Market Response to Racial Uprisings

Bocar Ba, Duke    Roman Rivera, Berkeley    Alexander Whitefield, Wharton

NBER Race and Stratification in the Economy
April 2024
Motivation

Demands from BLM and their policy implications

- Concerns Related to Police Behavior
  - The Black Lives Matter movement has sparked debate on race and policing around the world.
  - Calls to “re-think” the public safety production function:
    - Balancing increased police resources to fight crime with police reform.
    - Debates around “defunding the police” post-George Floyd.

- Impact of Public Discourse on Safety Spending
  - The movement’s effect on police spending remains unclear.
  - Proposals range from increasing resources for crime control and officer improvement to ”Defund the Police” initiatives aiming to reduce both.

⇒ Examining the BLM Movement’s Impact on Key Police Industry Firms
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This Paper
Market valuation of racial uprisings in the U.S.

- **Overview**
  - Study the impact of BLM on publicly traded firms.
  - Clarify the different policy views on policing.
  - Connect our results to the discussion on policing:
    - *Crime control vs. police reform vs. police abolition.*

- **Research Design: Impact of viral incidents tied to BLM on police firms**
  - New data of publicly traded firms tied to policing in the U.S.
  - **Supply Side: Firms’ performance**
    - SDID and Synthetic Control Method
    - Compare connected firms to non-police firms in same industry
  - **Demand Side: local governments’ response to protests**
    - Did local government adopted more police tech as a response to protests?
    - Challenges: places with adoption might have more protests
    - Impact of summer 2020 protests using IV approaches
    - Instrument for protest using weather and distance to closest police killing
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BLM and Firms Tied to Police

Police firms valuation changes with BLM events, driven by accountability and surveillance tech.
Outline

1. Background
2. Short-Run Analysis
3. Does the Market Respond Similarly to Other Viral Events?
4. What Is the Long-Term Impact of Trayvon Martin’s Murder?
5. What Is the Impact of George Floyd’s Murder on Performance?
6. Local Governments’ Response to the Summer 2020 Protests
7. Conclusion
Policy Discourse on Policing
Crime Control vs. Reform vs. Police Abolition

- **Crime Control**
  - Increase police resources to combat crime, including suspect identification and investigations.
  - Investments in surveillance technologies like predictive policing, data analytics tools, gunshot detection, drones, etc.

- **Police Reform**
  - Promote accountability through training, body-worn cameras, and oversight.

- **Police Abolition**
  - Inspired by Prison Abolition [Davis, 2011].
  - Advocates for reducing policing scale and reallocating funds to non-policing alternatives ⇒ “Defund the police” movement.
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Timeline

Growth of BLM + countermovement hashtags

01jan2011 01jul2013 01jan2016 01jul2018 01jan2021


- Death of Trayvon Martin
- Acquittal of George Zimmerman
- Beginning of the BLM movement
- Mistrial in the Jordan Davis Shooting
- Death of Michael Brown
- Death of Tamir Rice
- Death of Alton Sterling
- Death of George Floyd
Timeline
Origin of the BLM Movement

- **Death of Trayvon Martin on February 26, 2012**: Trayvon Martin, 17 years-old, was fatally shot by George Zimmerman, a 28-year-old neighborhood watch coordinator.

- **Acquittal of George Zimmerman on July 13, 2013**: Zimmerman was acquitted, sparking the creation of the hashtag #BlackLivesMatter and the beginning of the BLM movement.

- **Mistrial in the Jordan Davis Shooting on February 15, 2014**: Jordan Davis, a 17-year-old, was killed in November 2012 by Michael Dunn, a 45-year-old software developer. In February 2014, Dunn was convicted of an attempted murder, but jurors were unable to come to an agreement regarding the first-degree murder charge for killing Davis, leading to a mistrial.
Timeline
Post-Ferguson

- **Death of Michael Brown on August 9, 2014:** The first high-profile BLM protests in connection to incidents of police violence occurred in the summer of 2014, following the death of Eric Garner in July. Shortly thereafter, the killing of Michael Brown by Ferguson Police officer Darren Wilson in August 2014 prompted further protests related to BLM.

- **Death of Tamir Rice on November 22, 2014:** Tamir Rice, a 12-year-old boy, was killed by Timothy Loehmann, a Cleveland police officer.

- **Death of Alton Sterling on July 5, 2016:** Alton Sterling was killed by police in Baton Rouge. Shortly after, Philando Castile was killed by an officer in the Minneapolis–Saint Paul metropolitan area. The events of July 2016 also involved the killing of police officers in Dallas and Baton Rouge.

- **Death of George Floyd on May 25, 2020:** A Minneapolis police officer, Derek Chauvin, killed George Floyd. This event led to massive protests across the U.S. and around the world.
Data

- **Firms Analysis (Core Data)**
  - Comprehensive directory of vendors engaged with police departments from 2010 to 2021
    - Police Chief Magazine and Int. Association of Chiefs of Police
    - Focus on publicly traded firms
  - EDGAR for 10K filings.
  - Stock data sourced from CRSP, WRDS Beta Suite, and Compustat.
  - Mass shooting incidents data from the Anti-Defamation League and The Violence Project database

- **Sample Selection**
  - U.S. public firms listed from 2013 to 2020.
  - White-supremacist events: those causing at least one death and generating ≥ 100 Google News articles.
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Exposure to Policing and Control Group

**Connected Firms**

- **Step 1:** Identify policing-related terms in 10k reports ⇒ Police terms: “police, policing, law enforcement, sheriff, trooper”
- **Step 2:** Average exposure for each firm and define strong connection if above the 75th percentile, weak otherwise
  - ★ ⇒ **Strong connections:** Axon, ShotSpotter, Motorola, Smith Wesson, etc
  - ★ ⇒ **Weak connections:** 3M, Amazon, ATT, Microsoft, etc

**Control Group**

- Firms in the same states and 4-digits SIC
- **Donor pool:** firms in the same industries but without policing exposure.
### Table 1: Summary Statistics by Type of Connection

<table>
<thead>
<tr>
<th></th>
<th>(1) Strong Connection</th>
<th>(2) Weak Connection</th>
<th>(3) Donor Pool</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Mean</td>
<td>SD</td>
<td>Mean</td>
</tr>
<tr>
<td>Size</td>
<td>5.93</td>
<td>2.15</td>
<td>8.49</td>
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<tr>
<td>Profitability</td>
<td>-0.01</td>
<td>0.15</td>
<td>0.03</td>
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<tr>
<td>Leverage</td>
<td>0.20</td>
<td>1.16</td>
<td>1.70</td>
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<tr>
<td>Exposure to Policing</td>
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<td>0.07</td>
<td>0.00</td>
</tr>
<tr>
<td>Share of Government Client</td>
<td>0.50</td>
<td>0.32</td>
<td>0.14</td>
</tr>
<tr>
<td>Number of Firms</td>
<td>23</td>
<td>65</td>
<td>771</td>
</tr>
<tr>
<td>Observations</td>
<td>114</td>
<td>363</td>
<td>3058</td>
</tr>
</tbody>
</table>

Notes: The table presents descriptive statistics by the level of connection to policing. We multiply exposure by 100 readability. The variables size, profitability, and leverage capture log total assets, return on equity, and the ratio between total debt and total capital, respectively. All the variables are computed using the year before the event.
Outline

1 Background

2 Short-Run Analysis

3 Does the Market Respond Similarly to Other Viral Events?

4 What Is the Long-Term Impact of Trayvon Martin’s Murder?

5 What Is the Impact of George Floyd’s Murder on Performance?

6 Local Governments’ Response to the Summer 2020 Protests

7 Conclusion
Research Design

- For each firm \( i \) at date \( t \), the outcome \( CAR_{it} \)

\[
CAR_{it} = \mu + \alpha_i + \gamma_t + Police_{it}\beta + \epsilon_{it}
\]

- \( \alpha_i \) is a firm-fixed effect, \( \gamma_t \) is a time-fixed effect, and \( \mu \) is a constant.
- \( Police_{it} \): binary treatment, i.e., “connected firms” contracting with law enforcement before and after the event.
- \( CAR_{it} \) using Excess return on the market, size factor (SMB), value factor (HML), and momentum (UMD).

- **Synthetic Difference-in-Differences** [Arkhangelsky et al., 2021]
  - Compare firms exposed to policing to their “parallel synthetic control”.
  - **Synthetic counterfactual**: weighted combination of firms in the control group.
  - Assumption: no systematic differences between the outcomes trends of the treated and weighted outcomes of firms in donor pool in the absence of viral incident.
Research Design

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Daily Impact of Viral Events

\[ \text{sdid}_{\text{strong}} = 0.069 \text{ (s.e.}=0.010) \]
\[ \text{sdid}_{\text{weak}} = -0.001 \text{ (s.e.}=0.006) \]

![Graph showing the cumulative abnormal return over trading days for strong and weak viral events. The graph illustrates the impact of viral events on stock prices, with distinct lines for strong and weak events, highlighting the statistical significance of the effects.](image-url)
Effect by Events

Death of Trayvon Martin
Acquittal of George Zimmerman
Mistrial in the Jordan Davis Shooting
Death of Michael Brown
Death of Tamir Rice
Death of Alton Sterling
Death of George Floyd
Pooled

Treatment Effect
-1 -0.5 0 0.5 1 1.5 2 2.5

Weak Connection
Strong Connection
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Other Viral Events

- 11 events with 12-49 deaths

A. Mass Shootings

\[ \text{sdid}_{\text{strong}} = 0.0068 \text{ (s.e.}=0.0081) \]
\[ \text{sdid}_{\text{weak}} = 0.0041 \text{ (s.e.}=0.0052) \]
Other Viral Events

- 8 events with 1-11 deaths (Anti-black, LGBTQ+, antisemitic attacks)

\[
sdid_{\text{strong}} = 0.0176 \text{ (s.e.=0.0089)} \\
sdid_{\text{weak}} = 0.0009 \text{ (s.e.=0.0058)}
\]

B. White Supremacists Events

Cumulative Abnormal Return vs. Trading Day
Outline

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Research Design for the Long-Run Analysis

**Passive Investors with Portfolio**
- Construct buy-and-hold portfolios: strong and weak ties to policing
  - Market value-weighted returns in the main specifications
  - Equally value-weighted returns in the robustness specifications
- Construct donor pool portfolios of non-connected firms in the same SIC
  - Weakly and strongly connected firms comprise 58 and 18 randomly drawn firms

**Estimation Strategy**
- Similar approach as previously using the Carhart Four-Factor model
- SDID and SC estimators before and after the killing of Trayvon Martin
Long-Run Impact of BLM

Total Effect for Firms with Strong Connection

A. Strong Connection

sdid = 0.764
s.e. = 0.355

Death of Trayvon Martin ← ← Death of Michael Brown
Death of George Floyd → →

Treatment Effect

Placebos  Strong Connection
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Impact of George Floyd’s Murder on CARs

![Graph showing the impact of George Floyd's Murder on CARs with cumulative abnormal return values from day -21 to 21, including coefficients, standard errors, and a value of $474M.]
Potential Impact of Viral Events

- More video monitoring of police and civilians
  - BWC
  - Video recorders, cameras

- Increase in protests, unrests, riots
  - Restraint/Defense devices

- Impact on crime
  - Predictive Policing / Data /AI
  - Guns and less-than-lethal weapons
  - Crime analysis
  - Intelligence led-policing

- Demand for police accountability tools
  - Training
  - Course, School, Seminars
  - BWC

- Effect of civilians demand for police
  - 911/CAD
Impact of George Floyd’s Murder on CARs by Product Type

A. Top Performing Products

- Recorders, Video
- Thermal Imaging Systems
- Cameras, Video
- Cameras, Body-Worn
- Restraint/Defense Devices
- Surveillance Equipment
- Firearms + Firearms Training
- Equipment, Training
- Video Analysis And Enhancement
- Data Mining
- Courses/Schools/Seminars
- Artificial Intelligence
- Image Search And Analysis
- License Plate Recognition
- Records Management
- Case Management
- Weapons, Less-Lethal
- Security Devices/Systems
- Portable/In-Car

Treatment Effect

Values: -0.5, -0.2, 0.1, 0.4, 0.7, 1.0
Impact of the “Defund” Movement on Profits

↑ Sales and ↓ Cost of Goods Sold

A. Sales

coef = 2.168
s.e. = 0.768
value ($) = 1050M

B. Cost of Goods Sold

coef = -1.056
s.e. = 0.318
value ($) = -347M

Graph showing cumulative growth over quarters, with strongly connected and synthetic connected lines, indicating the impact on sales and cost of goods sold post-George Floyd’s murder.
Impact of Protests on Tech. Adoption from Police Dpt.

Data

- 2020 Law Enforcement Management and Administrative Statistics 2020
  - Survey with information of police + sheriff department adoption of technologies like body-worn cameras, videos, and gunshot detection
- GDELT merged with Mapping Violence Data to identify BLM related protests
- Weather info from the Global Historical Climatology Network [Klein Tank et al., 2002], matching agencies with their nearest weather stations

Estimation Strategy

- For each agency $i$, the adoption of technology is

  $$\text{adopt}_i = \alpha + \text{protest}_i \beta + X_i'\delta + \epsilon_i$$

- $\text{protest}_i$ is the intensity of BLM-protest between May 25 to July 31, 2020
- Instrument for protests: weather (temperature, precipitation, wind speed, humidity, tornado) and distance to the closest police-killing
- Critics of the exclusion restriction [Sarsons, 2015, Mellon, 2023], we use method from [Masten and Poirier, 2021] to recover the falsification adaptive set
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Table 3: Effect of BLM Protests on Body-Worn Camera and Gunshot Detection Adoption

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<thead>
<tr>
<th></th>
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<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Protest (Std. Dev.)</td>
<td>0.0150 (0.0136)</td>
<td>0.269*** (0.0623)</td>
<td>0.220*** (0.0509)</td>
<td>0.0416*** (0.0112)</td>
<td>0.0623** (0.0279)</td>
<td>0.0612*** (0.0226)</td>
</tr>
<tr>
<td>Specification</td>
<td>OLS</td>
<td>IV-Lasso</td>
<td>2SLS</td>
<td>OLS</td>
<td>IV-Lasso</td>
<td>2SLS</td>
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<tr>
<td>Controls</td>
<td>Yes</td>
<td>Yes</td>
<td>Yes</td>
<td>Yes</td>
<td>Yes</td>
<td>Yes</td>
</tr>
<tr>
<td>First-stage F-Stat</td>
<td>—</td>
<td>—</td>
<td>19.45</td>
<td>—</td>
<td>—</td>
<td>19.45</td>
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<tr>
<td>Mean of Dep.</td>
<td>0.52</td>
<td>0.52</td>
<td>0.52</td>
<td>0.05</td>
<td>0.05</td>
<td>0.05</td>
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<tr>
<td>Observations</td>
<td>1903</td>
<td>1903</td>
<td>1903</td>
<td>1903</td>
<td>1903</td>
<td>1903</td>
</tr>
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</table>

Notes: This table examines the impact of the summer 2020 BLM protests on police departments’ implementation of body-worn cameras and gunshot detection equipment. The dependent variable is binary, reflecting whether an agency has the technology. To standardize the independent variable, we normalize the count of BLM protests per agency by subtracting the average and dividing by the standard deviation. Each specification controls for the number of protests related to BLM from 2013 to 2019, type of law enforcement agency (police department vs. sheriff), county demographics (median income, percentage Black population, and percentage males aged 15–17), number of police officers per 10,000 population, and rates of violent and property crimes per 10,000 population in 2019. The 2SLS and IV-lasso specifications use weather variations from May 25 to July 31, 2020, and distance from the nearest police killing as instruments. Standard errors are clustered at the agency level. ***p < 0.01; **p < 0.05; *p < 0.1.
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Conclusion

Summary

- Firms with strong exposure to policing saw improved performance.
- Enhanced returns for companies focused on surveillance technology and BWC.
- BLM protests spurred additional investments in firms associated with crime control and police reform.
- The “Defund the Police” movement did not adversely affect these companies.
  - Notably, there was an increase in sales following Floyd’s murder.
  - Government exposed to protests increased their demand for surveillance and accountability tools

Implications: Study the beneficiaries of these socio-political events

- Investors anticipated the BLM movement would lead to increased public spending on policing.
  - This is evidenced by the growth in police resource allocation beginning with Trayvon Martin’s death.

⇒ Evidence suggests BLM protests influenced society to embrace demands from reformist, crime control, and BLM-reformists advocates and not BLM-abolitionists.
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Thank You!
Appendix
Heterogeneity by Level of Exposure to Government

A. Strong Connection

Death of Trayvon Martin
Acquittal of George Zimmerman
Mistrial in the Jordan Davis Shooting
Death of Michael Brown
Death of Tamir Rice
Death of Alton Sterling
Death of George Floyd
Pooled

Share of Public Sector Client > 50%
Share of Public Sector Client ≤ 50%
Table 4: Effect of BLM Protests on Video Technology Adoption

<table>
<thead>
<tr>
<th>Panel A) OLS</th>
<th>(1) Public Areas</th>
<th>(2) Mobile</th>
<th>(3) Drones</th>
<th>(4) Patrol Cars</th>
<th>(5) Weapons</th>
</tr>
</thead>
<tbody>
<tr>
<td>Protest (Std. Dev.)</td>
<td>0.036** (0.015)</td>
<td>0.030** (0.014)</td>
<td>0.006 (0.012)</td>
<td>-0.030** (0.015)</td>
<td>0.002 (0.004)</td>
</tr>
<tr>
<td>Mean of Dep. Observations</td>
<td>0.41 1903</td>
<td>0.20 1903</td>
<td>0.23 1903</td>
<td>0.53 1903</td>
<td>0.03 1903</td>
</tr>
</tbody>
</table>

| Panel B) IV-Lasso                |                  |            |            |                 |             |
| Protest (Std. Dev.)              | 0.147*** (0.057) | 0.225*** (0.056) | 0.294*** (0.062) | -0.009 (0.057) | -0.015 (0.015) |
| Mean of Dep. Observations        | 0.41 1903       | 0.20 1903   | 0.23 1903   | 0.53 1903       | 0.03 1903   |

| Panel C) 2SLS                     |                  |            |            |                 |             |
| Protest (Std. Dev.)              | 0.161*** (0.048) | 0.230*** (0.046) | 0.240*** (0.047) | -0.046 (0.049) | -0.005 (0.012) |
| First-stage F-Stat                | 19.45            | 19.45      | 19.45      | 19.45           | 19.45       |
| Mean of Dep. Observations        | 0.41 1903       | 0.20 1903   | 0.23 1903   | 0.53 1903       | 0.03 1903   |

Notes: This table examines the impact of the summer 2020 BLM protests on the adoption of video technology by police departments. The dependent variable is binary, indicating whether an agency has equipped itself with more than one type of video technology, such as patrol car cameras, public area surveillance, mobile units, aerial drones, and weapon-mounted cameras. To standardize the independent variable, we normalize the count of BLM protests per agency by subtracting the average and dividing by the standard deviation. Each specification controls for the number of protests related to BLM from 2013 to 2019, the type of law enforcement agency (police department vs. sheriff), county demographics (median income, percentage Black population, and percentage males aged 15–17), the number of police officers per 10,000 population, and the rates of violent and property crimes per 10,000 population in 2019. The 2SLS and IV-lasso specifications use weather variations from May 25 to July 31, 2020, and distance from the nearest police killing as instruments. Standard errors are clustered at the agency level. ***p < 0.01; **p < 0.05; *p < 0.1.
Long-Run Impact of BLM

Total Effect for Firms with Weak Connection

B. Weak Connection

<table>
<thead>
<tr>
<th>Year</th>
<th>Treatment Effect</th>
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</thead>
<tbody>
<tr>
<td>2010m1</td>
<td>-1.75</td>
</tr>
<tr>
<td>2012m1</td>
<td>-1.25</td>
</tr>
<tr>
<td>2014m1</td>
<td>-0.75</td>
</tr>
<tr>
<td>2016m1</td>
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<tr>
<td>2018m1</td>
<td>0.25</td>
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<tr>
<td>2020m1</td>
<td>0.75</td>
</tr>
</tbody>
</table>

sdid = 0.010
s.e. = 0.197

Death of Trayvon Martin ← ← Death of Michael Brown
Death of George Floyd → →

Placebos
Weak Connection
References


References II
