The Smart Policing Initiative in the LAPD: An Evaluation of Operation LASER

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Highlights

In 2015, Los Angeles' Strategic Extraction and Restoration Program (LASER) was implemented in four divisions of the LAPD: Newton, 77th Street, Southeast, and Southwest.

Four to six LASER Zones were identified in each division where violent and gun-related crimes were the highest. The Zones were based on a careful analysis of crime data (i.e., violent crime and gun-related crime from 2006-2014).

LASER focused on the highest concentration of violent crimes in the city of Los Angeles. The LASER Zones cover a total of 3.05 square miles or about 0.65% of the city (Los Angeles covers 469 square miles).

The zones remained the same for at least eight months and patrol officers were deployed to them every week. In addition, Crime Intelligence Details (CIDs) identified 15 to 50 Chronic Violent Offenders within their Divisions for monitoring and surveillance.

Methods and Findings

We used two methods to determine the effects of LASER on crime: 1) Time series analysis that measured crime reduction in the entire division; and 2) Changes in the mean number of crimes before and after LASER began for each LASER Zone within the divisions.

Time Series Findings

Newton Division. Three crime categories showed significant decreases in Newton as a result of LASER. Crime decreased by 14.81 Part 1 crimes, 3.64 gun crimes, and 1.93 robberies per deployment period (DP). Across the entire post-intervention period, LASER prevented 133.29 Part 1 crimes, 32.76 gun crimes, and 17.37 robberies in Newton.

77th Street Division. Three crime categories showed significant decreases in 77th. There were approximately 3.96 fewer violent crimes, 3.83 gun crimes, and 2.44 fewer robberies per deployment period (DP) due to LASER. Across all nine deployment periods, LASER prevented 35.64 Part 1 crimes, 34.47 gun crimes, and 21.96 robberies in 77th Street Division.

Southeast Division. After LASER began, the trend in crime decreased by 10.89 Part 1 crimes, 6.83 violent crimes, and 3.82 gun crimes per deployment period. Across all nine DPs, LASER prevented 98.01 Part 1 crimes, 61.47 violent crimes, and 9.25 gun crimes in Southeast.

Southwest Division. Surprisingly, across all five models, none of the measures for LASER are statistically significant. For all outcomes besides robbery all of the measures were negative, suggesting that decreases occurred. These measures may become significant as the number of observations increase in future reports.

Mean Changes in Crime in LASER Zones

To measure changes in the LASER Zones, we compared the average weekly crime in each of the zones for the six deployment periods (24 weeks) prior to LASER and the nine deployment periods (36 weeks) after LASER. We then computed the mean difference by zone and then divided by the area of the zone (in square miles) as the zones are not equally sized.

Newton Division. All LASER Zones showed decreases in crime in at least one crime category. LASER Zone 1 showed decreases across all crime types (Part 1, violent crime, gun crime, robbery, and aggravated assault). Zone 2B showed decreases in all types with the exception of a slight increase in aggravated assaults. Zone 3 showed decreases in only total Part 1 and gun crimes, while Zone 4 showed decreases only in robbery. Finally, the largest area of concern is Zone 2A which showed decreases in gun crime but substantial increases in Part 1 and Violent Part 1 crimes.

77th Street Division. In four of six LASER Zones, decreases in crimes occurred in at least one crime category. Zone 1showed decreases in gun crime and robbery. Zone 2 showed a substantial increase in Part 1 crimes, but decreases in gun crime and robbery. Crime increased in each category in Zone 3. Aggravated assault decreased in Zone 4 and Zone 5. Zone 5 also had a decrease in violent Part 1 crime. Finally, total Part 1 crime decreased in Zone 6.

Southeast Division. Decreases occurred in robbery in Zones 1 and 5. There were substantial increases in Part 1 crimes in all zones except Zone 5. There were substantial increases in Violent Part 1 crimes in Zone 2 and Zone 3. There were also substantial increases in gun crime in Zone 2 and aggravated assault in Zone 5. (Importantly, Zones 4 and 5 were dropped from the LASER operation after DP 10 and the withdrawal of supplemental patrol may result in diminishing effects in these zones).

Southwest Division. Decreases in crime occurred in three of six LASER Zones. Zone 1 showed decreases across all crime types. For Zone 5 there were decreases in all types except for aggravated assault. Zone 2A had a decrease in Part 1 crimes and smaller decreases in aggravated assault. Zones 2B, 3, and 4 had no observable decreases in any crime category. There were increases in Part 1 crimes in Zones 3 and 4, as well as increases in Violent Part 1 and robbery in Zone 4.

Conclusions

These results show that LASER may be responsible for tangible gains by reducing violent crimes in the four divisions where it has been implemented. Further, while a number of results fail to achieve statistical significance, crime is decreasing and these measures may become statistically significant when additional observations are available. These results suggest that despite issues with implementation, Operation LASER appears promising and should be continued.

However, there is clearly a need to decrease crime in particular LASER Zones for all divisions. There were observed gains in all divisions, but these gains were not constant across all LASER Zones within each division. Further, in all divisions, there were some LASER Zones that remain an area of concern. The net effect is that the crime increases in these Zones mask substantial improvements in other zones within the division. Continuing to focus efforts on these resistant Zones may lead to further improvements in crime reduction.

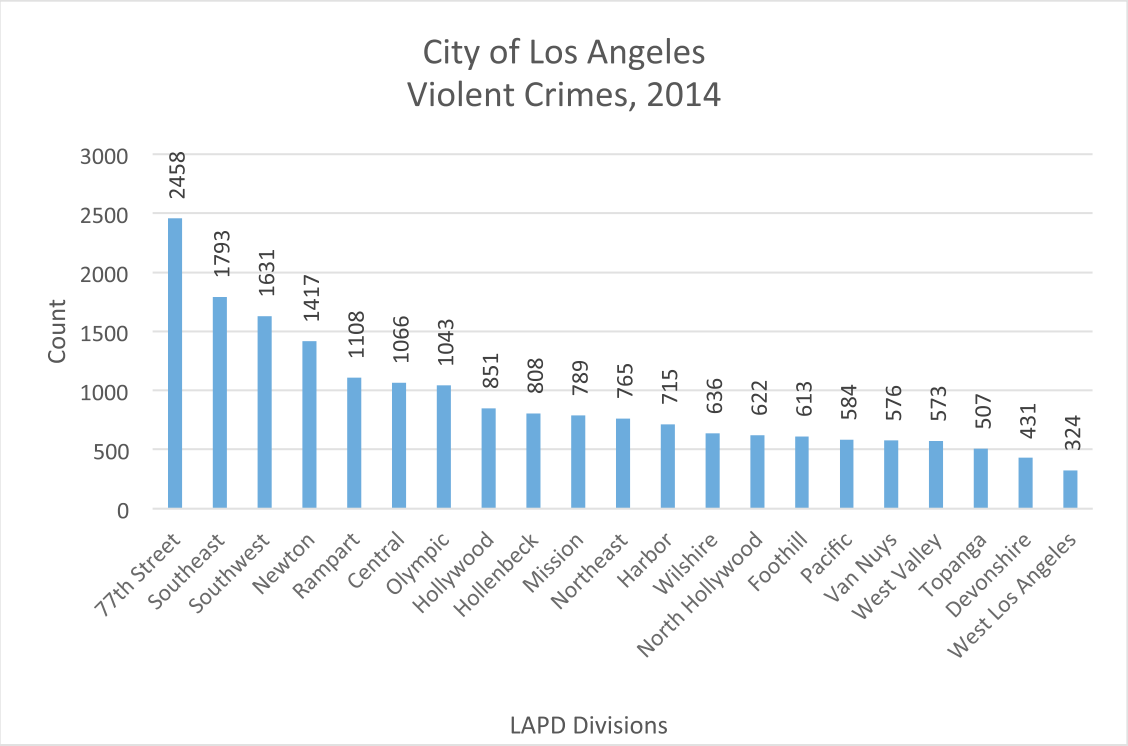
The Smart Policing Initiative in the LAPD: An Evaluation of Operation LASER

Introduction

In 2015, Los Angeles' Strategic Extraction and Restoration Program (LASER) was implemented in four divisions of the Los Angeles Police Department (LAPD): Southwest, 77th Street, Newton, and Southeast. This report provides the findings of an evaluation conducted by LAPD's Research Partner, Justice & Security Strategies, Inc.

Of the four divisions, LASER had previously been implemented in Newton. As a result of positive findings in that division over an 18-month period, Chief Charlie Beck announced on January 7, 2015 that Smart Policing would be the primary method for reducing violent crime in Los Angeles for the coming year. At his annual press conference Chief Beck said that the four areas with the highest numbers of violent crime in 2014 would be implementing/continuing Operation LASER — 77th Street, Southeast, Southwest, and Newton Divisions (see Figure 1 below).

Figure 1. Violent Crimes in LAPD Divisions, 2014

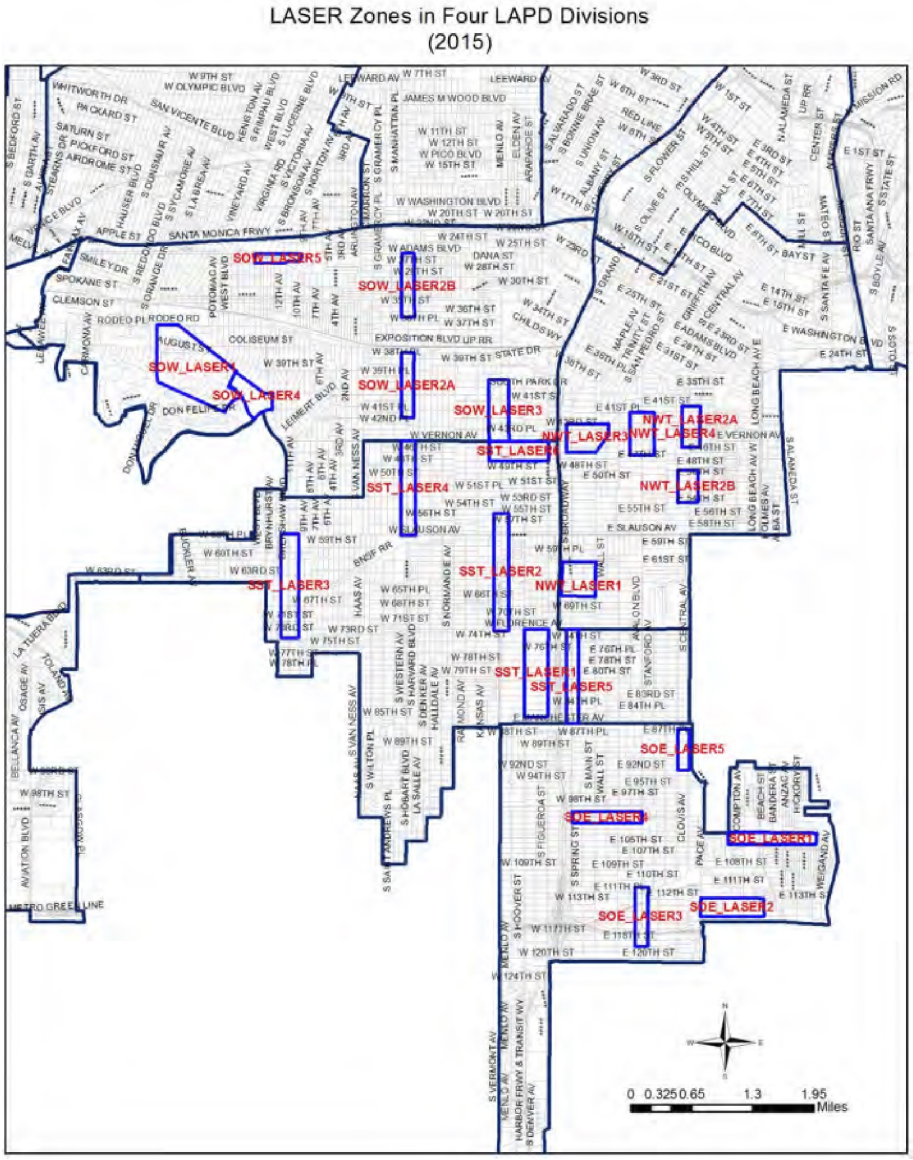


In January and February 2015, each division established a Crime Intelligence Detail (CID) consisting of at least one analyst and one officer. Working with JSS, the CIDs analyzed crime data, created hot spot corridors or LASER Zones, and created chronic offender bulletins.

Four to six LASER Zones were identified in each Division where violent and gun-related crimes were the highest (Figure 2). The Zones were based on historical crime data (i.e., violent crime from 2006-2014) and on the most recent three years (e.g., 2012-2014). This means that LASER focused on the highest concentration of violent crimes in the city of Los Angeles. Moreover, the LASER Zones cover a total of 3.05 square miles or about 0.65% of the city (Los Angeles covers about 469 square miles).

The zones remained the same for at least eight months and patrol officers were deployed to them every week. In addition, CIDs identified 15 to 50 Chronic Violent Offenders within their Divisions.

Figure 2. LASER Zones in Four LAPD Divisions



For the purposes of this report it is assumed that the start date for LASER was the first deployment period (DP) where all four divisions fully implemented the program. This corresponds to April 19, 2015 or DP 5. While some initial work on LASER was conducted in DP 4, there was a considerable amount of preparation (training, constructing chronic offender bulletins, selecting LASER corridors, etc.) that was conducted. Hence, full implementation across all four divisions was not begun until DP 5.

Methodology

In order to evaluate the success of LASER, we used two methods: 1) Time series analysis for the divisions; and 2) Changes in the mean number of crimes before and after LASER began for the individual LASER Zones within the divisions.

Times Series Analysis

We first examined segmented regression models for a time series design. These models were similar to the ones used to evaluate the previous implementation of LASER. The segmented regression model allows the intercept to capture the pre-existing level of crime at the beginning of the observation period and the coefficient of the time variable to capture the pre-existing trend in crime prior to the start of the LASER operation. The immediate shift in the level of crime is detected by the coefficient of the LASER variable (LASER x time) which switches from 0 to 1 during the period where LASER was fully implemented. The change in the trend of crime after LASER began can be detected using a post-implementation time variable that is set at zero until the start of LASER where it increments by 1 each DP after the intervention began. Our prior evaluation of LASER found that the "treatment effect" was primarily contained in the coefficient for post intervention time and we expect this in the current evaluation as well. A "treatment effect" for LASER would be detected by a significant negative coefficient for LASER x time which indicates the estimated additional monthly drop in crime after controlling for the pre-existing crime trend.

Seeing that these data constitute a time series, we controlled for the presence of temporal autocorrelation by computing Newey-West estimates of standard errors that adjust for time dependence. Due to concerns regarding the small number of observed time periods, we only adjust for a single time lag. While this likely removes the majority of the autocorrelation from the models, any remaining autocorrelation may lead to understating the standard errors of the coefficients. We also controlled for seasonality by including indicator variables for summer (June – August), fall (September – November), winter (December – February), and spring (March – May). While traditionally one of these variables would be removed from the model due to multicollinearity, deployment periods do not exactly match up with the seasonal variables and may cover dates from two different seasons.

We also include a dichotomous indicator for the recoding of aggravated assaults. In May of 2014, the LAPD became aware of a Los Angeles *Times* story suggesting that the LAPD had mistakenly coded some aggravated assaults as simple assaults. While the story did not appear until October 2014 and the LAPD determined that the extent of misclassification was small, the LAPD began to reconsider the classification of certain aggravated assaults. The net effect of this

decision is that aggravated assaults and all aggregate totals where aggravated assaults but not simple assaults were included (such as part 1 crimes, part 1 violent crimes, and gun crimes) showed a considerable increase. While it is not possible to distinguish between the impact of reclassification and an increasing crime trend, it is hoped that the dichotomous indicator absorbs the bulk of this effect.

The dependent variables under investigation are total Part 1 crime, violent Part 1 crime, gun crime (all Part 1 and Part 2 crimes with a gun), robbery, and aggravated assault. These counts were calculated for the entire divisions under investigation. For the purposes of comparison, Table 1 presents the mean crime counts for all divisions across the 36 observation periods under consideration. The divisions where LASER was implemented are highlighted in light brown. Notably, these four divisions clearly experience the highest levels of violent crime in Los Angeles.

Table 1. Mean Crime Counts by Division since 2013 DP 9

Division	Total Crime	Part 1	Violent Pt 1	Gun Crime	Homicide	Robbery	Agg Asslt
1	683.35	381.03	101.68	10.13	0.65	42.16	51.39
2	657.58	344.19	99.35	23.29	0.90	43.61	49.52
3	991.45	550.74	130.77	46.71	1.68	58.94	63.32
4	548.84	295.00	69.13	27.39	0.94	21.61	42.71
5	661.68	375.39	65.84	20.77	0.58	20.06	41.32
6	675.23	375.52	74.77	12.81	0.58	30.81	34.61
7	601.77	349.10	50.94	15.29	0.45	23.06	22.97
8	651.68	370.13	30.97	7.71	0.26	11.71	14.65
9	734.58	384.00	52.87	13.19	0.52	17.52	30.39
10	612.65	329.23	46.03	11.26	0.32	15.23	27.39
11	731.97	406.52	62.87	18.42	0.77	22.65	34.32
12	1062.97	568.55	194.81	80.87	3.68	78.03	104.39
13	698.13	399.65	118.52	42.16	1.48	49.19	63.55
14	826.10	498.77	54.42	13.42	0.45	20.45	27.87
15	814.10	454.87	57.84	13.81	0.48	16.77	35.55
16	539.71	283.26	49.61	15.32	0.94	14.03	30.16
17	682.65	390.61	40.58	9.29	0.16	12.13	24.45
18	804.97	432.77	144.13	64.16	3.06	60.55	73.52
19	760.29	393.94	65.94	18.65	1.06	22.94	36.68
20	693.32	359.16	83.94	22.23	0.68	42.68	34.55
21	681.19	378.81	46.32	9.48	0.16	15.26	26.65
Total	719.72	396.25	78.16	23.64	0.94	30.45	41.43

Results

Table 2 presents a summary of the observed intervention effects associated with Operation LASER. This table is presented for convenience and the individual models are discussed further in the sections that follow. Statistically significant coefficients are listed in bold.

Table 2. Effects of LASER by Division

	Part 1 Crimes	Violent Part 1	Gun Crime	Robbery	Aggravated Assault
Shift in Crime					
77th Street	8.82	-17.52	-7.40	-5.20	-12.56
Southeast	-3.35	9.09	**25.13**	8.86	8.85
Southwest	-15.40	-1.28	-7.97	1.56	-2.55
Newton	25.30	-8.73	2.53	-0.98	-7.91
Change in Trend					
77th Street	-6.38	**-3.96**	**-3.83**	**-2.44**	-1.31
Southeast	**-10.89**	**-6.83**	**-3.82**	-1.93	-2.45
Southwest	5.07	2.17	1.94	-0.79	2.56
Newton	**-14.81**	-2.21	**-3.64**	**-1.93**	0.06

The top panel of Table 2 presents the coefficients for the immediate increase or decrease in crime that accompanied the start of LASER. Statistically significant results are presented in bold. Many of these effects were not statistically significant. There were a number of effects suggesting that crime decreased immediately during the deployment period when LASER began. Importantly, these effects may be misleading as they may reflect artificial effects accompanying abnormally high or low crime values for that particular deployment period.

The bottom panel of results presents the coefficients for the additional change in the trend of crime once LASER began. These numbers can be interpreted as the additional increase or decrease in crimes per deployment period after LASER started. In 77th Street, LASER resulted in a decrease of 3.96 violent part 1 crimes, 3.83 gun crimes, and 2.44 robberies per deployment period. In Southeast, LASER led to a decrease of 10.89 total part 1 crimes, 6.83 violent crimes, and 3.82 gun crimes per deployment period. Surprisingly, no statistically significant decreases were noted for Southwest. Finally, in Newton LASER resulted in a decrease of 14.81 total part 1 crimes, 3.64 gun crimes, and 1.93 robberies per deployment period. Although not statistically significant, many of the other effects were in the appropriate direction.

Results from Newey-West Models

The results of the individual Newey-West models for Southwest division are presented in Table 3. Coefficients that reach the .05 level of significance or higher are highlighted in bold. The results for each dependent variable are listed in separate panels. In Appendix 1, plots of the observed vs. predicted values of the dependent variables are provided.

Across all five models, none of the coefficients for LASER are statistically significant. This suggests that Southwest did not experience a sizable immediate drop in crime when LASER began. This lack of immediate effect was also noted in the prior evaluation in Newton (see Uchida and Swatt 2013). However, for all outcomes besides robbery all of the coefficients were negative, suggesting that some decrease occurred. These coefficients may become significant as the number of observations increase in future interim reports. The coefficients for LASER x time are also not statistically significant for Part 1 crime and aggravated assaults, suggesting that these crimes increased after LASER began. While not statistically significant, the results for robbery show promise as they are trending downward.

Table 3. Newey-West Models for Southwest

	Part 1		Violent Pt 1		Gun Crime		Robbery		Agg Asslt	
Variable	b	SE	b	SE	b	SE	b	SE	b	SE
Agg Asslt Recode	64.51	36.11	16.38	15.15	15.56	12.66	--	--	11.32	9.82
Time	-0.91	3.67	-0.10	1.27	-0.52	0.98	0.48	0.37	-0.31	0.82
Summer	-31.70	22.65	2.77	7.90	-0.41	4.75	3.18	4.89	-0.67	4.84
Fall	38.66	20.97	1.93	8.22	1.84	7.73	7.97	5.57	-3.86	4.89
Winter	-47.59	27.44	-13.64	9.56	-7.53	8.85	-2.11	5.78	-10.38	8.25
Spring	43.01	23.46	**12.87**	5.23	**10.78**	4.90	0.20	3.98	**12.93**	4.08
LASER	-15.40	38.18	-1.28	12.34	-7.97	9.76	1.56	6.54	-2.55	9.75
LASER x time	5.07	8.33	2.17	2.32	1.94	1.75	-0.79	1.47	2.56	1.78
Constant	**513.63**	33.92	**117.50**	12.64	**42.95**	8.68	**47.90**	6.75	**59.42**	6.06

The results for the models for 77th Street division are presented in Table 3. Observed versus Predicted plots for all models are provided in the Appendix 1. Again, there were no significant immediate decreases for any of the crime types. However, for all but the total Part 1 variable, these coefficients are all negative and suggest a decrease in crime associated with the start of LASER. These coefficients may become significant when more observations are available.

Regarding the change in crime over time, Violent Part 1 crime, gun crime, and robbery all show statistically significant negative coefficients, suggesting a decrease in the trend in crime over time.[1] **In 77th Street, there were approximately 3.96 fewer violent crimes, 3.83 gun crimes, and 2.44 fewer robberies per deployment period due to LASER.** While not statistically significant, there were decreases observed with total Part 1 crimes and aggravated assaults. These coefficients may become significant when more observations are available. **When examined across all nine deployment periods, LASER prevented 35.64 total Part 1 Crimes, 34.47 gun crimes, and 21.96 robberies in 77th Street Division.**

[1] Importantly, the trend in crime could still be positive if the change in the trend is significant and negative. This would be evident if the magnitude of a significant coefficient for time exceeded the magnitude of the decrease. This does not appear to be the case in the current models, but may arise with updated results.

Table 4. Newey-West Models for 77th Street

Variable	Part 1		Violent Pt 1		Gun Crime		Robbery		Agg Asslt	
	b	SE	b	SE	b	SE	b	SE	b	SE
Agg Asslt Recode	21.69	36.44	1.90	13.73	-20.99	11.97	--	--	1.58	8.69
Time	1.57	3.44	**3.28**	1.23	**2.86**	1.14	**0.94**	0.17	**2.34**	0.83
Summer	37.21	24.05	**27.30**	7.98	**12.49**	5.02	**8.08**	3.38	**14.35**	6.53
Fall	**57.33**	18.63	10.57	7.98	4.22	6.45	2.18	3.46	8.26	6.00
Winter	20.89	17.25	-13.49	8.62	-6.80	6.51	**-9.11**	3.75	-4.65	6.20
Spring	-9.12	20.13	**-16.13**	6.56	-9.36	6.11	**-12.89**	2.80	-4.29	5.47
LASER	8.82	36.66	-17.52	12.73	-7.40	10.75	-5.20	5.41	-12.56	9.53
LASER x time	-6.38	5.16	**-3.96**	1.36	**-3.83**	1.37	**-2.44**	0.94	-1.31	1.02
Constant	**494.81**	32.38	**147.84**	13.01	**56.18**	10.07	**70.90**	4.35	**66.31**	10.76

The results for Newton division are presented in Table 4. Again, Observed versus Predicted plots for all models are provided in Appendix 1. There were no significant coefficients for the LASER variable in these models, suggesting that there was no immediate decrease in crime associated with LASER. The coefficients for Violent Part 1 crime, gun crime, and aggravated assault were all negative, so it remains possible that these coefficients become significant at a later time. **The coefficients for the post-implementation trend were statistically significant for three crime categories, indicating that the trend in crime decreased by 14.81 Part 1 crimes, 3.64 gun crimes, and 1.93 robberies per deployment period. Across the entire post-intervention period, LASER prevented 133.29 Part 1 crimes, 32.76 gun crimes, and 17.37 robberies in Newton.**

Table 5. Newey-West Models for Newton

Variable	Part 1		Violent Pt 1		Gun Crime		Robbery		Agg Asslt	
	b	SE	b	SE	b	SE	b	SE	b	SE
Agg Asslt Recode	20.60	20.83	0.53	11.53	-5.46	9.05	--	--	1.77	10.53
Time	3.02	2.01	**2.95**	0.99	**1.62**	0.74	**0.84**	0.20	**1.98**	0.85
Summer	23.98	16.57	**14.65**	5.82	7.29	4.22	0.34	2.92	**11.79**	3.76
Fall	26.14	17.50	2.37	7.14	4.01	6.49	4.37	3.66	-4.72	5.70
Winter	4.22	13.57	**-14.26**	6.55	2.29	5.47	-5.12	3.98	-10.34	5.34
Spring	-32.87	18.61	-12.90	11.99	-5.46	9.17	**-8.34**	3.74	-6.63	8.02
LASER	25.30	22.09	-8.73	9.37	2.53	8.13	-0.98	4.74	-7.91	7.11
LASER x time	**-14.81**	2.76	-2.21	2.08	**-3.64**	1.70	**-1.93**	0.73	0.06	1.57
Constant	**339.22**	21.29	**79.14**	9.55	**21.30**	8.80	**40.49**	3.97	**36.54**	7.64

The final set of models for Southeast division are presented in Table 5. Again, Observed versus Predicted plots for all models are presented in Appendix 1. There appeared to be a significant jump in gun crime associated with start of LASER, but no other models had a significant coefficient for LASER. The change in trend was statistically significant for Part 1, Violent Part 1, and gun crimes. **After LASER began, the trend in crime decreased by 10.89 Part 1 crimes,**

6.83 violent crimes, and 3.82 gun crimes per deployment period. Across all nine DPs, LASER prevented 98.01 Part 1 crimes, 61.47 violent crimes, and 9.25 gun crimes in Southeast.[2]

The coefficients for robbery and aggravated assaults are negative and these effects may become significant when more observations (DPs) are available.

Table 6. Newey-West Models for Southeast

	Part 1		Violent Pt 1		Gun Crime		Robbery		Agg Asslt	
Variable	b	SE	b	SE	b	SE	b	SE	b	SE
Agg Asslt Recode	-21.91	26.90	-7.58	15.73	-10.88	9.22	--	--	11.86	13.73
Time	**5.41**	2.17	2.60	1.33	0.56	0.83	0.23	0.34	0.60	1.11
Summer	**59.24**	15.71	**32.59**	10.51	**17.64**	5.91	**10.88**	4.07	**14.42**	6.73
Fall	**32.69**	13.46	**17.73**	8.44	13.05	6.56	3.39	4.73	11.20	7.76
Winter	-1.68	12.65	-4.76	5.65	7.50	4.83	1.49	4.79	-3.83	6.32
Spring	-0.01	20.28	-8.05	8.83	-6.40	7.50	-6.48	4.80	0.49	7.31
LASER	-3.35	23.19	9.09	9.45	**25.13**	7.26	8.86	9.16	8.85	9.79
LASER x time	**-10.89**	4.26	**-6.83**	2.40	**-3.82**	1.59	-1.93	1.74	-2.45	2.14
Constant	**346.54**	19.28	**100.69**	12.89	**48.45**	8.20	**53.34**	4.98	**48.38**	9.49

Mean Changes in Crime in the LASER Zones

To measure changes within the LASER Zones, we compared the average weekly crime in each of the zones for the six deployment periods (25 weeks) prior to LASER and the nine deployment periods (36 weeks) after LASER. We computed the mean difference by zone and then divided by the area of the zone (in square miles), as the zones are not equal in size (see Appendix 2 for a fuller description of the calculations for the 'mean effect'). These mean differences per mile squared are presented in Table 7. Positive numbers indicate that the average difference increases (crime went up) in the zone after LASER began and negative numbers indicate that the average difference decreases (crime went down). While positives and negative values are present in all divisions for at least one crime in one zone, there are substantial differences between divisions that help account for some of the differences in the findings across divisions.

In Newton, all LASER Zones showed decreases in crime in at least one crime category. LASER Zone 1 showed decreases across all crime types. Zone 2B showed decreases in all types with the exception of a slight increase in aggravated assaults. Zone 3 showed decreases in only total Part 1 and gun crimes, while Zone 4 showed decreases only in robbery. Finally, the largest area of concern is Zone 2A which showed decreases in gun crime but substantial increases in Part 1 and Violent Part 1 crimes.

[2] The computation for gun crime accounts for the increase of 25.13 gun crimes as evident by the statistically significant coefficient for the shift in crime. If this coefficient was not significant, the total impact of LASER would be 34.38 gun crimes prevented.

In Southeast, the only observed decreases were in robbery in Zone 1 and Zone 5. There were substantial increases in Part 1 crimes in all zones except Zone 5. There were substantial increases in Violent Part 1 crimes in Zone 2 and Zone 3. There were also substantial increases in gun crime in Zone 2 and aggravated assault in Zone 5. Importantly, Zones 4 and 5 were dropped from the LASER operation after DP 10 in 2015 and the withdrawal of supplemental patrol may result in diminishing effects in these zones.

In Southwest, decreases in crime occurred in three of six LASER Zones. There were decreases across all crime types for Zone 1. For Zone 5 there were decreases in all types except for aggravated assault. Zone 2A had a decrease in Part 1 crimes and smaller decreases in aggravated assault. Zones 2B, 3, and 4 had no observable decreases in any crime category. There were substantial increases in Total Part 1 crimes in Zones 3 and 4, as well as substantial increases in Violent Part 1 and robbery in Zone 4.

In 77th Street, in four of six LASER Zones, decreases in crimes occurred in at least one crime category. Zone 1 showed decreases in gun crime and robbery. Zone 2 showed a substantial increase in Part 1 crimes, but decreases in gun crime and robbery. Crime increased in each category in Zone 3. Aggravated assault decreased in Zone 4 and Zone 5. Zone 5 also had a decrease in violent Part 1 crime. Finally, total Part 1 crime decreased in Zone 6.

Compstat End-of-Year Report

At the end of each year, the Compstat Unit ranks all of the 21 LAPD Divisions in terms of the percentage change in crime from 2014 to 2015 (See Appendix 3). The rankings are for property crime, violent crime, and overall Part 1 crimes. In December 2015, the Compstat Unit reported that Southwest, 77th, Southeast, and Newton were ranked 3, 4, 5, and 12, respectively, in violent crime reduction and 77th Street, Southeast, Southwest, and Newton were ranked 1, 2, 6, and 7, respectively in overall Part 1 crime reduction. While LASER was not focused on property crimes, there may have been a residual effect on those crimes, as Newton, 77th, Southeast, and Southwest were ranked 1, 2, 3, and 8, respectively.

Conclusions

Taken as a whole, these results show that LASER may be responsible for tangible gains by reducing violent crimes in the four divisions where it has been implemented. Further, while a number of results fail to achieve statistical significance, crime is decreasing and these coefficients may become statistically significant when additional observations are available. These results suggest that despite issues with implementation, Operation LASER appears promising and should be continued.

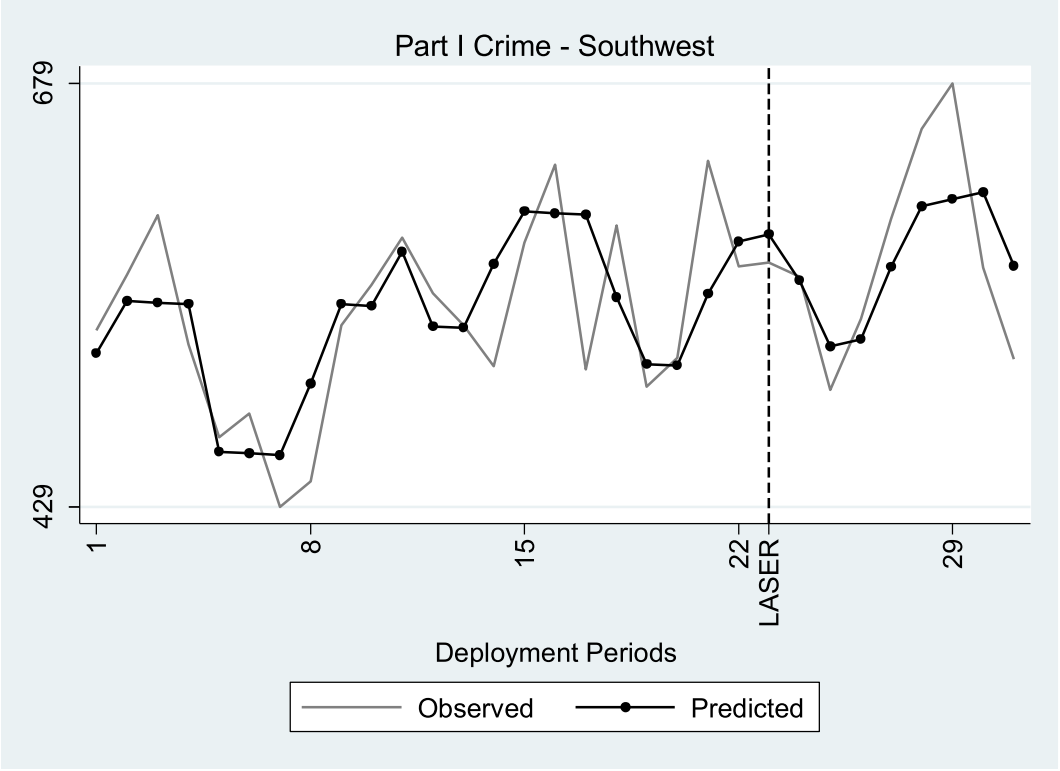
However, there is clearly a need to decrease crime in particular LASER Zones for all divisions. There were observed gains in all divisions, but these gains were not constant across all LASER Zones within each division. Further, in all divisions, there were some LASER Zones that remain an area of concern. The net effect is that the crime increases in these Zones mask substantial improvements in other zones within the division. It may be worth continuing to focus efforts on these resistant Zones to further improve crime reductions.

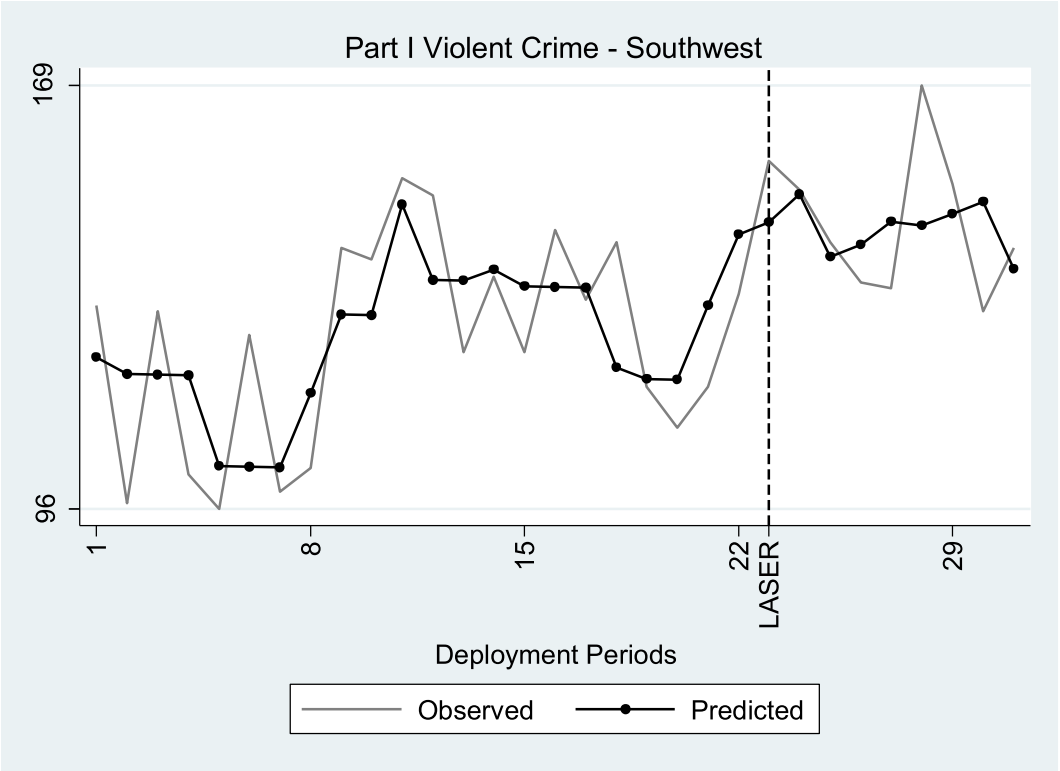
Caution is required in the interpretation of these results as more observations are needed for a comprehensive analysis. As such, statistical power is low and the models may be unstable. Once additional observation periods are available, it will be possible to improve statistical power and correct for any remaining methodological issues.

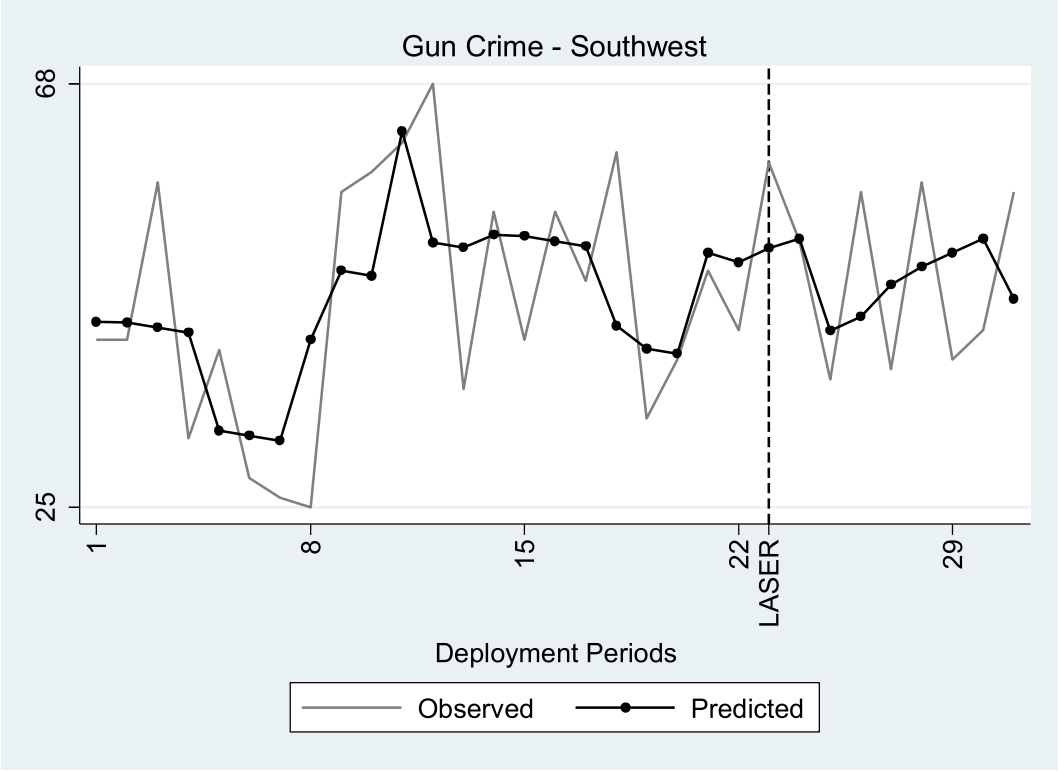
Table 7. Mean Change Standardized by Size of Zone

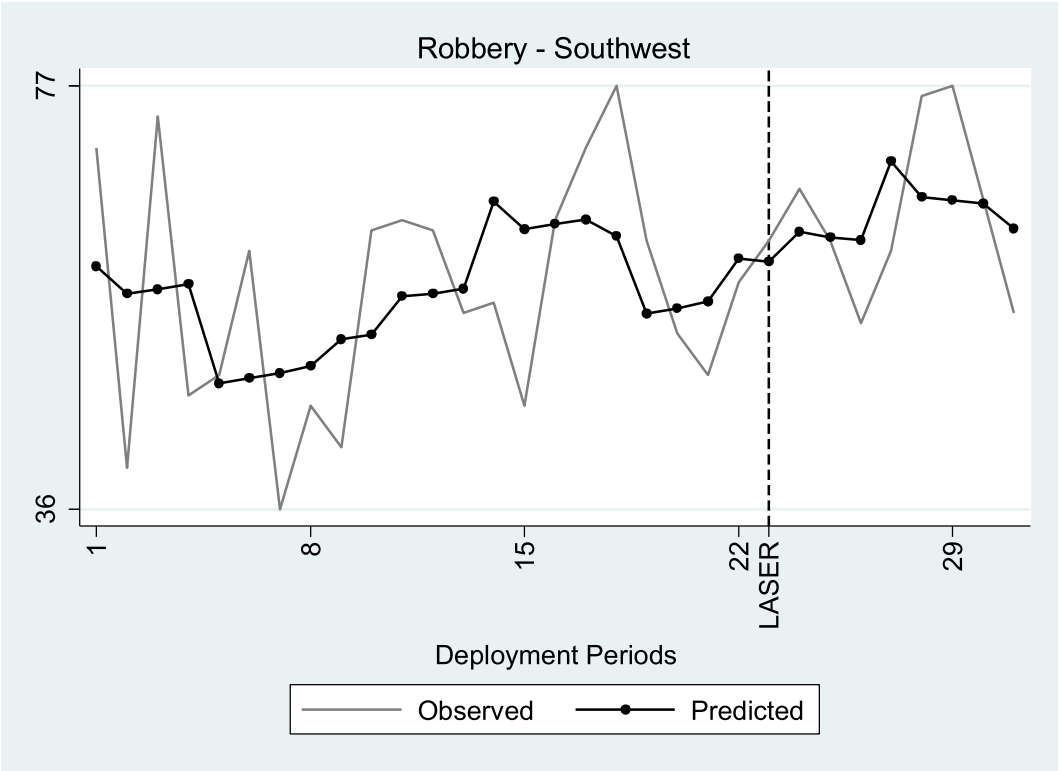
Laser Zone	Division	Area (Mi^2)	Percentage Increase per Mi^2				
			Part 1	Violent Pt 1	Gun Crime	Robbery	Agg Asslt
1	Newton	0.13	-1.32	-3.27	-2.29	-1.12	-2.14
2A	Newton	0.08	**11.63**	**8.38**	-0.21	4.08	4.12
2B	Newton	0.07	-2.87	-2.77	-3.79	-1.76	0.09
3	Newton	0.12	-0.33	2.64	-1.01	0.41	2.23
4	Newton	0.12	1.27	2.88	1.89	-0.65	2.91
1	Southeast	0.11	**9.73**	1.50	0.60	-2.36	3.24
2	Southeast	0.13	**5.55**	**6.31**	**5.54**	2.73	3.34
3	Southeast	0.09	**9.58**	**5.37**	4.99	0.20	4.68
4	Southeast	0.09	**8.12**	4.76	2.02	2.84	1.46
5	Southeast	0.05	4.66	4.74	2.15	-1.18	**6.65**
1	Southwest	0.50	-3.00	-0.53	-1.30	-0.64	-0.23
2A	Southwest	0.09	-3.98	0.71	1.61	2.22	-0.08
2B	Southwest	0.09	3.53	0.30	0.86	0.42	0.15
3	Southwest	0.14	**6.14**	1.42	0.12	0.52	0.88
4	Southwest	0.10	**12.57**	**8.47**	4.44	**7.10**	1.76
5	Southwest	0.05	-4.89	-1.04	-0.58	-2.74	0.48
1	77th	0.24	4.03	0.25	-0.22	-0.80	0.56
2	77th	0.20	**6.40**	-0.36	1.22	-1.11	0.53
3	77th	0.21	0.86	2.09	1.34	1.82	0.31
4	77th	0.16	1.93	0.13	2.04	0.95	-0.67
5	77th	0.13	2.71	-0.46	1.89	1.26	-0.63
6	77th	0.13	-4.47	0.88	1.46	0.68	0.80
Division-Wide							
Southwest		0.97	0.40	0.88	0.03	0.61	0.22
77th		1.06	2.29	0.48	1.16	0.36	0.21
Newton		0.53	1.31	1.37	-0.95	0.07	1.29
Southeast		0.48	**7.68**	4.51	3.19	0.63	3.57
Total		3.05	2.37	1.40	0.75	0.43	0.93

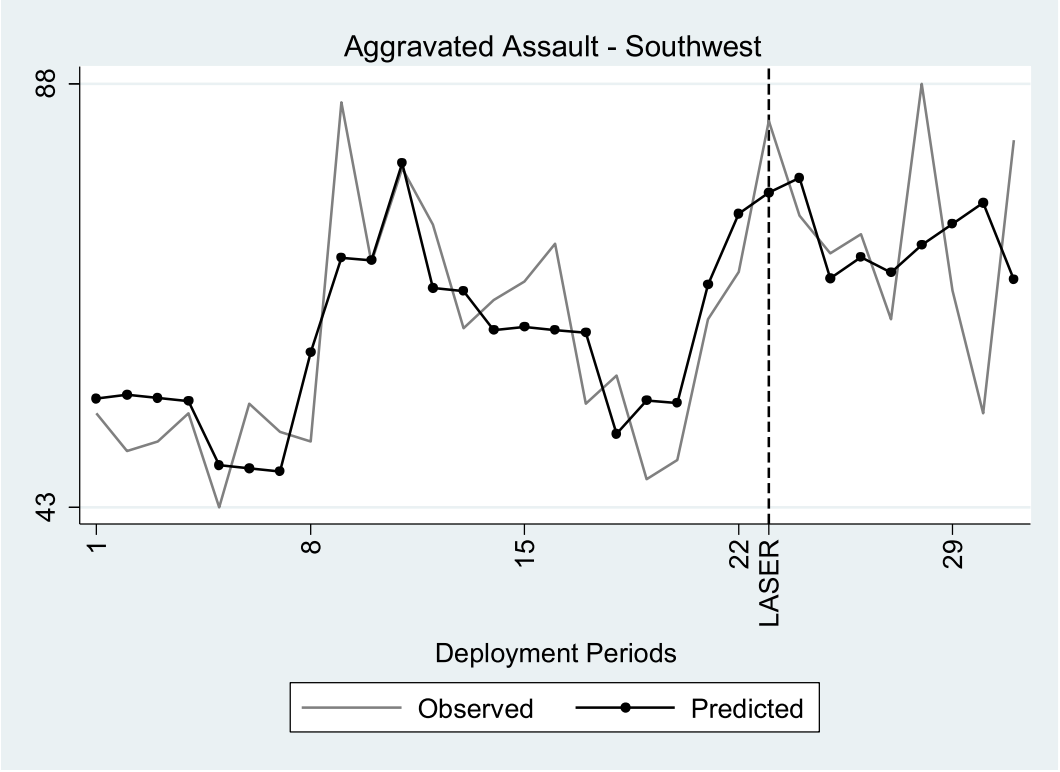
Appendix 1

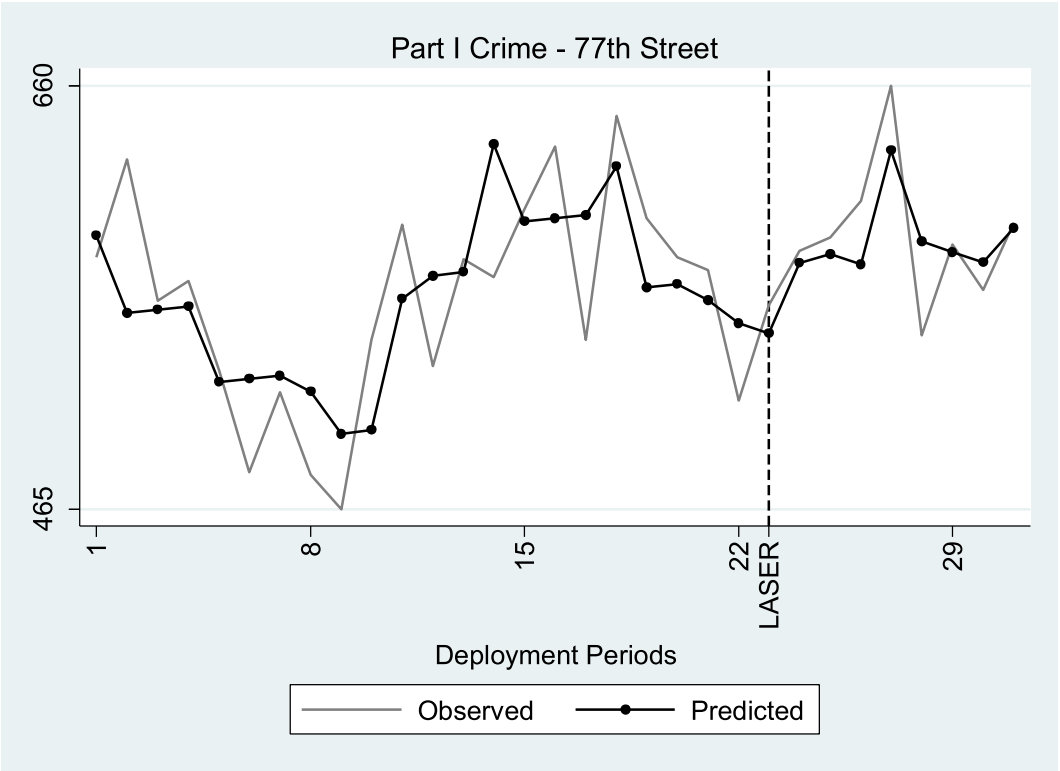

Part I Crime - Southwest
679
429
1
8
15
22
29
LASER
Deployment Periods
Observed
Predicted

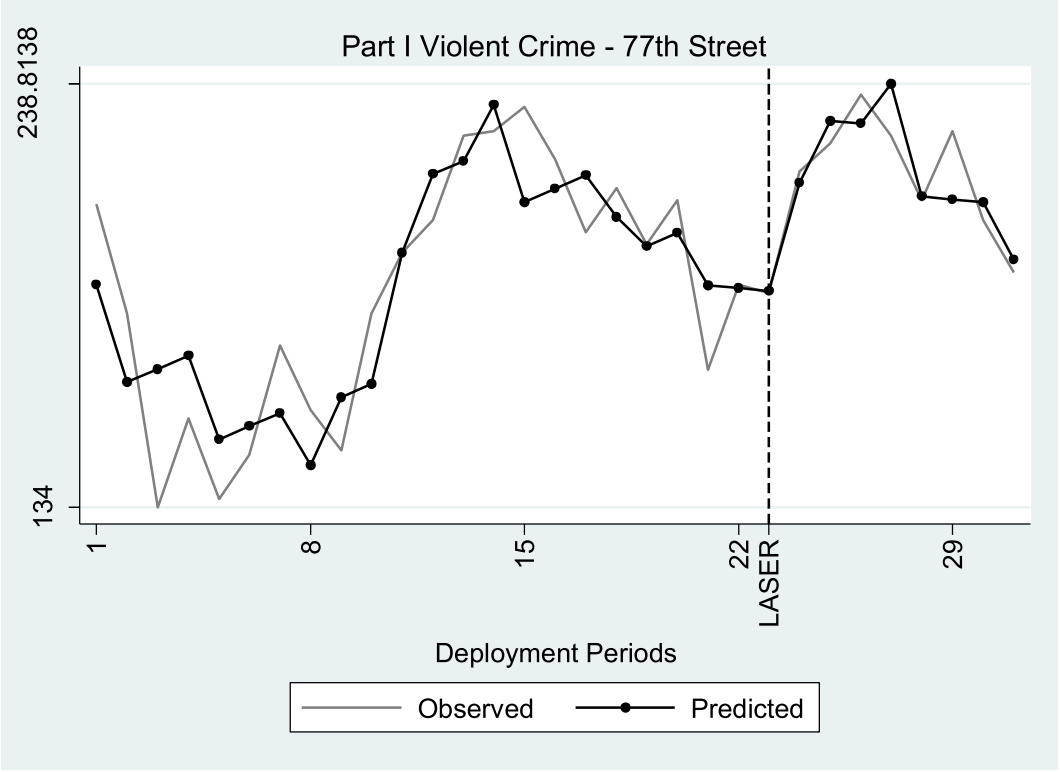

Part I Violent Crime - Southwest
169
96
1
8
15
22
29
LASER
Deployment Periods
Observed
Predicted

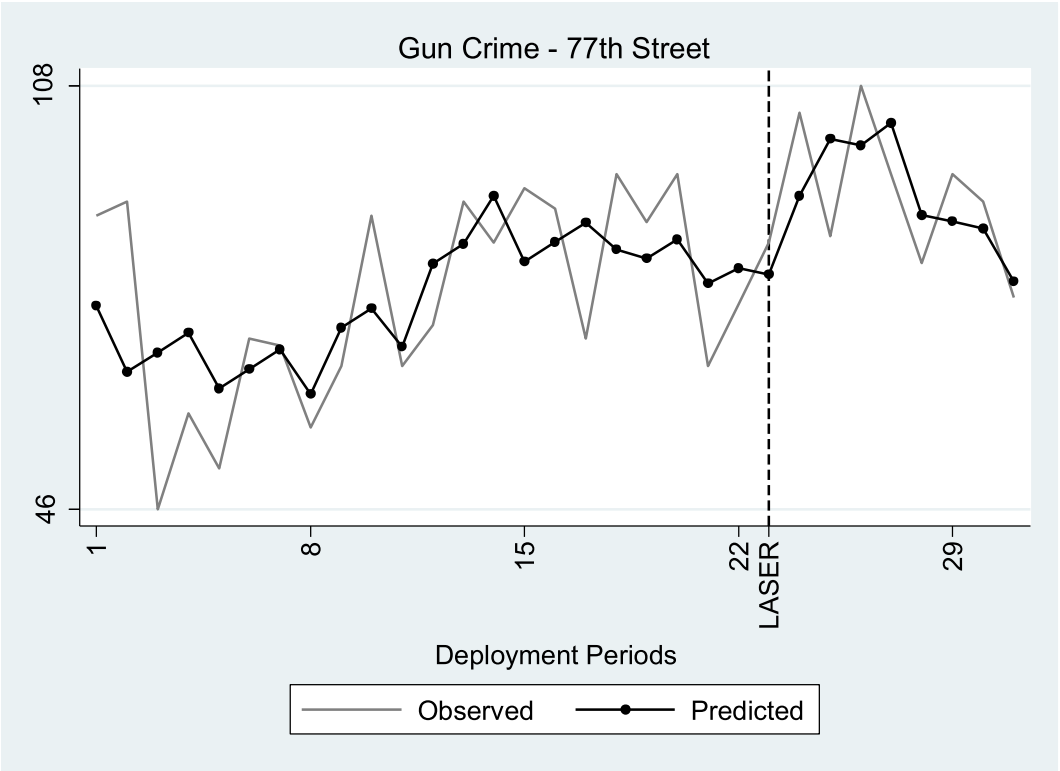

Gun Crime - Southwest
68
25
1
8
15
22
LASER
29
Deployment Periods
Observed
Predicted

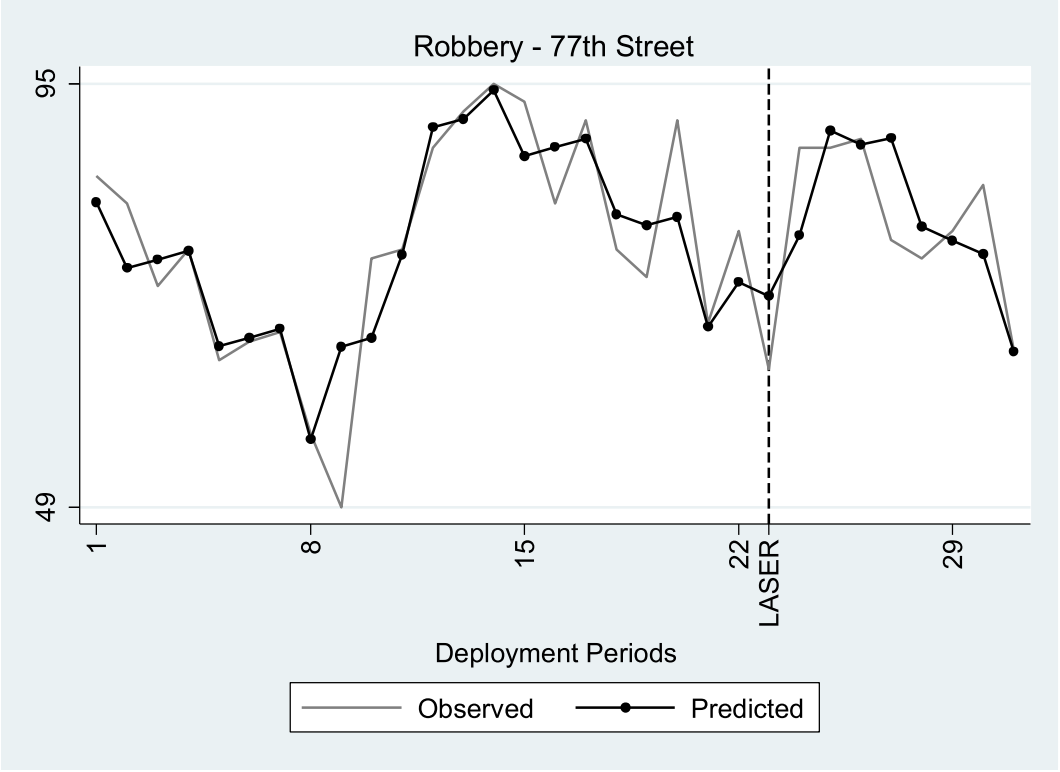

Robbery - Southwest
77
36
1
8
15
22
LASER
29
Deployment Periods
Observed
Predicted

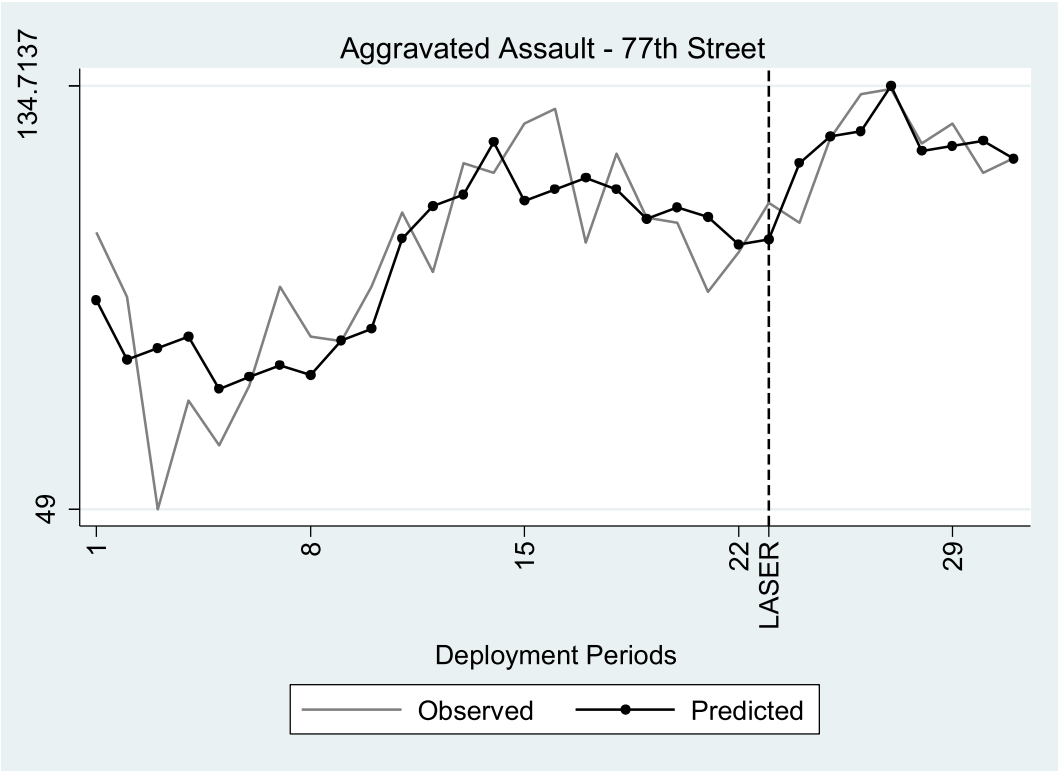

Aggravated Assault - Southwest
88
43
1
8
15
22
29
LASER
Deployment Periods
Observed
Predicted

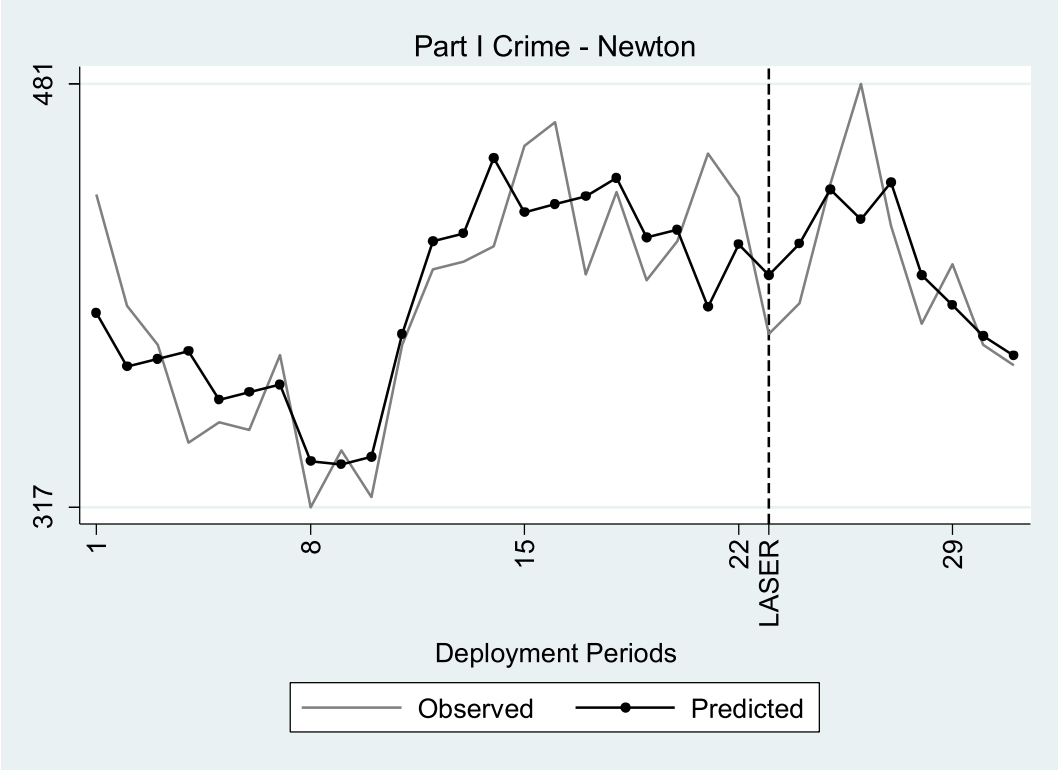

Part I Crime - 77th Street
660
465
1
8
15
22
29
LASER
Deployment Periods
Observed
Predicted

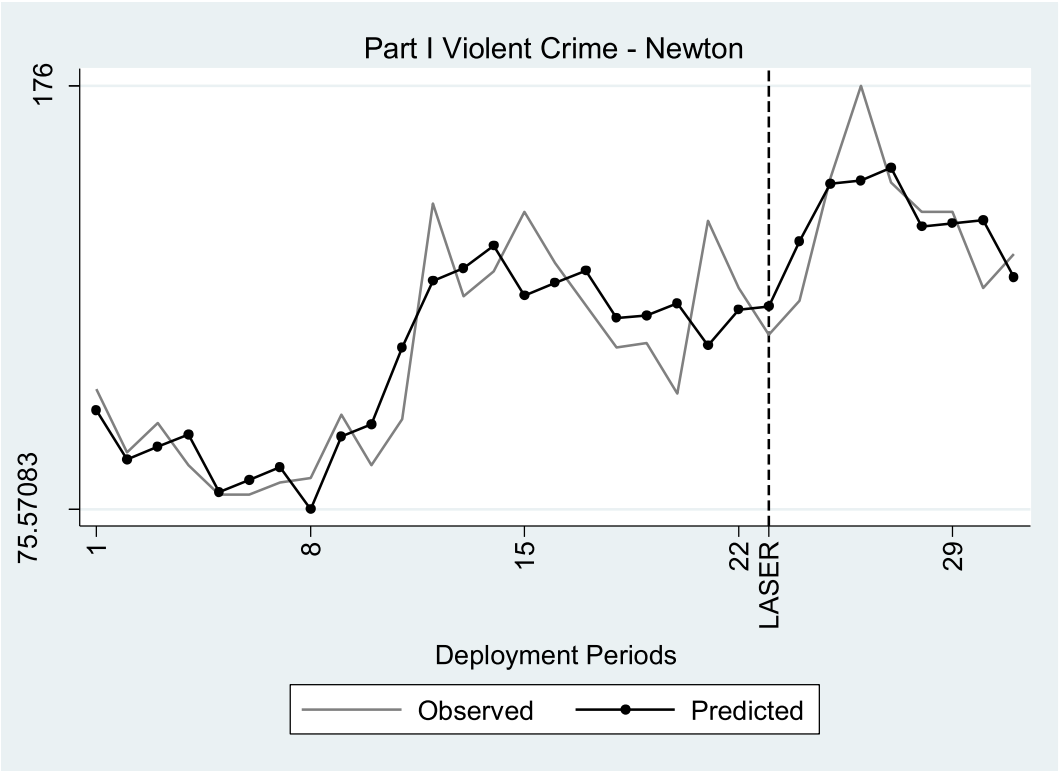

Part I Violent Crime - 77th Street
238.8138
134
1
8
15
22
29
LASER
Deployment Periods
Observed
Predicted

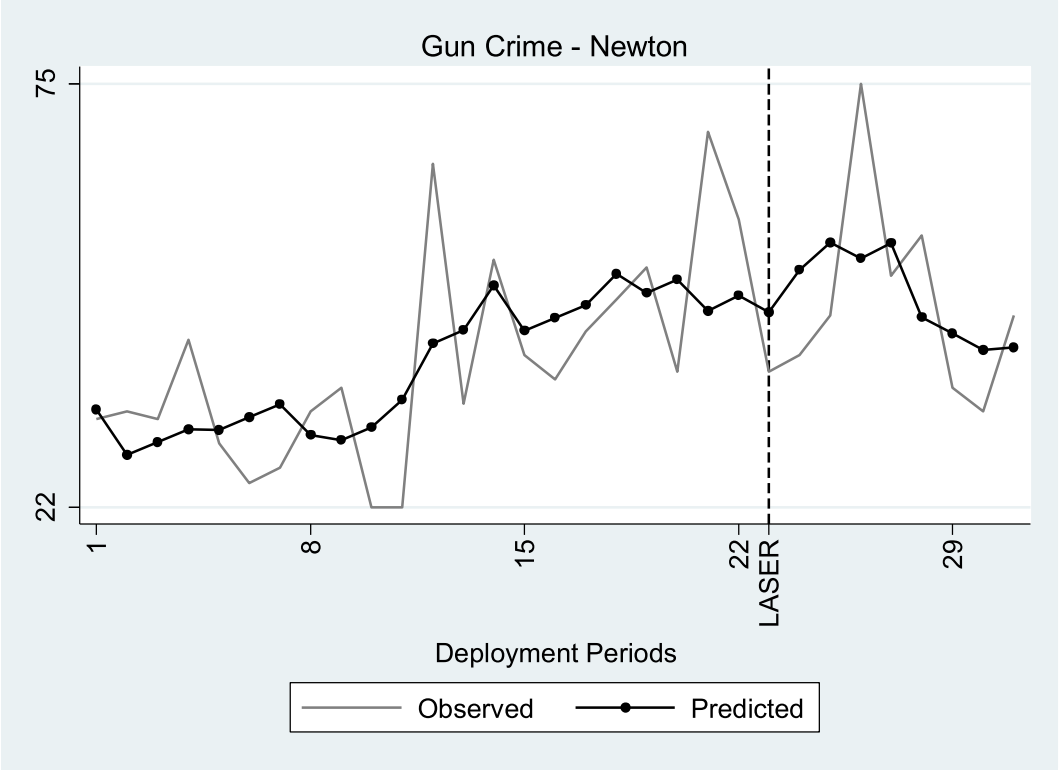

Gun Crime - 77th Street
108
46
1
8
15
22
29
LASER
Deployment Periods
Observed
Predicted

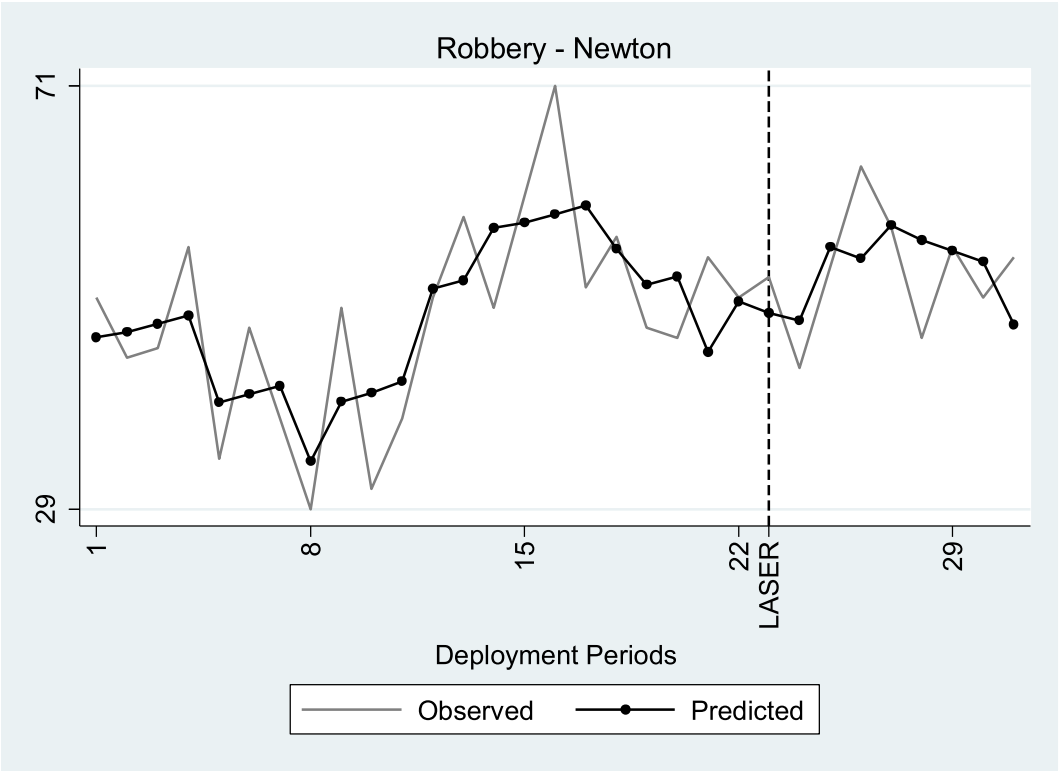

Robbery - 77th Street
95
49
1
8
15
22
LASER
29
Deployment Periods
Observed
Predicted

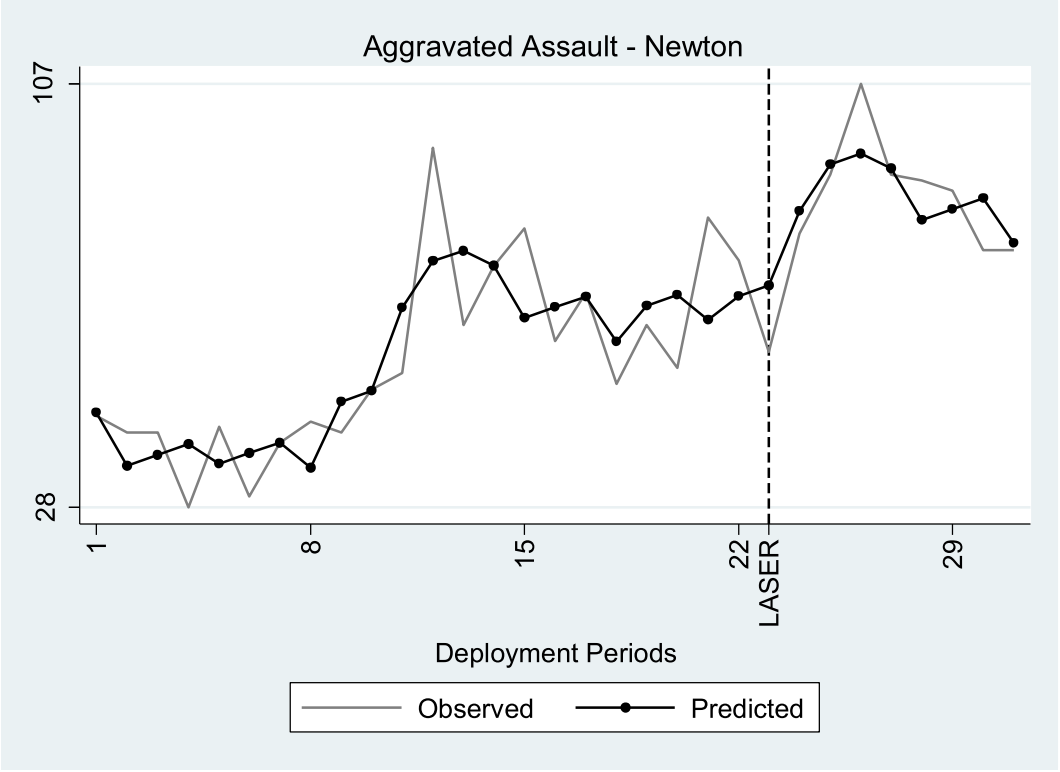

Aggravated Assault - 77th Street
134.7137
49
1
8
15
22
LASER
29
Deployment Periods
Observed
Predicted

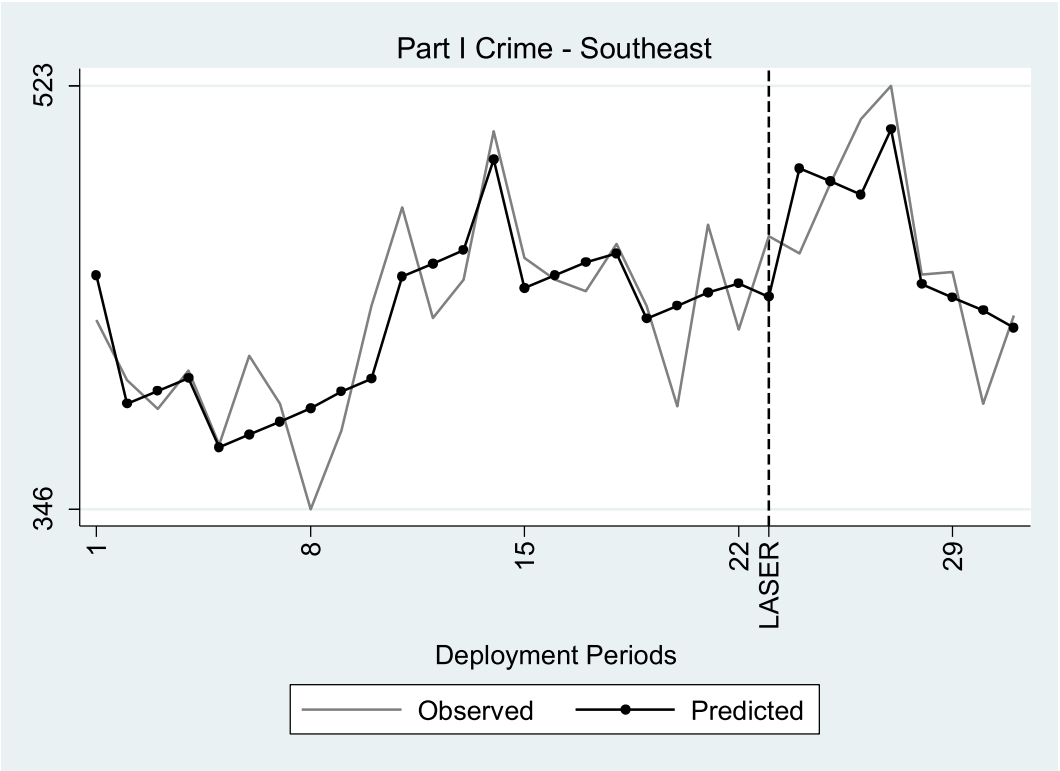

Part I Crime - Newton
481
317
1
8
15
22
LASER
29
Deployment Periods
Observed
Predicted

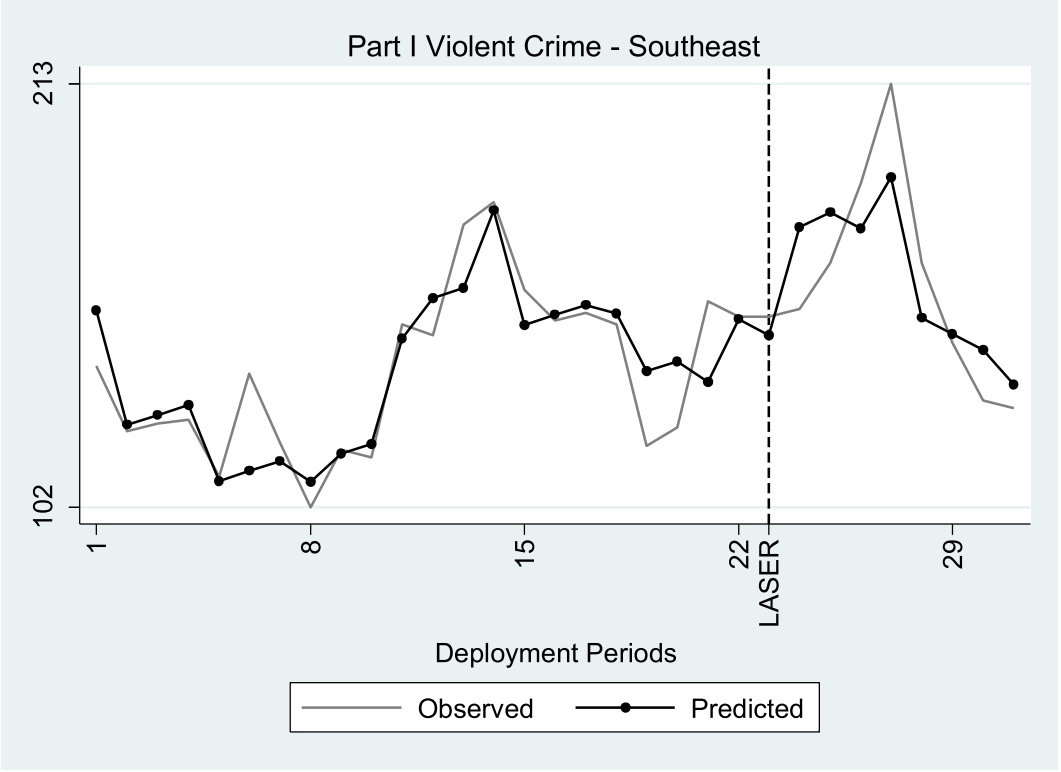

Part I Violent Crime - Newton
176
75.57083
1
8
15
22
LASER
29
Deployment Periods
Observed
Predicted

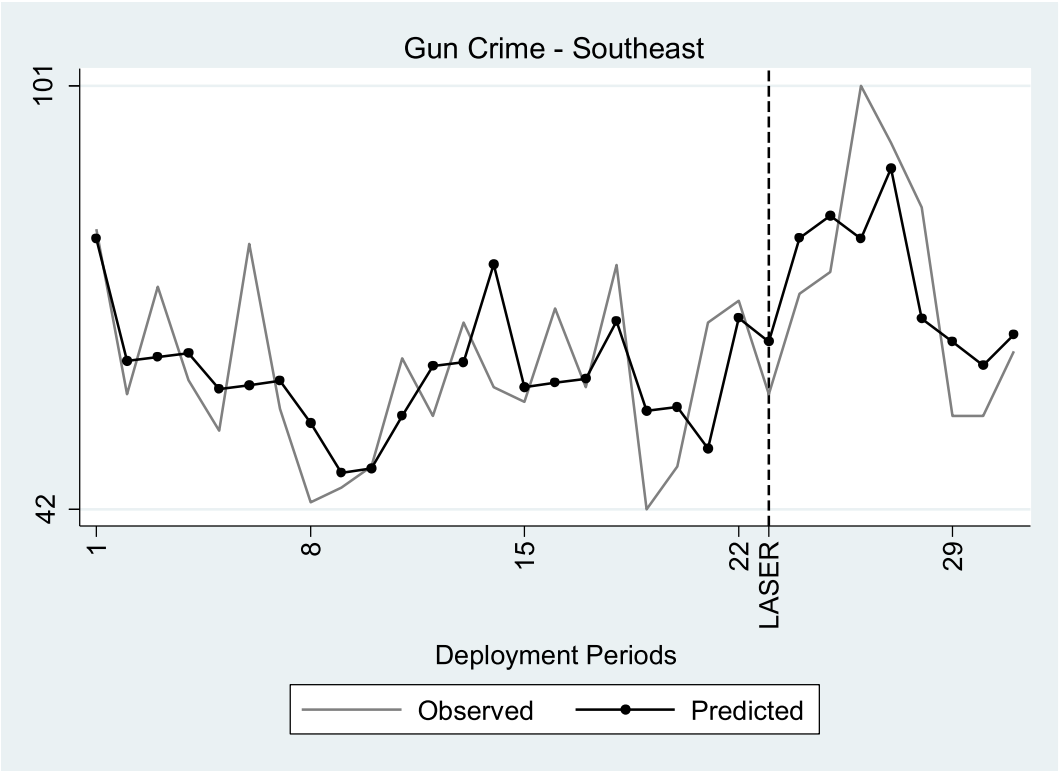

Gun Crime - Newton
75
22
1
8
15
22
LASER
29
Deployment Periods
Observed
Predicted

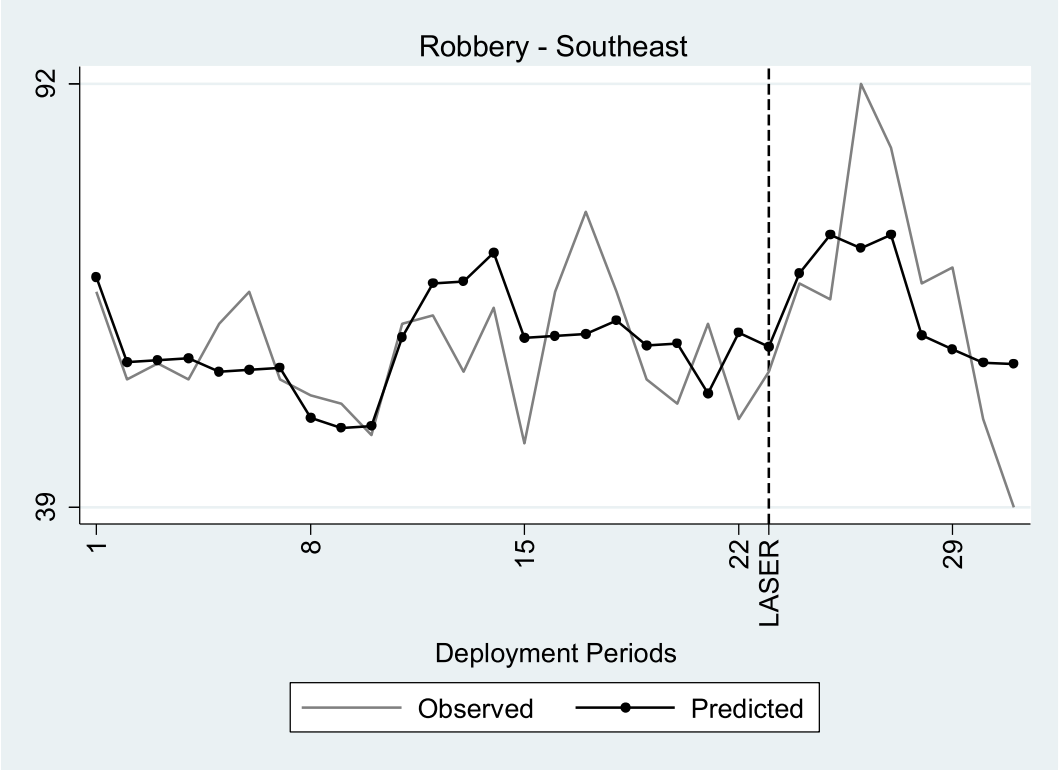

Robbery - Newton
71
29
1
8
15
22
LASER
29
Deployment Periods
Observed
Predicted

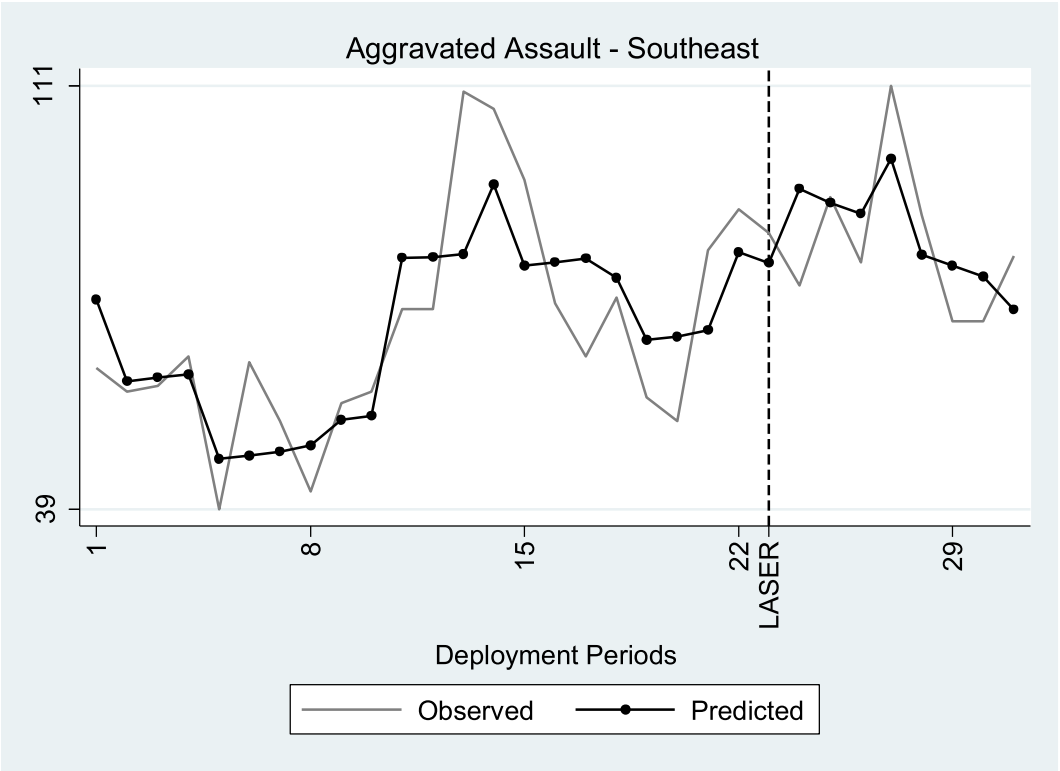

Aggravated Assault - Newton
107
28
1
8
15
22
LASER
29
Deployment Periods
Observed
Predicted


Part I Crime - Southeast
523
346
1
8
15
22
LASER
29
Deployment Periods
Observed
Predicted


Part I Violent Crime - Southeast
213
102
1
8
15
22
29
LASER
Deployment Periods
Observed
Predicted


Gun Crime - Southeast
101
42
1
8
15
22
29
LASER
Deployment Periods
Observed
Predicted


Robbery - Southeast
92
39
1
8
15
22
LASER
29
Deployment Periods
Observed
Predicted


Aggravated Assault - Southeast
111
39
1
8
15
22
LASER
29
Deployment Periods
Observed
Predicted

Appendix 2

Computing the Crime Change in LASER Zones

For each of the LASER Zones, the impact of LASER was defined as:

$$\text{Mean Effect} = \frac{\text{36 Week Average after LASER minus 25 Week Average before LASER}}{\text{Size of Zone in Square Miles}}$$

Weekly averages were used because the size of the time intervals were slightly unequal and the time metric for the effect is the same (weeks) as the metric for the raw data used in the computation.

The difference between the "post-LASER" and "pre-LASER" provides a simple measure of the change in crime associated with the intervention. Positive values for this difference indicate that on average crime increased after LASER started and negative values indicate that on average crime decreased after LASER started.

Because the LASER Zones differ in size, it is not possible to directly compare the raw mean differences between zones. To correct for this, we divide by the size of the zones so that the Mean Effect can be interpreted as the average change in crime counts per mile squared. After correcting for the size differences, the mean difference can be compared between LASER Zones. The resulting number is the change in crime counts per week if the LASER Zone covered one square mile (which is slightly larger than the area covered by all Newton LASER Zones).

Importantly, this mean change is only capturing upwards/downwards shifts and does not identify changes in crime trends. Further, the number of events in some Zones are small and the mean effects may appear to be substantial after standardizing by area. Finally, we are not calculating a significance test for this measure because of the preliminary nature of the results.

Appendix 3

Compstat Rankings