Black Lives Matter's Effect on Police Lethal Use-of-Force

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he/him
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Question and Method

Question: Has Black Lives Matter (BLM) reduced lethal use-of-force by police?

- Explicit goal
- Sign uncertain, a priori
- Media data $\rightarrow$ measurement error
- Lethal force predicts protests $\Rightarrow\!\!\!\!\!\!\not\Leftarrow$ parallel trends

Method: Event study of BLM protests using stacked diff-in-diff.

What is Black Lives Matter?

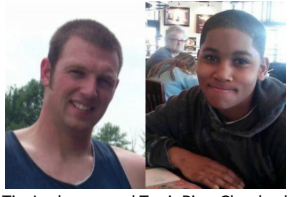
BLM became global movement in August 2014 after killing of Mike Brown.

Location: Protests cluster in places of high profile killings.

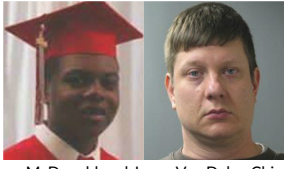
- White officer kills black male
- Caught on video
- Unarmed victim

Demand: Purview has broadened from police killings to black empowerment.

Mike Brown and Darren Wilson; Ferguson



Tim Loehmann and Tamir Rice; Cleavland



Laquan McDonald and Jason Van Dyke; Chicago

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Tactics are diverse

Die-in at Stanford

Insurrection in Baltimore

Eli Harold, Colin Kaepernick and Eric Reid

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Definition (Protests)

In-person gatherings under the banner of BLM to protest any nonpartisan issue.

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Data

Stacked dataset includes all *census places* with a population over 20,000 from 2000-2019 (quarterly).

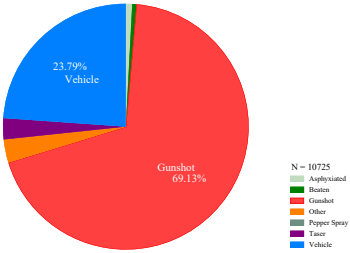
- 283 places with protests
- 1,265 places without protests.
- $N = 1{,}318{,}456$.

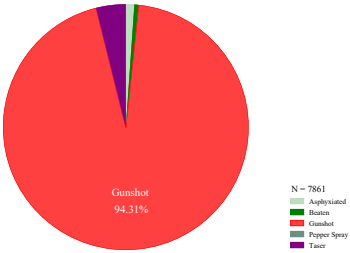
Sources:

- Williamson, Trump and Einstein (2018)
- Elephrame (webscrape)
- Fatal Encounters
- American Community Survey (5 year, 2013)
- Annual Survey of Public Employment
- Uniform Crime Reporting
- Law Enforcement Management and Administrative Statistics
- Harvard Election Data Archive
- Mapping Police Violence

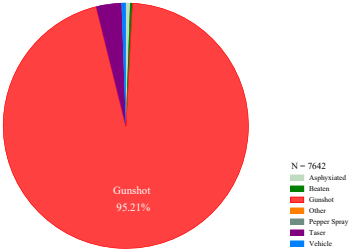
Police killings by database and cause-of-death

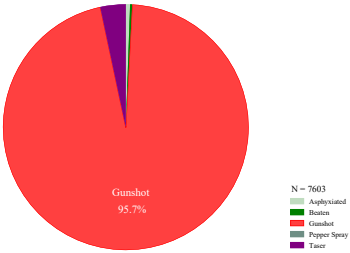
Fatal Encounters data



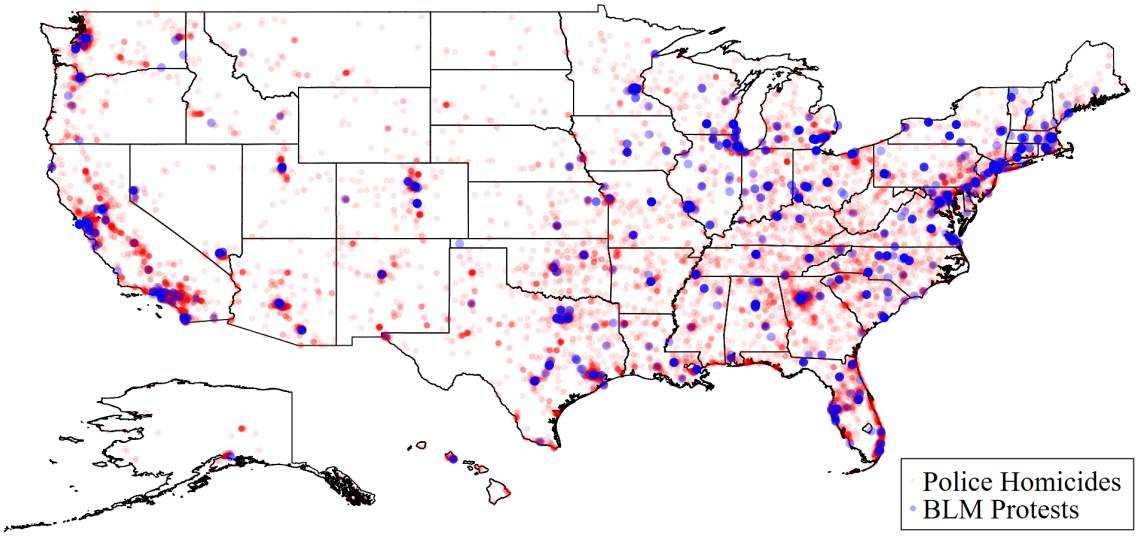


Mapping Police Violence data

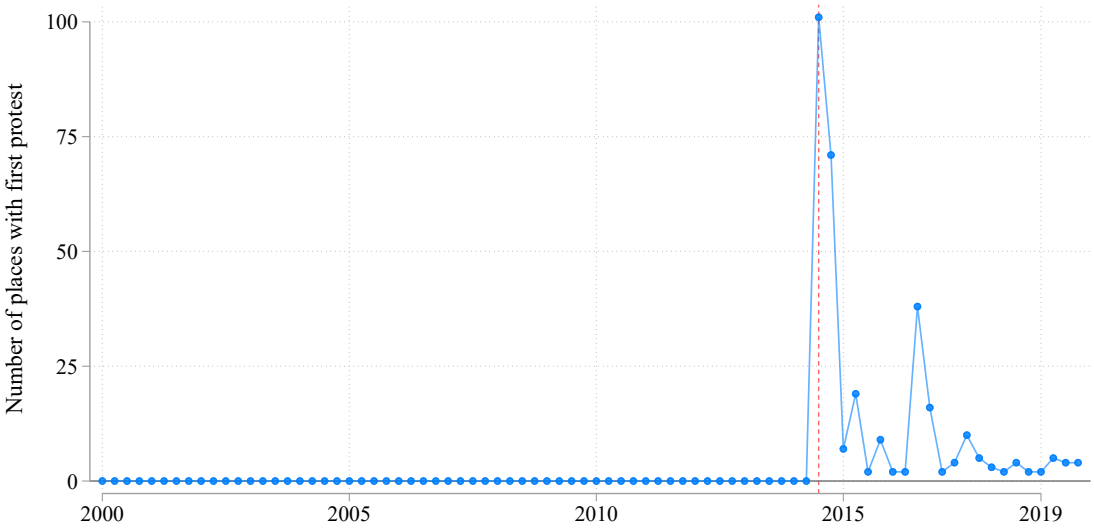




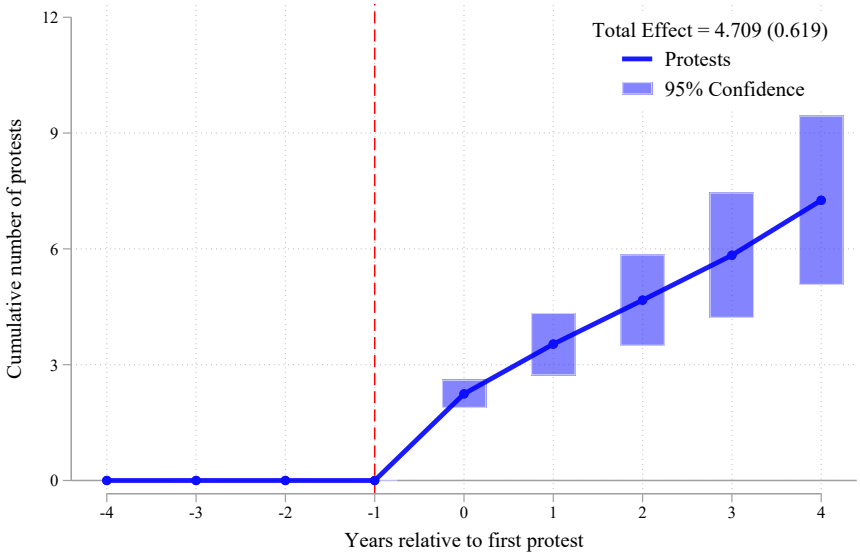
Identifying variation - space



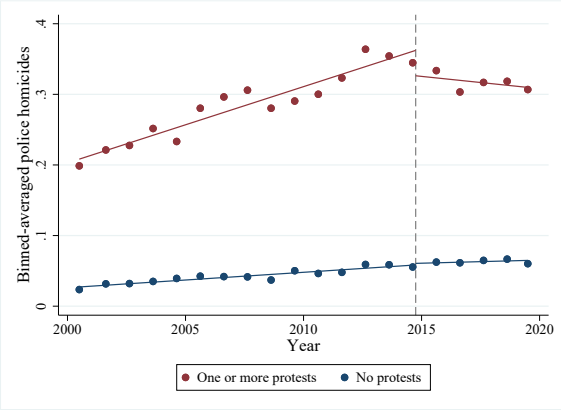
Identifying variation - time



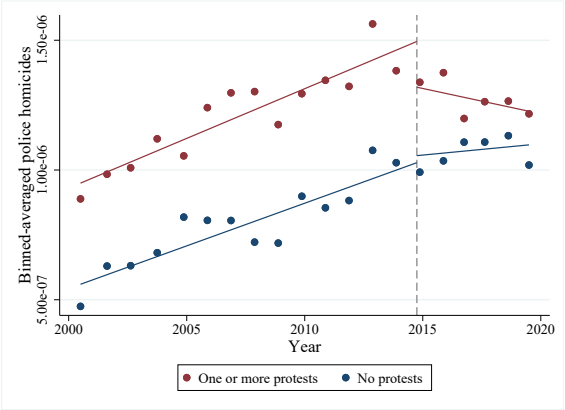
Evolution of total number of Black Lives Matter protests



Police Homicides



Police Homicides per Capita



Model – Stacked Difference-in-Difference

Stacked difference-in-difference with place-cohort and year-cohort fixed effects

$$\frac{Y_{c,i,t}}{N_{c,i,t}} = \mu + \sum_{k=-4}^{3} \beta_k D_{k,c,i,t} + \alpha_{c,i} + \delta_{c,t} + \epsilon_{c,i,t}$$

where

- $Y_{c,i,t}$ is lethal force in locality cohort c, place i, quarter t
- $N_{c,i,t}$ is normalization variable.
- $D_{k,c,i,t}$ indicates treatment status for single year k relative to the first protest
- $\alpha_{c,i}$ is cohort-state fixed effect
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- $\epsilon_{c,i,t}$ is the error term

Identification:

$$E(\epsilon_{c,i,t} | \{D_k\}_{k=-4}^{3}, \alpha_{c,i}, \delta_{c,t}) = 0$$

meaning, protests are exogenous conditional on fixed effects.

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Estimators

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Four estimators:

$$(\hat{\mu}, \hat{\beta}, \hat{\alpha}, \hat{\delta}) = \arg\min_{\mu,\beta,\alpha,\delta} \sum_{i=1}^{N} \sum_{t=1}^{T} \left(Y_{c,i,t} - \mu - \sum_{k=-4}^{3} \beta_k D_{k,c,i,t} - \alpha_{c,i} - \delta_{c,t} \right)^2 w_{c,i,t} \tag{2}$$

1) **OLS:** $w_{c,i,t} = 1$ $N_{c,i,t} = 1$

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4) **Synthetic diff-in-diff:** $w_{c,i,t} = \omega_{c,i} \times \lambda_{c,t}$ $N_{c,i,t} = 1$

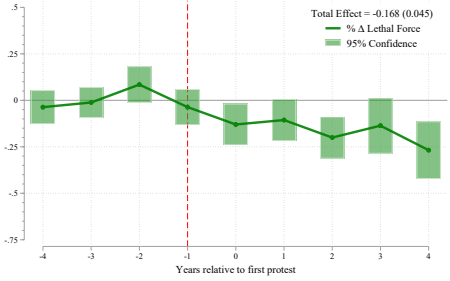
Inverse probability weighting

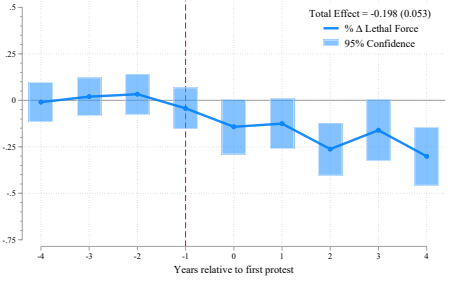
IPW use logistic ridge regression with 10-fold cross-validation. 80 potential controls:

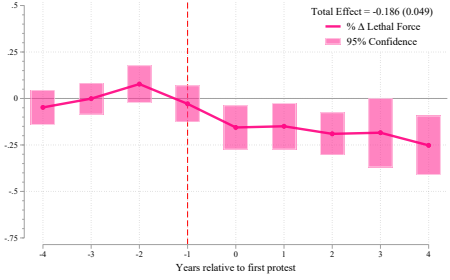
1. Labor market
2. Local demographics
3. Population size/density
4. Crime
5. Police per capita
6. Average police wage
7. 2008 Presidential Vote
8. Agency demographics
9. Agency cameras
10. Agency union
11. Agency policy
12. Community policing

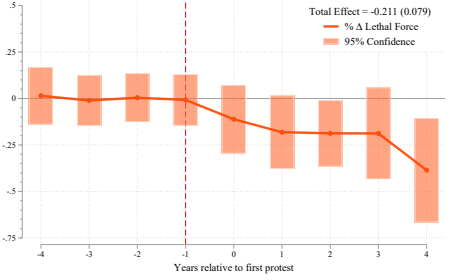
Red controls: at least 50% missing. Multiple imputation ($M = 10$).

Evolution of lethal force (%Δ)





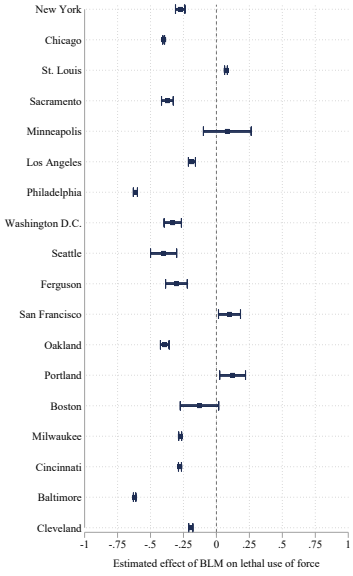




- **OLS**
- **Population weights (per capita)**
- **IPW on 2013 controls**
- **Synthetic diff-in-diff**

Case studies

- Descends in total protests
- OLS



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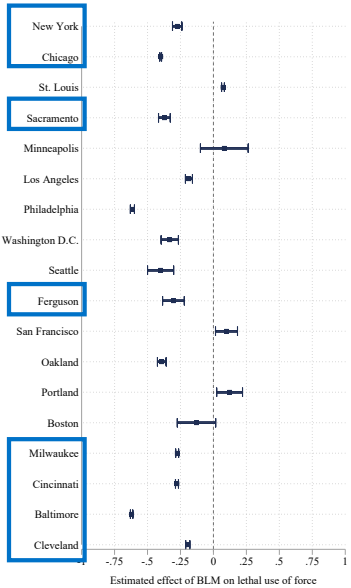

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- Descends in total protests
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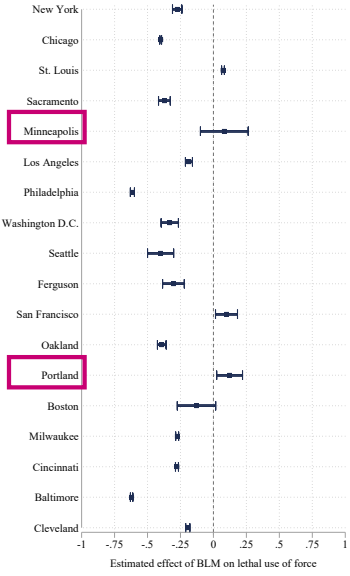
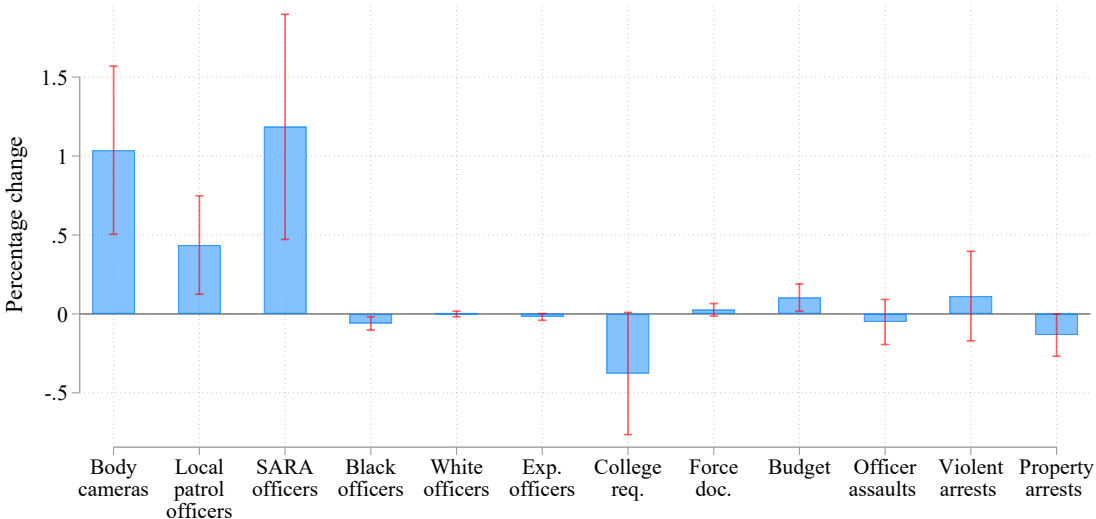
- Were 2020 protests a coincidence?



Mechanisms


Percentage change
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.5
0
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Black officers
White officers
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College req.
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Violent arrests
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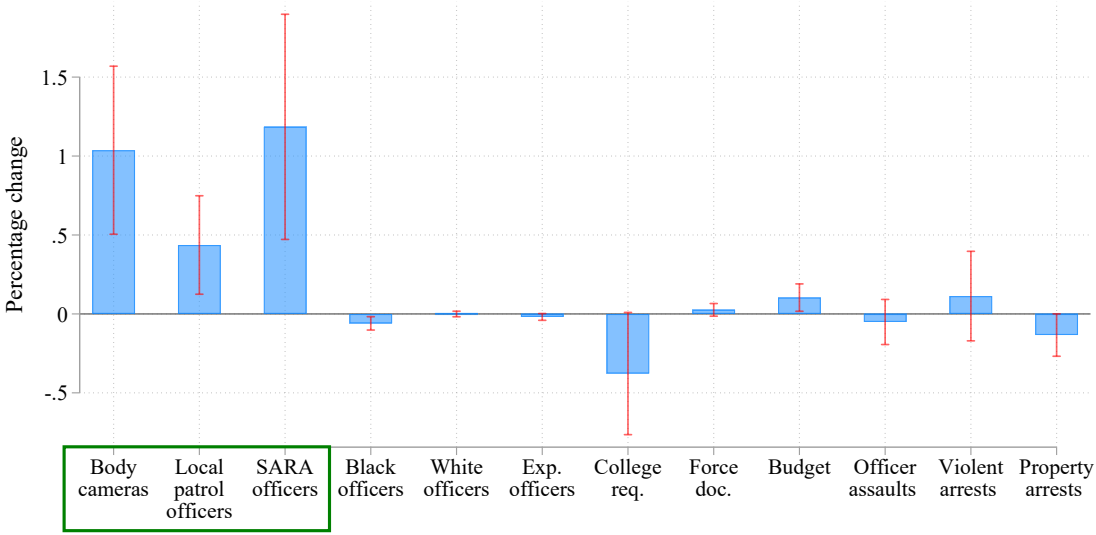
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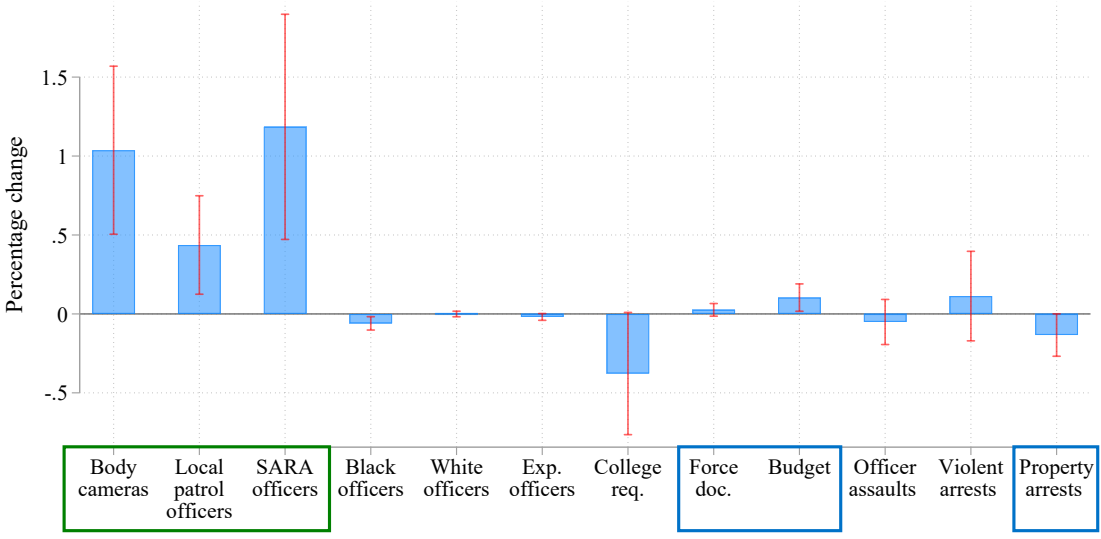
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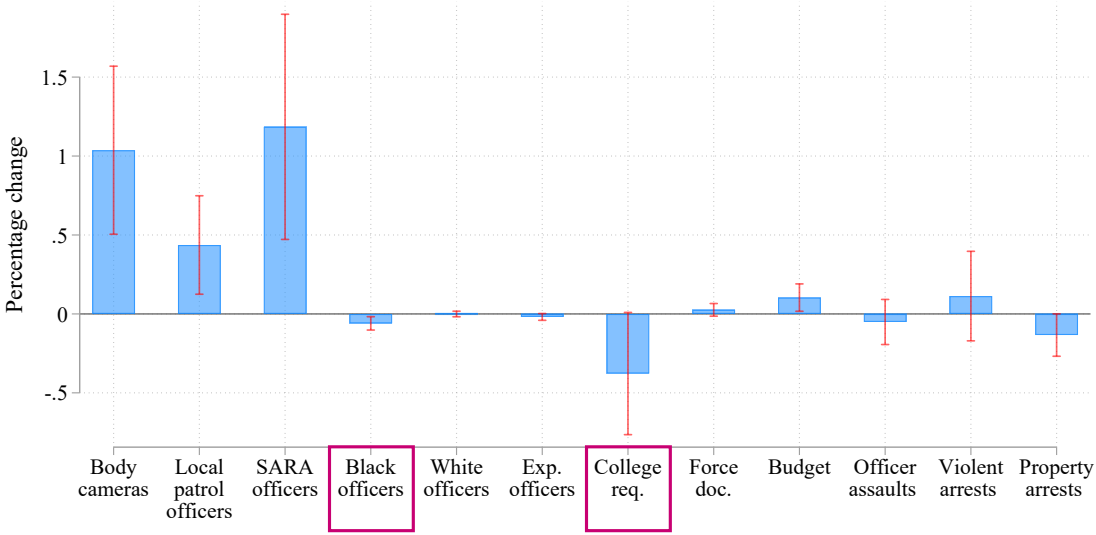
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- Robust to:
  - Estimator ▸ Next slide
  - Protest intensity ▸ Next slide
  - Population screen ▸ Next slide
  - Specification ▸ Next slide
  - Choice of data ▸ Next slide
- Does not hold when normalizing lethal force by arrests ▸ Next slide

Thank you!

Robustness to estimator

Back

	(1)	(2)	(3)	(4)	(5)	(6)
%ΔLethal Force	-0.168	-0.198	-0.186	-0.186	-0.188	-0.211
	(0.045)	(0.053)	(0.049)	(0.063)	(0.059)	(0.079)
ΔTotal Lethal Force	316	373	350	349	265	297
	(84.5)	(99.6)	(92.1)	(118)	(83.0)	(111)
Average outcome pre-protest ($\overline{Y_{-1}}$)	0.368	0.000	0.368	0.368	0.276	0.276
Average normalization pre-protest ($\overline{N_{-1}}$)	1	261,320	1	1	1	1
Total place-quarters after protest (e)	5100	5100	5100	5100	5100	5100
Total lethal force post-protest	1,815	1,815	1,815	1,815	1,815	1,815
Places with protests	283	283	283	283	283	283
Places without protests	1,265	1,265	1,265	1,265	1,265	1,265
Total number of protests	1,654	1,654	1,654	1,654	1,654	1,654
Total number of protesters	343,230	343,230	343,230	343,230	343,230	343,230
Number of cohorts	13	13	13	13	13	13
Sample size	1,318,456	1,318,456	1,318,456	1,318,456	1,318,456	1,318,456
Normalization	None	Popula-tion	None	None	None	None
Population weights		✓				
Pre-treatment control inverse probability weights			✓			
Event-place inverse probability weights				✓		✓
Event-quarter inverse probability weights					✓	✓

Impact by protests size and count quartiles

Back

	(1)	(2)	(3)	(4)	(5)
Maximum protest size					
Quartile 1 ($\leq$ 40)	-0.106	-0.121	-0.122	-0.227	-0.200
	(0.105)	(0.107)	(0.107)	(0.116)	(0.120)
Quartile 2 ($\leq$ 100)	-0.049	-0.077	-0.095	-0.136	-0.118
	(0.090)	(0.089)	(0.089)	(0.104)	(0.112)
Quartile 3 ($\leq$ 300)	-0.041	-0.090	-0.062	-0.158	-0.135
	(0.079)	(0.085)	(0.082)	(0.134)	(0.135)
Quartile 4 ($>$ 300)	-0.165	-0.220	-0.212	-0.263	-0.217
	(0.069)	(0.065)	(0.066)	(0.093)	(0.081)
Total number of protests					
Quartile 1 ($\leq$ 1)	-0.056	-0.066	-0.070	-0.099	-0.079
	(0.103)	(0.104)	(0.105)	(0.123)	(0.124)
Quartile 2 ($\leq$ 2)	-0.204	-0.239	-0.240	-0.374	-0.349
	(0.139)	(0.141)	(0.140)	(0.161)	(0.167)
Quartile 3 ($\leq$ 5)	0.034	0.011	-0.025	-0.117	-0.085
	(0.091)	(0.091)	(0.091)	(0.108)	(0.121)
Quartile 4 ($>$ 5)	-0.153	-0.205	-0.189	-0.248	-0.221
	(0.060)	(0.056)	(0.057)	(0.086)	(0.079)
Cohort-place fixed effects	✓	✓	✓	✓	✓
Cohort-time fixed effects	✓	✓	✓	✓	✓
Population controls		✓	✓	✓	✓
Consent decress controls			✓	✓	✓
Cohort-place linear time trend				✓	✓
Cohort-time-population fixed effects					✓

Robustness to population screen

Back

	(1)	(2)	(3)	(4)	(5)	(6)	(7)
%ΔLethal Force	-0.168	-0.169	-0.168	-0.163	-0.160	-0.201	-0.191
	(0.045)	(0.046)	(0.047)	(0.047)	(0.050)	(0.061)	(0.096)
ΔTotal Lethal Force	316	312	304	294	285	332	257
	(84.5)	(84.9)	(84.9)	(84.7)	(89.3)	(101)	(129)
Average outcome pre-protest ($\overline{\%N}_{-1}$)	0.368	0.448	0.555	0.619	0.710	0.961	1.152
Average normalization pre-protest ($\overline{N}_{-1}$)	1	1	1	1	1	1	1
Total place-quarters after protest (e)	5100	4117	3256	2912	2516	1722	1168
Total lethal force post-protest	1,815	1,772	1,710	1,672	1,641	1,504	1,304
Places with protests	283	223	174	154	132	90	61
Places without protests	1,265	552	290	169	99	26	6
Total number of protests	1,654	1,525	1,443	1,406	1,353	1,207	1,080
Total number of protesters	343,230	326,669	318,463	315,766	309,218	290,730	274,522
Population screen	20,000	40,000	60,000	80,000	100,000	175,000	250,000
Number of cohorts	13	13	12	9	8	7	6
Sample size	1,318,456	581,186	285,042	130,420	72,045	21,029	7,209

Robustness to specification

Back

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
%ΔLethal Force	-0.121	-0.101	-0.238	-0.168	-0.169	-0.126	-0.113	-0.170	-0.182	-0.181
	(0.048)	(0.040)	(0.066)	(0.045)	(0.046)	(0.049)	(0.049)	(0.057)	(0.078)	(0.104)
ΔTotal Lethal Force	228	191	447	316	318	237	213	319	343	254
	(90.2)	(75.1)	(124)	(84.5)	(86.4)	(92.1)	(92.1)	(107)	(147)	(146)
Average outcome pre-protest ($\overline{Y_{N_{-1}}}$)	0.368	0.368	0.368	0.368	0.368	0.368	0.368	0.368	0.368	0.276
Average normalization pre-protest ($\overline{N}_{-1}$)	1	1	1	1	1	1	1	1	1	1
Total place-quarters after protest (e)	5100	5100	5100	5100	5100	5100	5100	5100	5100	5100
Total lethal force post-protest	1,815	1,815	1,815	1,815	1,815	1,815	1,815	1,815	1,815	1,815
Places with protests	283	283	283	283	283	283	283	283	283	283
Places without protests	1,265	1,265	1,265	1,265	1,265	1,265	1,265	1,265	1,265	1,265
Total number of protests	1,654	1,654	1,654	1,654	1,654	1,654	1,654	1,654	1,654	1,654
Total number of protesters	343,230	343,230	343,230	343,230	343,230	343,230	343,230	343,230	343,230	343,230
Number of cohorts	13	13	13	13	13	13	13	13	13	13
Sample size	1,318,456	1,318,456	1,318,456	1,318,456	1,318,456	463,564	448,112	448,112	448,112	448,112
Cohort-place fixed effects	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Cohort-time fixed effects	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Cohort-time-population quintile fixed effects		✓								
Cohort-place linear time trend			✓							
Population controls				✓	✓	✓	✓	✓	✓	✓
Consent decree controls					✓	✓	✓	✓	✓	
Demographic and labor market controls						✓	✓	✓	✓	
Crime controls							✓	✓	✓	✓
Pre-treatment control inverse probability weights								✓		
Event-place inverse probability weights									✓	
Event-place and event-quarter inverse probability weights										✓

Estimates using Mapping Police Violence data

Back

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
%ΔLethal Force	-0.084	-0.145	-0.132	-0.095	-0.113	-0.110	-0.121	-0.235
	(0.043)	(0.062)	(0.085)	(0.086)	(0.083)	(0.118)	(0.084)	(0.121)
ΔTotal Lethal Force	158	274	81	71	83	82	65	126
	(81.1)	(117)	(52.0)	(64.1)	(60.6)	(87.9)	(45.1)	(64.9)
Average outcome pre-protest ($\overline{Y\%}_{-1}$)	0.342	0.000	0.111	0.000	0.132	0.000	0.097	0.000
Average normalization pre-protest ($\overline{N}_{-1}$)	1	245080	1	141521	1	53746	1	245080
Total place-quarters after protest (e)	5525	5525	5525	5525	5525	5525	5525	5525
Total lethal force post-protest	2,765	2,765	836	836	1,095	1,095	778	778
Places with protests	314	314	314	314	314	314	314	314
Places without protests	1,257	1,257	1,257	1,257	1,257	1,257	1,257	1,257
Total number of protests	1,753	1,753	1,753	1,753	1,753	1,753	1,753	1,753
Total number of protesters	350,150	350,150	350,150	350,150	350,150	350,150	350,150	350,150
Sample size	43,988	43,988	37,604	37,604	37,604	37,604	43,988	43,988
Police homicide subset	Total	Total	White	White	Black	Black	Unarmed	Unarmed
Benchmark	None	Population	None	White	None	Black	None	Population
Weight	None	Population	None	White	None	Black	None	Population

Robustness to normalization

Back

	(1)	(2)	(3)	(4)	(5)
%ΔLethal Force	-0.168	-0.137	-0.406	1.401	2.380
	(0.045)	(0.070)	(0.282)	(0.988)	(1.746)
ΔTotal Lethal Force	316	272	1,141	-3,824	-6,625
	(84.5)	(139)	(792)	(2,698)	(4,861)
Average outcome pre-protest ($\overline{y/N}_{-1}$)	0.368	0.000	0.001	0.002	0.001
Average normalization pre-protest ($\overline{N}_{-1}$)	1	261,320	739	301	915
Total place-quarters after protest (e)	5100	5100	5100	5100	5100
Total lethal force post-protest	1,815	1,815	1,815	1,815	1,815
Places with protests	283	283	283	283	283
Places without protests	1,265	1,265	1,265	1,265	1,265
Total number of protests	1,654	1,654	1,654	1,654	1,654
Total number of protesters	343,230	343,230	343,230	343,230	343,230
Benchmark	None	Population	Officers	Violent Arrests	Total Arrests
Sample size	1,318,456	1,318,456	800,504	1,146,908	1,157,089