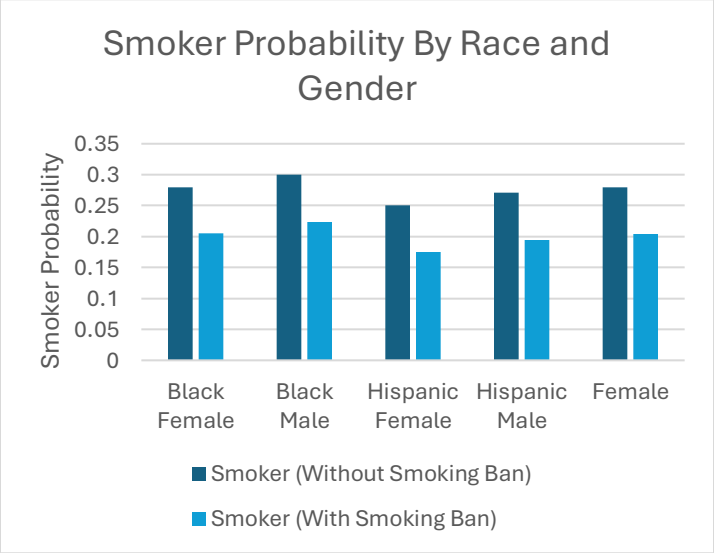
Table 4 – Effect of Smoking Bans on Different Age Groups

Without Smkban	0	1	2	3	4	5
smoker	0.305	0.294	0.283	0.271	0.26	0.248
With Smkban	0	1	2	3	4	5
smoker	0.229	0.218	0.206	0.195	0.183	0.172
Difference	0.076	0.076	0.077	0.076	0.077	0.076

Table 4 examines the difference between the probability of smoking with and without a smoking ban. This analysis found that each age range was impacted by approximately the same amount where a workplace smoking ban decreased the probability of smoking by about 7.6 to 7.7 percentage points. This shows that different age ranges are not likely to be affected disproportionately by a workplace smoking ban.

Race and Gender

Figure 3 – Smoking Probability by Race and Gender



We utilized the variables Black, Hispanic, and Female for demographic category of Race and Gender to analyze the impact of a smoke ban at the workplace. We can observe that men in general tend to smoke more across both races in comparison to women smokers before the smoke ban. Particularly, black men tend to smoke the most across the demographics of race and gender, followed by Black female, Hispanic male and then finally Hispanic female. After a smoke ban is implemented, the rate of smoking for both the races and gender goes down across the chart, with Black male still leading on the graph to be smoking the most.

Evans et al. (1999) controlled gender in their regressions. The findings were consistent with trends showing lower smoking participation among women. Our results align with the general trend that women smoke less than men, confirming the original paper's approach to controlling for demographics. Evans et al. (1999) included race as covariates but did not emphasize significant racial disparities in smoking behavior.

Table 6 – Regression Results by Race and Gender

VARIABLES	(1) smoker	(2) smoker
smkban		-0.076*** (0.009)
black	0.001 (0.016)	0.001 (0.016)
hispanic	-0.029** (0.013)	-0.033** (0.013)
female	-0.028*** (0.009)	-0.019** (0.009)
Constant	0.261*** (0.007)	0.303*** (0.009)
Observations	10,000	10,000
R-squared	0.001	0.009

Robust standard errors in parentheses
*** p<0.01, ** p<0.05, * p<0.1

The results from Table 6 show that, when looking specifically at race and gender, Hispanic people are 3.3 percentage points less likely to smoke, females are 1.9 percentage points less likely to smoke, and black people are 0.1 percentage points more likely to smoke, however, the results for black people are not statistically significant. A workplace smoking ban has the greatest effect, decreasing the probability of smoking by 7.6 percentage points.

Potential Extension

This replication successfully brought out the results of the demographic differences in smoking behavior between the model containing smoking bans and the model lacking smoking bans. However, several avenues for further research could deepen our understanding of how demographic differences interact with smoking bans and inform policy decisions. These potential extensions of the research could explore various dimensions of how smoking bans affect different population groups, as well as broader societal factors that might amplify or mitigate the effects of such bans.

While the study indicates that smoking bans have a somewhat stronger effect on men than women, gender differences in response to smoking bans could be explored in more detail. Gender differences in smoking behavior are well-documented, with women sometimes being less likely to smoke or more likely to quit smoking than men, yet their smoking patterns can be influenced by different social and economic factors. Understanding gender-specific responses to smoking bans could help design more effective interventions that target the specific challenges faced by men and women in quitting smoking.

Another promising extension of the research could focus on the effects of smoking bans on vulnerable populations, such as low-income workers, workers with mental health issues, and those with lower educational attainment. These groups may face additional barriers to smoking cessation, and smoking bans could have varying effects depending on their socioeconomic status or psychological well-being.

Citations

Evans, W. N., Farrelly, M. C., & Montgomery, E. (1999). Do workplace smoking bans reduce smoking?. *American Economic Review*, 89(4), 728-747.