Saving lives by regulating guns: Evidence for policy

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Despite obstacles, research is clarifying gun-policy impacts

By Philip J. Cook \(^1\) and John J. Donohue \(^2\)

Gun violence is a leading cause of death in the United States, where over 36,000 people were killed by gunshot in 2015 [including homicide, suicide, and accident (1)]. The gun-murder rate is 25 times as high in the United States as in other high-income nations, and the gun-suicide rate is eight times as high (2). Interpersonal gun violence has deleterious effects on economic development and standard of living in heavily impacted neighborhoods (3). Given this heavy burden, it is greatly concerning that many aspects of the body of research on gun violence have been deemed inadequate and inconclusive by expert panels of the U.S. Centers for Disease Control and Prevention (CDC) and of the National Academies of Sciences, Engineering, and Medicine (4–6). Fortunately, the flow of high-quality research has increased in recent years. Although the CDC largely withdrew from funding research on gun violence more than 20 years ago (under intense congressional pressure), there are active research programs in medicine, public health, law, and the social sciences under way in universities and think tanks. This good news, often lost in the well-justified complaints about the lack of federal funding, deserves greater recognition. New findings are providing a sound evidence base for policy-making and, among other contributions, have helped demonstrate efficacy in three important domains of gun policy: add-on sentences for gun use in violent crime, bans on gun possession by those convicted of drug crimes, and other government agencies have continued to support data collection that has been useful in studying violence, including the

cause a similar number of deaths each year), federal funding for gun-violence research is miniscule (7). The CDC initiated a gun-violence research program in the 1980s, but in 1996, influenced by the pro-gun National Rifle Association, Congress adopted the Dickey Amendment, which banned the use of government research funding to advocate for gun control, and cut the CDC budget by $2.6 million, which happened to be the budget of the gun-violence program. The CDC largely ended its gun research as a result of this clear message. However, the CDC and other government agencies have continued to support data collection that has been useful in studying violence, including the

“...the causal effect of... replacing a restrictive law with an RTC [right-to-carry] law...has been to increase violent crime.”

National Vital Statistics System, the Federal Bureau of Investigation (FBI) Uniform Crime Reports, the National Violent Death Reporting System, and the National Electronic Injury Surveillance System. Beginning in 2014 under President Obama, the National Institutes of Health provided $11.4 million for gun violence-related projects over the course of 3 years. It appears that this funding has been severely curtailed, which is not inconsistent with the Trump administration’s pro-gun stance (8).

There has been some private support for research, most notably from the Joyce Foundation, as well as the Fund for a Safer Future and several other foundations. The state of California recently created and funded the Firearm Violence Research Center. One of the most important sources of research support is implicit in the contractual arrangement that faculty have with their universities. For example, most of the research that we have done on gun violence has not been supported by external grants. As is typical for faculty of research universities outside of medicine and public health, our salaries have been paid directly by our universities with an understanding that part of our time is to be devoted to research projects of our own choosing. Many doctoral students in the social sciences also receive research support from their departments and universities. Hence, projects that do not require expensive data-collection efforts can be undertaken without external grants.

With journals in a variety of disciplines increasingly receptive to original research on gun violence and regulation [for example, see Levine et al. (9) on page 1324 of this issue], there has been a surge of publication in this area after a long plateau; publications in peer-reviewed journals jumped from about 90 per year to 150 in 2014 (the most recent year for which these data are available) (10). The scope and quality of gun-related research is growing, with clear implications for the policy debate.

THE CHALLENGE OF CAUSALITY

Some of the key findings on gun policies rely on a quasi-experimental method that, under some circumstances, can provide credible conclusions about causal impacts of policies. In general, the greatest challenge for nonexperimental policy impact evaluations is selection bias, whereby the treatment is “assigned” to jurisdictions by a political or bureaucratic process that is systematic, rather than random. For example, if a gun regulation is most likely to be enacted in jurisdictions that have recently experienced a surge in gun violence and if that surge is temporary, the result will be that implementation of the new measure is followed by a drop in crime, giving the false appearance that it was effective.

Fortunately, some programs were initiated in several jurisdictions over a period of time, and the time-and-place patterns of adoption were as good as random, or at least uncorrelated with (exogenous to) trends in the outcome variable. For each of the three policies that we focus on here, the policy in question was implemented at various times by several states, providing a set of field trials in a natural experiment. This approach, which exploits the “laboratory of the states,” is further refined by using state and year fixed-effects analysis to account for persistent interstate differences in homicide rates and to control for national variations in these rates (11).

The result is a “difference-in-differences” comparison of changes in the homicide rate before and after a policy change that can be compared with homicide-rate changes

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\(^1\)Sanford School of Public Policy, Duke University, Durham, NC 27708, USA. \(^2\)Stanford Law School, Stanford, CA 94305, USA. Email: pcook@duke.edu; donohue@law.stanford.edu

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in states that did not modify that policy in the same year. Best practice includes testing for whether a jurisdiction experienced unique variation in the outcome variable prior to the adoption of the policy in question, which would cast doubt on the exogeneity assumption (12).

**CONCEALED-CARRY RESTRICTIONS**

By the mid-1970s, all but five states had banned concealed carry of firearms, or limited concealed carry to those having a special permit from law enforcement, which was issued only to applicants deemed trustworthy. (Then and now, state law treated concealed carry differently than open carry of firearms.) Since then, most states have eased their restrictions, typically requiring permits to be issued to everyone who is legally qualified to own a gun and who meets certain minimum conditions, such as payment of a fee. Twelve states have gone further and eliminated the requirement for any sort of permit. By 2014, these “right-to-carry” (RTC) laws were in place in all but eight states and the District of Columbia. The state-by-state deregulation of concealed carry provides a promising case for the difference-in-differences method.

Lott and Mustard (13) were first to publish an evaluation of concealed-carry laws, using panel data for 1977 to 1992 and concluding that RTC laws reduced homicide rates in comparison with the more restrictive laws that preceded them. The mechanism, they said, was that RTC ensured that more “law-abiding” citizens would carry guns in public, which would have a deterrent effect on crime. This research was influential in the policy process, despite a number of immediate challenges to the Lott-Mustard results in the scientific literature (14, 15). Noting that the estimated effects of RTC laws were highly sensitive to the particular choice of control variables, a National Research Council expert panel reviewed and replicated the Lott-Mustard method (5), concluding that the evidence based on data through 2000 was too uncertain to determine the impact of these permissive gun laws on crime.

A major challenge to generating a valid estimate of the impact of RTC laws was the tidal wave of violent crime associated with the introduction of crack cocaine in 1984, which crested in the early 1990s and subsided thereafter. Although the crack epidemic appears to have boosted homicide rates in large cities across the nation (16), the overall impact on crime was much more intense in some states than in others. RTC laws were more likely to be adopted in states that had less of a crack problem, so any panel data analysis that could not properly control for the criminogenic influence of crack would necessarily generate a biased estimate of the impact of RTC laws, making them appear better (less harmful or more beneficial) than they actually were in influencing crime. This problem has plagued every panel data analysis of RTC laws, except for those that started after the impact of crack had fully dissipated (by the late 1990s and early 2000s).

With many years of post-crack–era data now available, there is an emerging consensus that, on balance, the causal effect of deregulating concealed carry (by replacing a restrictive law with an RTC law) has been to increase violent crime (17–19). If two promising new studies that use new statistical techniques (20, 21) withstand the rigorous of peer review, the evidence that RTC laws substantially increase violent crime will be even further buttressed.

Comparing state crime rates in 1977 (before the crack era) to those in 2014 (long after), one sees a striking difference in the aggregate changes in crime rates in states that adopted RTC laws versus those that resisted this option. Violent crime rates fell by 42.3% in the nine jurisdictions that did not adopt RTC, whereas the comparable decline was just 4.3% in the 36 states that adopted RTC laws after 1977 and before 2014 (20).

Further-refined estimates that use panel regression methods for annual data for this entire period, or for just the post-crack period, support the conclusion that RTC laws are associated with increases in violent crime (18). A new study (19) analyzes the impact of RTC laws on the homicide rate, as measured by the National Vital Statistics System (generally considered more accurate than the crime reports from the FBI). This study finds that RTC laws increase homicides, particularly firearm homicides, which increase by roughly 9% when strin-

The spread of right-to-carry laws has contributed to an increased incidence of carrying concealed handguns in public. Rather than deter crime, it now appears that the net result of these laws is to increase rates of gun violence.
tend to increase the potential for deadly violence in any tense confrontation, such as barroom and other angry arguments, highway collisions and disputes, and police stops of pedestrians and drivers. There are documented cases in which well-intentioned actions of private individuals with guns ended with the death of an innocent person (22). Importantly, guns carried outside the home are more likely to be lost or stolen, a major pathway to arming criminals (23). The estimate that 1% of gun carriers have their guns stolen each year plausibly implies that permit holders are furnishing criminals with over 100,000 guns per year (20).

Moreover, the presence of more guns on the street can complicate the job of police as they confront (or shy away from) armed citizens, e.g., by slowing the process of determining who might be the suspect(s) in an active-shooter situation if armed citizens on the scene pull out their weapons (24). Indeed, preventive patrol to get guns off the street in high-crime neighborhoods is no longer feasible when carrying guns is presumptively legal. Finally, when the public is more likely to be armed, robbers and other assailants may respond in kind, with an escalation of violence in their choice of arms and modus operandi. Future research should try to pin down the relative contribution of these different pathways to the increase in violent crime.

DOMESTIC VIOLENCE

The federal Gun Control Act of 1968 specified nine categories of people who were disqualified from obtaining or possessing firearms, including those convicted of or under indictment for a felony. In adopting the Lautenberg Amendment in 1996, Congress added a new category: those with a misdemeanor conviction for domestic violence. Although this new prohibition appeared to apply nationwide and went into effect immediately in states that had a domestic-assault statute, it was challenged and litigated in states that lacked a distinct domestic-violence statute (i.e., that did not have a specific crime of assault against a family member, distinct from the general law of assault). Implementation was delayed in those states until the appropriate federal circuit courts of appeals ruled that the new ban applied even for those convicted under a general assault statute, as long as the crime involved a domestic victim. Over the next 13 years, eight of the nine circuit courts, and finally the U.S. Supreme Court, ruled that no distinct domestic violence statute was needed for the ban to apply.

Analysis of this natural experiment (25), exploiting the staggered circuit-by-circuit implementation of the ban, indicated that the law created a deterrent to domestic violence both before a conviction (because conviction carries the additional penalty of loss of gun rights) and after (because there are severe federal penalties for a disqualified person who uses a gun to commit assault). In addition, the law, when fully implemented, would make it more difficult for convicted batterers to obtain a gun, as they would not pass the background check required as part of a purchase from a dealer.

Skeptics have opined that batterers are not likely to be influenced by the threat of punishment, or by a minor obstacle to obtaining a gun, but results suggest otherwise, providing strong support that the Lautenberg Amendment saves lives. The effect was particularly strong in reducing killings of female intimate partners. Gun murders for this group were reduced by 17%, estimated quite precisely and with no indication of substitution to other weapon types.

SENTENCING ADD-ONS

Most state criminal codes specify added prison time for those who are convicted of aggravated assault or robbery with a gun rather than a less lethal weapon. Thirty such “add-on” sentencing laws were adopted during the 1970s and 1980s. Analysis of a nearly 40-year time interval (26) found strong results for robbery—the only violent crime that has a pecuniary motive and thus may be more subject to rational calculation than assault and rape. Gun-robbery rates were reduced by about 5% (a statistically significant change) by the threat of a longer sentence. Longer sentences may also reduce crime by keeping criminals off the street for a greater amount of time, but this study looks at the first 3 years after implementation of the add-on provision, when convicted robbers would have been in prison whether or not the sentence had been extended.

POLICY EXPERIMENTATION

Gun regulation continues to be a very active area in state legislatures and courts. Of course, it is not always possible to develop “bullet-proof” conclusions concerning what works and what is worthwhile in the prevention of gun violence. To the usual concerns of meager funding and inadequate data, we add that the greatest challenge is often that policy reforms are intrinsically difficult to evaluate because of a lack of a credible basis for estimating the counterfactual. Policy-makers do not ordinarily consider evaliability when implementing a reform. Although in some cases, such as the three described above, it has been possible to use quasi-experimental methods to develop credible results, it is important going forward for public agencies to adopt an experimental frame of mind, recognizing that the true effect of the reform is not known, that it should be known before disseminating a reform, and that a systematic trial may help dispel uncertainty.

A commendable example is a violence-prevention initiative undertaken by the California Department of Justice called the Armed and Prohibited Persons System (APPS). APPS uses existing data to identify firearm owners among persons who have become prohibited from owning firearms as a result of a new criminal conviction or other event. It then seeks to recover those firearms. A special legislative appropriation funded a 3-year trial to eliminate the backlog of such cases. In an effort to discover whether APPS “works” with respect to reducing gun violence, the Department of Justice staged the recovery effort in a place-based randomized pattern so as to make it possible to estimate the impact of APPS in a small area. Knowledge of the effects of this program will be helpful to California policy-makers and to other states considering this approach.

REFERENCES

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