Detterent Effects of SQFs on Arrests in New York City: A Spatial Analysis for 2006

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Section 1

Background

Motivation

- NYPD claims Stop, Question and Frisks (SQFs) deter crime
- SQFs are highly controversial because of racial profiling and police violence allegations
- In 2013 federal court ruled SQF tactics in New York had to be changed $\rightarrow$ numbers drastically decreased
- Question remains: Did SQFs deter crime?

The current study's features

- Spatial analyses of all New York SQFs and arrests in 2006
- Micro-econometric design at the level of individual SQFs
- Computationally intensive approach
- Trying to close in on casual inference

Section 2

Theory

Considerations

- SQFs are based on **broken windows hypothesis** (Fagan & Davies 2000; Wilson & Keeling 1982)
- SQFs might change criminal's assesments of probability of being caught
- Effect could be detering or displacing
- Crime is clustered at specific locations

Theoretic Model

- $U(c \mid \ell_i)$: Utility of crime at location i
- $C(c \mid \ell_i)$: Cost of crime at location i
- p_{ℓ_i}: Probability of beeing caught at location i
- $U(\neg c \mid \ell_i)$: Utility of not choosing crime at location i
- $C(\neg c \mid \ell_i)$: Cost of not choosing crime at location i
- $(N_{sqf} \mid \ell_i, t)$: Number of SQFs at location i and time t
- $(N_c \mid \ell_i, t)$: Number of crimes at location i and time t

Decision Model

$$U(c \mid \ell_i) - C(c \mid \ell_i) \cdot p_{\ell_i} \; > \; U(\neg c \mid \ell_i) - C(\neg c \mid \ell_i)$$

$$p_{\ell_i} \; = \; f((N_{sqf} \mid \ell_i, t), \; (N_c \mid \ell_i, t), \; \cdot \;)$$

Hypothesis

Deterrence Hypothesis

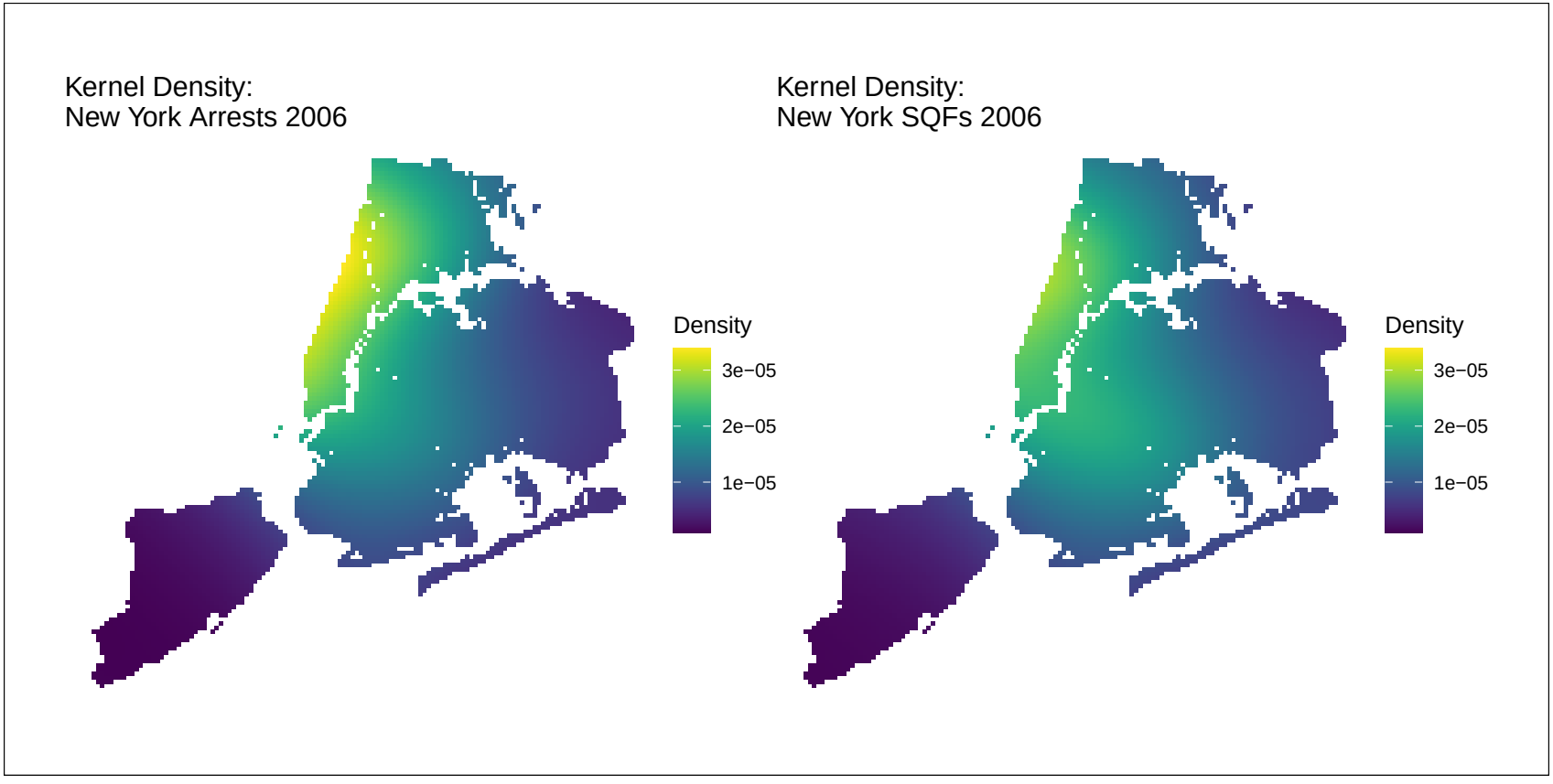
An SQF leads to a lesser number of arrests in a contained area of space and time.

Section 3

Data

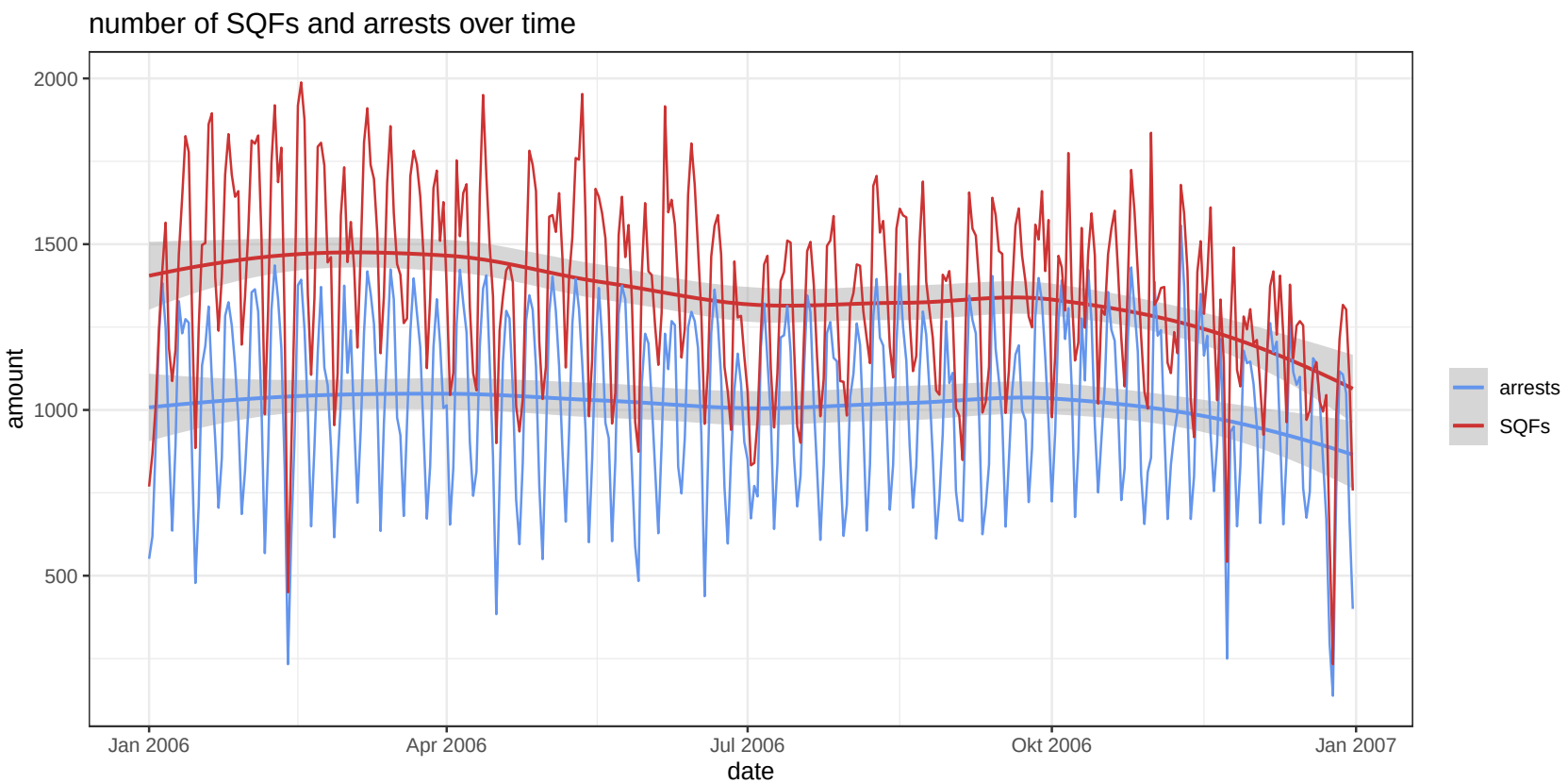
Data

- Data with geo-coordinates of SQFs and arrests in 2006 aquired from New York City's open data platform



Data

- 492277 SQFs and 371934 arrests were included in the analyses
- only 4 days in 2006 with more arrests than SQFs
- Amounts of SQFs and arrests follow a temporal periodicity → number of arrests might decrease after SQF because of this periodicity only



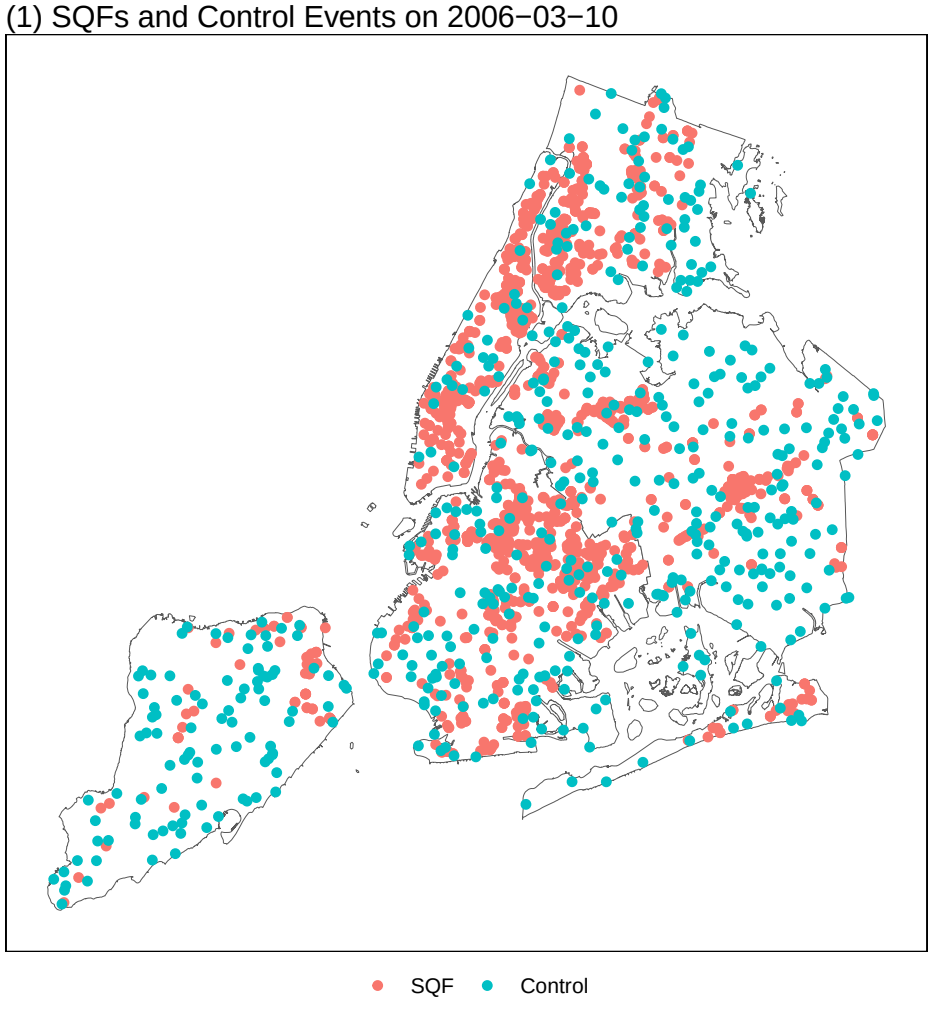
Section 4

Methods

Methods

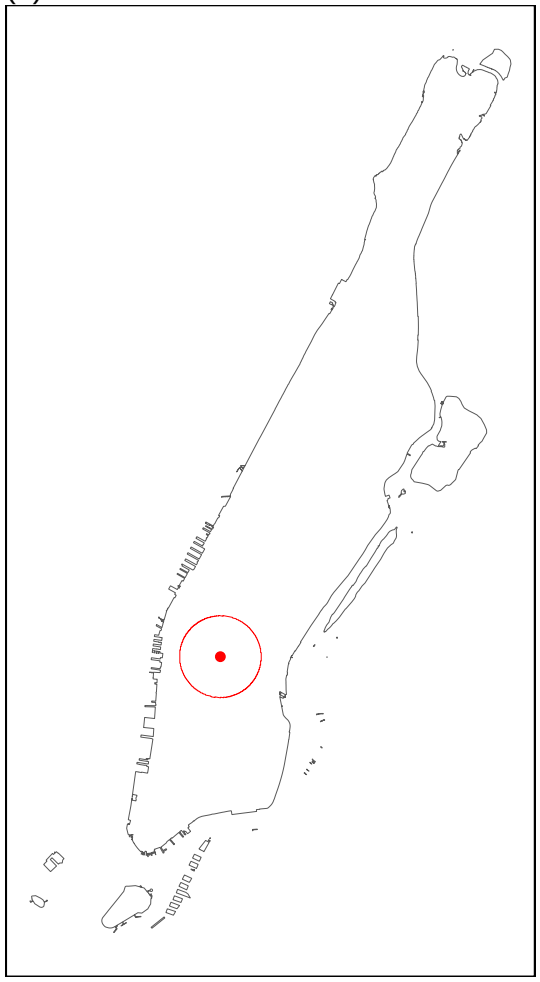
- Ripley's Cross K-function
  - are arrests spatially (anti-)clustered around SQFs?
- Micro-econometric analysis at level of individual SQFs
  - count amount of arrests in buffer around each SQF
  - varying time from -10 to +10 days from the event
  - varying buffer radius of 1km, 5km and 10km
  - poisson point process with 500 points per day as random control events
  - redo arrest counts for random control

Micro-econometric Design

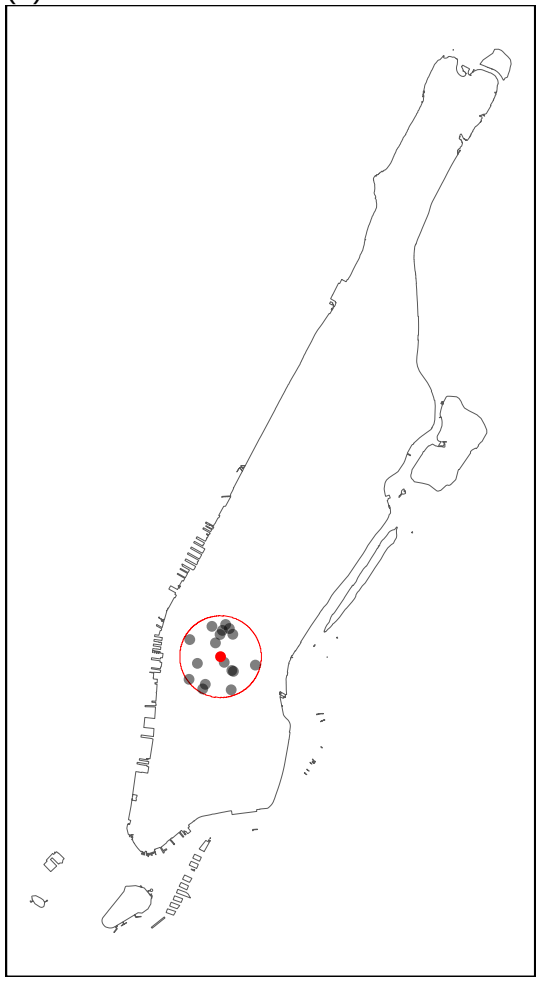


Micro-econometric Design

(2) 1km Buffer around each Event



(3) Count number of Arrests in Buffer

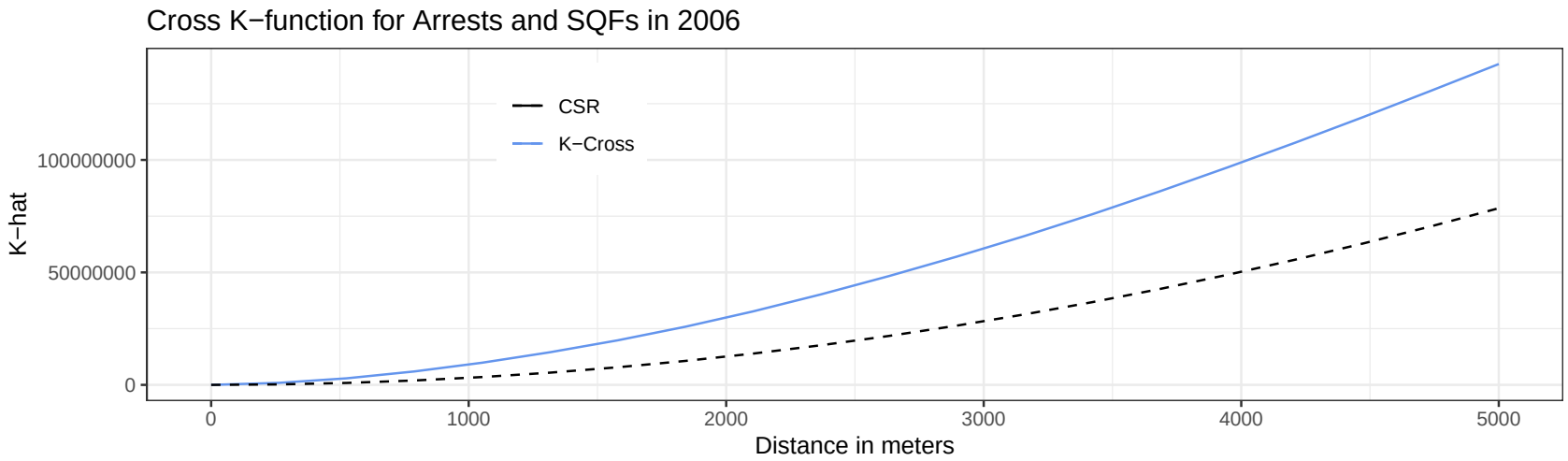


Section 5

Results

Cross K-function

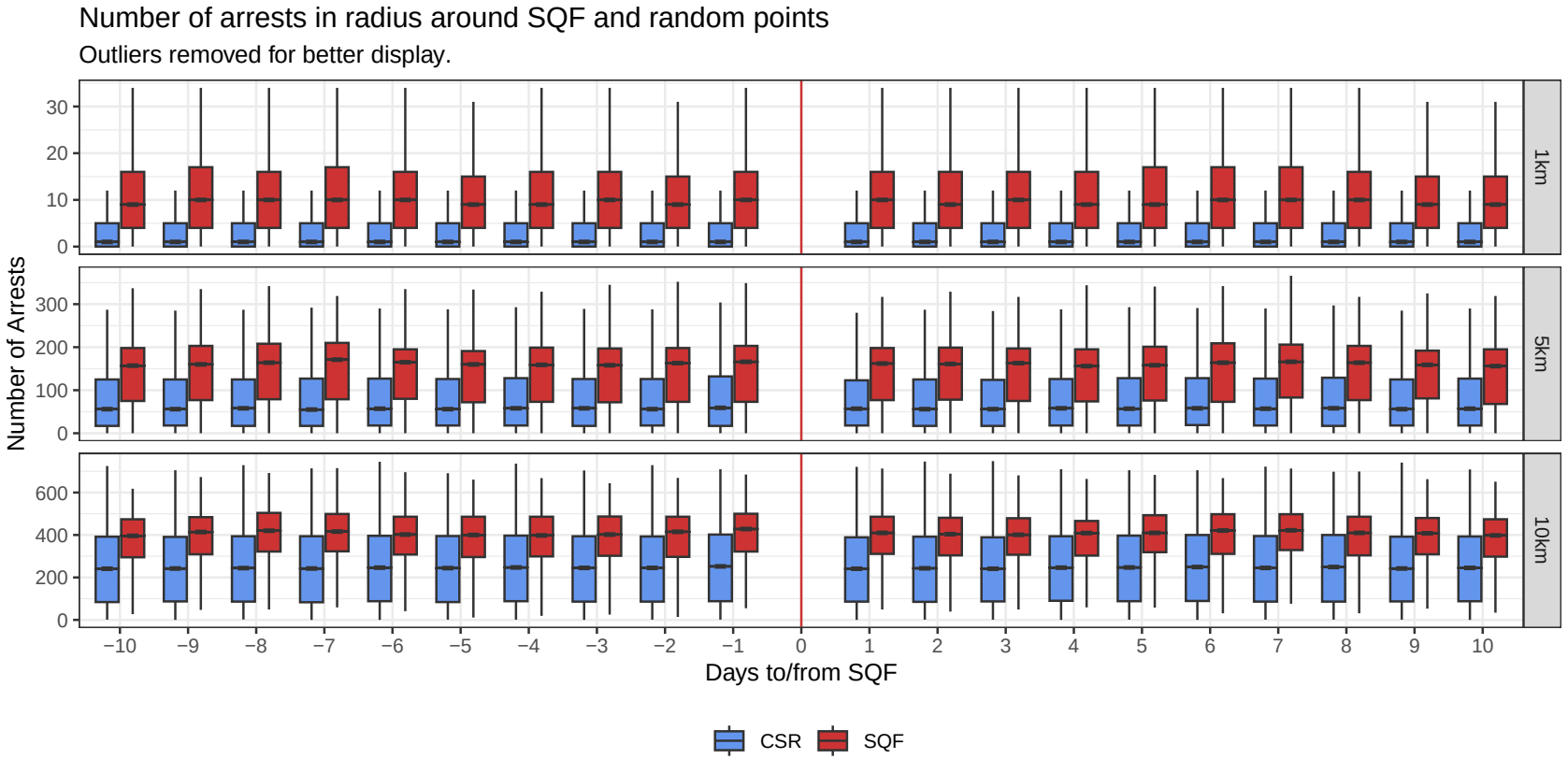
- "The expected number of *arrests* lying within a distance r of a typical *SQF*, standardised by dividing by the intensity of *arrests*" (Baddeley et al. 2016: 594)



- Arrests are highly clustered around SQFs
- Problem: this approach **doesn't consider time**
- Possible interpretation: there are crime hot spots, where arrests and SQFs are clustered together

Micro Approach

- More arrests around SQFs then around random points
- No change in number of arrests around random control events
- Number of arrests before and after SQFs are barely different



Micro Approach

	Dependent variable:			
	Number of Arrests			
	in 1km radius	in 5km radius	in 10km radius	in all radii
Intercept	5.863**	99.283***	277.605***	108.929
	(2.842)	(33.317)	(70.238)	(145.003)
Time to Event	0.016***	−0.006	0.152***	0.029**
	(0.001)	(0.004)	(0.008)	(0.013)
Other SQFs	0.001***	0.002***	0.006***	0.121***
	(0.00003)	(0.0001)	(0.0001)	(0.0002)
After Event	0.188***	−0.061	1.753***	−0.747***
	(0.017)	(0.066)	(0.118)	(0.210)
SQF or Control	4.737***	30.445***	45.654***	9.732***
	(0.070)	(0.554)	(1.288)	(0.499)
SQF*After	−0.094***	−0.074	−0.489***	0.163
	(0.014)	(0.055)	(0.098)	(0.174)
Observations	1 000 000	1 000 000	1 000 000	3 000 000
Akaike Inf. Crit.	5 360 547.000	8 123 731.000	9 309 816.000	33 885 736.000
Bayesian Inf. Crit.	5 360 653.000	8 123 837.000	9 309 922.000	33 885 865.000

Note: *p<0.1; **p<0.05; ***p<0.01
All models are fitted using OLS fixed-effects for the 5 boroughs of New York.
Model with all radii of observation includes additional fixed-efffects for radii.
Full dataset was sampled to include 50000 events.

Conclusion

- Deterring effects of SQFs on arrests are not stable throughout all observed spatial windows
- Found effects stay small

Section 6

Discussion

Forthcomings

- Other authors (Rosenfeld & Fornango 2017; Weisburd et al. 2015) find similarly small deterring effects of SQFs
- Attempt to estimate effects of individual SQFs instead of looking at effects at fixed spatial windows
- Control for temporal and spatial variance
- Randomly generated control group

Limitations

- Effects between arrest rates and SQF rates cannot be fully entangled
- Arrest rates only a vague measurement of crime $\rightarrow$ many other unconsidered factors influence arrest rates

Conclusion

Though the current investigation is limited in its interpretation, the NYPDs and other proponents claim that SQF practices effectively deter crime cannot be supported.

References

Baddeley, A., E. Rubak & R. Turner, 2016: Spatial Point Patterns: Methodology and Applications with R. Boca Raton, FL: Chapman & Hall/CRC.

Fagan, J. & G. Davies, 2000: Street Stops and Broken Windows: Terry, Race and Disorder in New York City. Fordham Urban Law Journal 28: 457–504.

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