

ShotSpotter Update

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1 Figures

2 Tables

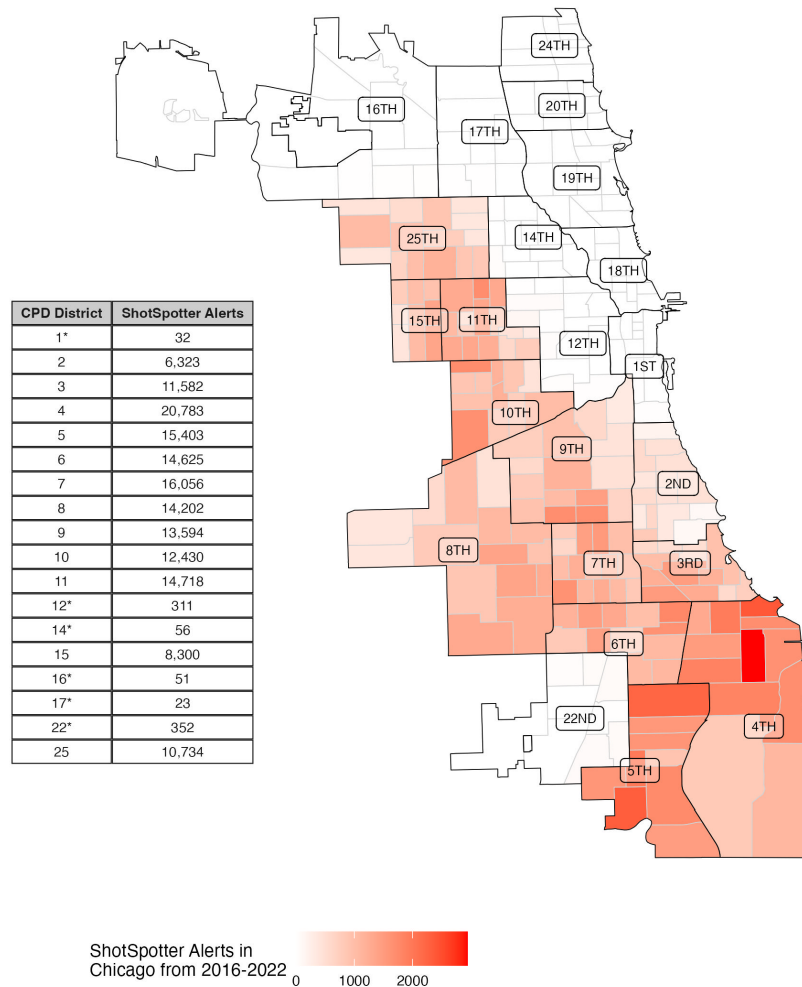


Figure 1: Number of ShotSpotter Alerts in Chicago by Police Beat/District

Note: There are a total of 18 police districts in Chicago. Each of these districts contains beats which are designated by the boxes within the district lines. ShotSpotter began implementation in 2017 and rolled out over the next two years. The table to the left of the map shows the number of ShotSpotter Alerts from 2016-2022. Districts with a star next to them denote districts that do not have ShotSpotter implemented and are therefore likely heard from microphones in neighboring districts.

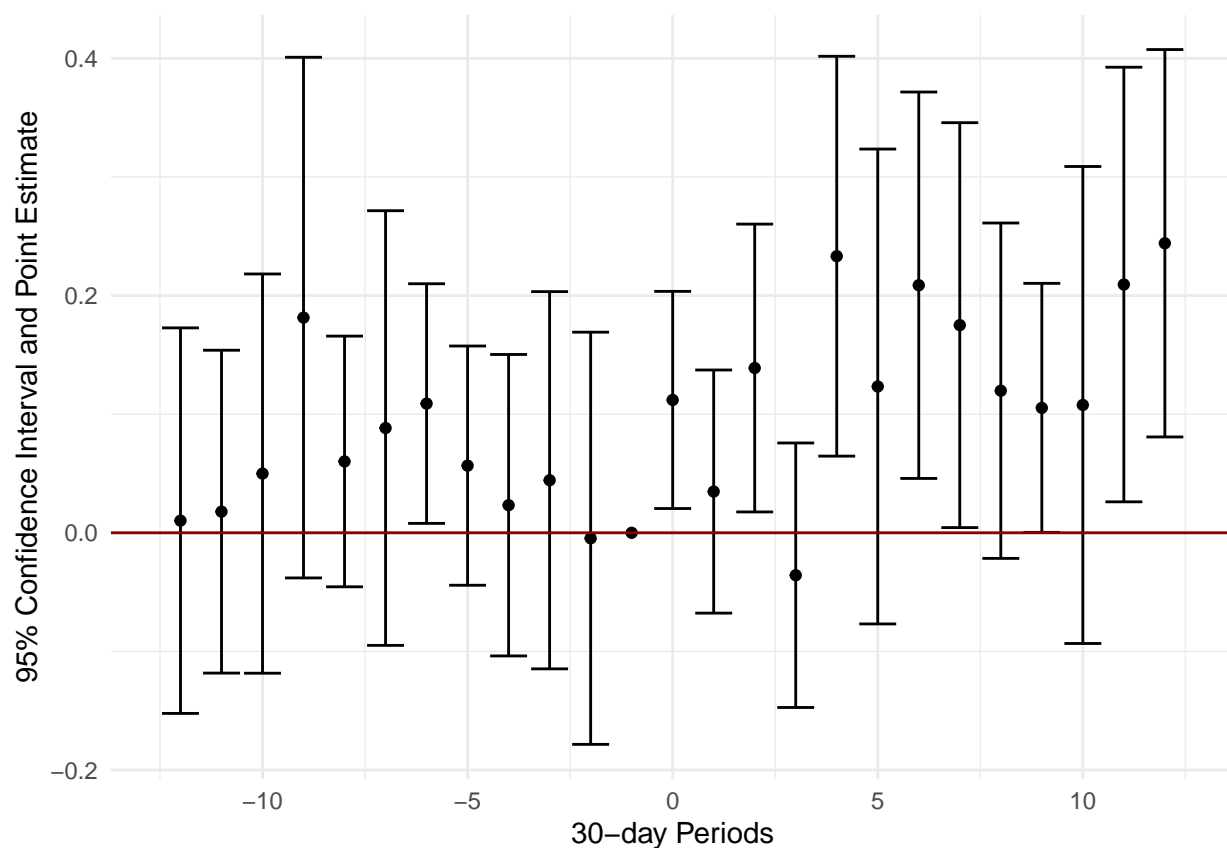


Figure 2: Event Study for Gun Arrests Outcome (OLS)

Note: Each point estimate is a 30-day period. Controls include day-by-month-by-year and district fixed effects. All periods are normalized by the 30-day period before ShotSpotter implementation. Standard errors are clustered by district. The x-axis represents the number of 30-day periods before/after the implementation of ShotSpotter while the y-axis represents the coefficient estimates and 95 percent confidence intervals.

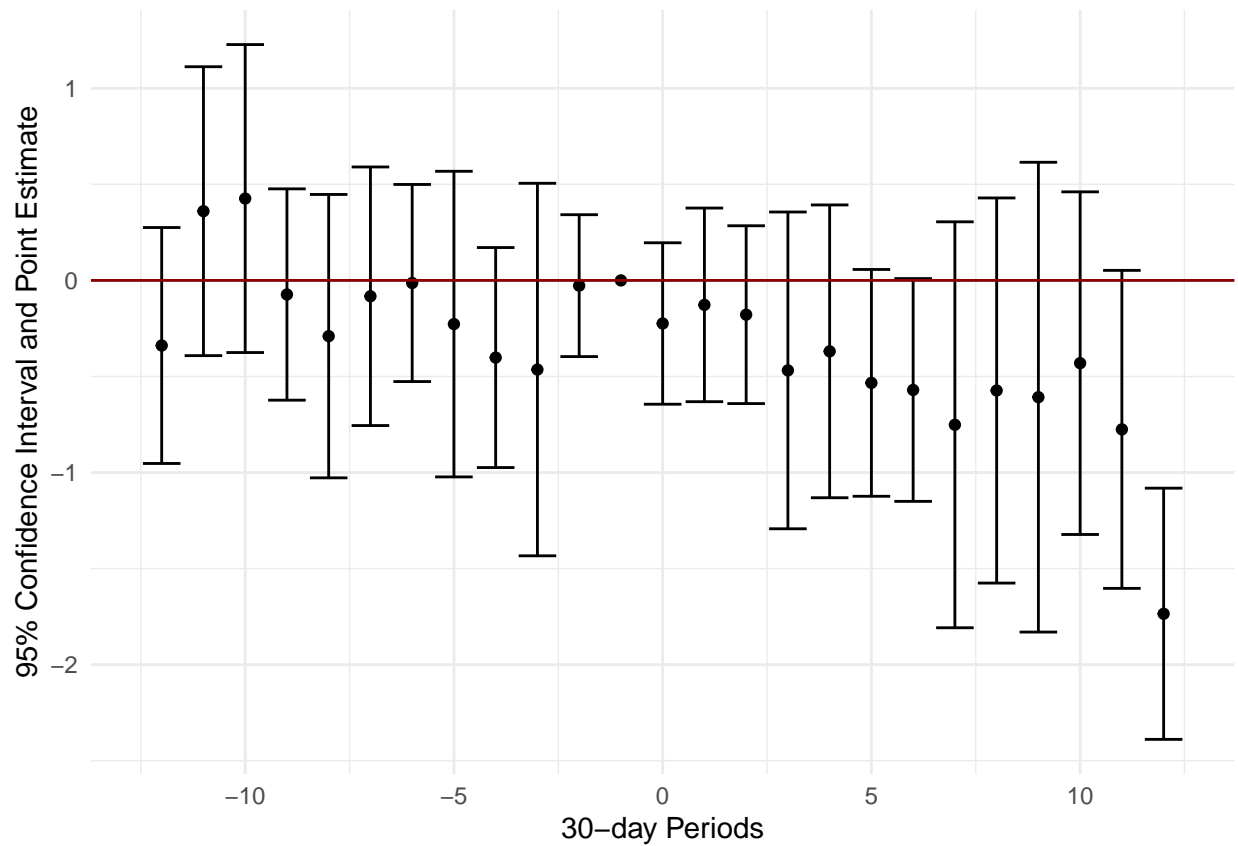


Figure 3: Event Study for All Other Arrests Outcome

Note: Each point estimate is a 30-day period. Controls include day-by-month-by-year and district fixed effects. All periods are normalized by the 30-day period before ShotSpotter implementation. Standard errors are clustered by district. The x-axis represents the number of 30-day periods before/after the implementation of ShotSpotter while the y-axis represents the coefficient estimates and 95 percent confidence intervals.

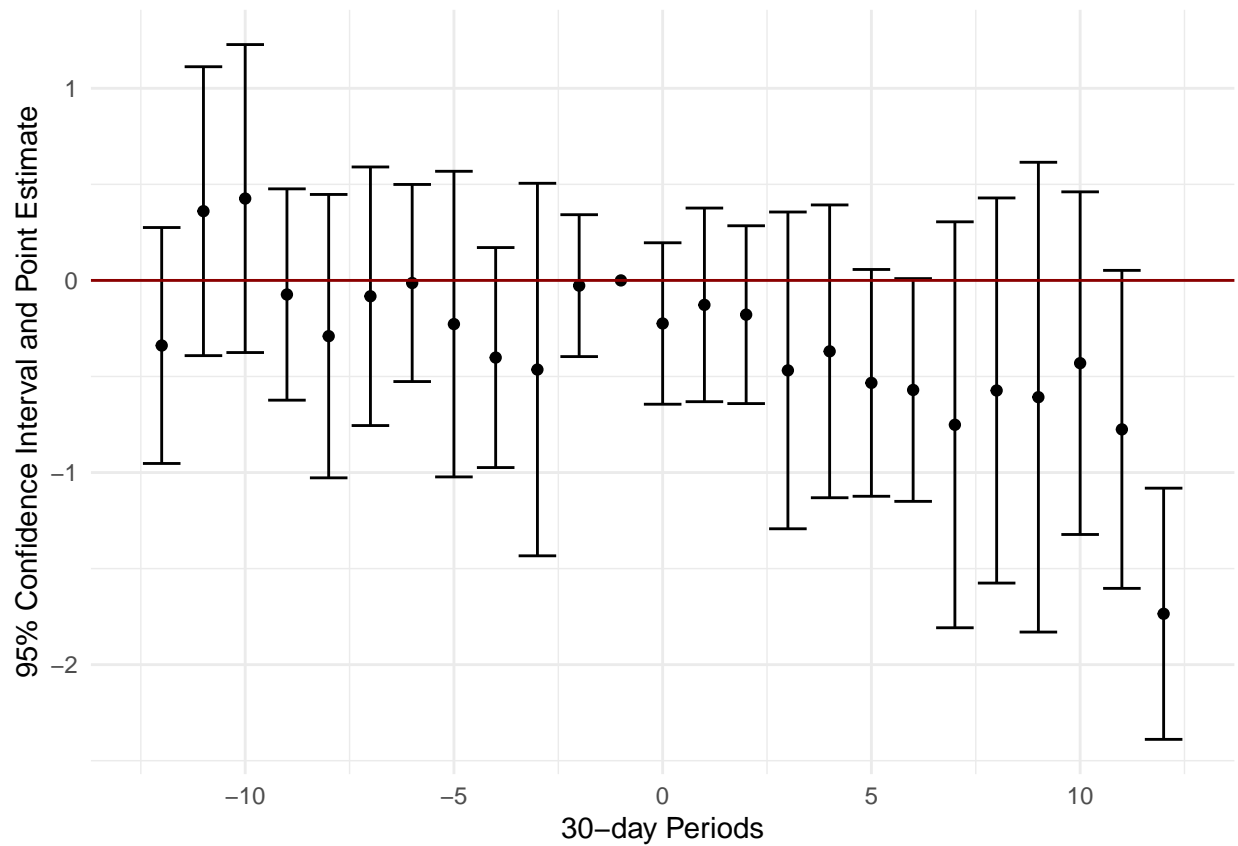


Figure 4: Event Study for All Other Arrests Outcome

Note: Each point estimate is a 30-day period. Controls include day-by-month-by-year and district fixed effects. All periods are normalized by the 30-day period before ShotSpotter implementation. Standard errors are clustered by district. The x-axis represents the number of 30-day periods before/after the implementation of ShotSpotter while the y-axis represents the coefficient estimates and 95 percent confidence intervals.

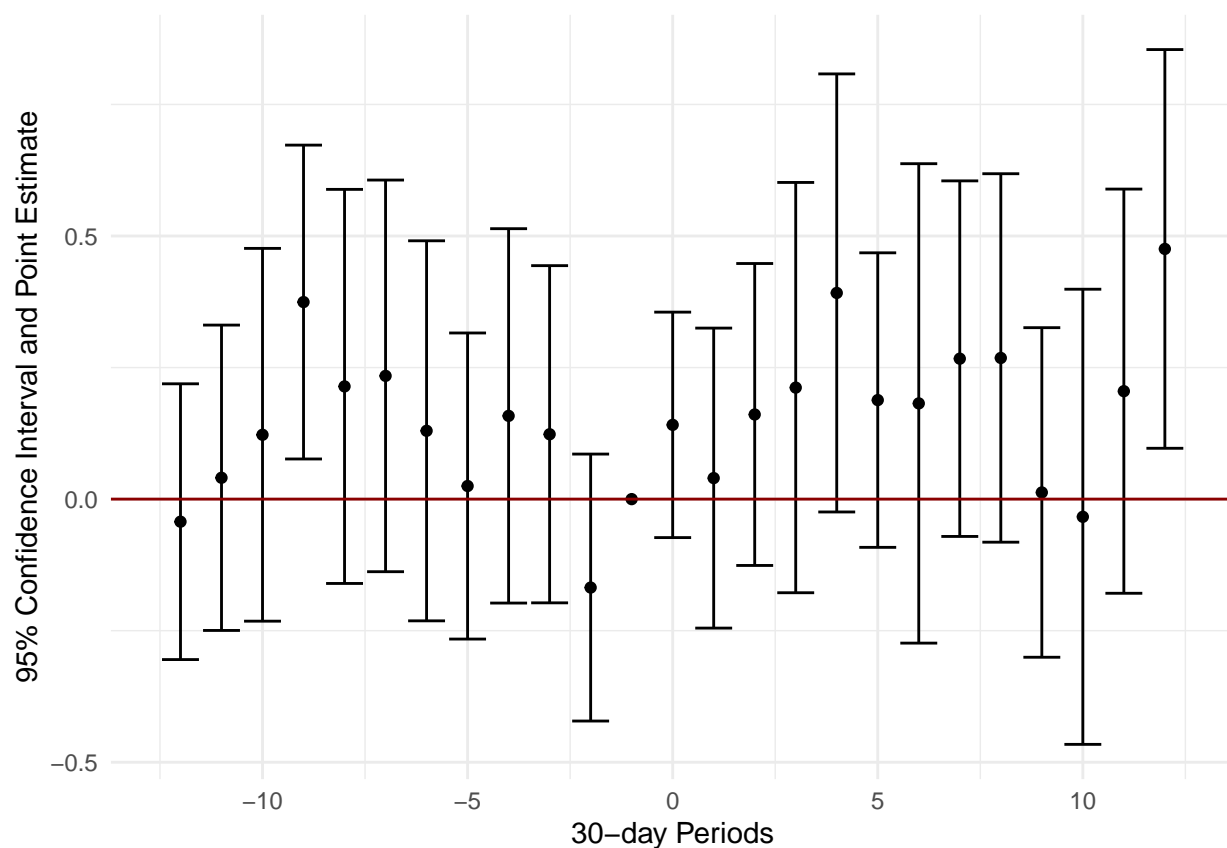


Figure 5: Event Study for Gun Involved Outcome

Note: Each point estimate is a 30-day period. Controls include day-by-month-by-year and district fixed effects. All periods are normalized by the 30-day period before ShotSpotter implementation. Standard errors are clustered by district. The x-axis represents the number of 30-day periods before/after the implementation of ShotSpotter while the y-axis represents the coefficient estimates and 95 percent confidence intervals.

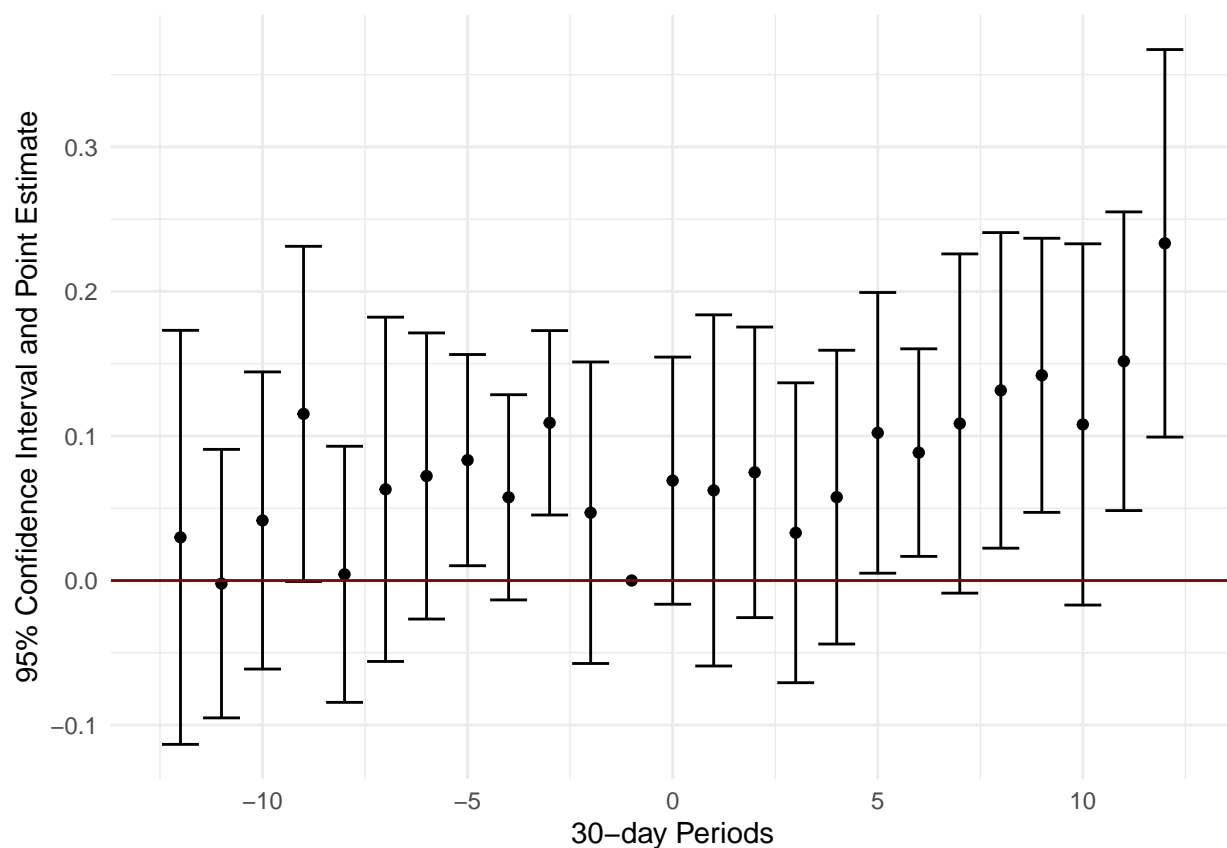


Figure 6: Event Study for Number Firearms Found

Note: Each point estimate is a 30-day period. Controls include day-by-month-by-year and district fixed effects. All periods are normalized by the 30-day period before ShotSpotter implementation. Standard errors are clustered by district. The x-axis represents the number of 30-day periods before/after the implementation of ShotSpotter while the y-axis represents the coefficient estimates and 95 percent confidence intervals.

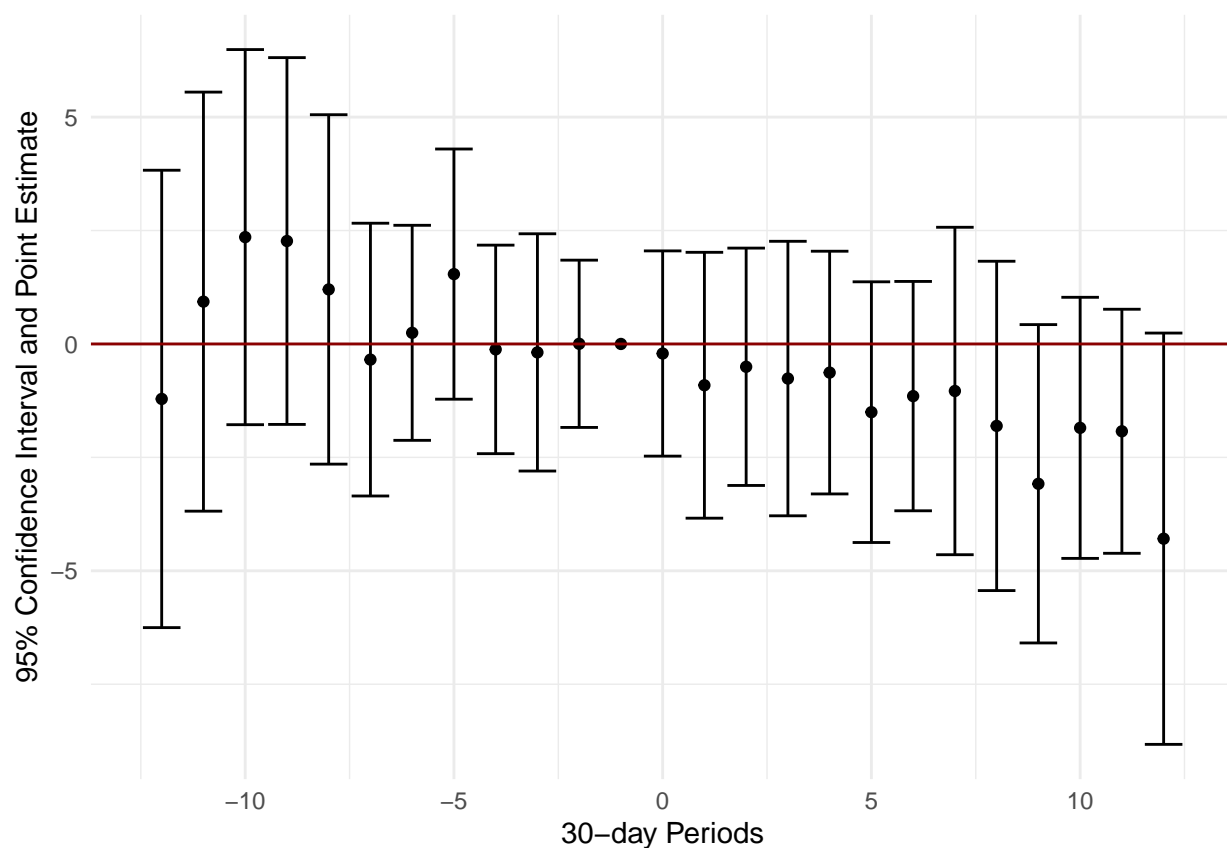


Figure 7: Event Study Number of Black Stops

Note: Each point estimate is a 30-day period. Controls include day-by-month-by-year and district fixed effects. All periods are normalized by the 30-day period before ShotSpotter implementation. Standard errors are clustered by district. The x-axis represents the number of 30-day periods before/after the implementation of ShotSpotter while the y-axis represents the coefficient estimates and 95 percent confidence intervals.

Table 1: Effect of ShotSpotter Activations on Various Outcomes (OLS/Poisson)

	OLS	Poisson	Omitting 2020	
			OLS	Poisson
	(1)	(2)	(3)	(4)
<i>Panel A: Number Gun Crimes</i>				
ShotSpotter Activated	0.324*** (0.091)	0.050 (0.046)	0.286*** (0.090)	0.038 (0.045)
Mean of Dependent Variable	2.018	2.018	1.991	1.991
Observations	56254	56254	48202	48202
<i>Panel B: Number Gun Arrests</i>				
ShotSpotter Activated	0.165*** (0.048)	-0.053 (0.077)	0.153*** (0.044)	-0.046 (0.076)
Mean of Dependent Variable	0.636	0.636	0.614	0.615
Observations	56254	56232	48202	48180
<i>Panel C: Number Non-Gun Crimes</i>				
ShotSpotter Activated	-1.615** (0.670)	-0.027 (0.018)	-1.973*** (0.578)	-0.045** (0.018)
Mean of Dependent Variable	28.686	28.686	29.442	29.442
Observations	56254	56254	48202	48202
<i>Panel D: Number Non-Gun Arrests</i>				
ShotSpotter Activated	-1.095*** (0.217)	-0.071** (0.025)	-1.044*** (0.207)	-0.075** (0.026)
Mean of Dependent Variable	4.753	4.753	4.968	4.968
Observations	56254	56254	48202	48202
FE: Day-by-Month-by-Year	X	X	X	X
FE: District	X	X	X	X

Note:

* $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$

Standard errors are clustered by district. Shotspotter is activated in 12 of the 22 police districts in Chicago. Number Gun Crimes refers to all crimes that have a gun involved. For instance, this can include a burglary or aggravated assault with a firearm. Number of Gun Arrests are the number of gun crimes that end in an arrest. Number of Non-Gun Crimes are all crimes that have no firearm involved. Similarly, not all of these end in arrests. Columns 3 and 4 omit year 2020 (Covid-19).

Table 2: Effect of ShotSpotter Activations on Investigatory Street Stops (OLS/Poisson)

	OLS	Poisson	Omitting 2020	
			OLS	Poisson
	(1)	(2)	(3)	(4)
<i>Panel A: All Stops</i>				
ShotSpotter Activated	-3.762*** (1.114)	-0.257*** (0.085)	-3.458*** (1.063)	-0.248*** (0.078)
Mean of Dependent Variable	12.986	12.986	13.373	13.373
Observations	56254	56254	48202	48202
<i>Panel B: Black Stops</i>				
ShotSpotter Activated	-3.107*** (0.871)	-0.295*** (0.088)	-2.703*** (0.861)	-0.271*** (0.085)
Mean of Dependent Variable	8.973	8.973	9.285	9.285
Observations	56254	56254	48202	48202
<i>Panel C: Firearms Found</i>				
ShotSpotter Activated	0.138*** (0.038)	-0.160 (0.102)	0.141*** (0.038)	-0.134 (0.103)
Mean of Dependent Variable	0.302	0.308	0.293	0.300
Observations	56254	55220	48202	47168
FE: Day-by-Month-by-Year	X	X	X	X
FE: District	X	X	X	X

Note:

* $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$

Standard errors are clustered by district. Shotspotter is activated in 12 of the 22 police districts in Chicago. Stops refer to footstops that have an investigatory stop report (ISR). Note that these stops do not include juveniles. Columns 3 and 4 omit year 2020 (Covid-19).

	(1) OLS	(2) Poisson	Without 2020	
			(2) OLS	(4) Poisson
Outcome: Gun Involved Crime				
Shotspotter Enacted	0.318*** (-0.089)	0.049** (-0.044)	0.283*** (-0.088)	0.038** (-0.044)
Shotspotter Enacted in Border	0.038 (-0.07)	0.017 (-0.049)	0.019 (-0.07)	0.003 (-0.05)
N	56,254	56,254	48,202	48,202
Outcome: Gun Involved Arrests				
Shotspotter Enacted	0.156*** (-0.046)	-0.053** (-0.075)	0.144*** (-0.042)	-0.047 (-0.075)
Shotspotter Enacted in Border	0.059** (-0.056)	-0.004 (-0.095)	0.058** (-0.051)	0.004 (-0.09)
N	56,254	56,232	48,202	48,180
Outcome: Non-Gun Involved Crime				
Shotspotter Enacted	-1.392** (-0.62)	-0.019** (-0.016)	-1.719*** (-0.508)	-0.036** (-0.015)
Shotspotter Enacted in Border	-1.507** (-0.681)	-0.058*** (-0.019)	-1.694*** (-0.589)	-0.064*** (-0.02)
N	56,254	56,254	48,202	48,202
Outcome: Non-Gun Involved Arrests				
Shotspotter Enacted	-1.067*** (-0.227)	-0.069*** (-0.024)	-1.012*** (-0.212)	-0.072*** (-0.025)
Shotspotter Enacted in Border	-0.184 (-0.299)	-0.017 (-0.035)	-0.210** (-0.282)	-0.027** (-0.037)
N	56,254	56,254	48,202	48,202