

# The adverse effect of trial duration on the use of plea bargaining and penal orders in Italy

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## Abstract

*The average duration of first-instance criminal trials has steadily increased in Italy over the last twenty years. Over the same period, the use of trial-avoiding procedures has decreased, contrasting the predictions of the economic models of plea bargaining. The phenomenon can be explained by the unique regulation of the Italian statute of limitations: if trials last longer than a certain time threshold, defendants must be acquitted. Hence, longer trials reduce defendants' incentives towards plea bargaining and penal orders. In an instrumental variable analysis on a panel of 140 first-instance judicial districts over the period 2005-2021 I find that longer first-instance trials decrease the use of both plea bargaining and penal orders in Italy. The results of the analysis call for a reform of the Italian statute of limitations, considering its perverse effect on defendants' incentives.*

**Keywords:** plea bargaining; penal orders; statute of limitations; criminal procedure; Law and Economics.

**JEL Codes:** K14; K42.

## 1. Introduction

In Italy, at least since the 1970s, criminal trials have been characterized by an excessive duration (Boari and Fiorentini, 2001; Mura and Patrono, 2011).<sup>1</sup> Over the last twenty years the situation has further deteriorated and in 2018 Italy ranked first among 47 European countries in terms of duration of first-instance criminal trials, with a disposition time of 361 days, compared to a continental average of 144 days (CEPEJ 2022).

Trying to decrease the average duration of criminal proceedings, since 1988 the Italian lawmakers have provided for two trial-avoiding conviction mechanisms. The first is a plea-bargaining procedure informally called *patteggiamento*, according to which a defendant can waive his right to trial in exchange for a discounted sentence. The second is a penal order procedure, known as *decreto penale di condanna*, according to which the prosecutor can impose a fine sentence already during the investigation phase; such sentence becomes a final conviction unless the defendant opposes it and asks for trial within 15 days.

The Law and Economics literature (Landes, 1971; Adelstein, 1978) predicts that a longer expected trial duration, by increasing the costs of trial, should incentivize both parties towards a greater use of plea bargaining. A similar reasoning can be extended to other trial-avoiding mechanisms such as penal orders. However, over the last twenty years, the use of both plea bargaining and penal orders has steadily decreased in Italy. I argue that this puzzling situation can be explained by the regulation of the Italian statute of limitations. According to such regulation, defendants must be acquitted if they are not convicted within a limited time since the alleged commission of the crime, regardless of any available evidence and of the resources already invested by the State in prosecuting the case. The

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<sup>1</sup> This led to several decisions of the European Court of Human Rights against Italy for violation of the right to a reasonable duration of trials, provided for in art.6 of the European Convention on Human Rights. See lastly *Petrella v. Italy*, no. 24340/07, ECHR 2021.

statute of limitations thus lowers the incentives for defendants towards a quick disposition of their case, since longer trials increase their chances of acquittal.

In recent years a growing number of countries have adopted plea-bargaining procedures (Fair Trials, 2017) and other trial-avoiding conviction mechanisms (Langer, 2021). However, the extent of their use in practice varies across jurisdictions, often in contrast with the lawmakers' expectations (Garoupa and Stephen, 2008; Paolini 2023). The present paper sheds light on institutional factors that may prevent a significant use of trial-avoiding procedures, especially in civil law jurisdictions.

The paper is organized as follows. Section 2 contains a brief overview of the related literature. Section 3 discusses the regulation and functioning of Italian criminal proceedings. Section 4 describes the empirical strategy, together with the instruments and additional relevant variables. Section 5 presents the data and their sources. In Section 6 I report and discuss the results of the analysis, while Section 7 concludes.

## 2. Related literature

According to the first economic model of plea bargaining (Landes, 1971) a plea agreement is more likely the more resources would a trial cost compared to plea bargaining.<sup>2</sup> In line with the theory, the same paper finds a positive correlation between plea bargaining and longer trial delays in U.S. district courts in the years 1960, 1967, and 1968.<sup>3</sup> The second economic model of plea bargaining (Adelstein, 1978) explicitly takes into account the effects of time on the decisions of the parties. A greater delay in the disposition of cases imposes greater costs on both prosecutors and defendants, which then try to minimize the time required for reaching an agreement.

The empirical research on the drivers of use of plea bargaining in individual jurisdictions is nearly exclusively focused on the U.S., with two exceptions. First, Boari and Fiorentini (2001) finds that the use of plea bargaining in Italy is positively correlated with the number of incoming cases, the proportion of reported cases with known authors, and the population size of districts, while it is negatively correlated with income levels, the density of lawyers, and a higher seniority of the chief prosecutor.<sup>4</sup> Second, Stephen et al. (2008) finds that a change in the remuneration of public defenders from payment for work done to a fixed fee caused an increase in plea-bargaining rates in Scotland. In the U.S. a greater likelihood of accepting plea agreements is exhibited by defendants in pretrial detention (Sacks and Akerman, 2012; Heaton et al., 2017; Leslie and Pope, 2017; Donnelly and MacDonald, 2018; Dobbie et al., 2018), by those on which a death penalty can be imposed (Kuzmienko, 2006; Thaxton, 2013) and by those charged with lower-severity offenses (Meyer and Gray, 1997). Lower plea-bargaining rates are instead observed in the months approaching prosecutorial elections (Bandyopadhyay and McCannon, 2014), since prosecutors can better show their ability to the electorate during court trials.<sup>5</sup> In cross-country settings, the empirical study of the determinants of use of plea bargaining is close to nil, mainly because of data unavailability and obstacles to causal inference (Langer, 2021). In a correlational study on 52 jurisdictions, Paolini et al. (2023) shows that higher plea-bargaining rates are observed in former Spanish colonies and in former members of the Warsaw pact, compared to common law jurisdictions, and in countries with jury trials. Conversely, lower plea-bargaining rates are observed both in very rich and very poor jurisdictions.

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<sup>2</sup> Among other implications of the model, plea bargaining should take place more often when the expected trial sentence is smaller, when defendants are more risk-averse, and when prosecutors' and defendants' estimates about the likelihood of conviction at trial differ widely.

<sup>3</sup> According to Landes, such effect should be mainly driven by defendants not released on bail, since a longer trial delay imposes greater costs on them. However, trial delay arguably increases expected trial costs for every type of defendant.

<sup>4</sup> The results are based on an analysis of 146 first-instance judicial districts in the period 1989-1992.

<sup>5</sup> For an extensive review of the empirical literature about plea bargaining in the USA see Subramian et al. (2020).

A further strand of literature explores the effects of the duration of criminal trials on various outcomes. Using Italian data for the period 1999-2002, Dalla Pellegrina (2008) finds that longer first-instance trials cause an increase in crimes against property. This effect could be attributed both to a discounting process, so that a delayed punishment is perceived as less costly, or to the diluting effect on deterrence caused by the Italian statute of limitations. Using data from Czech Republic in the period 1999-2008, Dušek (2015) finds that the introduction of a fast-track procedure led to a substantial increase in recorded drive-related offences, because of the reallocation of police resources towards crimes with low-enforcement costs.

### 3. Legal and factual background

#### 3.1. *The plea-bargaining procedure*

In 1989 a new code of criminal procedure entered into force in Italy, introducing a plea-bargaining procedure, informally called *patteggiamento*.<sup>6</sup> According to such procedure, the defendant can agree with the prosecutor to waive his right to trial and accept the imposition of a criminal sentence reduced up to one third.<sup>7</sup> Plea bargaining is possible for crimes punished with up to 5-year imprisonment, taking into account the sentence discount and the applicable mitigating circumstances.<sup>8</sup> In the case of prison sentences above 2 years, plea bargaining is not applicable to terrorism-related crimes, organized crime, some sexual crimes, and if the defendant is a recidivist.<sup>9</sup>

A plea agreement can only be concluded before the opening of first-instance trials. The negotiations involve only the defendant, together with his defense lawyer, and the prosecutor. After the agreement has been signed, it is reviewed by a judge, who can only accept or reject it, but not modify its content. The judicial review is quite thorough. Initially the judge checks whether plea bargaining can be applied in the case under review and if some causes exist that would have prevented a conviction at trial. Then the judge checks whether the charges corresponds to the alleged facts, whether all the mitigating and aggravating circumstances have been considered, and whether the proposed punishment is in line with the constitutional aim of rehabilitation. A conviction imposed through plea bargaining cannot be appealed.

#### 3.2. *The penal order*

If a custodial sentence is not needed and the evidence is strong enough, the prosecutor, during the investigation phase, can ask the judge to issue a penal order and impose a fine on the defendant. Before issuing the penal order, the judge checks whether a fine is the appropriate punishment, and whether no causes exist that would have prevented a conviction at trial.

The penal order that imposes the fine is then notified to the defendant, who can oppose it within 15 days and ask for trial.<sup>10</sup> Otherwise, the fine becomes final, and it equates a criminal conviction. In

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<sup>6</sup> Italy was then the first civil law country to adopt plea bargaining in Europe, thus initiating a trend which is still ongoing (Fair Trials, 2017; Langer, 2021; Paolini, 2023).

<sup>7</sup> Besides the sentence discount, in all cases plea bargaining entails the following additional benefits for defendants: the proceedings' expenses are not due; ancillary measures cannot be applied (e.g. suspension of the driving license); the conviction is not mentioned in the criminal records when required by privates; the conviction cannot be used as evidence in civil and administrative proceedings; all other effects of the conviction cease if the defendant does not commit a similar crime within a period of 2 to 5 years.

<sup>8</sup> For example, a crime that would have been punished with 7 years imprisonment at trial could be object of plea bargaining, because after the 1/3 discount the sentence to be imposed is just 4,67 years.

<sup>9</sup> Regardless of the sentence limit, plea bargaining cannot be used by underage defendants.

<sup>10</sup> Alternatively, when opposing the penal order, the defendant can propose a plea bargaining or ask for a simplified trial. However, if the prosecutor does not accept such proposal or request, the opposition stands, and the case will be adjudicated at trial. It is worth noting that, before being notified the penal order, the defendant can be totally unaware of the criminal investigation carried against him (Nicolucci, 2008).

order to disincentivize the opposition to penal orders, the law stipulates that the imposed fine must be half of the statutory minimum.<sup>11</sup>

### 3.3. *The statute of limitations*

According to the Italian regulation of the statute of limitations, a conviction can only be imposed within a limited time period since the alleged commission of the crime.<sup>12</sup> This period is equal to the maximum prison penalty set by law for that crime,<sup>13</sup> and in any case it cannot be less than 6 years for felonies and 3 years for misdemeanors.<sup>14</sup> If a conviction is not imposed within such period, the defendant must be acquitted, since the crime is considered extinct, regardless of the stage of the first-instance procedure in which the threshold is met.<sup>15</sup> For example, if a misdemeanor is punished by law with maximum 4-year imprisonment, the statute of limitations threshold is also set at 4 years. The only exceptions are crimes punished with life imprisonment, to which the statute of limitations does not apply.

### 3.4. *The organization of criminal proceedings*

When the prosecutor is notified about the commission of a crime, he must investigate the case, with the support of police forces. During the investigation stage any act that can impact the constitutional rights of people under investigation, e.g. searches and seizures, must be authorized by a specific judge, called G.I.P., which stands for “Judge assigned to the preliminary investigation”. The same judges also accept or reject the prosecutors’ requests directed at imposing penal orders and they review any plea agreement concluded during the investigation phase. At the end of the investigations, the prosecutor can ask the G.I.P. either to drop the case, for example because not enough evidence have been collected or no person can be charged, or to set a date for trial. If the charged crime is not a felony, or if it is statutory punished with less than 4-year imprisonment, the G.I.P. directly sets a date for trial. At any time before the opening of trial, prosecutors and defendants can still agree on a plea agreement, which will be then reviewed by the trial court.

If the charged crime is a felony, or if it is statutory punished with more than 4-year imprisonment, a preliminary hearing takes place before the actual trial. During this hearing a different judge, called G.U.P., which stands for “Judge assigned to the preliminary hearing”, decides whether the prosecutor has collected enough evidence, and whether, based on such evidence, it is possible to anticipate that the defendant will be convicted at trial. If the evidence collected cannot support the opening of trial, the G.U.P. can indicate to the prosecutor the need for supplementary investigations or reject altogether the request to set a date for trial. The preliminary hearing takes place with the necessary participation of both the prosecutor and the defense lawyer. During the preliminary hearing the defendant can also

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<sup>11</sup> By not opposing the penal order, the defendant enjoys the following additional benefits: the proceedings’ expenses are not due; ancillary measures cannot be applied (e.g. suspension of the driving license); the conviction cannot be used as evidence against the defendant in civil and administrative proceedings; all other effects of the conviction cease if the defendant does not commit a similar crime within a period of 2 to 5 years.

<sup>12</sup> Some procedural acts interrupt the computation of the statute of limitations threshold, such as the imposition of a penal order, or the judicial decrees that set the date for the opening of trial. When those acts take place the counter of the statute of limitations threshold is set to zero, but it starts running again since that same day.

<sup>13</sup> If the crime is punished only with a fine, the maximum amount prescribed by law is converted into days, according to a rate periodically established by law. For crimes punished neither with a prison sentence nor with a fine, the statute of limitations threshold is set at three years.

<sup>14</sup> Felonies, called *delitti*, can be punished with prison sentences up to 24 years while misdemeanors, called *contravvenzioni*, with prison sentences up to 3 years.

<sup>15</sup> After a reform entered into force in January 2020 (legge n. 3/2019), the time spent during the appeal and cassation trials is not relevant anymore for computing the statute of limitations threshold. Since the present analysis is focused on the duration of first-instance trials, I do not specifically consider the possible effects of such reform on the use of alternative procedures.

request to be judged by the G.U.P. according to a simplified-trial procedure called *procedimento abbreviato*. The G.U.P. also reviews any plea bargaining concluded in the period going from the end of the investigations to the end of the preliminary hearing itself.

To sum up, plea bargaining can take place: a) during the investigation stage, and be reviewed by the G.I.P.; b) between the end of the investigation stage and the opening of trial, for crimes that do not require the preliminary hearing, and be reviewed by the trial court; c) between the end of the investigation stage and the end of the preliminary hearing, and be reviewed by the G.U.P.

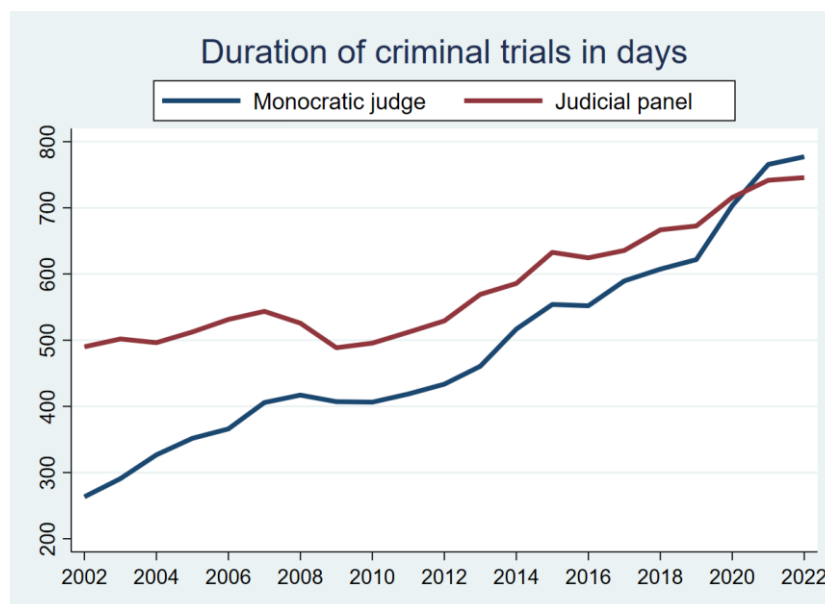
Instead, penal orders can only be imposed during the investigation stage by the G.I.P., upon request of the prosecutor.

After the preliminary hearing, the first-instance trial takes place before either a monocratic court or a judicial panel. The monocratic court has general jurisdiction over all crimes unless they are specifically attributed to the jurisdiction of the judicial panel. The monocratic court also functions as appellate court for criminal cases decided in first instance by justices of the peace.<sup>16</sup> The jurisdiction of the judicial-panel court includes crimes punished above 10-years imprisonment and a series of more serious crimes enumerated by law, such as terrorism, organized crime, rape, bankruptcy-related fraud. Homicide cases, together with few other crimes, are assigned to the jurisdiction of a different judicial-panel court, called assize court.<sup>17</sup>

All first-instance courts described above are organized in Tribunals, whose jurisdiction extends over a territory called *circondario*. Courts of Appeal are instead competent over a territory called *distretto* and which includes several *circondari*. The Italian territory is currently organized into 140 *circondari* (first-instance districts) and 26 *distretti* (second-instance districts).

### 3.5. Trial duration and the use of trial-avoiding procedures

The average duration of first instance trials has steadily increased over the last twenty years, as shown in Figure 1.

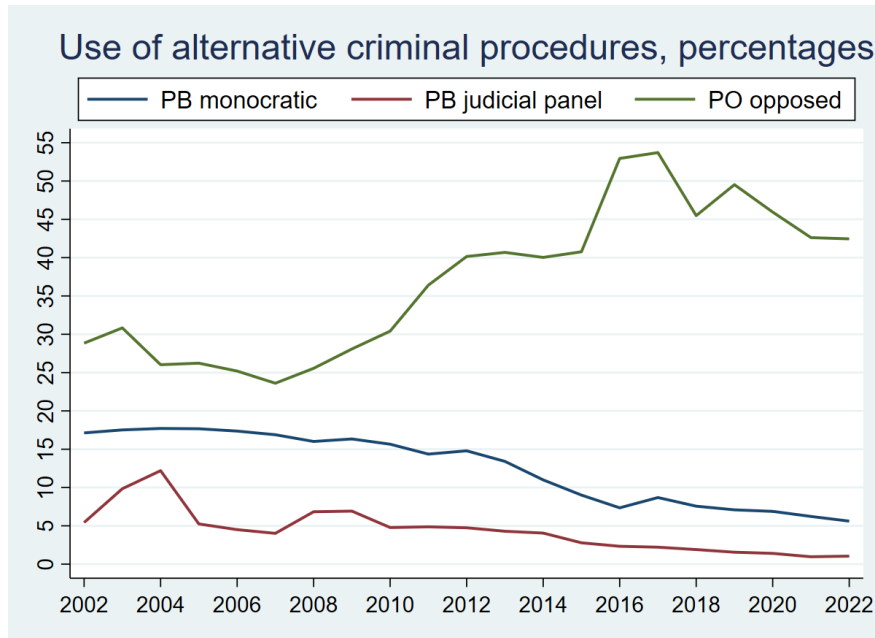


**Figure 1 – Average duration of first-instance criminal trials, 2002-2022**

<sup>16</sup> Justices of the peace have competence over a series of petty crimes enumerated by law. They cannot impose prison sentences or fines above 2.582 euros. Plea bargaining and penal orders do not apply to cases decided by justices of the peace.

<sup>17</sup> This is the only court that requires the presence of lay judges. The use of plea bargaining is not *de jure* excluded, but it has been *de facto* applied in just 21 cases between 2002 and 2022.

The average duration of trials before monocratic courts rose from 263 days in 2002 up to 777 days in 2022. The average duration of judicial-panel trials increased from 490 days in 2002 up to 745 days in 2022. Over the same period, in contrast with the predictions of Law and Economics models, the number of plea bargaining (PB) has decreased, while the oppositions to penal orders (PO) have increased, as depicted in Figure 2.



**Figure 2 - Use of plea bargaining and penal orders, 2002-2022**

Plea bargaining accounted for 17,13% of all cases decided by monocratic courts in 2002, but only for 5,61% in 2022. For judicial panels the proportion decreased from 5,43% in 2002 to 1,05% in 2022. At the same time, the ratio of opposed penal orders rose from 28,84% in 2002 to 42,25% in 2022.

#### 4. Empirical strategy

According to the Law and Economics literature, a greater expected cost of trial should increase the use of plea bargaining. A considerable component of the total costs of trial is the time necessary for adjudicating the case, since it constitutes a relevant opportunity cost for both defendants and prosecutors (Landes, 1971; Adelstein, 1978). However, I argue that in Italy longer trials might be preferred by defendants over a quick disposal of their case. The reason is the peculiar regulation of the Italian statute of limitations: defendants must be acquitted, regardless of any existing evidence against them, if they are not convicted within a certain period since the alleged commission of the crime. As shown above, Italy has experienced at the same time an increase in the average duration of criminal trials and a decrease in the use of trial-avoiding procedures over the last twenty years. However, this simple observation is not enough to conclude that longer trials cause a decrease in the use of plea bargaining and penal orders. Indeed, it is easy to argue that the causal mechanism primarily operates in the opposite direction. Namely, a lower use of plea bargaining and penal orders results in more ordinary trials which, under resource constraints, will take longer to be adjudicated. Trial duration is hence endogenous to the use of trial-avoiding procedures.

In order to overcome the endogeneity problem, I will rely on instrumental variable analysis. This approach requires to find a variable, called instrument, which is directly related to the explanatory variable (relevance condition), but at the same time not related to the outcome variable (exclusion restriction), unless because of its influence on the explanatory variable itself (Woolridge, 2018). In

the context of the present analysis, I need to find a variable that is directly related to my explanatory variable, trial duration, but not with my outcome variables, i.e. the use of plea bargaining and penal orders.

#### 4.1. *The instruments*

As first instrumental variable I use the number of criminal judges per 1.000 inhabitants in each first-instance judicial district (*circondario*). Such variable should be correlated with trial duration because a higher density of judges should ensure a quicker disposition of the caseload. At the same time, the exclusion restriction should hold, because judges cannot directly influence the number of plea bargaining and penal orders. Indeed, they can only impose penal orders when required to do so by prosecutors, and the decision to oppose the penal order is solely in the hands of the defendant. Regarding plea bargaining, judges never participate in the negotiations process. Furthermore, the judge that reviews the agreement is not the same judge competent over the procedural stage in which the agreement itself is concluded, except for the G.I.P. Similarly, it seems plausible that the decisions of prosecutors and defendants regarding the use of trial-avoiding procedures do not directly depend on the observed density of judges in the judicial district, unless because of the impact of such factor on the expected duration of criminal trials.

I argued that the density of criminal judges has no direct influence over the use of plea bargaining and penal orders. Unfortunately, the exclusion restriction can never be tested (Woolridge, 2018), and for this reason “good instruments should feel weird” (Cunningham, 2021, p.320). Indeed, a good instrument feels weird precisely because it does not show any direct correlation with the outcome variable. For this reason, I employ an additional instrument: the average yearly temperature in each first-instance judicial district. A popular strand of literature has tested the influence of weather on judicial decisions, with mixed results. Heyes and Saberian (2019) found that an increase in outdoor temperature caused a decrease in immigration judges’ propensity to grant asylum in the U.S. However, Spamann (2022) fails to replicate such result, when correcting for coding errors and enlarging the sample. Craigie et al. (2023) reports that high daily temperatures raise the likelihood of criminal convictions in India, while Evans and Siminski (2021) finds no effect of outside temperature on criminal court cases in Australia. However, the case outcome is not a relevant factor in the current analysis. Instead, I am interested in the relationship between weather conditions and the organization of court hearings. When the outside temperature is warmer, judges can decide to shorten the daily hearings, or to set hearings further in the future, both because working with higher temperatures can induce fatigue earlier, and because a nice weather increases the opportunity costs of holding trial.<sup>18</sup> Furthermore, in a meta-analysis of previous studies about office environments, Seppanen et al. (2006) finds that performance decreases with temperature above 23-24° C. Hence, if the courtroom is not well insulated, higher temperatures can induce a slower pace of work and lower productivity for all courtroom actors. Since there are reasons to believe that temperature can influence trial duration, the relevance condition should hold. At the same time, the exclusion restriction can be defended, because temperature can influence the work performance of a certain day, or the decision to not hold hearing in a warm summer day, but it is unlikely to influence prosecutors’ and defendants’ final decisions about the use of plea bargaining and penal orders.<sup>19</sup>

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<sup>18</sup> Judges maximize the same things that everyone else does, according to judge Posner (1993).

<sup>19</sup> Such claim is supported by that part of literature which does not find any influence of temperature on the outcome of court cases.

## 4.2. Other variables

The number of incoming cases is an easily observable factor that can influence the choices of both defendants and prosecutors in the use of trial-avoiding procedures. In particular, a larger number of new cases should have a negative impact on court's efficiency, and result in average longer disposition times. This will increase the prosecutors' willingness to offer plea agreements, or to request the imposition of penal orders, in order to quicken caseload disposal and to avoid incurring into the statute of limitations at trial. Symmetrically, the same considerations will decrease the defendant's incentives towards the use of trial-avoiding mechanisms. It can be argued that the effect of more incoming cases on prosecutor's choices will balance the opposite effect on the defendant's side, or that either of the effects can prevail. I argue that the effect on the defendant's side will prevail in practice, for two reasons. First, even if a quicker disposition of cases can enhance the career perspectives of the prosecutor, the stakes are still higher for the defendant, since he risks the imposition of a criminal conviction, and possibly a prison sentence. Second, and most importantly, a greater use of trial-avoiding mechanisms is unlikely to influence the career perspectives of Italian prosecutors in either direction. A 2006 reform has stipulated that every 4 years both judges and prosecutors will be object of a "professionalism judgement", which, in case of positive assessment, will determine a pay increase and the possibility of concurring for directive positions. Among the five criteria evaluated, one is of particular interest in this context: the number of disposed cases and the average disposition time. A larger use of trial-avoiding mechanisms would clearly help in obtaining a better assessment, but the reality is that professionalism judgements are just a formality, and that career progressions are *de facto* linked to seniority, as before the reform.<sup>20</sup> Hence, I expect the defendant's interests to prevail, and to observe a lower use of plea bargaining and penal orders with more incoming cases.

A similar effect should be observed in more populous judicial districts. A minimum number of judges and administrative staff is assigned to each Tribunal, regardless of the population of the judicial district. However, the number of judges, administrative staff, and even police officers does not grow proportionally with population. At the same time, more populated districts should be characterized by a more active social and economic life, which in turn creates more chances for the commission of crimes. Dalla Pellegrina (2008) argues that larger courts should be more efficient because of the effects of economies of scale, while Boari and Fiorentini (2001) reports that in bigger cities the average disposition time for criminal trials was six times larger than in smaller cities in the early 2000s. In his pioneer analysis Landes (1971) observed a greater propensity of defendants towards plea bargaining in more populated counties, attributing such result to average larger court delays in those jurisdictions.<sup>21</sup> Even without considering the actual efficiency of courts located in more populous districts, I argue that just observing a more crowded and chaotic court can induce in defendants an impression of inefficiency and an expectation of higher probabilities of incurring into the statute of limitations<sup>22</sup> Hence, I expect the population size of the judicial district to be negatively correlated with the use of trial-avoiding procedures.

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<sup>20</sup> A judge declared that between 2008 and 2019 nearly all "professionalism judgments" have had a positive outcome, while the negative ones are a negligible percentage (Perelli, 2019). Furthermore, according to a high-rank judge, most assessments are not only positive, but they declare excellence, thus hindering the possibility of signaling, among the diligent prosecutors, those who really deserve a better career progression (Mannucci Pacini, 2019). The lack of incentives towards a greater use of plea bargaining by Italian prosecutors is also discussed by Boari and Fiorentini (2001).

<sup>21</sup> Recall that, according to the Law and Economics literature, longer trials impose greater costs on both parties, thus increasing the incentives towards plea bargaining.

<sup>22</sup> Along the same lines, Chemin et al. (2023) finds that the construction of new court buildings in Kenya improved the perception of the judiciary among citizens and induced a greater use of the court system for the resolution of contractual disputes.



Income should be a relevant factor only for defendants, since the material resources assigned to each court, and to each prosecutor, do not directly depend on the GDP of the corresponding territory. Since defense lawyers are paid accordingly to the number of procedural acts they perform (Buonanno and Galizzi, 2014), opting for trial is the costlier choice for defendants, in comparison with plea bargaining and penal orders. Hence, I expect a lower use of plea bargaining and penal orders in richer districts.

## 5. Data

The present section describes the variables and their respective sources. Table 1 reports summary statistics for the variables used in the main analysis.

As outcome variables, I employ three different measures of the use of trial-avoiding procedures. The use of plea bargaining is measured by the percentage of plea-bargaining cases over the total number of cases disposed by monocratic courts (*pb\_mono*) and judicial panels (*pb\_coll*). The use of penal orders is measured by the percentage of opposed penal orders over the total number of penal orders issued (*po\_opp*). In robustness tests I also use the percentage of plea-bargaining cases over the total number of cases disposed by G.I.P. and G.U.P. offices (*pb\_gip*)<sup>23</sup>. A total of 42.088 plea agreements were concluded in Italy in 2022, the majority of which (57,85%) were reviewed by G.I.P. and G.U.P. offices (respectively 13.159 and 11.190 cases). However, the main function of G.I.P. and G.U.P. offices is not the adjudication of criminal cases. Indeed, decisions that impose the discontinuation of prosecution or that set a date for trial constituted 87,35% of the total number of decisions issued by those offices in 2022. Hence, the use of plea bargaining as an adjudication procedure is better captured by the proportion of cases decided by trial courts. In robustness tests I employ different measures of plea-bargaining, by including in the total number of disposed cases: for monocratic courts, cases decided as second-instance courts for the justices of the peace (*pb\_mono\_pace*); for judicial panels, cases decided by the assize court, considered as a special type of judicial panel (*pb\_coll\_assise*).<sup>24</sup> I personally computed all the variables described above, starting from raw data obtained upon request by the Statistics Department of the Italian Ministry of Justice (DG-Stat).

Regarding the main explanatory variable, the average duration of first-instance trials in days is directly provided by DG-Stat for monocratic courts (*durata\_mono*) and judicial panels (*durata\_coll*). Coming to control variables, I computed the number of incoming cases per 1.000 inhabitants by using two different sources of data. The raw number of incoming cases is again provided by DG-Stat with reference to different judicial offices, while data about the population of municipalities is provided by ISTAT (Italian Institute of Statistics). Differently from previous works about the functioning of first instance courts in Italy (Dalla Pellegrina, 2008; Buonanno and Galizzi, 2014) I use first-instance judicial districts as the basic unit of analysis, instead of administrative provinces (NUTS level 3).<sup>25</sup> Hence, I created a variable measuring the population of each first-instance judicial district (*pop*), by assigning each municipality to the respective Tribunal. The resulting novel dataset covers the period

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<sup>23</sup> The Ministry of Justice reports jointly the total number of cases disposed by G.I.P. and G.U.P. offices, so it is not possible to compute separate plea-bargaining rates.

<sup>24</sup> I do not use such variables in the main analysis, since plea bargaining cannot be applied in cases decided by justices of the peace, and because the use of such procedure is extremely limited, both *de jure* and *de facto*, in the assize court. As shown in Table A.1. in Appendix A, plea-bargaining rates are pretty similar to those used in the main analysis.

<sup>25</sup> In most cases the territory of first-instance judicial districts (*circondario*) overlaps with that of administrative provinces. However, in many cases a single province includes several first-instance judicial districts (e.g. the provinces of Messina and Reggio Calabria include 3 *circondari* each), or conversely more than one province are included in a single first-instance judicial district (e.g. the *circondario* of Cagliari includes the provinces of Cagliari and South Sardinia), or some municipalities are not included in the judicial district corresponding to the respective province.

2002-2022 and each of the 140 first-instance judicial districts.<sup>26</sup> I then computed the number of incoming cases per 1.000 inhabitants for monocratic courts (*inc\_ab\_mono*), including cases decided as second-instance court for the justices of the peace (*inc\_ab\_mono\_pace*), for judicial panels (*inc\_ab\_coll*), including assize courts (*inc\_ab\_coll\_ass*), and for G.I.P. and G.U.P. offices together (*inc\_ab\_gip*).<sup>27</sup>

**Table 1. Summary statistics**

	N	Mean	SD	Min	Max
PB – Monocratic courts	2372	12.358	7.431	.162	42.601
PB – Judicial panels	2372	3.2	4.774	0	44.444
PO opposed	2372	41.347	23.153	0	300
Trial duration – Monocratic	2372	509.886	263.857	4.384	1846.943
Trial duration – Judicial panels	2372	593.985	253.031	67.5	1816.649
Incoming cases – Monocratic	2372	6.034	2.488	.175	21.137
Incoming cases – Judicial panels	2372	.225	0.123	.004	.908
Incoming cases – GIP and GUP	2372	14.897	5.638	.732	56.056
Inhabitants	2372	426137.18	381431.637	57158	2820219
GDP per capita	2372	24836.383	7054.343	13800	55800
Judges per 1.000 inhabitants	2372	.039	0.021	.012	.151
Average yearly temperature	2240	15.889	1.920	10.59	21.28

Note: PB stands for plea bargaining, PO stands for penal orders.

For income levels (income) I used GDP per capita at current market prices provided by Eurostat for NUTS 3 level, corresponding to Italian administrative provinces, since comparable data are not available at the municipal level. I then assigned income levels to each first-instance judicial district, based on the province in which the respective Tribunal is located.<sup>28</sup>

For the first instrument (*judge\_ab*), I retrieved the number of first-instance criminal judges in each first-instance judicial district from the dataset “Justice” (Nifo and Vecchione, 2022) over the period 2005-2021. I then used those data and the variable *pop* to compute the number of judges per 1.000 inhabitants in each first-instance judicial district.<sup>29</sup>

For the second instrument (*temper*), I used the yearly average temperature in the capital of each administrative province in Celsius degrees for the years 2006-2021, as provided by ISTAT.<sup>30</sup> I then assigned the average temperature to each first-instance judicial district, based on the province in which the respective Tribunal is located. This method should ensure accuracy of the results, since

<sup>26</sup> I used as reference the territorial organization established by a 2012 reform, entered into force in 2014, that abolished 31 first-instance judicial districts. The reason for such choice is that data are provided by the Ministry of Justice with reference to the new territorial organization, also for years preceding 2014. The dataset “Justice” (Nifo and Vecchione, 2022) reports the population of each first-instance judicial district only for the period 2005-2021 and it does not include several judicial districts whose abolition was decided by the 2012 reform, but which are still functioning to date (e.g. Avezzano and Fermo).

<sup>27</sup> As mentioned above, data provided by the Ministry of Justice do not distinguish the number of incoming and disposed cases between G.I.P. and G.U.P. offices.

<sup>28</sup> Data for 2021 income levels are not yet available at the NUTS 3 level for Italy. For this reason, I considered the NUTS 2 level, corresponding to Italian administrative Regions, as a proxy for that year.

<sup>29</sup> As mentioned above, the dataset “Justice” does not include 4 first-instance judicial districts whose abolition was decided by the 2012 reform, but which are still functioning. Each abolished judicial district was merged with another one. Hence, I retrieved from the official website of the corresponding tribunal the number of judges in the district that was supposed to be merged, and I deducted it from the number of judges in the merging district, as reported by the dataset “Justice”. In this way I was able to compute the density of criminal judges for all 140 functioning first-instance districts.

<sup>30</sup> When data were missing for a specific year, I used the corresponding temperature from the previous year. For Gorizia, since data were totally missing, I used the average yearly temperature of the closest provincial capital, Udine, distant 38 km.

Tribunals are located in the provincial capitals, unless the province itself is split among more first-instance judicial districts. Even in the latter case, the territorial extension of provinces is limited and rather homogeneous in terms of average temperature.

## 6. Results and discussion

### 6.1. Baseline analysis: OLS with fixed effects

Table 2 reports the results of OLS regressions that include district and year fixed effects and all the variables later used in the IV analysis.

**Table 2. Baseline analysis – OLS with fixed effects**

VARIABLES	(1) pb_mono	(2) pb_coll	(3) po_opp
Trial duration - Monocratic court	-0.009*** (0.000)		0.002 (0.625)
Incoming cases - Monocratic court	-0.168** (0.047)		0.635* (0.095)
Trial duration - Judicial panel		-0.004*** (0.000)	
Incoming cases - Judicial panel		5.717** (0.011)	
Incoming cases – G.I.P.			-0.213 (0.150)
GDP per capita	-5.662** (0.021)	-0.292 (0.899)	8.497 (0.353)
Inhabitants	-18.682*** (0.000)	-3.848 (0.227)	6.887 (0.799)
Observations	2,371	2,371	2,371
R-squared	0.816	0.445	0.344
District FE	Yes	Yes	Yes
Year FE	Yes	Yes	Yes

Note: Robust standard errors in parentheses, clustered at the judicial-district level. Incoming cases per 1.000 inhabitants. Natural logarithm of GDP per capita and inhabitants.

\*\*\* p<0.01, \*\* p<0.05, \* p<0.1

In column 1, which considers plea bargaining in monocratic courts, all variables are statistically significant, and they show the expected signs. In particular, longer trials are negatively correlated with the use of plea bargaining, and the result is significant at the 1% level. In the case of judicial panels, reported in column 2, longer trials are again correlated with a lower use of plea bargaining, and the result is significant at the 1% level. However, more incoming cases are correlated with a greater use of plea bargaining, in contrast with my expectations. Since judicial panels decide more serious crimes, a possible explanation is that, in presence of a larger caseload, prosecutors are willing to offer plea bargaining in cases that they would have otherwise brought to trial. No other variables are statistically significant in column 2.

Column 3 considers the use of penal orders. When a penal order is opposed, the subsequent trial can be held either before a monocratic court or a judicial panel. However, since penal orders are used in petty cases that do not require the imposition of a prison sentence, in most cases the competent court

is the monocratic one. For example, in 2022 only 16 oppositions to penal orders were decided by judicial panels, in contrast with 18.852 opposition cases decided by monocratic courts. For this reason, I consider the duration of monocratic court trials as the main explanatory variable for the use of penal orders. I consider the number of incoming cases both for monocratic courts, which are usually the competent ones in the case of opposition, and for G.I.P. offices, since they are the competent court for issuing penal orders. Defendants will consider the flow of incoming cases in monocratic courts when deciding whether to oppose a penal order, since the opposition will most likely result in a monocratic-court trial. Prosecutors will instead observe the number of incoming cases in G.I.P. offices, as a proxy for the size of their own caseload, when deciding whether to issue a penal order in the first place. The number of incoming cases in monocratic courts is the only marginally significant variable in column 3, with the expected positive sign.

### 6.2. IV analysis: Density of judges

Table 3 shows the results of first stage regressions. In the regressions I included all the control variables used in the second stage, together with judicial-district and year fixed effects. Robust standard errors are clustered at the judicial-district level.

**Table 3. First stage – IV: Criminal judges per 1.000 inhabitants**

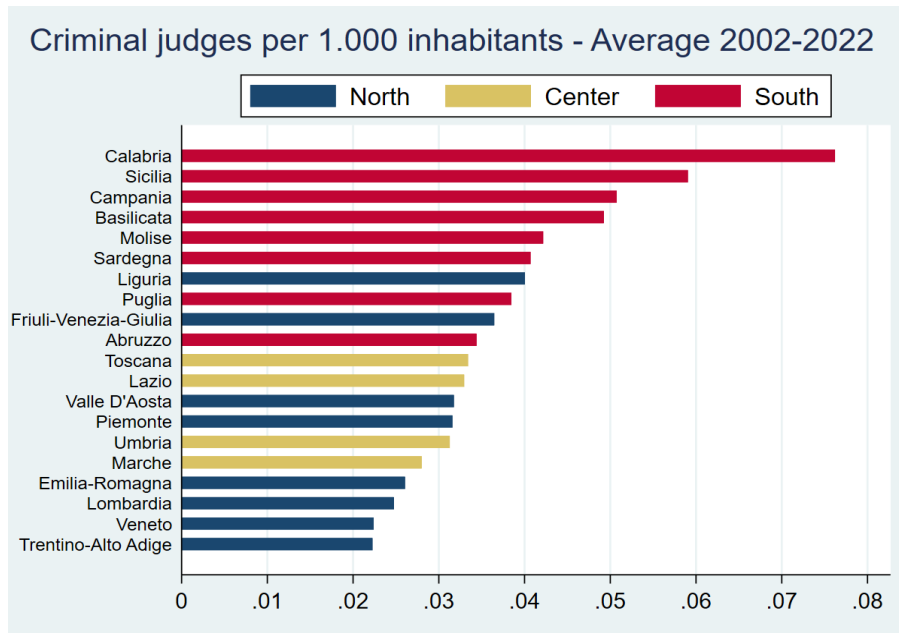
<b>Instrumented variable</b>	<b>pb_mono</b> durata_mono	<b>pb_coll</b> durata_coll	<b>po_opp</b> durata_mono
<b>Instrumental variable</b>			
Criminal judges per 1.000 inhabitants	26969.5*** (0.000)	19201.78*** (0.000)	26334.3*** (0.000)
<b>Weak identification test</b>			
Kleibergen-Paap rk Wald F statistic:	25.870	22.683	30.135
Stock-Yogo weak ID test critical values:			
10% maximal IV size	16.38	16.38	16.38
15% maximal IV size	8.96	8.96	8.96
20% maximal IV size	6.66	6.66	6.66
25% maximal IV size	5.53	5.53	5.53

Note: \*\*\* p<0.01, \*\* p<0.05, \* p<0.1

The density of judges is statistically a strong instrument, since for all three regressions the coefficients of the Kleibergen-Paap rk Wald F statistic are well above the 10% confidence level set by the Stock-Yogo test.<sup>31</sup> However, the coefficients are positive, in contrast with my expectations. Indeed, a positive coefficient means that a higher density of criminal judges is associated with longer criminal trials. Two factors can explain such result. First, the presence of more judges in the same judicial district may dilute the responsibility placed on each individual judge for the overall performance of the court. Second, it may happen that both the number of criminal judges and the duration of criminal trials are simultaneously influenced by a third variable. As depicted in Figure 3, this seems the case in Italy, since the number of judges per 1.000 inhabitants is systematically higher in southern regions, which are affected by a longer and more pervasive presence of organized crime.

<sup>31</sup> The Kleibergen-Paap rk Wald F statistic is used instead of the Cragg-Donald Wald F statistic when using clustered or robust standard errors, and I cluster errors at the judicial-district level. In order to test whether the instrument is strong, the value of the Kleibergen-Paap rk Wald F statistic must be then compared with the critical values indicated by the Stock-Yogo test. Higher values ensure greater strength of the instrument. See Stock and Yogo (2005) and Kleibergen and Paap (2006).

Over the period 2002-2022 the average number of criminal judges per 1.000 inhabitants in the South (0,052) is nearly double than in the Center (0,032) and in the North (0,028). In particular, the top three regions by density of criminal judges are Calabria (0,076), Sicily (0,059), and Campania (0,051). Those regions are the birthplaces and traditional operational areas of the three most powerful Italian criminal organizations.<sup>32</sup> The observed correlation between a stronger presence of organized crime and a higher density of criminal judges is confirmed by regulatory choices about the organization of first-instance judicial districts. In 2013 the new judicial district of Napoli Nord was created in the metropolitan area of Naples, while a 2012 reform imposed the abolition of many judicial districts, but specifically preserved those situated in areas characterized by a stronger presence of criminal organizations.<sup>33</sup>



**Figure 3 – First-instance criminal judges per 1.000 inhabitants, by Region**

Thus, the prevalence of organized crime influences the density of judges in each first-instance judicial district. At the same time, it may negatively impact the duration of criminal trials. A possible mechanism is the overinvestment of judicial and police resources in the investigation and prosecution of organized-crime cases, at the expenses of common crimes. Indeed, criminal trials involving members of criminal organizations might last longer because of the difficulties in building strong prosecutorial cases against them, both in monocratic courts and before judicial panels.<sup>34</sup> The necessity of holding longer trials for such crimes will lead in turn to a slowdown of all court activities. At the same time, the hearing of organized-crime cases might be prioritized over that of common crimes, thus leading to a further increase in the duration of common criminal proceedings.

The correlation between trial duration, the number of criminal judges, and a third variable, in this case the presence of organized crime, might threaten the validity of the exclusion restriction.

<sup>32</sup> Those organizations are respectively called *'ndrangheta*, *cosa nostra*, and *camorra*.

<sup>33</sup> The impact of organized crime on the territory was explicitly indicated as one of the guiding criteria for the reform of judicial districts. The judicial districts of Caltagirone, Sciacca, Lamezia Terme, Castrovillari, and Paola, located between Sicily and Calabria, were specifically preserved because of the pervasive presence of organized crime, despite the initial provision of their suppression.

See DLgs. 155/2012 and accompanying materials at <https://leg16.camera.it/561?appro=652#paragrafo3057>

<sup>34</sup> It is notoriously hard to break the bonds between the members of criminal organizations and to turn them into crown witnesses. At the same time, the territorial presence of the organizations hinders the cooperation between citizens and public authorities, both during the investigations and at trial.

However, plea bargaining cannot be applied in organized-crime cases punished with more than 2-year imprisonment, and those crimes are anyway assigned to the exclusive jurisdiction of judicial panels.<sup>35</sup> A specific exclusion is not provided in the case of penal orders, but it is difficult to imagine an organized-crime case in which the prosecutor may opt for such procedure, since it only allows the imposition of a discounted fine.<sup>36</sup> For these reasons, the results referred to monocratic courts and penal orders should be unaffected by the prevalence of organized crime in a given judicial district. However, the incidence of plea bargaining might be diluted in judicial panels, if the total number of disposed cases includes a particularly high proportion of organized-crime cases. Nonetheless, the concern is reduced when considering that plea-bargaining is not allowed also in other categories of cases, such as sexual crimes or terrorism, if the applicable sentence is above 2 years imprisonment. Hence, the incidence of organized-crime cases should be disproportionate not only in comparison with common crimes, but also with other excluded cases, in order to sensibly dilute the use of plea bargaining in judicial panels. As stated above, the exclusion restriction cannot be positively tested (Woolridge, 2018). However, a significant correlation between the dependent variable and the instrument might provide convincing evidence in the opposite direction. Appendix B reports the results of an OLS analysis identical to the one reported in Table 2, besides for the inclusion of the density of judges among the explanatory variables. The results are in line with those presented in Table 2, while the density of judges is never statistically significant. Nevertheless, the results of the IV analysis referred to judicial panels might be interpreted with greater caution.

Table 4 reports the results of the second-stage regressions.

Trial duration shows the expected sign, and it is statistically significant at the 1% level in all columns. Every additional day of trial is associated with a decrease of 0.026 percentage points in the use of plea bargaining in monocratic courts, and of 0.011 percentage points in judicial panels. In both cases the coefficients are more than double in size compared to the OLS regression. Trial duration is now statistically significant at the 1% level also with regards to penal orders. Every additional day of trial is associated with an increase of 0.064 percentage points in the oppositions to penal orders.

All variables included in column 1 are statistically significant at the 1% level, and they display the expected sign: more incoming cases, higher income levels, and a larger population are associated with a lower use of plea bargaining in monocratic courts. In column 2 the number of incoming cases in judicial panels is not significant anymore, while in the OLS regression it was significant at the 5% level, but with the opposite sign of what expected in theory. Higher income levels are associated with a lower use of plea bargaining before judicial panels as well, with 5% significance. The number of inhabitants in the judicial district is instead not significant in column 2. A possible explanation is that the functioning of judicial panels is not significantly different between more and less populous districts. Indeed, every judicial panel must be composed of 3 judges, regardless of any characteristic of the judicial district, and the number of incoming cases is never above the hundreds, even in the more populous ones.<sup>37</sup> In column 3, besides the duration of trial, the number of incoming cases in monocratic courts is the only significant variable, at the 1% level, and with the expected positive sign. As mentioned above, the number of incoming cases in monocratic courts is the relevant variable for

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<sup>35</sup> Legge n.134/2003 introduced art.444, 1-bis c.p.p., which excludes the applicability of plea bargaining to the crime called “criminal organization”, when the applicable sentence is above 2 years imprisonment.

<sup>36</sup> As recalled above, in 2022 only 16 cases of oppositions to penal orders were decided by judicial panels, which are the only court with jurisdiction over organized-crime cases. Even in the unrealistic circumstance that all those oppositions involved organized-crime cases, they would still amount to 0,085% of all oppositions to penal orders, thus not significantly undermining the validity of the estimations.

<sup>37</sup> The only exception is the judicial-panel court of Rome, with 1.745 incoming cases in 2022. However, the first-instance judicial district of Rome is also exceptional in terms of population, with 2.749.031 inhabitants in 2022, well above the second most populous first-instance judicial district, which was Torino with 1.657.481 inhabitants.

the defendant's opposition choice. The number of incoming cases at the G.I.P. office, which is a possible factor in the prosecutor's choice of issuing a penal order, is not statistically significant. This result seems to confirm that defendants' incentives play a larger role in the use of trial-avoiding procedures, compared to prosecutors' incentives. The number of inhabitants in the judicial district is only marginally significant, and with the expected positive sign.

**Table 4. Second stage – IV: Criminal judges per 1.000 inhabitants**

VARIABLES	(1) pb_mono	(2) pb_coll	(3) po_opp
Trial duration - Monocratic judge	-0.026*** (0.000)		0.064*** (0.000)
Incoming cases - Monocratic	-0.441*** (0.000)		2.260*** (0.000)
Trial duration - Judicial panel		-0.011*** (0.000)	
Incoming cases - Judicial panel		2.796 (0.225)	
Incoming cases - GIP			-0.259 (0.173)
GDP per capita	-11.530*** (0.002)	-5.188** (0.015)	0.290 (0.980)
Inhabitants	-24.004*** (0.000)	-2.635 (0.554)	49.042* (0.062)
Observations	2,372	2,372	2,372
Number of districts	140	140	140
District FE	Yes	Yes	Yes
Year FE	Yes	Yes	Yes

Note: Robust standard errors in parentheses, clustered at the judicial-district level. Incoming cases per 1.000 inhabitants. Natural logarithm of GDP per capita and inhabitants.  
\*\*\* p<0.01, \*\* p<0.05, \* p<0.1

### 6.3. IV analysis: Average yearly temperature

Although the exclusion restriction cannot be directly tested, it can be defended more easily when instruments feel weird (Cunningham, 2021). For this reason, I use an additional instrumental variable: the yearly average temperature in each first-instance judicial district. Indeed, the average temperature may influence the calendar of court hearings, and the work of the relevant courtroom actors, but it is unlikely to directly influence the defendant's choice of accepting a plea agreement or opposing a penal order.

Table 5 reports the results of the first stage regressions when using the average yearly temperature as instrument.<sup>38</sup> As before, I included in the regressions all the control variables used in the second stage, together with judicial-district and year fixed effects. Robust standard errors are clustered at the judicial-district level.

The average yearly temperature in the judicial district is strongly and positively correlated with trial duration. This means that, as expected in theory, higher average temperatures are associated with

<sup>38</sup> For reasons of data availability, the analysis is limited to the period 2006-2021, while data about the density of judges were available for the period 2005-2021.

longer criminal trials. The coefficient of the Kleibergen-Paap rk Wald F statistic is well above the 10% confidence level set by the Stock-Yogo test for monocratic courts and penal orders, while it is slightly below the 10% threshold, but well above the 15% one, for judicial panels. Consequently, also in this case the results regarding judicial panels might be interpreted with greater caution.

**Table 5. First stage – IV: Average yearly temperature**

<b>Instrumented variable</b>	<b>pb_mono</b> durata_mono	<b>pb_coll</b> durata_coll	<b>po_opp</b> durata_mono
<b>Instrumental variable</b>			
Average yearly temperature	70.88641*** (0.000)	49.58678*** (0.000)	65.34475*** (0.000)
<b>Weak identification test</b>			
Kleibergen-Paap rk Wald F statistic:	33.727	14.431	31.430
Stock-Yogo weak ID test critical values:			
10% maximal IV size	16.38	16.38	16.38
15% maximal IV size	8.96	8.96	8.96
20% maximal IV size	6.66	6.66	6.66
25% maximal IV size	5.53	5.53	5.53

Note: \*\*\* p<0.01, \*\* p<0.05, \* p<0.1

Table 6 reports the results of the second stage regressions.

**Table 6. Second stage – IV: Average yearly temperature**

<b>VARIABLES</b>	(1) pb_mono	(2) pb_coll	(3) po_opp
Trial duration - Monocratic court	-0.040*** (0.000)		0.090*** (0.000)
Incoming cases - Monocratic court	-0.743*** (0.000)		2.800*** (0.000)
Trial duration - Judicial panel		-0.017*** (0.001)	
Incoming cases - Judicial panel		1.559 (0.522)	
Incoming cases – G.I.P.			-0.091 (0.709)
GDP per capita	0.812 (0.858)	-0.655 (0.855)	-21.676 (0.206)
Inhabitants	-30.262*** (0.000)	-3.220 (0.539)	65.937** (0.023)
Observations	2,232	2,232	2,232
Number of districts	140	140	140
District FE	Yes	Yes	Yes
Year FE	Yes	Yes	Yes

Note: Robust standard errors in parentheses, clustered at the judicial-district level. Incoming cases per 1.000 inhabitants. Natural logarithm of GDP per capita and inhabitants.

\*\*\* p<0.01, \*\* p<0.05, \* p<0.1



In line with previous analysis, the duration of trials is statistically significant at the 1% level, and it shows the expected sign in all columns, while the size of the coefficient is notably larger. This means that longer trials decrease the number of plea agreements both in monocratic courts and judicial panels, while they increase the oppositions to penal orders.

Differently from Table 4, income levels are never significant. Columns 1 and 2 do not display any other difference in terms of significance or direction of the results, compared to the previous analysis. In column 3 the coefficient referred to the number of incoming cases at trial is again positive and statistically significant at the 1% level. The population size of the judicial district is again positively correlated with the oppositions to penal orders, with increased significance at the 5% level.

Appendix A reports the analysis performed on different measures of plea bargaining, including cases decided by the monocratic court as second-instance court, cases decided by assize courts, and plea agreements reviewed by G.I.P. and G.U.P. offices. In Appendix A, as in the main analysis, I use both the density of judges and the average yearly temperature as instruments. The results show the same significance and pretty much the same coefficients of the main analysis for monocratic courts, judicial panels, and penal orders. Regarding plea agreements reviewed by the G.I.P. and G.U.P. offices, when using the density of judges as instrument, the duration of trial is only marginally significant, with the expected negative sign and a very small coefficient. However, when using the average temperature as instrument, the duration of trial is not significant anymore. A possible explanation is that defendants that accept plea agreements already during the investigation stage are strongly averse to the trial option, hence they do not consider the expected trial duration as a relevant decision factor. Another possibility is that the percentage of plea bargaining in G.I.P. and G.U.P. offices is not a good measure for the actual use of such procedures, since the overwhelming majority of cases disposed by G.I.P. and G.U.P. do not involve decisions on the merits. The number of incoming cases in the G.I.P. and G.U.P. offices is instead statistically significant at the 1% level when using either of the instruments, and it shows the expected negative sign. This might indicate that defendants do not accept plea bargaining offers when they observe a higher caseload of courts during the investigation stage. A higher caseload can indeed anticipate a lengthier disposal of each case and higher chances of acquittal because of the statute of limitations. This result, together with the marginal significance of trial duration, may indicate that the expected duration of proceedings is a relevant decision factor also during the investigation phase for defendants.

## **7. Conclusions**

The average duration of first-instance criminal trials has steadily increased in Italy over the last twenty years. Over the same period, the use of plea bargaining and penal orders has decreased, in contrast with the predictions of the economic models of plea bargaining (Landes, 1971; Adelstein, 1978).

A lower use of trial-avoiding procedures results in more ordinary trials. Under resource constraints, this causes an increase in the average duration of trials. However, I argue that causality also runs in the opposite direction in Italy, so that longer trials induce a decrease in the use of trial-avoiding procedures. The reason is the peculiar regulation of the Italian statute of limitations, which makes a longer trial more attractive for defendants in comparison to a quick disposition of their case. Indeed, if defendants are not convicted within a limited period, they must be acquitted, even if trial has already been opened.

In order to identify the effect of trial duration on the use of plea bargaining and penal orders, I rely on instrumental variable analysis. I use two different instruments for trial duration: the number of criminal judges per 1.000 inhabitants and the average yearly temperature in each first-instance judicial district. By analyzing a panel of all 140 Italian first-instance judicial districts over the period 2005-2021 I find that longer first-instance trials decrease the use of both plea bargaining and penal

orders. In particular, every additional 90 days of duration of criminal trials decreases the use of plea bargaining between 2.34 and 3.6 percentage points in monocratic courts and between 0.99 and 1.53 percentage points before judicial panels. The same additional delay increases the oppositions to penal orders between 5.76 and 8.1 percentage points. Among other significant factors, a larger population and more incoming cases are associated with less plea bargaining in monocratic courts, and with more oppositions to penal orders. A higher average income is associated with less plea bargaining in both monocratic courts and judicial panels, but only when using the density of judges as instrument. The results of the main analysis are confirmed when using different measures for the use of plea bargaining.

The results are in line with the hypothesis according to which the Italian statute of limitations reduces defendants' incentives towards the use of trial-avoiding mechanisms, since longer trials increase their chances of acquittal. The results are also in line with the main message of the Law and Economics literature on plea bargaining, since defendants opt for trial-avoiding procedures only when they expect a worse outcome at trial (Adelstein, 2019). However, the analysis also shows that a longer disposition time does not always increase the costs of trial for defendants, as normally assumed by the economic models of plea bargaining (Landes, 1971; Adelstein, 1978).

Plea bargaining is probably the most transplanted institute of criminal procedure (Langer, 2004; Garoupa and Stephen, 2008) and the increasing adoption of trial-avoiding conviction mechanisms has been described as a global trend in recent years (Thaman, 2010; Langer, 2021; Paolini, 2023). The present paper shows how the institutional context is crucial for the use of trial-avoiding procedures and the success of legal transplants. In doing so, the present paper expands the empirical literature about the drivers of use of plea bargaining in individual jurisdictions outside the U.S. Furthermore, to the best of my knowledge, this is the first empirical analysis about the defendant's choice to oppose a penal order.

Future research might test whether, in the absence of statutes of limitations similar to the Italian one, longer trials cause a larger use of trial-avoiding procedures, as expected by the economic models of plea bargaining. Another possible venue of future research is the study of other jurisdiction-specific factors that prevent a widespread use of trial-avoiding procedures, in contrast with the aims and expectations of policymakers.

Coming to possible policy implications, the results of the analysis advocate for a reform of the Italian statute of limitations. Rather than being a remedy to excessive disposition times, the Italian statute of limitations contributes to the increase in the average duration of trials. Indeed, by increasing the chances of acquittal in case of longer trials, it disincentivizes the use of trial-avoiding procedures by defendants. The consequent larger use of ordinary trials, under resource constraints, results in longer average trial duration.

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## Appendices

### Appendix A – IV analysis with different measures of plea bargaining rates

#### A.1. Summary statistics

Table A.1. Summary statistics, main and extended IV analysis

	N	Mean	SD	Min	Max
PB – Monocratic courts	2372	12.358	7.431	.162	42.601
PB – Monocratic court, including appeal cases from Justices of the peace	2372	12.185	7.343	.16	42.601
PB – Judicial panels	2372	3.2	4.774	0	44.444
PB – Judicial panels, including assize courts	2372	3.127	4.713	0	44.444
PB – GIP and GUP	2372	4.285	2.451	.16	16.311
PO opposed	2372	41.347	23.153	0	300
Trial duration – Monocratic courts	2372	509.886	263.857	4.384	1846.943
Trial duration – Judicial panels	2372	593.985	253.031	67.5	1816.649
Incoming cases – Monocratic courts	2372	6.034	2.488	.175	21.137
Incoming cases – Monocratic court, including appeal cases from Justices of the peace	2372	6.121	2.517	.175	21.186
Incoming cases – Judicial panels	2372	.225	0.123	.004	.908
Incoming cases – Judicial panels, including assize courts	2372	.229	0.126	.006	.908
Incoming cases – GIP and GUP	2372	14.897	5.638	.732	56.056
Inhabitants	2372	426137.18	381431.637	57158	2820219
GDP per capita	2372	24836.383	7054.343	13800	55800
Judges per 1.000 inhabitants	2372	.039	0.021	.012	.151
Average yearly temperature	2240	15.889	1.920	10.59	21.28

Note: PB stands for plea bargaining PO stands for penal orders

#### A.2. IV: criminal judges per 1.000 inhabitants

Table A.2. First stage – IV: Judges per 1.000 inhabitants, additional offices

Instrumented variable	pb_mono_pace durata_mono_p ace	pb_coll_assise durata_coll_ass ise	pb_gip durata_m ono_pace	po_opp durata_mono pace
<b>Instrumental variable</b>				
Criminal judges per 1.000 inhabitants	26974.93***	19179.05***	26334.3* **	26334.3***
	(0.000)	(0.000)	(0.000)	(0.000)
<b>Weak identification test</b>				
Kleibergen-Paap rk Wald F statistic:	25.880	22.690	30.132	30.132
Stock-Yogo weak ID test critical values:				
10% maximal IV size	16.38	16.38	16.38	16.38
15% maximal IV size	8.96	8.96	8.96	8.96
20% maximal IV size	6.66	6.66	6.66	6.66
25% maximal IV size	5.53	5.53	5.53	5.53

Note: \*\*\* p<0.01, \*\* p<0.05, \* p<0.1

Table A.3. Second stage – IV: Judges per 1.000 inhabitants, additional offices

VARIABLES	(1) pb_mono_pace	(2) pb_coll_assise	(3) pb_gip	(4) po_opp
Trial duration - Monocratic court	-0.026*** (0.000)		-0.001* (0.086)	0.063*** (0.000)
Incoming cases - Monocratic	-0.437*** (0.000)		0.025 (0.341)	2.258*** (0.000)
Trial duration - Judicial panel		-0.011*** (0.000)		
Incoming cases - Judicial panel		2.941 (0.191)		
Incoming cases - GIP			-0.108*** (0.000)	-0.262 (0.171)
GDP per capita	-11.156*** (0.003)	-5.158** (0.013)	-0.685 (0.387)	0.404 (0.972)
Inhabitants	-24.107*** (0.000)	-2.783 (0.520)	2.501 (0.240)	48.831* (0.062)
Observations	2,372	2,372	2,372	2,372
Number of districts	140	140	140	140
District FE	Yes	Yes	Yes	Yes
Year FE	Yes	Yes	Yes	Yes

Note: Robust standard errors in parentheses, clustered at the judicial-district level.  
 Incoming cases per 1.000 inhabitants. Natural logarithm of GDP per capita and inhabitants.  
 \*\*\* p<0.01, \*\* p<0.05, \* p<0.1

### A.3. IV: Average yearly temperature

Table A.4. First stage – IV: Average yearly temperature, additional offices

<b>Instrumented variable</b>	<b>pb_mono_pace</b> durata_mono_pace	<b>pb_coll_assise</b> durata_coll_as_sise	<b>pb_gip</b> durata_mono_pace	<b>po_opp</b> durata_mono_pace
<b>Instrumental variable</b>				
Average yearly temperature	70.96423*** (0.000)	49.37372*** (0.000)	65.39442*** (0.000)	65.39442*** (0.000)
<b>Weak identification test</b>				
Kleibergen-Paap rk Wald F statistic:	33.896	14.296	31.543	31.543
Stock-Yogo weak ID test critical values:				
10% maximal IV size	16.38	16.38	16.38	16.38
15% maximal IV size	8.96	8.96	8.96	8.96
20% maximal IV size	6.66	6.66	6.66	6.66
25% maximal IV size	5.53	5.53	5.53	5.53

Note: \*\*\* p<0.01, \*\* p<0.05, \* p<0.1

Table A.5. Second stage – IV: Average yearly temperature, additional offices

VARIABLES	(1) pb_mono_pace	(2) pb_coll_assise	(3) pb_gip	(4) po_opp
Trial duration - Monocratic court	-0.040*** (0.000)		-0.002 (0.137)	0.090*** (0.000)
Incoming cases - Monocratic	-0.727*** (0.000)		0.021 (0.543)	2.789*** (0.000)
Trial duration - Judicial panel		-0.016*** (0.001)		
Incoming cases - Judicial panel		1.904 (0.418)		
Incoming cases - GIP			-0.113*** (0.000)	-0.095 (0.699)
GDP per capita	1.022 (0.820)	-0.871 (0.802)	-0.726 (0.467)	-21.426 (0.211)
Inhabitants	-30.146*** (0.000)	-3.346 (0.506)	1.846 (0.396)	65.590** (0.024)
Observations	2,233	2,233	2,233	2,233
Number of districts	140	140	140	140
District FE	Yes	Yes	Yes	Yes
Year FE	Yes	Yes	Yes	Yes

Note: Robust standard errors in parentheses, clustered at the judicial-district level.  
Incoming cases per 1.000 inhabitants. Natural logarithm of GDP per capita and inhabitants.  
\*\*\* p<0.01, \*\* p<0.05, \* p<0.1



## Appendix B – Density of judges and the use of trial-avoiding procedures

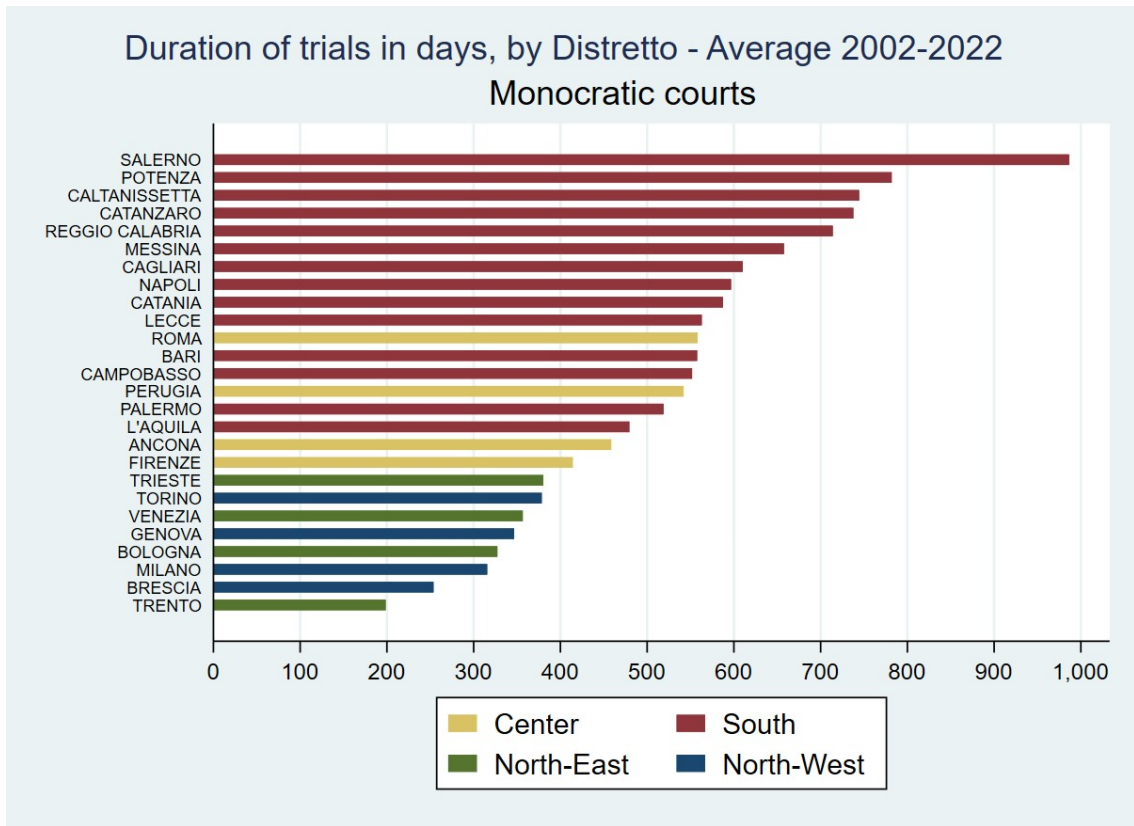
Table B.1. OLS with fixed effects - Test for endogeneity of judges

VARIABLES	(1) pb_mono	(2) pb_coll	(3) po_opp
Criminal judges per inhabitants	28.792 (0.703)	32.257 (0.438)	312.420 (0.305)
Trial duration - Monocratic court	-0.009*** (0.000)		0.001 (0.756)
Incoming cases - Monocratic	-0.172** (0.041)		0.598 (0.115)
Trial duration - Judicial panel		-0.004*** (0.000)	
Incoming cases - Judicial panel		5.581** (0.014)	
Incoming cases - GIP			-0.225 (0.128)
GDP per capita	-5.585** (0.023)	-0.200 (0.931)	9.347 (0.301)
Inhabitants	-17.006** (0.010)	-1.948 (0.693)	24.986 (0.429)
Observations	2,372	2,372	2,372
R-squared	0.816	0.445	0.344
District FE	Yes	Yes	Yes
Year FE	Yes	Yes	Yes

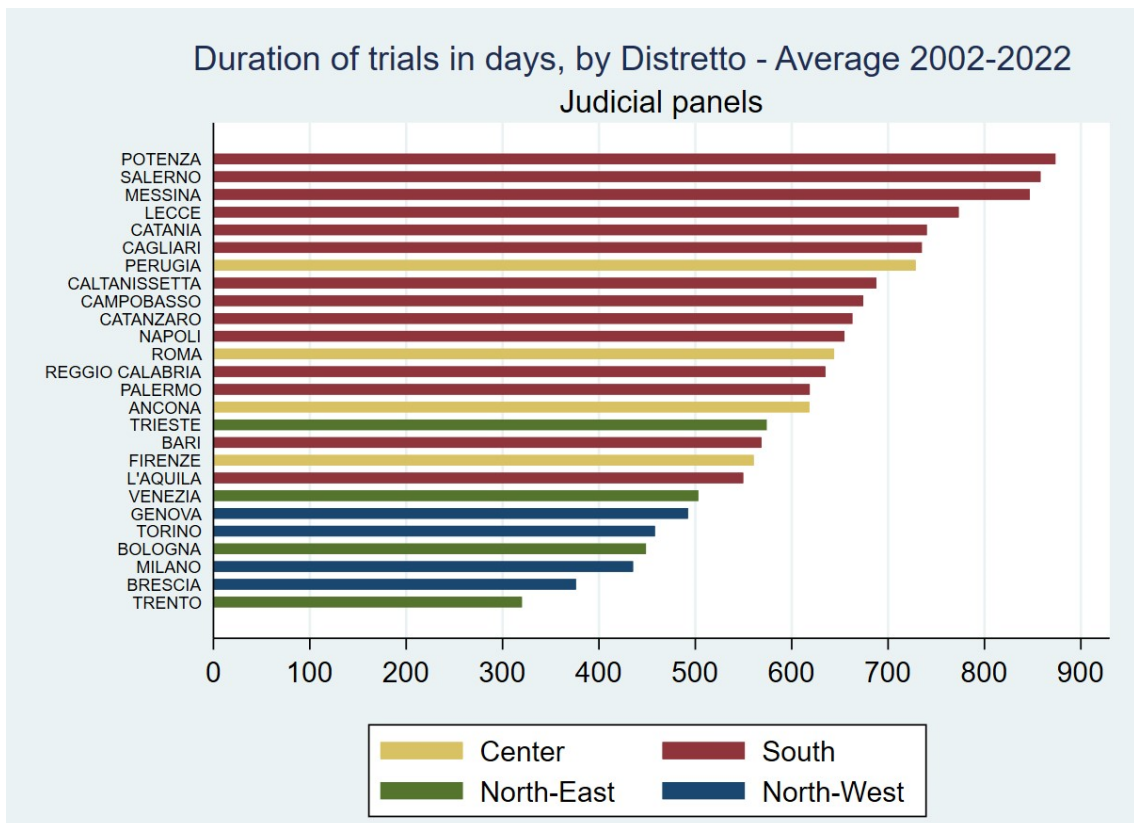
Note: Robust standard errors in parentheses, clustered at the judicial-district level.  
Incoming cases per 1.000 inhabitants. Natural logarithm of GDP per capita and inhabitants.

\*\*\* p<0.01, \*\* p<0.05, \* p<0.1

**Appendix C - Trial duration and the use of trial-avoiding procedures:  
Data referred to the territory of second-instance judicial districts**



**Figure C.1. Duration of trials in monocratic courts**



**Figure C.2. Duration of trials before judicial panels**

### PB in monocratic courts, by Distretto - Average 2002-2022

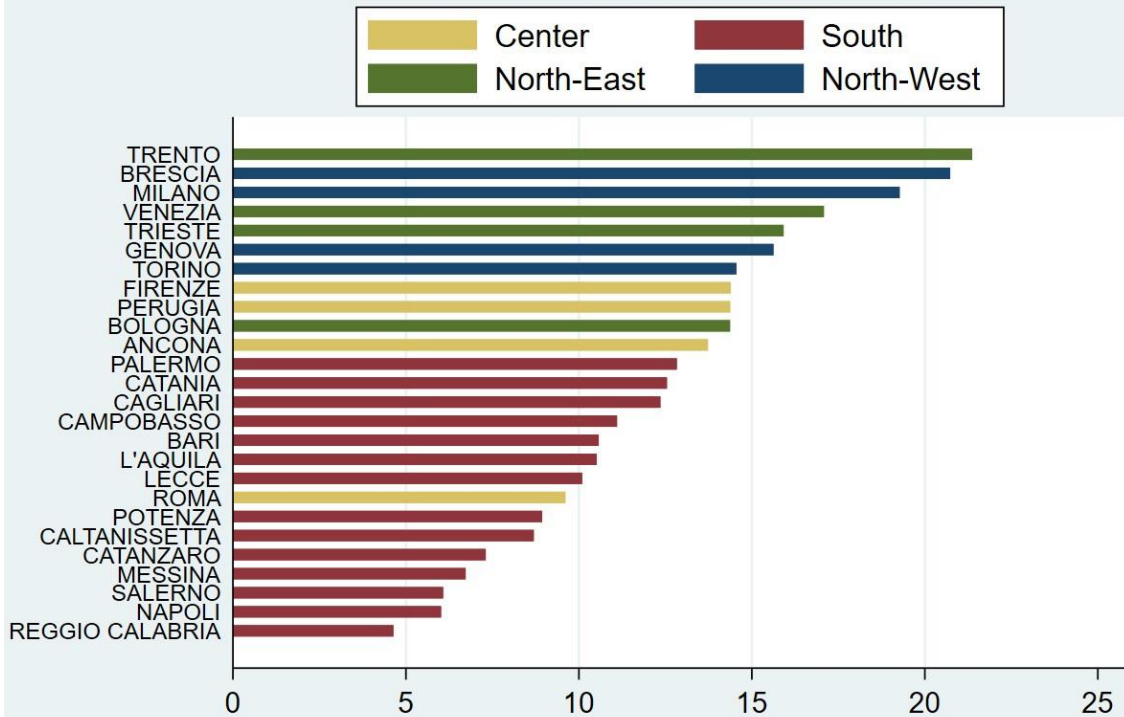


Figure C.3. Plea bargaining in monocratic courts

### PB in judicial panels, by Distretto - Average 2002-2022

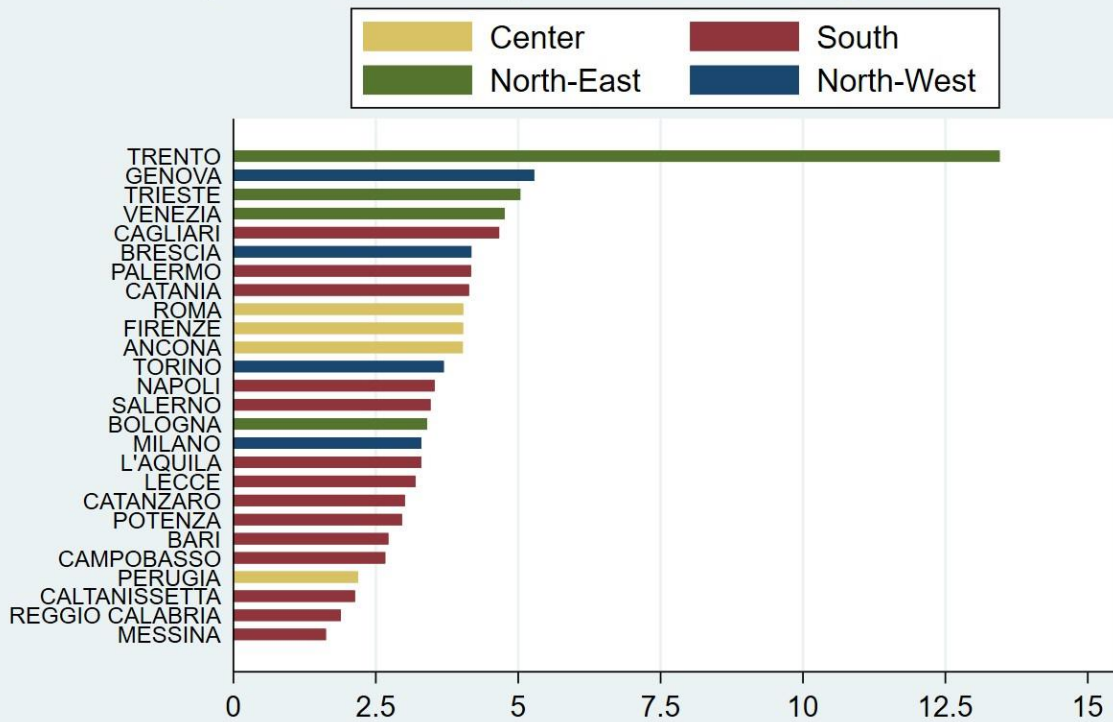


Figure C.4. Plea bargaining before judicial panels

## PO opposed, by Distretto - Average 2002-2022

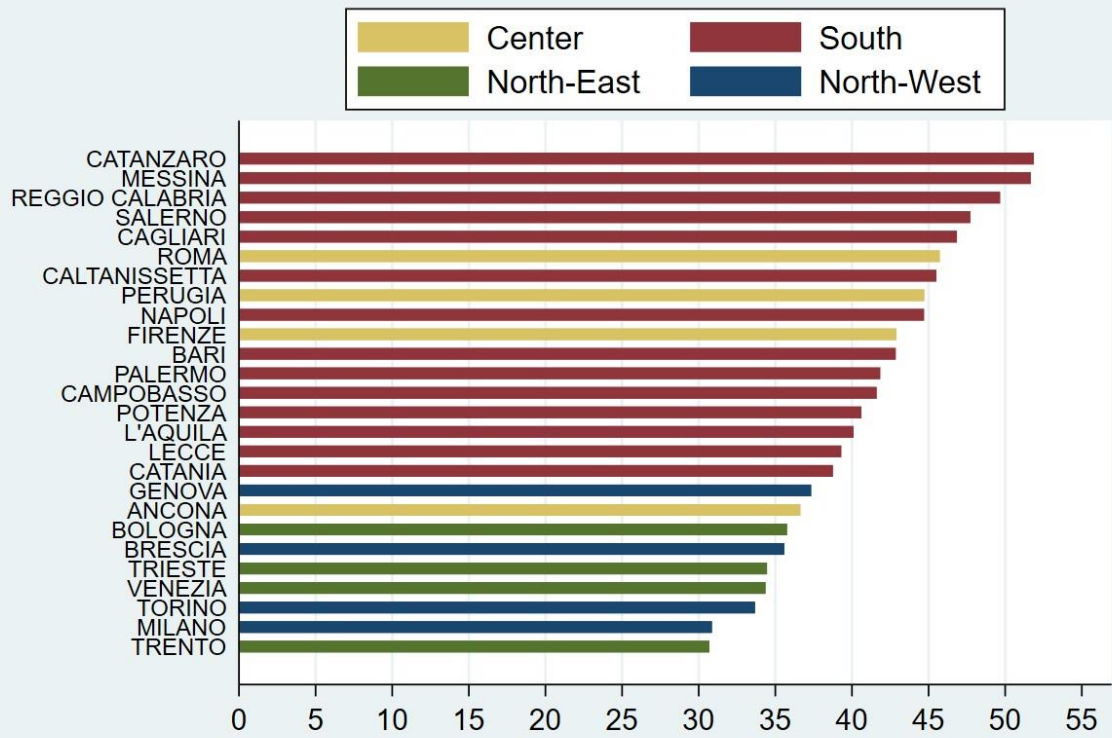


Figure C.5. Oppositions to penal orders