

## Campus Carry Laws and Campus Crime

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### *Abstract*

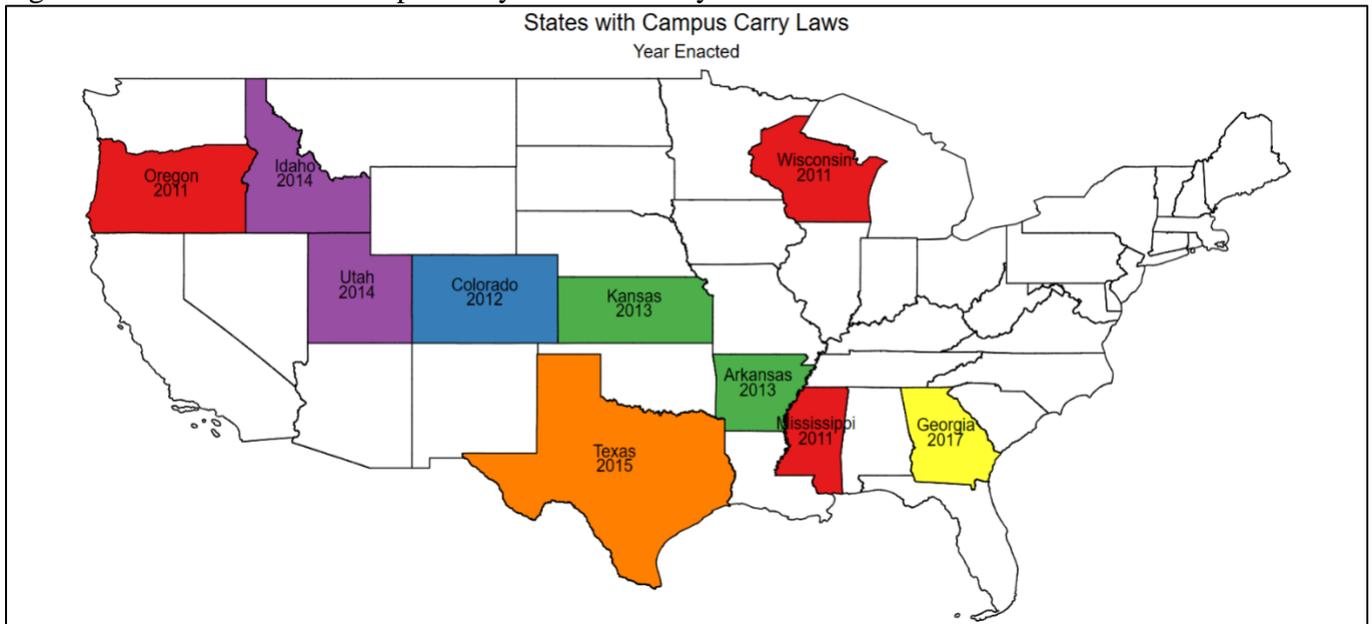
After the horrific events on the campus of Virginia Tech, many states took steps to make their campuses safe. While some states banned guns on campus, other states went in a different direction and allowed guns to be carried on campus. The purpose of this empirical study will be to estimate the effect of campus carry laws on on-campus crime rates. We employ both a basic fixed-effects model and a difference-in-differences model that can identify a causal effect. Neither model finds any strong effects of the campus carry law on campus crime rates.

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## INTRODUCTION

After the horrific shooting on the Virginia Tech campus in 2007, many institutes of higher education (IHE) started looking at their gun policies to have safer campuses. Many states explored the idea of banning guns on campus while other states went in the other direction to fully allow guns on campuses. There are 16 states that ban guns on campus and 23 states that leave the decision up to the individual campuses on whether to allow or ban weapons. As of 2017, there are 10 states that allow people to carry firearms on campus. Figure 1 shows the states with a campus carry law and the effective year.

Figure 1. States that allow campus carry and effective year



(Source: NCSL website)

Kansas' law was passed in 2013 but gave a four-year exemption to a number of public institutions, including universities and colleges. In Colorado and Oregon, the state Supreme Courts upheld the campus carry laws as constitutional.

While federal funding of gun violence research was limited during the past twenty-five years, there was a robust literature that sought to answer the question of what sort of policy could

limit gun violence. The advent of new methods for causal inference and state level policy reforms like child access prevention (CAP) laws and background checks provided avenues for promising analysis. RAND put out a comprehensive synthesis of the research evidence on firearm violence in 2018. They find support for CAP laws and background checks reduce gun suicides and homicides, and in certain cases can reduce violent crime rates. There is less consensus of the impact of outright bans and other limitations on firearm purchases. The purpose of this empirical study will be to estimate the effect of campus carry laws on on-campus crime rates.

This study takes its cues primarily from the right-to-carry (RTC) literature that has produced controversies surrounding methodology, time period, and covariates to include. Donohue, Aneja, and Weber (2018) provide a comprehensive analysis of right-to-carry laws comparing their model with three different models in previous analyses of RTC laws (Lott and Mustard (1997), Moody and Marvell (2008), and a report by the Brennan Center). The authors using a synthetic control method as well as a LASSO analysis find that RTC laws increase violent crime. The authors estimate that violent crime in a state is 13 to 15% higher ten years after the adoption of the law. They do not find any significant effects of RTC laws on property crime or murder rates. Manski and Pepper (2016) in their analysis of RTC laws on crime focus on the underlying assumptions when developing the methodology. The authors use bounded variation assumptions which allows the effects to be flexible across years, crimes, and states. Their results show the effects found depend on the underlying assumptions.

To our knowledge there has not been any systematic analysis of campus carry laws on campus crime as the adoption of campus carry laws are relatively new. There has been research on the determinants of crimes on campus. Sloan (1994) is one of the first empirical studies of the

correlates of campus crime, since public universities were required to record crime levels starting in 1992. Further updates to this law became known as the Clery Act which strengthened reporting requirements for IHE. Recent work on campus crime has centered its focus on sexual victimization.

For this study, we use a novel methodology that estimates the effect of campus carry laws on crime rates on university campuses. There are roughly 10 states that allow individuals to carry firearms on campus. We use this variation in state policies to provide a causal estimate.

## DATA

Data on campus crime is taken from the Department of Education's Campus Safety and Security (CSS) database. Enrollment numbers are taken from the Integrated Postsecondary Education Data System (IPEDS). The two databases are merged at the institution level and then the data is aggregated to the state level. We limit the sample to main campuses for the years between 2008 and 2015.

The primary dependent variable is the total count of Part 1 crimes, except for rape. We do not include the counts of rape (or incest, statutory, or fondling) because there was a definition change within our time period so comparison over years cannot be credibly performed. A second issue with rape counts is the problem of undercounting (Odunze, 2019). We separate out the dependent variable by institution type. We include total crimes for public four-year institutions and for private, non-profit, four-year institutions. We do not expect any effect for private institutions because they are not always subject to state law<sup>1</sup>. Figure 2 shows the crime rate for public and private institutions between 2008 and 2015.

Figure 2. Total Crime per 10,000 students by Institution Type

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<sup>1</sup> Under Texas' law, private institutions are allowed to opt-out.

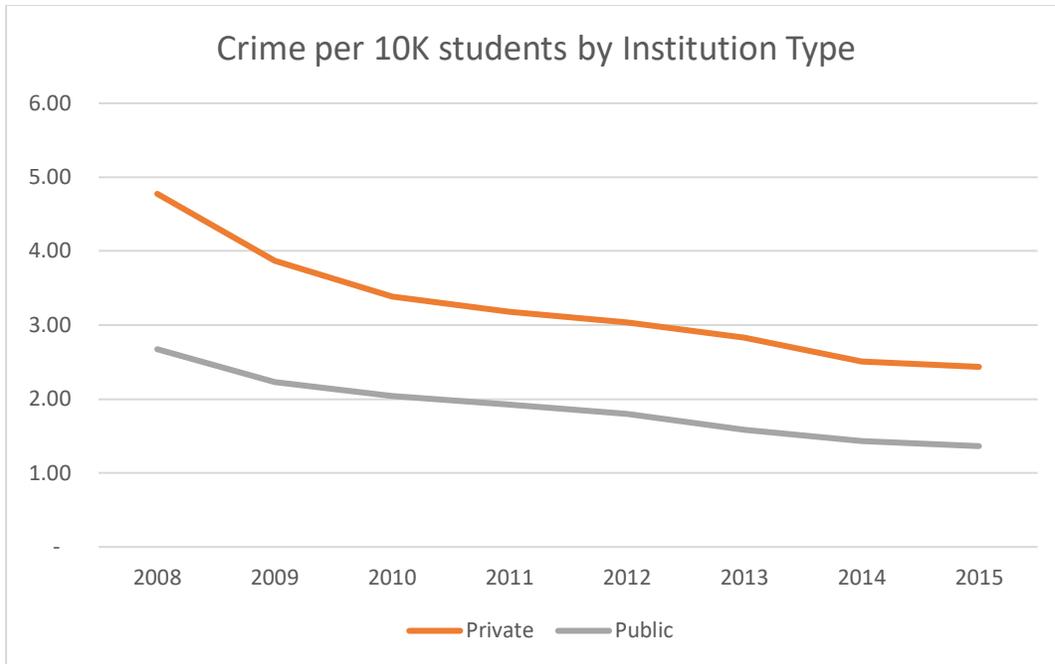


Figure 2 shows that crime is decreasing over this time period, which is true of national crime statistics over this period. Another interesting aspect of Figure 2 is that the crime rate for private institutions exceed that of public institutions, though both rates are small showing that campuses are generally safe.

## ANALYSIS

We estimate the effect of campus carry laws on the level of crime on university/college campuses. There are 10 states that allow individuals to carry firearms on campus. We can use the variation in state policies to conduct the empirical analysis. Because of the differences between public and private institutions we estimate separate models for institutions and separate models for the individual states that implemented a campus carry law prior to 2013.

Our data sample is panel of states covering the years 2008 to 2015. We estimate two models: a fixed effects panel data linear regression for the dependent variable that is the total

crime per 100,000 enrolled. We create an indicator variable to represent whether a state has a campus carry law. To isolate the effect of the campus carry law on crime outcomes, it is important to control for variables that influence crime rates. We aggregate the university/college data to the state-level and then merge it with the state-level controls. As a measure of deterrence, we include police staffing per 10,000. We control for unemployment, gross state product (GSP), per-capita ethanol consumption from beer, race and age-sex categories. As a proxy for gun prevalence, which controls for supply side factors, we use the number of background checks requested. This is an imperfect measure because it does not differentiate between existing gun owners who increase their stock and new gun owners. However, information on gun prevalence is severely limited<sup>2</sup>.

We run a basic regression, given in (1), where the crime rate is regressed on the dummy variable for states that enacted a campus carry law ( $Campus\ Carry_{it}$ ), a set of control variables including state demographics, deterrence measures, and a proxy for gun prevalence ( $X_{it}$ ), state ( $\gamma_i$ ), and year ( $\delta_t$ ) fixed effects.

$$(1) Crime\ Rate_{it} = \beta_0 + \beta_1 Campus\ Carry_{it} + \beta_2 X_{it} + \gamma_i + \delta_t + \rho_{it} + \varepsilon_{it}$$

The results of the model will tell us the difference in crime rates between states that have implemented the law and those without a law. We estimate fixed effects Poisson regression models for total crimes and for on-campus crimes, using enrollment numbers as the exposure variable.

TABLE 1. Fixed Effects Panel Models

	<b>Crime per 100K</b>	<b>Total Crime</b>	<b>On-Campus</b>
<i>Public Institutions</i>	<i>Linear</i>	<i>Poisson</i>	<i>Poisson</i>
Campus Carry Law	0.0211 (0.132)	-0.0203 (0.018)	-0.0286 (0.022)

<sup>2</sup> Summary statistics are provided in an appendix table.

<i>Private Institutions</i>	<i>Linear</i>	<i>Poisson</i>	<i>Poisson</i>
Campus Carry Law	0.1631 (0.338)	0.0316 (0.091)	0.0302 (0.086)

Note: + p<0.10, \* p<0.05, \*\* p<0.01, \*\*\* p<0.001; robust standard errors in parentheses. Controls include state demographics, deterrence measures, and a proxy for gun prevalence. Full results and detailed descriptions are in the Appendix.

The results of Table 1 show that the campus carry law is not significantly related to campus crime in any of the specifications. It was expected that if there were going to be any significant findings it would be exhibited in public institutions. As shown in Figure 2, campus crime was decreasing and there weren't any significant changes in rate and direction during the sample time period.

The previous analysis aggregated the data to estimate the effect of the campus carry law on campus crime as a whole. We can estimate state-specific models to see how the law in a given state affected that state's level of campus crime. Following Buchmueller, DiNardo, and Valletta (2011), we estimate a variant of (1) for every state in the sample. We alter (1) to place it in a difference-in-differences framework where the treatment group is the state that implemented the law and the time variable is the year the campus carry law was implemented. The estimating equation is outlined below:

$$(2) \text{ Crime Rate}_{it} = \beta_0 + \beta_1 \text{State}_i * \text{Year}_t + \beta_2 X_{it} + \delta_t + \gamma_i + \varepsilon_{it}$$

If the implementation of a campus carry law has an effect on campus crime rates, this effect should only show in states that have implemented the law. After the running (2) for every state in the sample, we rank-order the estimates and divide them by the number of states. Statistical significance is determined by rank ordering the estimates and dividing it by the total number of states. Significance occurs when the state of interest (the state with the campus carry law) is ranked within the top two (or bottom two) of the distribution. The null hypothesis is that the campus carry law has no effect on campus crime rates.

Tables 2 and 3 show the state-specific estimate (Post-Implementation) of the campus carry law on total campus crime. The subsequent two rows show the estimate of the state at the 5<sup>th</sup> percentile and the state at the 95<sup>th</sup> percentile. The final row shows the p-value for a two-tailed test to show the statistical significance.

Table 2. Impact of Campus Carry Law on Total Campus Crime

<b><i>Public Institutions</i></b>				
(N=400; mean(dv)=5.19)	Colorado	Mississippi	Oregon	Wisconsin
Post-Implementation	-0.193	-0.017	0.386	-0.281
5th percentile	-0.534	-0.494	-0.494	-0.494
95th percentile	0.636	0.386	0.314	0.386
Two-tailed test p-value	0.49	0.90	0.10	0.22
<b><i>Private Institutions</i></b>				
(N=392; mean(dv)=5.3)	Colorado	Mississippi	Oregon	Wisconsin
Post-Implementation	0.423	0.674	-0.198	-0.266
5th percentile	-1.173	-0.87	-0.87	-0.87
95th percentile	1.378	1.321	1.321	1.321
Two-tailed test p-value	0.37	0.25	0.61	0.53

The only statistically significant effect occurs in Oregon where the campus carry law has a mildly positive effect on total crime on public campuses.

Table 3. Impact of Campus Carry Law on Total On-Campus Crime

<b><i>Public Institutions</i></b>				
(N=400; mean(dv)=5)	Colorado	Mississippi	Oregon	Wisconsin
Post-Implementation	-0.284	-0.008	0.380	-0.479
5th percentile	-0.551	-0.479	-0.479	-0.444
95th percentile	0.646	0.38	0.374	0.38
Two-tailed test p-value	0.41	0.90	0.12	0.08
<b><i>Private Institutions</i></b>				
(N=392; mean(dv)=5.08)	Colorado	Mississippi	Oregon	Wisconsin
Post-Implementation	-0.162	0.642	-0.162	-0.349
5th percentile	-1.827	-1.157	-1.827	-1.157
95th percentile	3.329	1.577	3.329	1.577
Two-tailed test p-value	0.73	0.25	0.73	0.47

The only significant effect focuses solely on on-campus crime occurs in Wisconsin where the campus carry law has a negative effect on on-campus crime. Taking the results together, there is

not strong causal evidence in either direction on the impact of campus carry laws on campus crime.

## KEY TAKEAWAYS

This study provided an initial evaluation of the effect of campus carry laws on campus crimes. Using a novel methodology where we estimate state-specific models, this study does not find strong evidence in either direction of the implementation of these laws. In an analysis of four states who have implemented law since before 2015, only in Oregon and in Wisconsin are there significant effects and the direction of the effects were opposite. The results showed mild causal effects of the law in Oregon and in Wisconsin, though the effects were in opposite directions. The significant effects were only occurring in public institutions which is intuitive since the law is mandatory for public institutions.

This result is not unsurprising as crime is not a large factor on campuses relative to crime in general. This is the first cut of estimating a causal effect of campus carry laws and further work will expand to include more data and more states. Because of the lack of any real significant effects, we cannot say for certain about how campus carry laws influence behavior on and around campuses. The phenomenon of campus carry laws are relatively new and more analysis needs to be conducted.

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