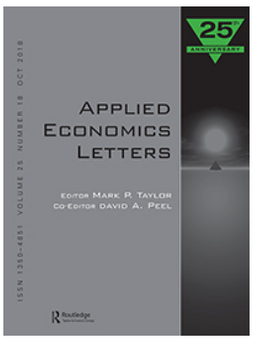

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Applied Economics Letters

ISSN: 1350-4851 (Print) 1466-4291 (Online) Journal homepage: https://www.tandfonline.com/loi/rael20

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To cite this article: Mark Gius (2009) The effect of gun ownership rates on homicide rates: a state-level analysis, Applied Economics Letters, 16:17, 1687-1690, DOI: 10.1080/13504850701675508

To link to this article: https://doi.org/10.1080/13504850701675508

Published online: 19 Feb 2008.

Applied Economics Letters, 2009, **16**, 1687–1690

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The effect of gun ownership rates on homicide rates: a state-level analysis

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The purpose of the present study is to examine the link between gun ownership rates and homicide rates. Using a very large cross-sectional survey dataset in order to obtain estimates for household-level gun ownership rates, and state-level data on homicides, the results indicate that gun ownership rates have a statistically significant and positive effect on the homicide rates at the 10% significance level. This result suggests that efforts to restrict access to firearms may reduce murders.

I. Introduction

Many believe that restricting access to firearms would result in a decrease in crime, especially violent crime. Others believe that restricting access to guns would have little to no effect on crime rates and would only trample the rights of US citizens to possess guns. Most prior empirical and anecdotal research in this area attempted to either establish or discredit a link between gun control laws and crime rates. The present study differs from prior research in that this study will look at the link between gun ownership rates and homicide rates. Given that over 66% of murders are firearm-related, do gun ownership rates affect homicide rates? Using a very large cross-sectional survey dataset, the Behavioural Risk Factor Surveillance System (BRFSS), in order to obtain estimates for household-level gun ownership rates, and state-level data on homicides, the present study will attempt to determine if gun ownership has any affect on homicide rates.

II. Literature Review

Given this is a fertile area for research, the following literature review should not be construed as being exhaustive but rather should be viewed as being representative of the published research on this topic. Kwon *et al*. (1997) attempted to determine if gun control laws had an effect on gun-related deaths in 1990. Looking at state-level data for only 1 year, the authors used as their dependent variable firearm deaths per 100 000 residents. Their independent variables were as follows: the poverty level; per capita alcohol consumption; percentage of population that lives in urban area; percentage of population between the ages 18 and 24 years; percentage of population that is Asian, African-American and Hispanic; and a dummy variable that takes the value one if the state had some type of restrictive gun laws and zero otherwise. According to the authors, in 1990, 26 states had gun control laws and 24 did not. Their regression results indicated that gun control laws did not have statistically significant effects on

Applied Economics Letters ISSN 1350–4851 print/ISSN 1466–4291 online © 2008 Taylor & Francis
http://www.informaworld.com
DOI: 10.1080/13504850701675508

firearm-related deaths. Variables which were significant included the following: the poverty level; per capita alcohol consumption and the percentage of population that is African-American. The results of this study are circumspect, however for two reasons. First, a very small sample was used. Second, the authors used a simple binary dummy variable in an attempt to capture the effect of myriad complex laws regarding guns. Clearly, more well-defined gun control variables should have been used to capture the true effects of gun control laws on firearm-related deaths.

Ludwig (1998) examined the effect of laws regulated the carrying of concealed weapons on violent crime rates. Specifically, the author was most interested in what are known as 'shall-issue' laws. These laws require local law-enforcement authorities to issue concealed handgun-carrying permits to anyone who meets certain criteria, such as age. Hence, the local police have no discretion in the issuing of these types of permits. At the time Ludwig wrote his paper, 31 states had enacted legislation allowing for 'shall-issue' permits. An important issue is the effect of these types of concealed handgun permits on violent crime rates. Using state-level data from 1977 through 1994 and using a difference estimation technique, the author found that 'shall-issue' permits actually increased the adult homicide rate. This result runs counter to many assertions by the pro-Second Amendment lobby that an increase in concealed handguns would reduce violent crime.

Kleck and Hogan (1999) attempted to determine if gun ownership increased the probability that the owner would commit a homicide. In addition, they presented an excellent synopsis of much of the research up to the time of the publication of their article on the relationship between gun ownership levels and violent crime rates. The results are mixed, although a slim majority of the papers (12 out of 23) reviewed by Kleck and Hogan showed a positive relationship between gun ownership and violence. In their study, the authors used survey data from two groups: incarcerated homicide offenders and the general population. The authors' results suggest that a person with a gun is 1.36 times more likely to commit a murder than a person without a gun.

Miller *et al.* (2002) examined the relationship between firearm ownership and homicide rates. Using regional and state-level data for the years 1988 to 1997, the authors found that those states or regions with higher levels of gun ownership had higher homicide rates. It is important to note that this study used the General Social Survey in order to obtain estimates of gun ownership rates at the regional level; state-level ownership rates were obtained from the BRFSS, the same survey used in the present study.

Finally, Moorhouse and Wanner (2006) looked the effect of gun control laws on crime rates and the effect of crime rates on gun control. Essentially, the authors were attempting to determine if the direction of causation, instead of going from gun control to crime rates, actually went from crime rates to gun control. In other words, do people living in high-crime areas have a greater desire for gun control than people living in low-crime areas? Using the Open Society Institute's Gun Control Index (GCI), the authors attempted to determine if gun control laws had an effect on crime rates in 1999 and in 2001. Using state level data, they found that gun control had no statistically significant effect on a variety of violent crime rates for either 1999 or 2001. The authors then estimated the effect of crime rates on gun control laws. Using the 1998 GCI and regressing it against 1995 crime rates and various other explanatory variables, the study found that the crime rate had a statistically significant and positive effect on the gun control index. Hence, gun control does not affect crime, but crime does affect gun control.

III. Empirical Technique and Data

Using Moorhouse and Wanner (2006), Ludwig (1998) and Kwon *et al.* (1997) as guides, the following equation is estimated in the present study:

$$Y = a_0 + a_1\text{WHITE} + a_2\text{RURAL} + a_3\text{COLLEGE} + a_4\text{INCOME} + a_5\text{UNEMP} + a_6\text{AGE} + a_7\text{ALCOHOL} + a_8\text{GUNS} + a_9\text{DENSE} + u \quad (1)$$

where Y denotes the number of homicides per 100 000 residents, WHITE is the percentage of the state's population that is white, RURAL is the percentage of the state's population that live in rural areas, COLLEGE is the percentage of the state's population that has a 4-year college degree, INCOME is per capita median income, UNEMP is the state's annual unemployment rate, AGE is the percentage of the state's population that is between the ages of 18 and 24 years, ALCOHOL is the per capita alcohol consumption, GUNS is the percentage of the state's

Table 1. Descriptive statistics

Variable	Mean	Minimum	Maximum
Y (homicide rate per 100 000 residents)	4.64	0.8	13.2
GUNS (percentage of households that own firearms)	0.376	0.092	0.614
AGE (percentage of population 18–24 years)	0.10	0.079	0.14
WHITE (percentage of population that is white)	0.82	0.24	0.978
RURAL (percentage of population that live in rural areas)	0.315	0	0.716
COLLEGE (percentage of population with college degree)	0.255	0.15	0.37
INCOME (per capita median income)	$30 110	$21 643	$45 398
UNEMP (annual unemployment rate)	0.05	0.031	0.076
ALCOHOL (per capita alcohol consumption, in gallons)	2.27	1.28	4.07
DENSE (population density)	186	1.11	1172

households that has at least one gun in their homes, and DENSE is the population density of the state.

Most of the explanatory variables have been used in previous studies that attempted to estimate crime rates. Moorhouse and Wanner (2006) used INCOME, RURAL and DENSE and Kwon *et al.* (1997) used UNEMP, ALCOHOL and AGE. Based on this prior research, it is expected that WHITE, RURAL, DENSE, COLLEGE and INCOME will all be negatively related to the homicide rate, while UNEMP, AGE, ALCOHOL and GUNS will all be positively related to homicide rates.

All data is state-level and was collected for the years 2001, 2002 and 2004. Data from those years was used because it is the most recent available and because gun ownership rates could only be calculated from the survey data for those years. All data, except for gun ownership rates, were obtained from the *Statistical Abstract of the United States* and *Uniform Crime Reports*. Gun ownership rates were estimated from data obtained from the BRFSS. The BRFSS is a data collection program administered by the Center for Disease Control and the US states and territories. This program, which began in 1984, measures and collects data on behavioural risk factors of adults who live in households. For the years 2004, 2002 and 2001, questions on gun ownership were included in the survey. The gun ownership rates by state were estimated from this data. No information is available on the actual number of guns a household owns, only that a household has guns. In addition, no information is available on whether or not the respondent had legal possession of the firearms. In the present study, guns or firearms denote both handguns and long guns (shotguns and rifles). Descriptive statistics of data are presented on Table 1. According to these statistics, the average homicide rate for this 3-year period was 4.64 murders per 100 000 residents, and the average gun ownership rate was 37.5%.

Table 2. Regression results

Variable	Coefficient	SE	Test statistic
Intercept	12.51	1.998	6.26
GUNS	0.00267	0.0014	1.904
AGE	16.29	5.57	2.925
WHITE	−7.79	1.37	−5.681
RURAL	−4.65	1.17	−3.987
COLLEGE	−3.675	5.066	−0.725
INCOME	−0.00014	0.0000067	−2.082
UNEMP	0.619	0.167	3.699
ALCOHOL	0.222	0.367	0.608
DENSE	−0.00078	0.0009	−0.868

Notes: Adjusted $R^2 = 0.999$, $N = 150$.

IV. Results and Concluding Remarks

OLS was used to estimate Equation 1. Statistical tests indicated that serial correlation and multicollinearity were not present. Regression results are presented on Table 2. As can be seen from the results, gun ownership rates have a statistically significant and positive effect on the homicide rates at the 10% significance level. This result suggests that efforts to restrict access to firearms would reduce murders. This result is not unexpected since 66% of murders are committed with a gun. Regarding the other explanatory variables, WHITE, RURAL and INCOME all had statistically significant and negative effects on the homicide rate, and UNEMP and AGE had positive effects.

These results are noteworthy since they suggest that, using state-level data, gun ownership rates have a positive effect on homicide rates. This result suggests that gun control laws, which restrict gun ownership, may be an effective method to reduce murders. This result is limited, however. Since many fewer nonhomicide, violent crimes and nonviolent crimes are perpetrated with a firearm, it is doubtful that restrictions on access to guns will have any statistically significant effect on those crime rates.

In addition, gun ownership rates have rather small effects, in terms of magnitude, on homicide rates. The explanatory variables that have large effects include WHITE, RURAL and AGE, variables that public policy makers have little control over.

References

Kwon, I.-W., Scott, B., Safranski, S. and Bae, M. (1997) The effectiveness of gun control laws: multivariate statistical analysis, *American Journal of Economics and Sociology*, **56**, 41–50.

Ludwig, J. (1998) Concealed-gun-carrying laws and violent crime: evidence from state panel data, *International Review of Law and Economics*, **18**, 239–54.

Kleck, G. and Hogan, M. (1999) National case-control study of homicide offending and gun ownership, *Social Problems*, **46**, 275–93.

Miller, M., Azrael, D. and Hemenway, D. (2002) Rates of household firearm ownership and homicide across US regions and states, 1988-1997, *American Journal of Public Health*, **92**, 1988–93.

Moorhouse, J. and Wanner, B. (2006) Does gun control reduce crime or does crime increase gun control?, *Cato Journal*, **26**, 103–24.