The Effect of Black Lives Matter Protests on Arrest Rates: Evidence from Chicago

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Abstract

Following the killing of George Floyd in May 2020, there have been nationwide large scale Black Lives Matter (BLM) protests against racism and police brutality. This study uses a difference-in-differences and an event study empirical strategy to examine the effect of BLM protests on arrest rates. Using crime data from Chicago and the timings of BLM protests, I find that arrest rates decrease the month following a BLM protest but increase in the months after that. This pattern is especially prominent for crimes that occur on the street and in public spaces. Additionally, I find an increase in arrest rates for more serious offenses, but no evidence on less serious offenses. However, these results should be interpreted with caution given the pre-trends.

1 Introduction

The Black Lives Matter (BLM) movement started in 2013 following the acquittal of George Zimmerman for the killing of a 17-year-old African American student Trayvon Martin in Florida. In May 2020, the killing of George Floyd in Minneapolis sparked nationwide Black Lives Matter protests against racism and police brutality. Previous research has found BLM

movement to reduce police brutality and the number of vehicle and pedestrian frisk (Abrams et al., 2021; Campbell, 2021; Shjarback et al., 2017).

Yet, little is known about the effect of these protests following the killing of George Floyd on arrest rates. BLM protests could affect police arrest behavior through multiple channels. First, protests against police brutality could lead to increased public scrutiny on police behavior. An increase in public scrutiny on policing behavior may lead to a decrease in arrest rates, as police officers may have the incentive to depolice, not engage in active policing and carry out fewer arrests, due to their awareness of the public scrutiny (Cheng and Long, 2018; Premkumar, 2020). Second, civilian's distrust towards police might reduce civilian's willingness to cooperate and engage with the police force such as reporting crimes through 911 calls and testifying as witnesses, therefore reducing arrest rates (Ang et al., 2021). Third, BLM protests could lead to increase in arrest rates, if they lead to reform measures within the police force.[1] Additionally, the presence of protests might increase patrolling and police allocation in areas where protests take place. This higher police presence might increase crime clearance.[2] It is also possible that BLM protests are much more heavily policed than other protests, or if the police is harsher on BLM protests and arrests them at a higher rate. Finally, BLM protests could lead to increase in crimes and thus increase in arrest rates, if these protests lead to unruly behavior, vandalism, or other criminal behaviors. Overall, the effect of BLM protests on arrest rates is likely ambiguous and remains an empirical question.[3]

In this paper, I examine the effect of BLM protests on arrest rates of crime incidents that happen after the onset of the BLM movement. To this end, I combine two datasets. The first contains arrest information on each reported crime incident in Chicago from January 2019 to October 2021. The second source records Black Lives Matter protests that occurred in Chicago since May 2020. I geocode the exact coordinate locations of 73 such protests.

[1] After the adoption of a consent decree in LAPD in response to the police misconducts, there was an increase in pedestrian and vehicle stops as well as an increase in arrests (Stone et al., 2009).

[2] This mechanism is likely to exist in all types of protests. Given that other protests also occurred concurrently with BLM protests, the estimated effect in arrest rate might capture the effects of both BLM protests and other protests.

[3] Disentangling which channels drive my results is an interesting question for future research.

To identify the causal effect of BLM protests on crimes, I follow the approach of hyperlocal variation described in Ang (2021). I compare the arrest rates for crimes that happen within a small distance to a major protest to those of crimes that happen farther away but in the same neighborhood. Employing a difference-in-differences event study, I find that BLM protests lead to an increase in arrest rates. In the months following the protest, arrest rates increase for crimes that happen nearby, and this effect is greater in magnitude for crimes that happen on the streets. Some slight nonparallel trends prior to the onset of the protests might constitute bias on the causality of our estimates, but the pre-trends are mostly negative, indicating a change in the direction of trends in arrest rates post-protest.

I also examine the heterogeneous effects on less serious and more serious offenses. I find little evidence on arrest rates for less serious offenses, including criminal damage and trespass, interference with public officer, public peace violation, weapons violation, liquor law violation, and gambling, whereas there is a significant increase in arrest rates for more serious crimes. To test the robustness of my estimates, I also estimate the effect of all types of protests in Chicago and find an increase in arrest rates, suggesting that there might be an increase in policing following not only BLM protests but also other protests. Finally, I check the sensitivity of my estimates on different subsets of the sample by restricting to big protests with more than a hundred participants and restricting to crime incidents that are exposed to a single BLM protest to eliminate cumulative effect. In both of these alternative samples, the increase in arrest rates stays robust.

The rest of the paper is organized as the following: §2 reviews the relevant literature; §3 describes the data; §4 introduces the empirical strategy; §5 presents the estimation results; §6 provides sensitivity analysis; §7 concludes.

2 Literature Review

There are 3 main strands of the growing literature on police brutality and subsequent

protests. The first strand of the literature examines the effect of police brutality scandals on traffic stops, arrest rates, and crime rates. Two related papers study the effect on traffic stops and hit rates. Abrams et al. (2021) use a difference-in-differences analysis to compare the number of vehicle searches and pedestrian frisk in May 2020 (the killing of George Floyd) to that in prior years. Using the same data from Chicago, they find a decrease in the number of frisk and searches made by the police after the protests and an increase in hit rates of discovery of contrabands and firearms. Using police department data from Missouri and the killing of a black man in Ferguson, Shjarback et al. (2017) concur the findings of Abrams et al. (2021) and also find no evidence of increase in total violent and property crimes.

Three other papers examine the effect on arrest and crime rates. Premkumar (2020) finds a decrease in arrest behavior for theft and other less serious offenses following a high-profile officer-involved fatality, whereas there is no change in arrest behavior for violent crimes. Cheng and Long (2018) perform a difference-in-differences analysis, and find a decrease in arrest rates in cities with high African American population following major police-related deaths of black civilians. Using city-level crime data in 81 US cities, Pyrooz et al. (2016) find an increase in robbery rates, but no significant evidence on total, property, or violent crimes, following the kiling of Michael Brown in Ferguson.

My main contribution to this strand of the literature is that I examine the effect of the protests following the murder of George Floyd because the BLM movement in May 2020, having 15 to 25 million people participating nationwide, has been greater in scale than the Ferguson protests and has been one of the largest movements in US history (Buchanan et al., 2020).

The second stand of the literature studies the police behavior following an increase in oversight and investigation on misconduct in response to police brutality scandals. Ba and Rivera (2019) use regression discontinuity design and beat-level data from Chicago. They find that robbery and murder rates increase without a corresponding increase in arrest rates during the time period after the release of the footage of Laquan McDonal shot by a CPD

officer. However, they find no such effect on crime and arrest rates when self-monitoring within the police force increases, highlighting different effects between self-monitoring and public oversight. Devi and Fryer Jr (2020) show that the "Pattern-or-Practice" investigations in response to a police use of deadly force lead to an increase in homicides and other felonies, which might be suggestive of de-policing behavior. Shi (2009) finds a decrease in monthly arrests in the months following the investigation after the shooting of a black civilian by white police officer in Cincinnati. Conversely, Stone et al. (2009) find that the number of pedestrian and vehicle stops doubles after the patter-or-practice lawsuit against LAPD and the adoption of a subsequent consent decree. They also find an increase in the proportion of arrests from these stops. Lastly, Pyo (2020) finds that police departments that have more police-related fatalities and have more protests against their conducts are more likely to implement body-warn cameras.

The third strand examines the effect of police brutality on other behaviors, such as civilian cooperation and trust toward police, civilian protest participation, and education outcomes of students. Desmond et al. (2016) use a time series design and find following the police violence towards Frank Jude in Milwaukee a decrease in residents' reporting of crimes through 911 calls, especially in Black communities. More recently, Ang et al. (2021) use the ratio of 911 calls to number of gunshots to measure civilian cooperation and find a significant drop in the ratio of 911 calls to gunshots after the killing of George Floyd in May 2020. With respect to civilian protest participation, Williamson et al. (2018) study the spatial relationship between police violence and protest activity. They find that BLM protests are more likely to occur in cities where there have been incidents of black civilians killed by police officers. Recently, Gonzalez and Prem (2022) focus on the protest behavior of teenagers after the killing of a 16-year-old by the police and find a decrease in rally participation of the classmates of the victim. Additionally, they also find a negative effect on the probability of higher education enrollment for schoolmates of the victim, but find little evidence on students that live close to the killing. On the other hand, Ang (2021) finds

a negative effect on academic performances and psychological well-bing for students that are exposed to police killings within close proximity.

Finally, a small but growing strand of the literature evaluates the effect of the BLM movement. Recently, Skoy (2021) uses a fixed-effect model to study the effect of BLM protests on fatal police interactions using national data. She finds a decrease in the number of fatal police interactions as the number of BLM protests increases, though this effect is temporary and in the short term. However, she finds no significant effect on the number of arrests made. Using a difference-in-differences estimation strategy, Campbell (2021) finds fewer lethal police use of force in places with BLM protests than places without the protests. Additionally, Mazumder (2019) finds that BLM protests following the killing of Michael Brown reduces racial prejudice for younger individuals. In contrast to the studies in this strand of the literature, I use arrest data at the disaggregated incident level and and from a shorter time period.

3 Data

I use data from two main sources. First, the information on Black Lives Matter protests comes from a publicly available dataset released by the Armed Conflict Location & Event Data Project (ACLED). ACLED is a non-profit organization that collects disaggregated data on protests and political violence. The data records the event date, size, city-level location, as well as the media source. I restrict the sample to protests that are related to the Black Lives Matter movement and have occurred in Chicago after the killing of George Floyd May 2020 onwards. To the best of my knowledge, the exact coordinate locations are not available in this dataset or any other publicly available data. Thus, I use the event date, description, and source provided by ACLED to obtain the street address or the neighborhood in which the protest occurred.[4] I then obtain the coordinate locations from the address using Google

[4]The most common sources from which I have obtained this information are newspaper outlets, such as Chicago Tribune, Chicago Sun Times, and Twitter.

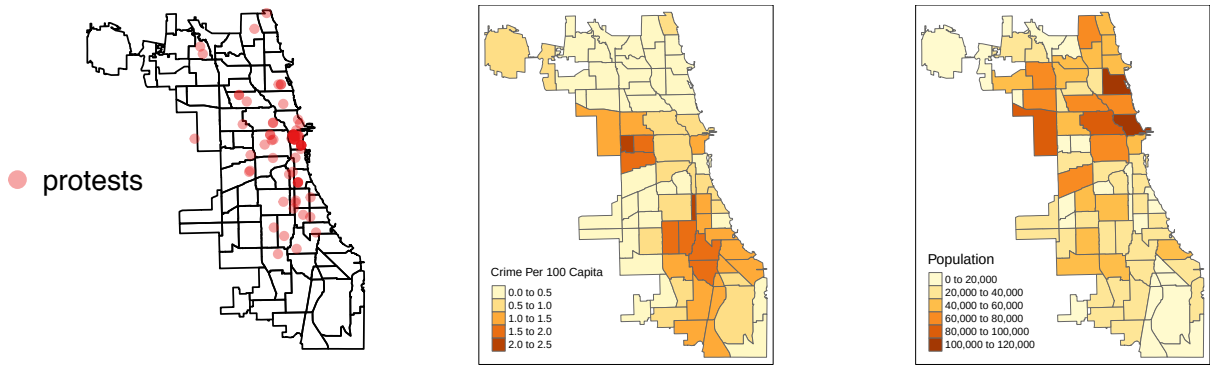
Maps.[5] In some cases, protesters marched a significant distance. For these protests, I record the locations at which the protesters initially gathered. When there are multiple protests happening at different locations for the same purpose on the same day, I record them as different events. The full sample consists of 420 protests, of which, 117 are related to the Black Lives Matter movement. I restrict the sample to the BLM protests for which I could verify the exact location. My final sample consists of 73 BLM protests, 54 of which have sizes greater than hundred. I also cross-validate the details of each BLM protest with other publicly available data sources such as the Crowd Counting Consortium Dataset from the Nonviolent Action Lab and the data on Black Lives Matter protests from Elephrame (an archive of data on protests and demonstrations in the US.)

My second source of data contains reported crime incidents in Chicago by the Chicago Police Department (CPD) from 2001 to 2021. The data contains information on the exact location and timing of each reported crime and provides a description of the incident and whether an arrest was made. I also observe the type of crime, whether the crime is committed on the street, and whether it is domestic crime. I restrict these data to crime incidents reported by the CPD from January 2019 to October 2021. In total, there are 640,032 reported crime incidents from January 2019 to October 2021. I then drop the crime incidents with missing and those that have occurred more than 3 miles away from a protest. My final crime data consists of 457,674 observations.

Figure 1 presents the distribution of BLM protests and average monthly crimes per 100 residents in Chicago which I observe that BLM protests are more likely to happen in highly populated neighborhoods. The correlation between protests and crime rates is not apparent.

Panel A of Table 1 presents descriptive statistics for crime incidents. Approximately 44% of the reported crimes are property crimes. The crimes that happen within 0.5 miles from a major BLM protest are more likely to be property crimes or drug crimes, and less likely to be

[5]For the protests for which I do not observe the exact street address, I record the official coordinates of the neighborhood in which they occurred. In most cases, these are the coordinates of the center of the neighborhood.



(a) Protest locations in Chicago

(b) Average monthly crimes per 100 capita in each community area

(c) Population in each community area in 2020

Figure 1

violence crimes or homicides. Among property crimes, more than 50% are thefts. This rate is higher for crimes closer to a BLM protest. Crimes that are closer to a BLM protest are less likely to occur on the street. The mean arrest rate for all crimes is approximately 18%. Property crimes have the lowest clearance rate of 8.6%. Crimes that happen on the streets have higher arrests rates than those that do not. This aligns with the intuition that crimes on the street are more likely to have more witnesses to identify suspects, which could lead to higher arrest rates. For property and violent crimes, the mean arrest rate of crimes within 0.5 mile from a BLM protest is statistically different from that of crimes more than 0.5 mile but less than 3 miles away from a protest. Among property crimes, there is statistically significant difference for theft and other property crimes, but not for burglary. Panel B of Table 1 presents descriptive statistics for BLM protests. Among the 73 BLM protests that happened between May 2020 and October 2021, 54 of them had more than 100 protesters.

4 Empirical Strategy

The primary obstacle to identification is that BLM protests are not random with respect to crime and arrest rates, but rather are likely to be endogenously determined. Panel A of Figure 1 suggests that protests are not random and tend to happen in neighborhoods

Table 1: Descriptive Statistics

Panel A: Crime Incidents										
		All			distance $\leq$ 0.5 mile			0.5 mile $<$ distance $\leq$ 3 miles		Statistically
	Arrest	N	Percent	Arrest	N	Percent	Arrest	N	Percent	Different
Crime Type										
property	0.086	198085	43.88	0.114	33612	49.83	0.080	164473	42.15	*
violent	0.150	150482	32.88	0.167	19055	28.25	0.148	131427	33.68	*
drug	0.995	20843	4.55	0.996	1900	2.82	0.995	18943	4.85	
homicide	0.281	1433	0.31	0.339	124	0.18	0.276	1309	0.34	
other	0.239	86831	18.97	0.198	12768	18.93	0.246	87405	23.01	*
total	0.178	457674	100.00	0.170	67459	100.00	0.179	390215	100.00	*
Property Crime Type										
burglary	0.055	16206	8.18	0.062	1874	5.58	0.054	14332	8.71	
other	0.102	79777	40.27	0.141	9946	29.59	0.097	69831	42.46	*
theft	0.078	102102	51.54	0.106	21792	64.83	0.070	80310	48.83	*
total	0.086	198085	100.00	0.114	33612	100.00	0.080	164473	100.00	*
Crime Location										
street	0.246	143573	31.37	0.219	17979	26.65	0.250	125594	32.19	*
other	0.147	314101	68.63	0.153	49480	73.35	0.146	264621	67.81	*
total	0.178	457674	100.00	0.170	67459	100.00	0.179	390215	100.00	*

Panel B: Protests		
	N	Percent
Protest Size		
size $<$ 100 or unknown	19	26.03
size$\geq$ 100	54	73.97
Total	73	100.00

Notes: Panel A presents summary statistics for the full crime incidents data, and separately for crimes within 0.5 mile from a BLM protests and crimes between 0.5 and 3 miles from a protest. The last column reports whether the mean arrest rate of crimes within 0.5 mile from a BLM protest differs significantly from that of crimes more than 0.5 mile but less than 3 miles away from a protest at 5% significance level.

with denser population. Panel B shows that neighborhoods in the south tend to have higher crime rates, therefore are likely to have tenser policing, but tend to not be hot spots of BLM protests. Additionally, resource mobilization and political opportunity which may vary across different neighborhoods in Chicago might have an impact on protest frequency (Williamson et al., 2018). Thus, by comparing a crime incident in Chicago downtown area to a crime in South Chicago, the estimation is likely to be confounded by neighborhood characteristics. To mitigate this issue, I follow the approach of hyperlocal variation used by Ang (2021). I compare arrest rates of crime incidents that take place within 0.5 mile from a BLM protest to those of crimes that happen between 0.5 and 3 miles. By doing this, I am comparing crime incidents that are of close proximity to a protest to crime incidents that are farther away but in the same area, and thus, are more likely to have comparable demographic characteristics.[6]

[6]Since the strategy of hyperlocal variation relies on the distance between crime incidents and protests, I restrict the sample to BLM protests for which I observe accurate locations. Namely, I drop the protests for which I only observe the neighborhood in which they occurred. This could mitigate the measurement error

I employ a difference-in-differences strategy to examine the effect of BLM protests on arrest rates. The treatment group consists of crime incidents that occur within 0.5 mile from a BLM protest.[7] The control group consists of incidents that are more than 0.5 mile but less than 3 miles away from a BLM protest. I estimate the following equation

$$Arrest_{int} = \alpha + \beta Protest_t + LaggedDailyCrime_{nt} + \lambda_t + \delta_n + \epsilon_{it} \tag{1}$$

where i is the index for each crime incident; n is the index for each neighborhood, and t is the index for each year-month. $Arrest_{int}$ is a dummy variable that equals 1 if a crime incident i in neighborhood n in year-month t is cleared by an arrest, and 0 otherwise. $Protest_t$ is an indicator that equals 1 if the crime happens after a BLM protest occurred within 0.5 mile of it. λ_t captures the year-month fixed effect; δ_n captures the neighborhood-fixed effect. I also control for lagged daily number of crimes in each neighborhood 30 days before each incident occurs, because higher crime rate in previous time periods could alter police arrest behavior and could also drive police shootings, which subsequently can lead to BLM protests.[8]

The pandemic has had profound impact on the lives of everyone and it is reasonable to think that it might have impacted the behavior of criminals and police. However, for this to be a threat to validity, these changes should vary significantly across neighborhoods. Following the onset of the pandemic in March 2020, multiple cities including Philadelphia enacted a policy change of reducing arrests for minor non-violent incidents as an effort to reduce prison population (Melamed and Newall, 2020). Though Chicago Police Department did not officially enact such policy, similar trend in arrest behavior is observed (Abrams et al., 2021). However, given that the pandemic might have resulted in a city-wide change in arrest behavior, I believe its effect could likely be picked up by the neighborhood-fixed

in my measure of protest proximity.

[7]For crime incidents that occur within 0.5 mile from multiple BLM protests, the treatment time is defined to be the month of the first BLM protest within 0.5 mile. In a sensitivity check, I define the treatment time based on the last protest that occurred before the date of the crime incident.

[8]I also control for lagged daily crime 15, 60, and 90 days before the dates of occurrence of the crime incidents and find no significant difference in the results, so I omit them here.

effect. Therefore, the change in arrest rate induced by the Covid-19 pandemic is unlikely to bias the estimates of the effect BLM protests.[9]

I also extend my difference-in-difference estimation to a dynamic event study by estimating the following equation

$$Arrest_{int} = \alpha + \sum_{m \in M} \beta_m Protest_t^m + LaggedDailyCrime_{nt} + \lambda_t + \delta_n + \epsilon_{it} \tag{2}$$

where $M \subset \mathbb{Z} \cap [-17, 17]$ with -17 capturing 17 months before and 17 capturing 17 months after a BLM protest happens within 0.5 mile to a a crime incident. $Protest_t^m$ is a dummy that is equal to 1 if a crime incident i occurs with m months from a protest. For instance, $m = 1$ suggests one month after the occurrence of the first BLM protest within 0.5 mile. Each estimated coefficient β_m is measured relative to the omitted period - the month before a BLM protest occurs. The other control variables are as described in equation 1.

5 Main Results

Table 2 presents my difference-in-differences estimates of BLM protests on arrest rates, where column 1 shows the estimation on all crimes, whereas columns 2 and 3 consider crimes that happen on the street and in public spaces respectively. In all three specifications, there is a statistically significant increase in arrest rates following a nearby BLM protest. The print estimate in column suggests that probability a crime that occurs within 0.5 mile of a BLM protest is cleared by an arrest increases by 15.6%, given the mean arrest rate of 17.8%. This effect is the greatest for crimes on the street, with an estimated increase of 3.6 percentage points in arrest rate, which translates to 25.8% increase. This is not surprising because these crimes are more likely to be affected by large gatherings and patrolling on the street. When

[9]There are other time-varying characteristics such as poverty rate, education, unemployment, and population that might have an effect on arrest rates. However, I believe this will not cause problems for the identification given the short time horizon of my data. These potentially confounding factors are slowly changing over such a short period of time and thus absorbed by the neighborhood fixed effects.

the sample is restricted to crimes in public spaces, the estimated increase in arrest rate is approximately 16.0% with respect to the mean arrest rate of 22.3%.

Table 2: Difference-in-Differences Estimates

	(1) All b/se	(2) Street b/se	(3) Public b/se
protest	0.02790***	0.06336***	0.03565***
	(0.002)	(0.005)	(0.003)
constant	0.19000***	0.22884***	0.22948***
	(0.005)	(0.010)	(0.007)
r2	0.04453	0.09263	0.06551
adjusted r2	0.04433	0.09204	0.06519
N	457674.00000	143573.00000	284021.00000
ymean	0.17791	0.24594	0.22279

* $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$

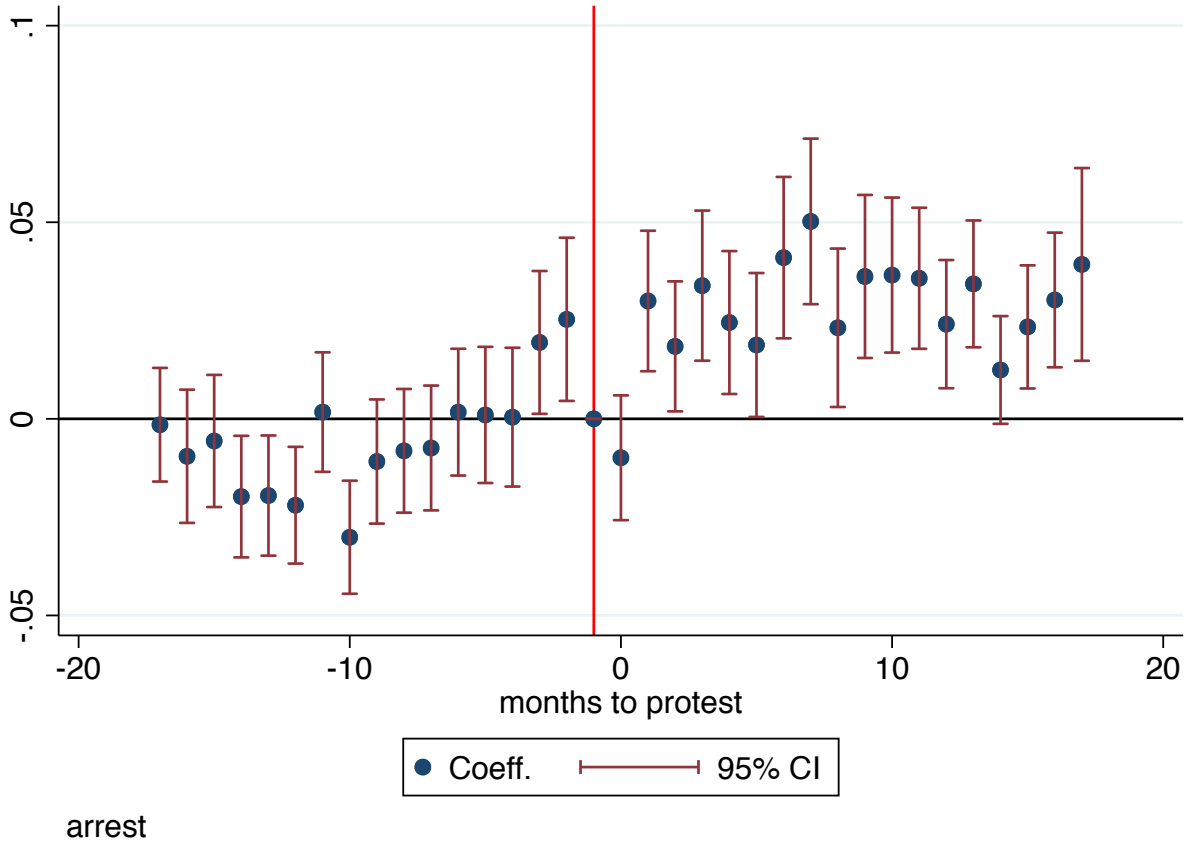
Notes: This table estimates equation 1 using a difference-in-differences framework. Protest equals to 1 if a crime occurs within 0.5 mile from a BLM protest (the control group consists of crimes that happen more than 0.5 mile away from any protest.) Column 1 estimates the effect of BLM protests on arrest rates on all crime incidents in Chicago from January 2019 to October 2021; column 2 estimates the same specification on crimes on the street only; column 3 estimates the same specification on crimes that take place in public spaces, excluding residences and apartments. ymean stands for the mean of the dependent variable.

The validity of my difference-in-differences estimation relies on the parallel trend assumption, namely, absent a BLM protest, the arrest rates in the treatment and control groups have similar trends. Figure 2 shows an event study of arrest rates for crime incidents that happen close to a major BLM protest.[10] I first estimate equation 2 on all crimes. The omitted period is the month before BLM protest happens. In all regressions, I control for neighborhood and month fixed effects to account for time invariant and neighborhood invariant heterogeneity, respectively. Observe that before the onset of BLM protests, there is slight pre-trend between the treatment and control groups. Although the estimated coefficients are noisy, they never exceed in magnitude 2.5 percentage points and are mostly negative, and with one exception are statistically insignificant.[11] After the onset of BLM protests, arrest

[10] Appendix table A1 presents the estimated coefficients in a table format.

[11] A joint F-test on the pre-protest estimated coefficients yields a F-stat of 3.03, which rejects the hypothesis that there is parallel trend in arrest before the protests, indicating potential bias on the causality of the

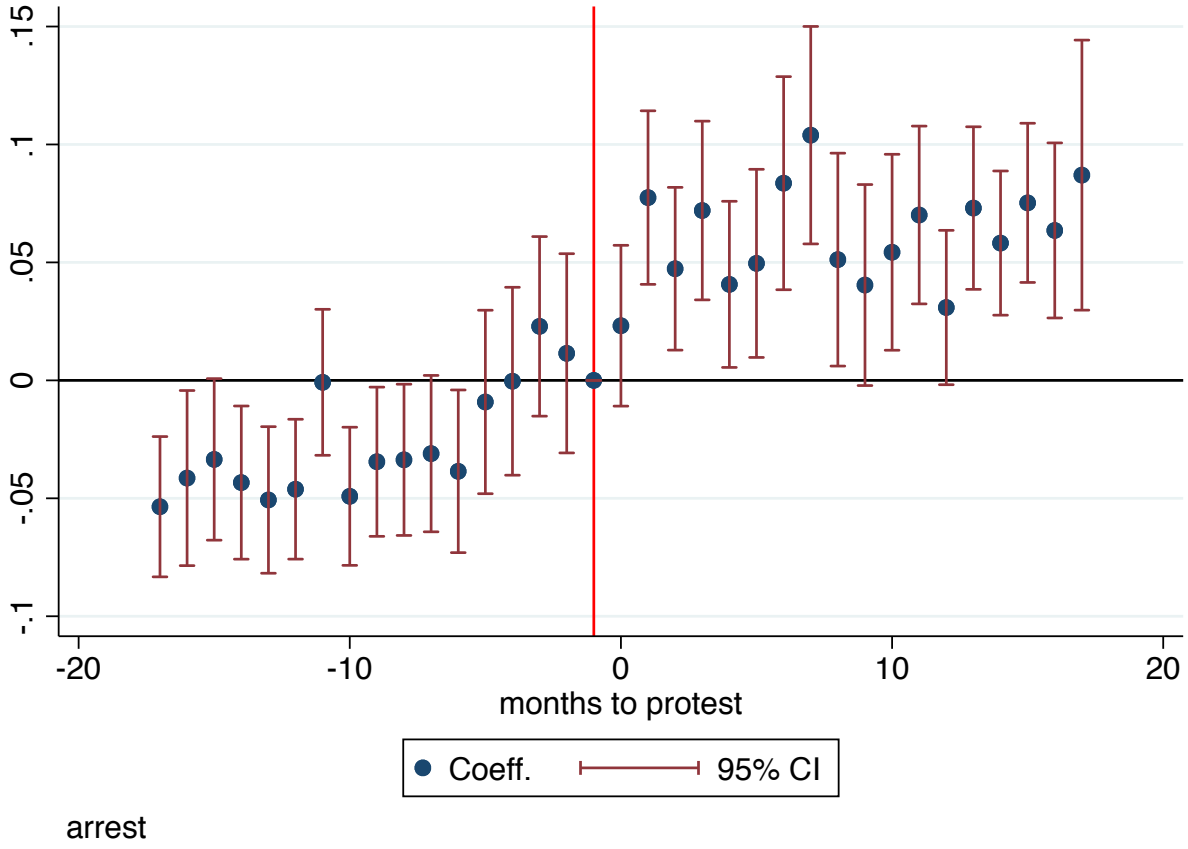
Figure 2: Effects on All Crimes



Notes: Notes: Figure presents event-study difference-in-differences estimated coefficients and 95% confidence intervals of equation 2 on all crimes in Chicago between January 2019 and October 2021. Standard errors are robust. Treatment group consists of crime incidents that happen within 0.5 mile from a BLM protest with verifiable accurate location in Chicago. Control group consists of crime incidents that take place more than 0.5 mile and less than 3 miles from any such protest. Time to treatment is defined as the number of months after exposure to the first protest within 0.5 mile. Red line represents the month before treatment.

rates increase for crime incidents that happen within 0.5 mile to a protest. The highest coefficient reaches 4.9 percentage points, which is approximately 30% of the average arrest rate.

Figure 3: Effects on Crimes on the Street



Notes: This figure presents event study difference-in-differences estimates and their 95% confidence intervals. The sample consists of all crime incidents that happen on the street in Chicago between January 2019 and October 2021. Standard errors are robust. Treatment group consists of crime incidents that happen within 0.5 mile from a BLM protest with verifiable accurate location in Chicago. Control group consists of crime incidents that take place more than 0.5 mile but less than 3 miles away from a BLM protest. Time to treatment is defined as the number of month before or after a BLM protest occurred. The vertical red line represents the month before treatment, the omitted category.

Figure 3 presents an event study for the same specification, but restricting to crimes that occur on the streets. My motivation behind this specification is that crimes on the street are most likely to be affected by increasing policing and patrolling as well as increasing witnesses

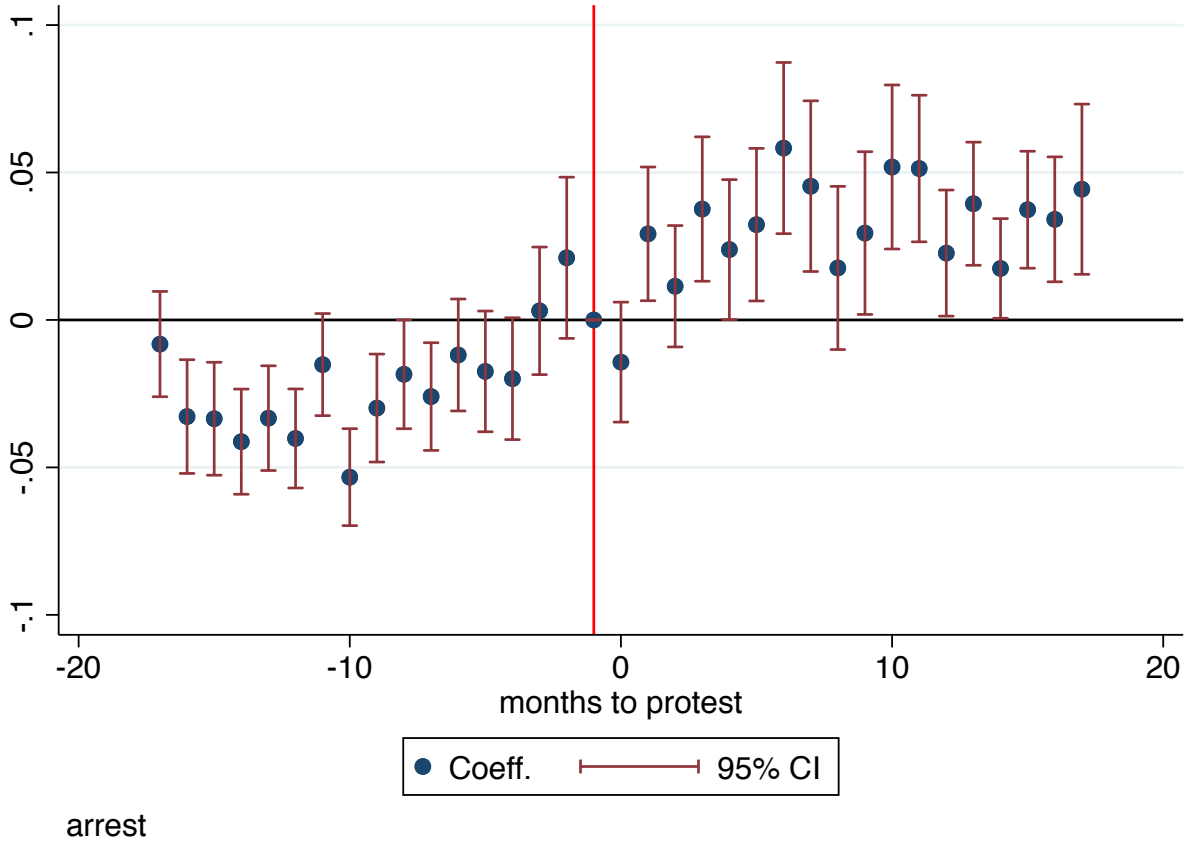
estimates.

on the street due to BLM protests. Therefore, the arrest rates of crimes on the street are more likely to be affected than those of crimes in indoor places. There exists significant pre-trend before the onset of protests, and thus my results should be interpreted with caution. Before the occurrence of protests, there is a negative trend in arrest rates, but arrest rates start rising after the protests. The estimated effects are positive for all months following the protests. The greatest effect happens 7 months after the protests, with an estimated increase of 10 percentage point in arrest rate. Restricting the sample to street crimes, the magnitudes of the estimated coefficients post BLM protest are in general greater than the full sample estimates. This corresponds with the prediction that crimes on the street are affected by protests more, since protests are likely to lead to more patrolling on the streets in areas where protests take place. However, crimes that happen indoor are less likely to be impacted by this change in allocation of policing. Nonetheless, given the pre-trend in arrest rates, we cannot interpret these results as causal.

Figure 4 restricts the sample to crimes that happen in public locations, excluding crimes that occur in apartment and residential buildings, because crimes that happen in privates spaces such as residential buildings are less likely to be affected by the protests. The increase in arrest rates of crimes in the public following the protests are consistent with the estimated effects on all crimes, but are greater in magnitude.

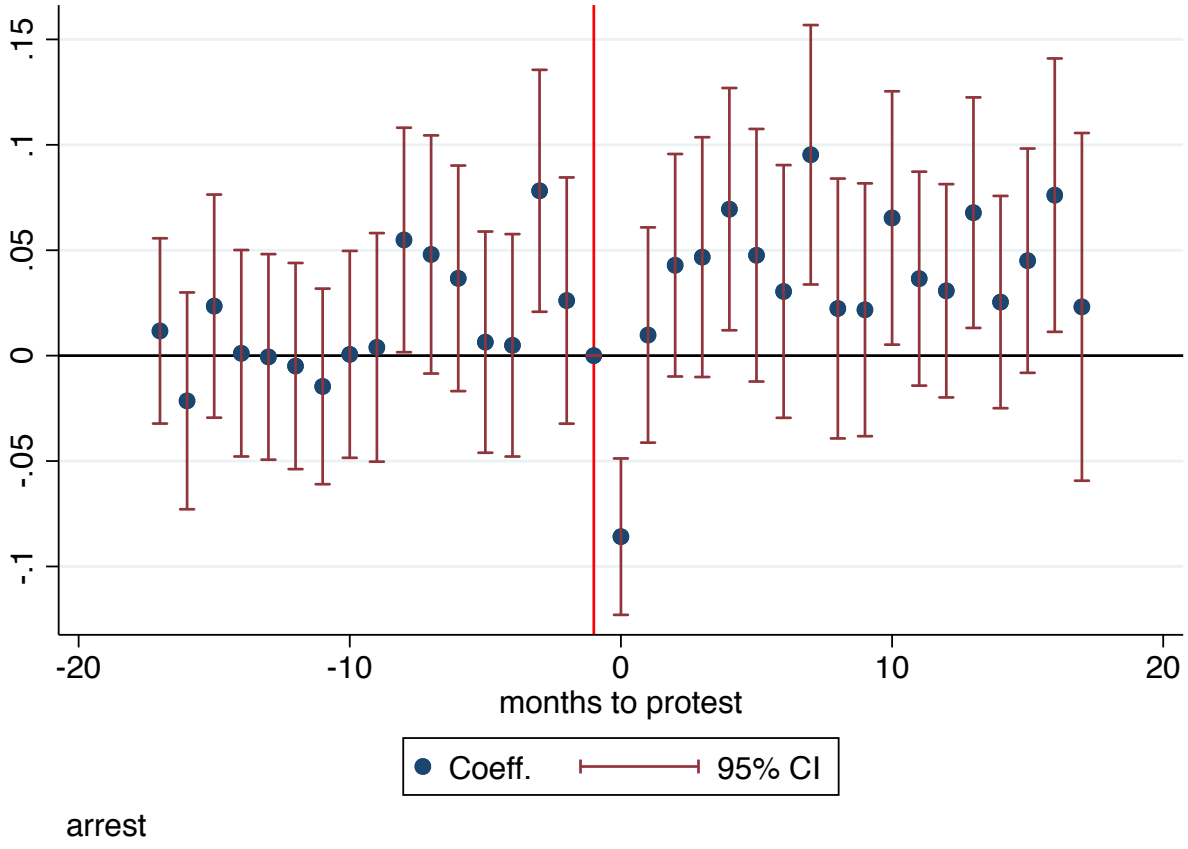
Because the police might have different attitudes towards different types of offenses, increasing policing for more serious offenses and depolice for less serious offenses, I restrict the sample of crime incidents to less serious offenses only. In addition, this specification allows me to test the hypothesis whether police arrest protesters, who are likely to commit less serious crimes, at higher rates. I define less serious offenses to include criminal damage, criminal trespass, interference with public officer, public peace violation, weapons violation, liquor law violation, and gambling, which comprise approximately 20% of all observations. Figure 5 provides little evidence of increase in arrest rates for less serious crimes. Following a BLM protest, it appears that my main results are driven by more serious crimes. As

Figure 4: Effects on Crimes in Public Spaces



Notes: This figure presents event study difference-in-differences estimates and their 95% confidence intervals. The sample consists of all crime incidents that happen in public spaces in Chicago between January 2019 and October 2021. Standard errors are robust. Treatment group consists of crime incidents that happen within 0.5 mile from a BLM protest with verifiable accurate location in Chicago . Control group consists of crime incidents that take place more than 0.5 mile but less than 3 miles away from a BLM protest. Time to treatment is defined as the number of months before or after a BLM protest occurred. The vertical red line represents the month before treatment, the omitted category.

Figure 5: Effects on Less Serious Offenses



Notes: Figure presents event-study difference-in-differences estimated coefficients and 95% confidence intervals of equation 2 on less serious offenses in Chicago between January 2019 and October 2021. Standard errors are robust. Treatment group consists of crime incidents that happen within 0.5 mile from a BLM protest with verifiable accurate location in Chicago. Control group consists of crime incidents that take place more than 0.5 mile and less than 3 miles from any such protest. Time to treatment is defined as the number of months after exposure to the first protest within 0.5 mile. Red line represents the month before treatment.

shown in Figure A1, there is a statistically significant increase in arrest rates for serious crimes following a protest. This could suggest that police might not be arresting more people regardless of the crime type, but rather targeting and increasing policing only for more serious crimes and felonies. In particular, there appears to be a drop in arrest rates in the month of BLM protests, suggesting perhaps a short-term decrease in proactive policing on less serious offenses.

To test whether the increase in arrest is driven by police arresting protest-related offenses at higher rates, I restrict the sample to crimes that are more likely to occur during protests, such as interference with officers, public peace violation, criminal damage, criminal trespass, burglary, assault, arson, and theft. As shown in Figure A2, there is a significant drop in arrest rates for protest-related offenses in the month in which the BLM protest occurs, followed by an increase in arrest in the subsequent months. This suggests that there might be a temporary de-policing behavior immediately after the protest occurs followed by an increase in arrest due to higher police presence in areas where a protest has occurred.

6 Sensitivity Analysis

I run several robustness checks of my results. First, I check the sensitivity of my estimates to different subsets of observations. There are a number of channels through which BLM protests could increase arrest rates. It is possible that the increase in arrest rates is due to the nature of large gatherings and crowds, which is typical for all types of protests and not only BLM protests. It is also possible that there is more police presence at BLM protests and that police arrests at BLM protests at higher rates than at any other type of protests. To test this mechanism, I estimate the same specification on BLM and other protests that occurred in Chicago between January 2019 and October 2021 and for which I was able to find verifiable exact locations.[12] After dropping protests with location precision above neighborhood level, I acquire a final data with 253 protests. Figure A3 presents the event study for the effect of

[12]Other types of protests include union protests and protests related to COVID-19 pandemic.

all protests in Chicago on arrest rates. Observe that there is a consistent increase in arrest rates after the occurrence of protests and the increase is greater in magnitude than that for BLM protests only. This is suggestive that perhaps policing behavior might be different at BLM protests.

Second, I examine whether the selection of treatment time for crime incidents that are exposed to multiple protests affect my results. I restrict the treated crime incidents to those that fall within 0.5 mile from one BLM protest only, yielding a sample of 416,975 incidents. By doing so, I eliminate the potential cumulative effect that could result from crimes that are exposed to multiple protests. Figure A4 presents the corresponding event study. Observe that there continues to be an increase in arrest rates for most months after the onset of BLM protests. A joint F-test on the periods before the occurrence of the protests yields a F-stat of 1.32 and rejects that any coefficient differs significantly from 0 at 5% level, indicating that including the crimes that are exposed to multiple BLM protests might be contributing to the violation of parallel trend in the main specification.

Third, I check whether the results stay robust when I change the treatment time for incidents exposed to multiple BLM protests. For crimes occurred within 0.5 mile from and after at least one BLM protest, I define the treatment time to be the date of the latest protest within 0.5 mile before the incident. For crimes that are only within 0.5 mile from BLM protests that occurred after the incidents, I define the treatment to be the date of the earliest protest after the incident. Figure A5 presents the corresponding event study. There is a consistent increase in arrest rates following the BLM protests, which suggests that our results stay robust to different definition of treatment time for incidents exposed to multiple protests.

Fourth, to examine whether the results are sensitive to excluding small protests, I also restrict the sample to BLM protests that have sizes greater than hundreds and report the event study results in Figure A6. There are two main reasons for this restriction. First, the larger the protests, the stronger the effect on arrest might be because for instance they

are the most policed and have the strongest impact on nearby police allocation and crime arrest rates. The protests wither greater sizes are more likely to attract more police and have an impact on nearby police allocation and crime arrest rates. Second, protests with greater sizes are more likely to be reported by the media and therefore be recorded. Figure A6 suggests that the increase in arrest rates stays robust when we restrict to big protests. However, this conclusion should be interpreted carefully due to the significant pre-trends.

Additionally, recent literature has shown that in two-way fixed effect (TWFE) difference-in-differences estimations, there might exist negative weights on estimated variance-weighted treatment effects, when the treatment time varies across observations, which is the case in my study (Goodman-Bacon, 2021; Sun and Abraham, 2021). I estimate the group-time average treatment effect developed by Callaway and Sant'Anna (2021), where each group g consists of crime incidents with the same unique year-month in which they are first treated, namely the year-month in which a BLM protest occurs within 0.5 mile, and time t is each year-month between January 2019 and October 2021. The control group consists of crime incidents that are never treated. I then aggregate to estimate the dynamic effect for crimes with different time to treatment, shown in Figure A7. There is little significant change in arrest rates after the BLM protests. In fact, after the correction for staggered treatment, the estimated coefficients for more than half of the post-protest months become negative and not statistically significant. The statistically significant decrease in arrest in the months immediately after the onset of protests suggest that there might have been a temporary de-policing behavior after the BLM protests. Thus, the increase in arrest could be due to staggered treatment in the two-way fixed-effect difference-in-differences model.

Finally, the error terms might be correlated within the same neighborhood. To mitigate this issue, I estimate the same specification in equation 2 with standard errors clustered at the neighborhood level. Figures A8, A9, and A10 for all crimes, crimes on the street, and crimes in public spaces respectively show that that my main results are robust to clustering the standard errors.

7 Conclusion

Using data on crimes and BLM protests in Chicago from January 2019 to October 2021 and employing a difference-in-differences model, I estimate the effect of a nearby BLM protest on arrest rates of crimes. I also extend the difference-in-differences model to a dynamic event study to check the identifying assumptions of the DD framework and the persistence of the effect. I find an increase in arrest rates for crimes that happen after a BLM protest occurred within 0.5 mile from the crimes. The results are statistically significant and robust when I restrict the sample to crimes on the street and crimes in public spaces. The effect is greatest in magnitude for crimes that happen on the street. However, for less serious crimes, there is a reduction in arrests in the month of protest but no significant effect observed in the following months. This suggests that the increase in overall arrest rates might result from the police deploying more policing to target more serious offense only. I also perform the same estimation on all types of protests and find a greater increase in arrest rates. Therefore, it is possible that the increase in arrest is due to the universal characteristic of more police presence at large gatherings and protests. When restricting to protest-related offenses, I find that arrest rates decrease in the month following the BLM protest and increase for subsequent months. This could suggest that at the one set of BLM protest, police are deployed in the are at higher rate, but choose to depolice immeditaely after the protest. However, these results should be interpreted with caution given the non-parallel pre-trends. Future research is needed to disentangle the mechanisms behind this change in police arrest behavior.

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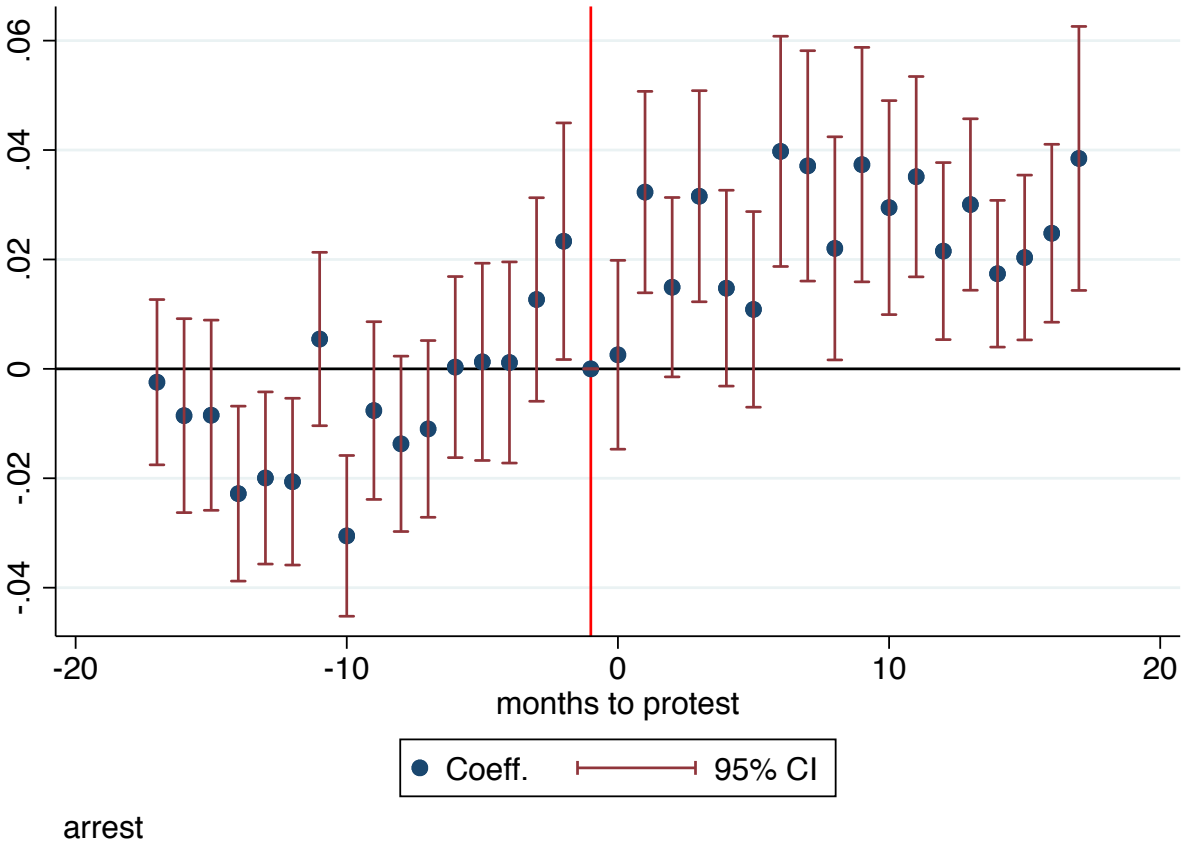
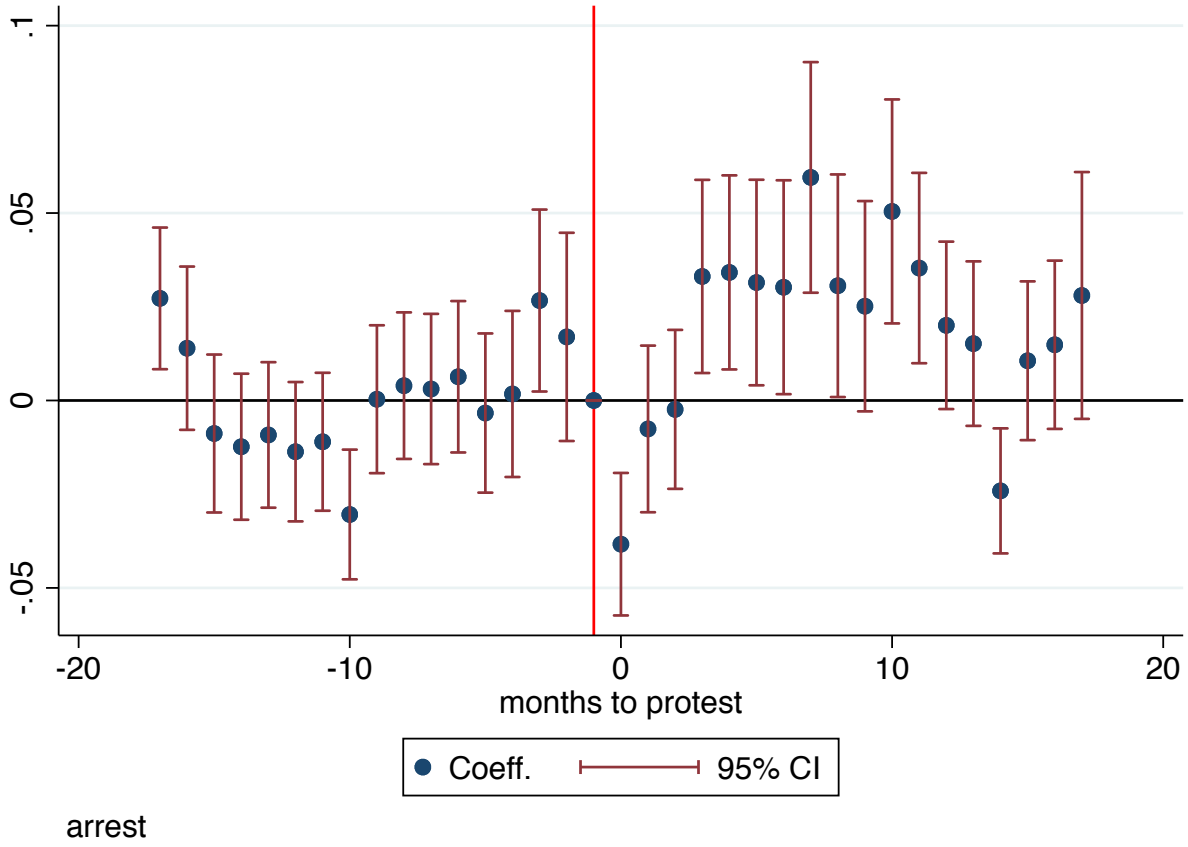
A Appendix Figures and Tables

Figure A1: Effects on More Serious Offenses



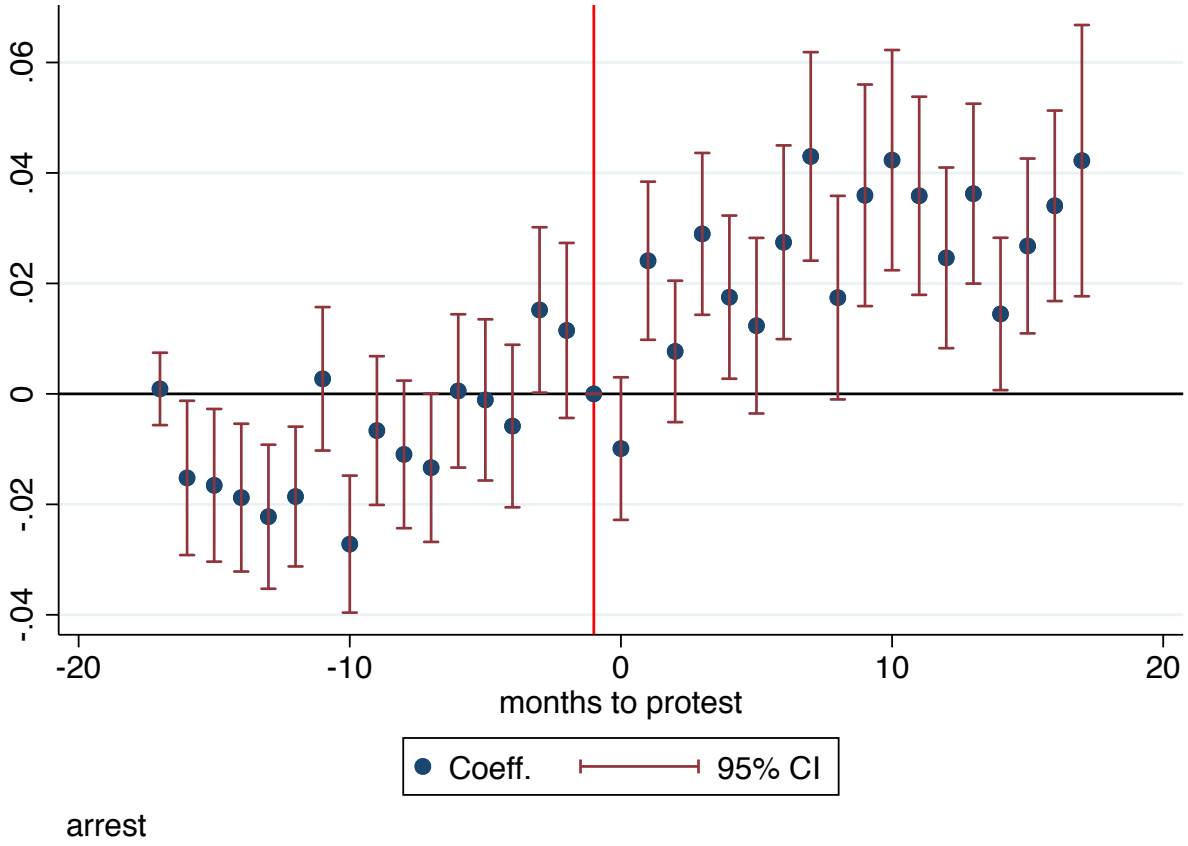
Notes: Figure presents event-study difference-in-differences estimated coefficients and 95% confidence intervals of equation 2 on more serious offenses in Chicago between January 2019 and October 2021. Standard errors are robust. Treatment group consists of crime incidents that happen within 0.5 mile from a BLM protest with verifiable accurate location in Chicago. Control group consists of crime incidents that take place more than 0.5 mile and less than 3 miles from any such protest. Time to treatment is defined as the number of months after exposure to the first protest within 0.5 mile. Red line represents the month before treatment.

Figure A2: Effects on Protest-related Offenses



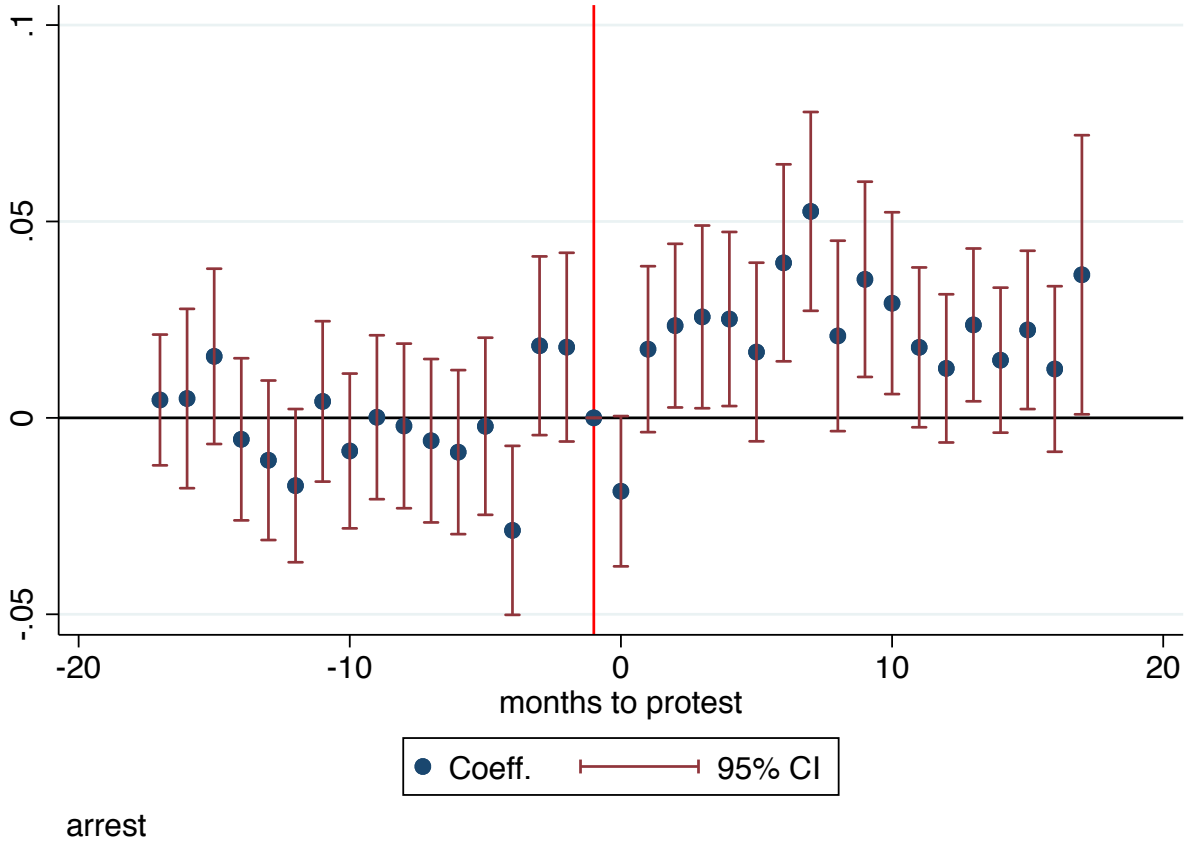
Notes: Figure presents event-study difference-in-differences estimated coefficients and 95% confidence intervals of equation 2 on protest-related offenses in Chicago between January 2019 and October 2021. Standard errors are robust. Treatment group consists of crime incidents that happen within 0.5 mile from a BLM protest with verifiable accurate location in Chicago. Control group consists of crime incidents that take place more than 0.5 mile and less than 3 miles from any such protest. Time to treatment is defined as the number of months after exposure to the first protest within 0.5 mile. Red line represents the month before treatment.

Figure A3: Effects of All Protests on Crimes



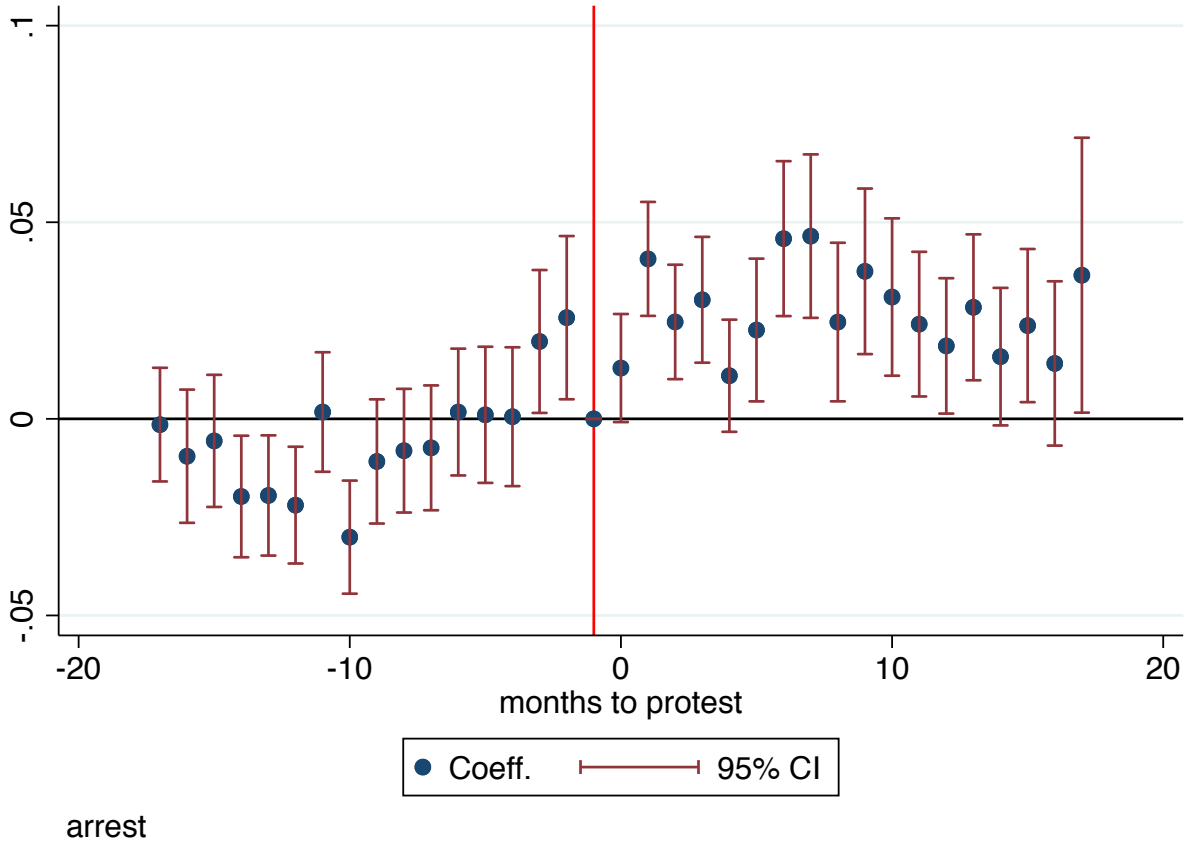
Notes: Figure presents event-study difference-in-differences estimated coefficients and 95% confidence intervals of equation 2 on all crimes in Chicago between January 2019 and October 2021. Standard errors are robust. Treatment group consists of crime incidents that happen within 0.5 mile from a protest in Chicago. Control group consists of crime incidents that take place more than 0.5 mile and less than 3 miles from any protest. Time to treatment is defined as the number of months after exposure to the first protest within 0.5 mile. Red line represents the month before treatment.

Figure A4: Effects on All Crimes with Single Exposure



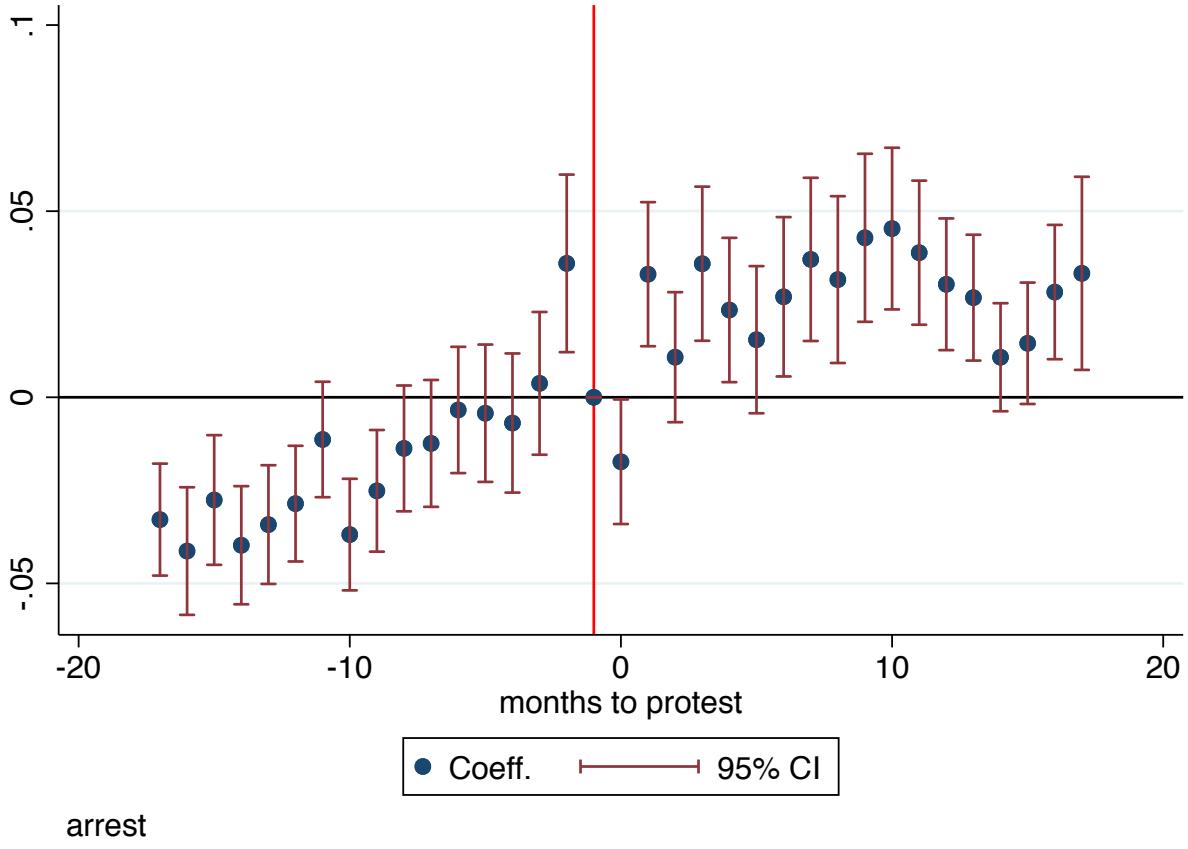
Notes: Figure presents event-study difference-in-differences estimated coefficients and 95% confidence intervals of equation 2 on all crimes that are exposed to one and only one BLM protest in Chicago between January 2019 and October 2021. Standard errors are robust. Treatment group consists of crime incidents that happen within 0.5 mile from one and only one BLM protest with verifiable accurate location in Cfhicago. Control group consists of crime incidents that take place more than 0.5 mile and less than 3 miles from any such protest. Time to treatment is defined as the number of months after exposure to the first protest within 0.5 mile. Red line represents the month before treatment.

Figure A5: Effects on All Crimes with Different Treatment Time Definition



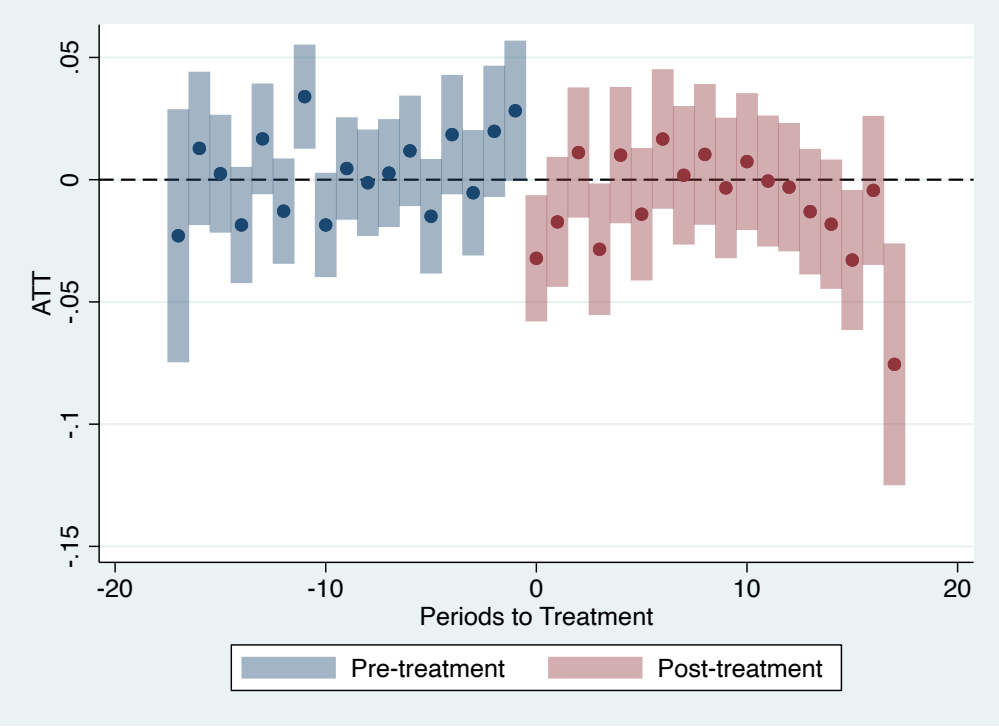
Notes: Figure presents event-study difference-in-differences estimated coefficients and 95% confidence intervals of equation 2 on all crimes in Chicago between January 2019 and October 2021. Standard errors are robust. Treatment group consists of crime incidents that happen within 0.5 mile from a BLM protest with verifiable accurate location in Chicago. Control group consists of crime incidents that take place more than 0.5 mile and less than 3 miles from any such protest. Time to treatment is defined as the number of months after exposure to the most recent protest within 0.5 mile. Red line represents the month before treatment.

Figure A6: Effects of Big Protests on Crimes



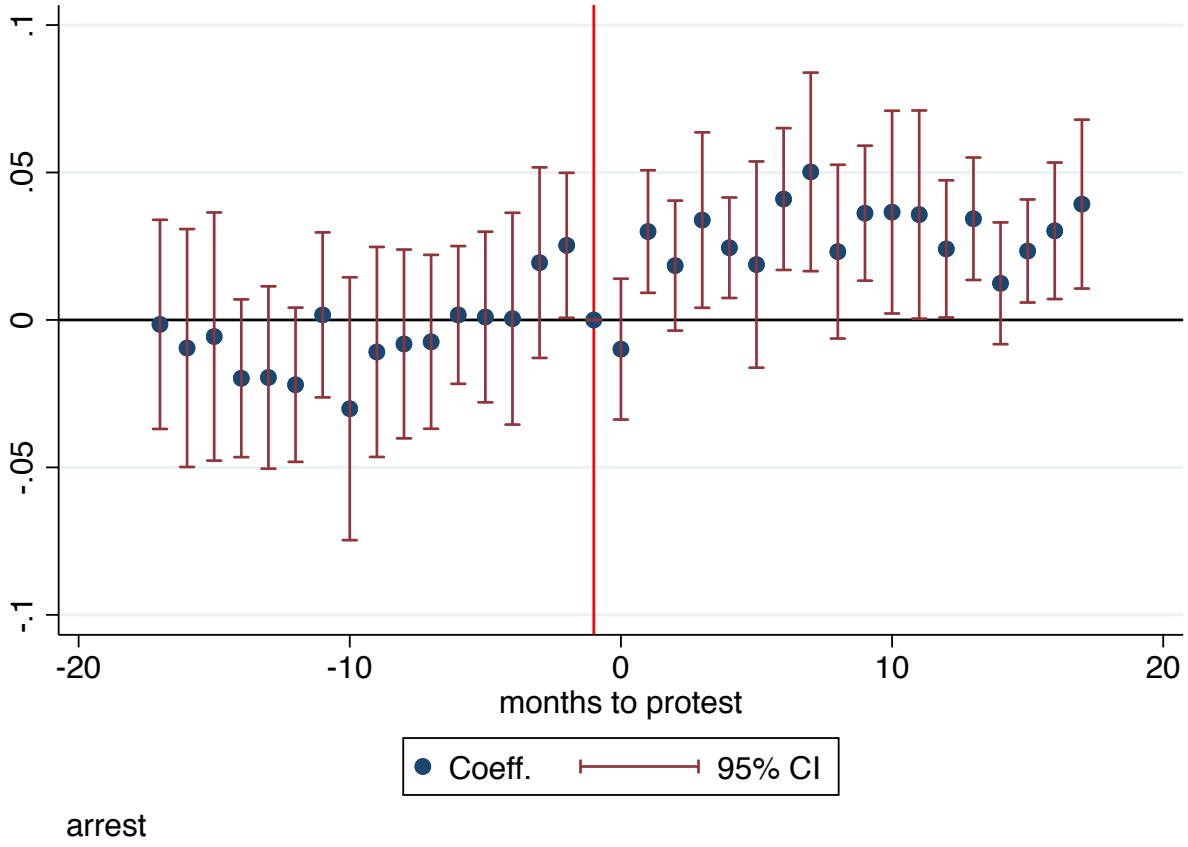
Notes: Figure presents event-study difference-in-differences estimated coefficients and 95% confidence intervals of equation 2 on all crimes in Chicago between January 2019 and October 2021. Standard errors are robust. Treatment group consists of crime incidents that happen within 0.5 mile from a BLM protest with verifiable accurate location and with size greater than hundreds. Control group consists of crime incidents that take place more than 0.5 mile and less than 3 miles from any such protest. Time to treatment is defined as the number of months after exposure to the first protest within 0.5 mile. Red line represents the month before treatment.

Figure A7: Effect on All Crimes with Staggered Treatment Correction



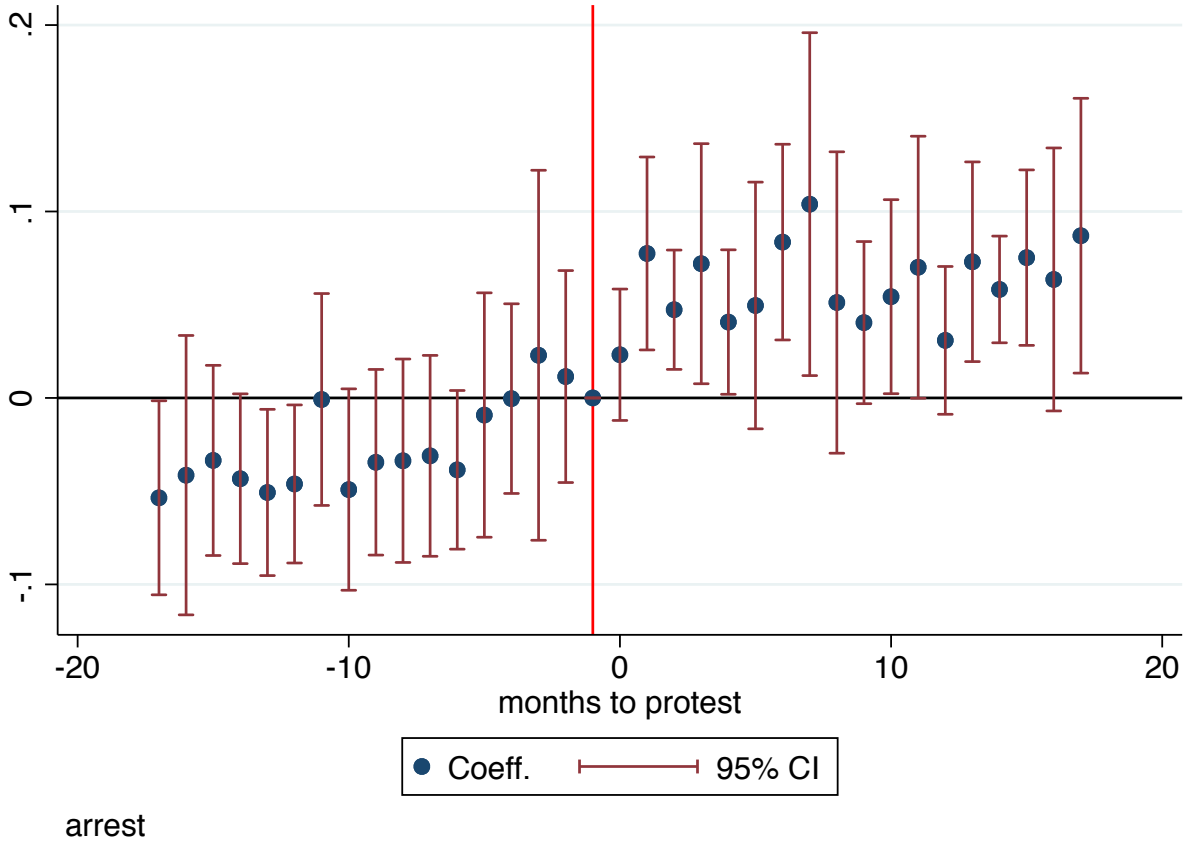
Notes: This figure shows estimated effect on arrest rates in Chicago and their 95% confidence intervals, after aggregating group-time average time effect. I estimate group-time average time effect for each group of crimes defined by the year-month the crimes are treated (the year-month in which the first BLM protest within 0.5 mile happens) and each time period defined as each year-month between 2019 and 2021. The control group consists of crimes that are never exposed to a BLM protest.

Figure A8: Effect on All Crimes with Clustered Standard Errors



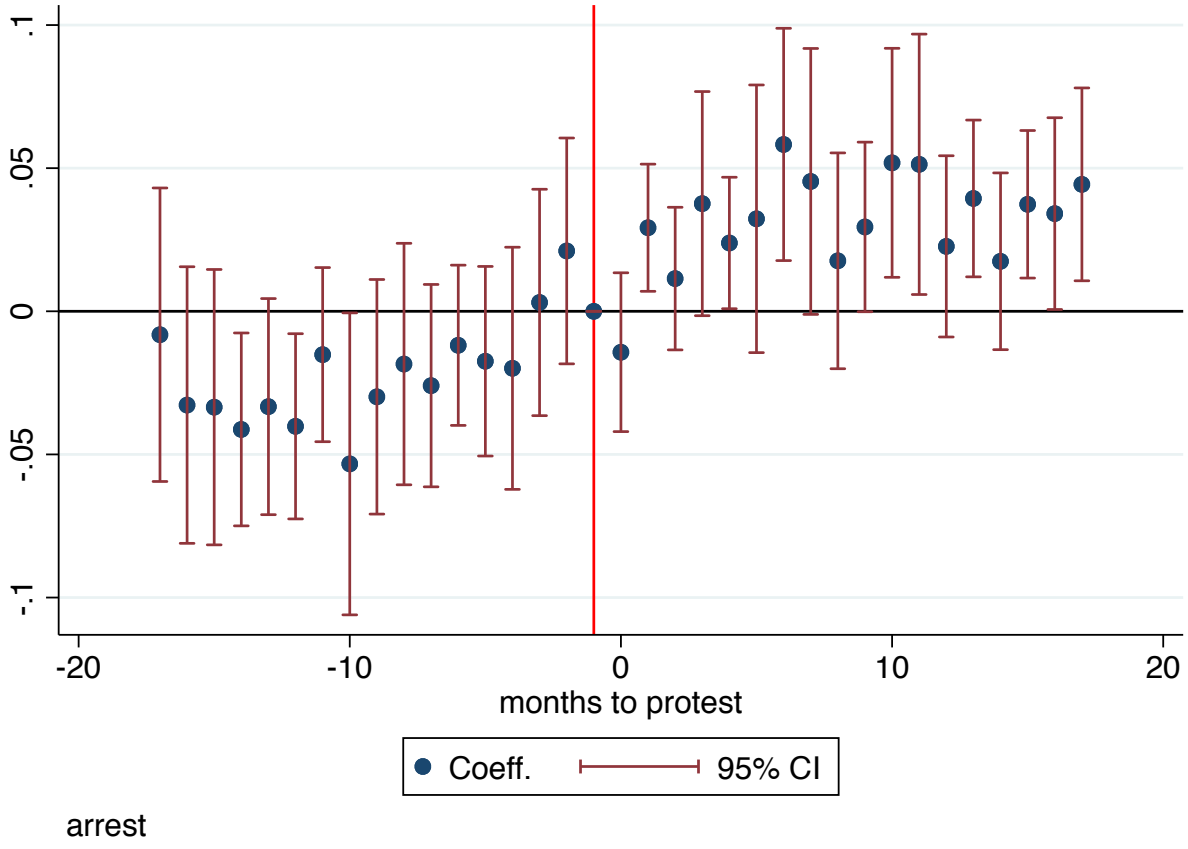
Notes: This figure presents event study difference-in-differences estimates and their 95% confidence intervals. The sample consists of all crime incidents in Chicago between January 2019 and October 2021. Standard errors are clustered by neighborhoods. Treatment group consists of crime incidents that happen within 0.5 mile from a BLM protest. Control group consists of crime incidents that take place more than 0.5 mile but less than 3 miles away from a BLM protest. Time to treatment is defined as the number of months before or after a BLM protest occurred. The vertical red line represents the month before treatment, the omitted category.

Figure A9: Effect on Street Crimes with Clustered Standard Errors



Notes: This figure presents event study difference-in-differences estimates and their 95% confidence intervals. The sample consists of crime incidents that happen on the street in Chicago between January 2019 and October 2021. Standard errors are clustered by neighborhoods. Treatment group consists of crime incidents that happen within 0.5 mile from a BLM protest. Control group consists of crime incidents that take place more than 0.5 mile but less than 3 miles away from a BLM protest. Time to treatment is defined as the number of months before or after a BLM protest occurred. The vertical red line represents the month before treatment, the omitted category.

Figure A10: Effect on Public Crimes with Clustered Standard Errors



Notes: This figure presents event study difference-in-differences estimates and their 95% confidence intervals. The sample consists of crime incidents that happen in public spaces in Chicago between January 2019 and October 2021. Standard errors are clustered by neighborhoods. Treatment group consists of crime incidents that happen within 0.5 mile from a BLM protest. Control group consists of crime incidents that take place more than 0.5 mile but less than 3 miles away from a BLM protest. Time to treatment is defined as the number of months before or after a BLM protest occurred. The vertical red line represents the month before treatment, the omitted category.

Table A1: Event Study Estimates

	(1) All	(2) Street	(3) Public
Time to Treatment	b	b	b
-17	0.00010	-0.05134***	-0.00649
-16	-0.00941	-0.04183*	-0.03282***
-15	-0.00519	-0.03374	-0.03435***
-14	-0.01924*	-0.04346**	-0.04096***
-13	-0.01977*	-0.05058**	-0.03367***
-12	-0.02219**	-0.04675**	-0.04041***
-11	0.00126	-0.00230	-0.01593
-10	-0.03014***	-0.04992***	-0.05364***
-9	-0.01040	-0.03469*	-0.03020**
-8	-0.00839	-0.03428*	-0.01848*
-7	-0.00725	-0.03167	-0.02623**
-6	0.00222	-0.03896*	-0.01162
-5	0.00122	-0.01023	-0.01731
-4	0.00097	-0.00032	-0.01978
-3	0.01907*	0.02182	0.00307
-2	0.02302*	0.00935	0.01913
0	-0.00914	0.02676	-0.01174
1	0.02953**	0.07555***	0.02812*
2	0.01881*	0.04797**	0.01277
3	0.03435***	0.07237***	0.03878**
4	0.02611**	0.04148*	0.02736*
5	0.01818*	0.04964*	0.03184*
6	0.04272***	0.08722***	0.06109***
7	0.04962***	0.10489***	0.04558**
8	0.02378*	0.05015*	0.01860
9	0.03544***	0.03805	0.02920*
10	0.03591***	0.05364*	0.05153***
11	0.03571***	0.07036***	0.05190***
12	0.02341**	0.03055	0.02268*
13	0.03481***	0.07353***	0.04043***
14	0.01353	0.05746***	0.01808*
15	0.02339**	0.07336***	0.03720***
16	0.02998***	0.06310***	0.03401**
17	0.03922**	0.08685**	0.04486**
constant	0.19077***	0.23745***	0.23427***
r2	0.04470	0.09314	0.06599
N	457674	143573	284021
ymean	0.17791	0.24594	0.22279

* $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$

Notes: Estimated coefficients in columns 1 to 3 are derived from the estimation results displayed in Figure 2 to 4.