The Institutional Role of the Italian Mafia: Enforcing Contracts When the State Does Not

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Abstract

Italy has one of the slowest civil judicial systems in Europe. At the same time, there exists anecdotal evidence suggesting that informal contract enforcement can be provided by organized crime. I present a simple theoretical framework to explain why citizens may turn to the Mafia for contract enforcement when the State is increasingly unable to fulfil this service. I empirically test the main model prediction using a novel database of Mafia-controlled areas across Italy between 2014 and 2019. I obtain confidential yearly data from the Superior Council of the Judiciary about the judge's retirement, which I use as a source of exogenous variation in the State's enforcement capacity. Results indicate that the Mafia expands its control over the territory when the State weakens its contract enforcement capacity.

Keywords: Contract enforcement, Criminal organizations, Mafia, Tribunals
JEL: P16, K40, H11

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"Judge Falcone acknowledged that, owing to the slowness of the courts in resolving litigation, it is common to turn instead to the local man of honor." - Repubblica[1], October 16, 1990

1 Introduction

Italy has one of the slowest civil judicial systems in Europe. In 2016, the European Commission for the Efficiency of Justice (CEPEJ) reported that the average time[2] needed to solve first-instance civil and commercial cases was 514 days in Italy versus a European average of 233 days. At the same time, there exists anecdotal evidence suggesting that informal contract enforcement can be provided by organized crime. In his seminal work, Gambetta [1993] already narrated that the local man of honor used to settle disputes between entrepreneurs, such as the timing and method of payment[3]. More recently, the Directorate of Anti-mafia Investigation reported some intervention of the police officers against Mafia members that were using violent methods, threats, and extortion, to obtain debt repayments[4].

In this paper, I address the following research question: can the civil tribunals' ineffectiveness in enforcing contracts explain the presence of the Mafia today? First, I provide a simple theoretical framework to explain the rational demand for the Mafia's services when the outside option, the civil tribunals run by the State, becomes less effective. Citizens engage in transactions and need a third party to solve possible controversies. Due to convex costs, the State can not satisfy the totality of the demand for contract enforcement. Even though the Mafia intervention generates negative externality, such as threats or extortion, there is an equilibrium where both the Mafia and the State provide contract enforcement. The main testable prediction is that a decrease in the tribunal's effectiveness increases the share of the population served by the Mafia. The second part of the paper tests the model prediction empirically by regressing the Mafia affiliation share on the tribunals' ineffectiveness. Since Mafia contract enforcement relies on widespread control of the territory (Gambetta [1993]), I use a novel database with

[1] *Repubblica* is a national Italian newspaper. The quote is reported in Gambetta [1993].

[2] The Disposition Time estimates the number of days needed to bring pending cases to an end. Together with the Clearance Rate, it is one of the indicators that better describes the judicial system's performance (CEPEJ [2018]).

[3] *"The woodcutters had originally agreed to be paid in logs; but when their work ended, they changed their minds and asked for cash. Colletti promised to settle the dispute, but ultimately the workers were given some money. Apparently, on this occasion, Colletti chose to side with the local workers."* Gambetta [1993]

[4] On 5 July 2018, in Catania and L'Aquila, as part of the "Pizzini" operation, the Guardia di Finanza executed the OCCC n. 3550/2018 RGNR and 2589/2018 RG GIP, issued by the Court of Catania on 29 June 2018, against a leading member of the SANTAPAOLA-ERCOLANO family and three other affiliates were held responsible for extortion aggravated by the mafia method, with violence and threats against debtors (DIA [2014-2019]).

the location of active Mafia groups for the years 2014-2019. The data are published by the Directorate of Anti-mafia Investigation (DIA [2014-2019]). They identify areas where the Mafia has solid activities, and hence it can acquire all necessary information to provide contract enforcement. Then I compute the share of the population living in Mafia-controlled areas at the tribunal district level. I also measure the State contract enforcement ineffectiveness as the number of pending civil cases, that is, the ones that remain unsolved at the end of each calendar year. I use this data to identify the impact of the State's contract enforcement on the presence of the Mafia. To generate exogenous variation in the State enforcement capacity, I use the number of retiring judges by a tribunal, and I rationalize this choice with a simple tribunal production function. The identification relies on the retirements being orthogonal to the presence of the Mafia. I provide some evidence to support this argument.

Results show that one retirement generates an increase in 400 pending cases. Further, an increase in 1000 pending cases increases the population exposed to the presence of criminal organization by 3.3%. Given the incredibly high persistence of the phenomenon[5] over centuries; the result mentioned above would be a successful one.

The contribution of this paper is threefold. First, a small theoretical literature of lawlessness and economics (Gambetta [1993], Greif [2000] and Dixit [2004]) studies nongovernmental alternatives to contract enforcement when the State is absent. I add to this literature by providing a simple theoretical framework where the State is present but ineffective, and there is interaction with a private alternative, the Mafia. Second, a strand of literature on organized crime explains the origins of the Mafia with its ability to substitute the State in one or more dimensions of the State capacity, as defined by Besley and Persson [2011], precisely because the State is highly ineffective. Some authors (Bandiera [2003], Buonanno et al. [2015], Acemoglu et al. [2020]) focus on legitimate violence and property rights, some others (Fiorentini and Peltzman [1997]) on the fiscal capacity and the provision of public goods. One dimension of the State capacity that has not been studied before in this context is contract enforcement. My contribution to this literature is twofold. First, I use both theory and empirics to provide evidence linking the Mafia's presence to the judicial system's ineffectiveness in enforcing contracts. Second, while the existing literature aims at explaining the origin of the Mafia, this paper is the first to apply

[5]The only available estimation concerns the presence of the Paesant Fasci in 1893. They make a municipality 69% more likely to register the presence of the Mafia in 1900. In 2019 this probability is still 53% (Acemoglu et al. [2001], Braccioli [2023])

the institutional approach to the presence of the Mafia in present times. Finally, a growing body of literature documenting the effects of ineffective civil courts on economic outcomes. Among the cross-country studies (Porta et al. [1998], Djankov et al. [2003], Nunn [2007]), the most relevant from my analysis is Acemoglu and Johnson [2005]. They found that, after controlling for legal institutions, contracting matters for the form of financial intermediation but less for economic growth. As a possible explanation, the authors suggest that contracting institutions are easier to replace than legal ones. In line with this reasoning, I contribute to the literature by showing that an alternative source of contract enforcement - the Mafia - flourishes more when formal contracting institutions are ineffective. Further, the literature on within-country comparison has been investigating mainly the effect of ineffective courts on the credit markets and firms' performance (Rajan and Zingales [1998], Jappelli et al. [2005], Chemin [2009a], Chemin [2009b], Visaria [2009], Lilienfeld-Toal et al. [2012], Chemin [2012], Ponticelli and Alencar [2016], Amirapu [2021]). In particular, Rao [2019] already documented that judges' vacancies, including temporary ones, decrease the tribunals' productivity in India. My contribution is to study the impact of courts' ineffectiveness on another important outcome, namely the alternative provision of contract enforcement by organized crime.

The rest of the paper is organized as follows. Section 3 develops the theoretical framework and discusses all the related assumptions. Section 4 presents the data. Section 5 builds the bridge between theory and empiric, discusses the identification strategy, and presents the results. Section 6 concludes.

2 Motivating facts

2.1 Mafia Contract Enforcement

There exists anecdotal evidence suggesting that informal contract enforcement can be provided by organized crime. In his seminal work, Gambetta [1993] already narrated that the local man of honour used to settle disputes between entrepreneurs, such as the timing and method of payment.

The following episode exemplifies the dynamics between the Mafia and the citizens[6]. Cassina owns a construction firm in Palermo, where most of is business is located. At some point, he won a contract

[6]For an extensive description of the Business of Protection, see Gambetta [1993]

to build the new river banks in the city of Ribera, province of Agrigento. The first thing that his team does is to contact Colletti, the Mafia boss in that town.

> *"When you open a site in an area which is far away from the main base of the firm, it is natural for those responsible for the site to rely on locals who show they can solve various problems as they emerge."*

According to these facts, the Mafia sells insurance against litigations. Before starting the transaction, the businessmen decide whether they want to buy protection from the local Mafia boss.

Luciano Cassina revealed that "the sums we paid were not for material supplies received from Colletti, but represented payment for 'services' of a different nature which Colletti had provided for us". He stressed that he had not been intimidated by Colletti, who "had always behaved correctly." Don Carmelo "solved problems," such as (...) mediating on every controversy with the locals.

During the construction work, a dispute arise between Cassina's firm and local workers:

> *"The woodcutters had originally agreed to be paid in logs, but when their work ended, they changed their minds and asked for cash."*

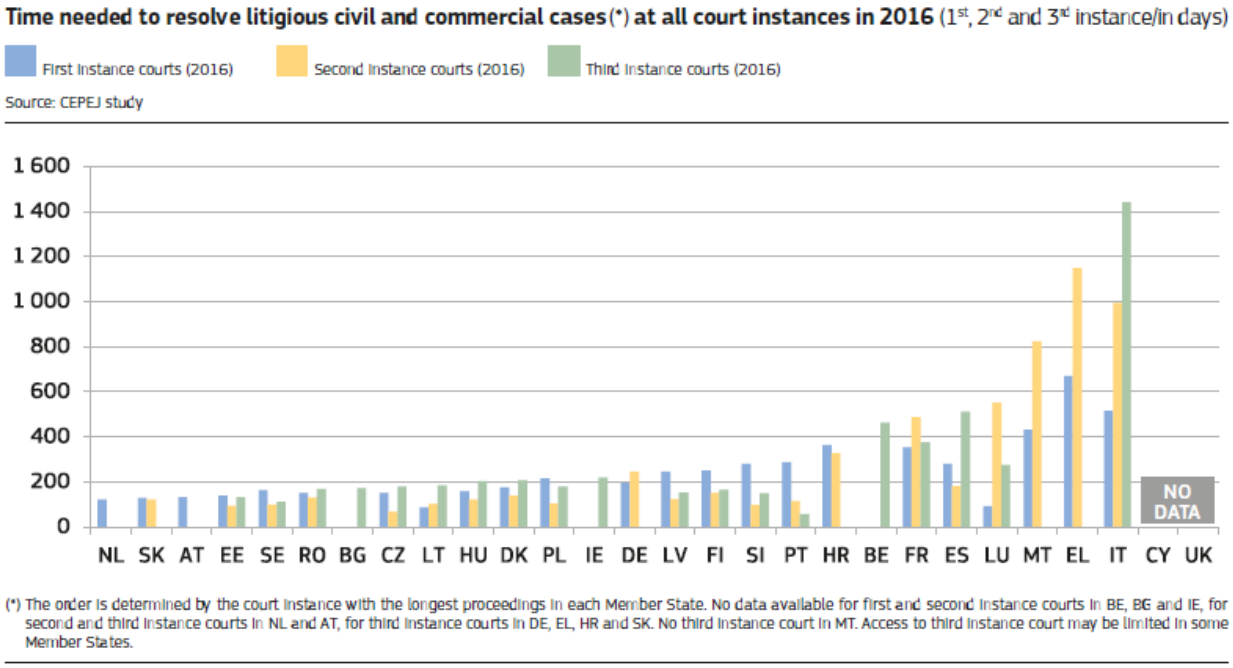
The contract between Cassina and the woodcutters is complete. However, an unforeseen circumstance happened, and they were not able to finalize it. Colletti resolved the dispute.

The agreement between the businessmen and the Mafia boss is limited to the time and the activity conducted in an area under Colletti's control. Once the firm left the town of Ribera, they were no longer protected by Colletti.

2.2 Civil Justice in Italy

Italy has one of the slowest civil judicial systems in Europe. In 2016, the European Commission for the Efficiency of Justice (CEPEJ) reported that the average time needed to solve first-instance civil and commercial cases was 514 days in Italy versus a European average of 233 days.

Figure 1: Ineffective civil tribunals.



Source: European Commission for the Efficiency of Justice (CEPEJ).

3 Theoretical Framework

> *"The market is therefore rational, in the sense that there are people who find it in their individual interest to buy mafia protection. [...]"*[7]

This section develops a simple theoretical framework in which both the State and the Mafia provide contract enforcement but the government cannot cover all the demand as it is too costly. The model generates a main prediction that directly addresses the research question and identifies a policy-relevant parameter.

3.1 General Set Up and Timing

I model the market of contract enforcement as a three-player Bayesian game with Nature and continuous payoffs. The players are the citizens I, and two contract enforcement agencies, the State S, and the Mafia M.

[7] Gambetta [1993], Introduction.

In this economy, the demand for contract enforcement is generated by Nature. At the beginning of the game, she draws the controversy rate $\delta \in [0, 1]$, which is the share of the transaction that will incur in litigation that the two business partners are not able to solve by themselves. *"The woodcutters had originally agreed to be paid in logs; but when their work ended, they changed their minds and asked for cash."* (Gambetta [1993]), as illustrated in section 2.1.

The timing is the following:

STAGE 1. The Mafia acts as a leader in a Stackelberg competition and decides the number of contracts to sell, namely the number of citizens for which it is ready to provide contract enforcement. The Mafia intervention generates negative externality η. The price of the service, the *pizzo*[8], remains identified.

STAGE 2. The State acts as a follower in the Stackelberg model and sets the effectiveness of the judicial system. Contract enforcement by the State is available to all citizens.

STAGE 3. The citizens observe the exogenous parameters, the State's effectiveness, and the price for Mafia contract enforcement. They compute their expected payoffs and choose whether they want to buy the Mafia contract enforcement.

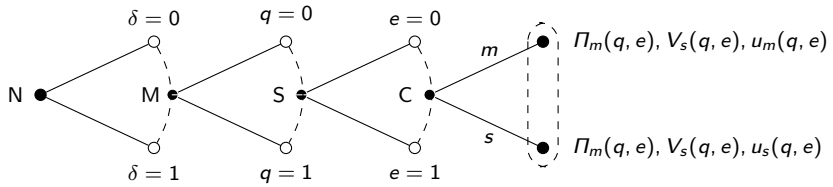
STAGE 4. Transaction decisions are taken, and payoffs are realized.

As the State is slower than the Mafia to react to the market, I present a baseline model with the State acting as a follower in a Stackelberg competition over quantities. However, results do not depend qualitatively on this assumption, and the model can be solved simultaneously or with the State acting as a leader.

After the market for contract enforcement clears, citizens undertake economic transactions; the Mafia and the State intervene where contract enforcement is needed, and the real payoffs are realized. Figure 2 illustrates the extensive form game that takes place before the transactions.

[8] Colloquial term to define a prize imposed by the Mafia for its services. "Finally, a typical example of the power exerted by Mafias on their territory of influence is the so-called *pizzo*, whereby legitimate business owners are forced to pay a part of their earnings to guarantee *protection*" Europol [2013]).

Figure 2: Extensive form.



NOTE: Nature (N) draws the controversy rate $\delta \in [0,1]$. The Mafia (M) chooses the optimal share of the population $q \in [0,1]$ to offer informal contract enforcement. The State (S) chooses the share of controversy $e \in [0,1]$ to solve. Citinzens (C) choose their affiliation status $j \in \{m, s\}$, the Mafia or State contract enforcement.

3.2 Payoffs

This subsection introduces the payoffs of the Citizens, the State and the Mafia, and discussed the main simplifying assumptions.

CITIZENS The economy is populated by a finite number of risk-neutral citizens $i \in \mathcal{I}$. Their utility only depends on the success of bilateral transactions they undertake with other citizens.

Citizens are ex-ante identical, but ex-post their affiliation status j takes value $j = m$ if the citizen is affiliated with the Mafia, and $j = s$ otherwise. Affiliation status matters for controversy resolution. In particular, $j = s$ grants access to the civil tribunal, the default option, while $j = m$ implies the intervention of the Mafia. To acquire $j = m$, a citizen receives an offer from the Mafia and pays the price for the service.

Without loss of generality, I normalize the population size to 1, and with a slight abuse of notation, I will refer to a representative citizen and drop the subscript $i \in \mathcal{I}$. The citizen's utilities are the following:

$$u_s(e,q) = (1-\delta)w_1 + \delta\Big[(1-q)[w_1 e + (1-e)w_0] + q(w_1 - \eta)\Big] \tag{1}$$

$$u_m(e,q) = w_1 - p \tag{2}$$

Transactions that encounter a controversy that is not solved yield a payoff $w_0 = 0$. Successful transactions yield a payoff $w_1 = 1$. This is the case of a transaction without any controversy or a solved one.

The share of litigations the State can solve is $e \in [0,1]$. The share of the population for which the

Mafia would intervene is $q \in [0, 1]$.

Equation 1 describes the citizen utility $u_s(e, q)$ for $j = s$. The first term is the case of a transaction that does not encounter any controversy. This event happens with probability $1 - \delta$ and has a value of $w_1 = 1$. The second term in square brackets represents the situation in which the transaction encounters a controversy, happening with probability δ. With probability $(1-q)$ the business partner is not affiliated with the Mafia, the case reaches the civil court. With probability e the case is solved by the State, yielding a payoff $w_1 = 1$, while with probability $1 - e$ the case is not solved, and the associated payoff is $w_0 = 0$[9]. Finally, with probability q, the litigation happens with an affiliated citizen. The case is solved by the Mafia and the associated payoff is $w_1 - \eta$, where η is the negative externality, or the technology, associated with the Mafia intervention. For instance, it can be considered the disutility from threats, or extorsions. Note that when the Mafia does not offer any contract, $q_m = 0$ and no negative externality η is generated.

Equation 2 represents the utility $u_m(e, q)$ under $j = m$, the case of an affiliated citizen. It yields the value of a successful transaction $w_1 = 1$ minus the price p of the Mafia contract enforcement. Note that the controversy rate does not enter $u_m(e, q)$ since the Mafia offers protection as insurance.

STATE The State's enforces contracts through civil courts. In particular, it chooses the optimal quantity of contract enforcement $e \in [0, 1]$ to provide, that is, the share of controversies that it solves. Note that e represents a probability from the citizen's perspective (equation 1).

The State's payoff function $V_s(e, q)$ is given by the following standard aggregated utility maximization:

$$\max_e \quad V_s(e, q) = \sum_{j \in \{m,s\}} \alpha_j u_j(e, q) - \delta(1 - q)c(e) \tag{3}$$

where α_j is the share of citizens for each affiliation status j. In particular $\alpha_m = q$ and $\alpha_s = 1 - q$.

The State's cost function $c(e)$ is convex with $c'(e) > 0$ and $c''(e) > 0$. This is a key assumption because it is the source of the State's ineffectiveness. I will use $c(e) = e^2/k_s$ for tractability, where k_s is a cost-effective parameter characterizing the technology and type of resources the civil courts deploy. This allows to differentiate the cost function from the Mafia's. Importantly, k_s has a clear link with the

[9] A reasonable amount of time is any trial duration that allows the parties to maintain the value of their business. For example, 233 days, the European average time needed to solve first-instance cases, is more reasonable than the Italian average, 514 days (CEPEJ [2018]).

empirical exercise as it allows to identify types of shifters that are useful for identification. I address this point extensively in section XX. Note that the term $\delta(1-q)$ multiplies the cost function since it represents the demand of contract enforcement faced by the State after the Mafia has offered its part.

In this economy, the State's only activity is to enforce contracts. This simplifying assumption allows abstraction from budget allocation and budget constraint.

Contract enforcement by the State can be considered a club good under uncertainty; individuals can enjoy the good until the club is not crowded, with uncertain realized congestion (Sandler et al. [1985]).

MAFIA The Mafia chooses the optimal quantity of contract enforcement to sell $q \in [0,1]$, that is the share of the population for which it is ready to solve litigations. Its payoff function $\Pi_m(e,q)$ is given by the following standard profit maximization:

$$\max_q \quad \Pi_m(e,q) = p(e,q)q - c(q) \tag{4}$$

where $p(e,q) > 0$ is the price and $c(e)$ is a convex cost function with $c'(e) > 0$ and $c''(e) > 0$.

As for the State, I will rely on a specific functional form, $c(e) = e^2/k_m$. Similarly to the State, the Mafia faces convex costs, as it must collect information on all the transactions in the controlled territory. Indeed, *"[...] the Mafioso would find it difficult to police all the transactions he guaranteed thus risking the loss of his reputation if a lemon were to be sold behind his back*[10]*"*. Hence, the Mafia might intentionally leave part of the demand unsatisfied. Differently from the State, the Mafia enforces contracts without necessarily being fair. The cost-effective parameter k_m is allowed to be different from k_s.

As in the motivating example in section 2.1, contract enforcement offered by the Mafia is insurance. In particular, citizens do not know whether their transaction will encounter a controversy. Further, they are not aware of the affiliation status of their business partner. Before they enter the transaction, they decide if they want the Mafia to protect them.

Discussion In this section, I discuss the interaction of the market of contract enforcement with other markets, and I argue that they are interesting extensions per se but they are not crucial to deliver the

[10] Gambetta [1993] Chapter 1, The Market.

results of this work.

First, contract enforcement supports economic transactions (Besley and Persson [2011]), which are at the center of the economy in general, and the only source of income in this model. The interaction between transactions and contract enforcement generates valuable results. For instance, in the literature on lawlessness and economics (Greif [2000], Dixit [2004]), agents choose whether to enter an economic transaction at first. This assumption allows the model proving that without a contract enforcement agency, the number of transactions is lower as individuals internalize the risk associated with litigations. I build on the top of this result to investigate whether, despite generating negative externalities, there is room for a second contract enforcement agency if the first one is ineffective. Relaxing the assumption of all agents entering the transaction allows to address research questions related to the GDP loss and to compare it with available estimation (Pinotti [2015]). Similarly, some economic sectors have a longer supply chain, and hence are more exposed to the effectiveness of the judicial system (Nunn [2007]). Here I do not allow for different economic sectors, but this can be introduced with heterogeneous citizens, such as income level or occupation, to investigate how they sort into an affiliation or to show which sectors are more likely to develop in Mafia-controlled areas.

Second, the Mafia has business other than contract enforcement. As suggested by Gambetta [1993], consider the Mafia as a firm. Other institutional activities, such as property rights enforcement (Bandiera [2003]) or legitimate violence (Acemoglu et al. [2020]), can be considered as different sectors of the same main business, "protection". While the assumption that activities from each sector are additive separable is a strong one, it allows contract enforcement to be analyzed separately. In addition, infiltration in private legal business (Piemontese [2020], Mirenda et al. [2022]) or in the public sector, such as distortion of public procurement (Tulli [2019]) or in public offices (Fenizia et al. [2020]), intuitively reconcile to this theory as they can be considered as markets that lack protection. Providing any institutional service, such as contract enforcement, is a way for the Mafia to gain control on that market.

Third, the Mafia provides contract enforcement, and protection in general, also in illegal markets. This case has been addressed already by Dixit [2004] and more recently by Dipoppa [2022], and it falls under the case of only one contract enforcement institution - the State does not enforce contracts in these markets. As discussed by Fiorentini and Peltzman [1997], in an illegal market, the interaction between the State and the Mafia concerns the ability of the State to provide valid alternatives to informal

business.

Fourth, while violence is a tool to enforce contracts, it also responds to other incentives (Gambetta [1993]). The control of illegal markets (Castillo et al. [2020]), establishing authority among different gangs or cartels (Dell [2015]), or influencing elections (Daniele and Dipoppa [2017]) are documented reasons that lead to the use of violence. In line with these findings, I assume that the Mafia does generate violence to enforce contracts, but I do not model the choice about its quantity since it comprehends other markets than the one this work focuses on.

3.3 Analysis

Since the outcomes from Nature's move are common information, the extensive form game in figure 2 can be solved by backward induction.

The share of the litigations optimal for the State to enforce is:

$$e^* = \frac{k_2}{2} \tag{5}$$

Given the particular function form of the cost function, for $k_s = 2$ the State satisfies the whole demand, that is $e^* = 1$. Conversely, there is room for Mafia contract enforcement for any value of $k_s < 2$.

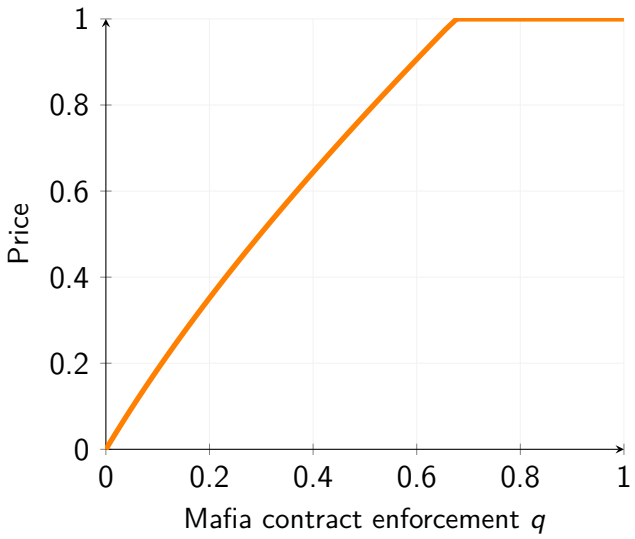
The Mafia offers the following price-quantity menu:

$$q^* = \frac{\delta k_m(2 - k_s)}{4 + 4\delta k_m - 2\delta k_m k_s - 4\delta\eta k_m}; \qquad p^*(e, q) = \frac{\delta(4 + 2\delta k_m - \delta k_m k_s - 2\delta\eta k_m k_s)}{4 + 4\delta k_m - 2\delta k_m k_s - 4\delta\eta k_m} \tag{6}$$

The supply of Mafia contract enforcement q^* equals zero for $\delta = 0$, when there is no demand; for $k_m = 0$, the Mafia is very ineffective; and for $k_s = 2$, the State is covering all the demand. Figure 3 plots the supply of contract enforcement by the Mafia for $k_m = 2$, $k_s = 1$ and increasing values of δ. As for normal goods, the share of the population q offered insurance by the Mafia increases with the price.

Before the game starts, Nature draws the controversy rate δ. This is a probability and litigations are realized at the end of the game. In the figure, all the transactions below the red line will encounter litigation. For this level of δ, and for $k_s = 1$ and $k_m = 2$, the Mafia offers insurance to a share of the

Figure 3: Mafia supply.



NOTE: Mafia supply of contract enforcement for $k_m = 2$, $k_s = 1$ and increasing values of δ. The vertical axe is the price as a function of e^*, q^*, and the parameters. The horizontal axe is q^* as a function of e^*, and the parameters.

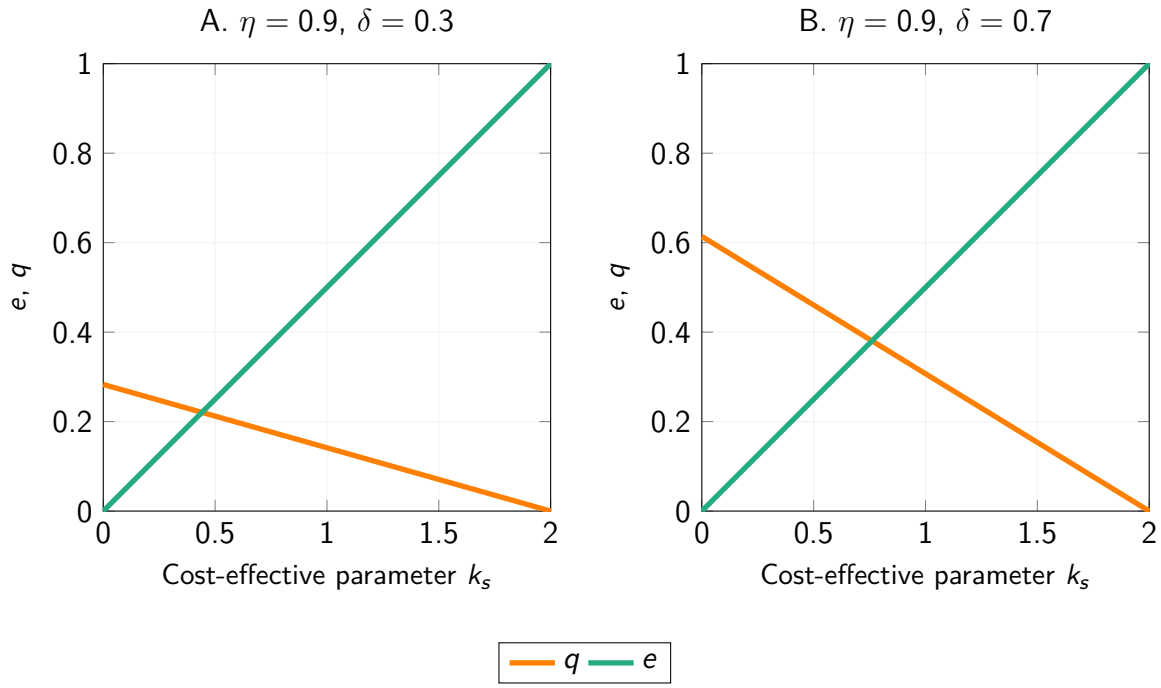
population q. In the figure, the Mafia protects the population on the left of the orange vertical line q. Note that $1 - \delta$ transactions undertaken by this share of the population will not need protection - in the figure, the upper left square. Finally, for $k_s = 1$, the State only enforces a share e of litigations - in the figure, the share of litigation below the teal horizontal line. The middle right rectangle in dots represents the share of transactions that will have an unsolved controversy.

Three parameters allow to shrink the share of transactions that will have an unsolved controversy: a decrease in δ, an increase in k_m and k_s. The only policy-relevant parameter is k_s. In particular, as long as $k_s < 2$ there will be unsolved controversies and positive provisions by the Mafia.

Figure 4 plots the equilibrium $(q^*, e(q^*))$ as a function of k_s. The other parameters are fixed to $\eta = 0.9$ and $k_m = 2$ in panels, while $\delta = 0.3$ in panel A and $\delta = 0.7$ in panel B. For any given level of k_s, the supply of the Mafia increases with δ, from panel A to B. Most importantly, it decreases with k_s.

There are three main predictions from the model:

Figure 4: Mafia and State contract enforcement.



NOTE: Equilibrium $(q^*, e(q^*))$ as a function of k_s. The other parameters are fixed to $\eta = 0.9$ and $k_m = 2$ in panels, while $\delta = 0.3$ in panel A and $\delta = 0.7$ in panel B.

PROPOSITION I: An increase in the State's effectiveness decreases the Mafia supply. That is:

$$\frac{\partial e*}{\partial k_s} > 0; \qquad \frac{\partial q*}{\partial k_s} < 0$$

As k_s increases, the State gets closer to meeting the whole demand. For example, when more resources are employed (see figure 4).

PROPOSITION II: An increase in the controversy rate generates an increase in the Mafia affiliation. That is:

$$\frac{\partial q^*}{\partial \delta} > 0$$

PROPOSITION III: An increase in violence generates an increase in the Mafia affiliation. That is:

$$\frac{\partial q^*}{\partial \eta} > 0$$

Detailed solutions are presented in appendix A and appendix B develops the model for a situation with the State only or with the Mafia only.

3.4 Theory to Empiric

This subsection aims at mapping the variables presented in the theoretical framework with the data. I provide detailed information about the databases in section 4. I further explain the link between the theory and the identification in section 5.1.

The key outcome variable is q, the share of the population offered by Mafia contract enforcement. As this is not observable in that data, I will use the share of the population living in mafia-controlled areas.

The main dependent variable is e, the share of litigations that the State solves. This value can be constructed as the share between the number of solved cases and the opened ones. Note that the model assumes that cases not solved disappear. However, these cases stay open and pending. Hence the number of pending cases better represents this value. I postpone to section 5.1 further adjustment needed to accommodate the identification requirements.

The policy-relevant parameter is k_s, a shock to the effectiveness of the State. I use the number of judges retiring for seniority as a negative shock on the tribunal production function.

The demand for contract enforcement is δ in the model and the number of opened cases in the data.

4 Data and Descriptive Statistics

The database includes 140 Italian tribunal districts[11], that is the universe of the first instance courts in the country, for the period 2014-2019.

Tribunals. The Directorate General for Statistics and Organisational Analysis of the Italian Ministry of Justice provides yearly data on the number of civil controversies received by each tribunal, the number

[11] The geographical competence of the Italian tribunals has been reformed in 2012. I refer to the *Serie Generale n.213 del 12-09-2012 - Supplemento Ordinario n. 185*, Table A of the *Gazzetta Ufficiale della Repubblica Italiana* (G.U. [2012]) to map the municipalities covered by 135 tribunal districts. As all the other sources I consult provide data for 140 tribunals, I manually reconstruct the geographical competence for five of them, consulting the tribunals' webpages. In particular, the Tribunals of Avezzano and Sulmona appear aggregated with L'Aquila; Lanciano and Vasto with Chieti; Urbino.

Table 4.1: Summary Statistics.

	Sample size	Mean	SD	Min	Max
Mafia[a]	840	0.24	0.36	0	1
Judges[b]	840	32.57	44.49	3	352
Retirements[c]	840	0.20	0.52	0	4
Pending Cases[d]	840	20.554	24.736	1.931	207.489
New Cases[d]	840	17.593	21.639	1.516	193.154
Solved Cases[d]	840	18.357	22.782	1.355	198.699
Population	840	422'998.60	379'557.29	58'264	2'820'219
GDP[e]	840	18'607.87	27'077.22	127	418'239

[a] Share of population living in Mafia-controlled areas over the total population.
[b] Number of active judges.
[c] Number of judges retired for seniority.
[d] In thousands.
[e] Total GDP in million euros.

of civil controversies solved - i.e. a final sentence has been announced - within the year, and the number of civil controversies pending at the end of each year - i.e. a final sentence has not been announced yet. Table 4.1 shows the summary statistics. On average, around 18 thousand cases are solved every year. However, the total demand for contract enforcement is much larger, with 38 thousand cases per year pending plus new ones[12].

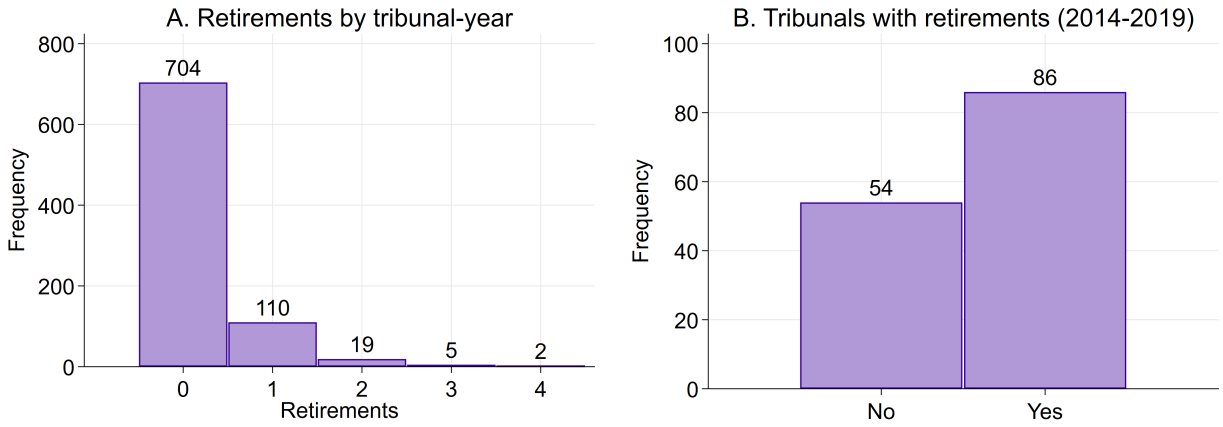
Panel A in figure 7 plots deciles of $P_{i,t}$ in 2017. Many tribunals in the South have the highest number of pending cases, particularly in Apulia and Campania. However, some areas in the Center and North also display high levels of pending cases.

I obtain confidential yearly data from the Superior Council of the Judiciary about the judge's staffing level. I observe the number of judges expected to be in office and the number of vacancies for each tribunal. I have information about the reasons for a vacant position: transfers, retirement, and other reasons. The sum of active and vacant positions is the total planned staffing of the tribunal, and the law fixes it. The latter was modified in 2012 during the reform mentioned above of the judicial system and successively updated by the Ministry of Justice to match better the need of the tribunals[13]. From 2014 to 2019, the overall observed increase is 2% of judges. I construct the variable *Judges* as the difference between the planned staff and the vacancies for transfers and other reasons. I separate retirements as they will serve as an exogenous shock in the empirical analysis. As the tribunals' needs

[12] Note that this is a rough measure as the correct way of computing the total demand of contract enforcement in each year is to sum the new cases to the pending ones of the previous year.

[13] Updates in 2014, 2016, 2017, 2019, and 2022. All information is available on the Ministry of Justice's official webpage.

Figure 5: Judges retiring for seniority.



NOTE: A. Number of retirement due to seniority. Unit of observation: tribunal-year. Observation 840. B. Number of tribunals that experienced at least one retirement event between 2014 and 2019 included. Unit of observation: tribunal. Observation 140.

are pretty heterogeneous, the number of judges varies from a minimum of 3 to a maximum of 352, while the retirements are 0 for one-third of the tribunals and range from 1 to 4 for the rest of them. Unfortunately, the data do not distinguish between judges working on civil versus criminal cases.

Figure 5 shows the frequency of the retirements. In panel A, the unit of observation is tribunal-year for 840 observations. Between 2014 and 2019, there have been 136 episodes of retirement. Panel B shows the number of tribunals that experienced at least one retirement event for the 140 tribunals: 86, 60% fo the sample, registered at least one episode.

Mafia presence. Since Mafia contract enforcement relies on widespread control of the territory (Gambetta [1993]), I use a novel database[14] that identifies neighbourhoods and municipalities controlled by each Mafia surname for 2014-2019, overcoming some limitations of other indices of Mafia presence (Bernardo et al. [2021]). The data are published by the Directorate of Anti-mafia Investigation[15] (DIA [2014-2019]) and they identify areas where the Mafia has stable activities[16]. Hence, it can acquire all the necessary information to provide contract enforcement. Figure 6 shows the names of Mafia families

[14]The database is used by Mirenda et al. [2022] to identify the surnames related to 'Ndrangheta activity.

[15]The DIA is a multi-force investigation body with the main aim of fighting and preventing any Italian organized crime or mafia activity. It was established with the law decree n. 345 of 29 October 1991.

[16]The information delivered by this data is comparable to those provided by Damiani [1881], and Cutrera [1900], used by Bandiera [2003] and Acemoglu et al. [2020] respectively.

Figure 6: Raw Mafia Data.

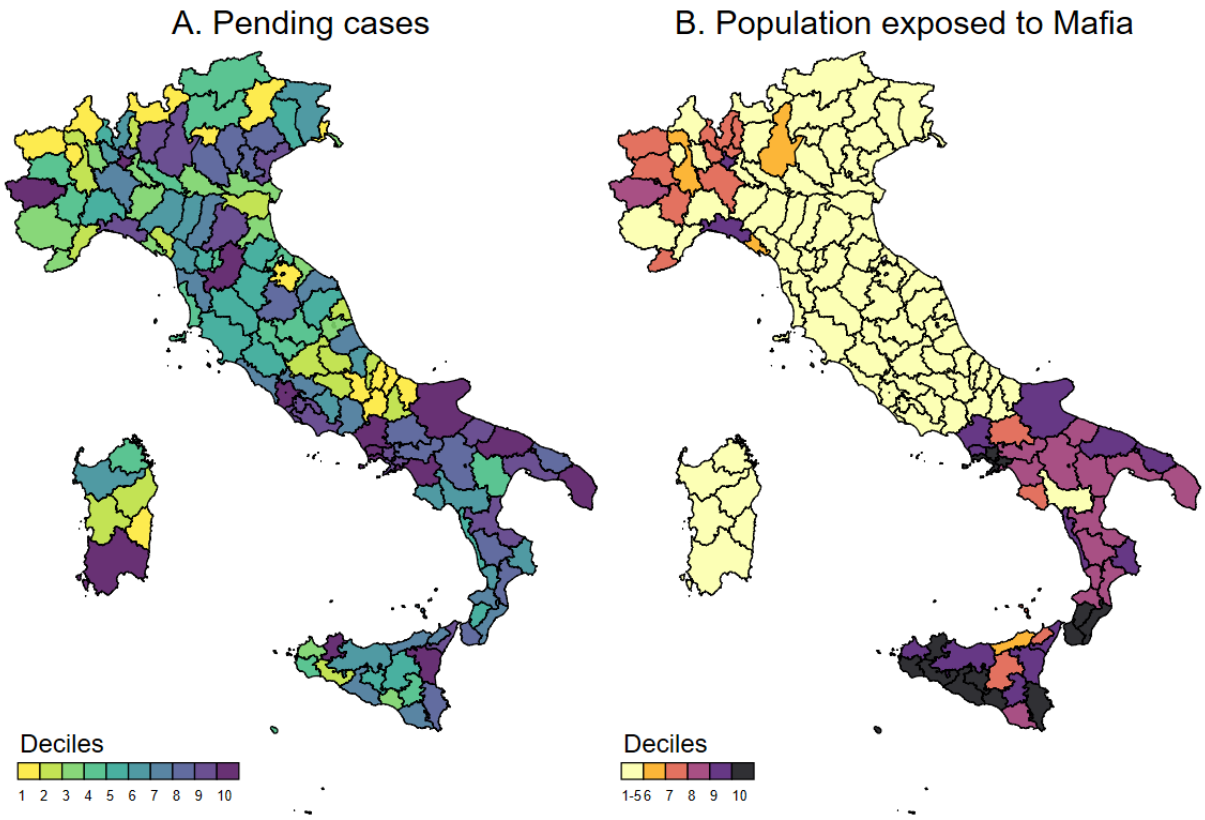
NOTE: Mafia families controlling the north part of the city of Reggio Calabria in 2019. Each white box contains the surname of the family in upper cases, followed by the neighbour aeres controlled. For example, the family *RUGOLINO* controls the area of *Villa San Giuseppe*.

that controlled each neighbourhood of Reggio Calabria in 2019. In upper cases, each white box contains the family's surname, followed by the neighbour aeres controlled. For example, the family *RUGOLINO* controls the area of *Villa San Giuseppe*. I use this information to construct the share of the population living in Mafia-controlled areas over the total population $M_{i,t}$. Note that this measure is an upper bound with respect to q, since it assumes that all the individuals living in Mafia-controlled municipalities are offered Mafia protection.

Panel B in figure 7 shows decile geographical distribution. Half of the Italian territory appears outside the direct control of organized crime, and hence, the first five deciles register a value of the variable equal to zero. Not surprisingly, higher population shares are registered in the South. Some areas in the Northwest also register some mild infiltration. For example, in areas coloured in orange, the share of the population living in a Mafia-controlled area is less than 10%.

Other variables. Population data at the municipal level for 2014-2019 and GDP per capita at the provincial level are publicly available from the National Institute of Statistics (ISTAT). I construct the GDP at the district level as the weighted average of GDP at the provincial level, using the number of municipalities in each tribunal district as weights.

Figure 7: Geographical distribution, tribunal level (2017).



NOTE: A. Share of the population living in Mafia-controlled areas over the total population of the tribunal district. B. Pending cases in 2017.

5 Empirical Analysis

This section discusses the empirical analysis. While the model generates three predictions, in the empirical analysis, I focus on the first one as it directly addresses the research question. I discuss related endogeneity issues and provide an instrumental variable approach to mitigate these concerns. Finally, I present the results to document ineffective civil tribunals' impact on the Mafia contract enforcement supply.

5.1 From theory to identification

According to the theoretical framework, the main testable prediction is that a decrease in the tribunal's effectiveness e increases the share of the population q offered contract enforcement by the Mafia, as defined in section 3. The baseline OLS regression is the following:

$$M_{i,t} = \alpha^{OLS} + \beta^{OLS} P_{i,t-1} + \tau_i + \kappa_t + \epsilon_{i,t}^{OLS} \tag{7}$$

where $M_{i,t}$ is the share of the Mafia-affiliated population, $P_{i,t-1}$ is the lagged number of pending cases normalized by the territorial extension of the tribunal, τ_i and κ_t are tribunal and year fixed effect respectively, β_{OLS} is the parameter of interest. Theory predicts it to be positive. As the model is static, it does not suggest whether the effect of $P_{i,t}$ on $M_{i,t}$ is to be expected to be contemporaneous or lagged. However, as the tribunal effectiveness is measured at the end of each t, it is reasonable to expect any effect on the affiliation $M_{i,t}$ to appear in the following year. Hence, I will present the analysis using the lagged value of the number of pending cases $P_{i,t-1}$.

Equation 7 might suffer from endogeneity for several reasons. The most obvious and standard with all the literature on the origin of organized crime is the "weak State" omitted variable bias. It is easier for the Mafia to expand in areas where the State is absent or less effective. This concern is likely to result in an upwards bias. A second possible threat is reverse causality. The direction of this effect is not apparent. The Mafia might increase litigiousness, causing part of the courts' ineffectiveness and resulting in an upward bias, or reduce the legal demand of contract enforcement, generating a downward bias. Section 5.2 presents an instrumental variable approach to address these concerns.

5.2 The tribunals' production function

This section proposes an instrumental variable approach to address the endogeneity concerns for equation 7 presented in section 5.1. I combine two instruments. First, the number of judges retiring for seniority is a negative shock for the tribunals' productivity, the policy-relevant parameter identified in 3. Unfortunately, information about the time it takes to replace a judge is unavailable. However, even when the replacement arrives the day after retirement, some organizational and bureaucratic fulfilment

possibly slows down the activities. The second instrument is the number of open cases for divorces and inheritance as exogenous demand. These are cases that require official paperwork and can not be informally solved by the Mafia.

To clarify the link between retirements and the number of pending cases, I introduce a descriptive model of tribunals' production function. As I will investigate the impact of the lagged value of the number of pending cases $P_{i,t-1}$ on the Mafia affiliation share, the first stage regression is presented in $t-1$. In each tribunal i, the number of pending cases $P_{i,t-1}$ at the end of the year $t-1$ is given by the following identity:

$$P_{i,t-1} \equiv O_{i,t-1} - S_{i,t-1} \tag{8}$$

where $O_{i,t-1}$ is the number of open cases, and $S_{i,t-1}$ the number of controversies solved. I assume that solved cases are the output of a tribunal production function, which depends on active judges $J_{i,t}$, the number of retired judges $R_{i,t}$, and the tribunals fixed effects ϕ_i, as follows:

$$S_{i,t-1} = f(J_{i,t-1}, R_{i,t-1}, \phi_i) = \psi^S J_{i,t-1} - \rho^S R_{i,t-1} + \phi_i + \omega^S O_{i,t-1} + \epsilon^S_{i,t-1} \tag{9}$$

where ψ is the average number of cases a judge deals with, and ρ is the average number of cases a retired judge would have dealt with. This allows the productivity of retiring judges to be different from the productivity of others. Then, the identity 8 can be rewritten as the following equation:

$$P_{i,t-1} = \rho^P R_{i,t-1} - \psi^P J_{i,t-1} + \omega^P O_{i,t-1} + \gamma_t + \phi_i + \epsilon^P_{i,t-1} \tag{10}$$

where γ_t are the tribunal time-trend fixed effects.

The second instrument is the number of open cases for divorces and inheritance as exogenous demand. These are cases that require official paperwork and can not be informally solved by the Mafia. Equation 10 becomes:

$$P_{i,t-1} = \rho^{IV} R_{i,t-1} - \psi^{IV} J_{i,t-1} + \omega^{IV} O_{i,t-1} + \delta^{IV} D_{i,t-1} + \phi_i + \gamma_t + \epsilon^{IV}_{i,t-1} \tag{11}$$

where $D_{i,t-1}$ is the number of open cases of divorces and inheritance.

Table 5.1: The tribunals' production function.

	(1)	(2)	(3)
Pending$_{t-1}$			
Retired$_{t-1}$	0.398***		0.433***
	(0.154)		(0.138)
Judges$_{t-1}$	0.040		0.035
	(0.037)		(0.034)
Open$_{t-1}$	0.337***	0.282***	0.289***
	(0.066)	(0.076)	(0.067)
Divorces$_{t-1}$		1.894***	2.003***
		(0.642)	(0.658)
Observations	700	700	700
KP	6.711	8.711	10.14
HJ-test			0.1467
Year*Tribunal FE	✓	✓	✓
Tribunal FE	✓	✓	✓
Robust SE	✓	✓	✓
Mean DP	20.885	20.885	20.885

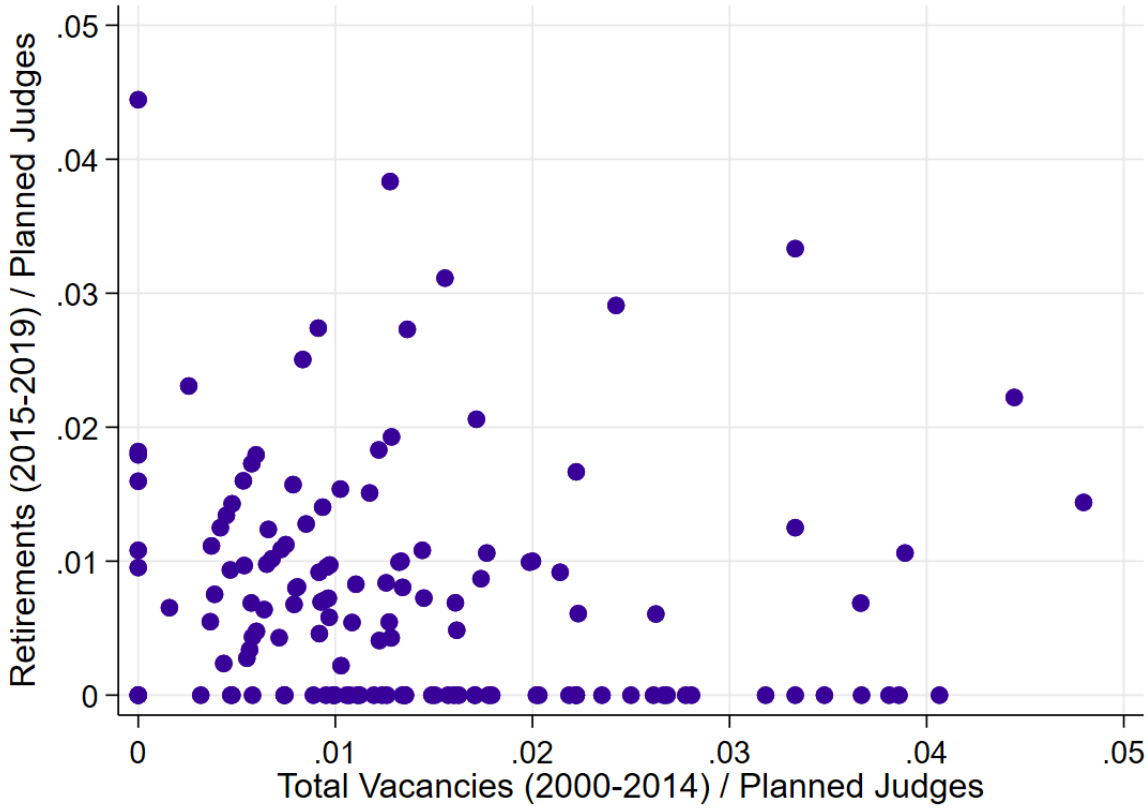
NOTE: $P_{i,t-1}$, $O_{i,t-1}$ and $D_{i,t-1}$ are in thousands. Standard errors are robust and the Kleibergen-Paap test is corrected for robust standard errors

Table 5.1 presents the results. For ease of readness, the $P_{i,t-1}$, $O_{i,t-1}$ and $D_{i,t-1}$ are presented in thousands. Column 1 presents the specification in equation 9. The effect of one retirement is an increase of roughly 400 pending cases. The number of active judges is not significant. Likely, this effect is mostly absorbed in the tribunal fixed effects. Column 2 presents the specification with the second instrument only. Finally, column 3 presents the specification in equation 11. The effect of one retirement judge is very similar to column 1 and the effect of the number of open cases for divorces and inheritance is also very similar to the one in column 2. The Kleibergen-Paap test is corrected for robust standard errors and takes 6.7, 8.7 and 10.1 values, respectively.

5.3 IV diagnostic

This section provides evidence to support the validity of the number of judges retiring for seniority as an instrument.

Figure 8: Retirements versus previous years' vacancies.



NOTE: Number of retirements in years 2015-2019 does not correlate with the number of vacancies in 2000-2014. The number of planned judges scales both variables. The vacancies include transfers and absences for other duties.

First, the exclusion restriction relies on retirements being orthogonal to the presence of the Mafia. The main concern is that judges ask to be transferred away from problematic areas, and hence, more of them reach retirement age in more desirable tribunals. To provide evidence against this concern, I built the total number of judges aged 65 years old in 2015 as the sum of all the seniority retirements from 2015 to 2019. I built the total number of vacancies in the years 2000 to 2014 included[17] I normalize

[17] The available years are 2000-2020. I excluded 2020 from the analysis due to the major shock caused by the COVID-19 pandemic.

Table 5.2: The tribunals' production function for criminal cases.

PendingCriminal$_{t-1}$	(1)	(2)	(3)
Retired$_{t-1}$	0.229	0.229	0.974
	(1.704)	(2.317)	(1.581)
Judges$_{t-1}$	0.523	0.523	0.155
	(0.330)	(0.456)	(0.286)
OpenCriminal$_{t-1}$	0.239***	0.239***	0.472***
	(0.059)	(0.066)	(0.042)
Observations	695	695	695
KP	0.0181	0.00977	0.379
Year*Tribunal FE	✓	✓	✓
Tribunal FE	✓	✓	
Year FE	✓		
District FE			✓
Robust SE	✓		✓
Cluster SE		✓	
Mean DP	87.64	87.64	87.64

NOTE: $PendingCriminal_{i,t-1}$ and $OpenCriminal_{i,t-1}$ are in hundred. Standard errors are robust and the Kleibergen-Paap test is corrected for robust standard errors

both measures by the total number of judges expected to be in charge by the law. A strong negative correlation between these two measures would have signalled that older judges concentrate in certain districts. Figure 8 provides evidence against this threat.

Second, the exclusion restriction would fail if the number of retirements impacted the presence of the Mafia through other channels. For example, it might slow down the criminal justice regulating punishment and detentions of Mafia members. To mitigate this concern, I run equation 8 substituting the number of pending and open civil cases with criminal ones. Table 5.2 shows that the number of retirements does not have a significant impact on the number of pending criminal cases. The Kleibergen-Paap test is roughly zero.

5.4 The impact of ineffective tribunals on the Mafia supply

This section documents the impact of ineffective civil tribunals on the Mafia supply of contract enforcement. Using the identification strategy proposed in section 5.2, I estimate the following second-stage regression:

$$M_{i,t} = \alpha^M + \beta^M P_{i,t-1} + \delta^M X_{i,t-1} + \tau_i + \kappa_t + \epsilon^M_{i,t} \tag{12}$$

where $P_{i,t-1}$ is the lagged number of pending cases, instrumented with retiring judges and number of open cases for inheritance and divorces as in equation 11, $X_{i,t-1}$ set of first stage controls $(J_{i,t-1}, O_{i,t-1},)$, τ_i and κ_t are tribunal and tribunal time-trends fixed effect respectively.

Table 5.3: The impact of ineffective tribunals on the Mafia supply

	(1)	(2)
Mafia_t	OLS	2SLS
Pending_{t-1}	0.0124***	0.0335**
	(0.005)	(0.016)
Observations	700	700
Year*Tribunal FE	✓	✓
Tribunal FE	✓	✓
Robust SE	✓	✓
Mean DP	0.237	0.237

[a] First stage controls as in equation
[b] Cluster at tribunal level.

Table 5.3 shows the results. Column 1 refers to the OLS regression as in equation 7 adding the controls $X_{i,t-1}$. The coefficient suffers from downward bias, compatible with a reverse causality argument due to a decrease in demand for contract enforcement as part of it is addressed by the Mafia.

The coefficient in column 2 expresses a 3.3% increase in population exposed to the Mafia for an increase of 1000 pending cases. Given the incredibly high persistence of the phenomenon[18] over centuries;

[18] The only available estimation concerns the presence of the Paesant Fasci in 1893 made a municipality 69% more likely to register the presence of the Mafia in 1900. In 2019 this probability is still 53% (Acemoglu et al. [2001], Braccioli [2023])

this would be a reasonably successful result.

6 Conclusion

This paper examines the relationship between the ineffectiveness of the Italian judicial system in enforcing contracts and the presence of the Mafia. Through the use of both theory and empirical evidence, the paper provides insight into how the ineffectiveness of the State in contract enforcement creates a demand for the Mafia's services, resulting in the negative externality of violence. The results of the regression analysis suggest that a decrease in the effectiveness of tribunals leads to an increase in the population served by the Mafia. The contribution of this paper to the literature is threefold. Firstly, it adds to the literature on lawlessness and economics by analyzing a context where the State is present but ineffective. Secondly, it provides evidence linking the Mafia's presence to the judicial system's ineffectiveness in contract enforcement, a dimension of the State's capacity that has not been studied before. Finally, the paper contributes to the growing body of literature documenting the effects of ineffective civil courts on economic outcomes by showing that the judicial system's ineffectiveness in contract enforcement directly impacts the presence of the Mafia.

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A Appendix

A.1 Detailed Solutions

This section solves the extensive form game in figure (2) by backward induction. Starting from the last node, the representative citizen (C) is indifferent between $a_i = M$ and $a_i = S$ if $u_{in} = u_{out}$. Replacing $w_1 = 1$ and $w_0 = 0$ yields the following indifference condition:

$$p(q, e) = \delta(1 + q\eta + eq - q - e) \tag{13}$$

The State solves the maximization problem in equation (3). Plugging equations 13, 2, 1 and population shares α_j yields:

$$\begin{aligned}
\max_e \quad & V_s(e, q) = (1 - q)[1 - \delta + \delta(1 - q)e + \delta q(1 - \eta)] + \\
& \qquad + q[1 - \delta + \delta(1 - q)e + \delta q(1 - \eta)] - \delta(1 - q)\frac{e^2}{k_s} \\
& \frac{\partial V_s(e, q)}{\partial e} = \delta - \delta q - 2\delta(1 - q)\frac{e}{k_s} = 0 \\
& e^* = \frac{k_2}{2}
\end{aligned} \tag{14}$$

To solve the Mafia-leader maximization problem stated in equation 4, use equation 13 and 14 as follows:

$$\max_q \quad \pi_m(q, e) = \delta(1 + q\eta - q + eq - e)q - \frac{q^2}{k_m} \tag{15}$$

$$\begin{aligned}
\max_q \quad & \pi_m(q, e) = \delta\Big(1 + q\eta - q + \frac{k_2}{2}q - \frac{k_2}{2}q\Big) - \frac{q^2}{k_m} \\
\max_q \quad & 2\delta k_m q - \delta k_m k_s q + \delta k_s k_m q^2 - 2\delta k_m q^2 + 2\delta\eta k_m q^2 - 2q^2 \\
& \frac{\partial \pi_m(e, q)}{\partial q} = 2\delta k_m - \delta k_m k_s + 2\delta k_s k_m q - 4\delta k_m q + 4\delta\eta k_m q - 4q = 0 \\
& q^* = \frac{\delta k_m(2 - k_s)}{4 + 4\delta k_m - 2\delta k_m k_s - 4\delta\eta k_m}
\end{aligned} \tag{16}$$

Plugging equations 14 and 16 into 13 yields the price:

$$\begin{aligned}
p^*(e,q) =& \delta - \frac{\delta}{2} + \delta\eta q^* + \frac{\delta q^*}{2} - \delta q^* = \\
=& 2\delta - \delta + 2\delta\eta q^* + \delta q^* - 2\delta q^* = \\
=& \delta + 2\delta\eta q^* - \delta q^* = \\
=& \frac{\delta(4 + 4\delta k_m - 2\delta^2 k_m k_s - 4\delta\eta k_m) + 2\delta^2\eta k_m(2 - k_s) - \delta^2 k_m(2 - k_s)}{4 + 4\delta k_m - 2\delta k_m k_s - 4\delta\eta k_m} = \\
=& \frac{4\delta + 4\delta^2 k_m - 2\delta^2 k_m k_s - 4\delta^2\eta k_m + 4\delta^2\eta k_m - 2\delta^2\eta k_m k_s - 2\delta^2 k_m + \delta^2 k_m k_s}{4 + 4\delta k_m - 2\delta k_m k_s - 4\delta\eta k_m} = \\
=& \frac{\delta(4 + 2\delta k_m - \delta k_m k_s - 2\delta\eta k_m k_s)}{4 + 4\delta k_m - 2\delta k_m k_s - 4\delta\eta k_m}
\end{aligned} \tag{17}$$

A.2 Comparative Statics

PROPOSITION I From the equation 14:

$$\frac{\partial e^*}{\partial k_s} = \frac{1}{2} \tag{18}$$

Equation 18 is always positive. From the equation 16:

$$\begin{aligned}
\frac{\partial q^*}{\partial k_s} &= \frac{-\delta k_m k_s(4 + 4\delta k_m - 2\delta k_m k_s - 4\delta\eta k_m) - (2\delta k_m - \delta k_m k_s)(-2\delta k_m k_s)}{(4 + 4\delta k_m - 2\delta k_m k_s - 4\delta\eta k_m)^2} \\
&= \frac{4\delta k_m k_s(\delta\eta k_m - 1)}{(4 + 4\delta k_m - 2\delta k_m k_s - 4\delta\eta k_m)^2}
\end{aligned} \tag{19}$$

The denominator in equation 19 is always positive. The first term of the numerator is also always positive. The second term is positive for $\delta\eta k_m > 1$.

PROPOSITION II From equation 16:

$$\begin{aligned}
\frac{\partial q^*}{\partial \delta} =& \frac{k_m(2 - k_s)(4 + 4\delta k_m - 2\delta k_m k_s - 4\delta\eta k_m) - \delta k_m(2 - k_s)(4k_m - 2k_m k_s - 4\eta k_m)}{(4 + 4\delta k_m - 2\delta k_m k_s - 4\delta\eta k_m)^2} \\
=& \frac{8k_m + 6\delta k_m^2 k_s^2 - 4k_m k_s}{(4 + 4\delta k_m - 2\delta k_m k_s - 4\delta\eta k_m)^2}
\end{aligned} \tag{20}$$

The denominator in equation 20 is always positive. The numerator is positive for $8k_m+6\delta k_m^2k_s^2-4k_mk_s > 0$.

PROPOSITION III From equation 16:

$$\begin{aligned}\frac{\partial q^*}{\partial \delta} =& \frac{-(2\delta\eta k_m - \delta k_m k_s)(-4\delta k_m)}{(4+4\delta k_m - 2\delta k_m k_s - 4\delta\eta k_m)^2} \\ =& \frac{8\delta^2 k_m^2 - 4\delta^2 k_m^2 k_s}{(4+4\delta k_m - 2\delta k_m k_s - 4\delta\eta k_m)^2}\end{aligned} \tag{21}$$

Note that the denominator is always positive. The numerator is positive for $8\delta^2k_m^2 - 4\delta^2k_m^2k_s > 0$

B Appendix

This section presents the solution for a situation with only one contract enforcement provider, the State or the Mafia.

B.1 State only

Suppose that the only third-party contract enforcement agency available is the State. The only utility function for the citizens changes as follows Obtained by setting $q = 0$ in equation 1.:

$$u(e) = (1-\delta)w_1 + \delta[w_1 e + (1-e)w_0] \tag{22}$$

The problem presented in section 3 becomes a one-player game - the State - with Nature and continuous payoff. In particular, the State maximizes:

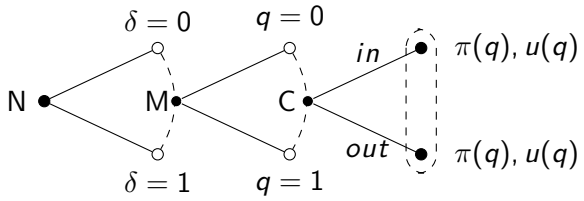
$$\begin{aligned}\max_e \quad & V_s(e) = u(e) - \delta^2 c(e) \\ \max_e \quad & V_s(e) = 1 - \delta + \delta e - \delta\frac{e^2}{k_s} \\ & \frac{\partial V_s(e)}{\partial e} = \delta - 2\delta\frac{e}{k_s} = 0 \\ & e^* = \frac{k_s}{2}\end{aligned} \tag{23}$$

The effectiveness is unchanged with respect to the case with two contract enforcement agencies. This reflects the assumption that the source of the ineffectiveness of the State is not the presence of the Mafia, but rather a challenging cost function.

B.2 Mafia only

Suppose now that the Mafia is the only third-party contract enforcement agency available. The extensive form game in figure 2 becomes the game in figure 2, a two-player game with Nature.

Figure A-1: Extensive form - Mafia only.



NOTE: Nature (N) draws the controversy rate $\delta \in [0, 1]$. The Mafia (M) chooses the optimal share of the population $q \in [0, 1]$ to offer informal contract enforcement. Citizens (C) choose their affiliation status $j \in \{m, n\}$, the Mafia or no contract enforcement.

The outside option for the citizens is different, and the utility functions change as follows:

$$u_{out} = (1 - \delta)w_1 + \delta q(w_1 - \eta)u_m = p - w_1 \tag{24}$$

where u_{out} is the utility without any contract enforcement agency. Hence, the indifference condition in equation 13 becomes $p(q) = \delta - \delta q(w_1 - \eta)$ and the Mafia's maximization problem:

$$\begin{aligned}
\max_q \quad & \pi(q) = p(q)q - c(q) \\
\max_q \quad & \pi(q) = (\delta - \delta q + \delta\eta q)q - \frac{q^2}{k_m} \\
& \frac{\partial \pi(q)}{\partial q} = \delta k_m - 2\delta k_m q + 2\delta k_m \eta q - 2q = 0 \\
& q^* = \frac{\delta k_m}{2 + 2\delta k_m - 2\delta k_m \eta}
\end{aligned} \tag{25}$$

Similarly to the case with the State, $q^* = 0$ for $\delta = 0$ or $k_m = 0$.

C Appendix

Table A-1: The tribunals' production function with clustered SE.

	(1)	(2)	(3)
$Pending_{t-1}$			
$Retired_{t-1}$	0.398**		0.433***
	(0.167)		(0.157)
$Judges_{t-1}$	0.040		0.035
	(0.048)		(0.045)
$Open_{t-1}$	0.337***	0.282**	0.289***
	(0.098)	(0.122)	(0.101)
$Divorces_{t-1}$		1.894**	2.003**
		(0.803)	(0.893)
Observations	700	700	700
KP	5.678	5.562	5.743
Year*Tribunal FE	✓	✓	✓
Tribunal FE	✓	✓	✓
Cluster SE	✓	✓	✓
Mean DP	20.89	20.89	20.89

NOTE: $Pending_{i,t-1}$, $Open_{i,t-1}$ and $Divorces_{i,t-1}$ are in thousand. Standard errors are clustered at the tribunal level and the Kleibergen-Paap test is corrected for clustered standard errors

Table A-2: The tribunals' production function with year FE.

	(1)	(2)	(3)
Pending_{t-1}			
Retired_{t-1}	0.377**		0.427***
	(0.157)		(0.142)
Judges_{t-1}	0.048		0.041
	(0.040)		(0.037)
Open_{t-1}	0.331***	0.285***	0.281***
	(0.068)	(0.081)	(0.069)
Divorces_{t-1}		1.824***	1.974***
		(0.671)	(0.684)
Observations	700	700	700
KP	5.715	7.386	9.025
HJ-test			
Year*Tribunal FE	✓	✓	✓
Tribunal FE	✓	✓	✓
Year FE	✓	✓	✓
Robust SE	✓	✓	✓
Mean DP	20.89	20.89	20.89

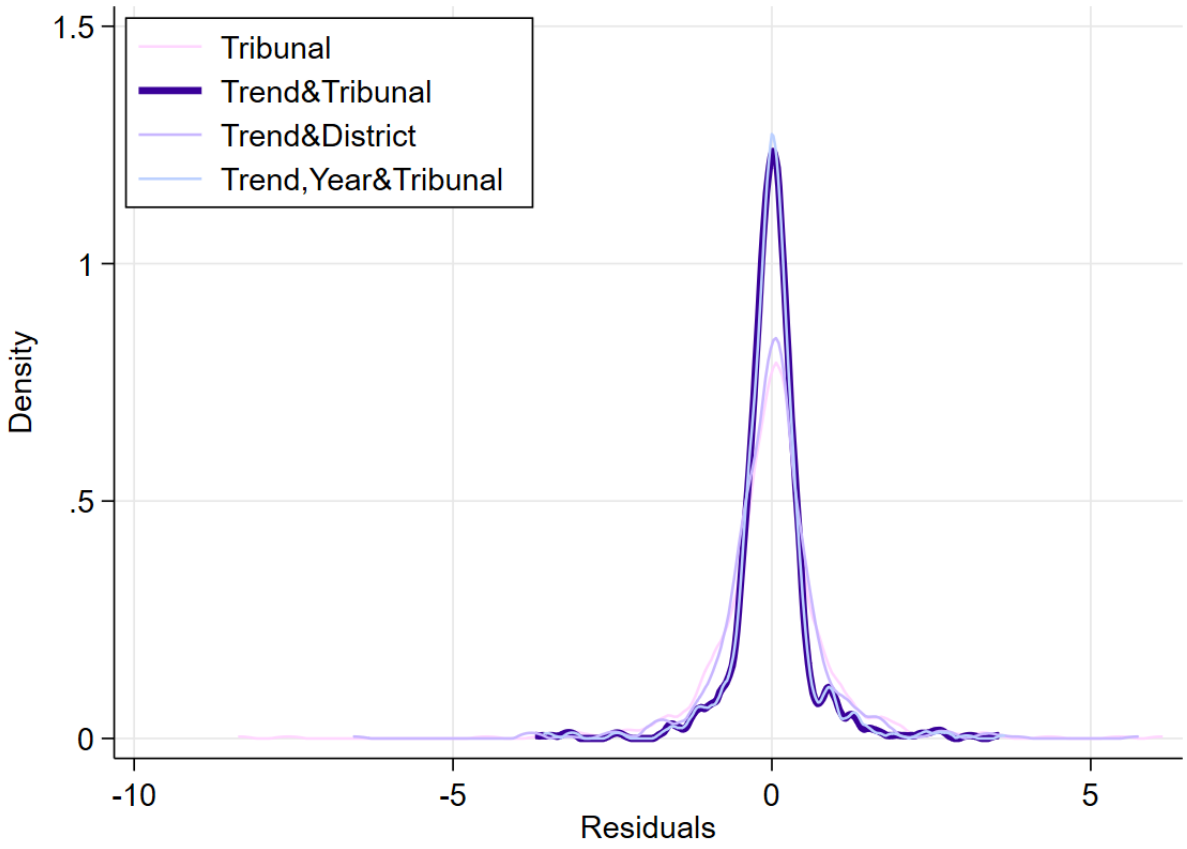
NOTE: $Pending_{i,t-1}$, $Open_{i,t-1}$ and $Divorces_{i,t-1}$ are in thousand. Standard errors are clustered at the tribunal level and the Kleibergen-Paap test is corrected for clustered standard errors

Table A-3: The tribunals' production function with district FE.

	(1)	(2)	(3)
$Pending_{t-1}$			
$Retired_{t-1}$	0.386*		0.453***
	(0.198)		(0.161)
$Judges_{t-1}$	0.066		0.024
	(0.041)		(0.029)
$Open_{t-1}$	0.530***	0.476***	0.471***
	(0.042)	(0.043)	(0.039)
$Divorces_{t-1}$		2.215***	2.215***
		(0.603)	(0.523)
Observations	700	700	700
KP	3.790	13.48	9.574
Year*Tribunal FE	✓	✓	✓
District FE	✓	✓	✓
Robust SE	✓	✓	✓
Mean DP	20.89	20.89	20.89

NOTE: $Pending_{i,t-1}$, $Open_{i,t-1}$ and $Divorces_{i,t-1}$ are in thousand. Standard errors are clustered at the tribunal level and the Kleibergen-Paap test is corrected for clustered standard errors

Figure A-2: First-stage residuals plot.



NOTE: Plot of the residuals for different first stage specification: tribunal fixed effects; tribunal time trend and tribunal fixed effects; tribunal time trend and district fixed effects; tribunal time trend, year and tribunal fixed effects.