ShotSpotter Update

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Trying to figure out new directions. We have somewhat solidified a good set of results and think they are relatively robust.

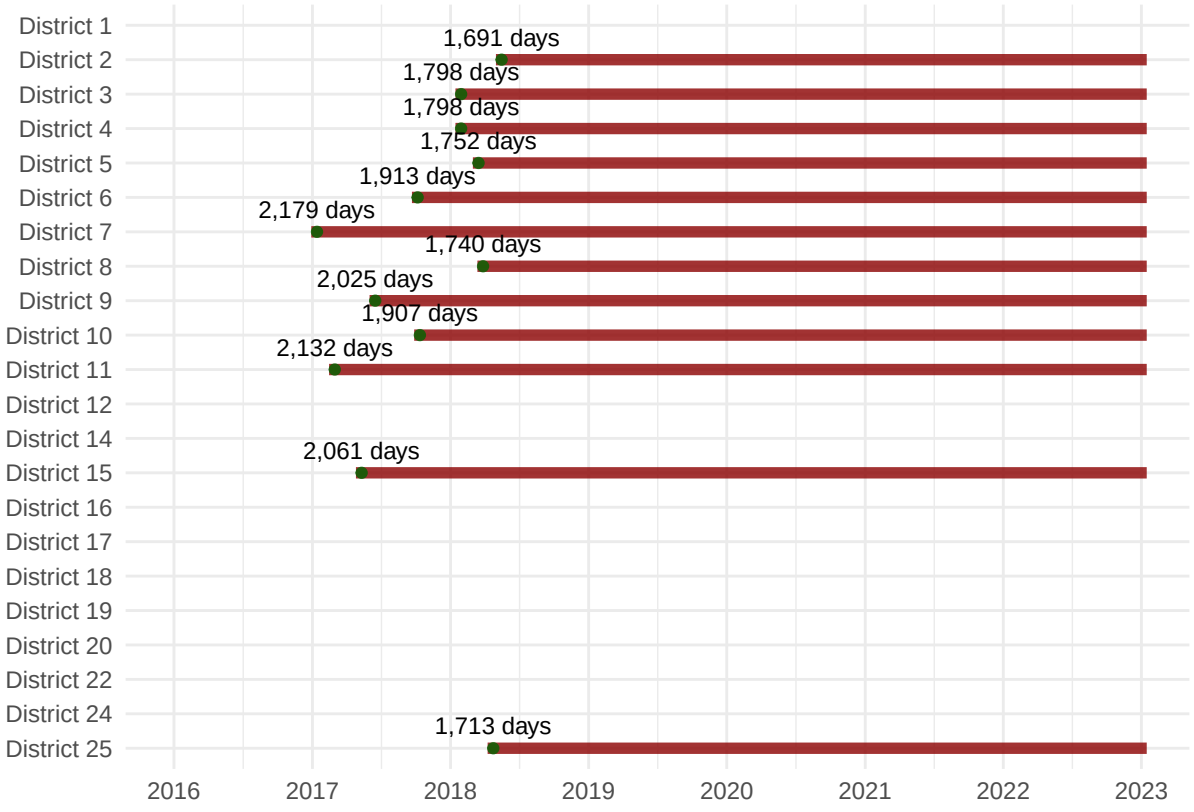
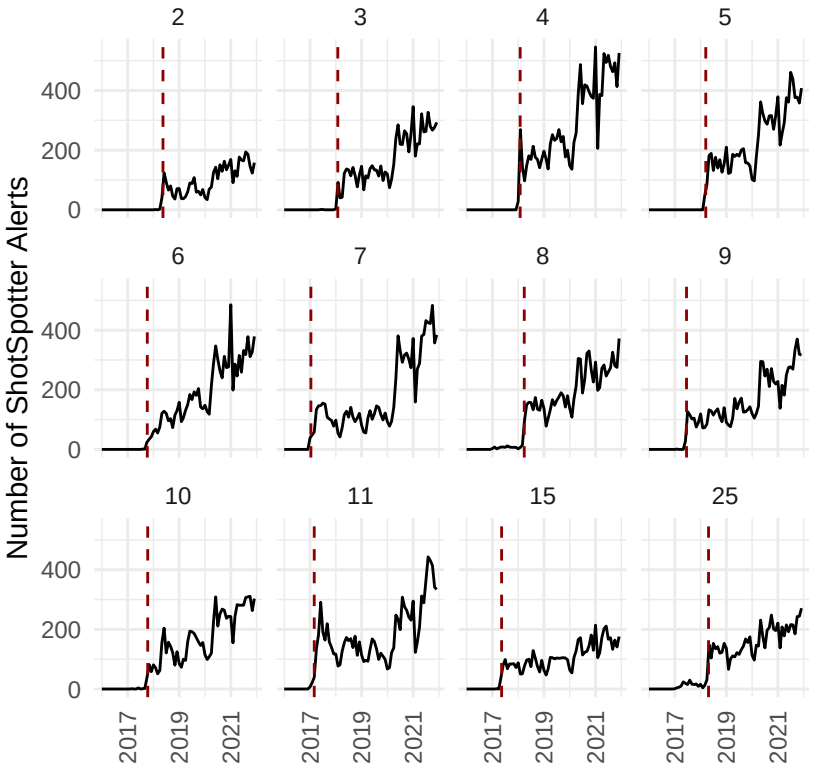


Figure 1: ShotSpotter Rollout Dates by District in Chicago

Note: There are a total of 18 police districts in Chicago, 12 of which get ShotSpotter implemented. Implementation began in early 2017 through late 2018.

1 Figures



District	Mean Shots
2	3.509
3	6.072
4	10.731
5	8.243
6	7.097
7	6.926
8	7.578
9	6.372
10	6.244
11	6.611
15	3.833
25	5.823

Figure 2: ShotSpotter Alerts Over Time

Note: There are a total of 18 police districts in Chicago, 12 of which get ShotSpotter implemented. Implementation began in early 2017 through late 2018. This graph shows the trend of the number of gunshots alerted by ShotSpotter.

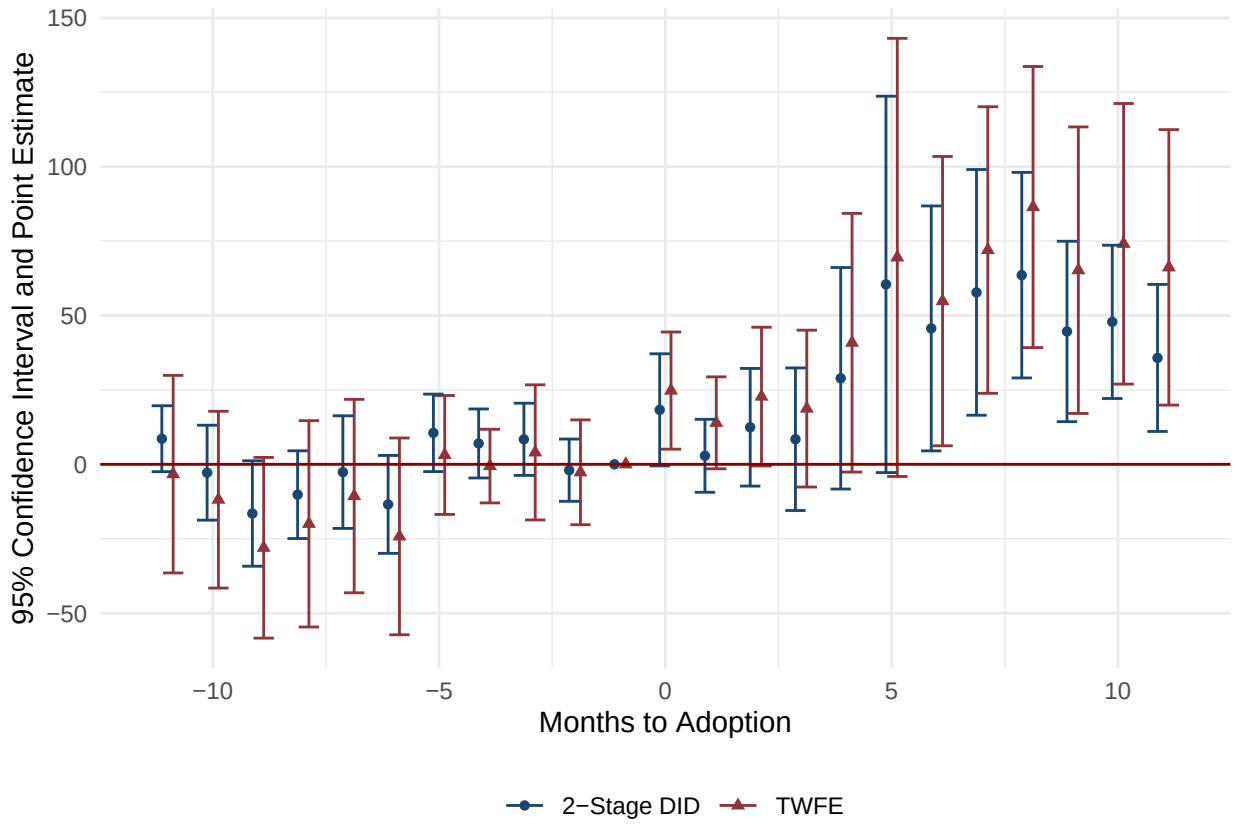


Figure 3: Event Study of Priority 1 Dispatch Times

Note: There are a total of 18 police districts in Chicago, 12 of which get ShotSpotter implemented. Implementation began in early 2017 through late 2018. This graph shows priority 1 time from received 911 call to time of dispatch. Priority 1 calls are designated as immediate dispatch.

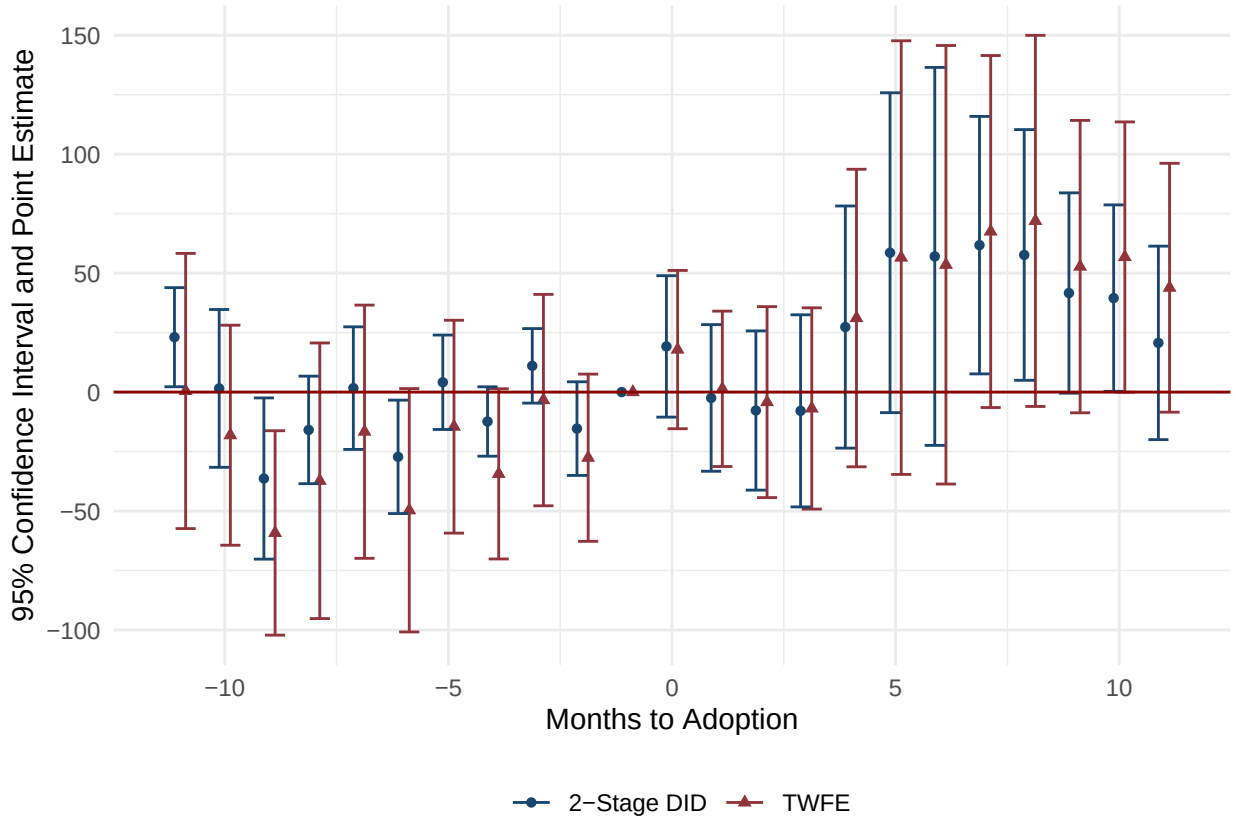


Figure 4: Event Study of Priority 2 Dispatch Times

Note: There are a total of 18 police districts in Chicago, 12 of which get ShotSpotter implemented. Implementation began in early 2017 through late 2018. This graph shows priority 2 time from received 911 call to time of dispatch. Priority 2 calls are designated as rapid dispatch.

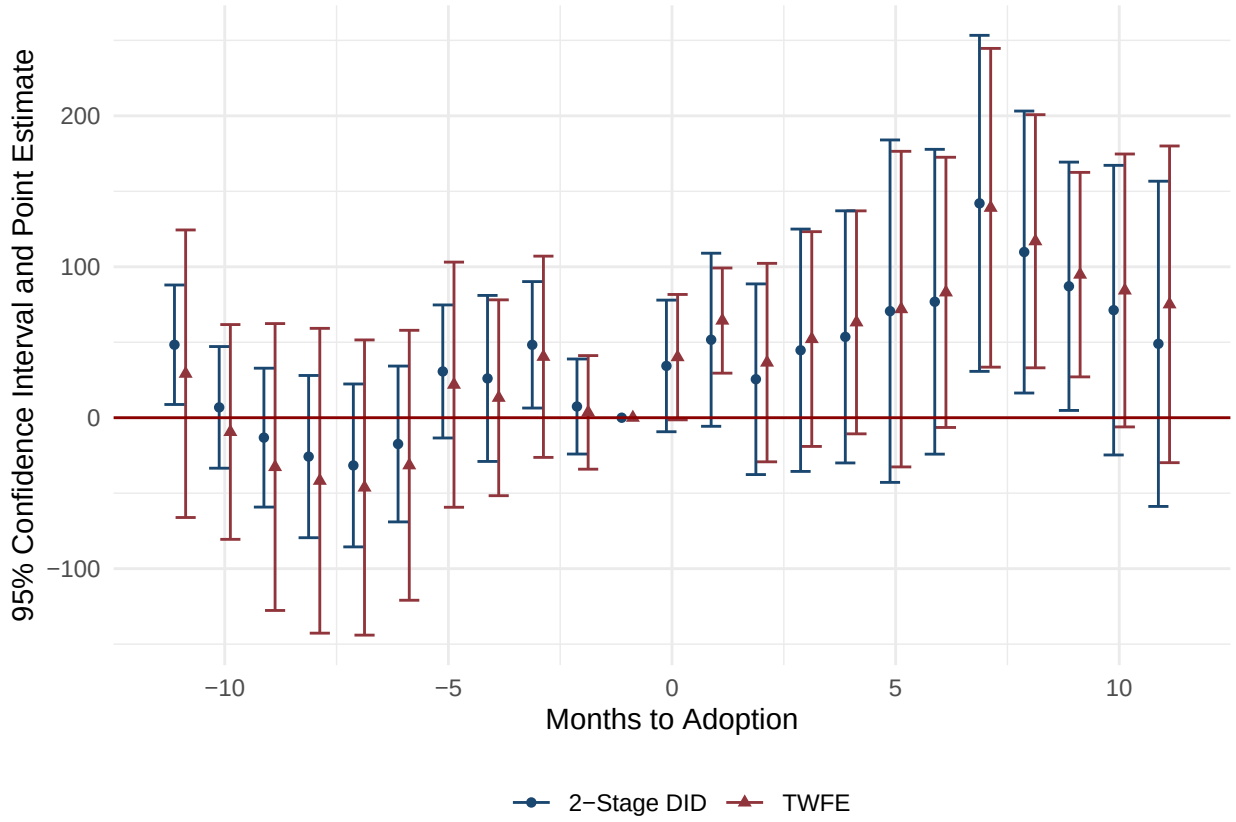


Figure 5: Event Study of Priority 1 Dispatch Times

Note: There are a total of 18 police districts in Chicago, 12 of which get ShotSpotter implemented. Implementation began in early 2017 through late 2018. This graph shows priority 3 time from received 911 call to time of dispatch. Priority 3 calls are designated as routine dispatch.

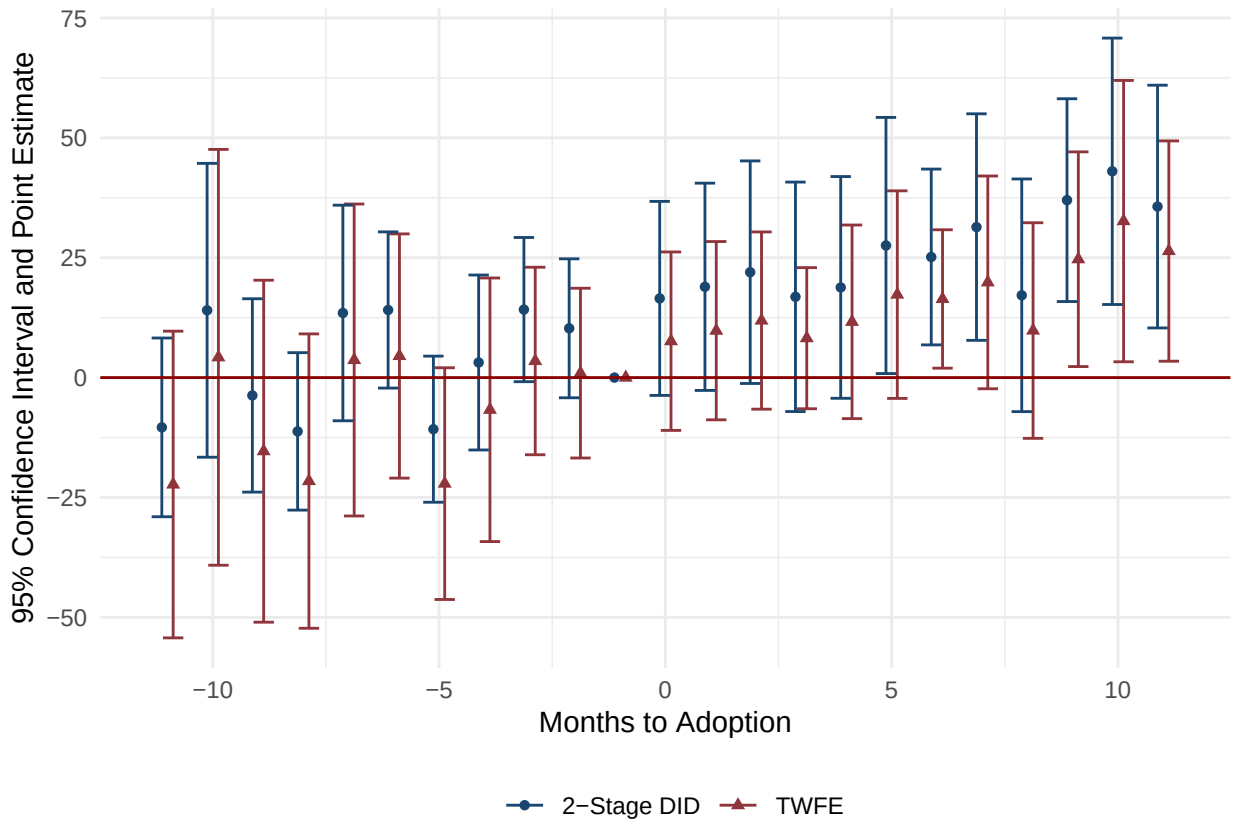


Figure 6: Event Study of Priority 1 Dispatch to On-Scene Times

Note: There are a total of 18 police districts in Chicago, 12 of which get ShotSpotter implemented. Implementation began in early 2017 through late 2018. This graph shows priority 1 time from a dispatched 911 call to the time the officer gets on-scene. Priority 1 calls are designated as immediate dispatch.

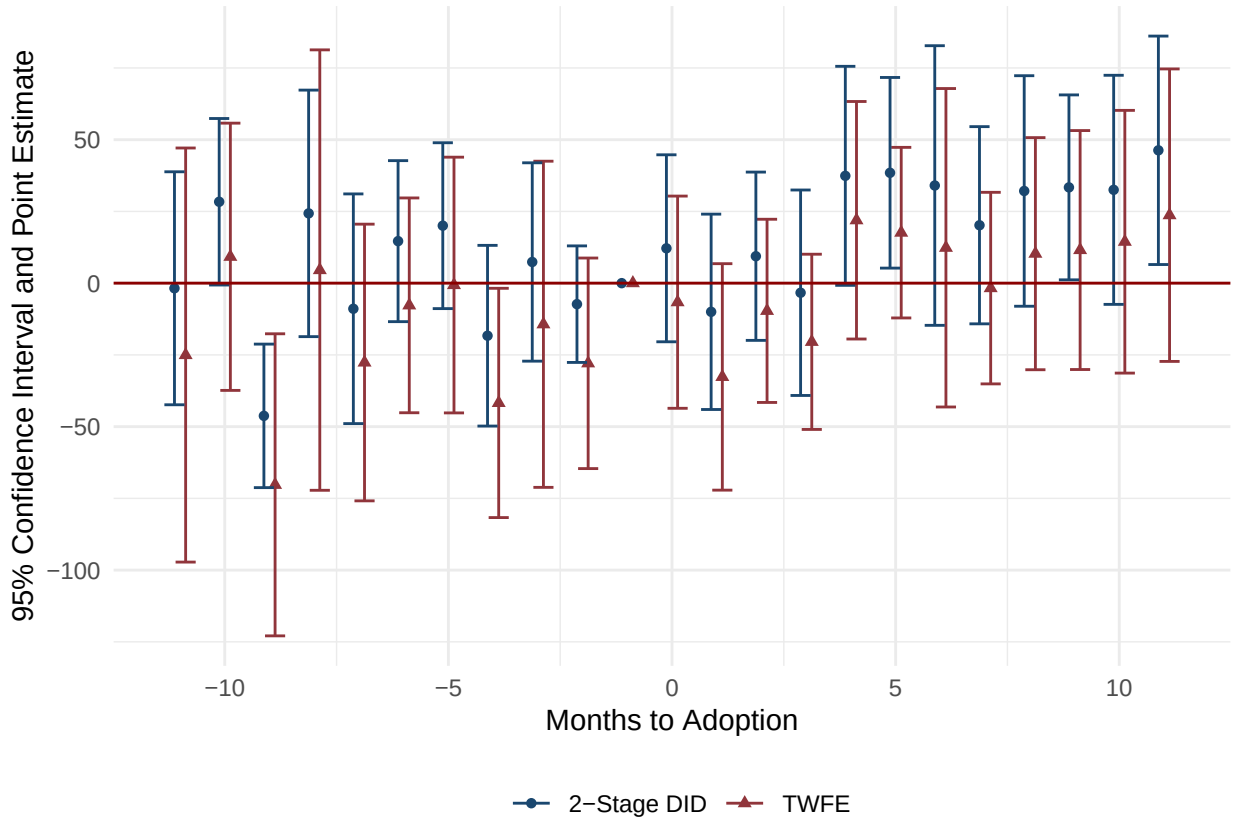


Figure 7: Event Study of Priority 2 Dispatch to On-Scene Times

Note: There are a total of 18 police districts in Chicago, 12 of which get ShotSpotter implemented. Implementation began in early 2017 through late 2018. This graph shows priority 2 time from a dispatched 911 call to the time the officer gets on-scene. Priority 2 calls are designated as rapid dispatch.

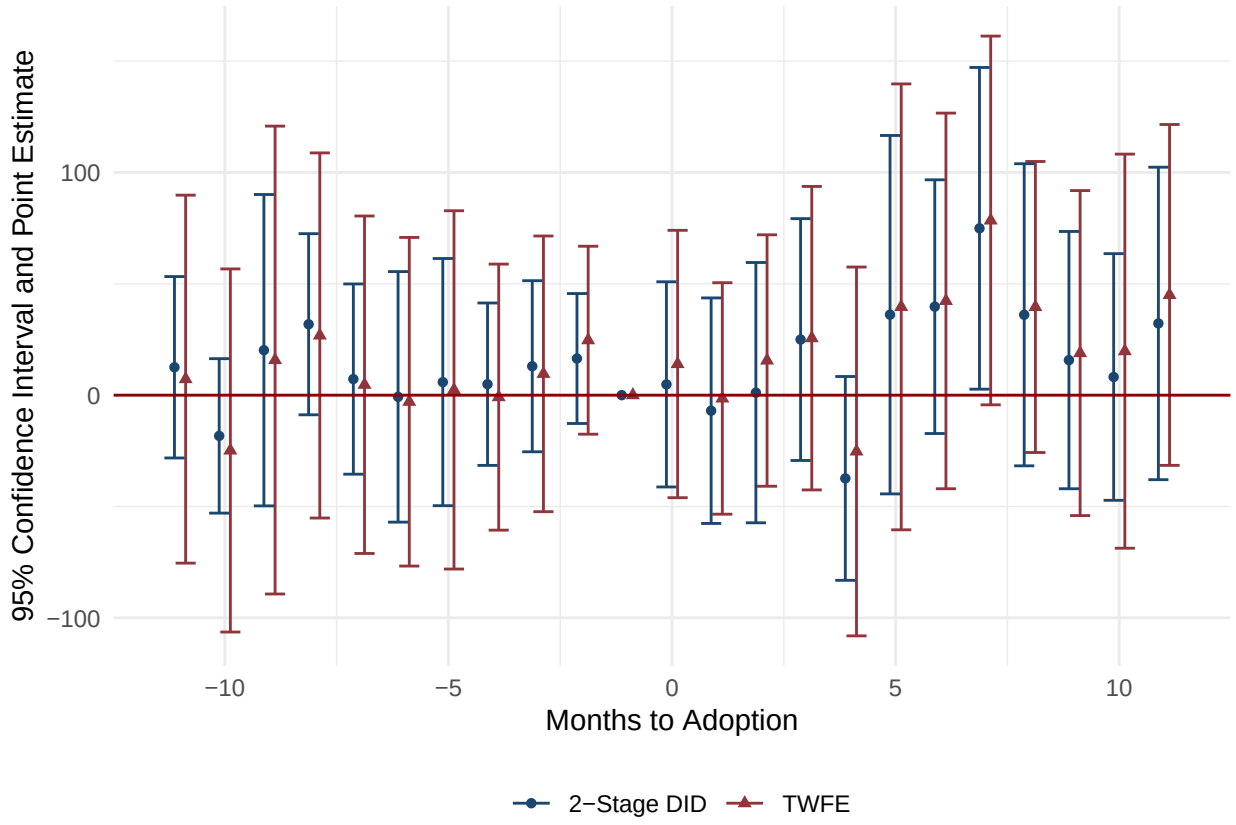


Figure 8: Event Study of Priority 3 Dispatch to On-Scene Times

Note: There are a total of 18 police districts in Chicago, 12 of which get ShotSpotter implemented. Implementation began in early 2017 through late 2018. This graph shows priority 3 time from a dispatched 911 call to the time the officer gets on-scene. Priority 3 calls are designated as routine dispatch.

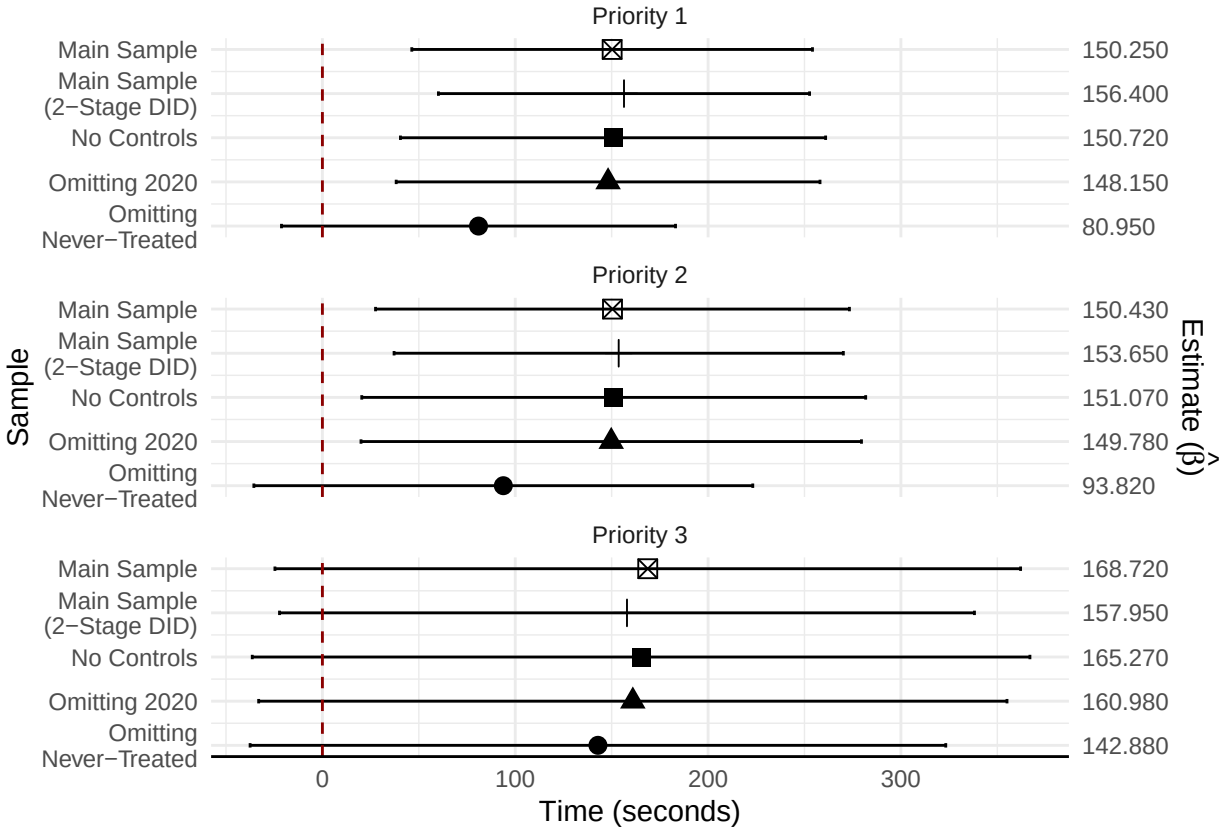


Figure 9: Robustness of Call to Dispatch Estimations

Note: This figure shows five different regression specifications for the time (in seconds) for a police officer to be dispatched from the time a 911 call is received. Main Sample refers to the main sample used in the paper. Main Sample (2-Stage DID) uses the main sample, but uses the 2-Stage DID estimation technique as outlined in Gardner (2022). No Controls omits all controls, yet keeps day-by-month-by year and district fixed effects. Omitting 2020 uses the main specification in the paper, but omits the year 2020 due to Covid-19. Last, Omitting Never-Treated uses the full sample, but omits any police districts that did not receive ShotSpotter technology.

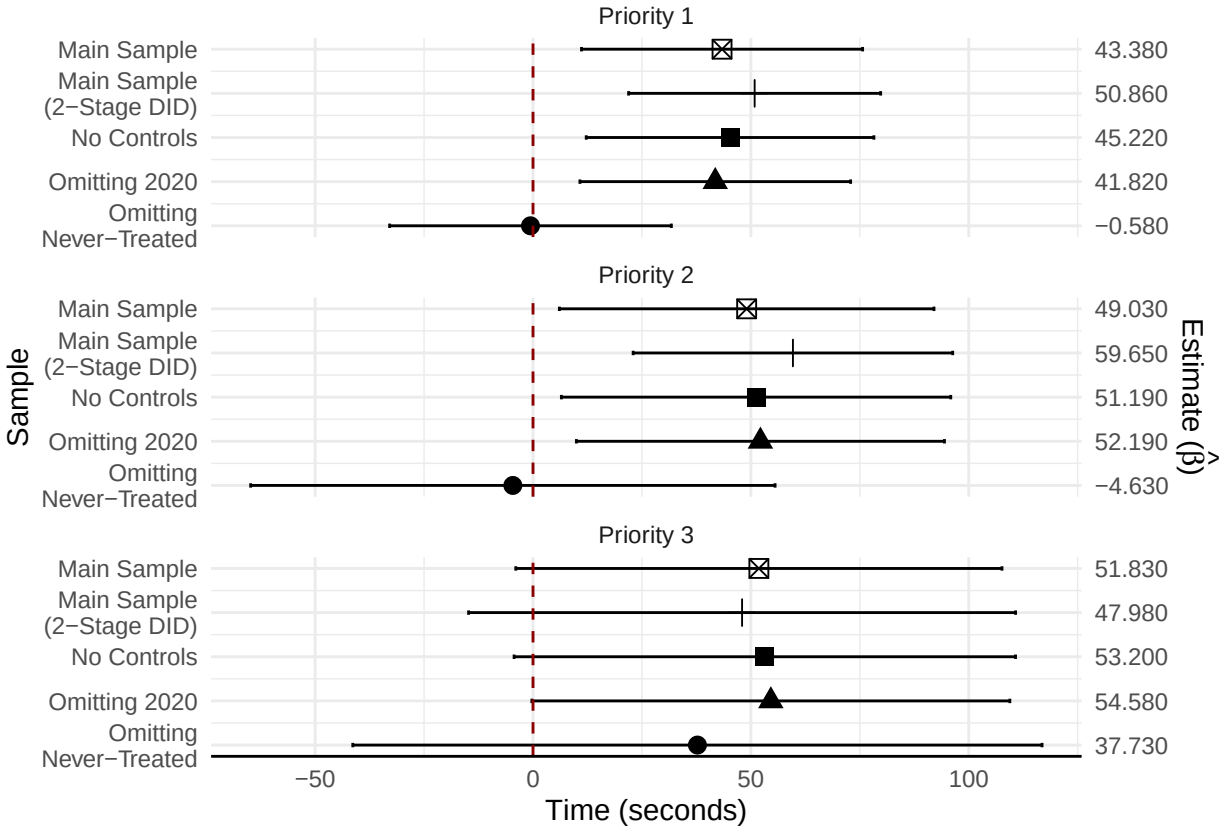


Figure 10: Robustness of Dispatch to On-Scene Estimations

Note: This figure shows five different regression specifications for the time (in seconds) it takes a police officer to reach the scene of the reported crime once they have been dispatched. Main Sample refers to the main sample used in the paper. Main Sample (2-Stage DID) uses the main sample, but uses the 2-Stage DID estimation technique as outlined in Gardner (2022). No Controls omits all controls, yet keeps day-by-month-by year and district fixed effects. Omitting 2020 uses the main specification in the paper, but omits the year 2020 due to Covid-19. Last, Omitting Never-Treated uses the full sample, but omits any police districts that did not receive ShotSpotter technology.

2 Tables

Table 1: Summary Statistics of Response Times (seconds)

	Mean	Std. Dev.	Median	Min	Max
Priority 1 Dispatches:					
Call to Dispatch	328.66	384.13	226.99	38.70	19,369.03
	(5.48 mins)	(6.40 mins)	(3.78 mins)	(0.64 mins)	(322.82 mins)
Dispatch to On-Scene	447.66	192.39	417.43	10.00	13,976.50
	(7.46 mins)	(3.21 mins)	(6.96 mins)	(0.17 mins)	(232.94 mins)
Number Dispatches	55.65	21.32	53.00	7.00	436.00
Priority 2 Dispatches:					
Call to Dispatch	434.08	466.94	304.87	20.00	16,518.83
	(7.23 mins)	(7.78 mins)	(5.08 mins)	(0.33 mins)	(275.31 mins)
Dispatch to On-Scene	576.83	363.84	512.52	5.00	27,756.50
	(9.61 mins)	(6.06 mins)	(8.54 mins)	(0.08 mins)	(462.61 mins)
Number Dispatches	25.31	10.30	24.00	0.00	139.00
Priority 3 Dispatches:					
Call to Dispatch	1,122.55	580.57	1,011.05	46.00	17,727.07
	(18.71 mins)	(9.68 mins)	(16.85 mins)	(0.77 mins)	(295.45 mins)
Dispatch to On-Scene	925.51	496.73	822.76	2.00	12,868.00
	(15.43 mins)	(8.28 mins)	(13.71 mins)	(0.03 mins)	(214.47 mins)
Number Dispatches	52.73	22.98	49.00	3.00	259.00
General:					
Number SST Alerts	2.57	4.46	0.00	0.00	71.00
Officer Hours	1,205.44	316.63	1,196.50	200.50	3,431.50

Note:
Units are in seconds unless otherwise noted. Data is at the district-by-day level. Call to Dispatch represents the amount of time from the 911 call to the dispatcher finding and dispatching a police officer to the scene. Dispatch to On-Scene is the time from dispatch to the scene of the reported crime. Priority 1 refers to an immediate dispatch, Priority 2 a rapid dispatch, and Priority 3 a routine dispatch. Officer Hours are the number of working hours sworn police officers work. Number of SST Alerts is the number of ShotSpotter alerts. Note that New Years Eve/New Years Day/Fourth of July are excluded from the sample as ShotSpotter Alerts can be as high as 392 on these days.

Table 2: Effect of ShotSpotter Rollout on Response Times (OLS)

	Priority 1		Priority 2		Priority 3	
	(1)	(2)	(3)	(4)	(5)	(6)
Panel A: Entry to Dispatch						
ShotSpotter Activated	150.074***	148.415***	150.016**	148.168**	166.926*	151.128*
	(49.820)	(49.886)	(58.929)	(59.203)	(92.806)	(87.592)
Border Activated		11.448		12.748		108.983*
		(30.800)		(40.277)		(62.936)
Mean of Dependent Variable	328.663	328.663	434.076	434.076	1122.552	1122.552
Observations	55748	55748	55747	55747	55748	55748
Panel B: Dispatch to Onscene						
ShotSpotter Activated	43.215**	42.686**	50.509**	48.155**	50.618*	46.332
	(15.541)	(15.275)	(20.285)	(20.511)	(26.926)	(28.145)
Border Activated		3.660		17.130		29.768
		(16.514)		(13.429)		(23.489)
Mean of Dependent Variable	447.663	447.663	570.950	570.950	912.748	912.748
Observations	55738	55738	55453	55453	55654	55654
FE: Day-by-Month-by-Year	X	X	X	X	X	X
FE: District	X	X	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. Priority calls range from 0-5. Only priorities 0-3 are shown here as. Priority 0 is highest priority (office calling for help), Priority 1 is immediate dispatch. Priority 2 is rapid dispatch. Priority 3 is routine dispatch. Panel A shows the time from entry call to dispatched officer. Panel B shows time from the dispatched officer to on scene. Controls in all models include controls for officer hours and number of dispatches.

Table 3: Effect of ShotSpotter Alerts on Response Times (OLS)

	Priority 1		Priority 2		Priority 3	
	(1)	(2)	(3)	(4)	(5)	(6)
Panel A: Entry to Dispatch						
Number SST Alerts	19.619***	19.541***	20.235***	20.155***	18.737**	17.935**
	(5.952)	(5.931)	(6.680)	(6.651)	(8.851)	(8.498)
Border Activated		10.846		11.170		111.337*
		(26.966)		(35.312)		(61.850)
Mean of Dependent Variable	328.663	328.663	434.076	434.076	1122.552	1122.552
Observations	55748	55748	55747	55747	55748	55748
Panel B: Dispatch to Onscene						
Number SST Alerts	3.510***	3.462***	4.938***	4.807**	5.080*	4.856*
	(0.848)	(0.821)	(1.723)	(1.701)	(2.541)	(2.530)
Border Activated		6.742		19.053		31.433
		(16.273)		(12.760)		(22.160)
Mean of Dependent Variable	447.663	447.663	570.950	570.950	912.748	912.748
Observations	55738	55738	55453	55453	55654	55654
FE: Day-by-Month-by-Year	X	X	X	X	X	X
FE: District	X	X	X	X	X	X

Note:

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