An Inquiry into the Cross-States Impacts of Gun-Control Legislations following the 2018 Parkland High School Shooting

Arthur Langlois,
Northeastern University

Project Description

In February 2018, an armed man opened fire at the Marjory Stoneman Douglas High School in Parkland, Florida, killing 17 people and injuring 15 others. This act of violence was one of the 3,428 shootings that occurred in the US since 2014 (Gun Violence Archive, 2022), or, in other words, one of the daily shootings occurring for 7 years straight in the country. The 2018 Parkland school shooting has sparked debates over the broader issue of gun violence -as highlighted by various policy makers and activists, gun violence is not limited to mass shootings: they also largely account for suicides, and less-than-four casualties' homicides (Figure 1). Following this horrific act of terror, an unprecedented thing happened: State legislators implemented various laws to restrict gun access, pressured by various movements led by survivors of the massacre. While the specificities of the legislations passed are rather heterogenous, they all shared a common motive: control gun access in an attempt to limit the number of gun violence -and more specifically mass shootings- in their respective states. Across the country, about half of the states passed at least one legislation aiming to restrict gun access. Yet unsurprisingly, the distribution by political affiliation of newly passed legislations was disparate, with 44 democrats-controlled-states tightening restrictions, compared to 20 republican controlled-states tightening restrictions (9 republican states lowered their gun laws restrictions). These various laws being passed across the country were unequivocally seen as a victory for gun control advocates, even considered as a legislative "tectonic shift" by the Giffords Center To Prevent Gun Violence.

The goal of this empirical project is to 1- Measure the extent to which the gun-restricting policies implemented following the 2018 Parkland shooting were successful in reducing gun violence across states. 2- Examine the cross states differences in the effectiveness of their respective policies, to identify which policies seem to be most efficient in reducing gun violence.
We will focus on States that have both implemented policies in response to 2018's Parkland shooting, and historically have high number of gun violence, in an attempt to understand the impact of the policies where it is most problematic. These states include: California, Florida, Washington, Wisconsin, New York, Ohio and Illinois (*Table 1*). Even though these states share comparable legislations such as

domestic violence restrictions and urban gun violence reduction programs, they are different in nature, therefore we will provide a thorough review of each state's newly implemented legislative framework since 2018. The dataset is comprised of daily city level data on gun incident with number of casualties and injuries between 2014 and 2021, compiled by the Gun Violence Archive, as well as daily suicide rates at the state level since 1999 obtained from the Center for Disease Control. These two datasets will be aggregated at the state and monthly level to construct a novel database. We will follow a synthetic control methodology in order to estimate the causal impact of the policies on 1- the total number of gun related incidents 2- the number of gun related homicides 3- the number of gun suicides. More specifically this methodology will be favored over traditional methods used in causal inference (such as Difference-in-Differences, Interrupted Time Series, or Instrumental Variables) due to its interpretability and transparency (Abadie, 2021), and its prevalence in the gun control literature. As the various policies enacted in the chosen states have been implemented in the same time period, it will be impossible to isolate the singular effects of a given policy in a given state (a policy A is a confounder of the effect of policy B on gun violence). Therefore, the econometric analysis will focus on the *global* impact of the various policies that have been implemented in a given state in response to the 2018 Parkland school shooting. To motivate the analysis and further articulate the hypothesized global effects of various policies implemented in a given state, the literature review of this project will include previous legislation specific evidence on their relationship to gun violence.

Justification for research

According to the CDC, there are about 45,000 annual deaths linked to gun violence in the country, and according to a common study by the Healthcare Cost and Utilization Project, the CDC and Everytown Research, the yearly economic cost of gun violence is estimated at $280 billion dollars (with $3.5 billion of medical costs alone, and an estimated 214.2 billion loss in "intangible loss of victims and survivors due to either a life cut short or a person permanently disabled by gun violence"). These economic costs vary highly depending on states, with southern states being hit the most (*Figure 2*). More specifically, gun violence has been shown to have significant detrimental sociological and psychological, most notably on children, community wellbeing, and often on multiple generations (Cook & Ludwig, 2002, Soni & Tekin, 2020, and Dursun, 2019). Gun violence is largely perceived as one of the largest problem in the country, with 72% of the population perceiving it as either a "Very Big Problem" or a "Moderately Big Problem". On the other hand, gun violence regulation has also become a divisive political subject: according to the same survey by the Pew Research Center, 80% of self-identified democrats respondents considered that

gun laws ought to be stricter than they are today, compared with 20% for self-identified republicans (Pew Research Center, 2021, see *Figure 3*).

The combination of high societal costs of gun violence along with the importance place it has taken in political debate calls for the need of rigorous assessment of policies effectiveness aiming at reducing gun violence. We hope the results of this research can provide guidance to policymakers and the general public at large regarding the effectiveness of these crucial policies.

Literature review

At its most fundamental level, the economic assessment of gun control is grounded on the basic notion of externalities; for Chaudhri and Geanakoplos, gun owners can be divided into three categories: hunting and sporting related, individual safety, and criminal activity (Chaudhri & Geanakoplos, 1998). In the situation where gun availability is widespread in a nation, there is a mechanical increase in the number of potential criminals now armed with guns. The theoretical consequence is a heightened number of criminal activity, yielding justification for regulations (Cook et al, 2010). Because the results of guns misuse are costly/difficult to limit and sanction, Cook finds a "logical case for regulations designed to preempt criminal use to facilitate law-enforcements efforts, to limit the likelihood of accidental misfires and achieve other public purposes", with the latter referring to ex ante regulation by S. Shavell (Shavell, 1984 & 2004). A short theoretical paper by Chaudhri and Geanakoplos constructed a theoretical model of the demand for gun, demonstrating that all things held equal, rendering guns illegal would greatly reduce their demand, due to their elastic nature. (Chaudhri & Geanakoplos, 1998). Notable critics like J. Miron, have argued that cross-country differences in gun violence could rather be attributed to differential drug enforcement policies, as opposed to the prominent rhetoric on the explanatory power of gun control (Miron, 2001).

The discussion with regards to gun control in the US has accumulated a large body of literature across the social sciences, yielded by considerable amounts of empirical work over the past twenty years. The majority of these studies pay close attention to the various impacts of specific policies on gun violence. Notably, Cook and Ludwig attribute the number of homicides directly to gun ownership and have estimated the elasticity of homicide with respect to gun ownership to 0.1 and 0.3, as well as arguing that households bear a large cost by purchasing firearms, by estimating that the average annual marginal cost of gun ownership at the household level could go as high as $1,800 (Cook & Ludwig, 2006). Kellermann

et al., have added and emphasized through a meticulous 32 month-study that the presence of a firearm in a household was associated with an increased risk of suicide (adjusted odd ratio of 4.8), (Kellermann et al., 1992). Kposowa et al., through a cross state analysis provide similar insights to Kellermann by also showing that household firearm ownership was associated with both suicide by all means, and firearm suicide. In addition, Kposowa et al. show that strictness of gun regulation reduced suicide rates.

The rising importance of gun violence in public debate has motivated the members of the scientific community to undertake empirical research to understand the legislation-specific impacts on gun related deaths.

Urban Gun Violence Reduction Programs
There are a wide array of gun violence reduction programs, and significantly vary across jurisdictions. Most models employ either through street outreach, (a study of its implementation done by Everytown Research & Policy showed it was associated with a 50% decline in gun injuries, as well as a 63% decline in shooting victimization) Group Violence Intervention Programs (GVI), or Hospital-Based Violence Intervention Programs (HVIPs). These different types of models have been shown to significantly reduce gun violence in targeted neighborhoods, as emphasized by Everytown Research's report. According to the report, "In reality, although some gun violence is connected to gang activity, gun violence occurs more frequently within informal social networks tied together by the places people live, the schools they attend, and their places of worship. Gun violence within these social networks is further concentrated into a very small percentage of people. This gun violence frequently occurs spontaneously, following a dispute or perceived disrespect, and between people who are known to one other. These encounters become deadly because a gun is present". (Everytown Research & Policy, 2021).

Domestic Violence Restrictions
Zeoli et al. show that prohibiting gun ownership from individual with a history of domestic violence has shown significant reduction on intimate partner homicides (about 10% reduction), across the country (Zeoli et al, 2018). This was motivated by previous research initiated by Zeoli et al., proving that out of 89 mass shooters between 2014 and 2017, 28 were suspected of domestic violence with 61% had been accused or convicted for domestic violence (Zeoli & Paruk, 2020)

Ownership restrictions
The academic literature is largely divided on the question of the impacts of ownership restrictions posited that gun ownership rates are strong predictors of homicide rates at the state level, but Gius found that gun

ownership rates have a statistically significant and positive effect on the homicide rates at the 10% significance level, suggesting that restricting gun access may reduce homicides (Gius, 2009). In a 1993 article, Kleck and Patterson found on the opposite, that most gun control restrictions in large cities have no significant effects on violence rates (Kleck, & Patterson, 1993)

Expanded background checks

In a 2017 study, Miller showed that 22% of current gun owners had acquired their firearm in the past two years, did so without any background check (Miller et al., 2017). Using longitudinal data at the state level between 1996-2005, Sen showed that more extensive background checks prior gun purchase are associated with both a decrease in firearm homicide and suicidal deaths (Sen & Panjamapirom, 2012).

Bump-Stock Ban

Bumps stocks are attachments made to a semiautomatic rifle enabling it to fire faster, and be used similarly than an automatic rifle. This issue came to the attention of policy-makers and the public when it was discovered that twelve of the rifles the Las Vegas mass murder used in his 2017 attack had been adjusted by a bump stock. Following this tragic event, even most firearms advocates such as the National Rifle Association expressed their support for tighter restrictions on such devices. A study in 2018 showed that 81% of American voters supported a ban on bump stocks (New York Times, 2017). In a firearms regulation's experts survey led by the NYT, a ban on bump stock, and more broadly on semi-automatic and automatic firearms reached a mean score of 6.1/10, when asked about how effective its implementation would be in preventing gun deaths. However, the academic literature regarding the relationship between a bump stock ban and homicide rate remains limited.

Red Flag Laws

Extreme Risk Protection orders, or "Red Flag Laws" are a set of legislation allowing a judge to temporarily remove a person's access to firearms when presented with evidence that are posing a risk for either others or themselves. The psychiatric literature has consistently shown that the implementation of ERPOs has saved lives (Swanson, 2019) as supported by state-wide comparative research in Indiana and Connecticut by Kivisto in 2018 (Kivisto et al., 2018). While the specificities of the laws differed across the two states, the results were the same: ERPOs are associated with a diminished number of gun related deaths, with most notable results regarding suicides (7.5% reduction in firearm suicides in the ten years following its enactment).

As stated initially, a careful analysis of the existing literature evaluating the legislation-specific impacts on gun violence both motivate and help construct robust hypotheses for our study.

References

- Abadie, A. (2021). Using synthetic controls: Feasibility, data requirements, and methodological aspects. Journal of Economic Literature, 59(2), 391-425.
- Astor, M., & Russell, K. (2018). After Parkland, a new surge in state gun control laws. The New York Times, 14.
- Berk, R. (n.d.). What is a mass shooting? what can be done? What is a Mass Shooting? What Can Be Done?
- Buchanan, L., Grothjan, E., Huang, J., Parshina-kottas, Y., Pearce, A., & Yourish, K. (2017, October 4). What is a bump stock and how does it work? The New York Times.
- Bui, Q., & Sanger-Katz, M. (2020). How to prevent gun deaths? Where experts and the public agree. The New York Times, 14.
- Chaudhri, V., & Geanakoplos, J. (1998). A note on the economic rationalization of gun control. Economics Letters, 58(1), 51-53.
- Centers for Disease Control and Prevention, National Center for Health Statistics. Underlying Cause of Death 1999-2020 on CDC WONDER Online Database, released in 2021. Data are from the Multiple Cause of Death Files, 1999-2020, as compiled from data provided by the 57 vital statistics jurisdictions through the Vital Statistics Cooperative Program.
- Cook, P. J., & Ludwig, J. (2002). The costs of gun violence against children. The Future of Children, 87-99.
- Cook, P. J., & Ludwig, J. (2006). The social costs of gun ownership. Journal of Public Economics, 90(1-2), 379-391.
- Cook, P. J., Ludwig, J., & Samaha, A. (2010). Gun Control after" Heller": Litigating against Regulation. In Regulation vs. Litigation: Perspectives from Economics and Law (pp. 103-135). University of Chicago Press.
- Community-led public safety strategies. Everytown Research & Policy. (2021, April 23).
- Donohue, J. J., & Levitt, S. D. (1998). Guns, violence, and the efficiency of illegal markets. The American Economic Review, 88(2), 463-467
- Dursun, B. (2019). The intergenerational effects of mass shootings. Available at SSRN 3474544.
- Follman, M., Lee, J., Lurie, J., & West, J. (2018). The true cost of gun violence in America.
- Gius, M. (2009). The effect of gun ownership rates on homicide rates: a state-level analysis. Applied economics letters, 16(17), 1687-1690.
- Gramlich, J. (2019). What the data says about gun deaths in the US. Report, Pew Research Center.
- Gun violence archive. Gun Violence Archive. (n.d.).
- Kellermann, A. L., Rivara, F. P., Somes, G., Reay, D. T., Francisco, J., Banton, J. G., ... &
- Kellermann, A. L., Rivara, F. P., Somes, G., Reay, D. T., Francisco, J., Banton, J. G., ... & Hackman, B. B. (1992). Suicide in the home in relation to gun ownership. New England Journal of Medicine, 327(7), 467-472.
- Kivisto, A. J., & Phalen, P. L. (2018). Effects of risk-based firearm seizure laws in Connecticut and Indiana on suicide rates, 1981–2015. Psychiatric Services, 69(8), 855-862.
- Kposowa, A., Hamilton, D., & Wang, K. (2016). Impact of firearm availability and gun regulation on state suicide rates. Suicide and Life-Threatening Behavior, 46(6), 678-696.
- Kleck, G., & Patterson, E. B. (1993). The impact of gun control and gun ownership levels on violence rates. Journal of Quantitative Criminology, 9(3), 249-287.

- Lopez, G. (2017, October 2). America's unique gun violence problem, explained in 16 maps and charts. Vox.
- Mass shootings in America. Everytown Research & Policy. (2021, November 8).
- Miron, J. A. (2001). Violence, guns, and drugs: A cross-country analysis. The Journal of Law and Economics, 44(S2), 615-633.
- Polinsky, A. M., & Shavell, S. (1984). The optimal use of fines and imprisonment. Journal of Public Economics, 24(1), 89-99.
- Santilli, A., O'Connor Duffany, K., Carroll-Scott, A., Thomas, J., Greene, A., Arora, A., ... & Ickovics, J. (2017). Bridging the response to mass shootings and urban violence: exposure to violence in New Haven, Connecticut. American journal of public health, 107(3), 374-379.
- Sanger-katz, M., & Bui, Q. (2017, October 12). A bump stock ban is popular with the public. but experts have their doubts. The New York Times.
- Schaeffer, K. (2021). Key facts about Americans and guns. Pew Charitable Trust.
- Sen, B., & Panjamapirom, A. (2012). State background checks for gun purchase and firearm deaths: an exploratory study. Preventive medicine, 55(4), 346-350.
- Soni, A., & Tekin, E. (2020). How do mass shootings affect community wellbeing? (No. w28122). National Bureau of Economic Research.
- Shavell, S. (2004). Minimum asset requirements and compulsory liability insurance as solutions to the judgment-proof problem.
- Schell, T. L., Cefalu, M., Griffin, B. A., Smart, R., & Morral, A. R. (2020). Changes in firearm mortality following the implementation of state laws regulating firearm access and use. Proceedings of the National Academy of Sciences, 117(26), 14906-14910.
- Swanson, J. W. (2019). Understanding the research on extreme risk protection orders: varying results, same message. Psychiatric services, 70(10), 953-954.
- Tushnet, M. (2008). Interpreting the right to bear arms—Gun regulation and constitutional law. New England journal of medicine, 358(14), 1424-1426.
- Vasilogambros, M. (2018). After Parkland, states pass 50 new gun-control laws. Pew Charitable Trusts, August, 2.
- Zeoli, A. M., McCourt, A., Buggs, S., Frattaroli, S., Lilley, D., & Webster, D. W. (2018). Retracted: Analysis of the Strength of Legal Firearms Restrictions for Perpetrators of Domestic Violence and Their Associations With Intimate Partner Homicide. American journal of epidemiology, 187(7), 1449-1455.
- Zeoli, A. M., & Paruk, J. K. (2020). Potential to prevent mass shootings through domestic violence firearm restrictions. Criminology & Public Policy, 19(1), 129-145.
- Miller, M., Hepburn, L., & Azrael, D. (2017). Firearm acquisition without background checks: results of a national survey. Annals of Internal Medicine, 166(4), 233-239
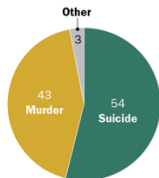
Appendix

**Suicides accounted for
more than half of U.S.
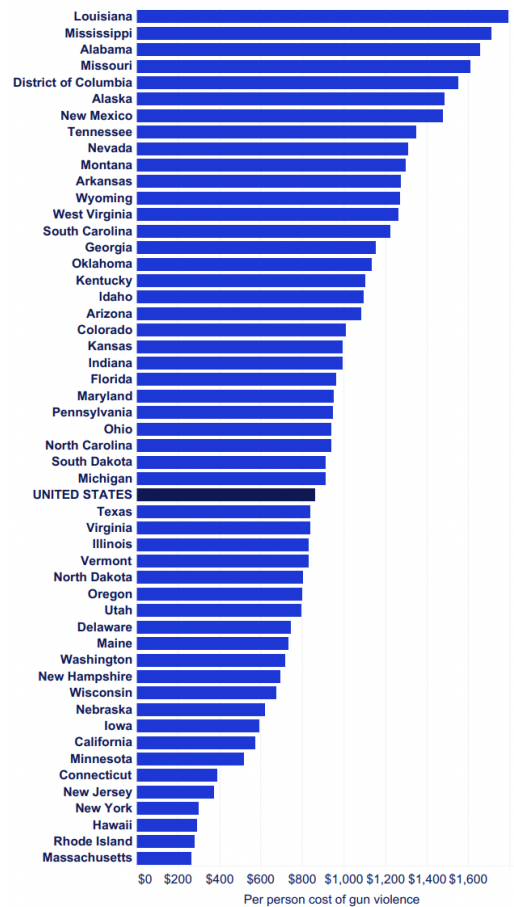gun deaths in 2020**

% of U.S. gun deaths, by type

Note: "Other" includes gun deaths that
were unintentional, involved law
enforcement or had undetermined
circumstances.
Source: Centers for Disease Control
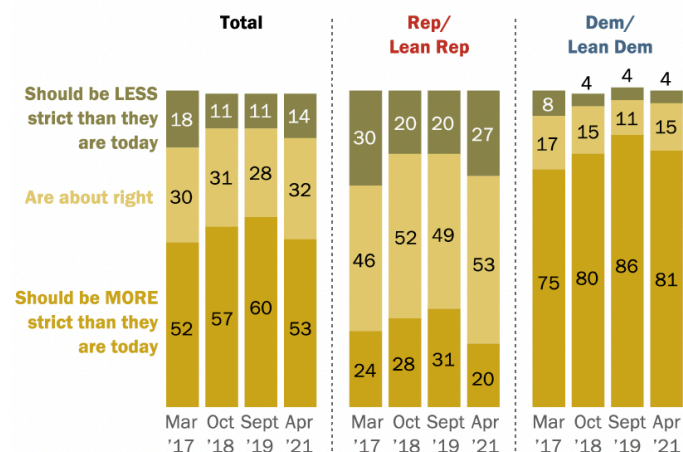and Prevention.

PEW RESEARCH CENTER

2.

3.

Support for stricter gun laws has fluctuated in recent years; fewer back stricter laws now than in 2019

% who say gun laws ...

	Total				Rep/Lean Rep				Dem/Lean Dem			
	Mar '17	Oct '18	Sept '19	Apr '21	Mar '17	Oct '18	Sept '19	Apr '21	Mar '17	Oct '18	Sept '19	Apr '21
Should be LESS strict than they are today	18	11	11	14	30	20	20	27	8	4	4	4
Are about right	30	31	28	32	46	52	49	53	17	15	11	15
Should be MORE strict than they are today	52	57	60	53	24	28	31	20	75	80	86	81

Note: No answer responses not shown.
Source: Survey of U.S. adults conducted April 5-11, 2021.

PEW RESEARCH CENTER

Tables
1.

State	Policies
Callifornia	Ownerhip restrictions, Urban Gun violence reduction programs
Florida	expanded background checks, bump stock ban, extreme risk protection order, waiting periods, urban gun violence reduction programs
Washington	bump stock ban, domestic violence restrictions, tightened concealed carry
Wisconsin	anti gun trafficking
New York	domestic violence restrictions, urban gun violence reduction programs
Ohio	domestic violence restrictions
Illinois	urban gun violence reduction programs

Definitions

For the purpose of this analysis we will borrow the definition of the Congressional Research Service And the Federal Bureau of Investigation for mass shooting, defined as "firearm violence resulting in at least four people being shot at roughly the same time and location, excluding the perpetrator".