

# Mafia infiltrations in times of crisis: Evidence from the Covid-19 shock

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# Introduction

# Motivation

- The relation between mafia expansion and the economy is complex and goes in both directions
  - Mafia-type organisations have flourished thanks to positive economic shocks in contexts of weak institutions ([Bandiera, 2003](#); [Buonanno et al., 2015](#); [Dimico et al., 2017](#)),
  - Presence and expansion of mafia influences the economic and social development ([Peri, 2004](#); [Pinotti, 2015a,b](#); [Acemoglu et al., 2020](#)).

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  - Presence and expansion of mafia influences the economic and social development (Peri, 2004; Pinotti, 2015a,b; Acemoglu et al., 2020).
- However, **almost no evidence at the micro level**. What conditions favour the expansion of mafia in the legal economy?
  - We rely on firm-level data
  - We exploit the Covid-19 shock to establish a causal relationship
  - We provide indirect evidence on why firms resort to mafia rather than bank credit

# Conceptual framework

- In our world, there are
  - ① Legal firms
  - ② Liquidity providers of two types: commercial banks and mafia-type lenders
- Entrepreneurs face a trade-off when choosing their funding sources:
  - Banks require firms to satisfy several conditions (e.g., collateral, long-standing debt...) but comply to laws
  - Mafia promptly provides liquidity with no ex-ante conditions but then takes control of firm through threats and violence

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- In normal times, legal firms should prefer legal banks
- Not necessarily true in financial distress

# Outline

- 1 Introduction
- 2 Data
- 3 Empirical Strategy
- 4 Results
- 5 Formal credit versus mafia lending
- 6 Conclusion

Data



# Data

- Balance Sheet data covering Italian incorporated firms from Cerved
- Ownership data covering the universe of Italian firms from Infocamere
- Mafia ('Ndrangheta) families from Direzione Investigativa Antimafia

# Data

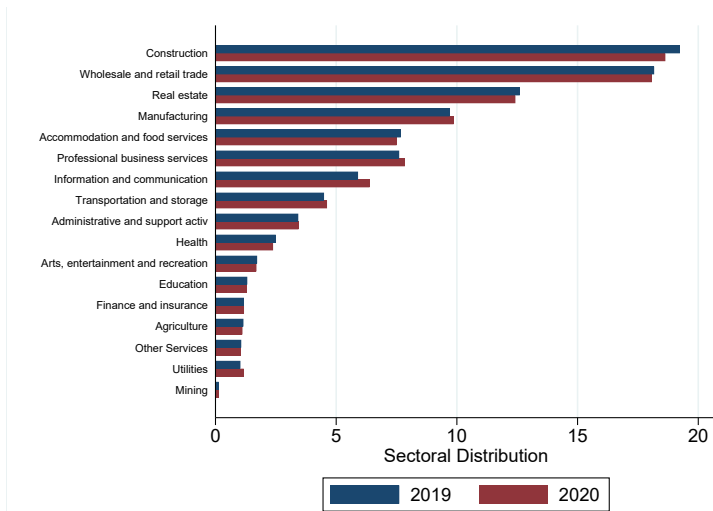
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- Mafia ('Ndrangheta) families from Direzione Investigativa Antimafia
- *Non-essential* sectors forced to close in March-May 2020 from DPCM
- Firms which obtained financial aid through the DL Rilancio (May 2020) from [Pelosi et al. \(2021\)](#)

## Firms data

- We use a panel of Italian incorporated firms merging balance sheet and (full) ownership structure information (N=549,203)
- The years of interest are 2018-2020
- Following [Mirenda et al. \(2022\)](#), we define a firm to be infiltrated by 'ndrangheta if at least one owner:
  - 1 whose last name matched one of those in the list of DIA and
  - 2 was born in Calabria
- We reconstruct the ownership structure tracking owners up to eight levels (i.e., owners of the owning companies)

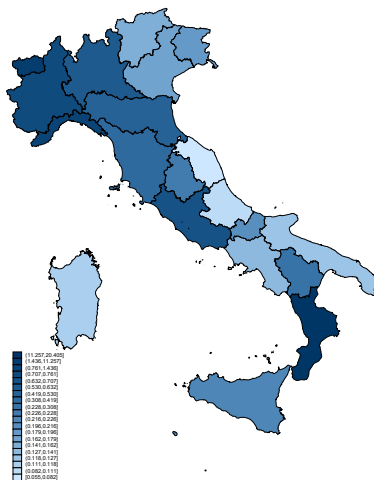
## Descriptive Statistics: infiltrations

- In 2020, 4,652 (0.84%) firms were infiltrated by 'ndrangheta, 0.79 in 2019



# Descriptive Statistics: infiltrations

- Highest incidence in region of origin and North-West



## Empirical Strategy

## Empirical Strategy

- Relation between firm performance and mafia entry likely **endogenous**  
e.g. more honest entrepreneurs may be also better able ones;  
well-performing businesses have easier access to formal credit (less need for mafia liquidity) ...



We exploit the negative shock to firms' performance induced by **Covid-19**

# Covid and the risk of mafia infiltration

- Concern that the mafia may take advantage of the Covid pandemic emergency to expand has risen from the very first months of the emergency

## Why the mafia are taking care of everyone's business

Organised crime is already giving food parcels to the poor in Italy and Mexico. For the cartels and syndicates, this crisis is an opportunity

25 Apr 2020



- Evidence from **Bol survey of firms** in 2020 shows that the fear of mafia infiltration raised significantly after Covid, especially for what concerned operations of anomalous business financing and acquisitions, more so in sectors more affected by the shock ([Mocetti and Rizzica, 2023](#))



# Empirical Strategy: DDIV

We implement an instrumented **Difference-in-Differences strategy (DDIV)**

(de Chaisemartin and D'Haultfœuille, 2017)

$$NDR_{ijlt} = \alpha_i + \beta X_{ijlt} + \phi_{jt} + \psi_{lt} + \epsilon_{ijlt} \quad (1)$$

$$X_{ijlt} = \gamma_i + \pi Z_j T_{2020} + \xi_{jt} + \nu_{lt} + \eta_{it} \quad (2)$$

- $NDR_{ijlt}$  is a dummy variable which equals 1 if the firm  $i$ , in 6-digit sector  $j$  and province  $l$ , is infiltrated in a given year  $t$  and onwards,
- $X_{ijlt}$  is a proxy of firm performance,
- $Z_j$  is our instrument: sectoral Covid closings
- $\phi_{jt}$  and  $\xi_{jt}$  are 4-digit-sector by year FEs,  $\psi_{lt}$  and  $\nu_{lt}$  are province by year FEs
- $\beta$  is *(local) average causal response*

## The instrument: Covid closings

- Five DPCMs have established the closing of firms operating in *non-essential activities*, with the objective of preventing the diffusion of the Covid-19 pandemic
- ATECO 4 and 6 digits
  - Repair of agricultural tractors (33.12.60): **open**
  - Repair of interchangeable parts for machine tools (33.12.91): **closed**
- Provides significant variation across and within ISIC sectors
- Firms closed for 19-67 days
- For simplicity, in the baseline analysis we define

$$Z_j = \begin{cases} 1 & \text{if closed} \\ 0 & \text{if didn't close} \end{cases}$$

## DDIV Requirements

Two exclusion restrictions and two further assumptions need to be satisfied:

- ER1:  $Z$  affects NDR only through  $X$

$$\mathbb{P}(NDR(X, 1) = NDR(X, 0)) = 1 \quad (3)$$

- ER2:  $Z$  does not affect past infiltrations nor past balance sheets

$$Z_j \perp\!\!\!\perp NDR_{ijlt} \text{ and } Z_j \perp\!\!\!\perp X_{ijlt}, \forall t < 2020 \quad (4)$$

- Parallel Trends on  $NDR_{ijlt}$  and  $X_{ijlt}$  [▶ Graphs](#)

$$\mathbb{E}(X_{it}^1 - X_{it}^0) \perp\!\!\!\perp Z, \mathbb{E}(NDR_{it}^1 - NDR_{it}^0) \perp\!\!\!\perp Z \quad (5)$$

- Monotonicity: the closing instrument affects firm's performance only in one direction, in our case negatively

$$\mathbb{P}(X_{2020}^1 \geq X_{2020}^0) = 1 \quad (6)$$

## Results

## Reduced Form estimates

First, we inspect whether the Covid shock is correlated with mafia infiltrations

$$NDR_{ijlt} = a_i + bZ_j T_{2020} + c_{Jt} + d_{lt} + e_{ijlt}$$

	(1)	(2)	(3)
<i>Dependent variable:</i>		NDR	
<b>Panel A: Closing dummy</b>			
Closing	0.000526** (0.000220)	0.000582*** (0.000218)	0.000357** (0.000165)
<b>Panel B: Number of Days</b>			
Closing days	0.0000187 (0.0000145)	0.0000187 (0.0000134)	0.00000590* (0.00000339)
N	1518090	1518090	1518090
Firm FE			Yes
Sector-Year FE	Yes	Yes	Yes
Province-Year FE		Yes	Yes
Mean of Dep Var	0.807	0.807	0.807

Notes: MWFE estimator. HDFE Linear regression. \*\*\*, \*\*, and \* indicate significance at the 1, 5, and 10 percent critical level. Robust standard errors clustered at firm level in parentheses. Sector-Year fixed effects are at ATECO 4 digit level.

→ closing was associated with an increase in the likelihood of being infiltrated in the order of 0.035 pp

## Main results: DDIV

Second, we run OLS and DDIV specification as shown in Equations (2)-(3)

	(1)	(2)	(3)	(4)
<i>Dependent variable:</i>	NDR			
<b>Panel A: OLS</b>				
(log) Revenues	0.0000923*** (0.0000349)			
<b>Panel B: 2SLS</b>				
(log) Revenues		-0.00535** (0.00231)	-0.00601** (0.00235)	-0.00388** (0.00184)
<b>Panel C: First-Stage</b>				
Closing		-0.0983*** (0.00977)	-0.0968*** (0.00980)	-0.0918*** (0.00834)
N	1518090	1518090	1518090	1518090
Firm FE	Yes			Yes
Sector-Year FE	Yes	Yes	Yes	Yes
Province-Year FE	Yes		Yes	Yes
Mean of Dep Var (%)	0.807	0.807	0.807	0.807
F-Stat		101.2	97.44	121.3

Notes: MWFE estimator. HDFE Linear regression. \*\*\*, \*\*, and \* indicate significance at the 1, 5, and 10 percent critical level. Kleibergen-Paap Wald rk F-statistic reported. Robust standard errors clustered at firm level in parentheses. Sector-Year fixed effects are at ATECO 4 digit level.

Closing  $\Rightarrow$   $\downarrow$  Revenues  $\Rightarrow$   $\uparrow$  Infiltration ( $\sigma_{NDR,X} \approx 0.5$ )

## Other results: changing $X_{ijlt}$

	(1)	(2)	(3)	(4)
<i>Dependent variable:</i>	NDR			
<b>Panel A: 2SLS</b>				
(log) EBITDA	-0.0140** (0.00691)			
(log) Current Assets		-0.0134* (0.00695)		
(log) Equity			-0.00914* (0.00468)	
Risk score				0.00302** (0.00152)
<b>Panel B: First-Stage</b>				
Closing	-0.0261*** (0.00435)	-0.0266*** (0.00605)	-0.0419*** (0.00842)	0.118*** (0.0228)
N	1489892	1516561	1405220	1517114
Firm FE	Yes	Yes	Yes	Yes
Sector-Year FE	Yes	Yes	Yes	Yes
Province-Year FE	Yes	Yes	Yes	Yes
Mean of Dep Var (%)	0.801	0.808	0.814	0.807
F-Stat	35.99	19.33	24.81	26.75

Notes: MWFE estimator. HDFE Linear regression. \*\*\*, \*\*, and \* indicate significance at the 1, 5, and 10 percent critical level. Kleibergen-Paap Wald rk F-statistic reported. Robust standard errors clustered at firm level in parentheses. Sector-Year fixed effects are at ATECO 4 digit level.

## Other results: continuous $Z_j$

	(1)	(2)	(3)
	NDR		
<b>Panel A: 2SLS</b>			
(log) Revenues	-0.00600 (0.00469)	-0.00578 (0.00419)	-0.00314* (0.00183)
<b>Panel B: First Stage</b>			
Closing days	-0.00311*** (0.000299)	-0.00323*** (0.000296)	-0.00188*** (0.000150)
N	1518090	1518090	1518090
Firm FE			Yes
Sector-Year FE	Yes	Yes	Yes
Province-Year FE	Yes	Yes	Yes
Mean of Dep Var (%)	0.807	0.807	0.807
F-Stat	32.21	35.79	140.5

Notes: MWFE estimator. HDFE Linear regression. \*\*\*, \*\*, and \* indicate significance at the 1, 5, and 10 percent critical level. Kleibergen-Paap Wald rk F-statistic reported. Robust standard errors clustered at firm level in parentheses. Sector-Year fixed effects are at ATECO 4 digit level.

→ **Length of closure matters**: going from the 10th to the 90th percentile in terms of closing days (38 to 67) increased the likelihood of infiltration from 2.8% to 4.9%



## Other results: heterogeneous effects

	(1)	(2)	(3)	(4)	(5)
<i>Dependent variable:</i>			NDR		
<b>Panel A: 2SLS</b>					
(log) Revenues	0.0000459 (0.000414)	-0.00534** (0.00252)	-0.00347 (0.00250)	-0.00108 (0.000982)	-0.000122 (0.000189)
<b>Panel B: First-Stage</b>					
Closing	-0.0984*** (0.0158)	-0.0902*** (0.00980)	-0.0818*** (0.0113)	-0.132*** (0.0181)	-0.0771*** (0.0176)
N	469903	1030997	814446	357587	321868
Firm FE	Yes	Yes	Yes	Yes	Yes
Sector-Year FE	Yes	Yes	Yes	Yes	Yes
Province-Year FE	Yes	Yes	Yes	Yes	Yes
Subsample	Industry	Services	North	Centre	South
Mean of Dep Var (%)	0.785	0.818	0.605	0.568	0.173
F-Stat	38.97	84.72	52.41	53.52	19.13

Notes: MWFE estimator. HDFE Linear regression. \*\*\*, \*\*, and \* indicate significance at the 1, 5, and 10 percent critical level. Kleibergen-Paap Wald rk F-statistic reported. Robust standard errors clustered at firm level in parentheses. Sector-Year fixed effects are at ATECO 4 digit level. Col (5) has been obtained by keeping firms which are located in Southern Italy (excluding Calabria)

→ concentrated in **services** and **North**

Formal credit versus mafia lending

# Why do firms resort to mafia lending?

- We examine the relationship between some features of the formal lending system and mafia infiltration



Leverage some specific public policy interventions aimed at providing financial support to distressed firms to **identify which features of the formal lending system** most explain why firms resort to mafia lending

# Gvt extraordinary measures in Covid times

## ① Grants (*Contributi a fondo perduto*)

- Free, quick liquidity
- Available to SMEs based on their assets in 2019 and their drop in revenues between April 2019 and April 2020

## ② Debt moratorium

- Postpone debts repayment
- Available to SMEs without non-performing loans

## ③ Government guaranteed loans

- Credit with no collateral
- Available to firms with <500 employees

Note: Information only on take-up, not on eligibility

▶ Aids by group

# The impact of Gvt measures

	(1)	(2)	(3)	(4)
<i>Dependent variable:</i>	NDR			
(log) Revenues	-0.00838** (0.00415)	-0.00556** (0.00279)	-0.00762** (0.00373)	-0.00512* (0.00269)
(log) Revenues × Any Aid	0.00391* (0.00207)			
(log) Revenues × Moratorium		0.00106* (0.000556)		
(log) Revenues × Grants			0.00456** (0.00206)	
(log) Revenues × Guaranteed Loans				-0.000165 (0.000526)
N	910836	910836	910836	910836
Firm FE	Yes	Yes	Yes	Yes
Sector-Year FE	Yes	Yes	Yes	Yes
Province-Year FE	Yes	Yes	Yes	Yes
Mean of Dep Var (%)	0.810	0.810	0.810	0.810
F-Stat	44.25	54.51	40.39	55.19

Notes: MWFE estimator. HDFE Linear regression. \*\*\*, \*\*, and \* indicate significance at the 1, 5, and 10 percent critical level. Cragg-Donald F-Statistic reported. Robust standard errors clustered at firm level in parentheses. Sector-Year fixed effects are at ATECO 4 digit level. Second-stage regression, obtained interacting revenues with a dummy if the firm obtained at least one aid (1) or at least moratorium (2), grants (3) and guaranteed loans (4).

## Formal credit vs mafia lending

- Receiving any form of aid significantly mitigates (halves) the negative impact of revenue decline on the likelihood of infiltration
- Firms resort to mafia lending especially because of difficult access to formal credit caused by **cost of credit** and by **outstanding debt**

Conclusion

# Conclusions

- Mafia takes advantage of situations of financial distress
- We provide causal evidence exploiting the Covid-19 shock
  - ⇒ A 10% drop in revenues (induced by forced closures) leads to an increase in the probability of infiltration of 4.8% with respect to baseline
- Effect driven by firms:
  - required to close for longer period,
  - located in Northern Italy, where the business is more profitable and thus attractive to mafias
  - operating in services
- Firms with large outstanding debt are most vulnerable
- Robustness: change  $y$ , restrict sample...



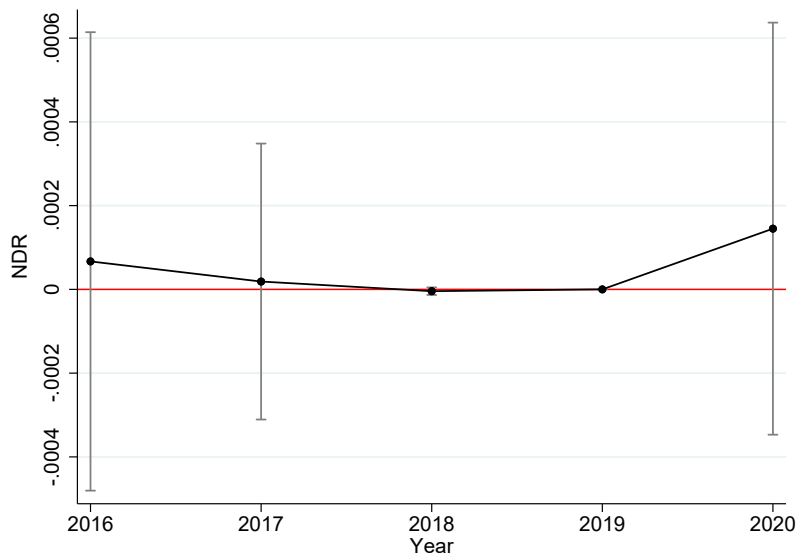
Thank You!  
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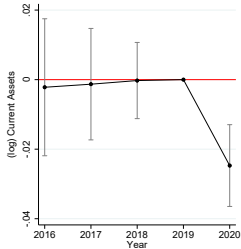
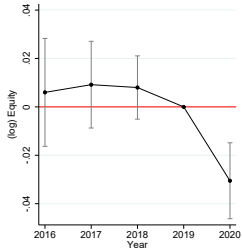
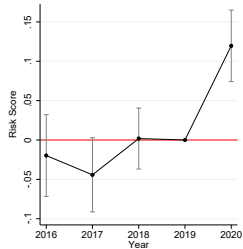
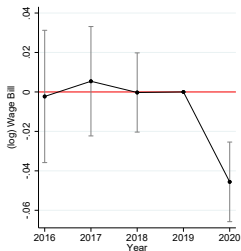
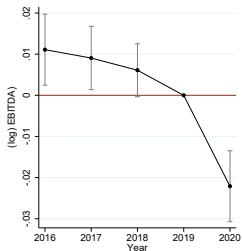
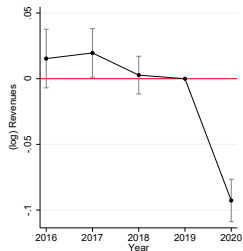
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Extra

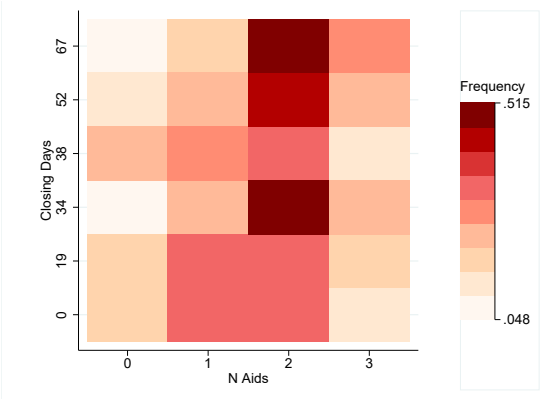
## Parallel Trends



# Parallel Trends



# Government Intervention



▶ Back (Aids)