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Organized crime and banks: assessing the effects of anti-mafia police actions on lending

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Abstract

This study examines how dismantling Mafia-connected firms affects banks' lending practices. Using a unique dataset of 667 such firms and loan-level data from the European Central Bank, our analysis shows that anti-Mafia operations precede an increase in bank loans to businesses that operate in areas that are directly affected by these actions. Specifically, overall loan volumes increase by approximately 0.8 percent, which translates to an increase of €1.38 billion in bank loans to these firms. The effect increases to 1.2 percent in areas that have experienced extensive Mafia activities, amounting to €2.76 billion in bank loans, and to 2.1 percent in areas that were once dominated by Mafia-connected firms that were engaged in rent extraction, amounting to €3.62 billion in bank loans. Borrowing costs rise concurrently, driven by heightened perceptions of risk following exposure of Mafia infiltration. Cross-sectional analyses indicate that banks' responses vary significantly because non-local and foreign banks and banks with no prior exposure to Mafia-affiliated firms face increased challenges related to their lack of local knowledge. Removal of Mafia-connected firms also correlates with improved productivity in affected municipalities, underscoring financial institutions' dynamic responses to the eradication of organized crime and the potential for economic revitalization in post-Mafia environments.

Keywords: Credit Market, Organized Crime, Credit Risk

JEL Classification: E52, E58, G11

"We have chosen to live with the mafias. Perhaps because it has never been possible to fully understand its danger and its ability to pollute and distort social, political and economic relations. For some time now, the mafias, especially in Italy but also in other parts of the world, have been altering the rules of the market and democracy, creating social inequalities and polluting the territories in which they operate."

(Nicola Gratteri, Italian Magistrate, Essayist and Public Prosecutor)

Non-technical summary

The infiltration of legitimate businesses by organized crime, particularly Mafia organizations, has long been a challenge in many parts of the world, including Italy. These criminal activities disrupt fair competition, suppress innovation, and distort economic markets, leading to reduced growth and increased inequality. This paper examines the impact of dismantling Mafia-connected firms through targeted anti-Mafia police actions on the financial sector, focusing on lending practices and credit availability.

One of the most significant insights from our paper is how the removal of Mafia-affiliated businesses affects both the volume of loans provided by banks and the costs of borrowing for businesses in the affected areas. The dismantling of Mafia-connected firms leads to a noticeable increase in lending to legitimate businesses in the same or neighboring areas. On average, firms in municipalities where anti-Mafia operations occurred experience a 0.8% rise in the loan amounts available to them. This effect is even stronger in regions with high levels of Mafia activity, with increases of up to 2.1%. These results suggest that removing criminal interference revitalizes the local economy, encouraging firms to expand and invest in the newly competitive landscape.

Despite the positive trend in lending volumes, borrowing costs rise in these regions. Banks increase interest rates, reflecting a higher perception of risk. This reaction stems from the revelations during anti-Mafia operations, which expose previously hidden risks associated with businesses in Mafia-dominated territories. The newfound transparency, while beneficial in the long term, introduces short-term uncertainty about the economic stability of these areas. Banks' reactions to these changes differ based on their proximity and prior exposure to Mafia-connected firms. Local and domestic banks, which typically have stronger ties to the communities and better access to qualitative insights about borrowers, maintain stable interest rates and adapt effectively to the new circumstances. Conversely, foreign and non-local banks, lacking deep local knowledge, raise borrowing costs as a precaution against perceived risks.

This paper identifies two key mechanisms driving these outcomes. The first is the "*intermediation effect*," which occurs when anti-Mafia actions create a safer and more transparent economic environment. With reduced criminal influence, legitimate businesses regain confidence, enabling them to seek additional financing for growth. This increased demand for loans reflects the businesses' desire to capitalize on the fairer market conditions. The second mechanism is the "*information effect*," which arises when anti-Mafia police operations uncover previously hidden risks and Mafia affiliations, providing banks with critical new information. This transparency enables banks to make better-informed decisions about lending. However, it also heightens banks' risk aversion in the short term, as they grapple with the uncertainties of the post-Mafia economic landscape.

Local banks, with their ability to gather soft information through close relationships and geographical proximity, show resilience and adaptability in responding to the evolving market dynamics. Their nuanced understanding of the local economy allows them to maintain steady lending practices. In contrast, foreign and non-local banks, which rely more on hard data such as financial statements, face greater challenges in accurately assessing risks. These institutions tend to respond by raising interest rates to buffer against potential uncertainties.

The removal of Mafia-connected firms not only facilitates increased lending but also has broader economic benefits. The resulting reduction in corruption and coercion levels the playing field for legitimate businesses. In areas previously dominated by rent-seeking practices, our paper finds significant productivity improvements. Firms are better able to allocate resources efficiently, spurring growth and innovation. The exit of criminally connected firms frees up market share for more efficient and competitive businesses, leading to overall economic revitalization.

This paper highlights on the importance of sustained efforts to combat organized crime, offering several recommendations for policymakers and financial institutions. Transparency is crucial for ensuring a healthy financial ecosystem. By continuing to dismantle criminal networks, authorities can create safer and more reliable environments for businesses and banks to operate. Supporting local and domestic banks in their ability to collect and utilize qualitative insights about borrowers can reduce informational asymmetry. This would help mitigate the adverse effects of uncertainty and improve financial intermediation. Future studies should explore the broader macroeconomic implications of anti-Mafia interventions, including their impact on GDP growth. Comparative studies in other regions affected by organized crime could provide valuable insights for global policy applications.

1 Introduction

Organized crime poses a significant global challenge, prompting governments worldwide to invest billions every year in limiting its effects. That criminal organizations' infiltration of legitimate businesses disrupts market dynamics and hampers economic growth underscores the urgent need for effective interventions.

Extensive research addresses organized crime's macroeconomic and microeconomic impacts. At the macro level, organized crime diminishes electoral competition and increases corruption, which undermine governmental efficiency and fair allocation of public resources, thus hampering economic development (Pinotti et al. 2013, Geys & Daniele 2014, De Feo & De Luca 2017, Godson & Williams 2001, Allum & Siebert 2004, Barone & Narciso 2015, Fenizia et al. 2024, Pinotti 2015). At the micro level, the consequences for individual firms are severe. Criminal organizations divert firms' resources to the pursuit of illicit activities, which reduces firm value, disrupts legitimate operations, and suppresses competition (Ambrosini et al. 2024, Bianchi et al. 2022, Chircop et al. 2023, Mirenda et al. 2022, Slutzky & Zeume 2024, Von Lampe 2015, Zimmerman & Forrester 2020).

Despite organized crime's negative effects, the literature provides little exploration of its impact on the financial sector. This limitation is particularly critical because of Mafia-related firms' need for bank financing (Bianchi et al. 2022) and the substantial costs financial institutions bear to prevent criminal infiltration, especially through costly know-your-customer and anti-money-laundering procedures. Industry estimates are that financial institutions in Europe, the Middle East, and Africa spend about $85 billion annually on compliance with anti-money-laundering procedures, much of it on identifying criminal enterprises when clients are first onboarded (LexisNexis 2024). To strengthen these efforts, the European Union established the Anti-Money Laundering Authority (AMLA) in 2024.

Given that bank financing plays a pivotal role in capital allocation, particularly in Europe, where it is businesses' primary source of funding, understanding the interplay between organized crime and the financial sector can help to ensure the economic system's integrity and efficiency[1]. This study seeks to address this need by examining systemic changes in banks' lending practices following disruption of organized crime networks. Specifically, we investigate how dismantling Mafia-connected firms affects the financial sector, with a focus on changes in banks' loan rates and terms.

Our study proposes that removing Mafia-connected firms influences financial institutions' lending activities through two mechanisms, the *intermediation effect* and the *information effect*. The *intermediation effect* refers to an increase in lending volume as businesses in areas that were once dominated by Mafia activities seek additional financing because the economic environment is safer and more growth-oriented, which enhances opportunities for innovation and expansion (Chircop et al. 2023, Slutzky & Zeume 2024, Ambrosini et al. 2024). The degree of firms' engagement with these opportunities can vary based on the overall economic conditions and residual Mafia influences.

The *information effect* arises as police actions reveal previously hidden Mafia activities, providing banks with new information. This newfound knowledge can have a twofold effect on lending: First, the information that Mafia influence has been eliminated from the area heralds a safer and more stable environment for economic activities, which could increase investment opportunities and improve market conditions. Conversely, while the immediate

[1]The credit intermediation process in the eurozone is predominantly managed by banks, which represent approximately 75 percent of the market, compared to 25 percent in the United States (De Santis & Surico 2013).

threat from the Mafia is removed, disclosure of their past presence can introduce concerns about potential lingering effects and new risks. Banks may be uncertain about the residual influence of these criminal networks and the possible emergence of new, as yet unidentified, threats. Despite the prospects for a healthier economic landscape, financial institutions may adopt a cautious stance. Johnson et al. (2002) discussion of institutional voids and governance challenges suggests that the financial sector's response could be tempered by the complexities of transitioning to a post-Mafia environment.

These two mechanisms suggest that the impact of anti-Mafia police actions on bank lending is complex, shaped by both mechanisms, and is a subject for empirical exploration. To assess the effect on bank lending of removing organized crime, we leveraged a unique database of firms that were linked to the Mafia, complemented by proprietary loan-level data from the European Central Bank (ECB). We conducted a detailed analysis of 38 anti-Mafia operations and associated court trials from 2019 to 2021 across Northern and Central Italy using official court documents to identify individuals who were convicted for Mafia-related offenses, as defined by Article 416bis of the Italian Penal Code. In line with established methodologies (Chircop et al. 2023, Bianchi et al. 2022, Ambrosini et al. 2024), we then classified firms as Mafia-connected by cross-referencing convicted board members' or shareholders' identities with records in the *Telemaco* database, which contains comprehensive data on all registered Italian firms. We classified a firm as Mafia-connected when any board member or major shareholder had been convicted of Mafia-related offenses. To examine shifts in banks' lending patterns, we used the ECB's *AnaCredit* dataset, which provides details on bank loans throughout the eurozone. We also employed the ECB supervisory dataset to gain insights into European banks' characteristics.

Our empirical strategy evaluates how anti-Mafia police actions affect bank lending by comparing differences in the lending behavior between a *treatment* group and a *control* group. The treatment group consists of non-criminal firms in certain municipalities and neighboring areas (peer firms) in a single province that have been directly affected by anti-Mafia police actions. The control group consists of non-criminal firms in certain municipalities in the same province that have never been targeted by anti-Mafia operations. This approach allowed us to isolate the effects of the presence and removal of organized crime on lending practices while controlling for other local economic variables.

To illustrate our research design, consider company M, which is Mafia-connected because a shareholder has been convicted under Art. 416bis of the Italian Penal Code. Company M is located in Municipality X in Province P. Our research design compares the change in lending activities among all firms in Municipality X and its neighboring municipalities (peer firms) to firms that operated elsewhere in Province P before and after the anti-Mafia action. We used the year of the anti-Mafia action as the year of the shock, that is, when firms' connection to the Mafia was first disclosed to the public and when the Mafia connection was "removed" because the Mafia-connected firm was seized by the legal authorities.

Our analysis indicates a significant increase in bank loans to firms that were located in or near certain municipalities following the dismantling of criminal organizations in or near those municipalities. Specifically, after anti-Mafia operations, the average loan provided to peer firms increased by approximately 0.8 percent, which corresponds to an increase in total lending of approximately €1.38 billion. These results suggest that removing criminal organizations significantly increased lending to peer firms, particularly in regions where Mafia infiltration was pervasive, as the average loan amount to peer firms rose by about 1.6 percent or an estimated aggregate lending

increase of €2.76 billion. What's more, when the criminal firms that were removed had been particularly deeply engaged in coercive and corrupt practices, we noted an increase in loan amount of approximately 2.1 percent and an aggregate lending increase of €3.62 billion. Our subsequent analyses reveal dual effects following anti-Mafia interventions: increases in bank lending and increases in the cost of borrowing. The rise in the weighted average interest rate indicates that banks perceive higher credit risks in these areas because of an increase in the estimated probability of defaults. This increase in perceived risk is likely to stem from anti-Mafia police actions' revealing the presence of Mafia-infiltrated companies in certain areas that were once considered to be unaffected by such risks, so banks adjust to the new risk landscape.

Further cross-sectional analyses reveal variations in how banks respond to risks that anti-Mafia operations expose about previously unknown connections between businesses and organized crime. These responses are significantly influenced by banks' access to "soft" information, that is, qualitative insights derived from personal interactions and local knowledge. Drawing from the literature, we examine two types of soft information: that derived from geographic proximity and that established through long-standing relationships (Liberti & Petersen 2019).

Our findings indicate that non-local and foreign banks, which are typically more reliant than local banks are on hard data like financial statements and credit scores, react to revelations of Mafia infiltration by increasing interest rates in affected territories. This response contrasts with that of local and domestic banks, which benefit from the deep local insights and established relationships—soft information—that allow them to make nuanced lending decisions without significant changes in their practices. Local banks leverage their extensive understanding of business owners' reliability and character, gathered through ongoing personal interactions, to inform their lending decisions. Non-local and foreign banks, which have limited access to such contextual information, perceive higher risks in their credit assessments and increase borrowing costs. This dynamic is supported by research that suggests that geographic proximity enables banks to collect soft information, thereby reducing the risk of adverse selection (Petersen & Rajan 2002, Degryse & Ongena 2005, Agarwal & Hauswald 2010).

When Mafia connections with local firms are revealed, banks that have not dealt with these now-exposed firms can find themselves at a disadvantage, as local banks that have, likely unknowingly, engaged with these companies can leverage their established relationships to reassess risks quickly based on their experiences and a deep understanding of local business dynamics. These experiences and insights allow them to evaluate and price loans accurately for non-Mafia firms in the same areas. In contrast, banks that did not have prior relationships with these exposed firms must rely on more generic and impersonal data, which hinders their ability to comprehend fully the nuances of the local business environment, so their perceptions of heightened risks often result in increased borrowing costs in areas that are affected by anti-Mafia actions.

Finally, we show that municipalities that are affected by the anti-Mafia operations see increases in their productivity, driven by more efficient allocation of credit and a cleaner economic environment.

We contribute to the literature in two primary ways. First, we contribute to the literature that analyses the determinants of bank lending (Bernanke & Blinder 1988, Kashyap & Stein 2000, Jiménez et al. 2014, Gambacorta 2005, Borio & Zhu 2012), which shows that bank lending is influenced by factors like monetary policy, bank capital, regulation, and macroeconomic conditions. Our paper highlights the presence of firms that are connected to organized crime as an additional factor. Second, we contribute to the finance and accounting literature that investigates

organized crime. Ravenda et al. (2015) and Bianchi et al. (2022) highlight Mafia firms' involvement in tax avoidance, while Slutzky & Zeume (2024), Chircop et al. (2023) and Ambrosini et al. (2024) focus on these firms' effects on their peers' economic outcomes. We add the amount and terms of lending to firms as a new and otherwise unexplored firm-level outcome that is affected by the removal of Mafia-related firms.

2 Why Do Anti-Mafia Police Actions Affect Peers' Credit Volume?

We argue that removal of a Mafia-related firm affects peer firms through the mechanisms of an *intermediation effect* and an *information effect*. We elaborate on these mechanisms below.

2.1 Anti-Mafia Police Actions and the *intermediation effect*

The presence of organized crime in a region can significantly hinder non-criminal firms' economic performance. Gambetta (1996) shows that Mafia organizations' using violence and coercion to control markets stifles competition and innovation, leading to higher prices and reduced product quality and hampering economic growth. Von Lampe (2015) and Gambetta (1996) by showing that organized crime infiltrates legitimate businesses to use them as fronts for illegal activities. This infiltration distorts market dynamics, as these businesses do not operate under the same constraints as legitimate firms, further reducing competition and efficiency.

Empirical research offers critical insights into the direct operational and market-level disruptions of Mafia-infiltrated companies. For example, Champeyrache (2018) demonstrates how these firms engage in strategic market manipulation, such as creating artificial scarcity. These tactics distort the competitive landscape and undermine market equilibrium, placing legitimate businesses at a substantial competitive disadvantage. Ravenda et al. (2015) and Bianchi et al. (2022) investigate the internal financial strategies that Mafia-associated firms employ, revealing engagement in aggressive earnings management and labor tax evasion, practices that destabilize the firms' financial health and contribute to broader market instability. In particular, Bianchi et al. (2022) show that these practices significantly increase operational costs and reduce profitability, escalating the risk that infiltrated firms will experience financial distress and bankruptcy. Mirenda et al. (2022) provide additional evidence on how Mafia-infiltrated enterprises exploit business operations for criminal purposes through money laundering and rent extraction. This exploitation distorts revenue streams and alters standard market behaviors, compounding financial instability and disrupting the economic landscape.

Law enforcement against Mafia-connected firms plays an important role in dismantling these illegal operations and leveling the playing field for legitimate businesses. Studies like that of Chircop et al. (2023) reveal that anti-Mafia police actions lead to a decrease in tax avoidance among peer firms, as once the Mafia's distorting effects are removed, legitimate businesses can revert to transparent, standardized practices. Similarly, Ambrosini et al. (2024) report that eliminating Mafia-connected firms improves peer firms' operational performance, suggesting that the pressure to adapt to a corrupt market environment can be alleviated so firms can operate authentically.

The literature's findings show that the Mafia's local infiltration of firms not only undermines these firms' operational efficiency but also has a pervasive economic influence by distorting market dynamics and stifling competition. Removing criminal elements can restore trust among businesses and between businesses and customers in the affected areas, thus revitalizing the area's social fabric and encouraging firms to seek financing to expand or improve their operations, thereby stimulating economic activity and increasing stability in the region.

2.2 Anti-Mafia Police Actions and the *information effect*

Difficulty in accessing external financing, which reduces corporate investment in businesses, tends to be cyclical (Bernanke et al. 1996). At the firm level, alleviating frictions in the credit market involves lenders' accessing sufficient information about borrowers or borrowers' offering sufficient collateral. Frictions like lack of information often stem from information asymmetry that may arise from hidden actions, leading to moral hazard (Holmstrom & Tirole 1997), adverse selection (Stiglitz & Weiss 1981), or bankruptcy (Townsend 1979). In credit markets the availability of information has a profound influence on lenders' behavior and market outcomes (Stiglitz & Weiss 1981), as it guides banks in making the financial decisions that can maximize stakeholders' profits and foster economic development.

While the removal of Mafia influence is expected to have a positive effect on peer firms' performance, it can also introduce previously unknown risks that affect informational asymmetry and introduce new uncertainties. Banks that operate in these newly liberated markets must contend with poorly understood competitive dynamics and the risk of residual Mafia presence, which complicate risk assessment. When anti-Mafia actions identify firms that are connected to organized crime, these actions not only reveal that a given area has been infiltrated by the Mafia but also highlight the risk that other unidentified firms in the same territory may also be involved. This situation is an example of Akerlof (1970) concept of information asymmetry, which makes distinguishing between low-risk and high-risk borrowers challenging, possibly heightening adverse selection.

Gennaioli et al. (2014) note that banks face significant risks when the environment changes rapidly, necessitating the development of updated risk models. DellAriccia et al. (2014) observe that banks might adopt more conservative lending approaches because of these increased uncertainties, and Johnson et al. (2002) suggest that, despite firms' potential for growth in a post-Mafia environment, the financial sector adapts cautiously to it. These considerations suggest the possibility of decreased bank lending in areas that experience anti-Mafia actions as banks adjust to the new risk landscape.

Police interventions that dismantle Mafia-connected firms can restore competition and increase credit availability by eliminating criminal distortions (the *intermediation effect*), but these operations also introduce new uncertainties (the *information effect*) that may instead reduce credit availability. These uncertainties arise from newly exposed risks that require banks to manage their risk assessment strategies to navigate the transition successfully and bolster economic development.

Building on these two propositions, we propose the following non-directional hypothesis:

H1: *Police actions that eliminate Mafia-connected firms do not affect bank lending activities to non-criminal firms in affected municipalities.*

3 Research Design, Data Sample

3.1 Research Setting and Method for Identifying Criminal Firms

Article 416-bis of Italy's Penal Code, which provides the legal framework for defining Mafia associations and prosecuting Mafia-related activities, is central to the ability to pinpoint municipalities that are affected by anti-Mafia actions. To identify these firms, we relied on the judicial process outlined under Article 416-bis, as detailed in Figure 1. Led by public prosecutors and carried out by the Anti-Mafia Investigative Directorate, along with other law enforcement agencies, these operations are initiated based on sources like tips, intelligence, and active surveillance. If sufficient evidence confirms Mafia activity (steps [1] and [2]), prosecutors file charges [3]; otherwise, the case is dismissed [2.1]. Once charges are filed, assets of implicated individuals are seized to sever ties with Mafia-connected firms, disrupting their economic base and operational control. The case then proceeds to trial [4], culminating in either acquittal [5] or conviction [6]. Convicted individuals face severe penalties, including the confiscation of assets such as company shares, to eliminate the Mafia's economic influence [7].

[Figure 1 about here]

We define the year of an anti-Mafia action as the shock year, as this is when law enforcement severs the criminal connection and publicly discloses the identities of those charged. Using legal records and the *Telemaco* database, we identified the limited liability companies in which these individuals held such significant positions as board memberships or held substantial ownership stakes. Following the criteria set forth by Chircop et al. (2023) and Ambrosini et al. (2024), we defined a firm as Mafia-connected if any board member or shareholder had been convicted of Mafia-related offenses. Our analysis of 111 anti-Mafia police operations conducted from 2018 to 2021 identified 722 criminal firms, which enabled us to determine the municipalities that were directly affected by anti-Mafia police actions.

To avoid confounding effects, we included only municipalities that experienced their first police action during the study period and excluded those that experienced prior interventions. This step ensured that our analysis isolated the impact of the anti-Mafia interventions that were conducted in the time period our research addresses.

3.2 Research Design

To explore anti-Mafia police operations' impact on lending, we employed a stacked difference-in-differences (stacked DiD) approach, as Cengiz et al. (2019), Deshpande & Li (2019), Gormley & Matsa (2011). By estimating causal impacts by exploiting variations in the timing and intensity of exposure to exogenous events, this method addresses the challenges of staggered DiD estimators that Barrios (2021), Baker et al. (2022), and Goodman-Bacon (2021) highlight. The method allowed us to create event-specific datasets for comparing outcomes for treated and untreated (control) groups. In our analysis, treated groups contain firms in municipalities and their surrounding areas[2] that were directly affected by anti-Mafia police actions, whereas control groups contain firms in municipalities

[2]We defined the surrounding area as the first-tier neighboring municipalities of each municipality. We downloaded the list of neighboring municipalities from the Istituto Nazionale di Statistica (ISTAT) website:

in the same province that have never experienced such interventions. To ensure that the comparison of outcomes was unbiased, we created a separate cohort for each police operation and categorized municipalities as either treated or untreated (control) based on their involvement in that operation. By stacking these individual cohorts, we were able to analyze the cumulative effect of the interventions using the following model (1):

$$Y = \beta_0 + \beta_1 \text{Anti-Mafia Actions} + \alpha + \delta + \phi + \Gamma + \varepsilon \tag{1}$$

Where Y is the outcome variable of interest, *Anti-Mafia Action* is a binary indicator set to 1 for treated firms and 0 otherwise, firm fixed effects (α) captures the characteristics of each firm that might influence the outcome, bank fixed effects (δ) accounts for the impact of specific banks on their client firms, province-time fixed effects (ϕ) adjusts for external factors that affect all firms in a province at a specific time, and industry-time fixed effects (Γ) addresses industry-wide trends and shocks during certain periods, and ε is the error term. All of the fixed effects are also interacted with cohort-specific fixed effects to reflect variations across groups and periods that were affected by the anti-Mafia actions, ensuring a detailed and nuanced analysis of the impacts. Standard errors are clustered at the province level[3].

3.3 Data Sources

We merged various datasets that offer firm characteristics, loan characteristics, and bank characteristics, as described in our analysis below.

Firm Characteristics: We obtained financial information for public and private Italian firms from the *Analisi Informatizzata delle Aziende Italiane* (AIDA) database, which is facilitated through the Orbis platform by Bureau van Dijk. A key advantage of using Italian data is the country's requirement that all limited liability companies disclose comprehensive financial details, including major items from the income statement and balance sheet, so we were able to include in our study a large sample of firms, from large corporations to small enterprises. We extracted annual data on key financial metrics from the AIDA database, including total assets (tangible and intangible), total liabilities, operating income, revenue, intermediate inputs, and the wage bill. The Orbis BVD database offers detailed geographic data, enabling us to pinpoint each firm's municipality and province.

Loan-Level Data: We used detailed loan-level data collected from the ECB's *AnaCredit* database, which provides monthly information on loans that exceed EUR 25,000 that are granted to legal entities in the Euro area[4]. This data includes key details about both lenders and borrowers and covers a wide range of financial institutions and credit instruments since 2018. Key features that we extracted from *AnaCredit* at the firm-bank level include the outstanding nominal amount (*Loan*), the credit instrument's interest rate (*Interest_Rate*), the probability of default assigned by the creditor (*Probability of Default*), total accumulated impairment amounts (*Impairments*), the number of protections that secure the instruments (*N_Collaterals*), the number of outstanding instruments (*N_Instruments*), and the remaining maturity of the instruments (in days) (*Maturity*).

https://www.istat.it/non-categorizzato/matrici-di-contiguita/.

[3]We estimate equation (1) using a Stata package for high-dimensional fixed effects (Guimaraes & Portugal 2010).

[4]A total of 3,400 financial institutions at the consolidated level, and 5,800 at the subsidiary level.

Bank Characteristics: We sourced quarterly consolidated bank-level data from the European Central Bank Balance Sheet Supervisory Dataset. This dataset includes information like total assets (*Bank_Size*), whether the bank is located in Italy or elsewhere (*Domestic_Bank* and *Foreign_Bank*), and whether the bank is classified as a local institution under Italian law (*Local_Bank*).

3.4 Sample Selection

In constructing the final sample, we focused on anti-Mafia police operations that were conducted between 2019 and 2021. Since we collected data from 2018 to 2022, this timeframe ensured the inclusion of at least one year of pre- and post-intervention observations. It also aligned with the availability of *AnaCredit* loan data, which first became accessible in 2018. By capturing firm, loan, and bank data from 2018 to 2022, our analysis provides a comprehensive view of the financial and lending activities that surrounded these interventions.

We classified firms into treated and control groups, where treated firms are located in municipalities that were directly affected by anti-Mafia police actions or in neighboring areas, and control firms are located in municipalities in the same province that have never been subject to anti-Mafia operations. Using quarterly *AnaCredit* data, we tracked lending activity before and after police operations to capture the immediate impact of these operations on demand for credit and banks' lending behavior. Our dataset consists of 11,722,240 firm-quarter observations for 163,343 unique firms in treated areas and 4,119,183 firm-quarter observations for 111,498 unique firms in control areas.

Figure 2 illustrates the geographic distribution of Mafia-connected firms and the locations of anti-Mafia police operations. Interventions were concentrated in the economically significant regions of Reggio Emilia, Verona, Venice, Milan, and Turin.

[Figure 2 about here]

4 Empirical Results

4.1 Descriptive Evidence: Criminal Firms & Lending

Before presenting the results of our main analysis, we compiled descriptive evidence on the borrowing patterns of criminal versus non-criminal firms. This preliminary analysis offers key insights into the financial characteristics and borrowing risks that are associated with criminal firms.

For this analysis, we focused on the 722 criminal firms identified in Section 3.1 during the period from 2018 to 2022. After we eliminated firms that lacked loan-level data from the *AnaCredit* database and financial statement data from the AIDA database, supplemented with manual data collection when necessary, the final sample consisted of 261 criminal firms.

To compare criminal firms with non-criminal firms, we employed propensity score matching, a robust technique for addressing endogeneity concerns and ensuring comparability between treated (criminal) and control (non-criminal)

groups. By matching firms based on observable characteristics, propensity score matching reduces bias that could arise from functional form misspecification (Shipman et al. (2017). For each criminal firm, we identified comparable peer firms using data from the year before the police operation. We conducted the matching based on the firms' return on assets (*Firm_ROA*), which measures profitability; leverage (*Firm_Leverage*), defined as total liabilities over total assets to capture financial risk; and size (*Firm_Size*), measured as the logarithm of total assets to reflect the scale of operations. To account for local and sectoral variations, we performed matching within province, industry, and year groups. We matched each criminal firm with the five nearest non-criminal firms based on propensity scores, with a 1 percent caliper imposed to ensure close matches. This procedure yielded a matched sample of 261 unique criminal firms and 1,230 unique non-criminal firms for comparison.

Table 1, which provides descriptive statistics on the lending behaviors of criminal and non-criminal firms, illustrates significant differences in their borrowing habits and risk profiles. Criminal firms exhibit lower average monetary amounts of loans outstanding (*Loan*)—€1,221,758, compared to €1,450,868 for non-criminal firms—indicating criminal firms' aversion to high borrowing because of the risk of increased scrutiny or inherent operational risks ($p < 0.001$). This cautious approach is corroborated by Bianchi et al. (2022) insights, which suggest that Mafia-connected firms may maintain lower financial profiles to avoid detection by regulatory authorities. These firms' engagement in activities that supplement their finances (e.g., money laundering) also diminishes their dependence on conventional banking systems (Bianchi et al. 2022, Mirenda et al. 2022).

Criminal firms' probability of default (*Probability of Default*) is significantly higher than that of non-criminal firms (0.286 vs. 0.076, respectively). This difference likely reflects criminal firms' operational inefficiencies and prioritization of other financial obligations, both of which increase their risk profiles. The elevated probability of default could also be attributed to a higher incidence of financial impairments (*Impairments*) (3,612 impairments for criminal firms vs. 1,391 for non-criminal firms; $p < 0.001$), indicating the former's difficulty (or perhaps minimal interest) in meeting deadlines for loan repayments. This increased risk is further evidenced by the risk premiums on interest rates (*Interest Rate*) that criminal firms pay, as their interest rates average 0.027, compared to 0.026 for non-criminal firms.

Criminal firms also typically pledge more collateral (*N_Collaterals*) than non-criminal firms do, averaging 3.353 compared to 2.941 for non-criminal firms and likely reflecting the increased collateral requirements imposed by banks because of perceived risks. Criminal firms also maintain fewer financial instruments (*N_Instruments*), at 2.529 instruments versus 2.614 for non-criminal firms, possibly as a strategy to reduce their financial footprint and avoid scrutiny. Their banking relationships (*Maturity*) are generally shorter, averaging 964 days compared to 1,052 days for non-criminal firms, perhaps reflecting a tactic to evade prolonged scrutiny or because of banks' reluctance to engage long-term with firms that are struggling to meet financial obligations. These results align with theories that collateral and relationships can serve as substitutes in reducing credit frictions (Anderson et al. (2023)). Criminal firms also often choose to bank with large institutions (*Bank_Size*) (€542B in assets vs. €495B for non-criminal firms) and foreign banks (*Foreign_Banks*) (0.179 foreign banks vs. 0.167 for non-criminal firms), perhaps to benefit from less stringent monitoring than that imposed by domestic banks.

Overall, these behaviors delineate a notably riskier profile for criminal firms' banking interactions than that for non-criminal firms, which could significantly affect financial institutions' risk assessments and management strategies.

In other words, criminal firms generate negative externalities in the financial sector—and, consequently, on the broader economy—before law enforcement intervenes.

[Table 1 about here]

4.2 Main Analysis

4.2.1 Anti-Mafia Police Actions: the *intermediation effect*

Table 2 reports the results of our baseline specification, which uses a stacked DiD approach to estimate anti-Mafia actions' average effect on lending volumes to non-criminal peer firms. The coefficient on Anti-Mafia Actions is positive and statistically significant ($\beta = 0.008$, $t = 3.05$, $p < 0.01$), so, following anti-Mafia operations, the average loan amount provided to peer firms increased by approximately 0.8 percent. In economic terms, this effect translates to an estimated increase of approximately €1.38 billion in total lending to non-criminal peer firms in treated areas[5].

Our post-intervention analysis revealed that, because of the enhanced competitive landscape and the opening of market opportunities, a significant uptick in credit availability resulted for non-criminal peer firms that operate in municipalities that were once dominated by Mafia organizations (Chircop et al. 2023, Slutzky & Zeume 2024, Zimmerman & Forrester 2020, Bianchi et al. 2022, Mirenda et al. 2022). The dismantling of Mafia connections allowed legitimate firms to function in a more transparent business environment, which fostered economic revitalization.

These findings support the presence of an *intermediation effect*, as eliminating Mafia-connected firms increased the demand for credit from non-criminal businesses in affected areas. The resulting intensified competition created new opportunities for growth and expansion, motivating firms to seek additional financing. This effect aligns with the notion that economic revitalization follows the dismantling of criminal monopolies, as supported by Chircop et al. (2023), Slutzky & Zeume (2024), Ambrosini et al. (2024).

[Table 2 about here]

Our analysis assumed that, in the absence of anti-Mafia police operations, peer firms (treated) and non-peer firms (control) would follow similar lending trends. To test the parallel trends assumption, we followed Barrios (2021) in focusing on entities that had been treated at some point during the study period. We calculated a "time to treatment" variable to represent the difference between each observation period and the treatment period. Rather than using calendar time, we employed event time indicators for periods before and after treatment, using the year immediately before the anti-Mafia action as the benchmark.

Our results confirmed that lending trends before the intervention were similar for both groups, validating the parallel trends assumption. Figure 3 illustrates that pre-intervention lending trends are statistically comparable for both groups, confirming our assumption. Post-intervention, lending volumes significantly increased for both groups,

[5]We computed the economic effect based on pre-treatment-period data. The median number of instruments per firm was 2.26 median loan amount per firm was €313,525.90, and the number of unique firms was 244,049. If a municipality was treated multiple times during the study period, we considered only the first treatment in computing the mean.

as evidenced by rising point estimates and positive confidence intervals. This increase demonstrates that removing the Mafia influence led to increased lending in affected municipalities, highlighting the positive impact of police actions on credit availability and credit outcomes.

[Figure 3 about here]

4.2.2 Additional Analyses: Mafia Firms' Scale of Operations and Activities

Building on our finding that removing the Mafia presence is associated with increased lending volumes to non-criminal peer firms (Table 2), we delved into the mechanisms that underlie this relationship. Specifically, we investigated the scale of Mafia operations, measured as the number of Mafia-infiltrated companies in a given area, and their economic activities, such as rent extraction and money laundering, to determine how these factors may have amplified the observed benefits related to lending post-intervention. We argue that areas that had a higher density of Mafia-related activities suffered from greater economic suppression than other areas did, making the removal of these operations particularly impactful. The dismantling of entrenched criminal networks in such areas is likely to lead to significant improvements in lending volumes, as it restores both economic stability and trust in financial institutions.

In addition to the scale of operations, we examined the distinct economic behaviors that are associated with Mafia activity. While money laundering through legitimate firms integrates illicit funds into the economy, rent extraction exerts a more direct and detrimental influence on market dynamics. Mafia-connected firms that engage in rent extraction distort competition by using coercion to dominate markets, which undermines efficiency and suppresses legitimate businesses. Drawing on Ambrosini et al. (2024), who find that firms in regions that are affected by Mafia-driven rent extraction exhibited greater performance improvements following the removal of these practices we argue that the cessation of rent-extraction activities contributes even more significantly to increases in lending volumes and enhancements in financial intermediation after anti-Mafia operations occur.

For our cross-sectional analyses, we used two conditional variables (Cond. Var) to explore the heterogeneity of the effects. First, to assess the scale of Mafia operations and capture variations in the intensity of Mafia presence across municipalities, we introduced *Mafia Presence Index*, a dummy variable that equals 1 for municipalities in which the number of Mafia-affiliated firms that were removed exceeds the sample's median, and 0 otherwise. Second, to examine Mafia-connected firms' economic behaviors, particularly their involvement in rent extraction, we constructed the variable *Rent Extraction*. Following the methodology outlined in previous studies (Mirenda et al. 2022, Ambrosini et al. 2024)), this dummy variable equals 1 when a firm's revenue growth corresponds closely with increases in its production inputs and 0 if its revenue growth quintile exceeds both their labor and capital growth quintiles. Such disparity suggests suspiciously disproportionate revenue increases relative to increases in inputs. We calculated the percentage growth in revenue, labor (log of the wage bill), and capital stock (log of tangible and intangible assets) and ranked these metrics into quintiles.

[Table 3 about here]

Table 3 presents the results of our cross-sectional analyses. The table reports the findings using Mafia Presence Index as the partitioning variable. The coefficient on the interaction term *Anti-Mafia Actions * Cond. Var (=1)* is positive and statistically significant at the 1% level, indicating a substantial increase in loan volumes for non-criminal peer firms in regions that had a higher density of Mafia-affiliated activities. Specifically, following anti-Mafia operations, the average loan amount to peer firms in these territories increased by approximately 1.6 percent, which translates to an estimated aggregate lending increase of €2.76 billion.

Table 3 also presents the results using Rent Extraction as the partitioning variable. The coefficient for the interaction term is 0.020 (significant at the 1% level), signifying a 2.1 percent increase in loan volumes for firms in areas where the Mafia engaged in rent extraction activities, which represents an aggregate lending increase of €3.62 billion. Overall, then, our findings suggest that regions with a high Mafia presence and those that were affected by Mafia rent extraction activities experienced significant increases in lending volumes following criminal firms' removal by anti-Mafia interventions.

4.3 Anti-Mafia Police Actions: The *information effect*

The results reported in subsection 4.2 are consistent with the intuition that economic revitalization follows the dismantling of criminal monopolies, allowing previously constrained firms to compete freely and innovate. In this section, we investigate whether banks adjusted their required returns following the removal of Mafia-connected firms from an area. Table 4 reports a statistically significant 0.018 percentage point increase, significant at the 5% level, in the weighted average interest rate for loans issued in municipalities that were affected by anti-Mafia actions, likely reflecting revised risk assessments in these areas.

[Table 4 about here]

To determine whether this adjustment corresponded to changes in underlying credit risk, we analyzed the probability of default (*Probability of Default*) in the affected regions. Table 5 shows a statistically significant .07 percentage point increase in the probability of default relative to the control group. This finding indicates that the removal of Mafia presence was associated with heightened estimated default risks in these municipalities, which may reflect economic disruptions during the transition to a more competitive and transparent market environment. The results also show that, while the removal of Mafia-connected firms can stimulate long-term economic revitalization, it can also introduce challenges during the transition period. Higher interest rates and elevated probability of default suggest that banks recognized and responded to these transitional risks by adjusting their lending conditions accordingly.

[Table 5 about here]

4.3.1 Additional Analysis: The Role of Soft Information

To understand the observed increase in interest rates following anti-Mafia actions, we investigated whether this effect varied across banks, as we expected cross-sectional variations in bank behavior because of differences in their

ability to manage information asymmetry. Police operations that target Mafia activities generate new information by revealing Mafia-infiltrated firms in certain regions, which can exacerbate informational asymmetries, as banks must reassess risks in terms of previously hidden criminal activities. The ability to mitigate such asymmetries is shaped by access to *soft information*, that is, qualitative insights that go beyond hard, quantitative data (Petersen & Rajan 2002).

Soft information typically originates from geographic proximity and relational networks. Geographic proximity allows banks to obtain detailed knowledge about local markets and borrowers (Petersen & Rajan 2002, Degryse & Ongena 2005, Agarwal & Hauswald 2010), whereas banks that are at a greater distance from borrowers may rely heavily on hard data, rather than soft information, in their decision-making. To assess the impact of proximity, we used two partitioning variables: *Domestic Bank* and *Local Bank*. *Domestic Bank* is a dummy variable set to 1 if the bank's headquarters is located in Italy, and 0 otherwise. Domestic banks, although they tend to be larger than local, cooperative banks, benefit from deep knowledge of the Italian market and regulatory environment, which enables them to make localized risk assessments. *Local Bank* refers to smaller, regionally focused cooperative and rural banks that operate in localized communities. Local banks include smaller cooperative and rural banks, as classified under Italian law. These banks operate within communities, so they gain superior informal knowledge through frequent interactions and long-standing relationships. Because of their access to soft information, local banks are expected to respond less acutely to the newly revealed risks than non-local banks do.

Table 6 presents the results of this analysis. When we used *Domestic Bank* as the partitioning variable, we found a statistically significant increase in interest rates of coeff: 0.162 basis points (t-stat: 4.94) for foreign banks *Anti-Mafia Actions * Cond. Var (=0)*. This result suggests that foreign banks, lacking domestic banks' localized knowledge, respond more cautiously to new information by raising interest rates. When we used *Local Bank* as the partitioning variable, the results showed a marginally significant increase in interest rates coeff: 0.13 basis points (t-stat: 1.78) for non-local banks. This finding indicates that, with limited access to soft information, non-local banks react more strongly to newly revealed risks than local banks do.

The analyses highlight the critical role of geographic proximity in shaping banks' responses to newly revealed risks. Banks that are located closer to their borrowers are better equipped to reduce informational gaps and uncertainties, as their proximity gives them a deep understanding of local markets and borrowers' profiles. This local knowledge enables these banks to adjust their lending practices in a measured and proportional manner. By contrast, foreign and non-local banks are less familiar with local conditions and rely more heavily on hard data to assess risk, so they tend to respond more cautiously to newly revealed risks, thus reflecting the challenges posed by informational asymmetries[6].

[Table 6 about here]

Relational networks offer another source of soft information. Sustained client relationships enable banks to accumulate private knowledge about borrowers over time, which facilitates precise risk assessments and well-informed lending decisions Degryse & Van Cayseele (2000). These relationships are particularly valuable when newly revealed

[6]Alternatively, local banks themselves might be part of local interdependencies or networks that either make them less aware of risks or lead them to tolerate the presence of Mafia-connected areas due to entrenched local ties.

risks, such as Mafia connections, emerge. We argue that banks that have had exposure to Mafia-connected firms have private information that is not available to other banks and that allows them to evaluate risks more accurately than banks that have no such exposure can. Upon public revelation of Mafia connections among firms in the area, banks that lack specific client history may respond by adjusting interest rates upward to counter the risks they perceive because, devoid of detailed private information, these banks confront significant informational asymmetry and uncertainty. Conversely, a bank that has already identified Mafia connections in its client base has incorporated this risk into its operational strategy. Degryse & Van Cayseele (2000) empirical evidence reinforces the notion that banks that are well-informed through deep relationships are less inclined than other banks are to make significant interest rate adjustments, as newly disclosed information corresponds with their existing knowledge.

To conduct this analysis, we collected data on 94 banks in our sample that had a customer firm identified as criminal (Section 3.1). Next, we created a dummy variable, *Mafia-Client Exposure*, which we set to 1 for the firms in our sample that had a relationship with any of these 94 banks, and 0 otherwise. When we found that a bank had a Mafia-connected customer in one municipality, we treated all of that bank's branches in the province as having connections to Mafia-linked activity.

[Table 7 about here]

Table 7 presents the results using *Mafia-Client Exposure* as the partitioning variable. The coefficient for *Anti-Mafia Actions * Cond. Var (=0)* is positive and marginally significant, with a value of 0.011 (t-stat: 1.73). This finding suggests that banks that had no prior relationships with Mafia-connected firms increase interest rates in response to anti-Mafia actions, likely reflecting their heightened perception of risk and uncertainty. Conversely, banks that had prior relationships with Mafia-connected firms show no statistically significant adjustment in interest rates, which is consistent with the expectation that those banks have already incorporated the associated risks into their decision-making.

These results emphasize the importance of relational networks in managing informational asymmetries. Banks that have sustained client relationships and prior knowledge of Mafia-connected firms are better equipped to assess and manage the risks associated with public revelations of the presence of such firms. By contrast, banks with no such relationships confront uncertainty and adjust their lending practices more significantly. This distinction underscores the role of private information accumulated through relational networks in shaping banks' responses to newly revealed risks.

4.4 Real Effects of Anti-Mafia Police Actions: Increased Productivity

Our findings indicate a significant increase in loan volumes for non-criminal peer firms in municipalities from which Mafia-controlled businesses were removed, particularly in regions with high Mafia activity in the form of rent extraction. Building on this finding, we tested whether removing Mafia-infiltrated companies improved productivity in these regions. According to Foster et al. (2008), the exit of inefficient firms facilitates resource reallocation, thereby enhancing productivity. Similarly, Baldwin & Gu (2006) highlight that competition-driven turnover increases productivity by shifting market share to more efficient businesses. In this context, we argued that firms that operated

in areas that were once affected by Mafia influence would see productivity improvements after anti-Mafia operations, as increased lending and reduced corruption foster a more competitive environment (Di Giorno et al. 2024, Baldwin & Gu 2006).

We leveraged the granularity of our dataset to build an industry-municipality corporate productivity indicator (*Productivity*), which is revenue per employee, weighted by company assets and aggregated across firms in an industry-municipality. We scaled this measure by the total assets in that particular industry-municipality, which allowed us to assess how efficiently firms in our sample used their employees and assets to generate revenue.

Table 8 presents the results. With a coefficient of 0.283 and a t-statistic of 3.30, *Anti-Mafia Actions* has a positive and statistically significant effect on productivity, suggesting that the removal of Mafia-connected firms improved productivity in affected areas. When we used *Mafia Presence Index* as the partitioning variable, the interaction term *Anti-Mafia Actions * Cond. Var (=1)* has a coefficient of 0.531 and a t-statistic of 2.12, significant at the 5% level, indicating that improvement in productivity was more pronounced in regions with higher concentrations of Mafia activities. Similarly, when we used *Rent Extraction* as the partitioning variable, the interaction term showed an even stronger effect, with a coefficient of 0.929 and a highly significant t-statistic of 6.48, suggesting that anti-Mafia actions substantially enhanced productivity in areas that featured high amounts of rent extraction. The p-values indicate significant differences between coefficients for both *Mafia Presence Index* ($p = 0.065$) and *Rent Extraction* ($p = 0.000$), suggesting that anti-Mafia actions had a stronger effect on productivity in regions that featured high levels of Mafia activity and rent extraction.

This result suggests that the broader impact of anti-Mafia operations extended beyond financial intermediation to have implications for macroeconomic stability. By eliminating Mafia-affiliated firms, these actions can trigger a restructuring of credit markets that encourages the rise of more efficient firms over less efficient ones, especially when the efficient firms receive financing from banks that diversify their portfolios across sectors and regions. As the efficiency of capital allocation improves, it can drive employment and economic expansion. Efforts to dismantle Mafia-linked firms, then, can be catalysts for restructuring capital allocation at the corporate level in some industry-municipalities. As a result, shifts in credit provision can enhance capital efficiency, accelerate firm growth, and boost employment, particularly in areas that had been dominated by rent-seeking.

[Table 8 about here]

5 Conclusions

By examining the complex relationship between organized crime and financial institutions, this study demonstrates how the removal of Mafia-connected firms affects banks' lending practices. Our findings indicate that dismantling criminal organizations leads to a significant increase in bank lending to non-criminal firms, particularly in areas where Mafia infiltration is pervasive. However, this surge in credit availability is accompanied by rising interest rates, reflecting banks' heightened awareness of risk following exposure of previously hidden Mafia activity.

The study highlights two key mechanisms that shape these outcomes. The *intermediation effect*, which fosters a safer and more dynamic business environment, thus encouraging firms to seek additional financing for growth and

innovation, and the *information effect*, which prompts banks to reassess their risk exposure in a way that leads to cautious lending practices and, in some cases, increased borrowing costs. Regarding the *intermediation effect*, we found that eliminating criminal elements can restore trust among businesses in the affected areas, revitalize the social environment in a way that increases businesses' confidence, and encourage them to pursue additional financing, increasing economic activity and stability in the region. We observed a significant rise in bank loans to firms in or near municipalities that experienced removal of criminal organizations, as our analysis shows that dismantling a criminal group increased loan demand from non-criminal peer firms by about €50,000 over the loan demand of businesses in the same province that were not affected by these actions. This finding suggests that eliminating criminal organizations boosts non-criminal firms' investment and lending needs, a view that is supported by an even more pronounced effect when the removed criminal firms had engaged in coercive and corrupt practices and in areas that feature pervasive or more intense Mafia infiltration.

Anti-Mafia police actions that eliminate Mafia-connected companies also provide banks with new information with which to assess borrowers' creditworthiness. Removing Mafia influence enhances transparency, which is essential for banks, as they depend on accurate information to make informed lending decisions. Transparency is vital for financial development, as it lowers costs for both lenders and borrowers and facilitates credit extension to legitimate businesses.

Despite these positive developments, eliminating Mafia influence also brings new uncertainties to the market. Banks must navigate a newly liberated environment in which new competitive dynamics are unclear, and the possibility of lingering effects or ongoing Mafia infiltration complicates their ability to assess risk accurately. As a result, after anti-Mafia interventions, bank lending increased, but so do borrowing costs. The rise in the weighted average interest rate reflects banks' perceptions of higher credit risks because police operations uncover previously hidden risks. Further cross-sectional analyses indicate that banks' responses to these risks vary, as they are influenced by their access to soft information in the form of qualitative insights derived from personal interactions and local knowledge. Borrowing costs increase significantly for non-local and foreign banks (non-Italian), whereas local and domestic banks do not see substantial changes.

On the macroeconomic side, our study suggests that the systemic eradication of Mafia-associated firms can have enduring effects on the economy. Firms that operate in regions that were once infiltrated by organized crime reap the benefits of reduced financing costs and amplified funding volumes. These interventions also improve capital allocation and employment dynamics in the industry-municipality regions that are cleansed of Mafia influence. Banks' improved allocation of capital directs investments toward more productive businesses, which allows these firms to grow and increases the whole region's economic productivity.

Overall, police crackdowns on Mafia-linked companies place non-criminal peer firms in a more favorable competitive landscape relative to their previous position. These police interventions could also reach beyond financial intermediation by influencing the macroeconomy well into the future, given the expected long-term benefits of improved financial intermediation and efficient capital allocation. The granular Anacredit dataset proved instrumental in our ability to address these complex policy questions, as it offered valuable insights into the Italian banking system and facilitated the precise measurement of bank-level exposure.

Our findings are useful for policymakers, as the findings demonstrate that anti-Mafia actions can help to mitigate

the informational asymmetries that affect certain economies and can have tangible outcomes for the wider economy and the overall welfare of society. They also illustrate that structural impediments and the institutional framework can create imbalances and economic inequalities both within and between jurisdictions, and that better legal protections and institutions lead to better outcomes for the financial system.

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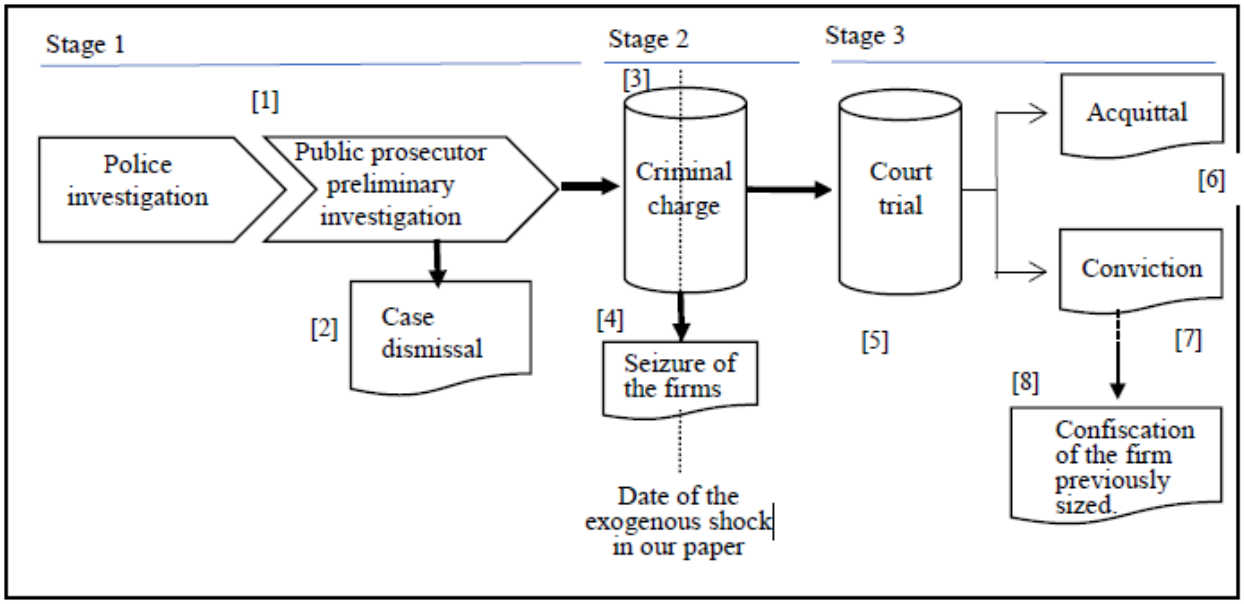

Figure 1: **Italian Judicial Process Under Article 416-bis**

Figure 1 illustrates the investigation and criminal process for mafia-related crimes under Article 416-bis of the Italian Penal Code. Public prosecutors coordinate police investigations [1], and at the end of the investigation [2], a judge can either file a criminal charge [3] or dismiss the case [2.1]. If criminal charges are filed, regular court trials take place [4]. The outcome could be either an acquittal [5] or a conviction [6]. Additionally, after examination by an expert, the individual's belongings, including equity shares in companies, may be confiscated [7]. We used documents from phase [4] to identify individuals charged and convicted of mafia associations. Subsequently, we cross-referenced these names with the *Telemaco* database to ascertain whether these individuals hold positions as board members or shareholders of any company.

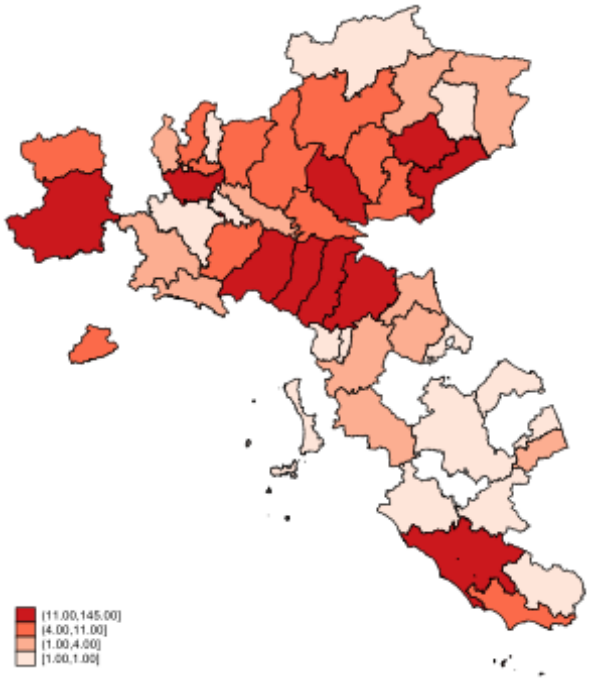

Figure 2: **Geographical Distribution of Criminal Firms**

Figure 2 shows the number of firms classified as criminal in each Province across Northern and Central Italy over the 2019-2021 period. Province borders are sourced from the Italian National Institute of Statistics (ISTAT).

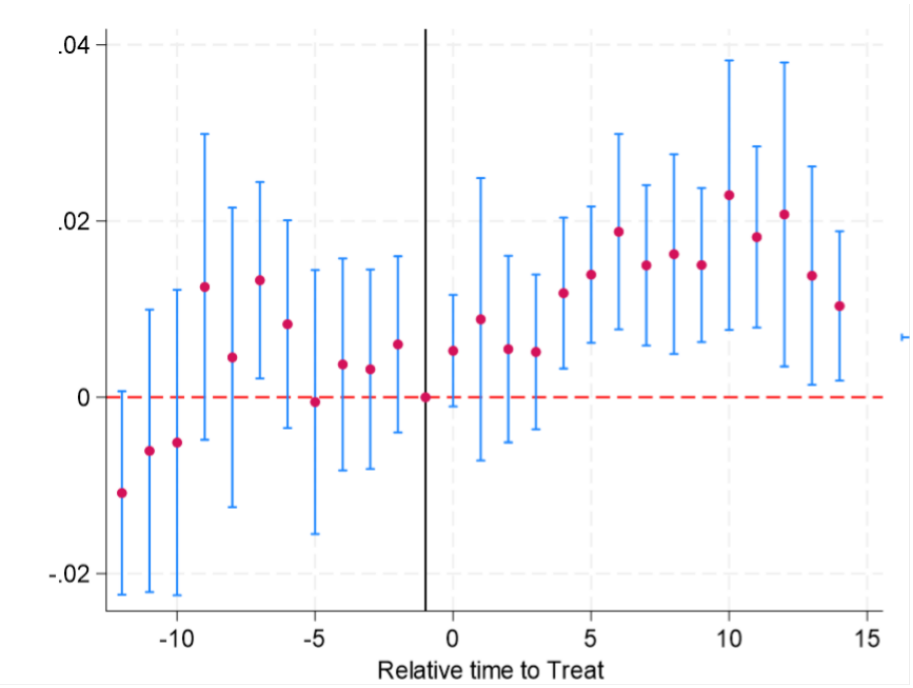

Figure 3: **Effect of Anti-Mafia Police Action on Lending**

This figure illustrates diagnostic parallel trends in lending behavior (*Loans*) for the staggered adoption of anti-Mafia police actions. Point estimates are displayed along with 90% confidence intervals. The baseline (omitted) reference period is one quarter prior to the police action in each municipality, indicated by the solid vertical line in the plot. The figure is created using the *Eventdd* Stata package.

Table 1: Differences in Means Between Criminal and Non-Criminal Firms

	Criminal Firms (1)	**Non-Criminal Firms (2)**	**Difference (3)**	**t-test (p-value) (4)**
Loan (/€)	1,221,758	1,450,868	(229,110)	<0.001***
Probability of Default	0.286	0.076	0.211	<0.001***
Impairments	3,612	1,391	2,221	<0.001***
Interest_Rate	0.027	0.026	0.001	<0.001***
N_Collaterals	3.353	2.941	0.413	<0.001***
N_Instruments	2.529	2.614	(0.085)	<0.003***
Maturity	964	1,052	(88.129)	<0.001***
Bank_Size (/€ 000)	542,000,000	495,000,000	47,000,000	<0.001***
Foreign_Bank	0.179	0.167	0.012	<0.02**

Note: This table provides differences in mean between criminal and non-criminal firms for the year preceding anti-Mafia police interventions. The dataset comprises data for 261 criminal firms identified in police operations from 2018 to 2021, for which pre-intervention data from *AnaCredit* and *Aida* are available. Using propensity score matching with replacement, each criminal firm was paired with five non-criminal firms based on return on assets, leverage (defined as total assets over total liabilities), and size (measured as the logarithm of total assets). The matching process required that the firms were in the same industry, province, and year, resulting in a total of 1,230 non-criminal firms for comparison. Loans is the logarithm (log) of the mean of total nominal amount of loans provided by a bank to a firm. *Probability of Default* is expressed as the percentage (%) likelihood that the firm will fail to meet its financial obligations, as assessed by the bank. *Impairment* refers to the total accumulated amounts in euros (EUR), which reflect financial losses specifically attributed to the firm, as recognized by the bank. *Interest Rates* are the rates applied on loans extended by the bank to the firm. *N_Collaterals* refers to the number of protections or securities backing the financial instruments between a bank and a firm. *N_Instruments* represents the number of financial instruments outstanding between a bank and a firm. *Foreign_Bank* is a dummy equal 1 if the bank is headquartered outside Italy, 0 otherwise. Column (1) details the mean values for criminal firms prior to the police actions, while column (2) displays the mean values for the matched non-criminal firms during the equivalent pre-action period. The differences between the means of the two groups are outlined in column (3), and the results of the t-tests are presented in column (4).

Table 2: Impact of Anti-Mafia Police Actions on Credit Availability

	Loans **(1)**
Anti-Mafia Actions	0.008***
	(3.05)
Observations	35,034,091
R-squared	0.6342
Cohort-Province-Year-Quarter FE	Yes
Cohort-Industry-Year-Quarter FE	Yes
Cohort-Firm FE	Yes
Cohort-Bank FE	Yes
Cluster	Province

Note: The table presents the results obtained by estimating Equation (1) using data from 2018 to 2022 and police operations conducted between 2019 and 2021. *Loans* is the logarithm (log) of the mean total nominal amount of loans provided by a bank to a firm. *Anti-Mafia Actions* takes the value of 1 for peer firms after an anti-Mafia police operation that removes Mafia-connected firms, and 0 otherwise. Peer firms (treated group) are defined as those operating in the same municipality (and adjacent areas) where these operations take place. The control group consists of firms operating in the same province as the removed criminal firms but in areas completely unaffected by any police interventions. The regression includes firm-fixed effects, bank-fixed effects, province-year-quarter fixed effects, and industry-year-quarter fixed effects, all of which are additionally interacted with the Cohort. *Loans* is winsorized at the 1% and 99% levels. Constant estimated but not reported. T-statistics are given in parentheses; standard errors are clustered at the province level. *, **, and *** denote significance at the 10%, 5%, and 1% levels, respectively.

Table 3: Partitioning by Number of Criminal Firms Removed and Business Model

	Loans	
	Mafia Presence Index	**Rent Extraction**
	(1)	**(2)**
Anti-Mafia Actions * Cond Var (=1)	0.016***	
	(4.15)	
Anti-Mafia Actions * Cond Var (=0)	0.003	
	(0.86)	
Anti-Mafia Actions * Cond Var (=1)		0.021***
		(5.49)
Anti-Mafia Actions * Cond Var (=0)		0.005
		(1.24)
Test between Coefficients [p-value]	[0.007]	[0.001]
Observations	35,034,091	35,034,091
R-squared	0.6342	0.6342
Cohort-Province-Year-Quarter FE	Yes	Yes
Cohort-Industry-Year-Quarter FE	Yes	Yes
Cohort-Firm FE	Yes	Yes
Cohort-Bank FE	Yes	Yes
Cluster	Province	Province

Note: This table presents the analysis of how the scale of Mafia operations and their economic activities impact lending post-intervention. It features two distinct sets of non-overlapping conditional variables: *Mafia Presence Index* and *Rent Extraction*. *Mafia Presence Index* is set to 1 (0) for municipalities where the number of removed Mafia-affiliated firms is above (below) the sample median. *Rent Extraction* is set to 1 (0) for firms in the top quintile of revenue growth relative to increases in production inputs, including the logarithms of the wage bill, tangible assets, intangible assets, and intermediate inputs. *Loans* is the logarithm (log) of the mean of the total nominal amount of loans provided by a bank to a firm. *Anti-Mafia Actions* takes the value of 1 for peer firms after an anti-Mafia police operation that removes Mafia-connected firms, and 0 otherwise. Peer firms (treated group) are defined as those operating in the same municipality (and adjacent areas) where these operations occur. The control group is represented by all firms that operate in the same province as the removed criminal firms but in areas completely unaffected by any police interventions. Regression includes firms-fixed effects, banks-fixed effects, province-year-quarter fixed effects, and industry-year-quarter fixed effects, all of which are additionally interacted with the Cohort. *Loans* is winsorized at the 1% and 99% levels. Constant estimated but not reported. t-statistics are given in parentheses; standard errors are clustered at the province level. *, **, and *** denote significance at the 10%, 5%, and 1% levels, respectively.

Table 4: Impact of Anti-Mafia Police Actions on Interest Rates

	Interest Rates **(1)**
Anti-Mafia Actions	0.018**
	(2.47)
Observations	21,895,008
R-squared	0.6013
Cohort-Province-Year-Quarter FE	Yes
Cohort-Industry-Year-Quarter FE	Yes
Cohort-Firm FE	Yes
Cohort-Bank FE	Yes
Cluster	Province

Note: The table reports the results of analyzing the impact of Mafia removal through police operations on bank interest rates. *Interest Rates* is the weighted average interest rate. *Anti-Mafia Actions* takes the value of 1 for peer firms after an anti-Mafia police operation that removes Mafia-connected firms, and 0 otherwise. Peer firms (treated group) are defined as those operating in the same municipality (and adjacent areas) where these operations occur. The control group is represented by all firms that operate in the same province as the removed criminal firms but in areas completely unaffected by any police interventions. Regression includes firm-fixed effects, bank-fixed effects, province-year-quarter fixed effects, and industry-year-quarter fixed effects, all of which are additionally interacted with the Cohort. *Interest Rates* is winsorized at the 1% and 99% levels. Constant estimated but not reported. t-statistics are given in parentheses; standard errors are clustered at the province level. *, **, and *** denote significance at the 10%, 5%, and 1% levels, respectively.

Table 5: Impact of Anti-Mafia Police Actions on Probability of Default

	Probability of Default **(1)**
Anti-Mafia Actions	0.007***
	(3.76)
Observations	22,035,613
R-squared	0.7400
Cohort-Province-Year-Quarter FE	Yes
Cohort-Industry-Year-Quarter FE	Yes
Cohort-Firm FE	Yes
Cohort-Bank FE	Yes
Cluster	Province

Note: The table displays the outcomes of analyzing the impact of Mafia removal through police operations on the probability of default. *Probability of Default* is the probability that firms will default on its obligation as in *AnaCredit*. *Anti-Mafia Actions* takes the value of 1 for peer firms after an anti-Mafia police operation that removes Mafia-connected firms, and 0 otherwise. Peer firms (treated group) are those operating in the same municipality (and adjacent areas) where these operations take place. The control group is represented by all firms that operate in the same province as the removed criminal firms but in areas completely unaffected by any police interventions. Regression includes firm-fixed effects, bank-fixed effect, province-year-quarter fixed effects, industry-year -quarter fixed effects all of which are additionally interacted with the Cohort. *Probability of Default* is winsorized at the 1% and 99% levels. Constant estimated but not reported. t-statistics are given in parentheses; standard errors are clustered at the province level. *, **, and *** denote significance at the 10%, 5%, and 1% levels, respectively.

Table 6: Partitioning by Domestic and Local Banks

	Interest Rates	
	Domestic Bank	**Local Bank**
	(1)	**(2)**
Anti-Mafia Actions * Cond Var (=1)	0.002	
	(0.20)	
Anti-Mafia Actions * Cond Var (=0)	0.162***	
	(4.94)	
Anti-Mafia Actions * Cond Var (=1)		0.027
		(1.44)
Anti-Mafia Actions * Cond Var (=0)		0.013*
		(1.78)
Test between Coefficients [p-value]	[0.000]	[0.209]
Observations	21,894,659	19,739,162
R-squared	0.6013	0.6125
Cohort-Province-Year-Quarter FE	Yes	Yes
Cohort-Industry-Year-Quarter FE	Yes	Yes
Cohort-Firm FE	Yes	Yes
Cohort-Bank FE	Yes	Yes
Cluster	Province	Province

Note: This table follows Table 5 and presents results on interest rates, with the sample partitioned according to two non-overlapping conditional variables: *Domestic Banks* and *Local Banks*. *Domestic Banks* is set to 1 (0) if the bank's headquarters is in Italy. *Local Banks* is set to 1 (0) if the bank is a "Cooperative Banks" as defined by Italian law. *Interest Rates* is the weighted average interest rate. *Anti-Mafia Actions* takes the value of 1 for peer firms after an anti-Mafia police operation that removes Mafia-connected firms, and 0 otherwise. Peer firms (treated group) are defined as those operating in the same municipality (and adjacent areas) where these operations occur. The control group is represented by all firms that operate in the same province as the removed criminal firms but in areas completely unaffected by any police interventions. Regression includes firm-fixed effects, bank-fixed effects, province-year-quarter fixed effects, and industry-year-quarter fixed effects, all of which are additionally interacted with the cohort. *Interest Rate* is winsorized at the 1% and 99% levels. Constant estimated but not reported. t-statistics are given in parentheses; standard errors are clustered at the province level. *, **, and *** denote significance at the 10%, 5%, and 1% levels, respectively.

Table 7: Partitioning by Mafia-Client Exposure

	Interest Rates
	Mafia-Client Exposure
	(1)
Anti-Mafia Actions * Cond Var (=1)	-0.040
	(-0.47)
Anti-Mafia Actions * Cond Var (=0)	0.011*
	(1.73)
Test between Coefficients [p-value]	[0.14]
Observations	22,572,516
R-squared	0.5938
Cohort-Province-Year-Quarter FE	Yes
Cohort-Industry-Year-Quarter FE	Yes
Cohort-Firm FE	Yes
Cohort-Bank FE	Yes
Cluster	Province

Note: This table follows Table 5 and presents results on interest rates, partitioning the sample based on whether banks had clients revealed to be Mafia-connected after police operations. *Mafia-Client Exposure* is set to 1 (0) if the bank had client firms subsequently identified as criminal, assuming all branches within the province are similarly exposed, and 0 otherwise. *Interest Rates* is the weighted average interest rate. *Anti-Mafia Actions* takes the value of 1 for peer firms after an anti-Mafia police operation that removes Mafia-connected firms, and 0 otherwise. Peer firms (treated group) are defined as those operating in the same municipality (and adjacent areas) where these operations occur. The control group is represented by all firms that operate in the same province as the removed criminal firms but in areas completely unaffected by any police interventions. The regression includes firms-fixed effects, banks-fixed effects, province-year-quarter fixed effects, and industry-year-quarter fixed effects, all of which are additionally interacted with the Cohort. *Interest Rate* is winsorized at the 1% and 99% levels. Constant estimated but not reported. t-statistics are given in parentheses; standard errors are clustered at the province level. *, **, and *** denote significance at the 10%, 5%, and 1% levels, respectively.

Table 8: Real Effects Anti-Mafia Police Actions

	Productivity		
		Mafia Presence Index	**Rent Extraction**
	(1)	**(2)**	**(3)**
Anti-Mafia Actions	0.283***		
	(3.30)		
Anti-Mafia Actions * Cond Var (=1)		0.531**	0.929***
		(2.12)	(6.48)
Anti-Mafia Actions * Cond Var (=0)		0.139	0.129***
		(1.48)	(2.87)
Test between Coefficients [p-value]		[0.065]	[0.000]
Observations	35,025,462	35,025,462	35,025,462
R-squared	0.9089	0.9119	0.9167
Cohort-Province-Year-Quarter FE	Yes	Yes	Yes
Cohort-Industry-Year-Quarter FE	Yes	Yes	Yes
Cohort-Firm FE	Yes	Yes	Yes
Cohort-Bank FE	Yes	Yes	Yes
Cluster	Province	Province	Province

Note: This table presents the impact of removing Mafia-connected firms on industry productivity. *Productivity* is revenue per employee, weighted by company assets and aggregated by industry-municipality, scaled by total assets in that specific industry-municipality. In column (2), *Mafia Presence Index* is set to 1 (0) for municipalities where the number of Mafia-affiliated firms removed exceeds (falls below) the median of our sample. In column (3), *Rent Extraction* is set to 1 (0) for firms where the quintile of revenue growth matches the increase in production inputs—including the logarithm of the wage bill (proxy for labor inputs), and the logarithms of tangible, intangible assets, and intermediate inputs. *Anti-Mafia Actions* takes the value of 1 for peer firms after an anti-Mafia police operation that removes Mafia-connected firms, and 0 otherwise. Peer firms (treated group) are defined as those operating in the same municipality (and adjacent areas) where these operations occur. The control group is represented by all firms that operate in the same province as the removed criminal firms but in areas completely unaffected by any police interventions. The regression includes firm-fixed effects, bank-fixed effects, province-year-quarter fixed effects, and industry-year-quarter fixed effects, all of which are additionally interacted with the Cohort. *Loans* is winsorized at the 1% and 99% levels. Constant estimated but not reported. t-statistics are given in parentheses; standard errors are clustered at the province level. *, **, and *** denote significance at the 10%, 5%, and 1% levels, respectively.

Table A.1: List of Anti-Mafia Police Operations Used to Identify Criminal Firms

Anti-Mafia Police Action	**Year**	**Anti-Mafia Police Action**	**Year**
A RUOTA LIBERA	2019	IMPONIMENTO	2020
ALTANUM	2019	ISOLA SCALIGERA	2020
AT LAST	2019	KRIMISA	2019
BASSO PROFILO	2021	LAMPETRA	2021
BILLIONS	2020	MAGMA	2019
CAMALEONTE	2019	MALA GESTIO	2019
CAMORRA A ROMA	2020	MALA PIGNA	2021
CANADA CONNECTION	2019	MAREDOLCE	2019
CARMINIUS	2019	METAMERIA	2021
CAVALLI DI RAZZA CONTRO LE 'NDRINE	2021	NUOVA NARCOS EUROPEA	2021
CORE BUSINESS	2019	OPERAZIONE DDA CATANZARO	2021
DINASTIA	2020	OSSESSIONE	2019
EDERA	2019	PLATINUM-DIA	2021
FAUST	2021	PONENTE FOREVER	2020
GEENNA	2019	PETROLMAFIE	2021
GHIMPU	2019	RINASCITA SCOTT	2019
GOLDEN WOOD	2020	SCACCO MATTO	2021
GOLGOTA	2021	TAURUS	2020
GRIMILDE	2019	TERRY	2019

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