

---

# The impact of state and federal assault weapons bans on public mass shootings

Mark Gius

Department of Economics, Quinnipiac University, Hamden,  
CT 06518, USA  
E-mail: [Mark.gius@quinnipiac.edu](mailto:Mark.gius@quinnipiac.edu)

---

The purpose of the present study is to determine the effects of federal and state assault weapons bans on public mass shootings. Using a Poisson effect model and data for the period 1982 to 2011, it was found that both state and federal assault weapons bans have statistically significant and negative effects on mass shooting fatalities but that only the federal assault weapons ban had a negative effect on mass shooting injuries. This study is one of the first studies that looks solely at the effects of assault weapons bans on public mass shootings.

**Keywords:** assault weapons ban; mass shootings

**JEL Classification:** K14; I12

## I. Introduction

According to a recent report prepared by the Congressional Research Service (Bjelopera *et al.*, 2013), a public mass shooting has four distinct attributes:

- (1) Occurred in a relatively public place.
- (2) Involved four or more deaths – not including the shooter.
- (3) Victims were selected randomly.
- (4) Shooting was not a means to a criminal end, such as robbery or terrorism.

Examples of high-profile public mass shootings that fit this definition are Sandy Hook, Aurora, Fort Hood, Virginia Tech and Columbine. Many of the perpetrators in these mass shootings used multiple types of firearms. Contrary to popular belief,

however, assault rifles were not the predominant type of weapon used in these types of crimes. In fact, according to a recent study, handguns were the most commonly used type of firearm in mass shootings (32.99% of mass shootings); rifles were used in only 8.25% of mass shootings (Huff-Corzine *et al.*, 2014). All data used in Huff-Corzine *et al.* (2014) is for the period 2001–2010.

Even though rifles are used in less than 10% of public mass shootings, one of the first pieces of legislation that comes up for consideration whenever there is a mass shooting is an assault weapons ban. For example, after the Sandy Hook shooting, there was a call for a revival of the 1994 federal assault weapons ban. This firearms ban was part of the Violent Crime Control and Law Enforcement Act of 1994 and outlawed semi-automatic weapons that had certain distinguishing features, such as pistol

grips, flash hidiers and folding stocks (Koper, 2004). The ban was very narrow; only 118 gun models were banned under this law. In addition to banning certain types of guns, the 1994 law also prohibited large-capacity magazines, which held more than 10 rounds of ammunition. This prohibition affected many more types of guns than the assault weapons ban primarily because many semi-automatic weapons, including handguns, are capable of using large-capacity magazines.

The 1994 law had several loopholes and exemptions. All assault weapons and large-capacity magazines manufactured prior to the effective date of the ban were legal to own and transfer. In addition, only exact copies of the banned assault weapon models were banned; models without certain characteristics were still legal even though the rate of fire was the same. Finally, there was no prohibition against new, legal assault weapons being able to accept older, grandfathered large-capacity magazines. Hence, most new, legal models of assault rifles could use pre-ban large-capacity magazines. Given the above, the federal law was limited in its ability to affect firearm availability or crime.

Regarding state-level assault weapons bans, California was the first state to enact such a law in 1989. Several other states followed California's lead and enacted their own bans shortly thereafter (Connecticut, Hawaii and New Jersey), and then, in 1994, the federal ban was enacted. After the federal ban expired in 2004, all of the states that had bans prior to 1994 opted to continue with them.

Even though there have been numerous calls for assault weapons bans, both at the state and at the federal level, very little research has been conducted on the effects of these laws on mass shootings. Gius (2014), looking at data for the period 1980 to 2009, found that state-level assault weapons bans had no significant effects on gun-related murder rates, but that the federal assault weapons ban was associated with a 19% increase in gun-related murders. Chapman *et al.* (2006) examined the effects of Australia's 1996 gun law reforms on firearm-related homicides, including mass shootings, and found that, after enactment of the laws, there were declines in firearm-related homicides and suicides but no significant decrease in unintentional firearm deaths. It was also noted that there were 13 mass shooting incidents in Australia in the 18 years prior to the enactment of the stricter gun control measures but no mass shootings after passage of the

laws. Koper (2004) looked at trends and correlations and concluded that the federal assault weapons ban's effect on gun-related violence was minimal at best. Duwe *et al.* (2002) examined the effects of right-to-carry laws on mass shootings. Using data for the period 1977 to 1999, the authors employed both Poisson and negative binomial models and found that right-to-carry laws had no statistically-significant effects on mass shootings. Finally, Lott and Landes (2000) looked at mass shooting incidents also for the period 1977 to 1997 and found that states that enacted right-to-carry laws had fewer mass shootings than states that did not enact such laws.

The purpose of the present study is to determine the effects of the federal and state assault weapons bans on public mass shootings. Using a Poisson, fixed-effect model and data for the period 1982 to 2011, it was found that both state and federal assault weapons bans had statistically significant and negative effects on mass shooting fatalities but that only the federal assault weapons ban had a negative effect on mass shooting injuries. This study is one of the first studies that looks solely at the effects of assault weapons bans on public mass shootings. Most prior studies examined the effects of other types of gun control measures on mass shootings (Lott and Landes, 2000; Duwe *et al.*, 2002; Chapman *et al.*, 2006) or the effects of assault weapons bans on much broader categories of crime (Koper, 2004; Gius, 2014).

## II. Empirical Technique and Data

In order to determine whether assault weapons bans have any effects on public mass shootings, the following equation is estimated in the present study:

$$\begin{aligned}
 Y = & \alpha_0 + \alpha_1 \text{ state assault weapons ban} \\
 & + \alpha_2 \text{ federal assault weapons ban} \\
 & + \alpha_3 \text{ control variables} \\
 & + \alpha_4 \text{ state fixed effects} \\
 & + \alpha_5 \text{ year fixed effects}
 \end{aligned} \tag{1}$$

where  $Y$  is the number of deaths or injuries due to mass shootings. Control variables include the following: percentage of population that is black; population density; percentage of population that has a 4-year college degree; per capita median income; annual unemployment rate; percentage of population that is aged 18–24;

percentage of population that is aged 25–34 and per capita prison population. The state assault weapons ban variable is expressed as a dummy variable that equals one if the state has an assault weapons ban and zero otherwise. The federal assault weapons ban dummy variable equals one for the years 1995–2004.

All data are state level and were collected for the years 1982–2011. Socio-economic data were obtained from the *Statistical Abstract of the United States* and other relevant Census Bureau documents. Information on state-level assault weapons bans were obtained from Ludwig and Cook (2003), the Legal Community against Violence, the National Rifle Association and the US Bureau of Alcohol, Tobacco, Firearms and Explosives.

Data on mass shootings were obtained from the Mother Jones website and the *Supplementary Homicide Reports*, US Department of Justice. According to this data, there were 57 public mass shooting incidents from 1982 to 2011. For the assault weapons ban period (which includes the federal ban years and the years when states that had their own assault weapons bans), there were 24 public mass shootings; for the nonban period, there were 33 incidents. The average number of fatalities per mass shooting during the assault ban period was 7.5; during the nonban period, the average number of fatalities was 8.6.

### III. Results and Concluding Remarks

A Poisson, two-way fixed-effect model, controlling for both state-specific and year-specific effects, was

used to estimate the effects of state and federal assault weapons bans on public mass shootings. All observations were weighted by state population. Results are presented on Table 1.

These results indicate that fatalities due to mass shootings were lower during both the federal and state assault weapons ban periods. Although some prior research has shown either that assault weapons bans did not reduce crime or that they actually increased gun-related murder rates (Gius, 2014), the present study's focus on mass shootings shows the effectiveness of these gun control measures in reducing murders due to mass shootings. Regarding the injury regression, state-level assault weapons bans had no statistically-significant effects, but the federal ban had a significant and negative effect on mass shooting injuries.

It is important to note that these results are not unexpected. In 2012, for example, there were 72 fatalities due to mass public shootings. Of those 72, at least 30 were committed using a rifle. In the same year, there were 12 765 murders, of which only 322 were committed using a rifle. Rifles (assault weapons) are used much more frequently in mass shootings than they are in murders in general. Hence, any law that restricts access to rifles is likely to be much more effective in reducing mass shootings than it is in reducing murders in general.

Finally, it is important to note that mass shooting fatalities are a very small percentage of overall murders. Hence, even if a certain type of gun control measure was found to completely eliminate mass shootings (which assault weapons bans do not), the overall murder rate would decline by a very small

**Table 1. Poisson fixed-effects regression results**

Variable	Mass shooting deaths	Mass shooting injuries
State assault weapons ban	-0.59202 (-2.28)**	0.298 (1.16)
Federal assault weapons ban	-1.079 (-7.04)***	-1.733 (-10.10)***
Proportion of population that is black	65.66 (5.33)***	87.05 (6.20)***
Population density	-0.0177 (-2.73)***	-0.0542 (-7.18)***
Real per capita median income	0.000029 (0.48)	0.00021 (3.53)***
Proportion of population with college degree	1.66 (0.70)	-4.72 (-2.21)**
Unemployment rate	-0.0698 (-0.02)	-3.51 (-1.06)
Proportion of population >18 and <25	-55.21 (-5.94)***	-84.27 (-7.81)***
Proportion of population >24 and <35	-39.20 (-5.09)***	-20.59 (-2.65)***
Per capita prison population	-0.00362 (-4.62)***	-0.00067 (-0.85)
Log-likelihood	-1846.48	-2860.63

Notes: \*\* 1% < *p*-value < 5%; \*\*\* *p*-value < 1%.

Test statistics are in parentheses.

State and year fixed effects are not reported.

amount. Therefore, although the results of the present study indicate that assault weapons bans are effective in reducing mass shooting fatalities, their effects on the overall murder rate are probably minimal at best.

## References

- Bjelopera, J., Bagalman, E., Caldwell, S. *et al.* (2013) *Public Mass Shootings in the United States: Selected Implications for Federal Public Health and Safety Policy*, Congressional Research Service, Washington, DC.
- Chapman, S., Alpers, P., Agho, K. *et al.* (2006) Australia's 1996 Gun law reforms: faster falls in firearm deaths, firearm suicides, and a decade without mass shootings, *Injury Prevention*, **12**, 365–72. doi:10.1136/ip.2006.013714
- Duwe, G., Kovandzic, T. and Moody, C. (2002) The impact of right-to-carry concealed firearm laws on mass public shootings, *Homicide Studies*, **6**, 271–96. doi:10.1177/108876702237341
- Gius, M. (2014) An examination of the effects of concealed weapons laws and assault weapons bans on state-level murder rates, *Applied Economics Letters*, **21**, 265–7. doi:10.1080/13504851.2013.854294
- Huff-Corzine, L., McCutcheon, J., Corzine, J. *et al.* (2014) Shooting for accuracy: comparing data sources on mass murder, *Homicide Studies*, **18**, 105–24. doi:10.1177/1088767913512205
- Koper, C. (2004) An Updated Assessment of the Federal Assault Weapons Ban: Impacts on Gun Markets and Gun Violence, 1994–2003, Report to the National Institute of Justice, US Department of Justice.
- Lott, J. and Landes, W. (2000) Multiple victim public shootings, Unpublished Paper, University of Chicago Law School, Chicago, IL.
- Ludwig, J. and Cook, P. (Eds) (2003) *Evaluating Gun Policy: Effects on Crime and Violence*, The Brookings Institution, Washington, DC.

Copyright of Applied Economics Letters is the property of Routledge and its content may not be copied or emailed to multiple sites or posted to a listserv without the copyright holder's express written permission. However, users may print, download, or email articles for individual use.