
An examination of the effects of concealed weapons laws and assault weapons bans on state-level murder rates

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The purpose of the present study is to determine the effects of state-level assault weapons bans and concealed weapons laws on state-level murder rates. Using data for the period 1980 to 2009 and controlling for state and year fixed effects, the results of the present study suggest that states with restrictions on the carrying of concealed weapons had higher gun-related murder rates than other states. It was also found that assault weapons bans did not significantly affect murder rates at the state level. These results suggest that restrictive concealed weapons laws may cause an increase in gun-related murders at the state level. The results of this study are consistent with some prior research in this area, most notably Lott and Mustard (1997).

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I. Introduction

On 14 December 2012, a young man carrying a Bushmaster XM15-E2S (Bushmaster Firearms, Madison, NC, USA) semi-automatic rifle shot his way into an elementary school in Newtown, Connecticut, killing 26 people, 20 of whom were children. Since a semi-automatic weapon was used in the commission of this crime, there have been debates both in Congress and in various state legislatures regarding the potential enactment of assault weapons bans. One of the measures that were considered at the Federal level was a revival of the 1994 Federal assault weapons ban, which expired in 2004. This firearms ban was part of the Violent Crime Control and Law Enforcement Act of 1994, and this act outlawed semi-automatic weapons and prohibited large capacity magazines that held more than 10 rounds of ammunition.

Regarding state-level bans, no state had an assault weapons ban before 1989. Then, in that year, California

enacted the first state-level ban on assault weapons. Several states followed suit, and shortly thereafter Connecticut, Hawaii and New Jersey enacted their own bans. In 1994, the Federal ban was enacted, thus rendering state laws moot. After the Federal ban expired in 2004, several states enacted their own bans once again.

Of course, there are many other types of gun control measures, both at the state and Federal level. One state-level gun control measure that was very common years ago but, in recent years, has become much less prevalent is the restrictive concealed carry weapons (CCW) law. These laws concern how permits are issued to individuals who want to carry concealed weapons, primarily handguns. There are four broad types of CCW laws. The first is unrestricted; individuals in these states do not need a permit to carry a concealed handgun. For years, the only state that had no CCW restrictions was Vermont. The next type of CCW law is a 'shall issue' law. In a 'shall issue' state, a permit is required to carry a concealed weapon, but state and local

authorities must issue a permit to any qualified applicant who requests one. This type of CCW law is not very restrictive. The third type of law is 'may issue'. In a 'may issue' state, local and state authorities can deny requests for concealed carry permits, even requests are from qualified applicants. This type of CCW law is considered restrictive. Finally, there some states that do not allow private citizens to carry concealed weapons. These states are known as 'no issue' or prohibited states. It is important to note that these four categories of CCW laws are rather broad, and not all states within a given category are equally restrictive. These laws vary in restrictiveness depending upon how states interpret and enforce their CCW statutes. In addition, some cities and counties have more restrictive concealed weapons laws than their home states.

In the present study, panel data controlling for both state and year fixed effects will be used to determine if state-level CCW laws and assault weapons bans had any effects on gun-related murder rates. Given that these laws are well-defined at the state level, and given that many states have altered these laws over the past 30 years, an analysis of the effects of CCW laws and assault weapons bans would be much more informative than an analysis of other types of gun control measures that few states have ever enacted and laws for which there has been little change over the past 30 years.

II. Literature Review

Although there have been numerous studies on the topic of gun control (Kwon *et al.*, 1997; Kleck and Hogan, 1999; Miller *et al.*, 2002; Moorhouse and Wanner, 2006), research on assault weapons bans and CCW laws have been more limited. One of the few studies that examined assault weapons bans was Koper and Roth (2001). Using state-level data from 1970 to 1995, the authors found that the Federal ban had little to no effect on homicide rates associated with firearms and on gunshot wounds per victim.

Regarding CCW laws, Lott and Mustard (1997) found that states with 'shall issue' concealed weapons laws had lower crime rates than states with more restrictive gun laws. They found that 'shall issue' laws resulted in a 7.65% drop in murders and a 5% drop in rapes. Their research suggests that individuals would be less likely to commit crimes if they knew that many others may be carrying concealed weapons.

Other research on CCW laws have yielded mixed results. Three papers that corroborated the findings of Lott and Mustard (1997) were Bronars and Lott (1998), Bartley and Cohen (1998) and Moody (2001). Studies that contradicted the findings of Lott of Mustard include Ludwig (1998), Dezhbakhsh and Rubin (1998) and Donohue (2003).

The present study differs from this prior research in several ways. First, data for the period 1980 to 2009 is examined; this is one of the longest time periods examined in any research on assault weapons bans or CCW laws. Second, the gun-related murder rate is used as the dependent variable. The use of this crime rate is important because most other studies looked at violent crime rates or homicide rates. Violent crime rate data is not disaggregated into gun-related violent crime and non gun violent crime, and homicides include justifiable killings and state-sanctioned killings; hence, an analysis using these types of crime rates may result in spurious conclusions.

III. Empirical Technique and Data

In order to determine if concealed weapons laws and assault weapons bans had statistically-significant effects on gun-related murder rates, a fixed effects model that controls for both state-level and year effects is used. The dependent variable used was the state-level gun-related murder rate. The gun-related murder rate is the crime rate most affected by gun control measures, and hence is the most appropriate crime rate to use in an analysis of the effectiveness of gun control measures.

Regarding the explanatory variables, dummy variables for assault weapons bans and restrictive CCW laws were included in the regression model. For the CCW dummy variable, if a state prohibits concealed weapons or if it is 'may issue', then it is assumed to be restrictive and is denoted by a value of one. For the assault weapons dummy variable, if a state has an assault weapons law, then it is denoted by a one. Although the contents of these statutes may differ quite substantially between states, for the purposes of this study, it is assumed that states with these laws restrict firearm possession in some way. Finally, a dummy variable that equals one for the period 1994 to 2004 is included in order to control for the Federal assault weapons ban.

In addition to the gun control measures, it is assumed that murder rates are dependent upon state demographics and various other state-level socioeconomic factors. These control variables were selected based on their use in prior research.

State-level data on gun-related murder rates were obtained from the *Supplementary Homicide Reports* which are compiled by the United States Department of Justice. The murder rate is in terms of murders per 100 000 persons. Information on state-level assault weapons bans and CCW laws were obtained from Ludwig and Cook (2003), the Legal Community Against Violence, the National Rifle Association and the United States Bureau of Alcohol, Tobacco, Firearms and Explosives. All other state-level data were obtained from relevant Census Bureau reports.

IV. Results and Concluding Remarks

Results are presented on Table 1. The CCW dummy variable is significant and positive, but the assault weapons ban is insignificant. Given that the average gun-related murder rate over the period in question was 3.44, the results of the present study indicate that states with more restrictive CCW laws had gun-related murder rates that were 10% higher. In addition, the Federal assault weapons ban is significant and positive, indicating that murder rates were 19.3% higher when the Federal ban was in effect. These results corroborate the findings of Lott and Mustard (1997). These results suggest that, even after controlling for unobservable state and year fixed effects, limiting the ability to carry concealed weapons may cause murder rates to increase. There may, however, be other explanations for these

Table 1. Fixed effects regression gun-related murder rate

Constant	-3.02 (-3.20)***
Assault weapons ban	-0.29 (-1.57)
Federal assault weapons ban	0.66 (2.42)**
Restrictive concealed carry laws	0.365 (3.74)***
Proportion of population that is white	0.172 (1.76)*
Proportion of population that is rural	1.93 (3.97)***
Real per capita median income	0.00021 (6.03)***
Proportion of population with college degree	-1.367 (-1.20)
Unemployment rate	3.397 (1.34)
Proportion of population >18 and <25	11.45 (2.27)**
Proportion of population >24 and <35	-2.876 (-0.91)
Per capita alcohol consumption	0.688 (4.05)***

Notes: $R^2 = 0.797$.

Test statistics in parentheses.

* 5% < p -value < 10%; ** 1% < p -value < 5%; *** p -value < 1%.

results. Laws may be ineffective due to loopholes and exemptions. The most violent states may also have the toughest gun control measures. Further research is warranted in this area.

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