Police Frisks

David Abrams, Hanming Fang & Priyanka Goonetilleke

January 2022

Motivation

- Stop-and-frisk policing has been the subject of investigation in dozens of cities over the past 20 years over concerns that the tactics are implemented excessively and with racial bias.
- The most influential economics paper on police stops is Knowles, Persico and Todd (2001) which spawned a large subsequent literature, notably Anwar & Fang (2006)
- KPT provides a simple hit rate based test to detect racial discrimination, which has been widely influential and adopted in many racial discrimination cases against police forces across the US

Motivation

- Key to KPT and similar models is assumption that police officers optimize an objective function with contraband discovery as a component, implying that officers should stop and frisk those individuals they believe most likely to carry contraband
- While hit rate tests have been widely used, until recently there was less focus on the assumption of optimizing behavior of police officers
  - Feigenberg & Miller (2021) and Gelbach (2021)
- This work should help inform analysis of this ubiquitous policing tactic

This Paper

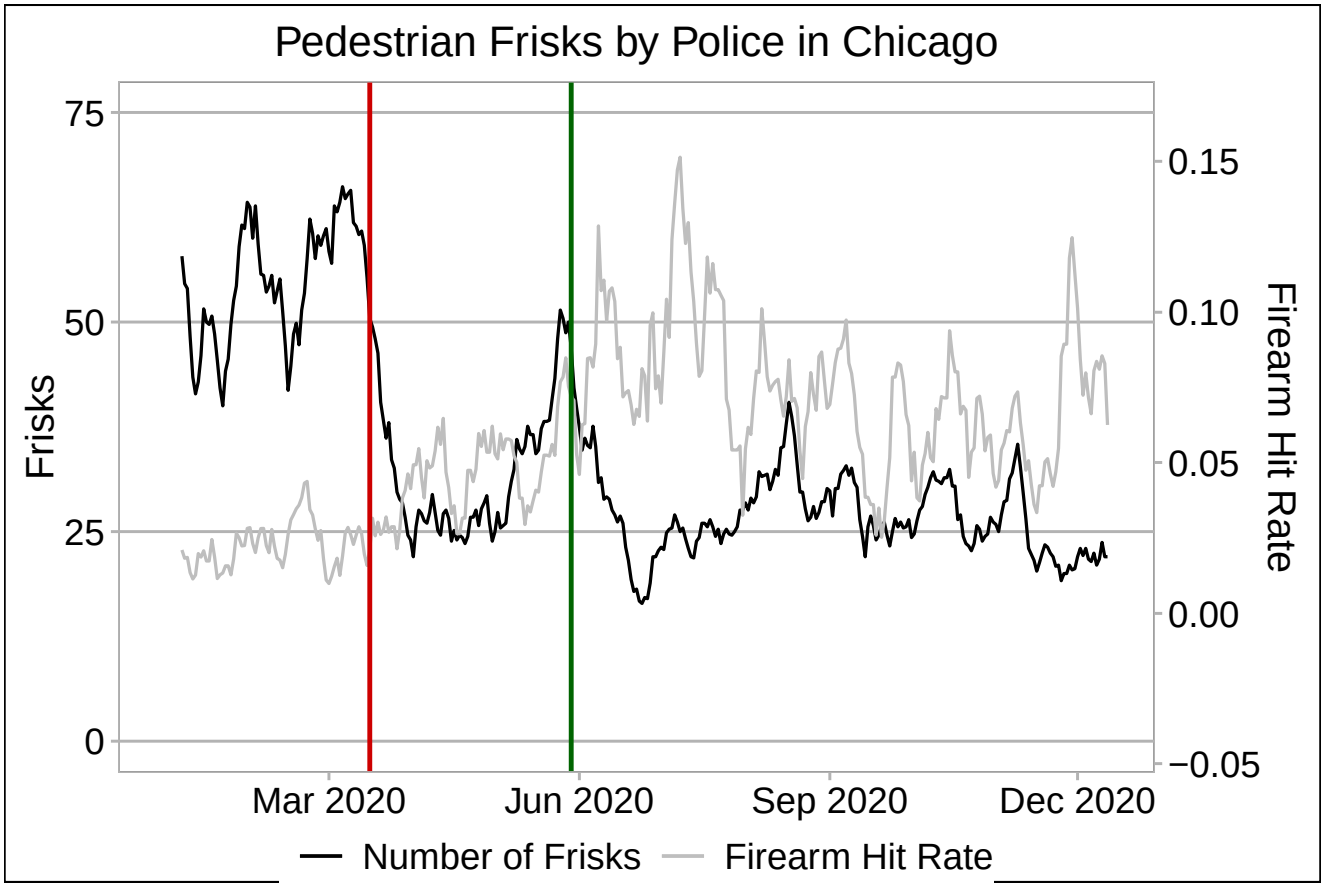
- We test one of the main implications of these models - that *ceteris paribus* a decrease in frisks should increase the contraband "hit rate"
- Exploit extraordinary event of 2020: protests following the killing of George Floyd
- With data from Chicago, use exogenous within officer variation in frisks to test the validity of the optimizing behavior assumption
- Use this variation to estimate the hit rate elasticity wrt frisks

Main Findings

- Hit rates rise substantially as the number of frisks per officer fall, consistent with police engaging in optimizing behavior
- Alternative explanations such as changes in mobility, suspect pool composition and underlying contraband carry rates don't explain the data
- Robust to changes in time period, officer pool composition, different controls, keeping geographic distribution constant, etc

Main Findings

Frisks fell drastically in Chicago following both the onset of the pandemic and the start of the protests after the killing of George Floyd Racial Breakdown



Daily number of pedestrian frisks in Chicago (black) and the associated firearm hit rate (grey). Red vertical line indicates the onset of the pandemic while the green indicates the start of the George Floyd Protests.

Legal Background

- Officers may stop (briefly detain) an individual
  - Requires reasonable suspicion of involvement in criminal activity
- Officers may then frisk the individual
  - Requires reasonable suspicion the individual is armed
  - Only allowed for the purpose of searching for weapons
  - However, the officer may seize any contraband discovered in the frisk e.g drugs or stolen goods
  - Hence we look at both general contraband and firearms specifically
- In a vehicle stop, the officer may search the vehicle
  - Requires probable cause that evidence of **any** criminality is concealed within the vehicle

Data

- Individual suspect-stop level data from the Chicago Police Department for 2016 - 2020
- Includes time/location of stop, police id, demographics of individual stopped, reason for stop, whether a search/frisk was conducted and the outcome of the stop.
- Mobility data from Google Community Mobility Reports
- Motor Vehicle Crash Data from the Chicago Police Department.
- Criminal incident reports from the Chicago Police Department

Summary Statistics

	Pedestrian Stops		Vehicle Stops	
Protests Period	Before	After	Before	After
Stops per Day	126	71	138	75
Searches per Day	42	26	84	44
% Male	90%	87%	86%	85%
% Black	63%	62%	63%	70%
Age	34.4	33.6	26.5	27.0
Searched	33%	36%	61%	59%
Contraband|Frisk/Search=1	14.2%	19.2%	25.4%	29.2%
Contraband|Race=Black,Frisk/Search=1	16.0%	20.4%	27.4%	30.6%
Contraband|Race=Other,Frisk/Search=1	10.7%	16.5%	21.2%	25.4%
Gun |Frisk/Search=1	5.8%	9.1%	2.5%	3.0%
Gun |Race=Black,Frisk/Search=1	7.8%	10.3%	3.2%	3.6%
Gun|Race=Other,Frisk/Search=1	2.0%	6.0%	1.1%	1.3%

"Before" is the 3 weeks before the protests began in Chicago and "After" is the following 6 weeks. Contraband is reported as a proportion of total frisks/searches conducted. "Gun" reflects whether the contraband found was a firearm.

Summary Statistics

	Pedestrian Stops		Vehicle Stops	
Protests Period	Before	After	Before	After
Stops per Day	126	71	138	75
Searches per Day	42	26	84	44
% Male	90%	87%	86%	85%
% Black	63%	62%	63%	70%
Age	34.4	33.6	26.5	27.0
Searched	33%	36%	61%	59%
Contraband|Frisk/Search=1	14.2%	19.2%	25.4%	29.2%
Contraband|Race=Black,Frisk/Search=1	16.0%	20.4%	27.4%	30.6%
Contraband|Race=Other,Frisk/Search=1	10.7%	16.5%	21.2%	25.4%
Gun |Frisk/Search=1	5.8%	9.1%	2.5%	3.0%
Gun |Race=Black,Frisk/Search=1	7.8%	10.3%	3.2%	3.6%
Gun|Race=Other,Frisk/Search=1	2.0%	6.0%	1.1%	1.3%

"Before" is the 3 weeks before the protests in began in Chicago and "After" is the following 6 weeks. Contraband is reported as a proportion of total frisks/searches conducted. "Gun" reflects whether the contraband found was a firearm.

Summary Statistics

	Pedestrian Stops		Vehicle Stops	
Protests Period	Before	After	Before	After
Stops per Day	126	71	138	75
Searches per Day	42	26	84	44
% Male	90%	87%	86%	85%
% Black	63%	62%	63%	70%
Age	34.4	33.6	26.5	27.0
Searched	33%	36%	61%	59%
Contraband|Frisk/Search=1	14.2%	19.2%	25.4%	29.2%
Contraband|Race=Black,Frisk/Search=1	16.0%	20.4%	27.4%	30.6%
Contraband|Race=Other,Frisk/Search=1	10.7%	16.5%	21.2%	25.4%
Gun |Frisk/Search=1	5.8%	9.1%	2.5%	3.0%
Gun |Race=Black,Frisk/Search=1	7.8%	10.3%	3.2%	3.6%
Gun|Race=Other,Frisk/Search=1	2.0%	6.0%	1.1%	1.3%

"Before" is the 3 weeks before the protests in began in Chicago and "After" is the following 6 weeks. Contraband is reported as a proportion of total frisks/searches conducted. "Gun" reflects whether the contraband found was a firearm.

Summary Statistics

	Pedestrian Stops		Vehicle Stops	
Protests Period	Before	After	Before	After
Stops per Day	126	71	138	75
Searches per Day	42	26	84	44
% Male	90%	87%	86%	85%
% Black	63%	62%	63%	70%
Age	34.4	33.6	26.5	27.0
Searched	33%	36%	61%	59%
Contraband|Frisk/Search=1	14.2%	19.2%	25.4%	29.2%
Contraband|Race=Black,Frisk/Search=1	16.0%	20.4%	27.4%	30.6%
Contraband|Race=Other,Frisk/Search=1	10.7%	16.5%	21.2%	25.4%
Gun |Frisk/Search=1	5.8%	9.1%	2.5%	3.0%
Gun |Race=Black,Frisk/Search=1	7.8%	10.3%	3.2%	3.6%
Gun|Race=Other,Frisk/Search=1	2.0%	6.0%	1.1%	1.3%

"Before" is the 3 weeks before the protests in began in Chicago and "After" is the following 6 weeks. Contraband is reported as a proportion of total frisks/searches conducted. "Gun" reflects whether the contraband found was a firearm.

Empirical Specification

- Difference-in-difference analysis comparing the change in hit rate around date of protests in 2020 to same dates in 2016 - 2019.
- Use only frisks 3 weeks before to 6 weeks after protest start

Empirical Specification

$$C_i = \alpha + \beta_1 after_i \times treat_i + \beta_2 after_i + \sum_{k=2016}^{2020}(\gamma_k \times year_{ik}) + \sum_{j=1}^{J}(\delta_j \times sector_{ij}) + t_i + \varepsilon_i \quad (1)$$

- C_i is an indicator for contraband discovery
- $after_i = 1$ if the frisk occurred after the date of protest start regardless of year
- $treat_i = 1$ if the frisk occurred in 2020
- $year_{ik}$ is a series of year dummies
- $sector_{ij}$ are dummies for the police sector where the frisk occurred
- t_i is a time trend
- ε_i is the error term

Results

Following the protests hit rates generally increased for both type of stops. For pedestrians stops there were proportionally larger increases in the hit rate for firearms than general contraband. Unconditional

	Chicago			
	All Contraband		Guns only	
	Vehicle	Pedestrian	Vehicle	Pedestrian
	(1)	(2)	(3)	(4)
After*Treat	0.032*	0.035*	0.004	0.025*
	(0.016)	(0.018)	(0.006)	(0.012)
Observations	20,100	16,918	20,100	16,918
Adjusted R2	0.017	0.011	0.005	0.016
Mean Y	0.195	0.112	0.016	0.029
Note:				*p<0.05 **p<0.01

Observations range from 3 weeks before the George Floyd Protests to 6 weeks after. The same calendar dates are used for all years. After = 1 beginning on May 29 of each year and 0 otherwise; Treat=1 for 2020 and 0 otherwise. All regressions include region and year fixed effects as well as a time trend. Robust standard errors clustered at the region level.

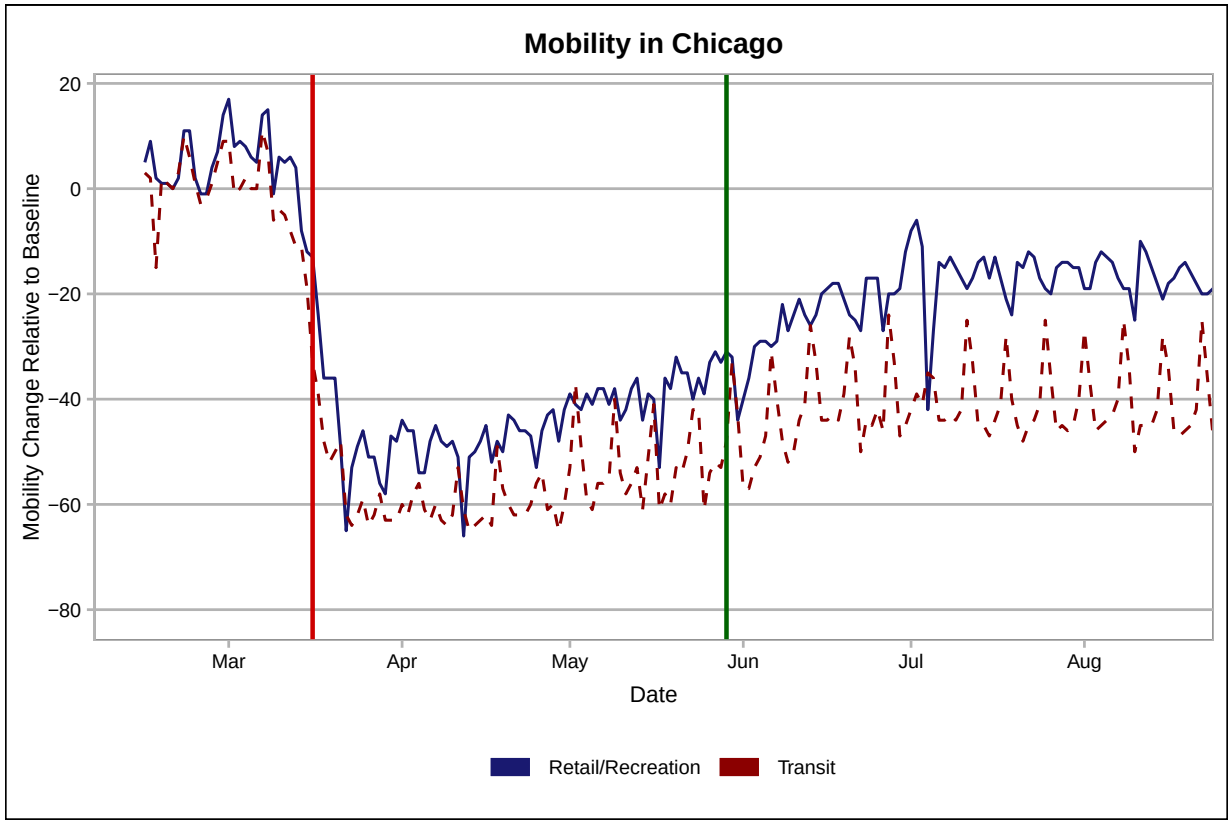
Results

- A 10% decrease in pedestrian frisks corresponds to an 11.1% increase in firearm hit rate and 6.4% increase in all contraband hit rate
- The analogous elasticities for vehicle frisks/searches are -0.33 for firearms and -.26 for all contraband

Consistent Officers

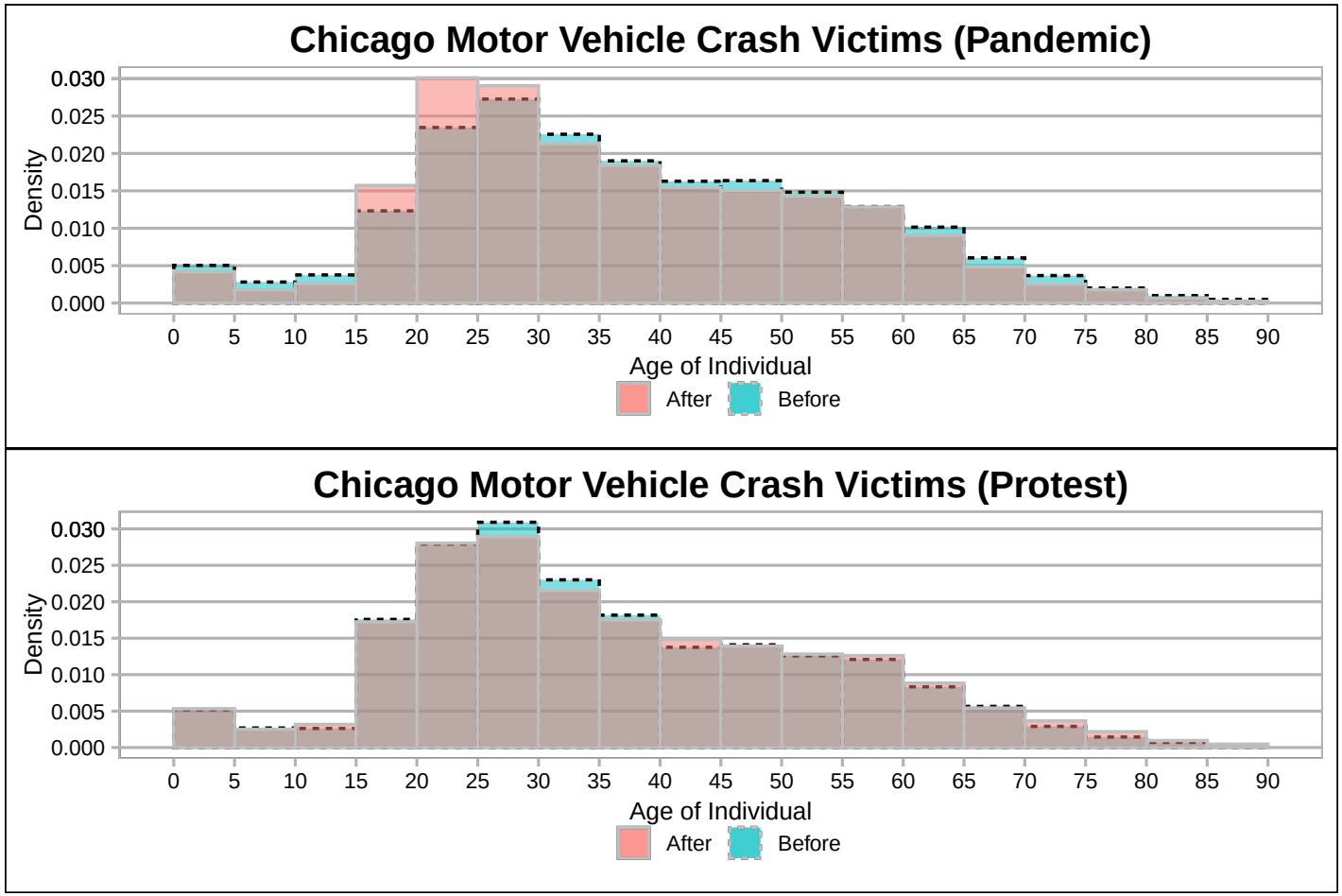
Change in Suspect Pool?

While mobility fell substantially around the pandemic onset, it stayed relatively stable over the period before and after the protests



Change in mobility over 2020 relative to a baseline established Jan 3 - Feb 6 2020. Google Community Mobility Reports Data for Retail and Recreation (blue solid line) and Transit (red dashed line). The red vertical line indicates the onset of the pandemic while the green indicates the start of the George Floyd Protests

Change in Suspect Pool?



PDFs showing age distribution of motor vehicle crash victims before and after each event. Data from 6 weeks before to 4 weeks after the pandemic onset are used and 3 weeks before to 6 weeks after the Protests. Period relative to the event is indicated by the color and outline of the bars, red being the days after and blue days before.

Change in Crime

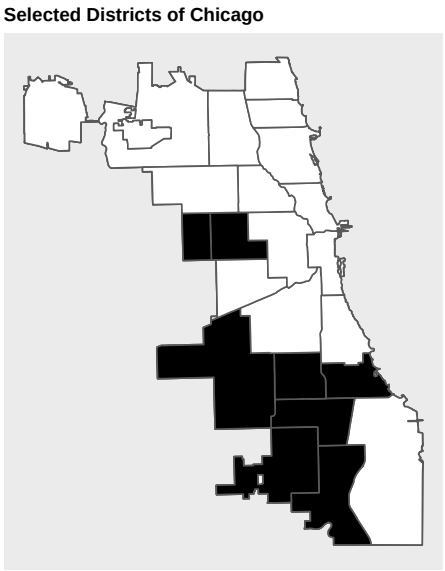
There were quite large increases in violent crime in summer, 2020 coinciding with the after protest period. Opioid Deaths

	Log of Daily Incident Reports				
	Overall	Violent	Shooting	Gun Crime	Drug
	(1)	(2)	(3)	(4)	(5)
After*Treat	0.137**	0.185**	0.354**	0.075	-0.354**
	(0.043)	(0.061)	(0.136)	(0.081)	(0.112)
Observations	315	315	315	315	315
Adjusted R2	0.613	0.187	0.216	0.145	0.723
Note:					*p<0.05 **p<0.01

Observations range from 3 weeks before the beginning of the George Floyd Protests to 6 weeks after for each year and After = 1 beginning May 29 and 0 otherwise; Treat = 1 for 2020 and 0 otherwise. All regressions include year fixed effects. Robust standard errors reported.

Region of Lower Shooting Increase

Main analysis for area of Chicago where shootings rose least



(a) Selected Districts

	Log of Daily Incident Reports			
	Overall	Violent	Shooting	Gun Crime
	(1)	(2)	(3)	(4)
After*Treat	0.104*	0.108	0.056	0.054
	(0.045)	(0.067)	(0.162)	(0.081)
Observations	315	315	315	315
Adjusted R2	0.396	0.096	0.159	0.177
Note:				*p<0.05 **p<0.01

(b) Change in crime

Hit Rate Increase in Region

Similar or larger hit rate rise even in subset of city where the increase in gun crime was lowest

	Protests			
	All Contraband		Guns only	
	Vehicle	Pedestrian	Vehicle	Pedestrian
	(1)	(2)	(3)	(4)
After*Treat	0.060**	0.066*	0.005	0.039
	(0.023)	(0.028)	(0.009)	(0.021)
Observations	10,885	8,361	10,885	8,361
Adjusted R^2	0.026	0.017	0.004	0.027
Mean Y	0.207	0.127	0.020	0.036
Note:				*p<0.05 **p<0.01

Data from 2016-2020 are used. In all specifications, observations range from 3 weeks before the start of the George Floyd Protests to 6 weeks after. The same calendar dates are used for all years. After = 1 beginning on May 29 of each year and 0 otherwise; Treat=1 for 2020 and 0 otherwise. All regressions include sector and year fixed effects as well as a time trend. Robust standard errors clustered at the sector level.

Conclusion

- Hit rates rose substantially as frisks fell dramatically
  - A 10% decrease in pedestrian frisks corresponded to a 11.1% increase in firearm hit rates
- Changes to suspect pool size, composition and contraband carry rates don't appear to explain results
- Lots of robustness checks (time period, officer pool composition, controls, constant geographic distribution) yield consistent results
- Police stop-and-frisk appears broadly consistent with optimizing behavior

Reference List

Anwar, S. & Fang, H. (2006), 'An alternative test of racial prejudice in motor vehicle searches: Theory and evidence', *American Economic Review* **96**(1), 127–151.

Feigenberg, B. & Miller, C. (2021), Racial disparities in motor vehicle searches cannot be justified by efficiency, Technical report, National Bureau of Economic Research.

Gelbach, J. B. (2021), 'Testing economic models of discrimination in criminal justice', *Available at SSRN 3784953* .

Exclude Protest Period

The effects are not driven by the protests themselves

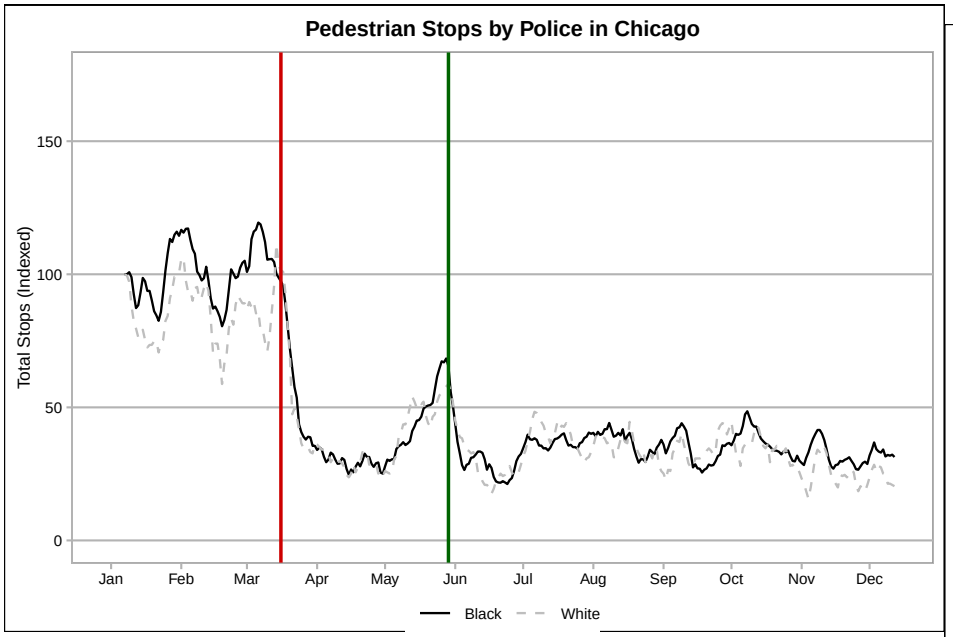
	Excluding First Two Weeks after Protests Began			
	All Contraband		Guns only	
	Vehicle	Pedestrian	Vehicle	Pedestrian
	(1)	(2)	(3)	(4)
After*Treat	0.041*	0.045*	0.002	0.028*
	(0.016)	(0.018)	(0.006)	(0.013)
Observations	19,514	16,252	19,514	16,252
Adjusted R2	0.018	0.014	0.005	0.016
Mean Y	0.199	0.115	0.016	0.030
Note:				*p<0.05 **p<0.01

Data from 2016-2020 are used. Observations start from 3 weeks before the start of the George Floyd Protests on May 29 and 6 weeks after 11 June are used with the days of protest in between excluded. The same calendar dates are used for all years. After = 1 beginning on May 29 of each year and 0 otherwise; Treat=1 for 2020 and 0 otherwise. All regressions include sector and year fixed effects as well as a time trend. Robust standard errors clustered at the sector level.

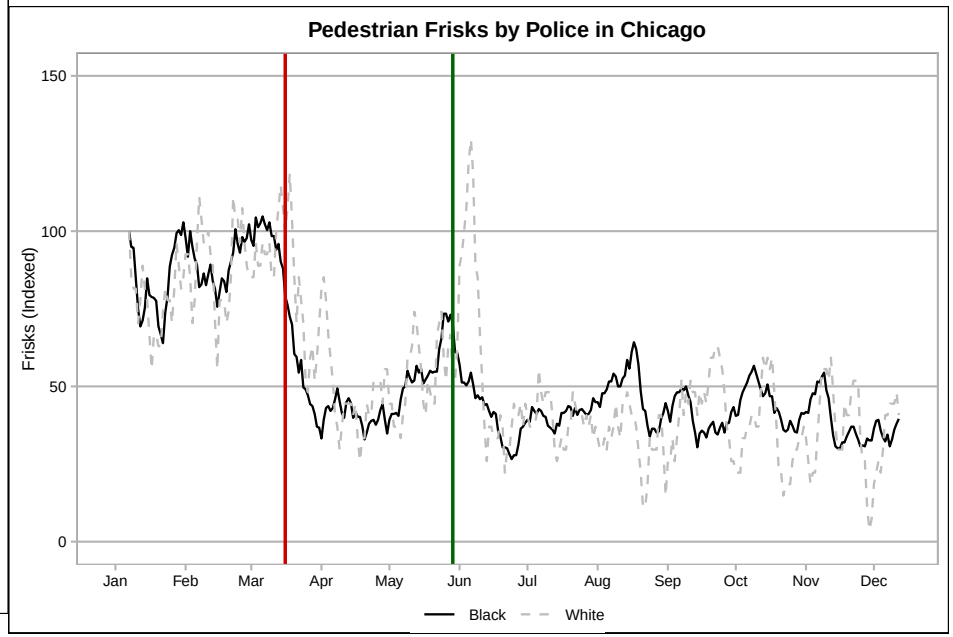
Stops and Frisks by Race

The changes were similar for both Black and white pedestrians.

Pedestrian Frisks



(a) Stops



(b) Frisks

The daily number of pedestrian (a) stops and (b) frisks in Chicago broken out by race. The data is shown for Black pedestrians (black) and white pedestrians (grey). Both series are indexed to the average for that race in the week from 1-7 January of 2020. The red vertical line indicates the onset of the pandemic while the green indicates the start of the George Floyd Protests

Results (Stops)

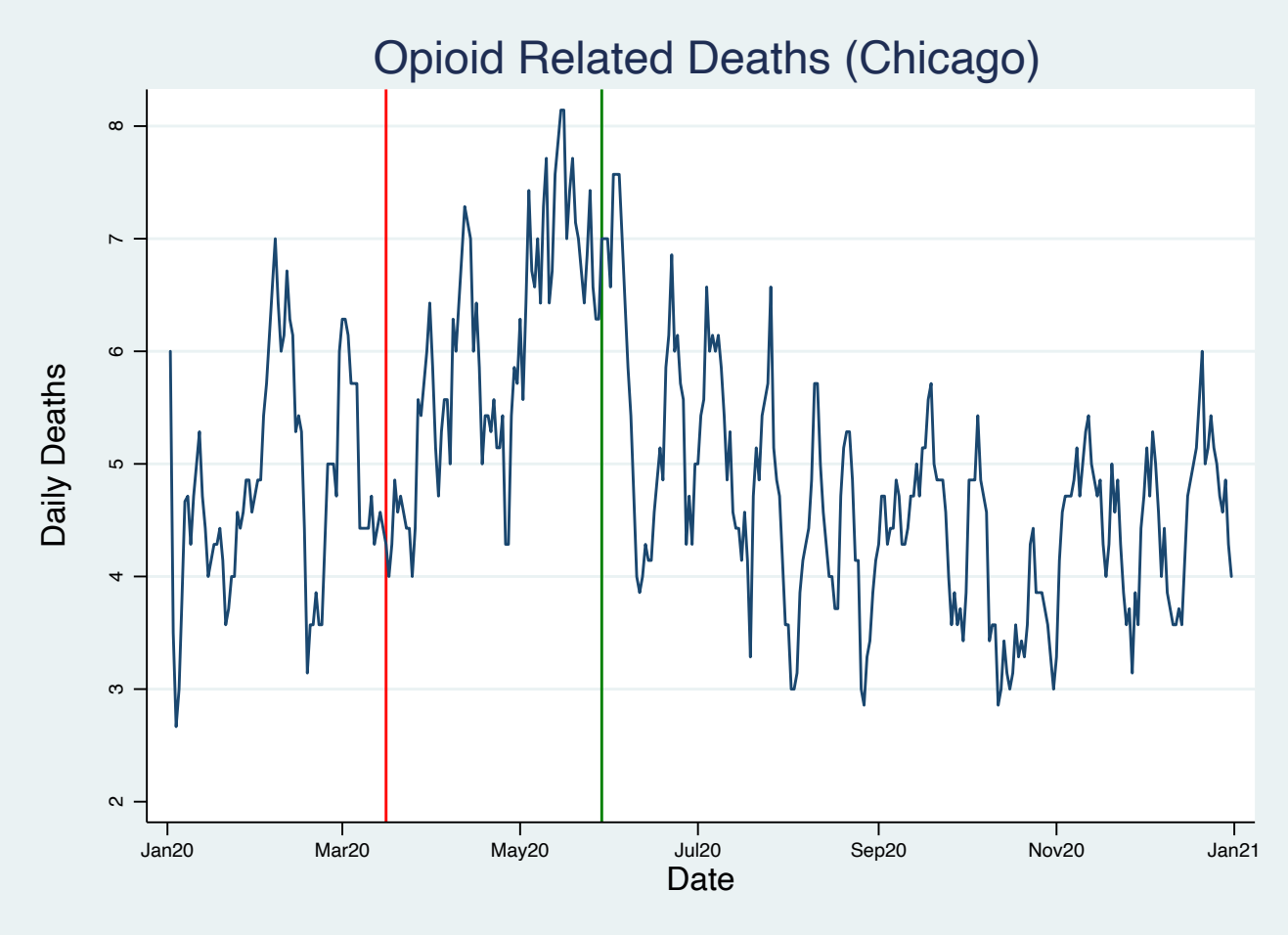
Following the protests hit rates generally increased. For pedestrians stops there were proportionally larger increases in the hit rate for firearms than general contraband. Conditional on Frisk

	Chicago			
	All Contraband		Guns only	
	Vehicle	Pedestrian	Vehicle	Pedestrian
	(1)	(2)	(3)	(4)
After*Treat	0.018	0.022**	0.002	0.011**
	(0.011)	(0.007)	(0.003)	(0.004)
Observations	36,619	63,840	36,619	63,840
Adjusted R2	0.024	0.011	0.004	0.008
Mean Y	0.127	0.032	0.009	0.008
Note:				*p<0.05 **p<0.01

The change in hit rate conditional on stop. Observations range from 3 weeks before the George Floyd Protests to 6 weeks after. The same calendar dates are used for all years. After = 1 beginning on May 29 of each year and 0 otherwise; Treat=1 for 2020 and 0 otherwise. All regressions include region and year fixed effects as well as a time trend. Robust standard errors clustered at the region level.

Opioid Deaths

Opioid drug overdose deaths declined following the protests. Back



The daily number of opioid deaths in Chicago. The red vertical line indicates the onset of the pandemic while the green indicates the start of the George Floyd Protests

Results - Consistent Set of Officers

Results are similar when looking only at the subset of officers who conducted searches/frisks in the 3 week period to the protest onset Back

	Chicago			
	All Contraband		Guns only	
	Vehicle	Pedestrian	Vehicle	Pedestrian
	(1)	(2)	(3)	(4)
After*Treat	0.019	0.038	0.008	0.015
	(0.028)	(0.032)	(0.009)	(0.02)
After	0.046*	0.020	-7.00E-03	0.001
	(0.019)	(0.019)	(0.006)	(0.01)
Observations	4,681	2,507	4,681	2,507
Adjusted R2	0.035	0.022	0.013	0.008
Mean Y	0.257	0.139	0.019	0.047
Note:				*p<0.05 **p<0.01

Observations range from 3 weeks before the George Floyd Protests to 6 weeks after.The data is restricted to frisks by officers who conduct at least one frisk in the 3 weeks before the protests began. The same calendar dates are used for all years. After = 1 beginning on May 29 of each year and 0 otherwise; Treat=1 for 2020 and 0 otherwise. All regressions include region and year fixed effects as well as a time trend. Robust standard errors clustered at the region level.