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Influences Firms' Performance**

By *Marta Degl'Innocentia, Marco
Frigeriob, and Si Zhou*

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The Fear Factor: How Mafia Influences Firms' Performance*

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Using coercion to instill fear, organized crime poses a global threat. We investigate how this threat distorts markets and generates real-world consequences using publications on Italian Mafia surnames disclosed by national judicial and investigative forces. We show that firms with executives sharing Mafia surnames negatively impact the performance, sales growth, and induce financial constraint of peer firms in the same industry and area. Peer firms also experience a decline in the number of employees. Our results are more pronounced in cases where there might be more severe asymmetric information concerning the identity of top executives, such as in the Northern regions, and in areas with more mafia infiltration and crimes. As a possible mechanism of how the fear of the Mafia disrupts relationships and economic transactions, we find that mafia-surname firms receive greater liquidity support from their suppliers.

Keywords: *Mafia, Peer effects, Performance, Resource misallocation, Liquidity*

JEL Classifications: G18, G32

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1. Introduction

Mafia¹ exerts a disruptive influence on the legal economies of countries worldwide through the use of extreme violence, corruption of public officials, penetration of the legitimate economy (e.g., through money laundering), and interference in the political process (Kenney and Finckenaer, 1995; Levi, 2002; Alesina et al., 2019). Additionally, it engages in racketeering, offering coercive private protection for landowners and businesses (Gambetta, 1993; Acemoglu et al., 2020). Previous studies have demonstrated that the Mafia can distort market functioning (Pinotti, 2015a,b; Ferrante et al., 2021), increase the cost of funding (Bonaccorsi di Patti, 2009), hinder foreign direct investments (Daniele and Marani, 2011), facilitate the misallocation of public funds (Barone and Narciso, 2015; Daniele and Dipoppa, 2017), and impact firms' revenues (Mirenda et al., 2022). Firms infiltrated by the Mafia also receive preferential treatment and benefit from reduced input costs through illicit means (Ravenda et al., 2015). This not only increases the cost of doing business (Arlacchi, 1983) but also leads to tax evasion among competing firms (Chircop et al., 2022).

Organized crime poses a significant threat to legally operating firms, endowing them with a competitive advantage. The capacity to disrupt markets stems from the fear of reprisals against those opposing criminal activities. The Mafia instills fear in society, fostering apathy and eroding trust in the rule of law (Siebert, 2003). This fear and apprehension stemming from the suspected presence of the Mafia can create uncertainty, leading businesses to curtail their operations or refrain from entering or dealing with specific markets altogether. We propose that the fear of the Mafia can lead individuals and organizations to allocate resources based on

¹ For the remainder of the paper, we will use the expressions *organized crime*, *criminal organizations*, *Mafia-type organizations*, and *Mafia* as synonyms. Although the term *Mafia* has its origins in Sicily, it is commonly used to refer to various other organized crime groups across the globe (Europol, 2013). We instead refer to Mafia from Sicily as *Sicilian Mafia* or *Cosa Nostra*.

emotional factors, rather than rational or objective considerations. In turn, this can result in misallocation, diverting resources away from their most efficient and productive utilization (Faccio et al., 2023). While connections to criminal organizations have been proven to lead to a systematic misallocation of economic resources (Mirenda et al., 2022; Bianchi et al., 2022), we therefore argue that the fear of the Mafia similarly prevents firms from deploying their resources in an optimal manner. Within this framework, as a novel research perspective, we specifically investigate whether the mere fear of the Mafia can exacerbate the business environment, consequently detrimentally impacting firms' performance when exposed to it. The concept of fear of crime is not new to the social scientists' literature, where it has been recognized as a major social problem. This fear produces significant adverse consequences, including the fracture of the sense of community, deterioration of well-being and cooperation, and alterations in individuals' habits (Box et al., 1988; Meyer et al., 2014; Silva et al., 2016). This behavioral adaptation to fear of crime can have broader social and economic implications.

It is empirically challenging to distinguish the fear factor from the effects of criminal activities perpetrated by the Mafia in the area. Ideally, we should observe how people react to the presence of real 'Mafiosi' infiltrated in the economy before judicial and investigative forces detect them. Unfortunately, we cannot gather information on 'Mafiosi' who are active in the area but have not yet been detected by anti-Mafia investigations. Neither can we observe how people respond to mafia infiltration in the same area. Furthermore, we do not know whether people change their behavior because of the fear factor or other related reasons, such as the preferential treatment received by mafia-infiltrated firms.

In this study, we circumvent these difficulties by employing the disclosure of Mafia surnames by anti-mafia investigation forces as an exogenous shock that triggers changes in the business environment. Particularly, we argue that people may suspect that firms led by top

executives with Mafia surnames could potentially have connections to criminal networks. Consequently, individuals may feel threatened by the Mafia. In turn, we state that this can influence the allocation of resources among economic players in the market and deteriorate the local economic environment.²

Our empirical setting is reinforced by global anecdotal evidence, indicating that individuals often consider a surname as a credible signal of Mafia identity (Smith and Varese, 2001). As a result, a surname alone can be potent enough to exert an intimidating effect. There are several examples of individuals using Mafia surnames, although never members of Mafia-type clans, to extort money or gain benefits from others all over the world.³ Similarly, we ask if individuals with a Mafia surname could be considered as real Mafiosi, particularly in circumstances where there could be more asymmetric information regarding their real identity.

From a theoretical viewpoint, we draw on the behavioral finance literature that has extensively documented that individuals' probabilistic perceptions and judgments are subject to various systematic errors (see, for example, Benjamin, 2018, for a review). Among them, a representativeness heuristic bias is associated with the tendency to judge as likely events that are merely representative, resulting in judgment errors regarding the probability of an outcome (Kahneman and Tversky, 1972; 1973). In finance it is not in fact unusual for example that a lender may assess the borrower's creditworthiness based on the extent to which the borrower reflects the essential characteristics of a stereotyped group (Baker and Nofsinger, 2010).

² The likelihood that top executives sharing a Mafia surname are actual 'Mafiosi' is low. Once identified by anti-Mafia investigations, firms colluding with criminal organizations should be removed from the market and, eventually, subjected to judicial administration.

³ For example, according to the police report, Salvatore Badalamenti, whose surname happened to be the same as that of a well-known Sicilian Mafioso, Tano Badalamenti, managed to extort money from entrepreneurs in a Piedmont village in the North of Italy (Smith and Varese, 2001). These impostors (people who claim to be Mafiosi but are not in reality, or people who claim to be protected by Mafiosi but are not) try to pass as real Mafiosi by using Mafia surnames to benefit from the Mafia reputation with the aim of extrapolating rents and taking advantage of others.

Furthermore, there is a well-documented body of management literature which argues that individuals tend to interact with each other following heuristic rules for information gathering and analytical cognitive elaboration in uncertain environments (e.g., Busenitz and Barney, 1997; Kahneman, 2002; Bingham et al., 2007; Bingham and Eisenhardt, 2011; Kahneman, 2011; Guercini et al., 2014).

In order to test our hypothesis empirically, we focus on Italy as an ideal context for this analysis, given the long-standing presence of several criminal organizations (such as the *Sicilian Cosa Nostra*, *Neapolitan Camorra*, and *'ndrangheta*) dating back to the nineteenth century.⁴ It is in fact estimated that these organizations have profoundly damaged Italy's local economic development leading to economic losses in terms of GDP and productivity up to around 16% over a thirty-year period (Peri, 2004; Albanese and Marinelli, 2013; Pinotti, 2015a,b). Organized crime has indeed a tight control on local territories (Le Moglie and Sorrenti, 2020). However, although people are aware that there is a high Mafia's infiltration in the community, they do not know to what extent.

For our identification strategy, we gather data pertaining to newly emerging Mafia families from the semi-annual reports on Mafia-type organizations published by judiciary police – the Anti-Mafia Investigation Directorate, DIA.⁵ The DIA report represents a comprehensive document summarizing all activities conducted by judicial and anti-Mafia investigation forces throughout the year. Every six months, the Minister of the Interior reports to Parliament the information related to the activities carried out and the results achieved by the DIA.

⁴According to the Law 646/82 Article 416-bis, Mafia organizations (*Associazioni a delinquere di stampo mafioso*) are defined as those groups that “exploit the power of intimidation granted by the membership in the organization, and the conditions of subjugation and omerta that descends from it, to commit crimes and acquire the control of economic activities, concessions, authorizations, and public contracts”.

⁵ The Anti-Mafia Investigation Directorate, also known as the DIA, is an Italian multi-force investigatory body established in 1991 which operates under the Department of Public Security of the Ministry of the Interior. Its main tasks are to conduct preventive investigations into activities relating to organized crime, as well as investigations connected exclusively to crimes of Mafia association.

Contextually, the DIA discloses a detailed report with an updated granular picture of the criminal organization's exponents operating on the Italian territory from the period 1992 up to the current year. All reports are advertised on the Ministry of Interior's webpage. Furthermore, information included in the DIA reports receive an extensive media coverage on major national and local TV channels, YouTube, radio, local and national newspapers (see Figure 1).⁶

[Insert Figure 1 about here]

As a result of this media attention, there is an increase in the search for news related to the surnames of mafia clans detected by the Anti-Mafia Investigation Division, as shown in Figure 2.⁷ This suggests an escalation in public attention and awareness of mafia clans due to the outcomes of the investigation activities conducted by the Anti-Mafia Investigation Division, which are subsequently reported in the DIA reports.

[Insert Figure 2 about here]

From the DIA reports we extract all the surnames of Mafia clan members, which were then matched with the top executives' surnames of firms present in the Bureau van Dijk's Orbis database. The matched firms are then labelled as *Mafia-surname firms*. Finally, we collected the financial data for a large sample of Italian firms for the period of 1999-2018 from AIDA,⁸ the Italian Bureau van Dijk's database. We use this information to develop a comprehensive set of measures for firm-level economic performance and other relevant control variables pertinent to our analysis.

⁶ See for example: <https://www.interno.gov.it/it/sicurezza-relazione-semestrale-dia-sulle-infiltrazioni-mafiose>; <https://www.interno.gov.it/it/notizie/relazione-dia-ii-semestre-2020-interessi-delleconomia-criminale-nel-perdurare-dellemergenza-sanitaria>; <https://www.youtube.com/watch?v=hMuNcjmBHp8&t=13s>; https://www.youtube.com/watch?v=oOTQOP7A_DE

⁷ We utilized Google Trends to investigate whether there was an increase in public attention for mafia surnames first disclosed in the DIA reports. In our Google search analysis, we combined specific mafia surnames with keywords such as "famiglia", "gruppo" and "clan". Subsequently, we verified that at least one of the related topics, showing the greatest increase in search frequency since the last analysis (Google Search reports five related topics by default), was associated with criminal organizations or activities.

⁸ AIDA stands for *Analisi Informatizzata delle Aziende* (Computerized Analysis of Firms).

To test our conjecture, we employ a *difference-in-differences* approach to analyze the changes in economic performance of firms in the same industry (4-digits NACE Rev.2 classification) and municipality (the Italian *Comuni*, which is more granular than NUTS 3 level) as *Mafia-surname firms*.⁹ For a given firm, the treatment is the uncovering of Mafia-surname peers, i.e., at least one Mafia-surname firm identified by the DIA report in the same area and industry. We therefore compare the change in economic performance of *treated* firms before and after the treatment with the change in economic performance of firms that are never treated (the control group) during the period of observation. A significant effect resulting from the exposure of Mafia-affiliated surname firms should be attributed to a distinct ‘fear of Mafia’ phenomenon, indicating Mafia-related apprehension rather than Mafia infiltration within those firms. Indeed, the direct impact of Mafia infiltration on the business environment should manifest itself irrespective of the disclosure of surnames associated with Mafia members (hereinafter referred to as *Mafiosi*). For example, Bianchi et al. (2022) find that connections to organized crime can deplete a company’s resources, potentially through money-laundering schemes, and pose a threat to its continued existence, thereby adversely affecting its shareholders. Moreover, if firms with Mafia-related surnames were genuinely linked to the Mafia, they should be driven out of the market after law enforcement discovers their criminal activities and discloses their identities.

Several key results emerge from the analysis. We find that Mafia-surname peers experience an economically significant reduction in operating performance, sales growth, and leverage by respectively 1.2%, 1.7% and 0.4%, while a significant increase of 0.4% in financial

⁹ Here, as in the remainder of the paper, we use the expression *Mafia-surname firms* or *Mafia-surname customers* to indicate the firms whose top executive’s surname happened to be the same as that of *Mafiosi* (i.e., known members of the Mafia). We also use *Mafia surnames* to indicate surnames that happened to be the same as those of *Mafiosi*.

constraints measured recurring to the Whited Wu index (WW-constrained). Chircop et al. (2022) show similar results in magnitude as concerns the improvement of peers' performance because of the removal of Mafia-related firms from the market following anti-Mafia police actions. This suggests that the fear of the Mafia generates an impact on the market that is comparable to that induced by real Mafia-related firms. Furthermore, we find that peer firms experience a decrease in their number of employees by approximately 5.22%. These findings provide evidence that the Mafia can indirectly contribute to resource misallocation through the influence of the fear factor.

We have ruled out alternative explanations for our results. To address concerns related to unobservable changes in the industry within a specific area and year, we controlled for Region-Industry-Year fixed effects. Additionally, we conducted a secondary analysis by excluding large peer clusters whose economic performance is more likely to be influenced by confounding factors, such as fiercer competition, rather than Mafia-surname firms. Finally, we exclude firms from the sample that had appointed top executives with surnames coinciding with those of Mafia clan members already disclosed in DIA reports. This precaution was taken to account for the possibility that these firms sought benefits in terms of resource allocation by deliberately appointing these top executives.

To strengthen our interpretation of the results, we also examine whether the bias induced by Mafia surnames is more pronounced in contexts where there is greater uncertainty regarding the identities of top executives, such as in areas outside the regions where Mafia organizations originate. In Southern regions, where the Mafia has its roots, it is more likely that real Mafiosi are well-known, reducing the probability of the occurrence of the behavioral bias. Moreover, as emphasized by Chircop et al. (2022), our focus on Northern and Central Italy helps mitigate the risk of misclassifying firms genuinely infiltrated by the Mafia but not yet detected by the police

as non-Mafia firms. This is because the presence of the Mafia is considerably less pervasive in Central and Northern Italy compared to Southern Italy (Gratteri and Nicaso, 2007). The results appear to be more robust for young Mafia-surname firms, which are less likely to be known by other businesses.

We also rerun the analysis by removing peer firms in the same industry and area as Mafia-surname firms with top executives who were born in the areas (Calabria region) where mafia clans (i.e., *'ndrangheta* clans) are more likely to have strong family ties rather than affiliation ties (Mirenda et al., 2022).¹⁰ This test allows us to mitigate the possibility that we include firms in our sample that are really infiltrated by mafia organizations. In addition, we check the robustness of our results by running a set of placebo and dynamic tests, and lagging our main variable of interest to corroborate the interpretation of the baseline results.

Having established the deterioration of performance for firms subjected to the fear of the Mafia, we turn to the question of whether mafia-surname firms may benefit from the allocation of economic resources. If Mafia-surname firms are suspected to be infiltrated by the Mafia, then we should also expect that, similarly to real mafia-connected firms, they benefit from the misallocation of economic resources. To test this, as a potential mechanism to explain this resource misallocation, we examine whether Mafia-surname firms receive additional liquidity resources from their trade partners after the disclosure of new Mafia surnames by judicial and investigative forces. We propose a specific hypothesis: suppliers may feel intimidated by potential retaliation from customers suspected of being Mafiosi based solely on their Mafia-like surnames, even without direct evidence of violence, corruption, or intimidation. As a result, suppliers may perceive Mafia-surname customers as having greater bargaining power and

¹⁰ The authors have collected the names of the *'ndrangheta* clans operating in the center and north from judicial and investigative evidence included in a report for the Italian Antimafia Parliamentary Commission (henceforth, APC) on various years.

extend more significant liquidity through trade credit to accommodate this perceived power dynamic.

The focus on trade credit to detect how Mafia-induced fear can distort economic transactions between firms is motivated by various reasons. First, according to previous studies, suppliers tend to extend trade credit, which consists of having a larger share of goods sold on credit, when they deal with influential buyers (Fisman and Raturi, 2004; Giannetti et al., 2011; 2021; Klapper et al., 2012; Fabbri and Klapper, 2016; Chod et al., 2019). Second, suppliers experience an information advantage over traditional lenders on both customers' creditworthiness and business condition (Petersen and Rajan, 1997). They also have the capability to enforce repayment of credit under the threat of stopping the supply of intermediate goods to their customers (Klapper et al., 2012). This means that suppliers' lending decisions are less likely to be affected by monitoring issues or by a lack of information on buyers' businesses. Therefore, our setting allows us to better disentangle the effect of Mafia surnames on firms' supply of liquidity. Finally, top executives are known to exert an influence on contract terms of trade credit (Intintoli et al., 2017).

In line with our conjecture, our findings show that Mafia-surname firms receive greater trade credit extension in the form of increasing levels of payables - i.e., amounts due to suppliers for goods or services received on credit which is a measure widely used in the literature (see for example, Love et al., 2007; Shenoy and Williams, 2015; Zhang, 2019). Specifically, they experience an increase of the ratio of account Payables to Cost of goods (*Cogs*), *PtC*, by six percentage points (one fifth of the median value of *PtC* for the entire sample), which

corresponds to an average payment delay of about 23 days for Mafia-surname customers after the disclosure of the DIA reports.¹¹

Our results show that Mafia-surname firms receive more trade credit extension in northern and central regions, and therefore outside the regions where Mafia families are generally rooted. In northern and central regions, entrepreneurs are less likely to know the real identity of Mafiosi and, thus, are more subject to the behavioral bias phenomenon. Additionally, we demonstrate that the impact linked to Mafia surnames is more pronounced in provinces with a higher infiltration of Mafia-type organizations in the economy, as reported by Transcrime (2015).¹² In these provinces, the effect stemming from the perceived threat is expected to be more substantial.

Last, we show that the effect of Mafia surnames prevails for customers dealing with suppliers offering services and differentiated products. These suppliers provide unique or highly customized inputs tailored to the specific needs of the buyer, in this way making both undesirable suppliers and customers difficult to substitute.

We rule out alternative explanations for our trade credit results by addressing concerns related to omitted variables associated with the characteristics of top executives and the board of directors. Furthermore, we conduct two tests to mitigate the possibility that our findings are influenced by top executives either being genuinely connected to Mafia-type organizations or feigning such connections. These tests incorporate considerations of media attention and social capital.

¹¹ We find consistent results when substituting *Payables to Cost of goods* with a broader ratio such as *Payables to Sales*.

¹² Based on the Nomenclature of Territorial Units for Statistics, Italian *regions* coincide with NUTS 2 regions, while Italian *provinces* coincide with NUTS 3 regions.

Our findings remain robust across various tests, including those for sample selection criteria, sample variation, and endogeneity concerns. Additionally, we conduct placebo and falsification tests, employ different sets of dependent and control variables, and explore alternative variable specifications. We also assess the validity of our quasi-natural experiment by examining whether firms' trade credit inversely affects the likelihood that their top executives' surnames are disclosed by the DIA report as Mafia surnames.

Our article contributes to several strands of literature. First, we offer a new angle of research to the growing body of literature emphasizing the pervasive impact of organized crime for the economy and society. Specifically, increased attention has been devoted to macro-effects (although difficult to investigate)¹³ associated with the distortion in the functioning of the market due to criminal organizations' infiltration in the economy. Many previous studies have mostly examined the effect of organized crime's investment in the legal economy at the aggregate level (Peri, 2004; Bonaccorsi di Patti, 2009; Daniele and Marani, 2011; Albanese and Marinelli, 2013; Barone and Narciso, 2015; Pinotti, 2015a,b; Daniele and Dipoppa, 2019; Le Moglie and Sorrenti, 2020; Ferrante et al., 2021). Recently, Mirenda et al. (2022) conducted an analysis at the firm level, finding that firms more exposed to Mafia infiltration experience a significant rise in their own revenues. Bianchi et al. (2022) find that mafia-connected firms have lower profitability, even though they report higher sales and lower labor cost. Slutzky and Zeume (2023) find that following anti-mafia enforcement actions there is an increase in competition among firms and for public procurement contracts. Focusing on peers' businesses Chircop et al. (2022) show that the removal of Mafia firms following Italian anti-Mafia police actions these actions reduce peers' tax avoidance. Taking a different trajectory, this study

¹³ Direct costs refer to the resources i) deployed in the fight against criminal organizations and ii) directly subtracted from the economy by Mafia-type organizations (e.g., through thefts, robberies, or extortions) (Mirenda et al., 2022).

represents the first attempt to ascertain the extent the fear stemming from the suspected presence of the Mafia can deteriorate the performance of other firms and lead to a distortion of resource allocation in the economy.

To this purpose, we explore how and to what extent the fear factor induced by the presence of Mafia-surname firms can jeopardize the peers' economic performance and result in the transfer of liquidity to firms believed to be associated with the Mafia.

In broader terms, we also add a new angle of research to the extensive literature linking trust with economic outcomes (e.g., Knack and Keefer, 1997; Dasgupta, 1988; Sapienza and Zingales, 2012; Lins et al, 2017). In particular, our study reveals a misallocation of resources in the economy driven by the fear of Mafia, primarily rooted in concerns about potential Mafia infiltration. Within this context, some firms face a decline in performance in an environment marked by reduced trust. Conversely, other firms may actually benefit from these circumstances.

Next, we offer new evidence on the importance of heuristics and judgment biases for the correct functioning of the market, in general, and financial transactions more in details. While prior studies have mainly focused on credit cycle and financial markets (e.g., Kahneman and Tversky, 1972; 1973; Gennaioli and Shleife, 2010; Bordalo et al., 2016, 2018), as a distinguishing feature, we also show that heuristics matters for firms' economic relationships.

Finally, we provide an alternative non-financial reason for trade credit (Klapper et al., 2012; Murfin and Njoroge, 2015; Barrot, 2016; Fabbri et al., 2016; Breza and Liberman, 2017; Coricelli and Frigerio, 2019; Giannetti et al., 2021; Gofman and Wu, 2022). Particularly, we complement this line of research by documenting the importance of the fear factor in the supplier-customer relationship.

This paper is organized as follows. Section 2 describes the institutional setting, and Section 3 presents the data and methodology. Section 4 discusses the main results while Section 5 focuses on trade credit as a mechanism through which the fear of the Mafia can distort market functioning. Section 6 rules out alternative explanations. Finally, Section 7 concludes the paper.

2. Institutional setting: Mafia-type organizations in Italy

Italy is home to a complex and well-branched system of criminal activities managed by Mafia-type organizations, which encompasses three major organizations: *Sicilian Mafia* or *Cosa Nostra* - originated from the Sicily region; ii) *Neapolitan Camorra* - originated from the Campania region; and iii) *'ndrangheta* - originated from the Calabria region. Although all Mafia-type organizations expanded their criminal activities to more productive and profitable regions (see Figure 1), 'Ndrangheta still dominates the North-West, while the Sicilian Cosa Nostra and Neapolitan Camorra appear to be more active in Central Italy (Mirenda et al., 2022). Furthermore, these Mafia-type organizations are viewed as a threat to the European Union (EU) and are prevalent in the continents of North and South America, as well as Australia, and the South African region (Europol, 2013). For instance, 'Ndrangheta has significantly infiltrated the formal economy and banking sectors to launder illicit proceeds, as observed in the UK and Germany (GOCI, 2021).

While Italy is among the countries with the most powerful crime groups in Europe, along with Spain, Montenegro, Albania, and Serbia, it is characterized by moderately high resilience to organized crime due to engagement in cooperation with the international community. This collaboration includes cross-border judicial and law enforcement cooperation (GOCI, 2021). Even though Mafia-type organizations differ in terms of economic and social conditions and history, they share common features. Criminal organizations tend to emerge alongside a weak

state, a failure to preserve the monopoly of coercion, and widespread distrust in institutions (Koivu, 2016; Acemoglu et al., 2020). In Italy, criminal organizations have traditionally been aggressive in monopolizing violent activities (Pinotti, 2015b). In this context, Mafia-type organizations manage to garner consensus within a segment of the population by providing alternative capital and jobs in more disadvantaged areas (Gambetta and Reuter, 1995; Le Moglie and Sorrenti, 2020).

3. Data and Methodology

3.1 Data

We collect data from multiple sources to explore the effect of the disclosure of Mafia surnames on the economic performance of Mafia-surname firms and their peers. The main source of information for Mafia surnames is the semi-annual DIA report, which provides an updated granular picture of the criminal organizations' exponents operating on Italian territory. This includes information drawn from judicial and investigative evidence on the Mafia-type organizations. In particular, the semi-annual report contains the surnames of the members of the Mafia-type clans that are active on the territory.¹⁴ We collect 5,235 Mafia surnames from the DIA reports over the period 1992-2018. Then, we link these Mafia surnames with the top executives' surnames retrieved from Orbis.¹⁵ We exclude from the sample firms whose top executives' surnames are associated with Mafia surnames since the beginning of the entire sample period as we cannot estimate any differential effect due to disclosure in the DIA reports

¹⁴ See Figures A.1 and A.2 for an example of DIA report.

¹⁵ After carefully investigating the data, we have developed the following ranking hierarchy to identify firms' Top Executives in Orbis: 1) Sole Administrator; 2) Chief Executive Officer; 3) Chairman/President of the Board; 4) President of the Management Board; 5) General Manager or Managing Director; 6) Administrator; 7) Director; and 8) Sole Partner. For each firm we consider the Top Executive with the highest title following our eight-part hierarchy. We, however, highlight that there is rarely an overlap between the above titles for the same firm. Overall, the result is that the first three ranks account for almost 65% of the total observations available in Orbis.

for them.¹⁶ Furthermore, this allows us to mitigate the possibility that a firm is established in a particular industry and area because of a Mafia-surname firm's presence. Our final sample includes 7,647 firms whose top executives have a Mafia surname (matching 3,357 Mafia surnames from the DIA reports).

We retrieve accounting data on Italian firms from the Bureau van Dijk's Aida database, which contains balance sheet data for most of the limited liability firms in Italy (*Società per Azioni* and *Società a Responsabilità Limitata*).¹⁷ For our analysis, we only consider firms in the nonfinancial business economy, also excluding primary industries and utilities because of their peculiarities. Based on the NACE Rev.2 classification, we specifically drop the following sectors: agriculture, forestry, and fishing (section A); mining and quarrying (section B); utilities (sections D and E); financial and insurance activities (section K); public administration, education, health, and entertainment (sections O to R); and other service activities (section S). We also exclude from our sample any firms that have been seized by the Italian government and put under judicial administration in the period of investigation as they are more likely to include firms that really colluded with the organized crime. Following prior studies (e.g., Calamunci and Drago, 2020; Calamunci, 2022), we detect firms subject to legal procedures from AIDA.¹⁸ By dropping them from the sample, we can better underpin the representative bias and Mafia-induced fear associated with Mafia surnames.¹⁹ In addition, we removed from the final sample firms with zero values for both account payables and account receivables since we are aware that missing data on trade credit at the firm level could sometimes be recorded as

¹⁶ We found that 57,032 firms, corresponding to around 10% of the firms in our sample, have top executives with Mafia surnames since the beginning of our sample period.

¹⁷ Under the Italian law, it is mandatory for firms to file and deposit annual reports with the local Chamber of Commerce.

¹⁸ We found 238 firms in the following AIDA categories: court ordered administration, court ordered liquidation, court ordered seizure, court order of cancellation.

¹⁹ Although we cannot exclude with certainty that there are still firms related with Mafia-type organizations in our sample, we mitigate such an issue by removing firms under judicial administration.

zeros (Coricelli and Frigerio, 2019), and this information is relevant for the second part of our analysis concerning inter-firm credit. The final sample encompasses 2,191,466 observations for 393,050 firms spanning from 2000 to 2018, with complete accounting and top executives' information.

As reported in Table 1, most firms are distributed within the following activities: manufacturing (19.3%), construction (17.2%), wholesale and retail trade (25%), real estate activities (15.2%), and professional, scientific, technical, and other activities (12.1%). Meanwhile, most of the Mafia-surname firms belong to similar industrial sectors, with a higher percentage in the wholesale and retail trade sector (30%). While firms are mainly located in Northern and Central regions (around 57%), most firms with Mafia surnames are instead located in Southern regions (65.5%).

[Insert Table 1 about here]

3.2 Empirical design

To explore the effect of Mafia-surname firms on peer firms, we implement a difference-in-differences strategy that relies mainly on three major factors: (i) accounting and governance information for the Italian firms over the entire territory; (ii) the exogeneity of the semi-annual report issued by DIA on Mafia-type organization; and (iii) identification of top executives with surnames in common with the members of Mafia clans. We define as *Mafia-surname firm* a firm whose top executive: i) has the same surname as those of Mafiosi disclosed by DIA reports from year t onwards²⁰; and ii) was born in one of the regions of the Mafia-origins regions

²⁰ t refers to the year in which the Anti-Mafia Investigation Division detects new members or activities of mafia clans. This is independent of the publication year of the DIA report. Information pertaining to the outcomes of the Anti-Mafia Investigation Division, which are subsequently summarized in the DIA report, is disclosed to the public through media channels in due course. As a robustness test, we have also lagged the Mafia-surname peers dummy variable to account for the fact that the second semi-annual DIA report is typically published in the first months of the following year, and the results are consistent (see Table A.5).

(Sicily, Apulia, Campania, Basilicata, or Calabria). The birthplace criterion enables us to gauge the extent of asymmetric information that may influence our estimation. We posit that the behavioral bias linked to Mafia surnames is likely to be more pronounced among top executives born in regions with historical ties to Mafia families.²¹ Our main variable of interest, *Mafia-surname peers*, is a dummy variable equal to one if firm i is in the same area (municipality) and industry as at least one Mafia-surname firm, and zero otherwise. The model specification is given as the following:

$$Y_{i,t} = \beta_0 + \beta_1 \text{Mafia-surname peers}_{i,t} + \beta_2 W_{i,t-1} + \delta_i + \eta_t + \varepsilon_{i,t} \quad \text{Eq. (1)}$$

where Y is alternatively *Operating Performance* (the firm's net income before depreciation, taxes, and extraordinary items, standardized by total revenues); *Sales Growth* (annual change in operating revenues divided by the lagged level of total assets), *Long-term Leverage* (long-term debt divided by total assets); *WW-constrained* dummy (dummy variable that is equal to 1 if the firm's WW index is ranked in the top tercile cross-sectionally, where the WW index is estimated following Whited and Wu, 2006); *Number of Employees scaled by Total Assets* (number of employees divided by Total Assets, with the total assets measured at the beginning of the year). W is the vector of firm characteristics at time $t-1$ including Size, Age, and Cash (cash and cash equivalent over total assets).²² All the financial ratios of our interest are winsorized at 2 percent and 98 percent level. We also incorporated firm and year fixed effects (δ_i and η_t) to avoid a potential bias from the omission of unobservable firm-specific and time-specific characteristics. Standard errors are clustered at the municipality level.

²¹ For instance, individuals may retain the accent from their region of origin, a common sociolinguistic phenomenon in Italy, facilitating the association of an individual with a specific part of the country (Cavanaugh, 2005). In an additional test, we rerun the baseline model, defining the main variable of interest – Mafia surnames – solely based on the first criterion: top executives having the same surname as that of Mafiosi based on information newly disclosed by the DIA reports.

²² See Table A.1 in the Appendix for a detailed description of all the variables employed in this study.

The corresponding coefficient, β_1 , represents the change in economic performance of treated firms before and after the treatment with the change in economic performance of firms that are never treated (the control group) during the period of observation. Note that in this setting, we consider as *treatment year* every year starting from the year in which the surname of a firm's top executive is associated for the first time with Mafia surnames based on DIA reports. A significant β_1 should be driven by the association of a firm with Mafia clans because of the DIA report rather than because of an existing link with Mafia.

To ensure that β_1 does not reflect time-varying shocks common to firms operating in certain geographical areas and industries, we also estimate an additional model specification controlling for region-industry-year fixed effects.

Table 2 presents descriptive statistics on the relevant firm-level ratios, while Table 3 shows the correlation matrix for the main variables employed in this study.

[Insert Table 2 about here]

[Insert Table 3 about here]

4. Empirical Findings

4.1 Main findings

In this section, we examine whether and to what extent the presence of Mafia-surname firms will affect the economic outcome of their peers. Table 4 reports the findings of Eq. (1), where Panel A shows the results for the specification with firm and year fixed effects, and Panel B reports the results with region-industry-year fixed effects. Regardless of the model specification employed, the coefficient on the variable of main interest, *Mafia-surname Peers*, is always negative and statistically significant with *Operating Performance*, *Sales Growth*, *Long-Term Leverage*, while is always positive and statistically significant with *WW-constrained*. The effect

is also economically significant as peer firms experience an economically significant reduction in *Operating Performance* and *Sales Growth* by 1.2% and 1.6%, respectively. Furthermore, we find a decrease of peers' long-term leverage by 0.4% while an increase of WW-constrained by 0.4%.²³ Our results also show a significant decrease in peer number of employees by 5.22%. Similar results are found in Panel B, although the effect on *Operating Performance* is half the one found in Panel A.

[Insert Table 4 about here]

In a subsequent analysis, we remove from our sample the largest municipality-industry-year clusters to mitigate the possibility that our results could be driven by unobservable confounding factors. We argue that the effect produced by Mafia-surname firms on peers should be weaker in the case of the largest industrial clusters where there are multiple players operating in the same industry-municipality. To this purpose, we rerun the baseline model by excluding large peers' clusters (municipality-industry-year) with more than 300 observations. These clusters include about 7% of the firms in our sample. Panel C shows the findings that are like those of the model reported in Panel B. Then, we rerun the baseline model by excluding Mafia-origins regions. Specifically, we investigate whether the impact of Mafia surnames is more pronounced in cases where there might be more severe asymmetric information concerning the identity of top executives. We posit that this issue could be more pertinent for firms located outside the regions traditionally associated with Mafia families. In these geographical areas, it is more likely that an individual can be linked to Mafia-type organizations solely based on their Mafia surname, given that the true identity of Mafiosi is often unknown. Furthermore, the prevalence of firms connected to Mafia organizations is lower in these regions compared to

²³ In 2018 (last year of our analysis) the operating profit in the Northern and Central regions is about € 41.6 billion, while in the Mafia-origins regions is about € 2.5 billion.

Mafia-origin regions. Consequently, there is a reduced likelihood of mistakenly categorizing firms genuinely associated with organized crime as non-Mafia entities. Accordingly, Panel D excludes firms headquartered in Mafia-origin regions. Again, the results are overall similar as those in Panel B, with slightly stronger effects on operating performance. Finally, in Panel E, we exclude firms that have appointed top executives with surnames already disclosed as ‘Mafiosi’ in the DIA report. This precaution mitigates the possibility that firms may endogenously select top executives with mafia-related surnames to gain economic benefits. In this empirical setting, firms are classified as mafia-surname firms in year t because their top executives happen to share the same surname as mafia clan members disclosed by the DIA report for the first time in the same year. The results are consistent with those reported in Panel A.

In an additional analysis, we consider the reputation of Mafia-surname firms. Notably, newly established firms are often less known among other businesses. Consequently, we argue that these firms are more susceptible to being mistakenly associated with the Mafia. Consistent with these considerations, Table A.2 reveals that the impact of Mafia surnames is more pronounced for young firms, particularly concerning *Sales Growth* and *WW-constrained* variables.

4.2 Additional tests

We run further tests to corroborate our findings. First, to ensure that our baseline results are not driven by sample variation, we perform a placebo test by randomizing the assignment of treatment (with no replacement) chosen from the sample period between 2000 and 2018 for the matching sample. We estimate the effect of pseudo-treatment with the full set of control variables as presented in the baseline model. We store the estimated coefficient of *Mafia-*

surname Peers and repeat this procedure 1,000 times to generate the distribution of the placebo estimates (mean, standard error, and relevant percentiles). Table 5 shows that the estimated coefficient is not significant, suggesting that the baseline findings are not driven by chance or by other omitted firm-level characteristics.

[Insert Table 5 about here]

We also perform a dynamic treatment analysis on the outcome variable across treated and control firms over time around the event, i.e., the first year in which one of the peer firms is associated to Mafia based on the Mafia-surname of its top executive. This analysis enables us to assess whether observed changes to outcome variables already occur prior to the DIA disclosure. In this case our results could capture a pre-existing trend. Figure 3 presents the results. As shown, we do not find any significant effect for the main variable of interest *Mafia-surname Peers* in the period before the DIA disclosure. This is consistent with the parallel trend assumption.

[Insert Figure 3 about here]

In addition, we exclude peer firms operating in the same industry and areas as Mafia-surname firms with executives who were born in the region (i.e. Calabria region) where criminal organizations are more likely to have stronger family ties rather than affiliation ties (Miranda et al., 2022). Table A.3 shows the results are consistent with the finding of Table 4.

Next, we also control for the popularity of Mafia surnames. Indeed, it is more likely that an executive with a less popular surname will be mistaken for a real Mafioso. Thus, we add to the baseline model the variable *Mafia rare surnames* that is a dummy variable equal to 1 if the frequency of the surname is ranked as the bottom 10% percentile among all the surnames in the data sample, and 0 otherwise. For this analysis, we only consider the areas (i.e., municipality)

with at least one Mafia-surname firm. Table A.4 shows that the effect of the Mafia surnames is generally stronger for rare surnames.

Furthermore, given the concern that the last semi-annual DIA report becomes publicly available in the first part of the following year, we highlighted that the outcomes of the yearly activities conducted by the Anti-Mafia Investigation Division, as reported in the DIA report, receive media coverage in due course. However, it could also be the case that certain information related to Mafia clans garner more public attention once the DIA report is published. In this scenario, the DIA report might exert an economic effect upon publication. To account for this, we lag the Mafia-surname peers to account for the fact that Table A.5 shows the results with lagged Mafia-surname peers dummies, which align with those reported in Table 4.

5. Economic benefits for Mafia-surname firms

In this section, we concentrate on the liquidity extensions received by firms with Mafia-associated surnames as a potential mechanism illustrating how fear can compromise inter-firm relationships. Specifically, we focus on the potential mechanism of firms' liquidity transfer, represented by trade credit. Section 5.1 presents the test and discusses the related findings; Section 5.2 focuses on criminal infiltration and origins, while Section 5.3 deals with hold-up problem. Finally, Section 5.4 deals with other robustness checks.

5.1 How does the fear factor influence liquidity transfer between firms?

In this section, we explore how and to what extent firms may respond to the perceived threat and fear generated by the potential presence of Mafia in related businesses. To test this effect, we investigate whether Mafia-surname firms receive additional liquidity resources from trade

partners. To this purpose, we analyze the effect of the disclosure of new Mafia clans' surnames (based on DIA reports) on the *Payables to COGS* ratio (*PtC*) of firms that are found to be Mafia-surname firms. The equation is given as the following:

$$PtC_{i,t} = \beta_0 + \beta_1 \text{Mafia-surname firm}_{i,t} + \beta_2 \text{Top-Executives-Origin}_{i,t} + \beta_3 W_{i,t-1} + \delta_i + \eta_t + \varepsilon_{i,t} \quad \text{Eq. (2)}$$

where the dependent variable, *PtC*, measures the amount of trade credit extended to firm *i* at time *t* as a percentage of its yearly purchases (proxied by the cost of goods). The *treatment* now is *Mafia-surname firm* which is a dummy variable that equals to one if firm *i* in year *t* is a Mafia-surname firm, i.e., satisfying the two conditions mentioned in Section 3.2; and zero otherwise. *Top Executives Origin* equals to one if the firm's top executive is born in one of the Mafia-origins regions, and zero otherwise. *W* is the vector of firm characteristics at time *t-1* including *Size*, *Age*, *Leverage Profitability*, *Tangibility*, *Cash*, and *Receivables*.²⁴ We also incorporated firm and year fixed effects to avoid a potential bias from the omission of unobservable firm-specific and time-specific characteristics. Standard errors are clustered at the province level (NUTS 3 level).

We estimate Eq. (2) both using the entire sample and a *matched* sample. The aim of the matched sample analysis is to consider the possibility that Mafia-surname firms may be associated with some fundamental characteristics possibly affecting our estimations. To address this potential selection bias, we employ a matching technique to construct suitable control/treatment samples for the comparison of trade credit mechanisms. Specifically, for each *treated* firm, we identify the *treatment year* in which the top executive's surname is associated for the first time with Mafia surnames (based on DIA reports). Then, for each treated firm, we select up to five *control* firms from the same industry and province that are closest in terms of

²⁴ See Table A.1 in the Appendix for a detailed description of all the variables employed in this study.

size (total assets) in the year prior to the treatment year. By considering firms within the same province and industry we limit the possibilities that firms in the treated and control groups are exposed to different local supply chain characteristics and conditions.

We also rerun the analysis using a three-years window setup - to limit the analysis of Mafia surnames to a window period. Next, we also assign zeros to *Mafia-surname firm* if the firm has appointed a top executive whose surname coincides with one of those already disclosed by DIA reports in previous years. This allows to control for the possibility that our findings are driven by top executive's turnover rather than the disclosure of new Mafia surnames.²⁵ Alternatively, to exclude the effect of turnover among top executives and isolate the effect of DIA disclosure, we also refine the sample to only include top executives that have been in charge of the firm since the beginning of the sample period. This should also mitigate the possibility that our findings are driven by missing information on top executive's turnover.²⁶ Finally, we employ the *PtC* deviation from its average industry-region-year level as an alternative dependent variable. This further alleviates possible concerns that firms in the treated and control groups may be exposed to different local industrial conditions.

Table 6 implements the identification strategy of Eq. (2) based on the different settings mentioned above: the entire sample (Column 1); the matched sample (Column 2); the three-year window setup (Column 3); alternative definition of the main variable of interest (Column 4); the subsample of firms without top executives' turnover (Column 5); and *PtC* deviation from average values by industry-region-year as an alternative dependent variable (Column 6). Our findings in Table 6 show that firms receive greater trade credit supply when their top executives

²⁵ In an unreported test, we also exclude these firms from our sample. The main result holds. The table is available upon request.

²⁶ As pointed out by Bedendo et al. (2020), Orbis reports the latest available information on the composition of firm's top executives. We retrieve the latest available data on board composition (as of July 2020).

are found to share their surnames with new Mafia organizations' members disclosed by DIA reports. Specifically, *Mafia-surname firm* dummy is significantly and positively related to *PtC*. The effect is also economically significant; for example, an increase of 6.3 percentage points in *PtC* (as reported in column 1) is corresponding to an extension of the payment delay by about 23 days (obtained by multiplying the estimated coefficient by 365). Similar results are found when estimating Eq. (2) based on the matched sample (column 2) and the three-years window setup (column 3), recurring to an alternative definition of *Mafia-surname firm* (column 4), removing firms with top executive's turnover over the period of investigation (column 5), and considering an alternative measure of *PtC* (column 6). In the remainder of the paper, we refer to the full and matched sample specifications (columns 1 and 2) as the main models.

[Insert Table 6 about here]

The results of Table 6 suggest that suppliers may mistakenly link Mafia-surname firms with organized crime. As a result, it seems that suppliers are induced to extend more trade credit to Mafia-surname customers to mitigate potential repercussions arising from "bad choices", such as not demonstrating sufficient flexibility towards firms suspected of Mafia connections. This finding also suggests that customers' top executives are not aware of the effect induced by their Mafia surnames. Otherwise, they could decide to shorten their payment duration to preserve their reputation.

5.2 Criminal infiltration and origins

In this section we explore whether the effect of Mafia surnames is stronger when there could be more severe asymmetric information regarding the real identity of Mafiosi. Thus, we focus on firms located in Central-Northern regions as previously explained. Consistent with our conjecture, Table 7 shows that the effect of clans' surname disclosure derives from firms located

in Central-Northern regions, while the effect disappears for Mafia-origins regions. Interestingly, *Top Executive Origin* dummy is negatively related to *PtC*, suggesting that suppliers have less trust in customers whose top executive is born in one of the Mafia-origins regions. Conversely, *Top Executive Origin* dummy is positively and significantly related to *PtC* in Mafia-origins regions. A plausible explanation is that payments in these regions are generally delayed to a greater extent and, possibly, on a friendly or relational basis (suppliers with a shared geographical origin).

[Insert Table 7 about here]

Based on the previous result, in the next robustness checks we only consider firms located in in Central-Northern regions. First, we split these firms according to the level of Mafia infiltration in the business at the provincial level (See Figure 4 for details). Our expectation is that the behavioral bias is stronger in the provinces where the threat of Mafia infiltration or retaliation is more credible. To account for the presence and importance of Mafia in the local economy, we employ the Transcrime Mafia Index (TMI) which measures the territorial Mafia infiltration based on military occupation and the Mafia's dominance in the illegal goods and services activities.²⁷ We use the median of the TMI distribution at the provincial level to distinguish between provinces with and without high Mafia infiltration.

[Insert Figure 4 about here]

Panel A of Table 8 shows that the estimates for *Mafia-surname firm* are only significant in the case of a *High Mafia Index* (columns 2 and 4), suggesting that the effect of Mafia surnames on trade credit extension can only be detected in the provinces with a greater infiltration of Mafia-type organizations. Similarly, in Panel B we split the sample according to

²⁷ The TMI employs the records of those convicted of being in a Mafia-type organizations according to Law 646 and art.416- bis, murders ascribed to Mafiosi, city councils dissolved because of Mafia infiltration, and assets seized due to organized crime.

whether firms are located in provinces with above-median Murders Index, i.e., High Murders Index, or in below-median one, i.e., Low Murders Index. The Murders Index is obtained as the average of the annual number of murders per total population at the provincial level during the observation period. Results in Panel B are consistent with those of Panel A.²⁸ These findings suggest that Mafia-surname firms are more likely to receive trade credit in the provinces where: i) the threat of Mafia punishment could be perceived as more concrete and probable, ii) there are more cases of murders and crime.

[Insert Table 8 about here]

5.3 Hold-up problems

In this section, we consider whether the effect of representative bias may vary with hold-up concerns which stem from product characteristics (Fee et al., 2006). This is important because if goods are more tailored to the needs of customers, such as differentiated goods, buyers should be less inclined to behave unethically.²⁹ Furthermore, both suppliers and customers are more likely to be locked-in to a specific relationship in the case of customized goods and services (Giannetti et al., 2011, Fabbri et al., 2016). This implies that suppliers facing high switching costs cannot easily replace existing undesirable customers. Consistently, we expect that the representative bias associated with Mafia surnames should be stronger in the case of customers dealing with suppliers of differentiated goods and services that are usually more likely to experience hold-up problems (e.g., Fee et al., 2006; Giannetti et al., 2011).³⁰

²⁸ Similar results are obtained when we split the sample considering the number of total crimes and the total number of receiving of / dealing in stolen goods at the provincial level. Data is retrieved from Istat.

²⁹ Customers facing high switching costs cannot easily replace existing suppliers to find compliant firms that are eager to allow delayed repayments because of the treat induced by Mafia surnames.

³⁰ Differentiated goods embed multidimensional characteristics, and therefore exhibit highly heterogeneous prices, while standardized goods tend to have a clear reference price listed in trade publications (Giannetti et al. 2011). For this reason, differentiated goods are usually more difficult to liquidate and are tailored to the needs of specific buyer.

We follow Giannetti et al. (2011) to distinguish between suppliers producing *differentiated goods* and *standardized goods*.³¹ Then, we consider a firm as using a high (low) proportion of differentiated inputs if the share of inputs that comes from sectors producing differentiated inputs is above (below) the median value of the entire sample. We follow the same procedure for standardized inputs. Table 9 confirms that the bias associated with Mafia surnames is stronger for firms dealing with a high proportion of differentiated inputs (and thus a low level of standardized inputs). The result suggests that behavioral bias is stronger in the case of goods that are more tailored to the needs of customers. This attenuates the possibility that customers replace the existing suppliers with others more eager to allow delayed repayments because of the threat induced by Mafia surnames. It also indicates that behavioral bias is stronger for suppliers that cannot easily replace existing undesirable customers.

[Insert Table 9 about here]

5.4 Robustness Checks

We run several other tests to corroborate the validity of our quasi-natural experiment. First, we focus on parallel trend and placebo test (Section 5.4.1). Next, we control for the validity of our quasi-natural experiment by checking whether firms' trade credit does not reversely affect the probability of a firm being treated (Section 5.4.2). Finally, we run additional tests for Mafia affiliation types, the construction sector where Mafia is particularly present, and firm size (Section 5.4.3).

³¹ Rauch (1999) and Giannetti et al. (2011) use the SIC code industrial classification. To run this analysis, we convert the SIC codes to NACE Rev.2 codes (2-digit), and then to the ATECO codes, the Italian industrial classification.

5.4.1 Dynamic treatment analysis and placebo test

We perform a dynamic treatment analysis that examines the timing of a firm's trade credit relative to the timing of the Mafia surnames' disclosure by the DIA semi-annual report. This analysis enables us to assess whether observed changes to trade credit extension already occur prior to Mafia surnames' disclosure by the DIA semi-annual report. In this case our results could be capturing a pre-existing trend. For the scope, we split the *Mafia-surname firm* dummy into six dummy variables based on the time interval that precedes or succeeds the publication of the DIA reports. If the assumption of parallel trends is violated, we should find that a relationship between the variable of our interest (*Mafia-surname firm*) and trade credit extension (*PtC*) already exists before the publication of the DIA report. The results of our dynamic treatment analysis in the Appendix (Table A.6) confirm that the coefficient estimates of *Mafia-surname firm* dummies before the publication of the DIA report are statistically insignificant for the entire sample, but also for the subsamples focusing respectively on firms located in Central-Northern regions and in Mafia-origins regions, suggesting no significant differences in pre-trends between the treated and control firms. This indicates that the parallel trends assumption holds (Roberts and Whited, 2013). Therefore, Mafia-surname firms' *PtC* increases significantly only after the DIA report's publication on Mafia surnames. These results mitigate the reverse causality issues. *Mafia-surname firm* dummies after the DIA release are especially significant in the case of Central-Northern regions, consistently with Table 7.

To ensure that our results are not driven by sample variation, we perform a placebo test by randomizing the assignment of treatment (with no replacement) chosen from the sample period between 2000 and 2018 for the matching sample. We estimate the effect of pseudo-treatment with the full set of control variables as presented in the model. We store the estimated coefficient of *Mafia-surname firm* and repeat this procedure 1,000 times to generate the

distribution of the placebo estimates (mean, standard error, and relevant percentiles). Table A.7 shows that the estimated coefficient is not significant, suggesting that the findings are not driven by chance or by other omitted firm-level characteristics. Finally, we have also lagged the *Mafia-surname firm* dummy in Table A.8 Results are consistent with those reported in Table 6.

5.4.2 Probability of firms being treated as Mafia-surname firms

We further check the validity of our quasi-natural experiment by checking whether firms' trade credit does not reversely affect the probability of a firm being treated. We consider as a firm's characteristics the regressors reported in Eq.(2) plus *PtC*. For this analysis, we employ a logit model. We drop the firms from the sample after they became *treated* (e.g., the surname of top executives appears for the first time in the DIA report). Estimation results in the Appendix (Table A.9) reveal that *PtC* does not significantly affect the likelihood of a firm being treated, in this way mitigating reverse causality issues.

5.4.3 Other tests

In further analyses, we explore whether our results also persist: (i) when we exclude firms whose top executives were born in areas where mafia clans have strong family ties (i.e., Calabria region); (ii) when we exclude the firms in the construction sector where the Mafia typically operates (Transcrime, 2015). Table A.10 in the Appendix shows that the main findings for both the full and matching samples also hold by excluding firms with top executives who were born in areas where mafia clans have stronger family ties (i.e., Calabria region) and firms in the sector with high mafia infiltration (such as the construction sector).

6. Alternative explanations

This section presents a battery of additional exercises carried out to mitigate alternative stories and to verify our findings on trade credit. First, we account for the possibility that our estimates can be affected by omitted variables related to top executives' and board of directors' characteristics (Section 6.1). Then, we mitigate the possibility that the effect of Mafia surnames is driven by the fact that top executives are really connected to Mafia-type organizations or pretend to relate to Mafia-type organizations by acting like 'impostors' (Section 6.2). Finally, we control for the possibilities that top executives' surnames can be typical in certain regions and therefore reflect the general attitude towards individuals coming from those areas (Section 6.3).

6.1 Characteristics of top executives and board of directors

We account for possible bias due to omitted information on either top executives' or board of directors' characteristics. As a further test, we therefore add to the model top executives' specific variables that could affect the usage of firms' trade credit. Specifically, in Columns 1 and 4 of Table 10 we control for age (*Top Executive age*), tenure (*Top Executive tenure*), and an indicator variable that takes a value of one if the top executive is female (*Top Executive female*). Similarly, in Columns 2 and 5 we repeat the estimations using board of directors' characteristics: i) average age of board of directors (*Board of Directors age*); ii) average tenure of board of directors (*Board of Directors tenure*); and iii) percentage of females in the Board of Directors (*Board of Directors female*). The estimates reported in Columns 1-2 and 4-5 of Table 10 are very similar to those in Table 6, in this way mitigating concerns over omitted variables related to governance and top executives' characteristics.

We also corroborate our estimates using an alternative set of fixed effects. We specifically consider the possibility that findings could also be affected by unobservable top executives' characteristics associated with their province of origin. In Table 10, we saturate our model by including top executives' provincial fixed effects. Columns 3 and 6 of Table 10 still show similar results.

[Insert Table 10 about here]

6.2 Real Mafiosi or 'impostors': DIA reports' coverage and social capital

In this section, we rerun our model by considering the frequency of appearances of Mafia surnames in the DIA reports. This test aims to further mitigate the possibility that top executives with Mafia surnames are genuinely related to Mafia families. We anticipate that media coverage of surnames is particularly relevant in the context of the representative bias phenomenon. Firms truly connected with Mafia organizations can extract rents from other firms through intimidating power, regardless of the media attention given to Mafia surnames. Specifically, we predict that the effect of the *Mafia-surname firm* dummy should be more pronounced for Mafia surnames that appear multiple times in the DIA reports, thus receiving more media attention. For this analysis we only focus on Central-Northern regions where the effect of Mafia surnames was found to be predominant. Consistent with our expectations, Table A.11 in the Appendix shows that *Mafia-surname firm* has a stronger impact on *PtC* for high cited (above the median) Mafia surnames than for low cited (below the median) Mafia surnames in the DIA reports.

Next, we run an additional analysis to verify whether our findings are driven by the local level of social capital, which could offer an alternative explanation to our phenomenon (e.g., Levine et al., 2018). We argue that Mafia-surname firms should be able to extrapolate rents from other firms by pretending to be related (or being related) to Mafia-type organizations in

areas with a low level of social capital. For this test, we draw on the concept of social capital implemented by Guiso et al. (2004) which encompasses two indicators at the provincial level: the efficiency of law enforcement,³² and civic engagement measured through voter turnout at referenda. Our results in Table 11 do not show any statistically significant difference between the coefficients of *Mafia-surname firm* dummy for firms in provinces with high and low levels of social capital. This suggests that Mafia surnames' effect does not emerge in provinces with weak law enforcement bodies and low resilience to organized crime.

[Insert Table 11 about here]

6.3 Excluding typical regional surnames

A further concern could be related to the fact that our main results could be affected by the general attitude towards people with a surname that is typical (more common) in Mafia-origins regions or Central-Northern regions. Although we control for the top executive origin as a regressor in the main model to mitigate such an issue, we run a further test to detect whether our findings are driven by surnames that are more frequent in certain geographic areas. In Columns 1 and 3 of Table 12, we rerun Eq. (2) after excluding from the sample all surnames that are typical in Mafia-origins regions (but not in Central-Northern regions). In Columns 2 and 4 of Table 12, we additionally exclude surnames that are typical in Central-Northern regions (but not in Mafia-origins regions). For this analysis, we define as *typical surnames* those belonging to the last decile of the distribution of all the surnames in our sample, considering

³² Data are retrieved from ISTAT. The court inefficiency reflects the mean number of years it takes to complete a first-degree trial by the courts located in a province. We identify provinces with Low (High) Judicial Inefficiency if the average number of years to complete the first-degree trial for all the courts located in those provinces is below (above) the national median value.

Mafia-origins regions and Central-Northern regions separately. Table 12 shows that the results are still consistent with those of the model in Table 6 for both the full and the matched samples.

[Insert Table 12 about here]

7. Concluding remarks

In this work, we intend to shed new light on organized crime's disruptive effect on the correct functioning of the economy, mainly caused by its tendency to control society using coercive power and by imposing a state of fear. We specifically offer new evidence on the fact that the mere *perception* of a threat posed by organized crime may deteriorate the business environment by instilling fear and apprehension in the relationships between firms and, consequently, distorting their financial transactions, even in the absence of direct evidence of criminal activities. We test this by using the semi-annual publication of the Anti-Mafia Investigative Directive (DIA) on Italian Mafia families' surnames as an exogenous shock. Our findings show that firms located in the same industry and area of firms whose top executives happen to have the same surname of Mafiosi experience a decrease in operating performance, sales growth and leverage, and are more likely to be financially constrained. Our results are robust to several tests.

To show in depth how Mafia-induced fear can jeopardize the economic performance, we then focus on inter-firm relationships and the liquidity transfer between firms. On this matter, we argue that firms whose top executives are found to share the same surname as known Mafiosi possess increased bargaining power with vis-à-vis their suppliers, leading to greater access to trade credit. Our findings confirm that Mafia-surname firms implicitly obtain a payment delay from their suppliers. Quantitatively, Mafia firms experience greater trade credit extension (e.g., a higher *payable to cost of goods* ratio) of about six percentage points, which corresponds to 23

days of payment delay in the post-DIA report's disclosure. This effect is more pronounced in Central-Northern regions and, particularly, in the provinces with a high Mafia infiltration, where the threat of Mafia punishments is perceived as more likely. The results of this study are robust to endogeneity concerns, different sample selection criteria, omitted variables related to top executives' and board of directors' characteristics, alternative treatment's specification, validation and placebo tests, and the use of different empirical specifications.

Our findings suggest that Mafia reputation can, *per se*, jeopardize firms' economic decisions and alter the correct functioning of the competitive forces in the industrial markets. Our study offers important suggestions to policy makers. First, policies against criminal organizations should aim to weaken the roots of the social consensus achieved through Mafia investment in the legal economy. Policy makers could, for example, consider strengthening Anti-Mafia Law Enforcement, but also promoting initiatives aimed at consolidating the relationship between institutions and citizens so that communities are not left vulnerable to criminal groups. Then, one possibility could also be to further strengthen and diffuse the use of anti-Mafia certification which provides a guarantee that the entrepreneurs and family members living with them have not been convicted of Mafia-type crimes, criminal association, or other serious crimes. In some countries (e.g., Italy) such certification is now only mandatory for firms that intend to participate in public contracts and other suppliers of services provided by Public Administrations. More information from the authorities and industrial associations on the initiatives aimed at contrasting Mafia activities and infiltration would certainly reduce the intimidating power of Mafia-type organizations.

Future research avenue might consider additional mechanisms through which the fear of Mafia can deteriorate the correct functioning of the market. Additional attention could also be

diverted to the supplier-customer relationship characteristics to underpin further possible mechanisms associated with criminal organizations.

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Figure 1: Media attention for DIA Report

This figure reports different national and local articles discussing DIA reports.

la spia
HOME CRONACA LE INCHIESTE DI "LA SPIA" CULTURA I BLOG DI "LA SPIA"
Mafia a Palermo, la Dia disegna la mappa: Al comando 8 mandamenti e 33 famiglie
13 Apr 2022 11:38
Di Paolo Borromedi
La Dia ha appena pubblicato un'indagine che mostra come sono cambiati i mandamenti di controllo nel 2021. In che modo? Con il rafforzamento di alcuni e la riduzione di altri. Il risultato è una mappa che mostra il territorio di Palermo diviso in 8 mandamenti e 33 famiglie.

sky tg24 ISRAELE-HAMAS MANOVRA
CRONACA News Approfondimenti Numeri Panchi
CRONACA
Relazione Dia: 'ndrangheta dominante della scena criminale, mafie operano sul web
14 set 2023 - 07:52

la spia
HOME CRONACA LE INCHIESTE DI "LA SPIA" CULTURA I BLOG DI "LA SPIA"
La mafia in Sicilia, la nuova mappa: le famiglie, i clan, i mandamenti per Provincia
13 Apr 2022 11:38
Di Paolo Borromedi
sky tg24 ISCRIZIONI A SKY 20 ANNI
CRONACA News Approfondimenti Numeri Panchi
CRONACA
Mafia, relazione Dia: "Meno violenza ma più infiltrazioni in economia"
07 apr 2022 - 07:58
Destinatario già condannato per mafia, estorsione, usura e altro
ORA IN UN'INCHIESTA DELLA REGIONE AISA
ANSAcheck
RIPRODUZIONE RISERVATA

Avvenire.it
PAPA NEWSLETTER OPINIONI ECONOMIA
Home - Attualità
Il rapporto. La Dia: mafie sempre più infiltrate nell'economia
13 Apr 2022 11:38
Ascolta
PALERMO TODAY
Avvenire.it
La nuova mafia a Palermo, ecco chi comanda: 'Quindici mandamenti gestiti da 81 famiglie'
La Dia ha appena pubblicato un'indagine che mostra come sono cambiati i mandamenti di controllo nel 2021. In che modo? Con il rafforzamento di alcuni e la riduzione di altri. Il risultato è una mappa che mostra il territorio di Palermo diviso in 8 mandamenti e 33 famiglie.
DIA
CRONACA
Catania, "buco" da 10 milioni in casa di cura: 5 arresti
L'inchiesta sulla gestione dei fondi regionali ha evidenziato una presunta associazione a...
10 lug - 07:43

Figure 2: Google trend of new mafia surnames after the publication of DIA report

We utilized Google Trends to investigate whether there was an increase in public attention for mafia surnames first disclosed in the DIA reports. The value equal to zero on the horizontal axis refers to the year of DIA report publication. In our Google search analysis, we combined all mafia surnames with the terms 'famiglia,' 'gruppo,' and 'clan,' which are widely used keywords in the context mafia in Google Trends. Panel a: *All keywords* reports the aggregate hits for all the mafia-surnames combined with all the keywords (“famiglia”, “gruppo” and “clan”).

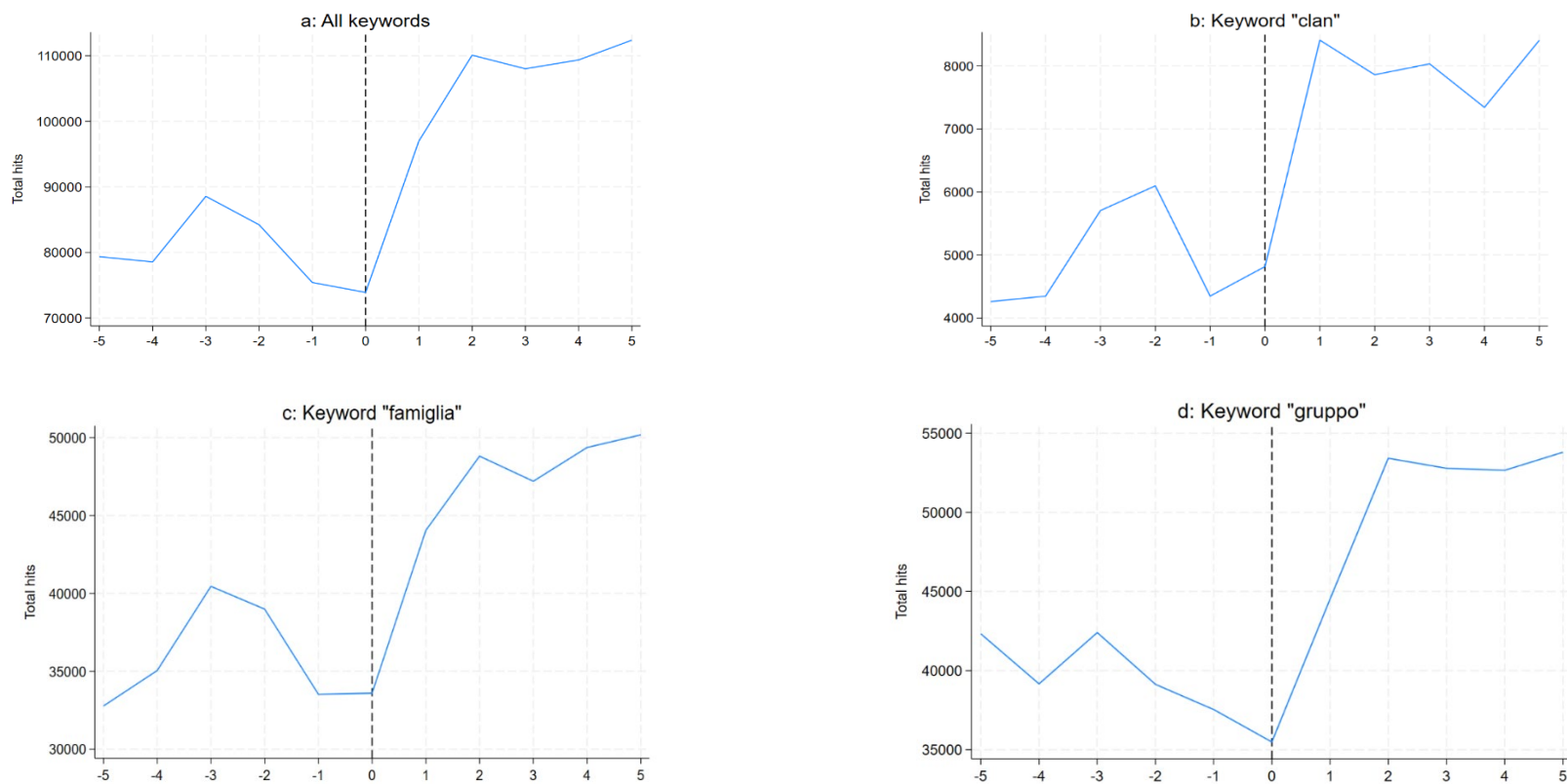


Figure 3: Dynamic treatment analysis

This figure reports the dynamic treatment analysis of the results in Table 4 Panel A. *Time around the Event* is represented in the horizontal axis, where the *event* is the first year in which there is at least one mafia-surname firm in the same area and industry as firm *i*. The dependent variables are *Operating Performance*, *Sales Growth*, *Long-term Leverage*, *WW Constrained*, and *Employees/TA*. Confidence intervals are represented at the 10% level. Variables' definitions are provided in Table A.1.

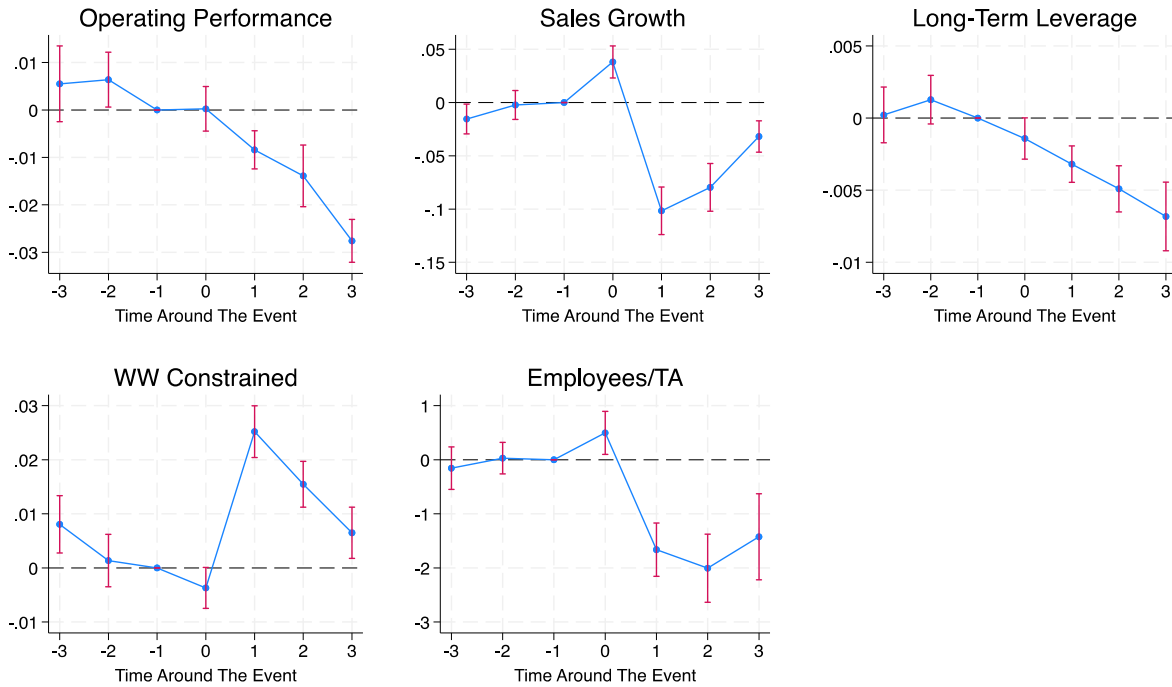


Figure 4: Mafia index

This figure shows the geographical distribution of the Transcrime Mafia Index (TMI), indicating Mafia presence at the provincial level.

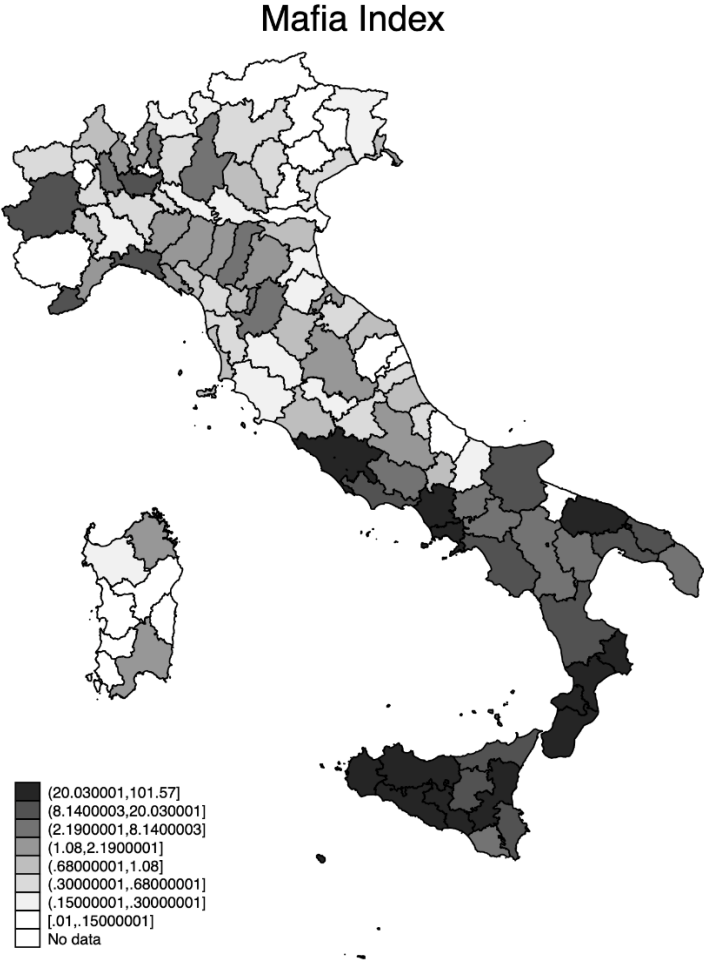


Table 1: Sample Description

This table presents the percentage of Mafia-surname firms and other firms for both the full and matching samples by i) NACE Rev.2 section and ii) Macro-region and Legal form type. The reference period is 2000 to 2018. The matching sample has been employed for Eq.2 (trade credit analysis).

	Full Sample				Matching Sample			
	Mafia-surname firms		Other firms		Mafia-surname firms		Other firms	
<i>NACE Rev.2 section</i>	# Firms	Per cent	# Firms	%	# Firms	Per cent	# Firms	%
Manufacturing	1,290	16.9	74,454	19.3	753	13.6	2,351	11.9
Construction	1,562	20.4	66,206	17.2	1,275	23.0	4,839	24.6
Wholesale and retail trade	2,360	30.9	96,200	25.0	1,853	33.5	6,050	30.7
Transportation and storage	440	5.8	15,780	4.1	297	5.4	1,073	5.4
Accommodation and food service activities	496	6.5	23,044	6.0	367	6.6	1,436	7.3
Information and communication	72	0.9	4,208	1.1	43	0.8	160	0.8
Real estate activities	532	7.0	58,756	15.2	407	7.3	1,745	8.9
Professional, scientific, technical and other act.	895	11.7	46,755	12.1	544	9.8	2,052	10.4
Total	7,647	100.0	385,403	100.0	5,539	100.0	19,706	100.0
<i>Italian Macro-region</i>								
North	1,810	23.7	222,507	57.7	1,083	19.6	4,982	25.3
Center	832	10.9	96,740	25.1	517	9.3	2,382	12.1
South	5,005	65.5	66,156	17.2	3,939	71.1	12,342	62.6
Total	7,647	100.0	385,403	100.0	5,539	100.0	19,706	100.0
<i>Legal form</i>								
Private limited companies	6,923	90.5	352,495	91.5	5,147	92.9	18,424	93.5
Public limited companies	362	4.7	12,597	3.3	144	2.6	342	1.7
Partnerships	254	3.3	15,480	4.0	194	3.5	742	3.8
Other legal forms	108	1.4	4,831	1.3	54	1.0	198	1.0
Total	7,647	100.0	385,403	100.0	5,539	100.0	19,706	100.0

Table 2: Descriptive statistics

This table presents the summary statistics of all the main variables in this study. The sample spans the 2000-2018 window. All variables obtained as ratios based on Orbis or AIDA data are winsorized within the 1st and 99th percentiles. See Table A.1 for variables' definitions. Normalized difference refers to the difference in mean values between the subsample of Mafia-surname firms and other firms. Normalized difference is obtained according to the definition in Imbens and Woolridge (2009).

Variable	#Obs.	Whole Sample					Mafia-surname firms	Other firms	Normalized diff.
		Mean	St. Dev.	p25	Med	p75	Mean	Mean	
<i>Firm characteristics</i>									
Mafia-surname peers	2,120,538	0.14	0.35	0.00	0.00	0.00	-	-	-
Mafia-surname firm	2,191,466	0.01	0.11	0.00	0.00	0.00	-	-	-
Operating Performance	2,191,466	0.04	0.31	0.01	0.04	0.11	0.04	0.04	-0.01
Sales Growth	2,191,466	0.11	0.60	-0.09	0.00	0.17	0.10	0.11	-0.00
Long-Term Leverage	2,191,071	0.08	0.15	0.00	0.00	0.11	0.07	0.08	-0.05
WW-constrained	2,190,451	0.29	0.45	0.00	0.00	1.00	0.27	0.29	-0.04
Employees / TA	1,462,145	12.27	19.09	3.10	6.50	13.20	11.92	12.28	-0.01
Payables to COGS (<i>PtC</i>)	2,191,466	0.60	1.35	0.16	0.29	0.49	0.67	0.60	0.04
Size	2,191,466	1.89	0.24	1.74	1.90	2.05	1.90	1.89	0.05
Age	2,191,466	2.58	0.73	2.08	2.56	3.14	2.54	2.58	-0.04
Leverage	2,191,466	0.19	0.21	0.00	0.12	0.33	0.17	0.19	-0.08
Profitability	2,191,466	0.05	0.11	0.01	0.04	0.08	0.05	0.05	-0.01
Tangibility	2,191,466	0.24	0.28	0.03	0.11	0.36	0.20	0.24	-0.09
Cash	2,191,466	0.11	0.15	0.01	0.04	0.15	0.11	0.11	0.01
Receivables	2,191,466	0.38	0.53	0.08	0.26	0.45	0.41	0.38	0.04
<i>Top executive characteristics</i>									
Top Executive origin	2,191,466	0.17	0.37	0.00	0.00	0.00	0.96	0.15	1.98
Top Executive age	2,191,466	52.55	12.80	43.00	51.00	61.00	50.91	52.59	-0.09
Top Executive tenure	2,191,466	6.67	5.85	2.00	5.00	10.00	7.43	6.66	0.09
Top Executive female	2,191,466	0.19	0.39	0.00	0.00	0.00	0.18	0.19	-0.03
<i>Board characteristics</i>									
Board of Directors age (avg)	2,191,466	52.39	12.42	44.00	51.33	61.00	50.88	52.42	-0.09
Board of Directors tenure (avg)	2,191,466	6.72	5.79	2.00	5.00	10.00	7.64	6.70	0.11
Board of Directors female (avg)	2,191,466	0.20	0.39	0.00	0.00	0.00	0.18	0.20	-0.04

Table 3: Correlation Matrix

This table presents the correlation matrix of the main variables in this study. The sample spans the 2000-2018 window. All variables obtained as ratios based on Orbis or AIDA data are winsorized within the 1st and 99th percentiles. See Table A.1 for variables' definitions.

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)
(1) Operating Performance	1,0000												
(2) Sales Growth	0,0598	1,0000											
(3) Long-Term Leverage	0,0571	-0,0675	1,0000										
(4) WW-constrained	-0,1086	-0,1179	-0,0952	1,0000									
(5) Employees / TA	-0,0104	0,3396	-0,1076	0,3174	1,0000								
(6) Payables to COGS	-0,0208	-0,0698	0,0923	-0,0116	-0,0633	1,0000							
(7) Size	0,0432	-0,0732	0,1758	-0,7228	-0,4634	0,0459	1,0000						
(8) Age	0,0062	-0,2459	0,0155	-0,2643	-0,3128	-0,0038	0,4038	1,0000					
(9) Leverage	0,0282	-0,0815	0,6487	-0,1323	-0,1535	0,0500	0,2103	0,0525	1,0000				
(10) Profitability	0,2840	-0,0176	-0,0844	-0,0046	-0,0081	-0,0925	-0,0272	-0,0462	-0,1391	1,0000			
(11) Tangibility	0,0934	-0,0695	0,2873	-0,1358	-0,0862	0,0979	0,1594	0,1829	0,1681	-0,0988	1,0000		
(12) Cash	0,0477	0,0808	-0,2005	0,2035	0,1678	-0,1035	-0,2842	-0,1186	-0,3383	0,2491	-0,2396	1,0000	
(13) Receivables	-0,0776	0,0294	-0,0129	-0,0383	-0,1023	0,2432	0,0245	0,0506	0,0017	-0,0888	-0,0354	-0,1597	1,0000

Table 4: Mafia-surname Peers

This table reports the regression results for the effect of the presence of at least one Mafia-surname firm in a municipality and industry NACE 4-digit on peer firms' economic outcome. Panel A controls for Firm and Year F.E, while Panel B, C and D control for region-industry-year F.E. Panel C excludes large peers' clusters, while Panel D excludes Mafia-origin regions. Panel E excludes firms who appointed top executives with mafia surnames. Standard errors are clustered at the municipality level and are reported in brackets. ***, **, and * denote statistical significance at the 1%, 5%, and 10% levels, respectively. Variables' definitions are provided in Table A.1.

	Operating Performance	Sales Growth	Long-Term Leverage	WW-constrained	Employees / TA
	(1)	(2)	(3)	(4)	(5)
PANEL A - Baseline					
Mafia-surname Peers	-0.012*** [0.003]	-0.016*** [0.005]	-0.004*** [0.001]	0.004** [0.002]	-0.522*** [0.169]
Size	0.535*** [0.008]	0.834*** [0.019]	0.168*** [0.005]	-1.419*** [0.015]	-25.050*** [0.607]
Age	-0.029*** [0.004]	-1.127*** [0.021]	-0.006*** [0.001]	0.141*** [0.003]	-13.274*** [0.388]
Cash	0.028*** [0.003]	-0.000 [0.010]	-0.019*** [0.001]	0.033*** [0.004]	4.971*** [0.204]
Firm f.e.	YES	YES	YES	YES	YES
Year f.e.	YES	YES	YES	YES	YES
Observations	2116005	2116005	2115605	2114896	1386697
r2	0.53	0.36	0.77	0.77	0.81
PANEL B - Controlling for Region-Industry-Year fixed effects					
Mafia-surname Peers	-0.005*** [0.002]	-0.030*** [0.004]	-0.002** [0.001]	0.006*** [0.002]	-0.594*** [0.107]
Size	0.536*** [0.008]	0.870*** [0.018]	0.169*** [0.005]	-1.436*** [0.016]	-24.472*** [0.613]
Age	-0.026*** [0.003]	-1.134*** [0.021]	-0.008*** [0.001]	0.145*** [0.003]	-13.106*** [0.420]
Cash	0.021*** [0.003]	0.000 [0.010]	-0.018*** [0.001]	0.034*** [0.004]	4.852*** [0.205]
Region-Industry-Year f.e.	YES	YES	YES	YES	YES
Observations	2107209	2107209	2106807	2106098	1377471
r2	0.54	0.38	0.77	0.78	0.82
PANEL C - Excluding large peers' clusters (municipality-industry-year with more than 300 obs.)					
Mafia-surname Peers	-0.004** [0.002]	-0.031*** [0.004]	-0.002* [0.001]	0.005** [0.002]	-0.603*** [0.114]
Size	0.528*** [0.007]	0.896*** [0.027]	0.164*** [0.008]	-1.445*** [0.014]	-24.302*** [0.558]
Age	-0.030*** [0.002]	-1.157*** [0.023]	-0.007*** [0.001]	0.147*** [0.003]	-12.939*** [0.300]
Cash	0.024*** [0.003]	0.001 [0.012]	-0.018*** [0.001]	0.034*** [0.004]	4.796*** [0.215]
Region-Industry-Year f.e.	YES	YES	YES	YES	YES
Observations	1963074	1963074	1962699	1962212	1316825
r2	0.54	0.39	0.77	0.78	0.82
PANEL D - Excluding Mafia-origin regions					
Mafia-surname Peers	-0.007*** [0.002]	-0.026*** [0.004]	-0.002* [0.001]	0.007*** [0.002]	-0.594*** [0.112]
Size	0.543*** [0.008]	0.876*** [0.020]	0.177*** [0.007]	-1.443*** [0.018]	-23.740*** [0.684]
Age	-0.023*** [0.003]	-1.071*** [0.027]	-0.010*** [0.001]	0.138*** [0.004]	-11.677*** [0.536]
Cash	0.019*** [0.004]	-0.005 [0.012]	-0.019*** [0.001]	0.032*** [0.004]	4.400*** [0.213]
Region-Industry-Year f.e.	YES	YES	YES	YES	YES
Observations	1858871	1858871	1858497	1857794	1200426
r2	0.54	0.37	0.77	0.78	0.82

Table 4: Mafia-surname Peers (continued)

	Operating Performance	Sales Growth	Long-Term Leverage	WW-constrained	Employees / TA
	(1)	(2)	(3)	(4)	(5)
PANEL E – Excluding firms who appointed top executives with mafia surnames					
Mafia-surname Peers	-0.011*** [0.003]	-0.015** [0.006]	-0.004*** [0.001]	0.004** [0.002]	-0.451*** [0.160]
Size	0.534*** [0.008]	0.835*** [0.020]	0.168*** [0.005]	-1.419*** [0.015]	-25.104*** [0.615]
Age	-0.029*** [0.004]	-1.128*** [0.021]	-0.006*** [0.001]	0.141*** [0.003]	-13.339*** [0.378]
Cash	0.028*** [0.003]	-0.001 [0.011]	-0.019*** [0.001]	0.034*** [0.004]	4.976*** [0.210]
Firm f.e.	YES	YES	YES	YES	YES
Year f.e.	YES	YES	YES	YES	YES
Observations	2116735	2116735	2116338	2115629	1387711
r2	0.53	0.36	0.77	0.77	0.81

Table 5: Placebo Test

This table plots the distribution of the coefficients on *Mafia-surname Peers* estimated from the placebo test by randomizing the assignment of treatment (with no replacement). We estimate the effect of pseudo-treatment with the full set of control variables as presented in the baseline model. We store the coefficient of *Mafia-surname Peers* and repeat this procedure 1,000 times to generate the distribution of the placebo estimates (mean, standard error, and relevant percentiles). *p5_left* refers to the 5th percentile of the left distribution, while *p5_right* refers to the 5th percentile of the right distribution.

	Coefficient b[<i>Mafia-surname Peers</i>] when the dependent variable is:				
	Operating Performance	Sales Growth	Long-Term Leverage	WW-constrained	Employees / TA
	(1)	(2)	(3)	(4)	(5)
Mean	-0.002	-0.003	-0.005	.0008	-.0958
S.E.	[.0011]	[.0020]	[.0004]	[.0010]	[.0528]
<i>p5_left</i>	-0.0020	-0.0030	-0.0013	-0.0009	-.1804
Median	-0.002	-0.003	-0.005	.0008	-.0982
<i>p5_right</i>	.0015	.0037	.0002	.0025	-.0076
Controls	Yes	Yes	Yes	Yes	Yes

Table 6: Mafia-surname firm and liquidity transfer

This table reports the estimation results of the baseline model. Column 1 considers the full sample; Column 2 considers the matching sample; Column 3 considers a three-years' window analysis; Column 4 assigns zeros to *Mafia-surname firm* if firm becomes Mafia-surname firms after the appointment of Top executives whose surname coincides with that of Mafiosi already disclosed by DIA reports in previous years; Column 5 considers only firms with the same Top Executives over the sample period; and Column 6 uses the *PtC* deviation from average values by industry-region-year as an alternative dependent variable. Variables' definitions are provided in Table A.1. Standard errors are clustered at the provincial level and are reported in brackets. ***, **, and * denote statistical significance at the 1%, 5%, and 10% levels, respectively.

Dependent variable: <i>PtC</i>	Full Sample	Matching Sample	[-3;+3] Window	Alternative treatment definition	Same Top Executives over the sample period	Deviations from average values by industry- region-year
	(1)	(2)	(3)	(4)	(5)	(6)
Mafia-surname firm	0.063*** [0.011]	0.040** [0.017]	0.038** [0.015]	0.068*** [0.014]	0.056** [0.026]	0.050*** [0.011]
TopExecutiveOrigin	-0.015 [0.022]	-0.043 [0.041]	-0.065 [0.059]	-0.002 [0.022]		-0.014 [0.021]
Size	-0.150*** [0.040]	-0.244*** [0.086]	-0.102 [0.153]	-0.150*** [0.040]	-0.074 [0.046]	-0.121*** [0.036]
Age	0.184*** [0.009]	0.160*** [0.025]	0.154*** [0.029]	0.184*** [0.009]	0.181*** [0.015]	0.162*** [0.011]
Leverage	-0.117*** [0.012]	-0.190*** [0.035]	-0.145*** [0.034]	-0.117*** [0.012]	-0.155*** [0.013]	-0.110*** [0.012]
Profitability	-0.255*** [0.015]	-0.236*** [0.036]	-0.219*** [0.042]	-0.255*** [0.015]	-0.221*** [0.014]	-0.239*** [0.014]
Tangibility	0.222*** [0.017]	0.264*** [0.050]	0.142*** [0.048]	0.222*** [0.017]	0.235*** [0.023]	0.194*** [0.016]
Cash	-0.006 [0.009]	-0.009 [0.040]	-0.044 [0.033]	-0.006 [0.009]	-0.005 [0.014]	-0.003 [0.008]
Receivables	0.280*** [0.017]	0.400*** [0.039]	0.252*** [0.027]	0.280*** [0.017]	0.282*** [0.020]	0.259*** [0.016]
Firm f.e.	YES	YES	YES	YES	YES	YES
Year f.e.	YES	YES	YES	YES	YES	YES
Observations	2,191,466	215,976	138,412	2,191,466	932,859	2,191,466
r2	0.65	0.63	0.70	0.65	0.64	0.63

Table 7: Central-Northern regions vs. Mafia-origins regions: full and matched samples

This table reports the estimation results of the baseline model by splitting the sample between firms located in Central-Northern regions and those in Mafia-origins regions. Variable definitions are provided in Table A.1. Standard errors are clustered at the provincial level and are reported in brackets. ***, **, and * denote statistical significance at the 1%, 5%, and 10% levels, respectively.

Dependent variable: <i>PtC</i>	Full sample		Matched sample	
	Central-northern regions	Mafia-origins regions	Central-northern regions	Mafia-origins regions
	(1)	(2)	(3)	(4)
Mafia-surname firm	0.065*** [0.017]	0.014 [0.014]	0.086*** [0.023]	0.022 [0.015]
TopExecutiveOrigin	-0.044*** [0.012]	0.202* [0.103]	-0.147*** [0.040]	0.247** [0.110]
Size	-0.140*** [0.043]	-0.209* [0.105]	-0.102 [0.104]	-0.301** [0.124]
Age	0.177*** [0.010]	0.192*** [0.023]	0.202*** [0.035]	0.127*** [0.034]
Leverage	-0.108*** [0.012]	-0.213*** [0.037]	-0.139*** [0.042]	-0.225*** [0.041]
Profitability	-0.241*** [0.014]	-0.360*** [0.024]	-0.169** [0.064]	-0.289*** [0.047]
Tangibility	0.208*** [0.017]	0.339*** [0.049]	0.221** [0.087]	0.288*** [0.060]
Cash	-0.004 [0.009]	-0.001 [0.041]	-0.032 [0.044]	0.003 [0.056]
Receivables	0.264*** [0.017]	0.367*** [0.030]	0.283*** [0.045]	0.447*** [0.040]
Firm f.e.	YES	YES	YES	YES
Year f.e.	YES	YES	YES	YES
Observations	1,910,180	281,286	70,528	145,448
r2	0.65	0.65	0.63	0.63

Table 8: Mafia presence Index and Murder Index: full and matched samples. Only for central-northern regions

This table reports the estimation results of the baseline model only for firms located in Central-Northern regions. In Panel A, we split the sample according to whether firms are in provinces with a high Mafia Index (above the median), *High Mafia Index*, or in provinces with a low Mafia Index (below the median), *Low Mafia Index*. In Panel B, we split the sample according to whether firms are in provinces with a high Murders Index (above the median), *High Murders Index*, or in provinces with a low Murders Index (below the median), *Low Murders Index*. For this analysis we consider both the full and matching samples. Variables' definitions are provided in Table A.1. Standard errors are clustered at the provincial level and are reported in brackets. ***, **, and * denote statistical significance at the 1%, 5%, and 10% levels, respectively.

	Full Sample		Matched Sample	
Panel A	Low Mafia Index	High Mafia Index	Low Mafia Index	High Mafia Index
	(1)	(2)	(3)	(4)
Mafia-surname firm	0.001 [0.073]	0.074*** [0.016]	-0.017 [0.092]	0.103*** [0.020]
TopExecutiveOrigin	0.012 [0.044]	-0.055*** [0.011]	-0.052 [0.163]	-0.158*** [0.042]
Controls	YES	YES	YES	YES
Firm f.e.	YES	YES	YES	YES
Year f.e.	YES	YES	YES	YES
Observations	609,189	1,300,991	9,058	61,470
r2	0.64	0.65	0.64	0.63
Panel B	Low Murders Index	High Murders Index	Low Murders Index	High Murders Index
Mafia-surname firm	0.036 [0.044]	0.076*** [0.016]	0.039 [0.052]	0.111*** [0.023]
TopExecutiveOrigin	-0.013 [0.030]	-0.060*** [0.013]	-0.105 [0.081]	-0.167*** [0.050]
Controls	YES	YES	YES	YES
Firm f.e.	YES	YES	YES	YES
Year f.e.	YES	YES	YES	YES
Observations	991,770	908,711	22,493	47,877
r2	0.65	0.65	0.63	0.63

Table 9: Industry characteristics

This table reports the estimation results of the baseline model for the full sample (Columns 1-2) and matched sample (Columns 3-4). Following Giannetti et al. (2011), we identify firms that rely on either *standardized goods* or *differentiated goods*. We consider a firm using a high (low) proportion of differentiated inputs if the share of inputs that comes from sectors producing differentiated inputs is above (below) the median value of the entire sample. We follow the same procedure for standardized inputs. Variables' definitions are provided in Table A.1. Standard errors are clustered at the provincial level and are reported in brackets. ***, **, and * denote statistical significance at the 1%, 5%, and 10% levels, respectively.

Panel A Relevance of differentiated inputs

Dependent variable: <i>PtC</i>	Full Sample		Matched Sample	
	Low relevance of differentiated inputs	High relevance of differentiated inputs	Low relevance of differentiated inputs	High relevance of differentiated inputs
	(1)	(2)	(3)	(4)
Mafia-surname firm	0.031 [0.025]	0.078*** [0.021]	0.023 [0.035]	0.059*** [0.018]
TopExecutiveOrigin	0.056* [0.028]	-0.020 [0.028]	0.104 [0.092]	-0.069 [0.060]
Controls	YES	YES	YES	YES
Firm f.e.	YES	YES	YES	YES
Year f.e.	YES	YES	YES	YES
Observations	1220666	465093	98612	50414
r2	0.66	0.64	0.65	0.64

Panel B Relevance of standardized inputs

Dependent variable: <i>PtC</i>	Full Sample		Matched Sample	
	Low relevance of standardized inputs	High relevance of standardized inputs	Low relevance of standardized inputs	High relevance of standardized inputs
	(1)	(2)	(3)	(4)
Mafia-surname firms	0.066*** [0.011]	0.016 [0.036]	0.044*** [0.014]	0.021 [0.042]
TopExecutiveOrigin	0.006 [0.031]	0.067 [0.047]	0.023 [0.067]	0.072 [0.137]
Controls	YES	YES	YES	YES
Firm f.e.	YES	YES	YES	YES
Year f.e.	YES	YES	YES	YES
Observations	944653	741106	83979	65047
r2	0.63	0.66	0.63	0.66

Table 10: Controlling for omitted variables for top executives' and board of directors' characteristics

This table reports the estimation results of the baseline model for the full sample (Columns 1-3) and matched sample (Columns 4-6). Columns 1 and 4 consider top executives' characteristics such as age (Top-Executive Age), tenure (Top-Executive Tenure), and gender, (Top-Executive Female). Columns 2 and 5 consider the average values of Board of Directors' characteristics such as age (Board of Directors' age (avg)), tenure Board of Directors' tenure (avg), and percentage of female directors Board of Directors female (avg). Columns 3 and 6 consider top executive province of origin FE. Variables' definitions are provided in Table A.1. Standard errors are clustered at the provincial level and are reported in brackets. ***, **, and * denote statistical significance at the 1%, 5%, and 10% levels, respectively.

Dependent variable: <i>PtC</i>	Full sample			Matched sample		
	(1)	(2)	(3)	(4)	(5)	(6)
Mafia-surname firm	0.063*** [0.011]	0.063*** [0.011]	0.063*** [0.011]	0.039** [0.017]	0.039** [0.017]	0.040** [0.017]
TopExecutiveOrigin	-0.023 [0.023]	-0.020 [0.022]		-0.048 [0.045]	-0.044 [0.044]	
Top Executive age	0.002*** [0.000]			0.002 [0.001]		
Board of Directors' age (avg)		0.002*** [0.001]			0.004* [0.002]	
Top Executive tenure	-0.000 [0.000]			-0.002 [0.002]		
Board of Directors' tenure (avg)		0.000 [0.001]			-0.002 [0.003]	
Top Executive female	-0.002 [0.013]			0.030 [0.040]		
Board of Directors' female (avg)		-0.007 [0.017]			0.051 [0.067]	
Size	-0.151*** [0.040]	-0.150*** [0.040]	-0.150*** [0.040]	-0.244*** [0.086]	-0.244*** [0.086]	-0.244*** [0.084]
Age	0.183*** [0.009]	0.183*** [0.009]	0.184*** [0.009]	0.161*** [0.025]	0.160*** [0.025]	0.159*** [0.026]
Leverage	-0.117*** [0.012]	-0.117*** [0.012]	-0.117*** [0.012]	-0.190*** [0.035]	-0.190*** [0.035]	-0.191*** [0.034]
Profitability	-0.255*** [0.015]	-0.255*** [0.015]	-0.255*** [0.015]	-0.236*** [0.036]	-0.236*** [0.036]	-0.236*** [0.036]
Tangibility	0.222*** [0.017]	0.222*** [0.017]	0.222*** [0.017]	0.263*** [0.050]	0.263*** [0.050]	0.265*** [0.050]
Cash	-0.006 [0.009]	-0.006 [0.009]	-0.006 [0.009]	-0.010 [0.040]	-0.010 [0.040]	-0.010 [0.039]
Receivables	0.280*** [0.017]	0.280*** [0.017]	0.280*** [0.017]	0.400*** [0.039]	0.400*** [0.039]	0.399*** [0.040]
Firm f.e.	YES	YES	YES	YES	YES	YES
Year f.e.	YES	YES	YES	YES	YES	YES
Top exec. province f.e.	NO	NO	YES	NO	NO	YES
Observations	2,191,466	2,191,466	2,191,466	215,976	215,976	215,976
r2	0.65	0.65	0.65	0.63	0.63	0.63

Table 11: Social Capital

This table reports the estimation results of the baseline model for the full sample (Columns 1-2) and matched sample (Columns 3-4) focusing on Northern regions. Columns 1 and 3 in Panel A consider firms located in provinces with low Judicial inefficiency, while Columns 2 and 4 consider firms located in provinces with high Judicial inefficiency. We identify provinces with Low (High) Judicial Inefficiency if the average number of years to complete the first-degree trial for all the courts located in those provinces is below (above) the national median value. Columns 1 and 3 in Panel B consider firms located in provinces with low referenda participation (above the national median participation rate), while Columns 2 and 4 consider firms located in provinces with high referenda participation (below the national median participation rate). Variables' definitions are provided in Table A.1. Standard errors are clustered at the provincial level and are reported in brackets. ***, **, and * denote statistical significance at the 1%, 5%, and 10% levels, respectively.

Panel A Judicial Inefficiency

Dependent variable: <i>PtC</i>	Full Sample		Matched Sample	
	Low Judicial Inefficiency (1)	High Judicial Inefficiency (2)	Low Judicial Inefficiency (3)	High Judicial Inefficiency (4)
Mafia-surname firm	0.065*** [0.024]	0.066** [0.030]	0.092*** [0.028]	0.078** [0.036]
TopExecutiveOrigin	-0.042** [0.018]	-0.048*** [0.015]	-0.163*** [0.055]	-0.120** [0.058]
Controls	YES	YES	YES	YES
Firm f.e.	YES	YES	YES	YES
Year f.e.	YES	YES	YES	YES
[t-test] Difference in Mafia-surname firm		0.001 [0.042]		-0.014 [0.045]
Observations	1206032	704148	45741	24787
r2	0.65	0.65	0.63	0.63

Panel B Referenda participation

Dependent variable: <i>PtC</i>	Full Sample		Matched Sample	
	Low Referenda Participation (1)	High Referenda Participation (2)	Low Referenda Participation (3)	High Referenda Participation (4)
Mafia-surname firm	0.049** [0.020]	0.099* [0.050]	0.079*** [0.025]	0.102* [0.057]
TopExecutiveOrigin	-0.060*** [0.010]	-0.006 [0.031]	-0.150*** [0.050]	-0.134* [0.072]
Controls	YES	YES	YES	YES
Firm f.e.	YES	YES	YES	YES
Year f.e.	YES	YES	YES	YES
[t-test] Difference in Mafia-surname firm		0.050 [0.046]		0.023 [0.052]
Observations	1046121	864059	51723	18805
r2	0.65	0.65	0.63	0.64

Table 12: Excluding common surnames

This table reports the estimation results of the baseline model for the full sample (Columns 1-2) and matched sample (Columns 3-4). Columns 1 and 3 exclude the surnames that are typical in Mafia-origins regions, while Columns 2 and 4 exclude the surnames that are typical both in Mafia-origins regions and central-northern regions. We consider as typical surnames those belonging to the last quintile of the distribution of all the surnames in our sample. Variables' definitions are provided in Table A.1. Standard errors are clustered at the provincial level and are reported in brackets. ***, **, and * denote statistical significance at the 1%, 5%, and 10% levels, respectively.

Dependent Variable: <i>PtC</i>	Full Sample		Matched Sample	
	Excluding surnames typical of Mafia-origins regions	Excluding surnames typical of Mafia-origins regions and surnames typical of central-northern regions	Excluding surnames typical of Mafia-origins regions	Excluding surnames typical of Mafia-origins regions and surnames typical of central-northern regions
	(1)	(2)	(3)	(4)
Mafia-surname firm	0.068*** [0.015]	0.070*** [0.016]	0.057*** [0.021]	0.051** [0.021]
TopExecutiveOrigin	-0.031 [0.033]	-0.015 [0.046]	-0.044 [0.052]	0.023 [0.074]
Size	-0.143*** [0.042]	-0.128*** [0.046]	-0.114 [0.099]	-0.144 [0.117]
Age	0.179*** [0.009]	0.178*** [0.011]	0.141*** [0.029]	0.143*** [0.029]
Leverage	-0.113*** [0.012]	-0.117*** [0.013]	-0.181*** [0.036]	-0.195*** [0.043]
Profitability	-0.252*** [0.015]	-0.268*** [0.016]	-0.244*** [0.041]	-0.263*** [0.046]
Tangibility	0.217*** [0.018]	0.213*** [0.021]	0.236*** [0.054]	0.236*** [0.051]
Cash	-0.003 [0.010]	-0.001 [0.012]	-0.010 [0.050]	-0.012 [0.058]
Receivables	0.273*** [0.017]	0.285*** [0.016]	0.365*** [0.033]	0.381*** [0.029]
Firm f.e.	YES	YES	YES	YES
Year f.e.	YES	YES	YES	YES
Observations	1,982,810	1,1598,60	150,832	124,015
r2	0.65	0.65	0.64	0.64

Appendix A

Figure A.1: An example of a DIA report for one NUTS3 region (i.e., Provincia di Caserta in Campania (NUTS2 region).

This map reports the areas (in the squared frame) where a clan (the clan's name is in capital letter and bold) is active. For example, the "Amato" clan is active in the following areas: "Santa Maria Capua Vetere, San Tammaro, San Prisco, Curti, Macerata Campania etc.



Source: DIA semi-annual report, 2013. Note: This figure reports the list of Mafia surnames in capital and bold letters for the province of Caserta.

Figure A.2: An example of the text in the DIA report

Il clan “CAPRIATI”, unitamente all’emergente frangia criminale costituita dal gruppo “RIZZO - LORUSSO”, seguirebbe a contrastare l’espansionismo della consorteria “STRISCIUGLIO - DE FELICE-CALDAROLA”, per il controllo delle attività illecite in alcuni quartieri del capoluogo.

Nel quartiere San Paolo i gruppi rivali “TELEGRAFO - MONTANI” e “DIOMEDE - MERCANTE”, artefici già dal 2002 di una lunga disputa armata, hanno ripreso a fronteggiarsi con l’intento di assumere il controllo delle attività illecite nel quartiere.

Source: DIA semi-annual report, 2013. Note: The Mafia surnames are directly reported in capital letters for the reports published before 2012.

Table A.1: List of variables

Variable	Description	Source
<i>Firm characteristics</i>		
Mafia-surname Peer	It is a binary dummy, is a dummy variable equal to one if firm i is in the same municipality and industry as at least one Mafia-surname firm, and zero otherwise. Peer firms are those operating in the same industry (4 digits) and municipality (<i>Comune</i>).	Our computation on Anti-Mafia Investigative Directive (DIA) reports and AIDA-BvD data
<i>PtC</i> - Payables to Cost of Goods	Creditors to Cost of Goods Sold ratio. Creditors is the volume of accounts payable, e.g., debt to suppliers	Our computation on AIDA-BvD data
Size	Total Assets in logarithms	Our computation on AIDA-BvD data
Age	Firm's age based on its year of incorporation	Our computation on AIDA-BvD data
Long-Term Leverage	Long-term Debt divided by Total Assets. In the BvD dataset, Long-term Debt is defined as long-term financial debts (e.g., to credit institutions (loans and credits), bonds)	Our computation on AIDA-BvD data
Short-term Leverage	Loans divided by Total Assets. In the BvD dataset, Loans are defined as short-term financial debts (e.g., to credit institutions + part of long-term financial debts payable within the year)	Our computation on AIDA-BvD data
Leverage	Sum of Loans and Long-term Debt divided by Total Assets. In the BvD dataset, Long-term Debt is defined as long-term financial debts (e.g., to credit institutions (loans and credits), bonds)	Our computation on AIDA-BvD data
Operating Performance	Operating Profit over Operating Revenues (Sales)	Our computation on AIDA-BvD data
Profitability	Operating Profit over Total Assets	Our computation on AIDA-BvD data
Sales Growth	Annual change in Operating Revenues (Sales) divided by the lagged level of Total Assets	Our computation on AIDA-BvD data
Tangibility	Tangible Fixed Assets over Total Assets	Our computation on AIDA-BvD data

Cash	Cash and Cash Equivalent over Total Assets	Our computation on AIDA-BvD data
Receivables	Debtors to Sales ratio. Debtors is the volume of accounts receivable, e.g., trade receivables from clients and customers	Our computation on AIDA-BvD data
WW-constrained	We identify financially constrained firms as firms whose WW index is ranked cross-sectionally in the top tercile and construct a binary variable accordingly. WW Index is built mirroring the approach proposed by Whited and Wu (2006) as: $-0.091 \times \text{cashflow}/\text{total_assets} - 0.044 \times \ln(\text{total_assets}) + 0.102 \times \text{sales_growth_avg} - 0.035 \times \text{sales_growth}$, where <i>sales_growth_avg</i> is the average value of Sales Growth in the same industry (3 digits) and year.	Our computation on AIDA-BvD data
Number of Employees to Total Assets	Number of Employees divided by Total Assets, with the total assets measured at the beginning of the year	Our computation on AIDA-BvD data
<i>Top Executives' characteristics</i>		
Mafia-surname firm	It is a binary dummy equal to one if the firm's Top Executive i) has the same surname of that of Mafiosi disclosed by DIA reports; and ii) was born in one of the regions of the Mafia-origins regions (Sicily, Apulia, Campania, Basilicata, or Calabria); and zero otherwise.	Our computation on Anti-Mafia Investigative Directive (DIA) reports and AIDA-BvD data
Top Executive Origin	It is a binary dummy equal to one if the firm's Top Executive is born in one of the Mafia-origins regions (Sicily, Apulia, Campania, Basilicata, or Calabria).	Our computation on Anti-Mafia Investigative Directive (DIA) reports and AIDA-BvD data
Top Executive age	Age of the Top Executive based on information about her/his date of birth.	Our computation on AIDA-BvD data
Top Executive tenure	Tenure of the Top Executive is calculated by the number of years she/he spent in office in that firm based on information about her/his appointment date.	Our computation on AIDA-BvD data
Top Executive female	It is a binary dummy equal to one if the firm's Top Executive is a female.	Our computation on AIDA-BvD data

Typically surnames in Mafia-origins regions	Accounts receivable to sales ratio	Our computation on AIDA-BvD data
Typically surnames in Mafia-origins regions and central-northern regions	Accounts receivable to sales ratio	Our computation on AIDA-BvD data
<i>Board of Directors' characteristics</i>		
Board of Directors age (avg)	Average age of the members of the Board of Directors based on information about their date of birth.	Our computation on AIDA-BvD data
Board of Directors tenure (avg)	Average tenure of the members of the Board of Directors, calculated by the number of years they have spent in office in that firm based on information about their appointment date.	Our computation on AIDA-BvD data
Board of Directors female (avg)	Percentage of females in the Board of Directors.	Our computation on AIDA-BvD data
<i>Regional Characteristics</i>		
Low/High Mafia Index	Italian provinces are classified as "Low Mafia Index" if the value of the Index is below the median, and "High Mafia Index" if the value is above the median. The Transcrime Mafia Index (TMI) is a measure of the Mafia presence at the provincial level.	Our computation on Transcrime Mafia Index (TMI)
Mafia-origins regions	Sicily, Apulia, Campania, Basilicata, and Calabria.	Based on Anti-Mafia Investigative Directive (DIA) reports
Central-northern regions	All Italia regions excluding the Mafia-origins regions (see above).	Based on Anti-Mafia Investigative Directive (DIA) reports

Table A.2: Young Mafia-surname Peers (<= 5 years)

This table reports the regression results for the effect of the presence of at least one Mafia-surname firm in a municipality and industry NACE 4-digit on peer firms' economic outcome. *Young Mafia-surname Peer* is a dummy variable equal to 1 if the youngest mafia-surname peer is not older than 5 years. Standard errors are clustered at the municipality level and are reported in brackets. ***, **, and * denote statistical significance at the 1%, 5%, and 10% levels, respectively. Variables' definitions are provided in Table A.1.

	Operating Perf.	Sales Growth	Long-Term Leverage	WW- constrained	Employees /TA
	(1)	(2)	(3)	(4)	(5)
Mafia-surname Peers	-0.011*** [0.003]	-0.015*** [0.005]	-0.004*** [0.001]	0.003* [0.002]	-0.545*** [0.170]
Mafia-surname Peers* Young Mafia-surname Peer	-0.005 [0.008]	-0.007* [0.004]	0.000 [0.000]	0.004*** [0.001]	0.129 [0.127]
Size	0.535*** [0.008]	0.835*** [0.020]	0.168*** [0.005]	-1.419*** [0.015]	-25.050*** [0.606]
Age	-0.029*** [0.004]	-1.127*** [0.021]	-0.006*** [0.001]	0.141*** [0.003]	-13.274*** [0.389]
Cash	0.028*** [0.003]	-0.000 [0.010]	-0.019*** [0.001]	0.033*** [0.004]	4.970*** [0.204]
Firm f.e.	YES	YES	YES	YES	YES
Year f.e.	YES	YES	YES	YES	YES
Observations	2116005	2116005	2115605	2114896	1386697
r2	0.53	0.36	0.77	0.77	0.81

Table A.3: Mafia-surname Peers – Accounting for areas where Mafia clans have strong family ties.

This table reports the regression results for the effect of the presence of at least one Mafia-surname firm in a municipality and industry NACE 4-digit on peer firms' economic outcome. The sample excludes peer firms in the same industry and municipality as Mafia-surname firms with top executives who were born in areas where mafia clans have strong family ties (i.e., Calabria region). Standard errors are clustered at the municipality level and are reported in brackets. ***, **, and * denote statistical significance at the 1%, 5%, and 10% levels, respectively. Variables' definitions are provided in Table A.1.

	Operating Performance	Sales Growth	Long-Term Leverage	WW-constrained	Employees /TA
	(1)	(2)	(3)	(4)	(5)
Mafia-surname Peers	-0.012*** [0.003]	-0.015*** [0.004]	-0.004*** [0.001]	0.004** [0.002]	-0.603*** [0.169]
Size	0.535*** [0.008]	0.835*** [0.018]	0.168*** [0.005]	-1.419*** [0.015]	-25.033*** [0.593]
Age	-0.029*** [0.004]	-1.123*** [0.020]	-0.006*** [0.001]	0.141*** [0.003]	-13.230*** [0.404]
Cash	0.028*** [0.003]	-0.002 [0.010]	-0.019*** [0.001]	0.033*** [0.004]	4.927*** [0.204]
Firm f.e.	YES	YES	YES	YES	YES
Year f.e.	YES	YES	YES	YES	YES
Observations	2090495	2090495	2090100	2089404	1371285
r2	0.53	0.36	0.77	0.77	0.81

Table A.4: Rare surnames (only for areas with at least one Mafia-surname firm)

This table reports the regression results for the effect of the presence of at least one Mafia-surname firm in a municipality and industry NACE 4-digit on peer firms' economic outcome. *Mafia rare surnames* is a dummy variable that is equal to 1 if the frequency of the surname is ranked as the bottom 10% percentile among all the surname in the data sample. Standard errors are clustered at the municipality level and are reported in brackets. ***, **, and * denote statistical significance at the 1%, 5%, and 10% levels, respectively. Variables' definitions are provided in Table A.1.

	Operating Perf.	Sales Growth	Long-Term Leverage	WW- constrained	Employees /TA
	(1)	(2)	(3)	(4)	(5)
Mafia-surname Peers	0.0121*** (0.003)	-0.0010 (0.007)	-0.0002 (0.001)	-0.0009 (0.002)	-0.1488 (0.124)
Mafia-surname Peers * Mafia rare surnames	-0.0284*** (0.006)	0.0312 (0.019)	-0.0109** (0.005)	0.0168*** (0.003)	0.7820 (0.534)
Size	0.5467*** (0.012)	0.7896*** (0.048)	0.1698*** (0.012)	-1.3870*** (0.028)	-25.7340*** (1.153)
Age	-0.0043 (0.007)	-1.1639*** (0.066)	-0.0044*** (0.001)	0.1492*** (0.008)	-16.6463*** (1.477)
Cash	0.0270*** (0.007)	-0.0019 (0.022)	-0.0181*** (0.001)	0.0364*** (0.009)	5.6458*** (0.518)
Firm f.e.	YES	YES	YES	YES	YES
Year f.e.	YES	YES	YES	YES	YES
Observations	467768	467768	467686	467266	256989
r2	0.4249	0.2066	0.7269	0.7110	0.7527

Table A.5: Mafia-surname Peers (with lagged Mafia-surname Peers)

This table reports the regression results for the effect of the presence of at least one Mafia-surname firm in a municipality and industry NACE 4-digit on peer firms' economic outcome. Panel A controls for Firm and Year F.E, while Panel B, C and D control for region-industry-year F.E. Panel C excludes large peers' clusters, while Panel D excludes Mafia-origin regions. Standard errors are clustered at the municipality level and are reported in brackets. ***, **, and * denote statistical significance at the 1%, 5%, and 10% levels, respectively. Variables' definitions are provided in Table A.1.

	Operating Performance	Sales Growth	Long-Term Leverage	WW- constrained	WW-constrained
	(1)	(2)	(3)	(4)	(4)
PANEL A - Baseline					
Mafia-surname Peers	-0.011*** [0.003]	-0.018** [0.007]	-0.002*** [0.001]	0.003* [0.002]	-0.565*** [0.148]
Size	0.532*** [0.008]	0.834*** [0.019]	0.167*** [0.005]	-1.412*** [0.016]	-24.902*** [0.635]
Age	-0.028*** [0.004]	-1.127*** [0.022]	-0.006*** [0.001]	0.140*** [0.003]	-13.329*** [0.416]
Cash	0.028*** [0.003]	-0.001 [0.010]	-0.019*** [0.001]	0.033*** [0.004]	5.018*** [0.214]
Firm f.e.	YES	YES	YES	YES	YES
Year f.e.	YES	YES	YES	YES	YES
Observations	2115525	2115525	2115123	2114408	1384969
r2	0.53	0.36	0.77	0.77	0.81
PANEL B - Controlling for Region-Industry-Year fixed effects					
Mafia-surname Peers	-0.006*** [0.002]	-0.030*** [0.004]	-0.002** [0.001]	0.006*** [0.001]	-0.643*** [0.104]
Size	0.533*** [0.008]	0.870*** [0.018]	0.168*** [0.005]	-1.430*** [0.016]	-24.490*** [0.629]
Age	-0.025*** [0.003]	-1.134*** [0.022]	-0.008*** [0.001]	0.144*** [0.003]	-13.158*** [0.455]
Cash	0.021*** [0.003]	-0.001 [0.010]	-0.018*** [0.001]	0.034*** [0.004]	4.880*** [0.217]
Region-Industry-Year f.e.	YES	YES	YES	YES	YES
Observations	2106719	2106719	2106315	2105600	1375731
r2	0.54	0.38	0.77	0.78	0.82
PANEL C - Excluding large peers' clusters (municipality-industry-year with more than 300 obs.)					
Mafia-surname Peers	-0.006*** [0.002]	-0.033*** [0.005]	-0.002** [0.001]	0.006*** [0.002]	-0.637*** [0.107]
Size	0.524*** [0.007]	0.898*** [0.028]	0.163*** [0.008]	-1.440*** [0.014]	-24.275*** [0.555]
Age	-0.029*** [0.002]	-1.158*** [0.022]	-0.007*** [0.001]	0.147*** [0.003]	-12.980*** [0.318]
Cash	0.023*** [0.003]	-0.000 [0.012]	-0.018*** [0.001]	0.034*** [0.004]	4.785*** [0.228]
Region-Industry-Year f.e.	YES	YES	YES	YES	YES
Observations	1959288	1959288	1958913	1958423	1313658
r2	0.54	0.39	0.77	0.78	0.82
PANEL D - Excluding Mafia-origin regions					
Mafia-surname Peers	-0.007*** [0.002]	-0.027*** [0.005]	-0.002** [0.001]	0.007*** [0.002]	-0.674*** [0.115]
Size	0.541*** [0.008]	0.879*** [0.020]	0.176*** [0.007]	-1.439*** [0.018]	-23.806*** [0.715]
Age	-0.022*** [0.003]	-1.071*** [0.027]	-0.010*** [0.001]	0.137*** [0.004]	-11.707*** [0.571]
Cash	0.019*** [0.003]	-0.007 [0.012]	-0.019*** [0.001]	0.032*** [0.004]	4.410*** [0.232]
Region-Industry-Year f.e.	YES	YES	YES	YES	YES
Observations	1855252	1855252	1854878	1854169	1196937
r2	0.54	0.37	0.77	0.78	0.82

Table A.6: Dynamic treatment analysis

This table reports the dynamic treatment analysis of the results in Table 6 for the full sample. The dependent variable is *PtC*. *Mafia-surname firm*⁻³⁺ and *Mafia-surname firm*⁻² are dummy variables equal to one for, respectively, three and more years and two years before the top executive's surname appears in the DIA report, and 0 otherwise; *Mafia-surname firms*⁰ is a dummy variable equal to one in the year in which the top executive's surname appears in the DIA report; *Mafia-surname firms*⁺¹, *Mafia-surname firms*⁺² and *Mafia-surname firms*⁺³⁺ are dummy variables that equal to one for one year, two years and three years and more after the top executive's surname appears in the DIA report, respectively. Variables' definitions are provided in Table A.1. Standard errors are clustered at the provincial level and are reported in brackets. ***, **, and * denote statistical significance at the 1%, 5%, and 10% levels, respectively.

Dependent variable: <i>PtC</i>	Italy	Central-northern regions	Mafia-origin regions
	(1)	(2)	(3)
<i>Mafia-surname firm</i> ⁻³⁺	-0.040** [0.020]	-0.050 [0.031]	-0.033 [0.025]
<i>Mafia-surname firm</i> ⁻²	-0.024 [0.017]	-0.023 [0.025]	-0.024 [0.023]
<i>Mafia-surname firm</i> ⁰	0.006 [0.015]	0.045 [0.028]	-0.005 [0.016]
<i>Mafia-surname firm</i> ⁺¹	0.022 [0.027]	0.081*** [0.026]	0.000 [0.031]
<i>Mafia-surname firm</i> ⁺²	0.042* [0.024]	0.112*** [0.034]	0.015 [0.024]
<i>Mafia-surname firm</i> ⁺³⁺	0.013 [0.031]	0.105** [0.040]	-0.025 [0.031]
Top Executive Origin	-0.063 [0.059]	-0.166*** [0.061]	0.292** [0.116]
Firm-Year controls	YES	YES	YES
Firm f.e.	YES	YES	YES
Event Year dummies	YES	YES	YES
Year f.e.	YES	YES	YES
Observations	138,412	44,336	94,076
r2	0.70	0.71	0.69

Table A.7: Placebo Test

This table plots the distribution of the coefficients on *Mafia-surname firm* estimated from the placebo test by randomizing the assignment of treatment (with no replacement) from the sample period between 2000 and 2018 for the matching sample. We estimate the effect of pseudo-treatment with the full set of control variables as presented in the baseline model. We store the coefficient of *Mafia-surname firm* and repeat this procedure 1,000 times to generate the distribution of the placebo estimates (mean, standard error, and relevant percentiles). p10_left refers to the 10th percentile of the left distribution, while p10_right refers to the 10th percentile of the right distribution. Standard errors are clustered at the provincial level and are reported in brackets. ***, **, and * denote statistical significance at the 1%, 5%, and 10% levels, respectively.

Dependent Variable: <i>PtC</i>	
	<i>_b[Mafia-surname firm]</i>
Mean	-.0048
S.E.	[.0077]
p10_left	-.0174
Median	-.0044
p10_right	.0074
Controls	Yes

Table A.8: Mafia-surname firm and liquidity transfer (with lagged Mafia-surname firm)

This table reports the estimation results of the baseline model. Column 1 considers the full sample; Column 2 considers the matching sample; Column 3 considers a three-years' window analysis; Column 4 assigns zeros to *Mafia-surname firm* if firm becomes Mafia-surname firms after the appointment of Top executives whose surname coincides with that of Mafiosi already disclosed by DIA reports in previous years; Column 5 considers only firms with the same Top Executives over the sample period; and Column 6 uses the *PtC* deviation from average values by industry-region-year as an alternative dependent variable. Variables' definitions are provided in Table A.1. Standard errors are clustered at the provincial level and are reported in brackets. ***, **, and * denote statistical significance at the 1%, 5%, and 10% levels, respectively.

Dependent variable: <i>PtC</i>	Full Sample	Matching Sample	[-3;+3] Window	Alternative treatment definition	Same Top Executives over the sample period	Deviations from average values by industry- region-year
	(1)	(2)	(3)	(4)	(5)	(6)
Mafia-surname firm	0.064*** [0.013]	0.041** [0.020]	0.037** [0.015]	0.089*** [0.030]	0.061** [0.025]	0.049*** [0.012]
TopExecutiveOrigin	-0.003 [0.019]	0.012 [0.049]	-0.045 [0.043]	0.012 [0.018]		0.000 [0.018]
Size	-0.149*** [0.040]	-0.301*** [0.112]	-0.312* [0.169]	-0.149*** [0.040]	-0.070 [0.046]	-0.121*** [0.036]
Age	0.184*** [0.009]	0.144*** [0.020]	0.197*** [0.032]	0.185*** [0.009]	0.182*** [0.014]	0.162*** [0.011]
Leverage	-0.119*** [0.011]	-0.197*** [0.051]	-0.193*** [0.044]	-0.118*** [0.011]	-0.157*** [0.013]	-0.112*** [0.012]
Profitability	-0.256*** [0.015]	-0.264*** [0.040]	-0.239*** [0.039]	-0.256*** [0.015]	-0.219*** [0.013]	-0.240*** [0.014]
Tangibility	0.223*** [0.018]	0.259*** [0.058]	0.131*** [0.039]	0.223*** [0.018]	0.239*** [0.023]	0.195*** [0.016]
Cash	-0.007 [0.009]	-0.025 [0.038]	-0.085* [0.043]	-0.007 [0.009]	-0.004 [0.014]	-0.004 [0.008]
Receivables	0.281*** [0.017]	0.377*** [0.040]	0.249*** [0.031]	0.281*** [0.017]	0.283*** [0.020]	0.260*** [0.016]
Firm f.e.	YES	YES	YES	YES	YES	YES
Year f.e.	YES	YES	YES	YES	YES	YES
Observations	2,208,986	236,205	152,708	2,208,986	939,714	2,208,986
r2	0.65	0.62	0.70	0.65	0.64	0.63

Table A.9: Probability of firm being treated as Mafia surname firm

This table shows whether firms' characteristics drive the probability of a firm being treated. For this analysis we employ a logit model, where the dependent variable takes a value of one for the firms being treated, and zero otherwise. Once a firm became treated, that firm is then dropped from the sample. Column 1 only considers the main variable of interest, *PtC*, while Column 2 also considers as additional relevant characteristics the regressors reported in Equation 2. Standard errors are clustered at the provincial level and are reported in brackets. ***, **, and * denote statistical significance at the 1%, 5%, and 10% levels, respectively.

Dependent Variable: Mafia-surname firm	(1)	(2)
Payables-to-COGS	-0.003 [0.010]	-0.001 [0.010]
Size		0.463*** [0.068]
Age		-0.001 [0.019]
Leverage		0.162** [0.072]
Profitability		0.212* [0.128]
Tangibility		-0.299*** [0.062]
Cash		-0.170* [0.098]
Province f.e.	YES	YES
Industry (2-digit) f.e.	YES	YES
Year f.e.	YES	YES
Observations	2,154,076	2,154,076
Pseudo r2	0.17	0.17

Table A.10: Mafia clans with family ties and industrial sector with high mafia infiltration

This table reports the estimation results of Table 6 for the full sample (Columns 1-2) and matched sample (Columns 3-4). Columns 1 and 3 exclude firms with top executives born areas with mafia clans with strong family ties (i.e., Calabria region), while Columns 2 and 4 exclude firms in the sector with high mafia infiltration (i.e., construction sector). Variables' definitions are provided in Table A.1. Standard errors are clustered at the provincial level and are reported in brackets. ***, **, and * denote statistical significance at the 1%, 5%, and 10% levels, respectively.

Dependent Variable: <i>PtC</i>	Full Sample		Matched Sample	
	Excluding firm with top executives born in Calabria region	Excluding firms in the construction industry	Excluding firm with top executives born in Calabria region	Excluding firms in the construction industry
	(1)	(2)	(3)	(4)
Mafia-surname firm	0.068*** [0.015]	0.044*** [0.012]	0.070*** [0.016]	0.036* [0.019]
TopExecutiveOrigin	-0.031 [0.033]	0.027 [0.018]	-0.015 [0.046]	0.030 [0.049]
Size	-0.143*** [0.042]	0.029 [0.037]	-0.128*** [0.046]	0.044 [0.079]
Age	0.179*** [0.009]	0.127*** [0.010]	0.178*** [0.011]	0.079*** [0.025]
Leverage	-0.113*** [0.012]	-0.108*** [0.012]	-0.117*** [0.013]	-0.177*** [0.032]
Profitability	-0.252*** [0.015]	-0.237*** [0.015]	-0.268*** [0.016]	-0.252*** [0.039]
Tangibility	0.217*** [0.018]	0.229*** [0.019]	0.213*** [0.021]	0.262*** [0.044]
Cash	-0.003 [0.010]	0.020** [0.009]	-0.001 [0.012]	0.033 [0.032]
Receivables	0.273*** [0.017]	0.283*** [0.018]	0.285*** [0.016]	0.430*** [0.046]
Firm f.e.	YES	YES	YES	YES
Year f.e.	YES	YES	YES	YES
Observations	2,151,783	1,829,222	203,794	164,146
r2	0.65	0.65	0.63	0.64

Table A.11: Highly-cited Mafia Surnames in the DIA Report

This table reports the estimation results of the baseline model for the full sample (Columns 1-3) and matched sample (Columns 2-4) focusing on Central-northern regions. Columns 1 and 2 consider Mafia surnames that are cited in more than three DIA reports, while Columns 3 and 5 consider Mafia surnames than are cited in three or fewer DIA reports. Variables' definitions are provided in Table A.1. Standard errors are clustered at the provincial level and are reported in brackets. ***, **, and * denote statistical significance at the 1%, 5%, and 10% levels, respectively.

Dependent variable: <i>PtC</i>	Considering only highly-cited Mafia surnames		Considering only lowly-cited Mafia surnames	
	Full Sample	Matching Sample	Full Sample	Matching Sample
	(1)	(2)	(3)	(4)
Mafia-surname firm	0.086*** [0.031]	0.108*** [0.036]	0.039 [0.035]	0.075* [0.038]
TopExecutiveOrigin	-0.025* [0.014]	-0.119* [0.063]	-0.042* [0.024]	-0.279*** [0.078]
Size	-0.130*** [0.047]	-0.126 [0.099]	-0.143*** [0.046]	-0.007 [0.135]
Age	0.180*** [0.009]	0.224*** [0.034]	0.176*** [0.010]	0.205*** [0.042]
Leverage	-0.101*** [0.012]	-0.132** [0.061]	-0.111*** [0.013]	-0.163*** [0.046]
Profitability	-0.242*** [0.014]	-0.173*** [0.060]	-0.236*** [0.014]	-0.157** [0.062]
Tangibility	0.208*** [0.018]	0.188** [0.092]	0.215*** [0.018]	0.264*** [0.093]
Cash	-0.006 [0.010]	-0.061 [0.045]	-0.003 [0.009]	-0.017 [0.040]
Receivables	0.263*** [0.017]	0.274*** [0.052]	0.261*** [0.018]	0.274*** [0.034]
Firm f.e.	YES	YES	YES	YES
Year f.e.	YES	YES	YES	YES
Observations	1758695	59201	1767285	61851
r2	0.65	0.63	0.65	0.64

APPENDIX B

A short historical overview of Mafia clans in Italy

The Sicilian Mafia (*Cosa Nostra*) made its first appearance in the nineteenth century in Sicily during the tumultuous process of the fall of the Bourbon Kingdom (which had included southern Italy and Sicily) and the unification of Italy (e.g., Gambetta, 1993; Lupo, 1996; Dickie, 2004;).¹ Besides the highly profitable business around illicit drug production and trafficking, the Mafia has traditionally focused on private protection and racketeering, and on private and public construction. Similarly, *'ndrangheta* originated in the nineteenth century in the province of Reggio Calabria with brigandage movements on the Aspromonte uplands, to oppose Italy's unification, which was heralding the dismantling of the feudal system and introducing modern capitalism to the rural areas of the South (Mirenda et al., 2022). Today *'ndrangheta* has a dominant position in most of the transnational drug traffic and most of the organization's revenues are produced outside Calabria region (Mirenda et al., 2022). The origin of *Neapolitan Camorra* is still debated. *Neapolitan Camorra* comprises many bands without a horizontal and community-based structure as in the case of *'ndrangheta*.² It mainly specializes in cigarette smuggling, drug trafficking, extortion and usury, and counterfeiting. Originally founded by the Camorra boss Raffaele Cutolo, Apulian Sacra Corona Unita is the youngest Italian criminal organization, which became active between the late

¹ In the 1890s the Mafia was present in most of the urban parts of Sicily, in some of the mining areas, such as Favara and Grotte in the Girgenti province, and in the most rural parts of the island (Buonanno et al., 2015). The spread of the Mafia over the Sicilian territory was possible due to a pervasive use of coercive power by landowners and local politicians against the Peasant Fasci movement (Acemoglu et al., 2020), a popular movement of democratic and socialist inspiration in support of the poorest and most exploited working classes' rights. Although the Mafia declined considerably during Mussolini's fascist dictatorship, however, after the war, former members of the Mafia formed tight relations with the Christian Democrats, which became the major party in Italy (e.g., De Feo and De Luca, 2017). Only with the Maxi trials of 1986–87, and the murder of two judges, Giovanni Falcone and Paolo Borsellino, did the Mafia appear to have started declining.

² During this post-Second World War period, Naples played a strategic role in the contraband market of cigarettes and, at the beginning of the 1970s, was a major base of international contraband and criminal traffic (Barbagallo, 1999; 2010). With the New Organized Camorra (Nuova Camorra Organizzata, NCO) established by the Boss Raffaele Cutolo in the 1980s and 1990s, Camorra changed its configuration from a criminal organization with a metropolitan gangster style into a more structured organization. During the same years, Camorra expanded its networks beyond the regional borders by acquiring a dominant position in the drug trafficking activities from Latin America.

1970s and early 1980s. The presence of close relationships with members of both the Calabrian *'ndrangheta* and *Neapolitan Camorra* has been crucial for the emergence of this new criminal organization (Massari, 2014). Apulian Sacra Corona Unita specializes in cigarette smuggling, arms trafficking, human trafficking, money laundering, extortion, and drug trafficking.³ Finally, the so-called Basilischi was an Italian criminal organization, founded in 1994 in Potenza, and then extended to the rest of Basilicata. Since the late 1990s, this organization shrank significantly due to several arrests and interventions by the police. Nowadays, many areas are under the control of *'ndrangheta* clans.

³ DIA, 2008. Semi-annual publication.



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