Market Response to Racial Uprisings

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NBER Race and Stratification in the Economy

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Motivation

- Concerns Related to Police Behavior
  - ▶ The Black Lives Matter movement has sparked debate on race and policing around the world.
  - ▶ George Floyd's death ignited the largest, most sustained protest movement in U.S. history (New York Times, 2020).
  - ▶ 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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Demands from BLM and their policy implications

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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

This Paper
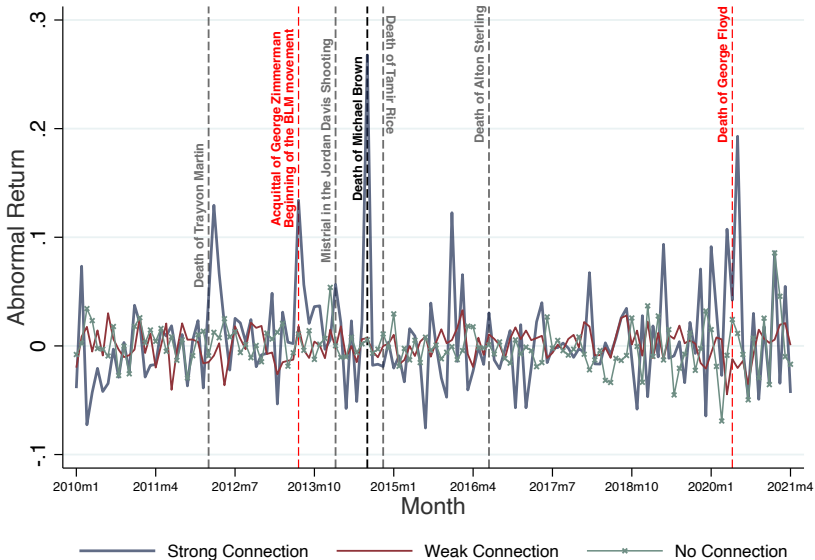Market valuation of racial uprisings in the U.S.

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BLM and Firms Tied to Police

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

Outline

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.
  - Critique: Potentially expands policing reach without mitigating harm to marginalized communities [Gilmore, 2007, Vitale, 2017].

- 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
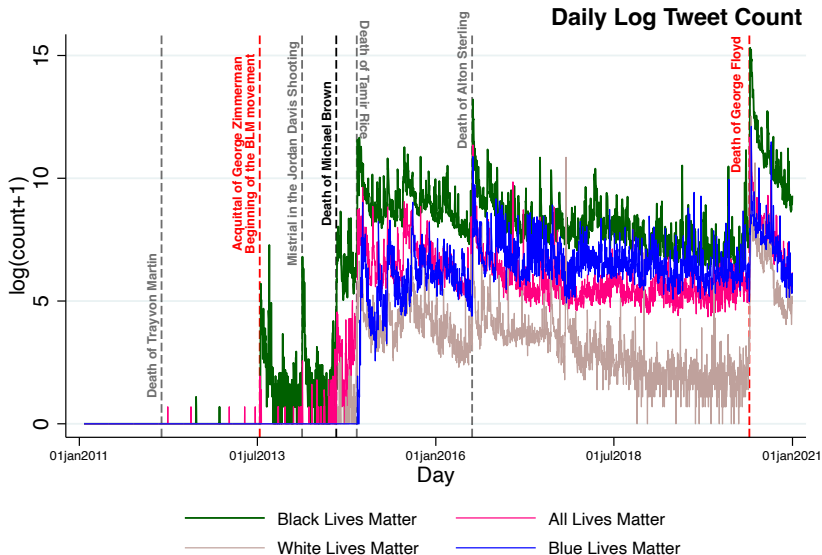
Timeline

- **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.
  - Mass shootings: deadliest incidents between 2010 and 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 $\Rightarrow$ 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
    - ⋆ $\Rightarrow$ Strong connections: Axon, ShotSpotter, Motorola, Smith Wesson,etc
    - ⋆ $\Rightarrow$ 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.

Summary Statistics

Table 1: Summary Statistics by Type of Connection

	(1) Strong Connection		(2) Weak Connection		(3) Donor Pool	
	Mean	SD	Mean	SD	Mean	SD
Size	5.93	2.15	8.49	2.16	6.20	2.03
Profitability	-0.01	0.15	0.03	0.08	-0.09	0.34
Leverage	0.20	1.16	1.70	8.65	0.59	7.60
Exposure to Policing	0.06	0.07	0.00	0.00	0.00	0.00
Share of Government Client	0.50	0.32	0.14	0.22		
Number of Firms	23		65		771	
Observations	114		363		3058	

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

Research Design

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

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

  - α_i is a firm-fixed effect, γ_t is a time-fixed effect, and μ 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.
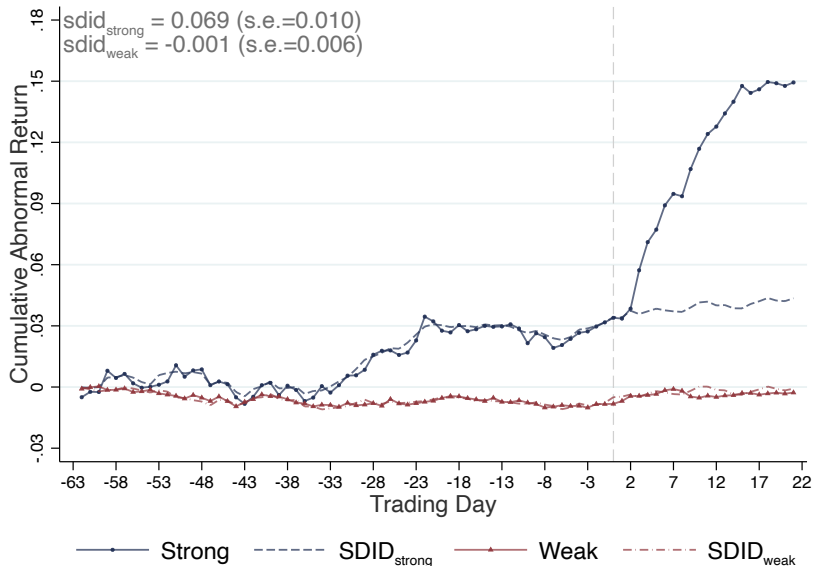
Research Design
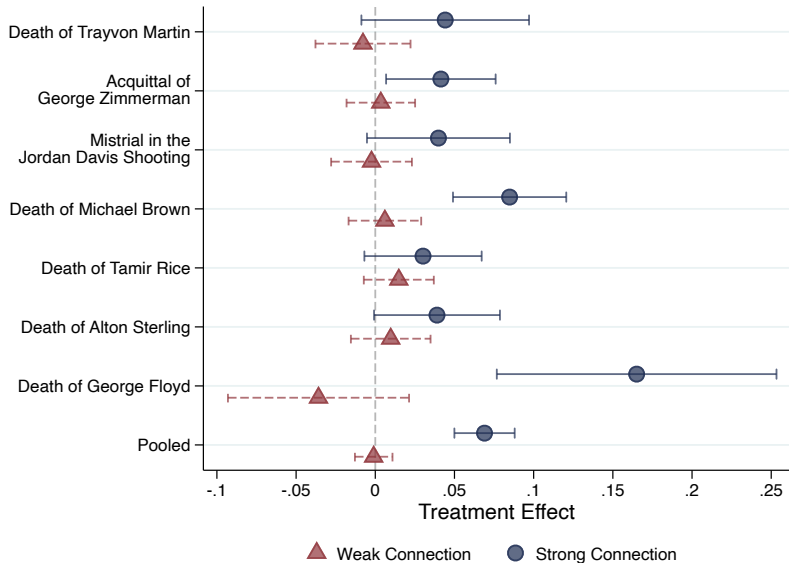
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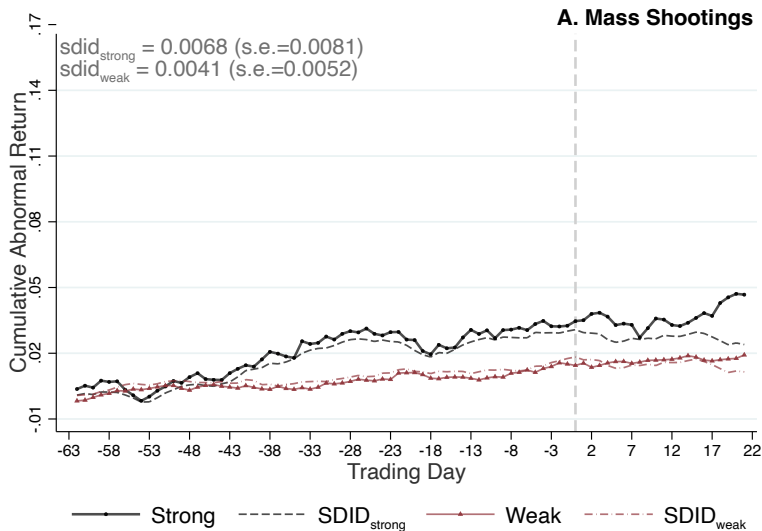
Daily Impact of Viral Events

Effect by Events

Figure: Treatment effect by events. Y-axis lists events (top to bottom): 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. X-axis: Treatment Effect ranging from -.1 to .25. Legend: △ Weak Connection, ● Strong Connection.

Outline

Other Viral Events

- **11 events with 12-49 deaths**

A. Mass Shootings

sdid$_{strong}$ = 0.0068 (s.e.=0.0081)
sdid$_{weak}$ = 0.0041 (s.e.=0.0052)

Cumulative Abnormal Return

Trading Day

Strong — — SDID$_{strong}$ — Weak — — SDID$_{weak}$

Other Viral Events

- **8 events with 1-11 deaths (Anti-black, LGBTQ+, antisemitic attacks)**
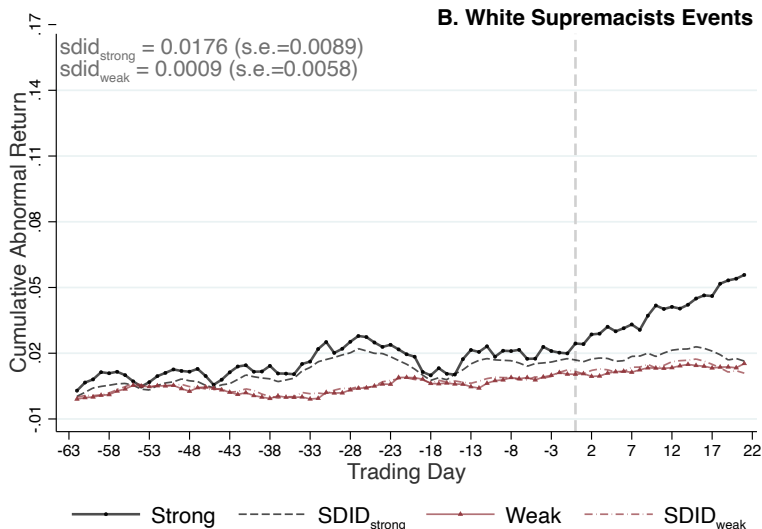
B. White Supremacists Events

$sdid_{strong}$ = 0.0176 (s.e.=0.0089)
$sdid_{weak}$ = 0.0009 (s.e.=0.0058)

Cumulative Abnormal Return

Trading Day

Strong — — — — SDID$_{strong}$ — — Weak — · — · SDID$_{weak}$

Outline

Research Design for the Long-Run Analysis

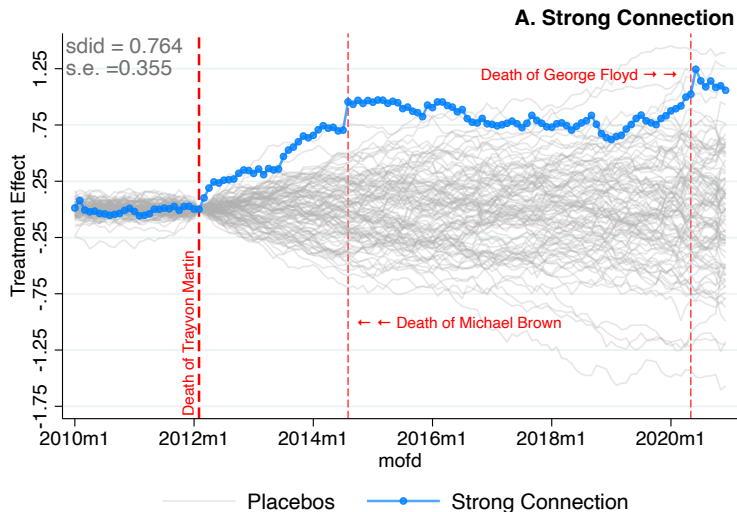- **Passive Investors with Portfolio**
  - ▸ Construct buy-and-hold portfolios: strong and weak ties to policing
    - ★ Market value-weighted returns in the main specifications
    - ★ Equally value-weighted returns in the robustness specifications
  - ▸ Construct donor pool portfolios of non-connected 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
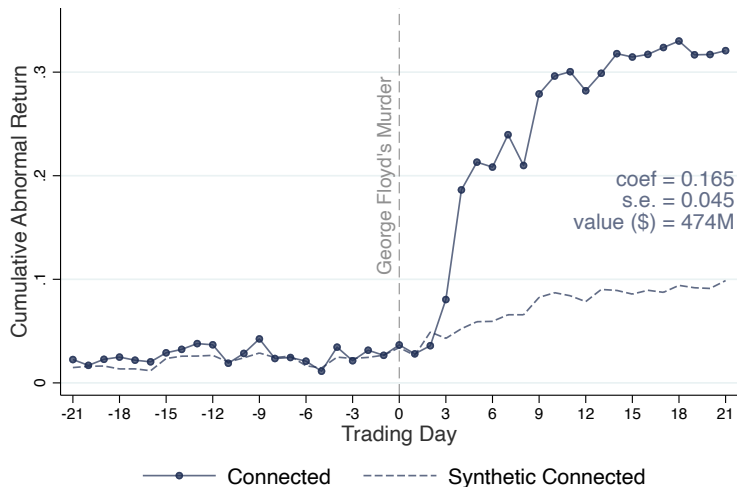
Long-Run Impact of BLM

Total Effect for Firms with Strong Connection

A. Strong Connection

sdid = 0.764
s.e. =0.355

Death of George Floyd → →

Death of Trayvon Martin

← ← Death of Michael Brown

Treatment Effect

mofd

Placebos   Strong Connection

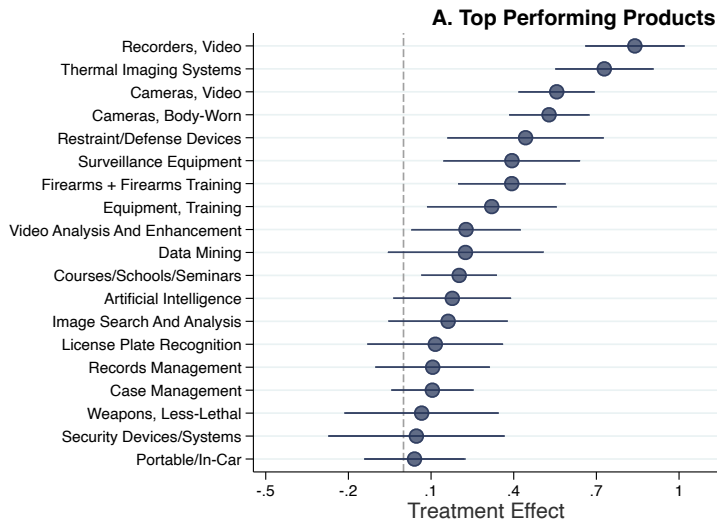# Outline

Impact of George Floyd's Murder on CARs

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

Impact of the "Defund" Movement on Profits

⇑ Sales and ⇓ Cost of Goods Sold

Outline

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

$$adopt_i = \alpha + protest_i\beta + X_i'\delta + \epsilon_i$$

  - $protest_i$ 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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Effect of Protests on BWC and Gunshot Detection

Table 3: Effect of BLM Protests on Body-Worn Camera and Gunshot Detection Adoption

	(1) Body Worn Camera	(2) Body Worn Camera	(3) Body Worn Camera	(4) Gunshot Detection Tech.	(5) Gunshot Detection Tech.	(6) Gunshot Detection Tech.
Protest (Std. Dev.)	0.0150	0.269***	0.220***	0.0416***	0.0623**	0.0612***
	(0.0136)	(0.0623)	(0.0509)	(0.0112)	(0.0279)	(0.0226)
Specification	OLS	IV-Lasso	2SLS	OLS	IV-Lasso	2SLS
Controls	Yes	Yes	Yes	Yes	Yes	Yes
First-stage F-Stat	—	—	19.45	—	—	19.45
Mean of Dep.	0.52	0.52	0.52	0.05	0.05	0.05
Observations	1903	1903	1903	1903	1903	1903

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 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. ***$p < 0.01$; **$p < 0.05$; *$p < 0.1$.

Outline

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.

$\Rightarrow$ 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

Share of Public Sector Client > 50%   ◇ Share of Public Sector Client ≤ 50%
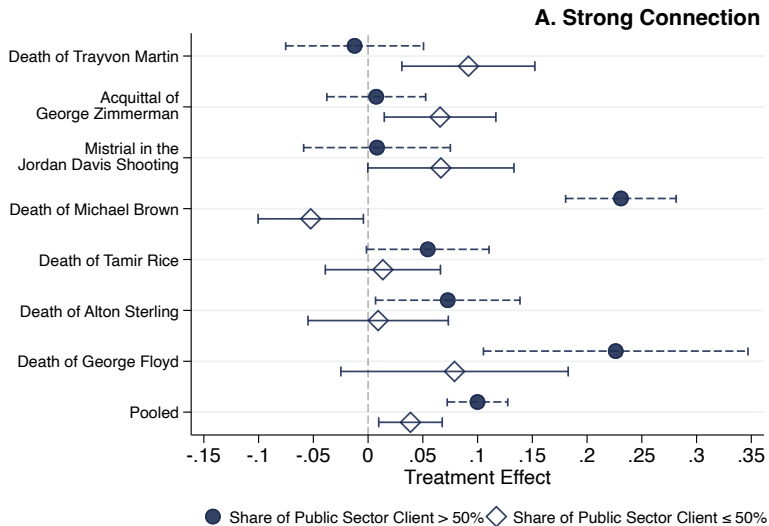
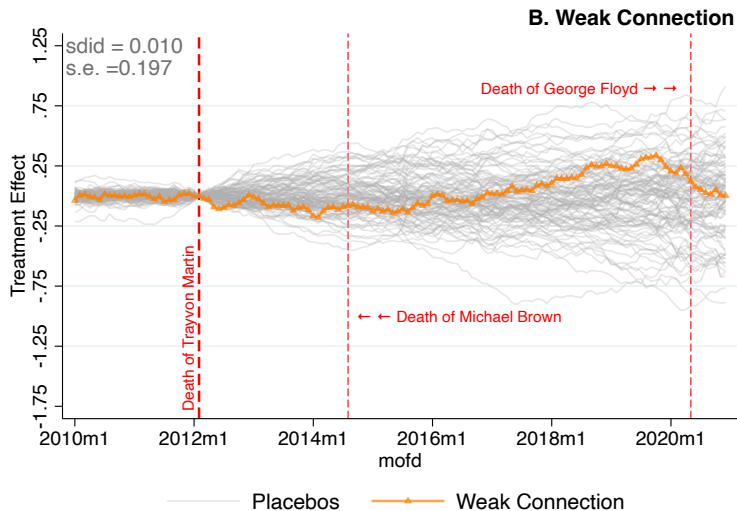# Effect of Protests on Adoption of Video Technologies

Table 4: Effect of BLM Protests on Video Technology Adoption

	(1) Public Areas	(2) Mobile	(3) Drones	(4) Patrol Cars	(5) Weapons
Panel A) OLS					
Protest (Std. Dev.)	0.036**	0.030**	0.006	-0.030**	0.002
	(0.015)	(0.014)	(0.012)	(0.015)	(0.004)
Mean of Dep.	0.41	0.20	0.23	0.53	0.03
Observations	1903	1903	1903	1903	1903
Panel B) IV-Lasso					
Protest (Std. Dev.)	0.147**	0.225***	0.294***	-0.009	-0.015
	(0.057)	(0.056)	(0.062)	(0.057)	(0.015)
Mean of Dep.	0.41	0.20	0.23	0.53	0.03
Observations	1903	1903	1903	1903	1903
Panel C) 2SLS					
Protest (Std. Dev.)	0.161***	0.230***	0.240***	-0.046	-0.005
	(0.048)	(0.046)	(0.047)	(0.049)	(0.012)
First-stage F-Stat	19.45	19.45	19.45	19.45	19.45
Mean of Dep.	0.41	0.20	0.23	0.53	0.03
Observations	1903	1903	1903	1903	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. ***$p < 0.01$; **$p < 0.05$; *$p < 0.1$.
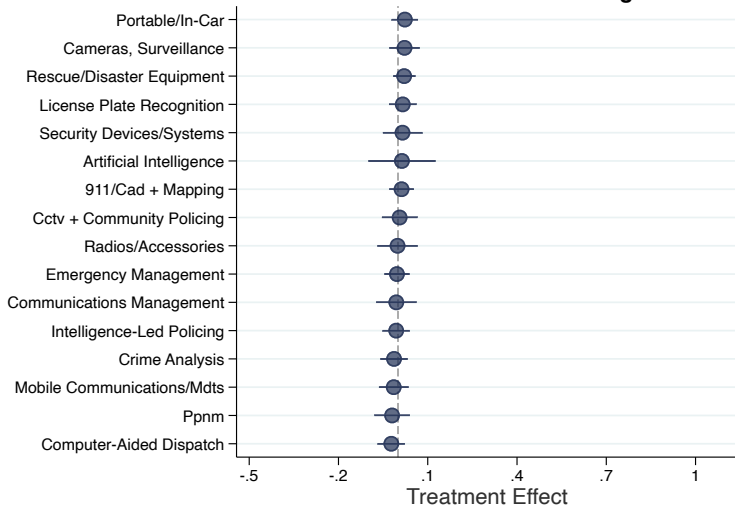
Long-Run Impact of BLM

Total Effect for Firms with Weak Connection

B. Bottom Performing Products

Portable/In-Car
Cameras, Surveillance
Rescue/Disaster Equipment
License Plate Recognition
Security Devices/Systems
Artificial Intelligence
911/Cad + Mapping
Cctv + Community Policing
Radios/Accessories
Emergency Management
Communications Management
Intelligence-Led Policing
Crime Analysis
Mobile Communications/Mdts
Ppnm
Computer-Aided Dispatch

-.5   -.2   .1   .4   .7   1

Treatment Effect

References I

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