RIGHT-TO-CARRY AND CAMPUS CRIME: EVIDENCE FROM THE NOT-SO-WILD-WEST

JILL K. HAYTER, GARY L. SHELLEY, AND TAYLOR P. STEVENSON*

Introduction

Improbable and unpredictable events sometimes have large impacts on our lives. Taleb (2007) argues that "Black Swan" events, characterized by "rarity, extreme impact and retrospective predictability," shape our lives and the world in which we live. These events are highly significant, but they are outliers. They are difficult to either understand or explain and nearly impossible to predict.

None of the students, faculty, or administrators in Blacksburg, VA on April 16, 2007 could have predicted the day would be different than any other on the Virginia Tech campus. It was this day a student went on a shooting rampage, killing 32 people and wounding 25 more, before finally killing himself. One reaction to the Virginia Tech shooting was a call for stronger gun control laws. A number of university administrators and faculty have been vocal in their support of stronger gun control. Notably, Oklahoma Chancellor of Higher Education Glen Johnson stated "There is no scenario where allowing concealed weapons on college campuses will do anything other than create a more dangerous environment for students, faculty, staff and visitors." Popular sentiment is summed up by Alex

* Jill K. Hayter is Assistant Professor of Economics at East Tennessee State University. Gary L. Shelley is Associate Professor of Economics at East Tennessee State University. Taylor P. Stevenson (stevenst@etsu.edu) is Assistant Professor of Economics at East Tennessee State University.

CITATION INFORMATION FOR THIS ARTICLE:

Jill. K. Hayter, Gary L. Shelley, and Taylor P. Stevenson. 2014. "Right-to-Carry and Campus Crime: Evidence from the Not-so-Wild-West." *Libertarian Papers*. 6 (1): 1-20. ONLINE AT: libertarianpapers.org.

Hannaford of *The Atlantic* (2011), "Guns are designed for one thing only—and the more of them there are, the greater chance of someone getting hurt." This is referred to as the "more guns, more crime" argument.

Not everyone shares this viewpoint that more guns lead to more crime. Some advocate less restrictive gun laws. Those who cite the "more guns, less crime" argument contend that firearms should be allowed on college campuses. Their argument is that large groups of unarmed individuals, such as those on university campuses, are vulnerable targets for would-be criminals. Since the massacre at Virginia Tech, several states have introduced legislation to lift the mandate that college campuses be completely free of firearms.

The campus firearm debate continues as a microcosm of the larger debate over the second amendment. Gun advocates argue that individuals who are licensed to carry a concealed firearm should not be prohibited from carrying on college campuses. On the other hand, university administrators and campus security officials are outspoken in their defense of the ban of firearms from campus.

Campus right-to-carry continues to be a highly debated issue. Since 2007 twenty-three state legislatures have considered bills allowing some form of right-to-carry on college campuses. In Utah, all state higher education institutions allow concealed carry on campus by individuals with a valid permit to carry a concealed weapon (CCW). The Utah legislature also passed a law prohibiting campuses from banning firearms carried by permit holders. The law was challenged by the University of Utah, but was upheld by the state supreme court in 2006.

Similar legislation was passed in the state of Colorado. Campuses of Colorado State University in Colorado Springs and Pueblo were the first to allow concealed carry on campus; today concealed carry is allowed on all campuses in Colorado. State laws in Colorado and Utah require individuals to be twenty-one years old to legally carry concealed firearms.

Recently, bills legalizing concealed carry on campus in the Tennessee and Texas legislatures have either failed or stalled. However, Tennessee lawmakers subsequently passed a law that allows concealed carry permit holders to keep firearms locked inside personal vehicles in public parking lots, including those on college campuses. While no longer a crime, the Tennessee Board of Regents (TBR) continues to consider possession of a firearm, even within a locked vehicle a violation of TBR policy. Mississippi passed a law allowing carry on state campuses; however, the right to carry on campus requires special training in addition to the regular concealed carry

permit requirements. In July 2011, the Attorney General of Virginia, Ken Cuccinelli, issued an opinion that individuals who hold concealed carry permits may carry firearms where it is "not otherwise prohibited by law." The University of Virginia's policy against firearms, according to Cuccinelli, "does not carry the force of law." Therefore, firearms are not illegal on UVA's campus, but do violate university policy.

This paper seeks empirical evidence of any significant difference in the reported crime rate associated with adoption of right-to-carry on public college campuses in Utah and on the Colorado Springs and Pueblo campuses in Colorado. Campus crime rates for these institutions in the years following adoption of campus concealed carry are compared to those for the years preceding the change in policy. Crime rates for these institutions also are compared to those from public schools in Colorado, New Mexico, Arizona, and Wyoming that do not allow the right to carry firearms. Regression results show there was no significant change in crime rates associated with adoption of right-to-carry on campus. To the contrary, results suggest a weak inverse relation between right-to-carry and the aggravated assault rate.

The next section provides a summary of the debate concerning the link between guns and crime, including previous evidence found regarding the causes of crime. Then, a description of the data used in this study is provided. The study continues with a description of the Tobit regression model used to analyze crime rates and a summary of the associated empirical results. Finally, the ending section contains concluding remarks.

Right-to-Carry Laws and Crime

John Lott and David Mustard (1997) use county level panel data from 1977-1992 to estimate the effects of legalized concealed carry of firearms on crime rates and crime trends. Their analysis estimates a four to seven percent drop in violent crime rates following the passage of right-to-carry legislation. Lott and Mustard also found evidence that an increase in property crime rates was associated with allowing concealed carry. They suggest that criminals substitute non-violent crime such as burglary for violent crime such as robbery when there is a higher probability that potential victims will be armed. However, in their analysis of overall crime trends the authors find a decrease in violent crime without an increase in property crime. Based on such findings the authors argue more guns are associated with less crime. Lott reinforced his argument with later studies (1998, 2000, and 2010).

The possibility of omitted variables in the Lott and Mustard analysis was noted by Levitt (2004). Using data from the 1980s and 1990s Levitt

found evidence that higher crack cocaine usage rates, incarceration rates, and increases in police resources were responsible for the changes in crime rates over time. Ayres and Donohue (2003) argue that crime rates were rising in the late 80s and early 90s due to increases in drug and gang activity. However, the majority of the jurisdictions that saw increases in crime rates were in non-right-to-carry states. The mid-90s welcomed a precipitous drop in crime rates nationally. Thus, Ayres and Donohue attribute Lott and Mustard's findings to national trends. Using county level data from 1977-1997 Ayres and Donohue found an increase in the cost of property damage attributable to crime in right-to-carry states. The debate continued with Donohue (2003, 2004) and Ayres and Donohue (2009) providing evidence against the "more guns less crime" hypothesis.[1]

In 2005, a committee formed by the National Research Council (NRC) reviewed the existing literature concerning the right to carry a firearm. In their report the NRC concluded that empirical results from the previous studies were sensitive to model specification. The NRC also found prior estimates of the impact of concealed carry laws were not robust when extended beyond their original time periods. Overall, the NRC's panel of economists, sociologists, and political scientists concluded that the evidence was not strong enough to make a policy statement. James Q. Wilson was the lone dissenting member of the NRC Committee. Wilson argued that, despite the contradictory results, the clear effect of right-to-carry laws was a decrease in the murder rate. Thus, the debate regarding the effect of guns on crime remains unsettled and quite lively.

The Campus Crime Data

Previous literature has used either state level data or county level data to evaluate the effect of right-to-carry laws on crime. The present paper follows an empirical approach similar to the studies mentioned above; however, it uses a pooled data set composed of institution level data observations from 85 public college and university campuses for academic years 2000-2001 through 2008-2009. Thus, there are 765 total data points in the pooled sample. The 2008-2009 year is the most recent year for which data is available. The schools are located in the contiguous states of Arizona, Colorado, New Mexico, Utah, and Wyoming. Utah and Colorado are the only states permitting concealed carry on campus during this sample period.

[1] A more thorough discussion of the debate may be found in Lott (2010) and Aneja, Donohue, and Zhang (2011).

The remaining states were selected because they are geographically close to Utah and Colorado and because they are most likely to have similar demographic and cultural characteristics.[2]

The campus crime data was obtained from the Office of Postsecondary Education and lists the number of reported criminal incidents by type for each campus. This source also provides information as to whether the institution is a 2-year or 4-year school, and total enrollment. Financial data regarding the number of Pell grant recipients for each campus was obtained from the National Center for Education Statistics. Demographic data, which included the race of enrolled students, was collected from the Integrated Postsecondary Education Data System (IPEDS).

The number of murders, forcible sex offenses, robberies, and aggravated assaults are summed to obtain the number of violent crimes. Non-violent crimes include burglaries, non-forcible sex offenses, motor vehicle thefts, and arsons.[3] One of the most notable characteristics of the data is the low incidence of crime at these institutions. The average number of crimes per campus per year is 17.16, including several schools that report zero total crimes in some years. The average number of reported violent crimes per campus per year is only 2.58, again with several schools reporting zero violent crimes. However, there are exceptions to the low number of crimes. The sample includes observations for a campus in a year as high as 338 total crimes and 40 violent crimes.

Statistics regarding reported criminal incidents by category are reported in Table 1. The second column shows the total number of reported incidents in each category. The percentage of total criminal incidents falling into each category is presented in the third column. The greatest percentage of total crimes comes from burglaries (61.75%), while motor vehicle thefts make up the second largest percentage (19.44%). These two non-violent crimes comprise approximately 81% of total reported campus crimes. In contrast, violent crimes are only 15.07% of total reported criminal incidents. The fourth column displays the number of incidents in each category per school per year. These numbers again highlight the relatively low incidence of reported crimes on campus. Overall, there are only 17.16 reported crimes

[2] While comparison of crime rates in Colorado and Utah to those in California or northeastern states would be interesting it is beyond the scope of this study. Future work includes expanding the data to include more states.

[3] Negligent manslaughter is also included in the list of crime categories; however, there were no incidents of this type within this pool of data.

per campus per year. Although, there are 8,109 total reported campus burglaries, this is only 10.6 incidents per school per year. Violent crime is rare on campus, averaging only 2.58 incidents per school per year. There were only six reported campus murders and zero cases of negligent manslaughter observed in the entire sample. Indeed, an incident of violent crime on campus appears to be a "black swan" event.

Table 1
Campus Crime Statistics

Type of Crime	Number of Incidents	Percent of Total Crime	Incidents per Campus per Year
Total Crimes	13,131	------	17.16
Violent Crimes	1,979	15.07%	2.58
Aggravated Assaults	959	7.30%	1.25
Forcible Sex Offenses	766	5.83%	1.00
Robberies	248	1.89%	0.32
Murders	6	0.05%	0.01
Non-Violent Crimes	11,152	84.93%	14.58
Burglaries	8,109	61.75%	10.60
Motor Vehicle Thefts	2,553	19.44%	3.34
Arsons	417	3.18%	0.55
Non-Forcible Sex Offenses	73	0.56%	0.10
Negligent Manslaughters	0	0.00%	0

This study examines whether right-to-carry on campus affects the reported crime rate at an institution. The crime rate is calculated as the number of incidents per 100 students enrolled on campus in the given year. In the analysis, the impact of right-to-carry is examined separately for violent and non-violent crime rates. Finally, the analysis is extended to include a further breakdown of violent crime rates by category and an examination of the non-violent crime of burglary. As shown in the second column of Table 2, the average crime rate is small. The fact that the median crime rates (reported in the third column) tend to be noticeably smaller than the mean indicate that the crime rate series tend to contain outliers that are considerably larger than the median value. The outliers can be seen by examining the fourth column of Table 2 where the maximum observed value for each crime rate is large compared to either the mean or median crime rate. Further, as shown in the fifth column of Table 2, several campuses report zero crime rates for many types of crime in a given year.

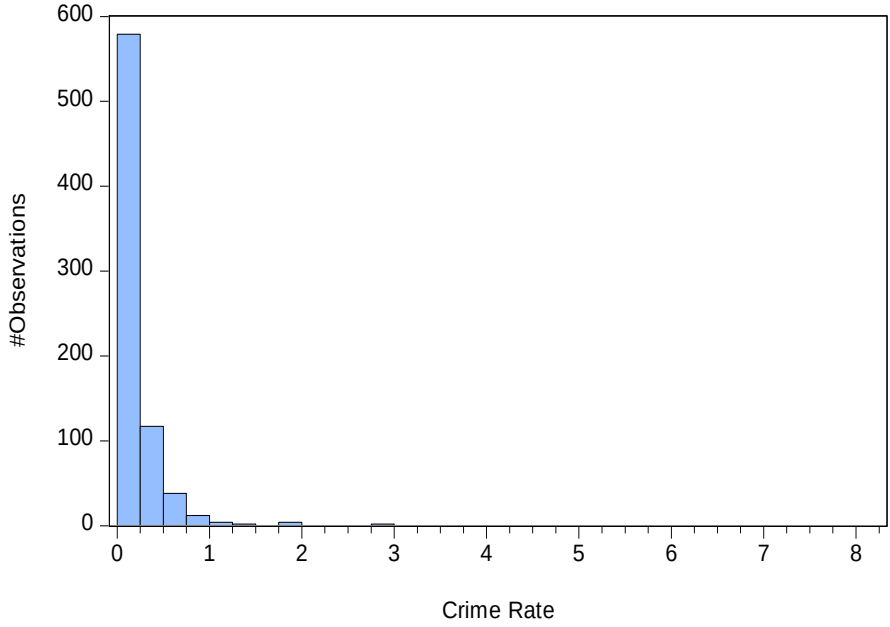
Table 2
Campus Crime Rate Statistics

Crime Rate	Mean	Median	Maximum	Observations Equal to Zero
Total Crime Rate	0.2239	0.0945	8.1545	165
Violent Crime Rate	0.0394	0.0000	3.8544	385
Aggravated Assault	0.0216	0.0000	1.2903	496
Forcible Sexual Offense	0.0105	0.0000	0.2342	528
Robbery	0.0073	0.0000	3.4261	647
Murder	0.0000	0.0000	0.0215	761
NonViolent Crime Rate	0.1845	0.0739	7.9399	192
Burglary	0.1555	0.0509	7.9399	243
Motor Vehicle Theft	0.0223	0.0000	0.5263	440
Arson	0.0051	0.0000	0.7026	637
NonForcible Sexual Offense	0.0016	0.0000	0.4435	736
Negligent Manslaughter	0.0000	0.0000	0.0000	765

Figure 1 displays the probability distribution of the total reported crime rate. The horizontal axis shows potential values for the crime rate while the vertical axis shows the number of actual observations of each value. For example, the first bar on the left shows that the total crime rate was less than 0.25 for 579 of the total 765 data points (85 campuses for 9 years). As can be seen from Figure 1, the probability distribution of the total crime rate does not resemble a normal distribution; rather, it is truncated at zero. Furthermore, the majority of the probability density is concentrated in the left side of the distribution with a long slender tail on the right side of the distribution.[4] Tobit regressions are used to control for the fact that the crime rates cannot fall below zero. The Tobit regressions employed in this study include a difference-in-differences approach to estimate the effects of right-to-carry on the campus crime rates. A more complete description of the statistical model is provided in the following section.

[4] The probability distributions of the violent and non-violent crime rates, as well as their component series display the same shape. Because of their similarity, these distributions are not displayed in the paper. However, they are available upon request from the authors.

Figure 1
Probability Distribution of Total Campus Crime Rates



The Tobit Regression Model

The statistical model in this paper uses Tobit regressions to account for the fact that crime rates are left censored at a value of zero. Crime rates cannot be negative, and as shown in the fifth column of Table 2 there are a large number of zero crime rates observed in this data sample. The Tobit regression is one variation of a censored regression in which:

$$y_{i,t} = y^*_{i,t} \; if \; y^*_{i,t} > 0; \tag{1}$$
$$y_{i,t} = 0 \; if \; y^*_{i,t} \leq 0,$$

where $y^*_{i,t}$ is an unobserved variable:

$$y^*_{i,t=} \; x'_{i,t}\beta. \tag{2}$$

The dependent variable $y_{i,t}$ is the crime rate, defined as the number of reported crimes per 100 enrolled students. A row vector of potential explanatory variables is contained in $x'_{i,t}$, and β is a vector of coefficients to be estimated. In the Tobit model, the β coefficients measure a combination of the effect of a given explanatory variable on the crime rate and the impact

of the explanatory variable on the probability of observing a non-zero crime rate.

The primary goal of this study is to investigate whether the change in state law such that individuals licensed to carry a concealed weapon are allowed to carry a concealed weapon on a college campus is associated with a significant change in the reported campus crime rate. A difference-in-differences approach is used to model the potential effect. To implement this approach, we include three dummy variables in the $x_{i,t}$ vector of explanatory variables. A first dummy variable, NeverRTC, is set equal to one for all time periods for campuses allowing campus carry at no time in this sample. A second dummy variable, EverRTC, is set equal to one for all time periods for those campuses that allow campus carry at any time in the sample. The first two dummies are included to capture differences in campus crime rates between the two sets of campuses independent of the introduction of right-to-carry.[5] These two dummy variables are particularly important in this application as they help determine if a difference in campus crime rates is due to right-to-carry or to the fact that many of the RTC campuses are located in Utah. A third dummy variable, RTC, is set equal to one for only the time periods and campuses with right-to-carry in place. This dummy variable is intended to capture the effect of the introduction of right-to-carry on the campus crime rate.[6]

Of the 85 schools in this sample, 15 fall into the RTC category. All of the schools with right-to-carry are in Utah or Colorado.[7] Firearms were allowed in all Utah schools in the sample beginning in 2005, with the exception of the University of Utah which allowed firearms beginning in 2007. A significant positive coefficient multiplying the RTC dummy would provide evidence that right-to-carry on campus is associated with a

[5] No constant is included in the regression to avoid perfect collinearity.

[6] A model of each crime rate also was estimated that replaced the EverRTC dummy with separate dummy variables for the Colorado versus Utah schools that ever allowed right-to-carry. This was intended to investigate whether controlling separately for Utah would affect the results. Estimates for this model are virtually identical to those reported in the paper so are omitted for brevity.

[7] The bulk of the RTC campuses are in Utah. The Church of Latter Day Saints is very prominent in Utah and reportedly claims 40 to 70 percent of the state population. Public schools do not account for religious affiliation; therefore, we were unable to control for the proportion of students in public colleges and universities who are practicing Mormons. Utah regularly ranks in the bottom of the state crime reports.

significantly higher campus crime rate. A significant negative coefficient multiplying RTC would provide evidence that right-to-carry is associated with a significantly smaller campus crime rate.

Several other explanatory variables are included in the regression to capture demographic differences between the schools and time trends in the various crime rates. The first is the percentage of students that receive Pell grants at a school (PctPell) in a given year. This variable is included as a proxy for the percentage of students coming from lower income households. The percentage of enrolled students who are white (PctWhite) also is included in the set of independent variables. The next explanatory variable is the percentage of enrolled students who are male (PctMale). An explanatory variable also is included to control for the percentage of enrolled students who are under the age of 22 (Pct_Under22). This variable is intended to in part control for the fact that concealed carry permits are not available to those individuals under the age of 21.[8] The next explanatory variable is a dummy variable (FourYear) that is set equal to one for four-year institutions. There are 28 four-year (and 57 two-year) schools in this sample. This variable is included since the demographics of students attending four-year institutions may differ from those students attending two-year schools, thus resulting in different crime rates. Dummy explanatory variables for each year 2002-2009 (T2, T3,…, T9) are also included in the regressions to account for overall changes in the number of crimes across campuses from one year to the next.[9] Coefficients multiplying the time dummies estimate the fixed time effects for this pooled data sample.

In terms of the full set of explanatory variables, the $\boldsymbol{x}_{i,t}'\boldsymbol{\beta}$ expression from equation (2) can be written with $Time_j$ as the j^{th} time period dummy:

$$y_{i,t}^{*} = \beta_1 NeverRTC + \beta_2 EverRTC + \beta_3 RTC + \beta_4 PctPell + \beta_5 PctWhite + \beta_6 EPctMale + \beta_7 Pct_{Under22} + \beta_8 FourYear + \sum_{j=1}^{8} \beta_{8+j} Time_{1+j} \quad (3)$$

[8] Percentage of enrolled students under the age of 21 was not available in the data.

[9] The initial academic year of 2000-2001 is used as the control for the set of time dummies.

Tobit Results

Maximum likelihood estimates of the Tobit model are reported in Table 3 for the total crime rate. The estimated $\hat{\beta}$ coefficients are presented in the second column of the table. Robust standard errors, reported in the third column, are used to correct for potential problems with serial correlation or heteroskedasticity. Calculated z-statistics with their associated p-values are presented in the fourth and fifth columns respectively. As mentioned earlier, in Tobit models the estimated $\hat{\beta}$ coefficients are not the marginal effect of the given variable on the crime rate. Rather the estimated coefficient reflects a combination of the effect of the given variable on the crime rate and the probability of observing a non-zero crime rate. However, it is possible to estimate the marginal effect of the given explanatory variable on the crime rate at the mean value. These estimates are included in the results in the last column of Table 3 labeled "Marginal Effect."

The usual R-square measure of goodness of fit is not well defined in Tobit regressions; however, the correlation between fitted values from the regression estimates and actual total crime rates is equal to 0.592 suggesting that the regression helps explain campus crime rates. The first two autocorrelations of the residuals are highly significant; therefore, results are reported using robust coefficient standard errors.[10] The set of time dummies (t2, t3,…, t9) are jointly significant using a 1% test size.[11] The marginal significance level of the RTC variable in this regression is 42.03%, indicating that right-to-carry has no significant effect on the reported campus crime rate with any reasonable test size.[12]

---

[10] Residual autocorrelations are highly significant for all of the following crime rate regressions. Thus, only results with robust standard errors are reported.

[11] The time dummies are neither individually nor jointly significant for some of the following regression models with other crime rates as the dependent variable. However, in no case does inclusion or exclusion of the time dummies affect the results of the regression regarding the significance of the RTC variable.

[12] (a.) We thank an anonymous referee for pointing out that the difference-in-differences estimation in situations with serial correlation in the dependent variable (crime rate) and low variation in the intervention variable (RTC) is prone to overstate significance levels. Thus, the inverse relationship between right-to-carry and the total crime rate may be more statistically significant than is indicated by the p-value of the RTC coefficient.

Table 3
Tobit Regression Results: Total Crime Rate

Variable	Coefficient	Std. Error	z-Statistic	Prob.	Marginal Effect
NeverRTC	-0.849994	0.313815	-2.708586	0.0068	-0.53631
EverRTC	-0.925506	0.336473	-2.750609	0.0059	-0.58395
RTC	0.057402	0.071226	0.80591	0.4203	0.03622
PctPell	0.001638	0.002119	0.772891	0.4396	0.00103
PctWhite	-0.005285	0.001414	-3.736884	0.0002	-0.00333
PctMale	1.975397	0.591297	3.340786	0.0008	1.24639
Pct_Under22	0.006191	0.001985	3.11851	0.0018	0.00391
FourYear	0.218252	0.029691	7.35089	0	0.13771
T2	-0.028363	0.059308	-0.478238	0.6325	-0.0179
T3	0.050776	0.075835	0.669554	0.5031	0.03204
T4	0.04488	0.067219	0.667676	0.5043	0.02832
T5	0.152834	0.090829	1.682655	0.0924	0.09643
T6	0.013602	0.059077	0.230241	0.8179	0.00858
T7	-0.056914	0.056986	-0.998734	0.3179	-0.03591
T8	-0.068059	0.058588	-1.161667	0.2454	-0.04294
T9	-0.132809	0.059008	-2.250674	0.0244	-0.0838

If allowing concealed carry on campus leads to commission of more crimes involving the use of guns, then the violent crime rates could potentially be affected more than would non-violent crimes. To test this possibility, the violent crime rate is examined next. Estimates of the Tobit model for the violent crime rate are presented in Table 4. The correlation between fitted values from the regression and actual violent crime rates is equal to 0.4041. The marginal significance level of the RTC dummy is 44.92%. Similar to the results for the total crime rate, right-to-carry has no significant effect on the reported violent crime rate.

(b.) One institution experienced crime rates that were unusually high for this sample. Total crime rates were 8.155% and 7.175% in two years and violent crime rates were 0.887% and 0.735% in those years. However, Tobit estimates for a sample excluding this institution still indicated no significant effect of right-to-carry on either total or violent crime rates.

Table 4
Tobit Regression Results: Violent Crime Rate

Variable	Coefficient	Std. Error	z-Statistic	Prob.	Marginal Effect
NeverRTC	-0.163155	0.077411	-2.107652	0.0351	-0.06437
EverRTC	-0.137509	0.086743	-1.585245	0.1129	-0.05425
RTC	-0.018485	0.024427	-0.756751	0.4492	-0.00729
PctPell	0.00016	0.000579	0.276346	0.7823	6.32E-05
PctWhite	-0.001911	0.000556	-3.436368	0.0006	-7.54E-04
PctMale	0.293173	0.149386	1.962518	0.0497	0.11566
Pct_Under22	0.001344	0.000596	2.254575	0.0242	5.30E-04
FourYear	0.106488	0.018376	5.794999	0	0.04201
T2	-0.014399	0.026868	-0.535913	0.592	-0.00568
T3	0.022025	0.031661	0.695644	0.4867	0.00869
T4	0.02134	0.026381	0.808913	0.4186	0.00842
T5	-0.0104	0.027458	-0.378764	0.7049	-0.0041
T6	0.025416	0.025257	1.006307	0.3143	0.01003
T7	0.009168	0.025046	0.366064	0.7143	0.00362
T8	-0.002228	0.025489	-0.087399	0.9304	-8.79E-04
T9	0.007727	0.025607	0.301736	0.7629	0.00305

It is possible that right-to-carry has no effect on the overall violent crime rate, but could have significant effects on one or more of its component categories. Results for the aggravated assault rate, forcible sexual assault rate, and burglary rate are provided in Tables 5-7.[13] The correlation between the fitted and observed crime rates are 0.4255, 0.3486, and 0.1079 respectively for these three regressions. Estimates again suggest no significant association between campus right-to-carry and either the forcible sexual assault or robbery rates with marginal significance levels of the RTC variable of 49.42% and 87.29% respectively. However, the marginal significance level of the RTC variable is 13.71% with a negative estimated coefficient for the aggravated assault rate. This result provides weak evidence that RTC was associated with a reduction in the reported aggravated assault

[13] Murder occurs so infrequently in this data set that separate estimates for this crime rate are not possible.

rates on the Colorado and Utah campuses. The estimated marginal effect is -0.0122, meaning that the adoption of campus right-to-carry was associated with a decline in the aggravated assault rate by 0.0122 on the Utah campuses and on the Colorado campuses allowing the right to carry firearms.

Table 5
Tobit Regression Results: Aggravated Assault Rate

Variable	Coefficient	Std. Error	z-Statistic	Prob.	Marginal Effect
NeverRTC	-0.126476	0.076819	-1.64642	0.0997	-0.0322
EverRTC	-0.10186	0.086833	-1.17305	0.2408	-0.02594
RTC	-0.047996	0.032286	-1.486574	0.1371	-0.01222
PctPell	-8.07E-05	0.00055	-0.146703	0.8834	-2.05365E-05
PctWhite	-0.00282	0.000725	-3.888101	0.0001	-7.18E-04
PctMale	0.333963	0.158343	2.109116	0.0349	0.08503
Pct_Under22	0.000674	0.000677	0.99619	0.3192	1.72E-04
FourYear	0.116567	0.025295	4.608305	0	0.02968
T2	-0.038095	0.032749	-1.163231	0.2447	-0.0097
T3	0.007098	0.036135	0.19643	0.8443	0.00181
T4	0.005695	0.0304	0.18735	0.8514	0.00145
T5	-0.011931	0.030825	-0.387051	0.6987	-0.00304
T6	0.010798	0.030054	0.359275	0.7194	0.00275
T7	0.006123	0.029344	0.208658	0.8347	0.00156
T8	-0.005154	0.029722	-0.173404	0.8623	-0.00131
T9	0.00485	0.029596	0.16386	0.8698	0.00123

Table 6
Tobit Regression Results: Forcible Sexual Offense Rate

Variable	Coefficient	Std. Error	z-Statistic	Prob.	Marginal Effect
NeverRTC	-0.123093	0.033169	-3.711151	0.0002	-0.03122
EverRTC	-0.106773	0.035978	-2.967745	0.003	-0.02708
RTC	-0.007607	0.011128	-0.683583	0.4942	-0.00193
PctPell	-0.000151	0.000129	-1.169329	0.2423	-3.82E-05
PctWhite	0.000209	0.00017	1.226034	0.2202	5.30E-05
PctMale	0.006005	0.050709	0.118412	0.9057	0.00152
Pct_Under22	0.000874	0.000244	3.583503	0.0003	2.22E-04
FourYear	0.052839	0.005311	9.949427	0	0.0134
T2	0.001614	0.011179	0.144402	0.8852	4.09E-04
T3	0.008738	0.012498	0.699122	0.4845	0.00222
T4	0.011497	0.010174	1.130118	0.2584	0.00292
T5	0.013445	0.01121	1.199309	0.2304	0.00341
T6	0.019624	0.010037	1.955069	0.0506	0.00498
T7	0.014456	0.010349	1.396956	0.1624	0.00367
T8	0.011399	0.010591	1.076343	0.2818	0.00289
T9	0.0138	0.010478	1.317033	0.1878	0.0035

It has been argued that right-to-carry discourages the commission of non-violent crimes such as burglary or motor vehicle theft due to an increase in the probability of being killed or wounded during commission of these crimes. In contrast, it also has been argued that possession of firearms may increase the burglary rate as criminals seek to steal the guns. In light of these possibilities, we now examine the non-violent crime rate and the burglary rate. Estimates of the Tobit regression for these two series are presented in Table 8 and Table 9. The correlation between the fitted values from the regressions and the actual crime rates are 0.5753 and 0.5608. The coefficient multiplying RTC is positive in both regressions. However, the marginal significance levels of 29.05% and 38.09% respectively suggest no statistically significant association between campus right-to-carry and either the campus non-violent crime rate or burglary rate.

Table 7
Tobit Regression Results: Robbery Rate

Variable	Coefficient	Std. Error	z-Statistic	Prob.	Marginal Effect
NeverRTC	-0.014469	0.038495	-0.37586	0.707	-0.0015
EverRTC	-0.029327	0.043618	-0.672354	0.5014	-0.00304
RTC	0.002187	0.013671	0.160013	0.8729	2.27E-04
PctPell	-0.000952	0.000267	-3.572313	0.0004	-9.87E-05
PctWhite	-0.000718	0.000262	-2.746206	0.006	-7.45E-05
PctMale	-0.000736	0.06342	-0.011602	0.9907	-7.63E-05
Pct_Under22	0.000308	0.00029	1.061399	0.2885	3.19E-05
FourYear	0.03861	0.006883	5.609211	0	0.004
T2	0.009693	0.013185	0.735122	0.4623	0.001
T3	0.010914	0.012617	0.86499	0.387	0.00113
T4	0.006839	0.015488	0.441526	0.6588	7.09E-04
T5	-0.01264	0.01357	-0.931465	0.3516	-0.00131
T6	0.011647	0.012787	0.910869	0.3624	0.00121
T7	-0.004561	0.012921	-0.352975	0.7241	-4.73E-04
T8	-0.000672	0.012488	-0.053783	0.9571	-6.96E-05
T9	0.003028	0.012286	0.246487	0.8053	3.14E-04

Table 8
Tobit Regression Results: Non-Violent Crime Rate

Variable	Coefficient	Std. Error	z-Statistic	Prob.	Marginal Effect
NeverRTC	-0.827669	0.298314	-2.774487	0.0055	-0.49814
EverRTC	-0.906172	0.314928	-2.877391	0.004	-0.54539
RTC	0.069249	0.065509	1.057094	0.2905	0.04168
PctPell	0.001267	0.001804	0.702016	0.4827	7.62E-04
PctWhite	-0.004106	0.001296	-3.167496	0.0015	-0.00247
PctMale	1.714834	0.544931	3.146885	0.0017	1.03209
Pct_Under22	0.005896	0.001875	3.144808	0.0017	0.00355
FourYear	0.192313	0.026675	7.209472	0	0.11575
T2	-0.019252	0.050797	-0.379012	0.7047	-0.01159
T3	0.046991	0.066084	0.711084	0.477	0.02828

T4	0.045412	0.056923	0.797777	0.425	0.02733
T5	0.175807	0.091489	1.921617	0.0547	0.10581
T6	0.028266	0.050699	0.557516	0.5772	0.01701
T7	-0.034439	0.04962	-0.694053	0.4876	-0.02073
T8	-0.048608	0.051099	-0.951258	0.3415	-0.02926
T9	-0.115003	0.04979	-2.309774	0.0209	-0.06922

Table 9
Tobit Regression Results: Burglary Rate

Variable	Coefficient	Std. Error	z-Statistic	Prob.	Marginal Effect
NeverRTC	-0.859485	0.286036	-3.004811	0.0027	-0.46624
EverRTC	-0.901359	0.300115	-3.003373	0.0027	-0.48896
RTC	0.056739	0.064751	0.876255	0.3809	0.03078
PctPell	0.001704	0.001884	0.904329	0.3658	9.24E-04
PctWhite	-0.003714	0.001281	-2.898394	0.0038	-0.00201
PctMale	1.51109	0.493009	3.065037	0.0022	0.81972
Pct_Under22	0.006048	0.001902	3.180512	0.0015	0.00328
FourYear	0.202857	0.028126	7.212511	0	0.11004
T2	-0.0082	0.048369	-0.16954	0.8654	-0.00445
T3	0.051328	0.059538	0.862103	0.3886	0.02784
T4	0.060351	0.056181	1.074234	0.2827	0.03274
T5	0.175238	0.087877	1.994137	0.0461	0.09506
T6	0.048684	0.046988	1.036098	0.3002	0.02641
T7	-0.001731	0.045739	-0.037844	0.9698	-9.39E-04
T8	-0.027586	0.048787	-0.565428	0.5718	-0.01496
T9	-0.107468	0.046984	-2.287343	0.0222	-0.0583

Conclusion

The ongoing debate concerning the relationship between right-to-carry laws and crime rates is certain to continue among academics, advocates, and policymakers. Previous work has found mixed empirical evidence, which has conflicting policy implications. This paper examines whether allowing right-to-carry on college campuses in Utah and on two campuses in Colorado was

associated with any significant change in reported campus crime rates. We find no significant relationship between right-to-carry and the total crime rates, the violent crime rates, or the nonviolent crime rates on these campuses. Further, no significant relation was found between campus right-to-carry and the campus forcible sexual assault rates, robbery rates, or burglary rates. Although based on a marginal significance level of the right-to-carry variable of only 13.71%, there is weak evidence of an inverse relationship between campus right-to-carry and the aggravated assault rates on the campuses allowing right-to-carry. In summary, we find no evidence that allowing concealed carry of firearms makes campuses less safe. This finding is robust for all examined crime rates.

It would be hasty to make a policy decision based solely on the empirical evidence that has been presented in this paper. Findings are for a very small number of right-to-carry campuses and the study is geographically limited to a small number of western states. However, one implication of our analysis is quite clear. The popular conception that allowing concealed carry of firearms on campus would make the college campus environment less safe is not supported in this data sample. In conclusion, no evidence is found that lifting bans on firearms resulted in "wild-west" style shootouts on the college campuses included in this study.

References

Abhay Aneja, John J. Donohue III, Alexandria Zhang. 2011. The Impact of Right-To-Carry Laws and the NRC Report: Lessons for the Empirical Evaluation of Law and Policy. *Social Science Research Network Paper*: 1632599.

Ayres, Ian and John J. Donohue. 2003. Shooting Down the More Guns, Less Crime Hypothesis. *Stanford Law Review*, 55(4): 1193-1312.

Ayres, Ian and John J. Donohue. 2009. More Guns Less Crime Fails Again: The Latest Evidence from 1977-2006. *Econ Journal Watch*, 6(2): 218-238.

Donohue, John J. 2003. *The Impact of Concealed-carry Laws. Evaluating Gun Policy*. J. Ludwig & P. J. Cook (Eds.). Washington, DC: Brookings Institution Press. 287–324.

Donohue, John J. 2004. Guns, Crime, and the Impact of State Right-to-Carry Laws. *Fordham Law Review*, 73: 623-652.

Hannaford, Alex. 2011. The Campus Carry Movement Stutter-Steps Across America. *The Atlantic*. Accessed online at http://www.theatlantic.com/politics/archive/2011/05/the-campus-carry-movement-stutter-steps-across-america/237915/.

Levitt, Steven D. 2004. Understanding Why Crime Fell in the 1990's: Four Factors that Explain the Decline and Six that Do Not. *Journal of Economic Perspectives*, 17: 163-190.

Lott, John R. and David Mustard. 1997. Crime, Deterrence and Right-to-Carry Concealed Handguns. *Journal of Legal Studies*, 26(1): 1-68.

Lott, John R. 1998. *More Guns, Less Crime*. Chicago: University of Chicago Press.

Lott, John R. 2000. *More Guns, Less Crime*. 2nd Edition. Chicago: University of Chicago Press.

Lott, John R. 2010. *More Guns, Less Crime*. 3rd Edition. Chicago: University of Chicago Press.

National Research Council. 2005. *Firearms and Violence: A Critical Review*. Washington: The National Academies Press.

Taleb, Nassim Nicholas. 2007. *The Black Swan: The Impact of the Highly Improbable*. Random House.