

Analysis of Covid-Era Policing Policies on Philadelphia Arrests

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Introduction

Analysis Overview

- Looking at how Philadelphia arrest rates change due to pandemic-era policing policies.
 - What happens when pandemic-era policies are implemented?
 - What happens when pandemic-era policies are removed?

Relevance

- Analysis focuses on city of Philadelphia
- 2020 Stay-At-Home order unprecedented policy with unique implications
- Analyzing crime & arrest trends increasingly pertinent as police forces fall under increasing scrutiny

Event Research

Pandemic Court Clog

- Philadelphia courts procedures were largely put on hold, leading to overcrowded jails and pressure from civil rights organizations like the ACLU for new policing policies.

Philly police to halt narcotics arrests, other charges during COVID outbreak

With courts closed by pandemic, Philly police stop low-level arrests to manage jail crowding

“If an officer believes that MAY 02, 2020

safety, the officer will notify the officer of the circumstances and utilize discretion in determining the appropriate

Philadelphia police to resume making arrests for nonviolent crimes following pause due to COVID-19

A stoppage on arrests for certain crimes due to coronavirus has come to an end, the Police Commissioner announced Friday



Memo Release

- Philadelphia Police Commissioner, Danielle M. Outlaw released an internal memo (which was leaked to the public). These policies were repealed weeks later.

Good Afternoon:

The City of Philadelphia has updated its posture concerning the Covid-19 pandemic. Beginning today (March 17, 2020), the City is suspending all public-facing services. To that end, most municipal buildings will be closed to the public, as the City tries to limit the potential for exposure to Covid-19. Patrol Districts will remain open to the public.

In addition, beginning Wednesday, March 18, 2020, only essential employees will be required to come in to work. If you have questions about who is essential and non-essential, please consult with your supervisor.

In tandem with the City's enhanced response, the Police Department will also be making modifications to several of our existing protocols. These adjustments include the following:

Effective Today (March 17, 2020), during the 4pm x 12am tour, arrests for the following offenses will be effectuated via Arrest Warrant:

- § All Narcotics Offenses
- § Theft from persons
- § Retail Theft
- § Theft from auto
- § Burglary
- § Vandalism
- § All Bench warrants
- § Stolen auto
- § Economic crimes (bad checks, fraud)
- § Prostitution

If an officer believes that releasing the offender would pose a threat to public safety, the officer will notify a supervisor, who will review the totality of the circumstances and utilize discretion, in the interest of public

- § All Narcotics Offenses
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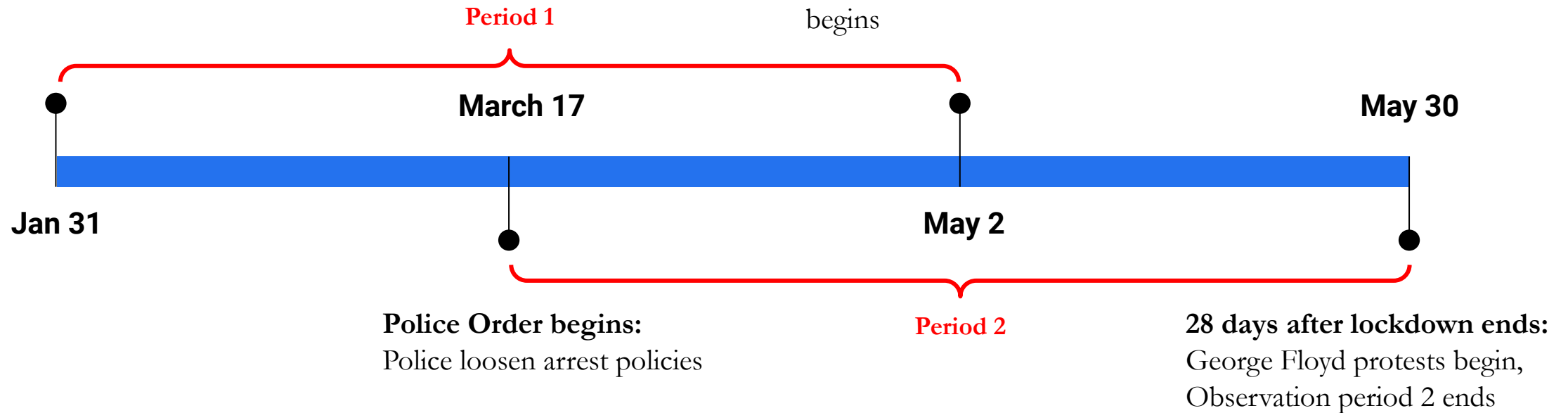


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Context Timeline

45 days before Police Order:
Observation period begins

Police Order Lifted:
Arrest policies return to standard form;
observation period 1 ends, period 2
begins



Period 1: “Lockdown Period”
Period 2: “Post-Lockdown Period”

Hypothesis

We hypothesize that the internal police memo caused a significant decrease in petty arrests after the effective date of the internal police memo, and the policy lift caused higher than typical arrests after the conclusion of policy due to compensate for arrest delays.

Data & Methods

Methodology: Data Sourcing

Data Search

- Looking for dataset that contained overall arrest data, petty crime example data (e.g. narcotics/drug arrests), and violent crime data (e.g. firearm arrests)
- First searched through cleaner data databases like Kaggle
 - Turned to Philadelphia District Attorney's Office
 - Provided an overwhelming amount of data, from incidents, arrests, case length, charges across different categories of time and divided by district, zipcode, etc.
 - Decided to use citywide arrest data across various petty/violent crimes
 - Day-by-day reports allowed observation of local effects

Data Cleaning Process

- Narrowed scope of data to specific section of each year
- Chose drug and firearm arrests as a popular possession-related petty crime with enough daily volume to observe significant difference

Dataset	Daily Citywide	Daily by Police District	Daily by ZIP Code (ZCTA)	Weekly by Census Tract	Quarterly by Census Tract
Incident Data	OpenDataPhilly				
Arrests Data	CSV	CSV	CSV	CSV	CSV
Charges Data	CSV	CSV	CSV	CSV	CSV
Case Outcome Data	CSV	CSV	CSV	CSV	CSV
Bail Data	CSV	CSV	CSV	CSV	CSV
Future Years of	CSV	CSV	CSV	CSV	CSV



Philadelphia District Attorney's Office

	CSV			CSV	CSV
				CSV	CSV
				CSV	CSV
				CSV	CSV
Summary Case Outcomes Data	CSV	CSV	CSV	CSV	CSV
Summary Case Length Data	CSV	CSV	CSV	CSV	CSV

Methodology: Technical Analysis

Research Method: Simple Difference-in-Differences

Treatment: Philadelphia in Year 2020

Control: Philadelphia in Years 2014 - 2019

Regression Design: Amount of arrests = Intercept + B1(Post) + B2(Treatment) + B3(Treatment x Post)

- Regressions were done twice, once where the Post-Period represents after the police order and another where the post-period represents after the order was lifted

Parallel Trends

- We saw parallel trends hold before our 1st event of interest (March 17th Police Order)
- However, parallel trends did not hold before our 2nd event of interest (May 2nd Order Lift)

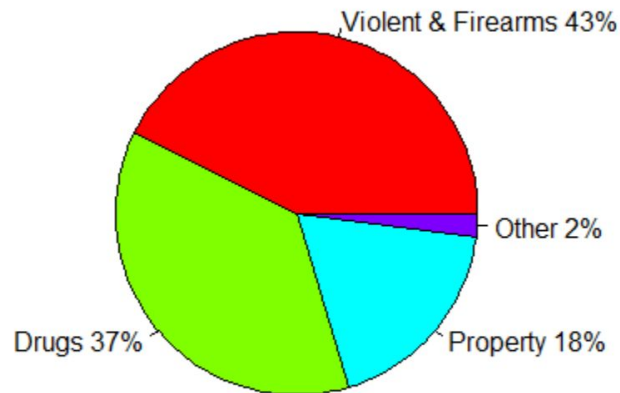
Checking for Confounding variables and other Arrests

- We limited our windows to exclude other significant events e.g George Floyd Protests
- Checking if results were due to the police order (petty-crime arrest) versus a general police shift
 - We examined non-petty offenses e.g Firearm Possession Arrests

Summary Statistics

2020 Total Number of Arrests: 22,240

Categorized Offenses in 2020



	All Arrests	Drug Possession	Firearm Possession
Minimum	8.0	0	0
1st Quantile	46.0	1.0	3.0
Median	66.5	3.0	5.0
Mean	72.1	5.7	5.7
3rd Quantile	95.5	9.5	8.0
Maximum	241.0	39.0	22.0

Results

Lockdown: Total Arrests

$$\text{Equation: } \hat{Y} = a + \beta_1 X_1 + \beta_2 X_2 + \beta_3 X_1 X_2 + \varepsilon$$

$$\text{Equation: } \hat{Y} = 109.9 - 6.08X_1 + 2.94X_2 - 77.30X_1X_2 + \varepsilon$$

- interaction term shows statistical significance
- sample size = 180 (90*2)

```
Call:
lm(formula = number_of_arrests ~ Treatment + Post + TreatmentxPost,
    data = all_the_arrests)

Residuals:
    Min       1Q   Median       3Q      Max
-66.907  -9.574   2.402  13.108  62.174

Coefficients:
            Estimate Std. Error t value Pr(>|t|)
(Intercept)   109.907     1.909   57.586 <2e-16 ***
Treatment     -6.081     3.817   -1.593  0.112
Post           2.941     2.714    1.084  0.279
TreatmentxPost -77.301     5.428  -14.241 <2e-16 ***
---
Signif. codes:  0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1

Residual standard error: 22.42 on 360 degrees of freedom
Multiple R-squared:  0.5899,    Adjusted R-squared:  0.5865
F-statistic: 172.6 on 3 and 360 DF,  p-value: < 2.2e-16
```

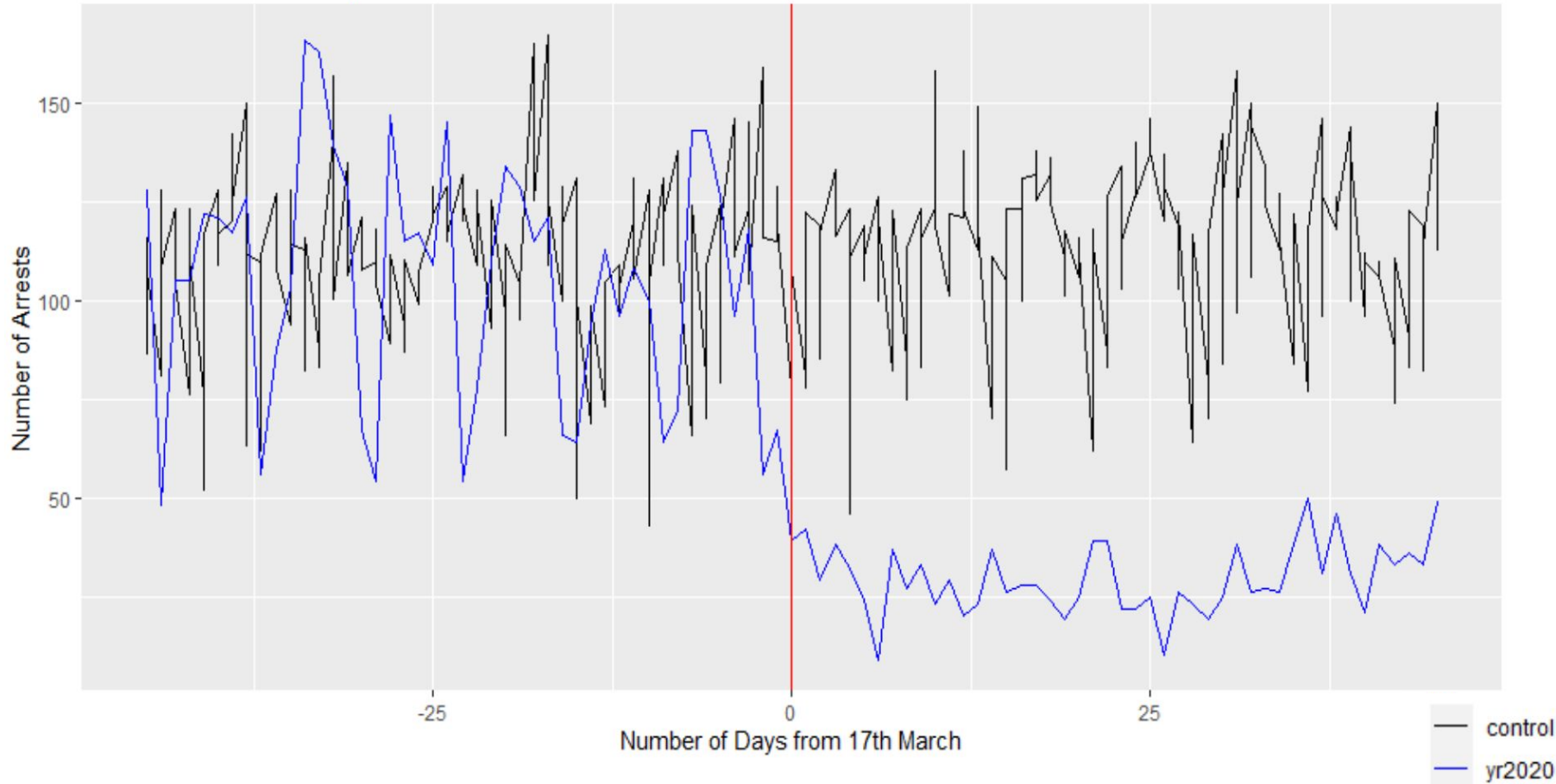
X_1 = Dummy variable for Treatment Group
(1 if year 2020, 0 otherwise)

X_2 = Dummy variable for being in the lockdown
(1 for after March 17, 0 otherwise)

X_1X_2 = interaction term

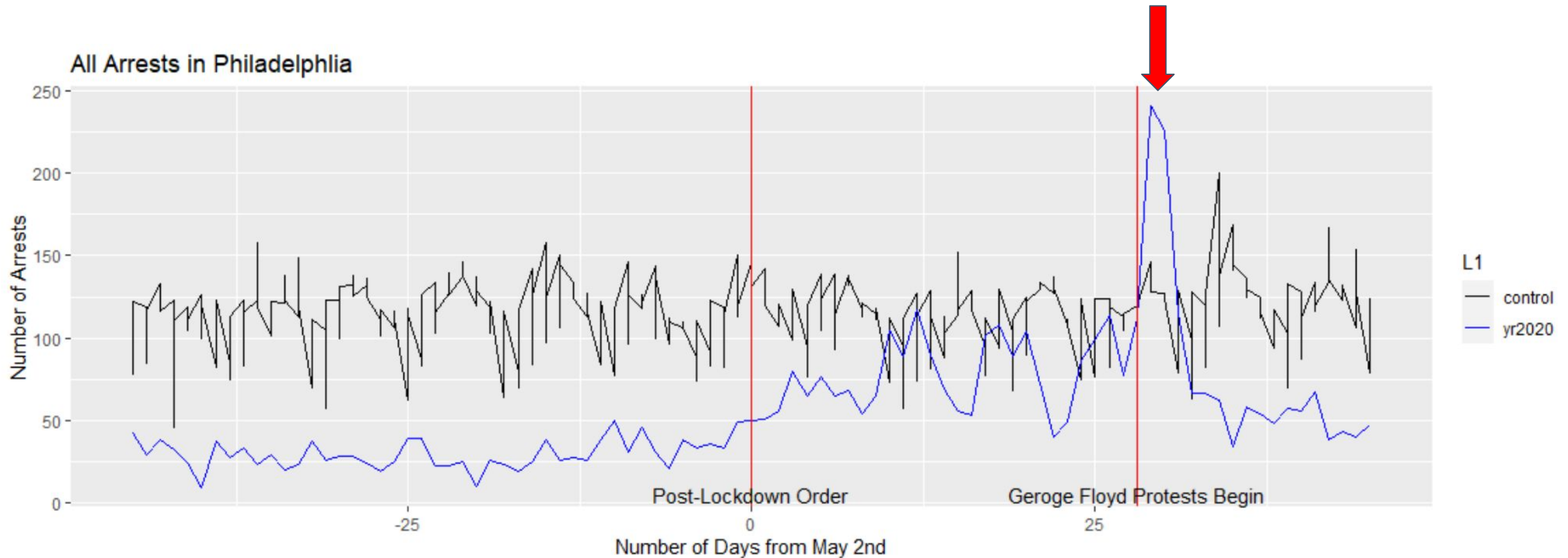
Lockdown: Total Arrests

All Arrests in Philadelphia



- significant drop when the lockdown happened
- Parallel trend Observed

Post Lockdown: Total Arrests



Post Lockdown: Total Arrests

$$\text{Equation: } \hat{Y} = 113.3 - 83.39X_1 - 1.39X_2 + 50.41X_1X_2 + \varepsilon$$

X_1 : Dummy variable for Treatment Group
(1 if year 2020, 0 otherwise)

X_2 : Dummy variable for being in post-lockdown period (1 for after May 2, 0 otherwise)

X_1X_2 : Interaction term

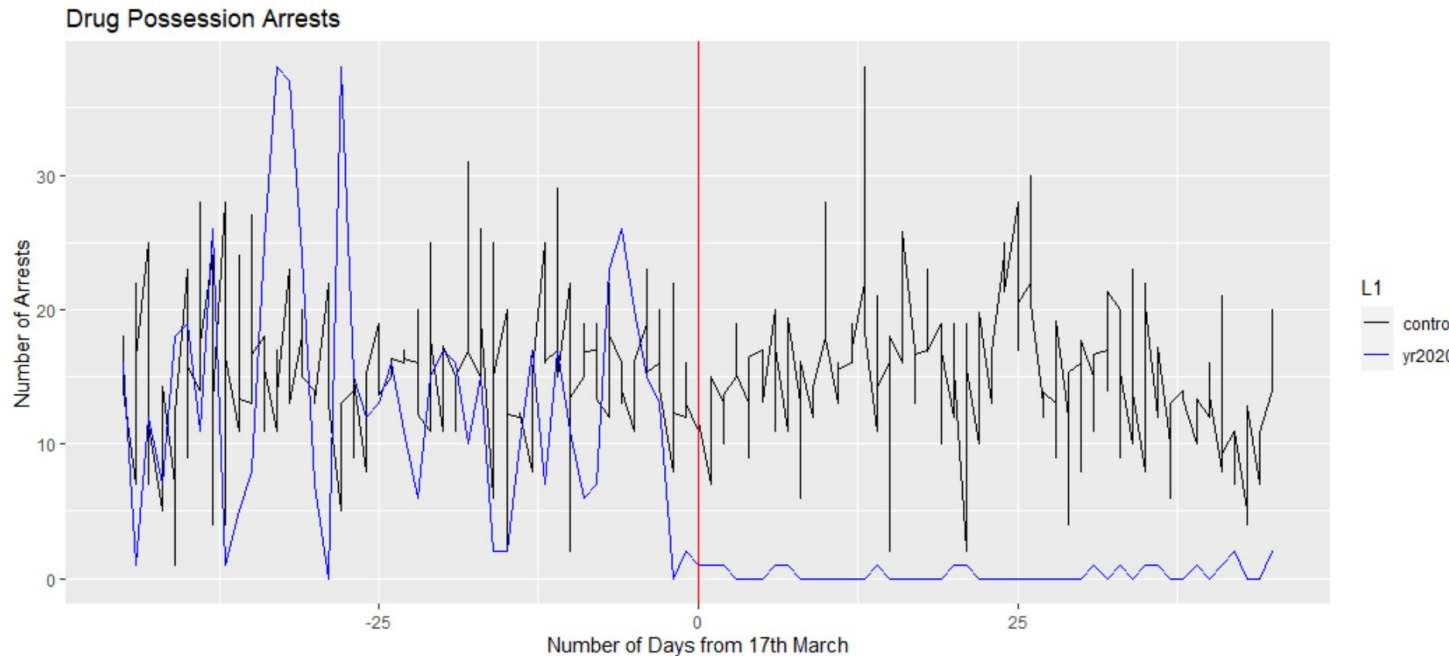
P- Value of interaction: $<2e-16$

```
Call:
lm(formula = number_of_arrests ~ Treatment + Post_Post + TreatmentxPost_Post,
    data = all_post_arrests_w)

Residuals:
    Min       1Q   Median       3Q      Max
-67.303  -9.011   2.059  12.088  44.697

Coefficients:
              Estimate Std. Error t value Pr(>|t|)
(Intercept)    113.303     1.671   67.797 <2e-16 ***
Treatment      -83.390     3.342  -24.949 <2e-16 ***
Post_Post      -1.394     2.717   -0.513  0.608
TreatmentxPost_Post  50.410     5.434   9.277 <2e-16 ***
---
Signif. codes:  0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1
```

Lockdown: Drug Arrests



```
Call:
lm(formula = number_of_arrests ~ Treatment + Post + TreatmentxPost,
    data = all_drugs_oss)

Residuals:
    Min       1Q   Median       3Q      Max
-14.2995  -2.9963  -0.3778   2.1779  24.5652

Coefficients:
            Estimate Std. Error t value Pr(>|t|)
(Intercept)  15.2995     0.5010  30.540 <2e-16 ***
Treatment    -1.8647     1.0019  -1.861  0.0635 .
Post         -0.3032     0.7124  -0.426  0.6706
TreatmentxPost -12.7538    1.4248  -8.951 <2e-16 ***
---
Signif. codes:  0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1

Residual standard error: 5.885 on 360 degrees of freedom
Multiple R-squared:  0.4037,    Adjusted R-squared:  0.3987
F-statistic: 81.25 on 3 and 360 DF,  p-value: < 2.2e-16
```

$$\text{Equation: } \hat{Y} = 15.30 - 1.86X_1 - 0.30X_2 - 12.75X_1X_2 + \varepsilon$$

X_1 : If Treated = 1, 0 otherwise

X_2 : If After Policing Order = 1,
0 otherwise

X_1X_2 : Interaction term between
Treatment and Post

Post Lockdown: Drug Arrests

Equation: $\hat{Y} = 15.12 - 14.75X_1 - 1.17X_2 + 3.3719X_1X_2 + \varepsilon$

```
Call:
lm(formula = number_of_arrests ~ Treatment + Post_Post + TreatmentxPost_Post,
    data = all_post_drugs_w)
```

Residuals:

Min	1Q	Median	3Q	Max
-13.124	-2.124	-0.247	2.043	22.876

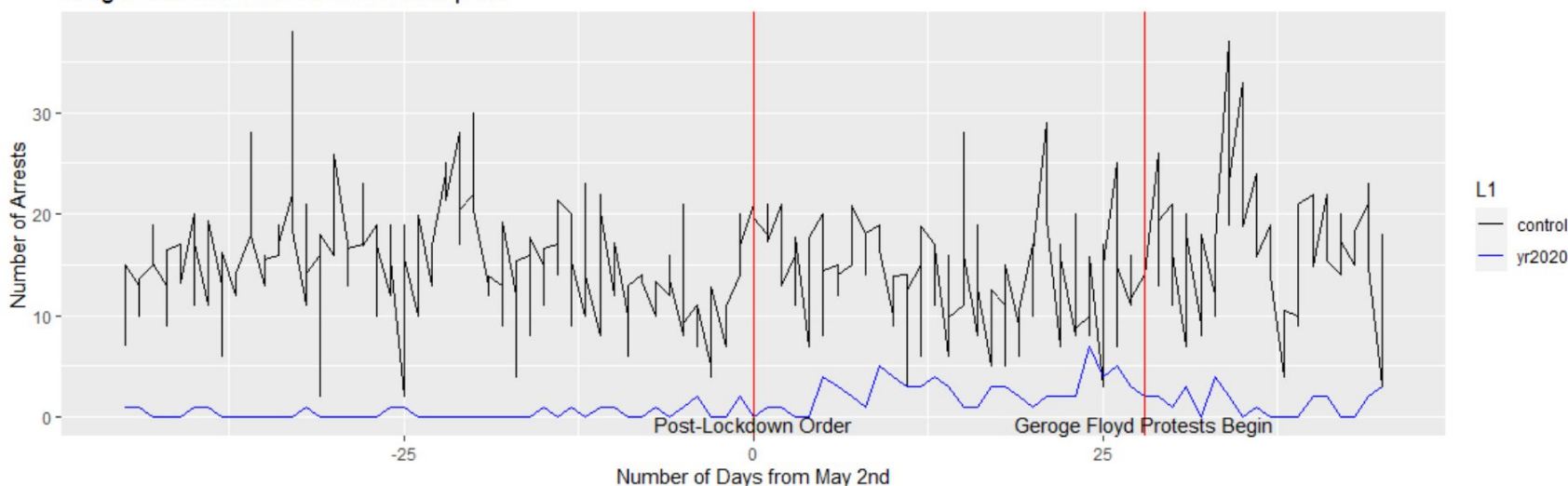
Coefficients:

	Estimate	Std. Error	t value	Pr(> t)
(Intercept)	15.1244	0.4055	37.296	<2e-16 ***
Treatment	-14.7548	0.8110	-18.192	<2e-16 ***
Post_Post	-1.1700	0.6593	-1.775	0.0770 .
TreatmentxPost_Post	3.3719	1.3185	2.557	0.0111 *

 signif. codes: 0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1

Standard Error of the Estimate: 4.764 on 292 degrees of freedom
 Adjusted R-squared: 0.6031
 n = 3 and 292 DF, p-value: < 2.2e-16

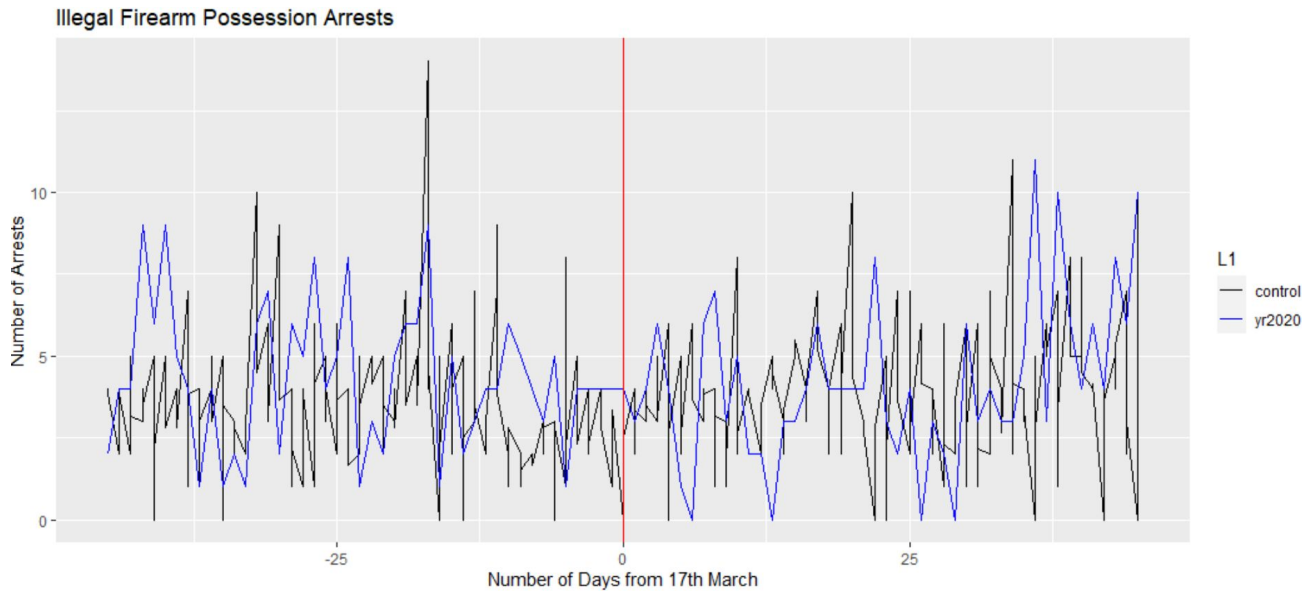
Drug Possession Arrests in Philadelphia



- X_1 : If Treated = 1, 0 otherwise
- X_2 : If After Policing Lift Order = 1, 0 otherwise
- X_1X_2 : Interaction term between Treatment and Post

Balance Check: Firearm Arrests

Lockdown: Firearm Arrests



Regression:

$$\hat{Y} = 3.457 + 0.848X_1 + 0.439X_2 - 0.543X_1X_2 + \varepsilon$$

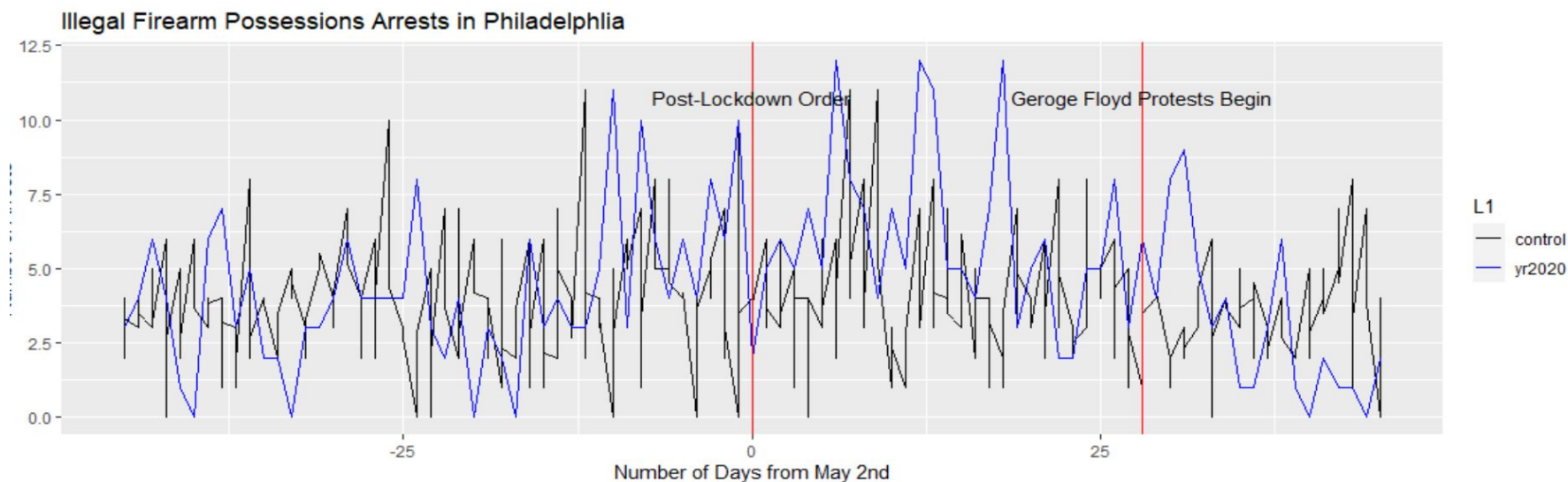
X_1 : If Treated = 1, 0 otherwise

X_2 : If After instituting order = 1, 0 otherwise

X_1X_2 : Interaction term between Treatment and post

P-Value of Treatment X Post: 0.292

Post Lockdown: Firearm Arrests



Regression:

$$\hat{Y} = 3.912 + 0.242X_1 + 0.105X_2 + 1.885X_1X_2 + \varepsilon$$










X_1 : If Treated = 1, 0 otherwise

X_2 : If After Lifting order = 1, 0 otherwise

X_1X_2 : Interaction term between Treatment and Post

P-Value of Treatment X Post: 0.00233

Results Summary

	Lockdown Period (relative to control)	Post Lockdown (relative to control)	Post Lockdown (relative to pre period)
Total Arrests			
Drug Arrests			
Firearm Arrests			

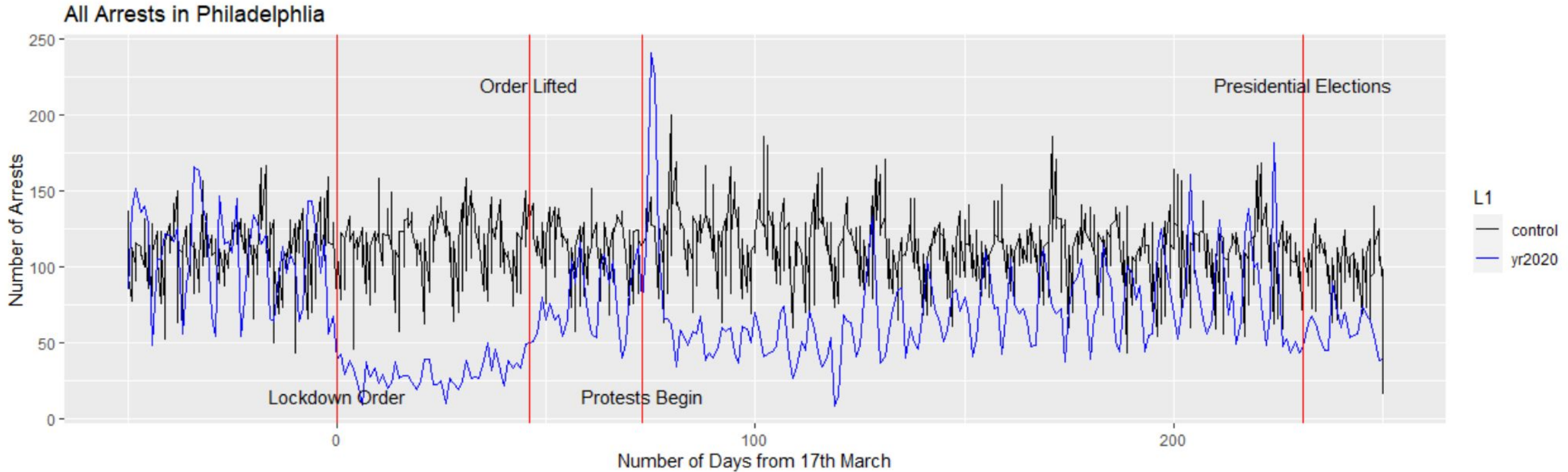
Conclusion

Hypothesis

We hypothesize that the internal police memo caused a significant decrease in petty arrests after the effective date of the internal police memo, and the policy lift caused higher than typical arrests after the conclusion of policy due to over-compensation.

Our analysis suggests that the memo was responsible for a significant decrease in petty arrests, but the lift of the policy did not necessarily lead to full compensation in the post-period.

Long Term Arrests



Limitations of Analysis

Limitations of Future Projections

- As a result of the George Floyd protests, increased scrutiny of police activities may have affected policing activities, changing arrest patterns after May 2
- Changes in implicit behavior caused by Covid-19 (which continued to exist beyond the lockdown) may have had an impact on arrest rates beyond the change in explicit policing orders
- While we assume actual levels of petty crime remained the same (due to our balance checks), there is the possibility true petty crime did actually decrease

Limitations of Experimental Design

- Since Covid-19 affected the entire globe at once, it is difficult to find a location with a comparable parallel trend which did not experience covid effects
 - Control used to project 2020 may be imperfect

Implications & Further Research

- This analysis opens the door to broader causal questions:
 - Does media attention increase the efficacy of policing policies?
 - Did policies like the one investigated lead to tangible (public health) benefits/harm to society?
- Research the impact of pandemic-era arrest reduction policies on jail covid-positivity/mortality rates across different counties/states.
- Cross-check sources about the pandemic effects on true crime, and if the police were more effective at making arrests (arrest rates were higher/lower) in locations where arrest-reduction policies were in place.
- Find reliable reports of true changes in petty criminal behavior as a result of the pandemic.
- Check results against aggregated petty/violent crimes, or other specific crimes.
- Check for differences in responsiveness to internal policy changes in Philadelphia police department and other departments.
- Check for differences in responsiveness when changes are public/internal.

Thank You