Permitless Carry Laws and Firearm Violence

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Abstract: Firearm violence, including assault related non-fatal shootings and homicides, is among the leading causes of death in the United States. Competing narratives and theoretical interpretations regarding deregulation of firearms and its impact on safety exist nationwide. For instance, does allowing individuals to possess concealed weapons in public without testing or licensing—known as permitless carry—lead to more, less, or the same level of gun violence? Despite the recent permeation of state permitless carry policies—the number of states with these policies has roughly doubled since 2020—little has been documented concerning the causal relationship between these recent laws and firearm violence. Pairing the Gun Violence Archive (GVA) with the Callaway & Sant'Anna (2021) difference-in-differences method, we find that permitless carry laws were generally not associated with sustained differences in the number of victims injured, victims killed, suspects injured, or suspects killed. However, we do find instances of temporary differences: seven years after the laws were enacted, we measure *fewer suspect killings* overall, *fewer victim and suspect killings* when focusing on open-carry states which allow publicly visible handguns, and *fewer victim and suspect injuries* when the victims are female. When the suspects are female, we measure *more victim and suspect injuries* but *fewer suspect deaths*. In contrast, we observe no differences when the suspects are males. These heterogeneous outcomes highlight a potentially disproportionate burden or benefit of these laws.

Keywords: Permitless Carry, Firearm Violence

There are no competing interests to report.

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Background

High rates of firearm violence, including homicides and assault-related non-fatal shootings, claim too many lives and greatly diminish community safety in the United States. Homicides are among the five leading causes of death for individuals aged 1 to 44, disproportionately affecting communities of color and youth.[1,2] Many states have recently weakened or eliminated requirements for public and concealed firearm carriage. From 2016 through 2023, 21 states adopted permitless carry laws, allowing for individuals in the state who wish to carry concealed weapons in public to do so without special testing or licensing.[3] Some research suggests that less restrictive firearms regulations may lead to more concealed gun carrying in public, gun thefts, the availability of firearms obtained through underground markets, and ultimately allow for increased aggression and firearm assaults. Most recently, a study by Doucette et al. (2023) found that states who implemented permitless carry policies prior to 2019 (which excludes about 15 currently treated states) had 21 additional gun assaults per 100,000 population.[4]

While there is emerging evidence suggesting that the implementation of permitless concealed carry laws may be associated with increases in non-fatal shootings and firearm homicides, results are mixed.[5-10] Some studies have found uncertain effects of adopting permitless carry policies on violent crime, homicide, and aggravated assault.[6,10] In a recent systematic review of the evidence on gun policies, Smart et al. (2023) conducted a quality assessment of studies examining the effects of permitless carry on violent crime, overall homicides, and firearm specific homicides utilizing criteria based on methodological flaws, including: threats to causal identification, violation of statistical assumptions and inaccurate inferential statistics, and risk of model overfit.[8] They found only two studies examining the

effects of permitless carry on total homicides without serious methodological issues and determined there is inconclusive evidence for this link.[8] Further, there is no clear understanding on how permitless carry law implementation may interact with other state gun policies (e.g., open-carry laws, which allow for permitted non-concealed public carry of firearms) to impact firearm violence outcomes, or how such policies differently impact different populations.

The overall goal of the paper is to strengthen the causal evidence base that links state permitless carry laws and firearm violence and utilizes (1) a fuller set of states that have expanded these laws, and (2) relatively recent methodological innovations that allow for pooling treatment effects that have occurred in different time periods. We will assess whether the implementation of permitless carry laws impacted fatal and non-fatal firearm violence for the suspects and victims. Further, we will examine how permitless carry laws and open carry laws may interact to influence firearm shootings. We also examine differential impacts by the gender of both the victims and the suspects.

Methodology

Data

We utilized the Gun Violence Archive (GVA) for years 2014-July 2024 (N=412,025). The GVA is a publicly available data set of firearm violence events. Automated and manual methods are used to gather daily information on fatal and non-fatal firearm injuries nationally from more than 7,500 sources, including local and state police, media, data aggregates, etc.[13] Incident data collected include date, address, and number of individuals injured or killed. Individual victim and offender details are collected including age, gender, status, and relationship to one another. GVA has been validated as a reliable epidemiological data source for examination of firearm

violence,[14] and is the only existing national database including non-fatal firearm injuries beyond 2021. Key outcomes variables include victims injured, victims killed, suspects injured, or suspects killed.

Sample

Given the data, which spanned 2014 through 2024, three states—Alaska (2003), Arizona (2010), Wyoming (2011)—expanded their permitless carry laws prior to the data window and were excluded. Vermont has permitless carry in its constitution (from 1793) so was excluded. We did not have policies in hand for the District of Columbia so this was also excluded. This leaves the final sample at 46 states over 11 years. There was a total of 412,025 incident observations. Observations were collapsed to state-by-year counts. Thus, there is a maximum sample of 506 state-by-year observations.

To gather gender information, we merged the incident file with the participants file, leading to a total sample of 520,262 observations (only one participant observation did not merge into the incident file). Overall, 91.2% of this sample were victims while 8.8% were suspects; 84.0% of the sample was male while 16.0% was female. Suspects were 95.3% male while victims were 82.8% male. When conducting the gender-based analyses, we flagged each victim and suspect by their reported gender and similarly collapsed the data to state-by-year observations, along victim and suspect gender dimensions.

Statistical Analysis

We used the Callaway and Sant'Anna Difference-in-Differences (CSDID)[12] approach to estimate the impact of permitless carry laws on gun-based injuries and death among victims and

suspects. CSDID accommodates staggered treatment timing in a multi-period setting and allows for heterogeneous treatment effects across cohorts and over time. We implemented the event-study version of CSDID to estimate dynamic average treatment effects relative to the year prior to the permitless carry law changes. We estimated the group-time average treatment effect on the treated (ATT) for states who launched permitless carry laws at time *g* and whose outcomes were observed in year *t.* This is defined as:

$$\text{ATT}(g,t) = E\left[Y_{it} - Y_{i,g-1} \mid G_i = g \right] - E\left[Y_{it} - Y_{i,g-1} \mid G_i > t \right]$$

where Y_i is the outcome in year t and $Y_{i,g-1}$ is the outcome in the pre-treatment period. The treatment group is defined by $G_i=g$ and control group is the "never treated" cohort. We then aggregated to the group-time yearly ATT estimates to obtain the event-study treatment effects.

We conducted variations to this analyses to better understand the robustness of our overall results as well to understand how sub-populations may be distinctly impacted: (1) excluding states who were impacted by the 2022 *New York State Rifle and Pistol Association (NYSRPA) vs. Bruen* Supreme Court ruling. As a result of this case, a handful of our never treated control states— California, Hawaii, New York, Maryland, and Massachusetts—were compelled to convert from "may-issue" to "shall-issue" policies on the grounds of the second amendment right to bear arms outside the home for self-defense. This case, having occurred within one year of the permitless carry law enactment of twelve states, could contaminate the control group; (2) Focusing only on "open-carry" law states who allow fully or partially visible handguns in public. Publicly visible guns could amplify the potential impacts of increased gun availability brought about by permitless carry laws. States with open-carry laws include: Alabama, Alaska, Arizona, Arkansas, Colorado, Delaware, Georgia, Idaho, Indiana, Iowa, Kansas, Kentucky, Louisiana, Maine, Michigan, Mississippi, Missouri, Montana, Nebraska, Nevada, New Hampshire, New

Mexico, North Carolina, North Dakota, Ohio, Oklahoma, Oregon, Pennsylvania, South Carolina, South Dakota, Tennessee, Texas, Utah, Vermont, Virginia, Washington, West Virginia, Wisconsin, and Wyoming; and (3) stratifying by the gender of the victim or suspect.

Results

Figure 1 and Table 1 contain the main results. For victim-based outcomes, no pre-period estimates are statistically significant. In the seventh year after the permitless carry laws were enacted, impacted states saw 281 fewer victims injured per year (Standard Error [SE] = 89, 95% Confidence Intervals [CIs] = -510 to -53]. As for the impacts on suspects, there is one statistically significant pre-period estimate among each of the suspects injured and suspects killed outcomes. Otherwise, there are no statistically significant results in the post-period.

Figure 2 and Table 2 contain results that exclude California, Hawaii, New York, Maryland, and Massachusetts as these states were impacted by the NYSRPA vs. Bruen ruling that could impact the outcomes during the study window. The results are similar as in the main specification for victims injured, victims killed, and suspects injured: For victims injured, there are no statistically significant pre-period estimates and one statistically significant result in the seventh year after the permitless carry laws were enacted: -261 (SE = 93, 90% CI: -498 to -24). For victims killed, there are similarly no statistically significant results. For suspects injured, first pre-period estimate is 19 (SE = 4, 90% CI: 9 to 28). The results differ for suspects killed, with no statistically significant pre-period results and a newly statistically significant result in the seventh year after the permitless carry laws were enacted: -8 (SE = 3, 90% CI: -16 to -0.2).

Figure 3 and Table 3 contain results that focus on the 35 states that have open carry laws. For victims injured, there are no statistically significant results. For victims killed, there are no

statistically significant pre-period results. However, those in the seventh year after the policy change were associated with 90 fewer victims killed (SE = 31, 90% CI: -168 to -12). For Suspects Injured, the first two pre-period estimates are statistically significant: 22 (SE = 4, 90% CI: 12 to 31) and 23 (SE = 4, 90% CI: 12 to 35). There are no statistically significant results in the post-period. Finally, for suspects killed, there are no statistically significant pre-period results, but those in the seventh year after the policy change were associated with 11 fewer victims killed (SE = 3, 90% CI: -18 to -3).

Figure 4 and Table 4 detail results by victim gender. For all four killed outcomes (i.e., victims and suspects killed for female and male victims), there are no statistically significant results in the pre- or post-periods. For the victims injured outcomes, there are no statistically significant pre-period estimates for female or male victims. However, in the post-periods, there are heterogenous differences by victim gender: -67 (SE = 22, 90% CI: -123 to -10) for female victims in the seventh year after the policy change and 105 (SE = 35, 90% CI: 15 to 195) for male victims in the last time period after the policy change. For the Suspects Injured outcomes, there are three instances of statistically significant estimates in the pre-period: 2 (SE = 1, 90% CI: 1 to 3) in the second pre-period and 2 (SE = 1, 90% CI: 0 to 3) in the seventh pre-period for female victims, and 6 (SE = 2, 90% CI: 1 to 10) in the first pre-period for male victims. There are no statistically significant post-period effects for suspects injured and male victims. However, for female victims, there is a three year sustained reduction by two victims killed during the sixth through eighth year of the policy change: SE = 0.5 and 90% CI: -3 to -0.4); SE = 0.5 and 90% CI: -4 to -1; and SE = 0.4 and 90% CI: -3 to -0.4, respectively.

Figure 5 and Table 5 detail the effects of permitless carry laws by suspect gender. Among female suspects, there is only one statistically significant pre-period estimate, which is during the

first pre-period year for suspects injured: 2 (SE = 1, 90% CI: 0 to 4). This outcome is associated with an increase 3 suspects injured (SE = 0.4, 90% CI: 2 to 4) in the final year of the sample. This group also is associated with 7 more victims injured in the same time period (SE = 1, 90% CI: 3 to 11). In contrast, the number of suspects killed decrease by 3 in this same period (SE = 1), 90% CI: -5 to -1). For male suspects, there are three instances of statistically significant pre-period estimates: 7 (SE = 3, 90% CI: 0 to 14) for the first pre-period estimate on victims injured, 19 (SE = 4, 90% CI: 9 to 28) for the first pre-period estimate on suspects injured, and -23 (SE = 8, 90% CI: -44 to -2). There are no statistically significant effects in the post-period for any of the outcomes for male suspects.

Discussion

Overall

In general, we do not find that permitless carry laws are associated with sustained differences in victim or suspect gun injuries or deaths among the twenty-five states that enacted these laws since 2015 against the never-treated comparator states.

We do, however, find instances in which these laws are associated with temporary fleeting differences in outcomes. In our main specification and in our specification that excludes the NYSRPA states from the control cohort, we consistently find evidence that there was a reduction in victim injuries seven years after implementation of a state permitless-carry policy that is not statistically significant in any year before or after. In general, this time period is where we find most of the statistically significant results across specifications and outcomes: (1) when excluding the NYSRPA states, this time period is also associated with fewer suspect killings; (2) when focusing on open-carry states only, this time period is associated with fewer victim and

suspect killings; (3) when focusing on female victims, this time period is linked to fewer victim and suspect injuries. The patterns around this time period generally suggest a gradual dip in victim injuries that becomes statistically significant in this time period before returning to a null effect and, for suspect and victim killings, the pattern appears to be more discontinuous before returning to a null effect. This time period, these patterns, and their reasons and drivers require further inquiry.

We also find instance of heterogeneous impacts along gender. For instance, when the suspects are female, there is some evidence that permitless carry laws are linked to more victim and suspect injuries but fewer suspect deaths. In contrast, we observe no differences in outcomes when the suspects are males. Similarly, when the victims are females, while we see fewer injuries among victims and suspects, when the victims are males, we see evidence of increased victim injuries. These difference in impacts suggest that gender is playing some kind of mediating role in these policies. The potential benefits—i.e., fewer injuries and deaths—and the potential burdens of these laws—i.e., more injuries and deaths—appear to be unevenly distributed. The underlying reasons for these asymmetries also require further investigation.

Limitations

Our study has several limitations, including: (1) states selected into permitless carry laws and so, while there is potential for viewing these results as possibly causal given generally parallel trends pooled across multiple time-periods, endogeneity is always a risk in interpreting these results; (2) there is limited follow-up data, especially for the large number of states who recently enacted permitless carry laws—fourteen since 2021—which limits their contribution to the lagged effects that we measure. For instance, most of our measured effects occur several

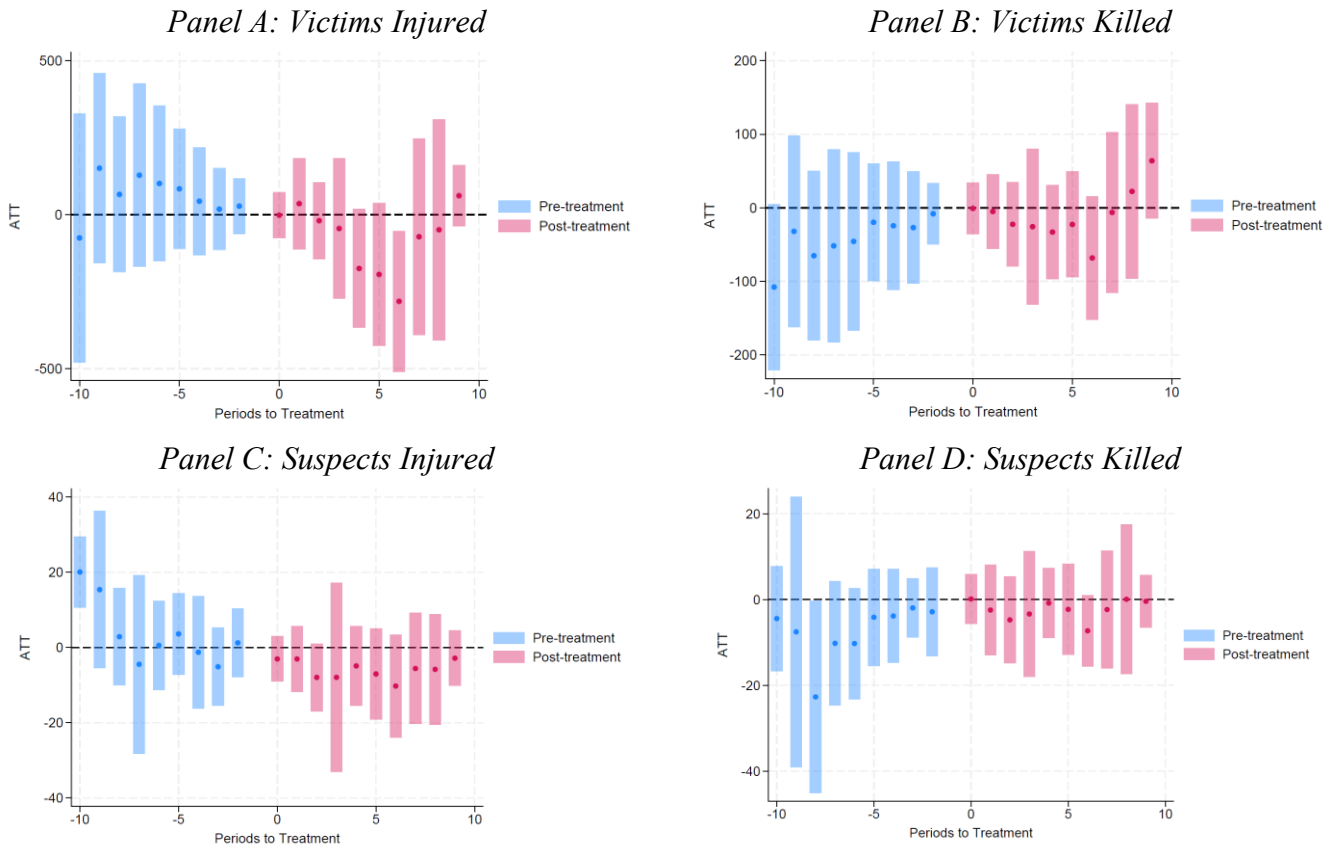
years after enactment and none of these states contribute to that variation; (3) it is possible that reporting of gun violence was altered coincident with the enactment of permitless carry laws. If this occurred, our results would be biased accordingly; and (4) all datasets in this topic area have their challenges, and the GVA is no exception as it lacks the ability to disentangle defensive versus aggressive incidents, lacks racial and ethnic details, and tends to have fewer details on the demographics of the suspects.

Conclusion

Overall, we find that permitless carry laws were generally not associated with sustained differences in the number of victims or suspects injured or killed. Underneath these null effects are periods of generally decreased injury or death with reductions in death most pronounced among the open-carry states. These results would be generally consistent with a narrative that more guns—and more visible ones—may modestly and temporarily reduce overall deaths; however, these results are fleeting. Heterogeneous burden and benefits by victim and suspect gender highlight that any potential benefits may be disproportionally born. More research is needed to elucidate the nature of these patterns and differences.

Tables and Figures

Figure 1: Results for Victims Injured/Killed and Suspects Injured/Killed



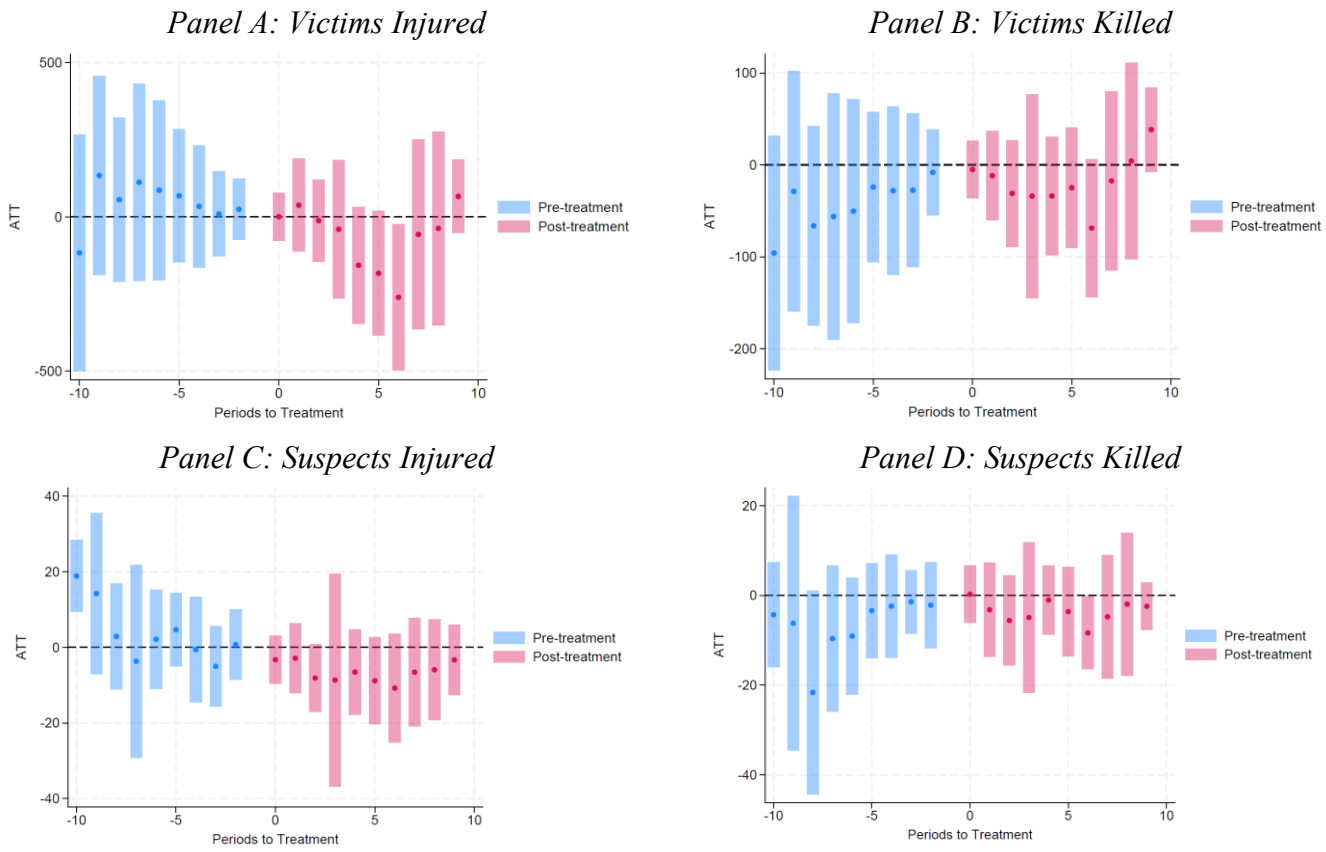
Notes: N=506 observations (46 states). 90% confidence intervals are reported.

Table 1: Results for Victims Injured/Killed and Suspects Injured/Killed

Time Period	Victims Injured	Victims Killed	Suspects Injured	Suspects Killed
Time -10	-75 (157)	-108 (41)	20* (4)	-4 (5)
	[-480 to 329]	[-221 to 5]	[11 to 30]	[-17 to 8]
Time -9	151 (120)	-32 (47)	15 (8)	-8 (13)
	[-157 to 459]	[-162 to 98]	[-6 to 36]	[-39 to 24]
Time -8	66 (98)	-65 (42)	3 (5)	-23* (9)
	[-187 to 318]	[-180 to 50]	[-10 to 16]	[-45 to -0.3]
Time -7	128 (115)	-52 (48)	-4 (9)	-10 (6)
	[-169 to 426]	[-183 to 79]	[-28 to 19]	[-25 to 4]
Time -6	101 (98)	-46 (44)	1 (5)	-10 (5)
	[-152 to 354]	[-167 to 76]	[-11 to 12]	[-23 to 3]
Time -5	84 (75)	-20 (29)	4 (4)	-4 (5)
	[-110 to 278]	[-100 to 60]	[-7 to 14]	[-15 to 7]
Time -4	44 (68)	-24 (32)	-1 (6)	-4 (4)
	[-131 to 219]	[-112 to 63]	[-16 to 14]	[-15 to 7]
Time -3	18 (52)	-27 (28)	-5 (4)	-2 (3)
	[-115 to 151]	[-103 to 49]	[-16 to 5]	[-9 to 5]
Time -2	28 (35)	-8 (15)	1 (4)	-3 (4)
	[-62 to 118]	[-50 to 34]	[-8 to 10]	[-13 to 7]
Time +0	-2 (29)	-1 (13)	-3 (2)	0 (2)
	[-75 to 72]	[-36 to 34]	[-9 to 3]	[-6 to 6]
Time +1	36 (57)	-5 (18)	-3 (3)	-2 (4)
	[-112 to 184]	[-55 to 45]	[-12 to 6]	[-13 to 8]
Time +2	-19 (48)	-22 (21)	-8 (4)	-5 (4)
	[-144 to 105]	[-79 to 35]	[-17 to 1]	[-15 to 5]
Time +3	-45 (88)	-26 (39)	-8 (10)	-3 (6)
	[-272 to 183]	[-132 to 80]	[-33 to 17]	[-18 to 11]
Time +4	-175 (75)	-33 (23)	-5 (4)	-1 (3)
	[-367 to 18]	[-97 to 31]	[-16 to 6]	[-9 to 7]
Time +5	-194 (90)	-23 (26)	-7 (5)	-2 (4)
	[-426 to 38]	[-95 to 49]	[-19 to 5]	[-13 to 8]
Time +6	-281* (89)	-68 (31)	-10 (5)	-7 (3)
	[-510 to -53]	[-152 to 16]	[-24 to 3]	[-16 to 1]
Time +7	-72 (124)	-6 (40)	-6 (6)	-2 (5)
	[-390 to 247]	[-116 to 103]	[-20 to 9]	[-16 to 11]
Time +8	-49 (139)	22 (43)	-6 (6)	0 (7)
	[-408 to 310]	[-96 to 141]	[-20 to 9]	[-17 to 17]
Time +9	62 (38)	64 (29)	-3 (3)	0 (2)
	[-37 to 160]	[-15 to 142]	[-10 to 4]	[-7 to 6]

Notes: N=506 observations (46 states). Standard Errors are in parentheses. 90% confidence intervals are in brackets. * p<0.10 ** p<0.05 *** p<0.01

Figure 2: Results for Victims Injured/Killed and Suspects Injured/Killed
(Excluding NYSRPA vs. Bruen States From the Control Cohort)



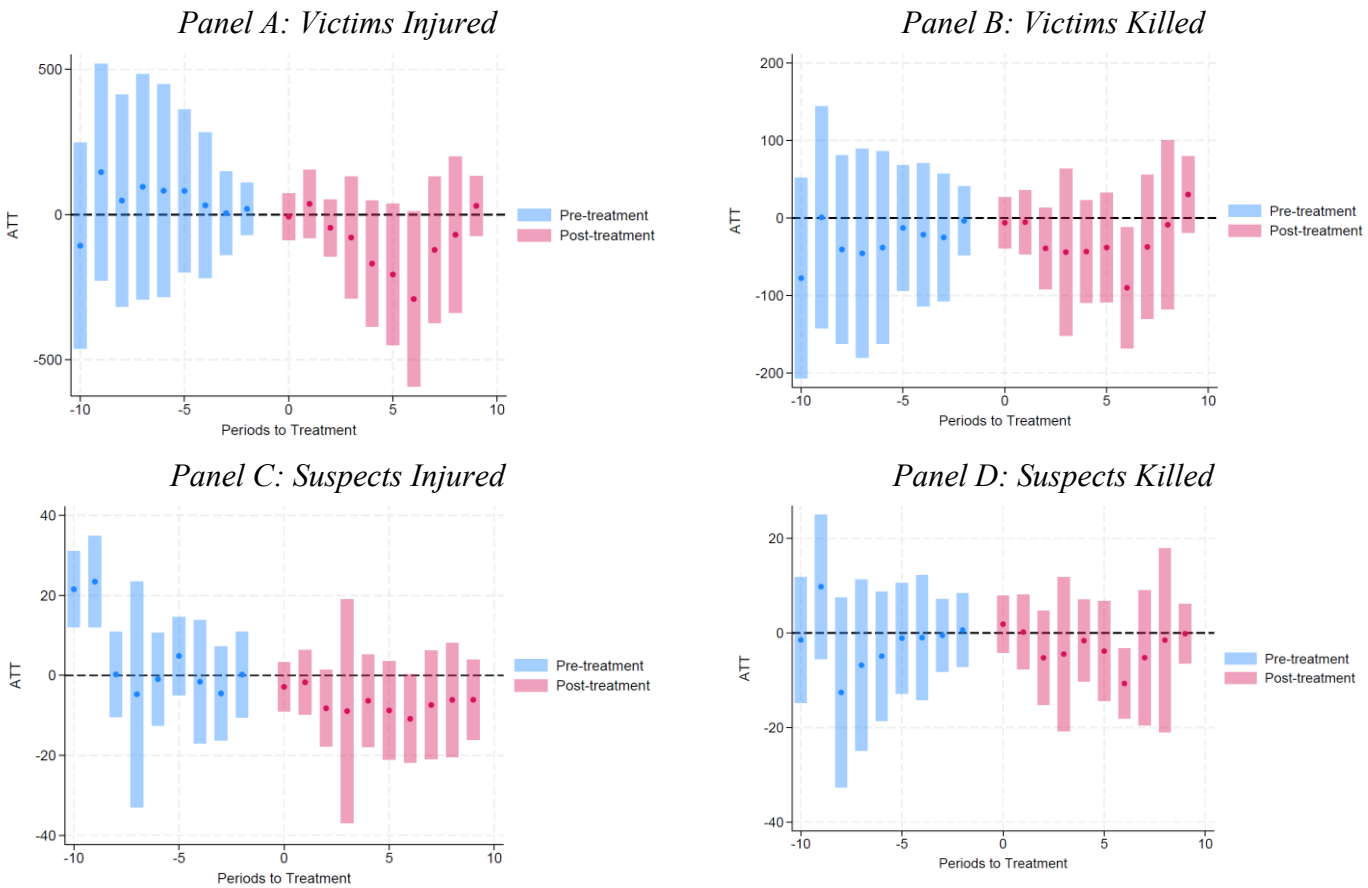
Notes: N=451 observations (41 states). 90% confidence intervals are reported. NYSRPA vs. Bruen-affected states include California, Hawaii, New York, Maryland, and Massachusetts.

Table 2: Results for Victims Injured/Killed and Suspects Injured/Killed
(Excluding NYSRPA vs. Bruen States From the Control Cohort)

Time Period	Victims Injured	Victims Killed	Suspects Injured	Suspects Killed
Time -10	-117 (151)	-96 (49)	19* (4)	-4 (5)
	[-500 to 267]	[-223 to 32]	[9 to 28]	[-16 to 7]
Time -9	134 (126)	-29 (50)	14 (8)	-6 (11)
	[-188 to 456]	[-160 to 102]	[-7 to 36]	[-35 to 22]
Time -8	55 (105)	-66 (41)	3 (6)	-22 (9)
	[-211 to 322]	[-174 to 42]	[-11 to 17]	[-44 to 1]
Time -7	112 (125)	-56 (51)	-4 (10)	-10 (6)
	[-207 to 431]	[-190 to 78]	[-29 to 22]	[-26 to 7]
Time -6	86 (114)	-50 (47)	2 (5)	-9 (5)
	[-205 to 378]	[-172 to 71]	[-11 to 15]	[-22 to 4]
Time -5	68 (84)	-24 (31)	5 (4)	-3 (4)
	[-147 to 283]	[-106 to 58]	[-5 to 14]	[-14 to 7]
Time -4	34 (78)	-28 (35)	-1 (5)	-2 (5)
	[-165 to 232]	[-120 to 64]	[-15 to 13]	[-14 to 9]
Time -3	9 (54)	-28 (32)	-5 (4)	-1 (3)
	[-129 to 147]	[-111 to 56]	[-16 to 6]	[-8 to 6]
Time -2	25 (39)	-8 (18)	1 (4)	-2 (4)
	[-75 to 124]	[-55 to 39]	[-9 to 10]	[-12 to 7]
Time +0	0 (30)	-5 (12)	-3 (2)	0 (3)
	[-77 to 78]	[-36 to 26]	[-10 to 3]	[-6 to 7]
Time +1	38 (59)	-12 (19)	-3 (4)	-3 (4)
	[-113 to 188]	[-60 to 37]	[-12 to 6]	[-14 to 7]
Time +2	-12 (52)	-31 (22)	-8 (4)	-6 (4)
	[-145 to 121]	[-89 to 27]	[-17 to 1]	[-16 to 4]
Time +3	-40 (88)	-34 (42)	-9 (11)	-5 (7)
	[-265 to 184]	[-145 to 77]	[-37 to 19]	[-22 to 12]
Time +4	-157 (74)	-34 (25)	-7 (4)	-1 (3)
	[-346 to 33]	[-98 to 31]	[-18 to 5]	[-9 to 7]
Time +5	-183 (79)	-25 (25)	-9 (5)	-4 (4)
	[-385 to 19]	[-90 to 41]	[-20 to 3]	[-14 to 6]
Time +6	-261* (93)	-69 (29)	-11 (6)	-8* (3)
	[-498 to -24]	[-144 to 6]	[-25 to 4]	[-16 to -0.2]
Time +7	-57 (121)	-17 (37)	-7 (6)	-5 (5)
	[-365 to 250]	[-115 to 80]	[-21 to 8]	[-19 to 9]
Time +8	-37 (123)	4 (41)	-6 (5)	-2 (6)
	[-351 to 276]	[-103 to 111]	[-19 to 7]	[-18 to 14]
Time +9	66 (47)	38 (18)	-3 (4)	-2 (2)
	[-52 to 185]	[-8 to 84]	[-13 to 6]	[-8 to 3]

N=451 observations (41 states). NYSRPA vs. Bruen-affected states include California, Hawaii, New York, Maryland, and Massachusetts. Standard Errors are in parentheses. 90% confidence intervals are in brackets. * p<0.10 ** p<0.05 *** p<0.01

Figure 3: Results for Victims Injured/Killed and Suspects Injured/Killed
(Open Carry States)



Notes: N=385 observations (35 states). 90% confidence intervals are reported. Open carry states include: Alabama, Alaska, Arizona, Arkansas, Colorado, Delaware, Georgia, Idaho, Indiana, Iowa, Kansas, Kentucky, Louisiana, Maine, Michigan, Mississippi, Missouri, Montana, Nebraska, Nevada, New Hampshire, New Mexico, North Carolina, North Dakota, Ohio, Oklahoma, Oregon, Pennsylvania, South Carolina, South Dakota, Tennessee, Texas, Utah, Vermont, Virginia, Washington, West Virginia, Wisconsin, and Wyoming.

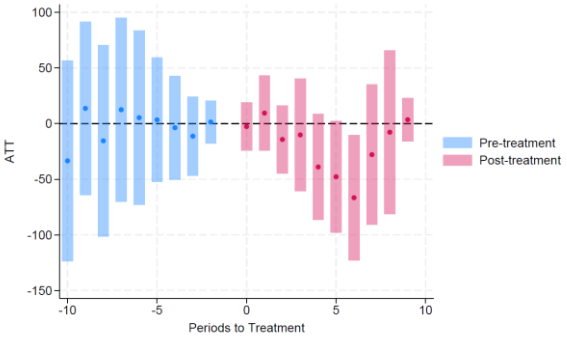
Table 3: Results for Victims Injured/Killed and Suspects Injured/Killed
(Open Carry States)

Time Period	Victims Injured	Victims Killed	Suspects Injured	Suspects Killed
Time -10	-107 (139)	-78 (51)	22* (4)	-1 (5)
	[-461 to 247]	[-207 to 52]	[12 to 31]	[-15 to 12]
Time -9	146 (147)	1 (56)	23* (4)	10 (6)
	[-227 to 520]	[-143 to 144]	[12 to 35]	[-5 to 25]
Time -8	48 (144)	-41 (48)	0 (4)	-13 (8)
	[-317 to 414]	[-162 to 81]	[-10 to 11]	[-33 to 8]
Time -7	96 (153)	-46 (53)	-5 (11)	-7 (7)
	[-293 to 484]	[-181 to 89]	[-33 to 24]	[-25 to 11]
Time -6	82 (144)	-38 (49)	-1 (5)	-5 (5)
	[-283 to 448]	[-162 to 86]	[-13 to 11]	[-19 to 9]
Time -5	82 (110)	-13 (32)	5 (4)	-1 (5)
	[-199 to 362]	[-94 to 68]	[-5 to 15]	[-13 to 11]
Time -4	32 (99)	-22 (36)	-2 (6)	-1 (5)
	[-219 to 282]	[-114 to 71]	[-17 to 14]	[-14 to 12]
Time -3	5 (57)	-25 (32)	-5 (5)	0 (3)
	[-139 to 149]	[-108 to 57]	[-16 to 7]	[-8 to 7]
Time -2	20 (35)	-4 (18)	0 (4)	1 (3)
	[-71 to 110]	[-48 to 41]	[-11 to 11]	[-7 to 8]
Time +0	-7 (32)	-6 (13)	-3 (2)	2 (2)
	[-87 to 73]	[-39 to 27]	[-9 to 3]	[-4 to 8]
Time +1	37 (46)	-5 (16)	-2 (3)	0 (3)
	[-80 to 154]	[-47 to 36]	[-10 to 6]	[-8 to 8]
Time +2	-45 (39)	-39 (21)	-8 (4)	-5 (4)
	[-143 to 53]	[-92 to 13]	[-18 to 1]	[-15 to 5]
Time +3	-79 (82)	-44 (42)	-9 (11)	-4 (6)
	[-289 to 131]	[-152 to 64]	[-37 to 19]	[-21 to 12]
Time +4	-169 (86)	-43 (26)	-6 (4)	-2 (3)
	[-386 to 48]	[-109 to 23]	[-18 to 5]	[-10 to 7]
Time +5	-206 (96)	-38 (28)	-9 (5)	-4 (4)
	[-450 to 37]	[-109 to 32]	[-21 to 4]	[-14 to 7]
Time +6	-291 (119)	-90* (31)	-11 (4)	-11* (3)
	[-593 to 11]	[-168 to -12]	[-22 to 0]	[-18 to -3]
Time +7	-122 (99)	-37 (36)	-7 (5)	-5 (6)
	[-374 to 130]	[-130 to 56]	[-21 to 6]	[-20 to 9]
Time +8	-69 (106)	-9 (43)	-6 (6)	-2 (8)
	[-338 to 199]	[-118 to 100]	[-20 to 8]	[-21 to 18]
Time +9	30 (41)	30 (19)	-6 (4)	0 (2)
	[-73 to 134]	[-19 to 80]	[-16 to 4]	[-6 to 6]

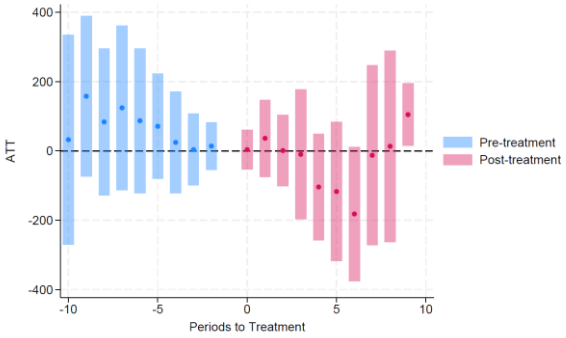
N= N=385 observations (35 states). Open carry states are listed in the notes of Figure 2. Standard Errors are in parentheses. 90% confidence intervals are in brackets. * p<0.10 ** p<0.05 *** p<0.01

Figure 4: Results for Victims Injured/Killed and Suspects Injured/Killed (by Gender of Victim)

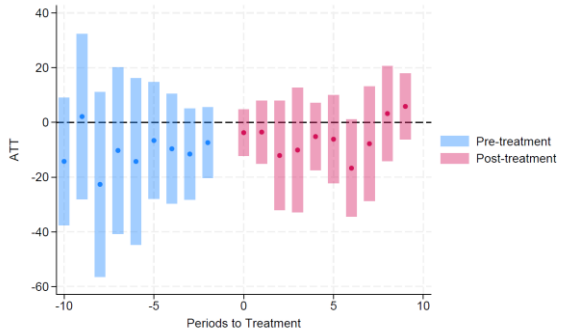
Panel A: Victim Injured (Female Victims)



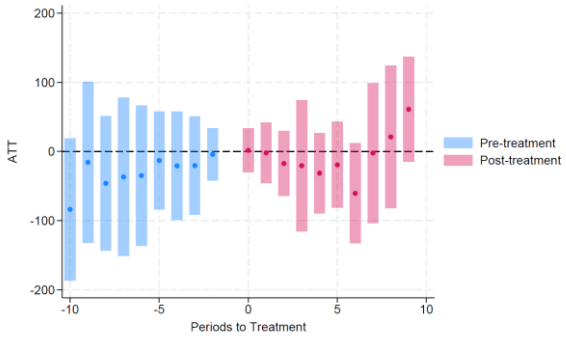
Panel E: Victim Injured (Male Victims)



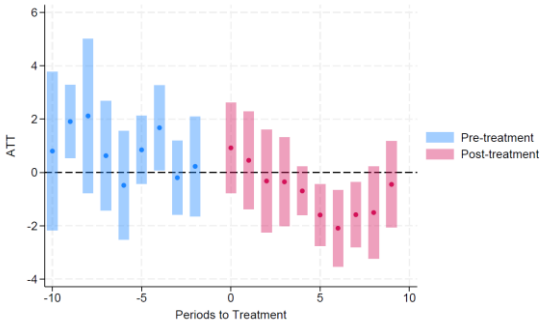
Panel B: Victim Killed (Female Victims)



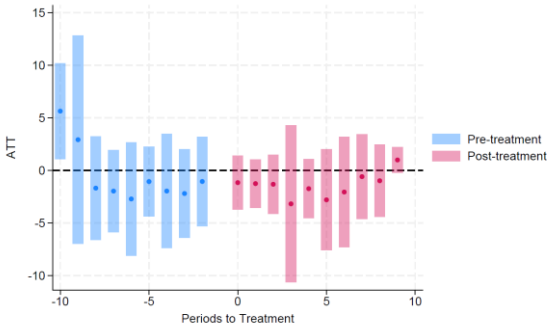
Panel F: Victim Killed (Male Victims)



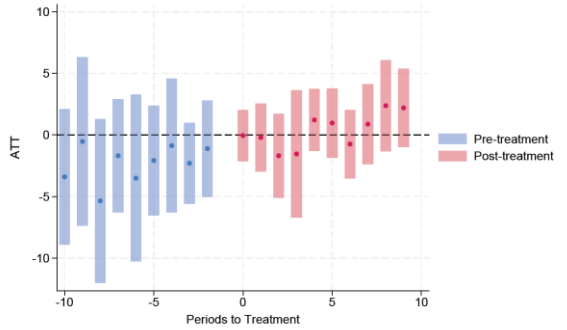
Panel C: Suspect Injured (Female Victims)



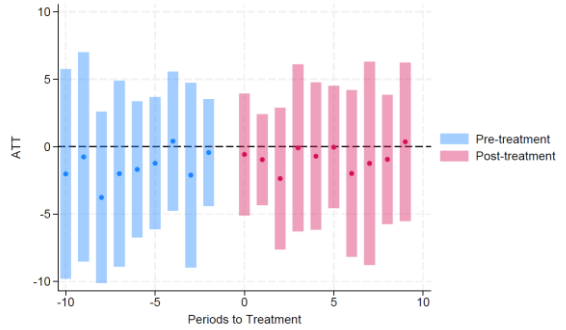
Panel G: Suspect Injured (Male Victims)



Panel D: Suspect Killed (Female Victims)



Panel H: Suspect Killed (Male Victims)



Notes: N=505 observations for female victims, 506 for male victims (46 states, unbalanced by one observation for female victims). 90% confidence intervals are reported.

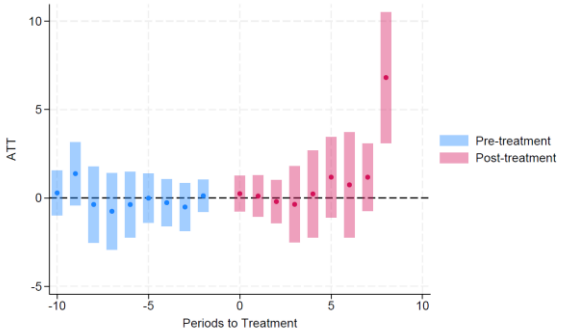
Table 4: Results for Victims Injured/Killed and Suspects Injured/Killed (by Gender of Victim)

	Female Victims				Male Victims			
Time Period	Victims Injured	Victims Killed	Suspects Injured	Suspects Killed	Victims Injured	Victims Killed	Suspects Injured	Suspects Killed
Time -10	-33 (35)	-14 (9)	1 (1)	-3 (2)	33 (117)	-84 (37)	6* (2)	-2 (2)
	[-124 to 57]	[-38 to 9]	[-2 to 4]	[-9 to 2]	[-270 to 335]	[-187 to 19]	[1 to 10]	[-10 to 6]
Time -9	14 (30)	2 (12)	2* (1)	-1 (3)	158 (89)	-16 (42)	3 (4)	-1 (1)
	[-64 to 92]	[-28 to 32]	[1 to 3]	[-7 to 6]	[-73 to 389]	[-132 to 101]	[-7 to 13]	[-9 to 7]
Time -8	-15 (33)	-23 (13)	2 (1)	-5 (3)	84 (82)	-46 (35)	-2 (2)	-4 (1)
	[-102 to 71]	[-56 to 11]	[-1 to 5]	[-12 to 1]	[-128 to 296]	[-143 to 51]	[-7 to 3]	[-10 to 3]
Time -7	12 (32)	-10 (12)	1 (1)	-2 (2)	124 (92)	-37 (41)	-2 (2)	-2 (1)
	[-70 to 95]	[-41 to 20]	[-1 to 3]	[-6 to 3]	[-112 to 361]	[-151 to 78]	[-6 to 2]	[-9 to 5]
Time -6	5 (30)	-14 (12)	0 (1)	-4 (3)	87 (81)	-35 (36)	-3 (2)	-2 (1)
	[-73 to 84]	[-45 to 16]	[-3 to 2]	[-10 to 3]	[-122 to 296]	[-136 to 67]	[-8 to 3]	[-7 to 3]
Time -5	3 (22)	-7 (8)	1 (0)	-2 (2)	71 (59)	-13 (25)	-1 (1)	-1 (1)
	[-53 to 59]	[-28 to 15]	[0 to 2]	[-7 to 2]	[-80 to 223]	[-84 to 58]	[-4 to 2]	[-6 to 4]
Time -4	-4 (18)	-10 (8)	2* (1)	-1 (2)	25 (57)	-21 (28)	-2 (2)	0 (1)
	[-50 to 43]	[-30 to 10]	[0 to 3]	[-6 to 5]	[-122 to 171]	[-99 to 57]	[-7 to 3]	[-5 to 6]
Time -3	-11 (14)	-12 (7)	0 (1)	-2 (1)	4 (40)	-20 (25)	-2 (2)	-2 (1)
	[-47 to 24]	[-28 to 5]	[-2 to 1]	[-6 to 1]	[-100 to 107]	[-91 to 51]	[-6 to 2]	[-9 to 5]
Time -2	1 (7)	-7 (5)	0 (1)	-1 (2)	14 (27)	-4 (13)	-1 (2)	0 (1)
	[-18 to 21]	[-20 to 6]	[-2 to 2]	[-5 to 3]	[-55 to 83]	[-42 to 33]	[-5 to 3]	[-4 to 4]
Time +0	-3 (8)	-4 (3)	1 (1)	0 (1)	4 (22)	2 (11)	-1 (1)	-1 (1)
	[-24 to 19]	[-12 to 5]	[-1 to 3]	[-2 to 2]	[-54 to 61]	[-30 to 33]	[-4 to 1]	[-5 to 4]
Time +1	9 (13)	-4 (4)	0 (1)	0 (1)	37 (43)	-2 (16)	-1 (1)	-1 (1)
	[-24 to 43]	[-15 to 8]	[-1 to 2]	[-3 to 3]	[-74 to 147]	[-46 to 42]	[-4 to 1]	[-4 to 2]
Time +2	-14 (12)	-12 (8)	0 (1)	-2 (1)	1 (40)	-17 (17)	-1 (1)	-2 (1)
	[-45 to 16]	[-32 to 8]	[-2 to 2]	[-5 to 2]	[-101 to 104]	[-64 to 30]	[-4 to 1]	[-8 to 3]
Time +3	-10 (19)	-10 (9)	0 (1)	-2 (2)	-10 (72)	-21 (34)	-3 (3)	0 (1)
	[-61 to 41]	[-33 to 13]	[-2 to 1]	[-7 to 4]	[-197 to 177]	[-116 to 74]	[-11 to 4]	[-6 to 6]
Time +4	-39 (18)	-5 (5)	-1 (0)	1 (1)	-104 (59)	-31 (21)	-2 (1)	-1 (1)
	[-86 to 8]	[-18 to 7]	[-2 to 0]	[-1 to 4]	[-257 to 49]	[-90 to 27]	[-5 to 1]	[-6 to 5]
Time +5	-48 (19)	-6 (6)	-2* (0.4)	1 (1)	-117 (78)	-19 (22)	-3 (2)	0 (1)
	[-98 to 2]	[-22 to 10]	[-3 to -0.4]	[-2 to 4]	[-318 to 84]	[-81 to 43]	[-8 to 2]	[-5 to 4]
Time +6	-67* (22)	-17 (7)	-2* (0.5)	-1 (1)	-182 (75)	-60 (26)	-2 (2)	-2 (1)
	[-123 to -10]	[-34 to 1]	[-4 to -1]	[-4 to 2]	[-375 to 12]	[-133 to 12]	[-7 to 3]	[-8 to 4]
Time +7	-28 (24)	-8 (8)	-2* (0.5)	1 (1)	-12 (100)	-2 (36)	-1 (2)	-1 (1)
	[-91 to 35]	[-29 to 13]	[-3 to -0.4]	[-2 to 4]	[-272 to 247]	[-103 to 99]	[-5 to 3]	[-9 to 6]
Time +8	-8 (28)	3 (7)	-2 (1)	2 (1)	14 (107)	21 (37)	-1 (1)	-1 (1)
	[-81 to 66]	[-14 to 21]	[-3 to 0]	[-1 to 6]	[-263 to 290]	[-82 to 124]	[-4 to 2]	[-6 to 4]
Time +9	4 (8)	6 (5)	0 (1)	2 (1)	105* (35)	61 (27)	1 (0)	0 (1)
	[-16 to 23]	[-6 to 18]	[-2 to 1]	[-1 to 5]	[15 to 195]	[-15 to 137]	[-0.2 to 2]	[-6 to 6]

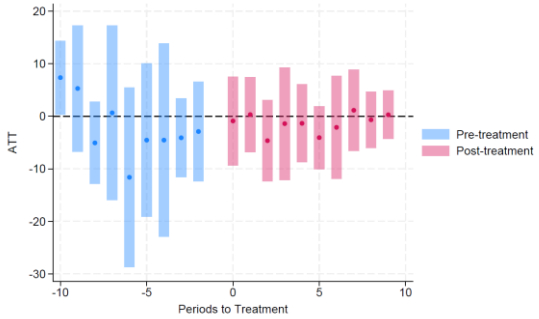
Notes: N=505 observations for female victims, 506 for male victims (46 states, unbalanced by one observation for female victims). Standard Errors are in parentheses. 90% confidence intervals are in brackets. * p<0.10 ** p<0.05 *** p<0.01

Figure 5: Results for Victims Injured/Killed and Suspects Injured/Killed (by Gender of Suspect)

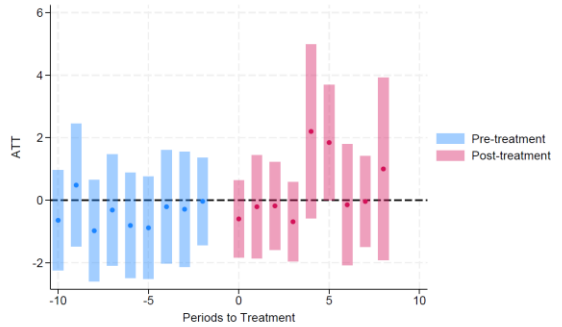
Panel A: Victim Injured (Female Suspects)



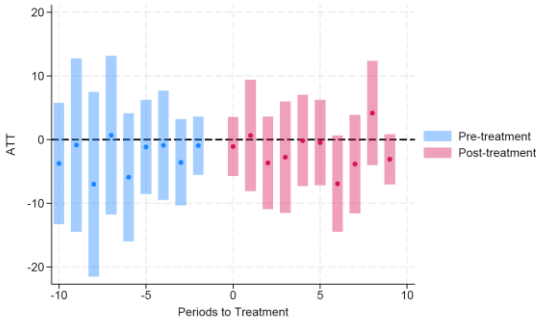
Panel E: Victim Injured (Male Suspects)



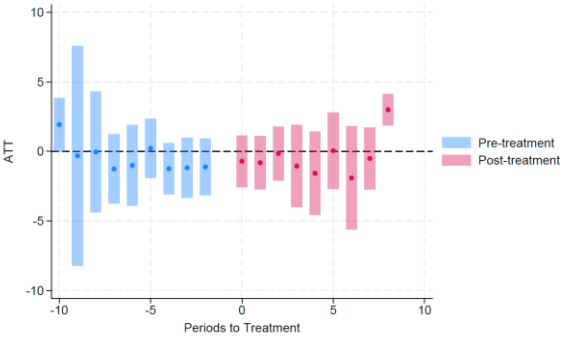
Panel B: Victim Killed (Female Suspects)



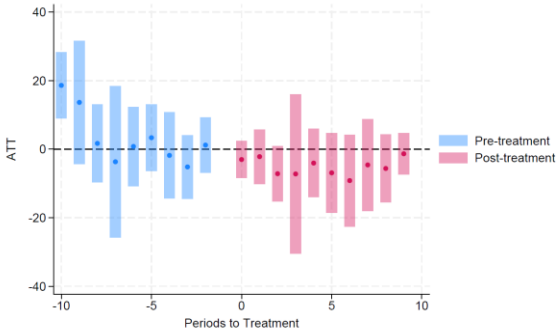
Panel F: Victim Killed (Male Suspects)



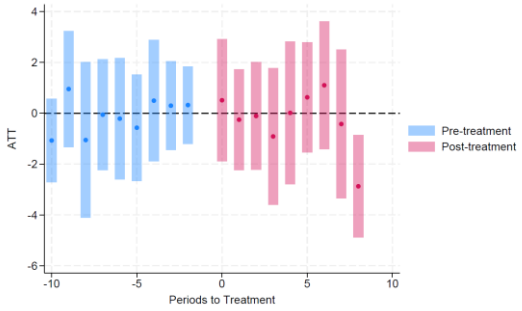
Panel C: Suspect Injured (Female Suspects)



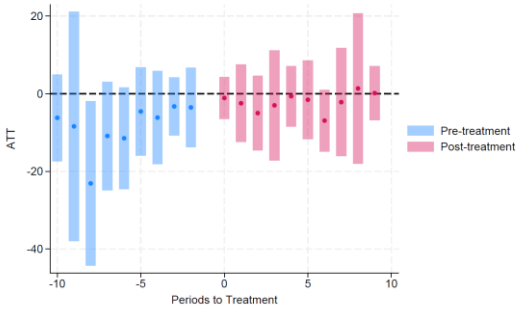
Panel G: Suspect Injured (Male Suspects)



Panel D: Suspect Killed (Female Suspects)



Panel H: Suspect Killed (Male Suspects)



Notes: N=506 observations for male suspects, 366 for female suspects (46 states, unbalanced by one observation for female suspects). 90% confidence intervals are reported.

Table 5: Results for Victims Injured/Killed and Suspects Injured/Killed (by Gender of Suspect)

	Female Suspects				Male Suspects			
Time Period	Victims Injured	Victims Killed	Suspects Injured	Suspects Killed	Victims Injured	Victims Killed	Suspects Injured	Suspects Killed
Time -10	0 (1) [-1 to 2]	-1 (1) [-2 to 1]	2* (1) [0 to 4]	-1 (1) [-3 to 1]	7* (3) [0 to 14]	-4 (3) [-13 to 6]	19* (4) [9 to 28]	-6 (4) [-17 to 5]
Time -9	1 (1) [0 to 3]	0 (1) [-1 to 2]	0 (3) [-8 to 8]	1 (1) [-1 to 3]	5 (5) [-7 to 17]	-1 (4) [-14 to 13]	14 (7) [-4 to 32]	-8 (12) [-38 to 21]
Time -8	0 (1) [-3 to 2]	-1 (1) [-3 to 1]	0 (2) [-4 to 4]	-1 (1) [-4 to 2]	-5 (3) [-13 to 3]	-7 (5) [-21 to 7]	2 (5) [-10 to 13]	-23* (8) [-44 to -2]
Time -7	-1 (1) [-3 to 1]	0 (1) [-2 to 1]	-1 (1) [-4 to 1]	0 (1) [-2 to 2]	1 (6) [-16 to 17]	1 (4) [-12 to 13]	-4 (9) [-26 to 18]	-11 (5) [-25 to 3]
Time -6	0 (1) [-2 to 1]	-1 (1) [-2 to 1]	-1 (1) [-4 to 2]	0 (1) [-3 to 2]	-12 (7) [-29 to 5]	-6 (3) [-16 to 4]	1 (5) [-11 to 12]	-11 (5) [-25 to 2]
Time -5	0 (1) [-1 to 1]	-1 (1) [-3 to 1]	0 (1) [-2 to 2]	-1 (1) [-3 to 2]	-5 (6) [-19 to 10]	-1 (2) [-8 to 6]	3 (4) [-6 to 13]	-5 (4) [-16 to 7]
Time -4	0 (1) [-2 to 1]	0 (1) [-2 to 2]	-1 (1) [-3 to 1]	0 (1) [-2 to 3]	-5 (7) [-23 to 14]	-1 (3) [-9 to 8]	-2 (5) [-14 to 11]	-6 (5) [-18 to 6]
Time -3	-1 (1) [-2 to 1]	0 (1) [-2 to 2]	-1 (1) [-3 to 1]	0 (1) [-1 to 2]	-4 (3) [-12 to 3]	-4 (2) [-10 to 3]	-5 (4) [-14 to 4]	-3 (3) [-11 to 4]
Time -2	0 (0) [-1 to 1]	0 (1) [-1 to 1]	-1 (1) [-3 to 1]	0 (1) [-1 to 2]	-3 (4) [-12 to 7]	-1 (1) [-5 to 4]	1 (3) [-7 to 9]	-4 (4) [-14 to 7]
Time +0	0 (0) [-1 to 1]	-1 (0) [-2 to 1]	-1 (1) [-3 to 1]	1 (1) [-2 to 3]	-1 (3) [-9 to 8]	-1 (1) [-6 to 4]	-3 (2) [-8 to 2]	-1 (2) [-6 to 4]
Time +1	0 (0) [-1 to 1]	0 (1) [-2 to 1]	-1 (1) [-3 to 1]	0 (1) [-2 to 2]	0 (3) [-7 to 7]	1 (3) [-8 to 9]	-2 (3) [-10 to 6]	-2 (4) [-12 to 7]
Time +2	0 (0) [-1 to 1]	0 (1) [-2 to 1]	0 (1) [-2 to 2]	0 (1) [-2 to 2]	-5 (3) [-12 to 3]	-4 (2) [-11 to 4]	-7 (3) [-15 to 1]	-5 (4) [-15 to 5]
Time +3	0 (1) [-3 to 2]	-1 (0) [-2 to 1]	-1 (1) [-4 to 2]	-1 (1) [-4 to 2]	-1 (4) [-12 to 9]	-3 (3) [-11 to 6]	-7 (9) [-30 to 16]	-3 (6) [-17 to 11]
Time +4	0 (1) [-2 to 3]	2 (1) [-1 to 5]	-2 (1) [-5 to 1]	0 (1) [-3 to 3]	-1 (3) [-9 to 6]	0 (2) [-7 to 7]	-4 (4) [-14 to 6]	-1 (3) [-8 to 7]
Time +5	1 (1) [-1 to 3]	2 (1) [0 to 4]	0 (1) [-3 to 3]	1 (1) [-2 to 3]	-4 (2) [-10 to 2]	0 (2) [-7 to 6]	-7 (5) [-18 to 5]	-2 (4) [-12 to 9]
Time +6	1 (1) [-2 to 4]	0 (1) [-2 to 2]	-2 (1) [-6 to 2]	1 (1) [-1 to 4]	-2 (4) [-12 to 8]	-7 (2) [-14 to 1]	-9 (5) [-23 to 4]	-7 (3) [-15 to 1]
Time +7	1 (1) [-1 to 3]	0 (1) [-1 to 1]	-1 (1) [-3 to 2]	0 (1) [-3 to 3]	1 (3) [-7 to 9]	-4 (2) [-12 to 4]	-5 (5) [-18 to 9]	-2 (5) [-16 to 12]
Time +8	7* (1) [3 to 11]	1 (1) [-2 to 4]	3* (0.4) [2 to 4]	-3* (1) [-5 to -1]	-1 (2) [-6 to 5]	4 (3) [-4 to 12]	-6 (4) [-16 to 4]	1 (8) [-18 to 21]
Time +9	N/A	N/A	N/A	N/A	0 (2) [-4 to 5]	-3 (1) [-7 to 1]	-1 (2) [-7 to 5]	0 (3) [-7 to 7]

Notes: N=506 observations for male suspects, 366 for female suspects (46 states, unbalanced by one observation for female perpetrators). 90% confidence intervals are in brackets.

Appendix

Table A1: Full Sample Summary Statistics

	Treated States	Control States
Victims Injured	518 (537)	741 (817)
Victims Killed	286 (309)	294 (300)
Suspects Injured	41 (45)	35 (34)
Suspects Killed	52 (58)	45 (45)
Observations	275	231
Number of States	25	21

Notes: Annual means are reported and standard deviations are in parentheses.

Table A2: States by Year of Change to Permitless Carry Laws

Year of Change	State
<2015	VT (1793), AK (2003), AZ (2010), WY (2011), ND (2017 for residents)
2015	ME, KS
2016	WV, MS
2017	NH, MO
2019	OK, SD, KY
2020	ID
2021	TX, IA, TN, UT, MT
2022	IN, OH, GA
2023	NE, AR, FL, AL
2024	LA, SC
None (Controls)	CA, CO, CT, DE, HI, IL, MD, MA, MI, MN, NV, NJ, NM, NY, NC, OR, PA, RI, VA, WA, WI

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