Received: 28 January 2024 | Revised: 14 May 2024 | Accepted: 29 May 2024

DOI: 10.1111/kykl.12399

ORIGINAL ARTICLE

KYKLOS WILEY

Experts and arbitration outcomes: Insights from public procurement contract disputes

Claudio Detotto[1] | Riccardo Marselli[2] | Bryan C. McCannon[3] | Marco Vannini[4]

[1]University of Corsica & CRENoS, Corte, France

[2]University of Naples Parthenope & CRENoS & CRISEI, Naples, Italy

[3]Illinois Wesleyan University, Bloomington, Illinois, USA

[4]University of Sassari & CRENoS, Sassari, Italy

Correspondence
Riccardo Marselli, University of Naples Parthenope & CRENoS & CRISEI, Naples, Italy.
Email: marselli@uniparthenope.it

Abstract

We explore the use of experts in arbitration proceedings by analysing public procurement contract disputes in Italy. Balancing cost with accuracy, participants to a contract select arbitration when speedy dispute resolution is valued highly. Alternative dispute resolution mechanisms tend to give appointed arbitrators discretion in how to proceed. Consequently, principal-agent problems can arise. Using an inverse-probability-weighted approach, we show that the use of an expert causes a slowing down of the case resolution, without having an effect on the outcome of the dispute nor resolving uncertainty as measured by unanimous decisions by the panel of arbitrators. Conflict resolution mechanism designers should consider the alignment of incentives between the disputants and the service providers.

1 | INTRODUCTION

Disputes arise as a normal consequence of economic exchange. Throughout history, societies have developed conflict resolution mechanisms to deal with these problems.[1] Modern governments create legal institutions as a public service. Regarding best mechanism design, there are numerous normative dimensions to consider. One important consideration is accuracy. While identifying a dispute's correct outcome is challenging, an institution that includes

[1]See McCannon (2018) for a discussion of arbitration in ancient Athens as an example.

available evidence, uses professional representatives and applies equally to all can be expected to lead to better outcomes. On the other hand, disputes are costly, and the mechanisms created to resolve these disputes add further costs. These costs not only include the monetary costs, such as fees and lawyer expenses, but also arise from the opportunity cost of delay. A balance between accuracy and cost must be struck.[2]

As the private marginal values on accuracy and cost likely vary across market participants, a public system of dispute resolution cannot be expected to satisfy all. Consequently, parties not too infrequently seek out alternative dispute resolution mechanisms. Arbitration is especially popular. Clauses within many types of contracts pre-commit the two sides to use arbitration to resolve any conflict that may arise. Parties who put more weight on cost mitigation are expected to prefer arbitration instead of using the publicly provided courts.

One noteworthy example of this is contracts in Italy. The Italian courts are notorious for the backlog and delay. For example, the European Union measures the efficiency of courts across Europe. For the time needed to resolve civil and commercial disputes, Italy ranks last on the continent taking approximately 550 days on average to resolve such a case. This is more than a year longer than Germany for example (European Commission, 2019).[3] This can be harmful. For one, payment for services provided is withheld. Suppliers, though, incurred the costs to performing the contract and, hence, risk insolvency. Further, completion of performance can be halted due to the dispute. If a dispute arises during the construction of a building, for example, the timeline to completion can be put on hold. The purchaser loses out on the use of the building, and the contractor has its labour's and equipment's use delayed. Hence, many contracts include the use of arbitration to provide a fast resolution.[4]

Here, we obtain access to a database of public procurement contract disputes in Italy. Many public works projects are outsourced to private contractors and the legal setting to resolve disputes that arise with these contracts has evolved over the years (see overview below). Since 2006, with the transposition of EU directives on public procurement into national law, the disputes at the execution phase of contracts can be resolved by arbitration under the supervision and support of the Chamber of Arbitration set up within the Italian anti-corruption authority known as the ANAC (Autorità Nazionale AntiCorruzione). Quite a bit of leverage is given to the individuals selected as arbitrators in choosing how to manage the proceedings. Importantly, they choose whether to involve outside experts.

In recent years, both in Italy and in the rest of the world, the use of experts has been increasing. Correspondingly, concerns have been voiced that, perhaps, their use is being abused. As noted in a commentary by De Berti (2011), 'sometimes one has the impression that the need to appoint experts and expert witnesses is taken for granted'.[5] This stands in stark contrast to the ICC (2017) recommendation that 'it is helpful to start with a presumption that expert evidence will not be required. Depart from this presumption only if expert evidence is needed in order to inform the arbitral tribunal on key issues in dispute'. Therefore, from an institutional design perspective, it is important to understand the incentives that affect expert's use in arbitration.

We argue that one important decision that affects the speed at which arbitration resolves disputes is the choice to use a tribunal-appointed expert. For public procurement contracts, individuals can be employed to estimate costs, provide relevant information on construction practices or weigh in on legal rules and procedural norms. The use of experts is optional. Ashenfelter and Dahl (2012) have commented previously on the use of party-appointed experts in labour-management contract disputes arguing that a Prisoner's Dilemma is created. Fees must be paid to these experts, which can help one side in the labour dispute. They show, though, that if both sides employ experts, the dispute's costs escalate without a measurable impact on the outcome observed. For arbitration mechanisms such as what is used for public procurement contracts in Italy, the decision to bring in an expert comes from the arbitrators

[2]There are, of course, other normative considerations as well. Arbitration can provide private, rather than public, resolution of disputes. Formal court rulings, on the other hand, can contribute to precedence creation and act as a guide for future, similar transactions that reduce the overall level of disputes.
[3]https://ec.europa.eu/info/sites/default/files/justice_scoreboard_2019_en.pdf.
[4]In fact, the European Scorecard shows that Italy has experienced the most dramatic reduction in the number of new civil and commercial cases that are filed in the public courts. The number of new cases has reduced by approximately 40% between 2010 and 2017. This contrasts with most other European countries who have experienced only negligible decreases (and for some, increases) in the number of cases entering the public courts.
[5]Taken from De Berti (2011) on page 54. Also, we adopt the naming convention in this paper, as suggested by De Berti (2011) where, in arbitration, 'experts' are appointed by the tribunal, while 'expert witnesses' are appointed by the parties in the dispute.

appointed to the dispute. We explore, from a principal-agent perspective, whether the use of experts adds to the delay. If so, then this would complement the escalated financial costs documented by Ashenfelter and Dahl (2012). Rather than this inefficiency arising from a Prisoner's Dilemma problem between the disputants, the deadweight loss we identify arises from the principal-agent problem created by arbitrator discretion.

We use the set of public procurement contract disputes resolved in Italy between 2007 and 2020. Following an inverse-probability-weighted approach, we explore the causal effect of using an expert. Our primary finding is that the expert's use dramatically increases the duration of the case (i.e., number of days between the filing of the dispute and its resolution). Further, we are unable to document any other change in the outcomes of the disputes. The determination of the arbitral award is unaffected by an expert's use and the likelihood that the panel of arbitrators reaches a unanimous decision is unaltered. Thus, the use of tribunal-appointed experts does not affect the outcome or its uncertainty but does delay the process. If alternative dispute resolution mechanisms are intended as an option for participants who put a premium on cost reduction, rather than focusing primarily on accuracy, then institutional designers should consider addressing the principal-agent concerns created by discretion in the proceedings.

There is a plentiful literature exploring both theoretically and empirically the consequences of specific institutional features used in arbitration mechanisms. A primary concern has been contrasting conventional arbitration, where the arbitrator is free to make any award desired, to final-offer arbitration, where the arbitrator is bound to select one of the two final offers made by the disputants (Ashenfelter & Bloom, 1984; Farber, 1980). Experimental research has compared mechanisms (Deck et al., 2007a, 2007b). The effect of strategic information transmission during the final-offer arbitration process has received quite a bit of attention (Farmer & Pecorino, 1998, 2003, 2013). Marselli et al. (2015) and Gershoni (2021) consider the consequences of the use of a panel of arbitrators, rather than a sole arbitrator, on settlement rates. Even the mechanism used to select the arbitrators has been considered (Bloom & Cavanagh, 1986). We contribute by exploring the use of tribunal-appointed experts. As mentioned, we complement the analysis of Ashenfelter and Dahl (2012) who remark on the Prisoner's Dilemma nature to disputants choosing whether to hire experts to support their case. Here, we evaluate the principal-agent problem that arises if the arbitrators are given discretion to use outside experts.[6] While Ashenfelter and Dahl (2012) show that the arbitral award is unaffected when both sides employ experts, we show that both uncertainty amongst the arbitrators and the ultimate award is unaffected, but the duration of the dispute is extended.

Multiple authors have investigated the public procurement contracting environment. There is a small literature exploring from different perspectives the costliness of these contracts. Nakabayashi (2013) estimates the extent to which small business set-asides increased government procurement costs in Japan. Coviello and Mariniello (2014) measure the effect of increased publicity of contracts on costs in the context of Italian procurement auctions. Interestingly, both studies show that, despite the uncertain link between participation and competition in auctions, the higher the number and diversity of bidders the lower the net costs of procurement. Coviello et al. (2018) instead document how the contract enforcement phase affects suppliers' strategies in executing a public procurement work: when courts are inefficient public works are delivered with longer delays. More recently, public works procured by Italian municipalities have been examined by Baltrunaite et al. (2020) and Decarolis et al. (2020) with the aim of providing novel evidence on the costs resulting from higher discretion in the awarding process. According to the former contribution, broader discretion results in a larger share of contracts awarded to politically connected firms (i.e., firms having at least one of the directors or shareholders recorded as a local politician in the relevant years) and to bidders with lower ex-ante productivity. Exploiting a confidential data set of firms and procurement officials investigated for corruption, the latter work finds that discretion leads to greater efficiency and more illicit opportunities with overall net benefits in case of sufficient competition. Against this backdrop, we pay attention to the extra cost of resolving the disputes that typically arise in the provision phase of the procured good/services. The increasing use of arbitration in this area has been associated with increasing dissatisfaction over elements of the current modus

[6]Webb and Wagar (2018) evaluate an expedited arbitration mechanism used in Canadian labour-management disputes and show that it quickens the dispute's resolution.

operandi of this private institution that threaten the expectation of greater finality and efficiency at less cost than litigation (Feerick & Gerstel, 2019). Which element is more relevant depends on the specific (legal) context and the merit of the controversy. Here, we document the presence of agency costs related to the inefficient use of panel appointed experts. Our paper also connects to the vast literature on institutions in which similar resolution mechanisms and their efficiency are a matter of concern. For instance, effective management of insolvency procedures by courts is essential for ensuring correct restructuring/liquidation decisions and economic stability through the allocation of risk amongst parties in a predictable, equitable and transparent manner. Efficient insolvency systems can contribute to higher creditor recovery rates and greater investor confidence; conversely, ineffective judicial management can hinder debt restructuring efforts and efficient reallocation of resources in the economy (Menezes, 2014).[7] Despite obvious differences relative to procurement controversies, here as well agency conflicts between judge/courts and insolvency administrators or managers and owners generate inefficient outcomes, namely, excess liquidation, excess continuation and excess delay (Dou et al., 2021). Similar agency costs may also arise under the WTO dispute settlement system, where expert advice, apart from helping to fix technical issues, 'is keenly sought after and accepted by panels because of the important role it can play in the legitimizing of WTO decision-making' (Pauwelyn, 2002, p. 326).

In Section 2, we describe the contracting environment and arbitration mechanism used in Italy. The data set studied is detailed in Section 3, and Section 4 illustrates the identification strategy. Section 5 presents the main results. Section 6 concludes.

2 | ARBITRATION MECHANISMS IN ITALY

As of today, public procurement contracts in Italy are regulated by the Public Contract Code (Legislative Decree n. 36/2023), the outcome of a 30-year process of adaptations and integration of the past fragmented legislation and two major revisions to comply with the 2004 and 2014 EU directives on procurement. Their implementation produced the Public Contract Code of 2006 (hereafter PCC) and the New Public Contract Code of 2016 (hereafter NPCC) pertinent to our exercise. Public contracts are contracts for pecuniary interest concluded in writing between one or more economic operators (EOs) and one or more contracting authorities (CAs) and having as their object the execution of works, the supply of products, or the provision of services.[8]

Arbitration concerning disputes in the execution phase of public contracts in Italy dates back to 1865. Recently, it has been criticized consistently as favouring the private contractors over the contracting authorities. Allegations of corruption or lack of integrity[9] were widespread (Gambetta, 2018), and the substantial bills of some arbitration panels often shocked the public.

To tackle these issues, the Legislative Decree n.53/2010 partially modified some articles of the PCC, and since then, the main features of the new regime, which allows arbitration as an ordinary litigation remedy alternative to trial before a court, are as follows: (1) the CA shall indicate in the call for tender, or in the notice/invitation for procedures without a call, the intention to adopt an ex ante arbitration clause[10]; (2) ex-post arbitration agreements are forbidden; (3) each party nominates the arbitrator of its choice from amongst professionals with special expertise on the topic of the contract; (4) the third arbitrator, that is, the chairman of the arbitration board, shall be chosen by the

[7]Indeed, in the anomalous case of Spain (bankruptcy rates abnormally low), the negative effect of the unattractiveness of bankruptcy procedures on firms capital structure and innovation is well documented (see Celentani et al., 2010), and interestingly, the modernization of the system via specialized commercial courts (Juzgados de lo Mercantil) had a positive impact on the use of the institution (see Detotto et al., 2019).

[8]According to the PCC, EO is any natural or legal person, public entity, group of such persons and/or entities, including any temporary association of undertakings, entity without legal personality which offers the execution of works and/or a work, the supply of products or the provision of services on the market. CA means the state public administrations, the local public authorities, the other noneconomic public authorities, the bodies governed by public law, the associations, the unions, the consortia, whatever called, formed by one or more such authorities.

[9]Integrity as defined by OECD refers to the use of funds, resources, assets and authority, according to the intended official purposes, to be used in line with public interest.

[10]The successful tenderer can reject the arbitration clause, which in such case shall not be included in the contract.

parties from amongst professionals that are not only experienced but also independent and have not served as party-appointed arbitrator or lawyer in arbitral proceedings regulated by the PCC over the previous 3 years; and (5) irrespective of the value of the dispute, the remuneration of the arbitration panel plus the secretary cannot in any case exceed €100,000.

The amended PCC confirmed the role of the Chamber of Arbitration in (a) record-keeping of public contracts arbitrators and experts; (b) attending the code for arbitration; and (c) appointing the third arbitrator in case of disagreement between the parties and administrating the associated dispute. Function (a) is particularly important in that, in case of (c), the Chamber of Arbitration must select the chairman from a short-list of registered arbitrators[11] on the basis of predetermined and objective criteria. Whereas the latter, based on competence and seniority, has been stable over the years, the sampling procedure to form a comprehensive short-list has been frequently revised in order to keep up with the variable number of registered arbitrators and the over-representation of the legal professions in the register.[12]

Further changes to the PCC have been brought by the 'Anticorruption Law' (Law 6 November 2012, n. 190).[13] Since then, especially as a consequence of the clause concerning the mandatory prior authorization (see Footnote 13), arbitration disputes plunged steadily. Depending on the contracting authority involved (e.g., municipalities, regional governments, local healthcare authorities and ministries of the government), the choice of arbitration for each single contract had to be passed in the corresponding governing body, which often was not uniquely identified and, what's more, led to further uncertainty over the administrative process. Even official reports by ANAC (2015, p. 177) emphasized this factor behind Italy's 'flight from arbitration'.

Finally, on 18 April 2016, the Italian Government approved the Legislative Decree n. 50 implementing the new public procurement directives[14] of the European Parliament and of the European Council. Under the new code (NPCC), all the practices governing the public procurement arbitration disputes have been confirmed, but stricter rules for being appointed as arbitrator/chair have been introduced.[15]

While experts in arbitration disputes are a salient feature of all legal system, it is worth stressing the different role they play in common law and in civil law countries. In the former, court proceedings are adversarial in nature; each party to the case tends to appoint their experts in order to support their claims with the risk of triggering 'a battle of experts of doubtful neutrality, or even of declared partiality, the prize going to the more articulate and convincing one, not necessarily to the one telling the truth, the whole truth and nothing but the truth' (De Berti, 2011, p. 55). In the latter, in accordance with the inquisitorial approach, experts are appointed by the court, respond to the judges, and must be an independent third party, neutral and impartial: Here, opponents are muted, and the battle of experts cannot be staged. After the hearings, the judges may decide to adhere to or deviate from the expert's conclusions. Despite the varied legal landscape, since the adoption by the United Nations Commission on International

[11]Professionals willing to enter the arbitration list must apply to the Chamber, submitting a CV and any documentation to be eligible. Pursuant to art. 242, paragraph 6 of the PPC, the following categories can be enrolled in the list of arbitrators of the Chamber of Arbitration: (i) ordinary magistrates, accounting magistrates and State attorneys in service designated by their competent body, as well as State attorneys and ordinary magistrates not in service; (ii) attorneys registered with ordinary and special bars who are authorized to practice before superior courts who have the requisites for the appointment as counsellor to the Court of Cassation; (iii) experts who have a college degree in engineering and architecture who are authorized to exercise the profession for at least ten years and who are registered with the relative professional register; and (iv) tenured university professors in legal and technical subjects and managers of the public administrations, holding the same degrees, with specific skills in the field of public contracts for works, services and supplies.

[12]Professionals, academics and managers of the public administration with a legal background account for more than 80% of the register.

[13]A partial list includes: (i) mandatory prior authorization by the governing body of the contracting authority, to include the arbitration clause in the public contract or notice; (ii) prohibition from participating in arbitral panels for judges, State's attorneys and tax commissions members; (iii) obligation that both parties, in a dispute between public administrations, shall choose their arbitrators solely from amongst public chief officers; (iv) recommendation that the public party in a dispute between a public administration and a private company shall preferably appoints a chief officer as its arbitrator; and (v) determination by the public party of the maximum fee to be paid to the chief officer acting as arbitrator plus the provision that any difference between the fees actually paid to the arbiters and the predetermined maximum amount shall be entered into the balance sheet of the contracting authority.

[14]Directives 2014/23/EU, 2014/24/EU and 2014/25/EU on public procurement and awarding concession contracts, procurement by entities operating in the water, energy, transport and postal services sectors and on the reorganization of the Public Procurement Regulation.

[15]In particular, ordinary magistrates, administrative accountants and military personnel (regardless of whether they are in service), as well as State attorneys and prosecutors (regardless of whether they are in service), and members of tax commissions, cannot be appointed.

Trade Law in 1976 of a unified legal framework for arbitration, known as the UNCITRAL Model Law, some harmonization has taken place. Today, most European member countries (European Parliament, 2014) follow this model, which has a Civil Law orientation. The latest revision of the rules[16] allows either type of experts to participate in arbitral proceedings, but the tribunal-appointed experts will be subject to a strict screening process for qualification, independence and impartiality. The increasing importance of expert advise in dispute settlement may have many reasons. Scholars emphasize in particular the growing intertwined legal, economic, financial and technical issues involved in contemporary commercial disputes vis-à-vis the necessarily limited knowledge of arbitrators. Yet opportunistic behaviour cannot be overlooked, and in fact, it is also pointed out that expert advice may be arranged for the convenience of the arbitrator, eager to free himself from the burdensome task of ascertaining the occurrence of the facts, as it is easier for him to use the consultant for analyses and investigations that could otherwise be done (Benatti, 2016, p. 128). Our investigation appraises empirically the role of these latter type of experts, admittedly impartial advisers rather than partisan litigators.

3 | DATA

From the text of the contract disputes filed at the Chamber of Arbitration, we are able to generate a number of measurable variables.[17] First, we create three outcome variables. Each file records the date that the dispute was initiated and the date at which the award was announced. Thus, the number of days between these two dates makes up our *Duration* variable. Second, using the votes of the three arbitrators, we create an indicator variable equal to one if the three arbitrators reach a unanimous decision. This is our variable *Unanimity*. A dissenting opinion may be undesirable as it might detract from the authority of the award and jeopardize the environment. On the other hand, a balanced and nonacrimonious dissenting opinion may provide evidence to the losing party that all arguments were taken into account and exhaustively analysed by the arbitral tribunal during deliberation. With this variable we are able to consider the role of experts in affecting a crucial feature of the arbitral procedure. Third, we record the outcome of the dispute. The amount (in Euros) is provided. This makes up our variable *Award*. We normalize this by the initial amount claimed. That is, suppose that one party initially claims that *A* Euros should be paid in the contract, while the other party claims that only *B* should be paid for the services rendered. If the arbitrators award a payment of *C*, then we record the outcome as $Award = \frac{C}{A+B}$. Thus, one can interpret the award outcome as the proportion of the total dispute that is chosen.[18] It is important to normalize the outcome by the total dispute size to disentangle the relative 'victory' of one party from the stakes involved, which will be included as a control variable *Value*. A common observation is that arbitrators tend to 'split the baby' making an award at the midpoint of the demands made by the disputants. An outcome further from a 50-50 split potentially signals that one side has made a stronger case than the other.

A number of control variables can also be derived. An important aspect in explaining dispute duration is the complexity of the claim. Measuring this dimension is problematic. We propose a proxy of this variable by calculating the number of queries filed during the dispute. The variable *Queries* represents the sum of the queries of the two parties. The rationale is that the complexity of a dispute increases with the number of inquiries and interrogations made by the two parties. Another aspect that influences arbitration outcomes is the composition of the arbitration panel. To this end, we count for each arbitration panel the number of members with a technical background (like engineers and architects) to generate the variable *Technical Panel*.[19] Because participation to a dispute involves both

[16] https://uncitral.un.org/sites/uncitral.un.org/files/media-documents/uncitral/en/arb-rules-revised-2010-e.pdf, art. 27, 28 and 29.

[17] All data generated or analysed during this study are included in this published article and in the supporting information.

[18] Occasionally, only one side makes a claim. We interpret this as a dispute where one side is asking for an additional payment and the other is claiming a zero modification to the contract. Hence, we would treat $B = 0$. Assuming A is greater than B, award values higher than 0.5 indicate that the value of C is closer to A than B. Values lower than 0.5 indicate that C is closer to B compared with A. When the ratio $\frac{C}{A+B}$ equals 0.5, it means C is exactly midway between A and B. In this context, the indicator *Award* can be viewed as a proxy of the relative success of the claimant.

[19] Notably, in 83.64% of cases, the panel consists entirely of jurists, whereas only 4.54% of cases have a majority of members with a technical background.

TABLE 1 Summary statistics.

	Mean	SD	Min.	Max.
Outcome variables				
Duration	542.4818	350.5053	52	2335
Award	0.3279	0.3113	0	1
Unanimity	0.8455	0.3622	0	1
Treatment variable				
Expert	0.6181	0.4869	0	1
Dispute characteristics				
Technical panel	0.2227	0.5657	0	3
Value (in millions)	30.6797	187.0038	0.0145	2583.856
Queries	11.7272	9.8735	0	84
Public works	0.8136	0.3902	0	1
Parties characteristics				
Revenues (in millions)	61.2856	201.0225	0	1312.298
Equity	14.9819	39.5898	−491.0095	84.36
Population (in millions)	11.6315	22.5912	0.000391	59.11
Corruption index	0.2388	0.1898	0.0147	0.8697

Note: All public procurement contract disputes filed at the Chamber of Arbitration (ANAC) between 2007 and 2020 are included; $N = 220$.

opportunity costs and money, in the case of the private party, we proxy the former with the variable *Revenue*; that is, the company's average annual revenues over the 3-year period before the dispute, and the latter with *Equity*; that is, the equity-to-asset ratio (= *Net Worth/Total Assets*) which captures the health of the company's balance sheet.

Further, we use the population of the municipality where the CA is located as a measure of the number of individuals who are expected to benefit from the execution of the public contract, *Population*.[20] Also, it represents the size of the municipality, which proxies strong legal skills and the ability to draft comprehensive contracts. This aspect is relevant because a well-designed contract reduces the risk of misunderstandings and costly litigation. Furthermore, we control for the local environment where the municipality operates. We employ the corruption index of Italian provinces as measured by Nifo and Vecchione (2014). We expect that more corrupt municipalities may experience more disputes and CAs in corrupt municipalities may be less efficient.[21] Finally, we create an indicator variable for whether the contract is for a public works project, *Public Works*.[22]

Given our interest in exploring the role of experts, the list of explanatory variables ends with an indicator variable *Expert* which is equal to one if an outside expert was used in the arbitration proceedings. The descriptive statistics for these variables are provided in Table 1.

[20]Population data come from the Italian National Institute of Statistics.

[21]The inclusion of this index in our formulation is inspired on one hand by the ample scope for corruption at all stages of the procurement process (decision, tendering and execution stage) stressed by Iossa and Martimort (2013) and on the other hand by the observation that the quality of the public administration is historically higher in less corruption-ridden districts (Putnam, 1993). Furthermore, as Baldi et al. (2016) pointed out, in less corrupted environments, municipalities may manage the procurement process more efficiently. They can choose awarding mechanisms that better align with contract characteristics, reducing informational asymmetries and the likelihood of costly renegotiations. This improvement can subsequently decrease disputes.

[22]Alternatively, procurement contracts are used to buy products or hire services.

4 | IDENTIFICATION STRATEGY

Our objective is to identify the causal impact of the use of an outside, tribunal-appointed expert on the outcome of an arbitration proceeding. We consider three distinct outcome variables. To do so, we estimate the following outcome model to analyse the effect of the expert on the outcome Y_{irt} of an arbitration proceeding:

$$Y_{irt} = \alpha Expert_{irt} + X_{irt}\beta + \rho_r + \tau_t + \epsilon_{irt} \quad (1)$$

where Y_{irt} is the outcome variable of interest (either duration, award or unanimity) for observation i which arises from a municipality in region r in year t. X_{irt} is the vector of control variables provided in Table 1. We will include region fixed effects to account for unobserved variation in economy, governance and culture (to name a few) across the country (ρ_r) and year indicator variables to account for unobserved time effects (τ_t) due to macroeconomic events or amendments to institutional features. Then, α and β represent, respectively, a coefficient and a vector of parameters to be estimated. Finally, ϵ_{irt} is the unobserved error term.

If the treatment were perfectly randomized, we could estimate Equation (1) with an OLS approach and the coefficient α would indicate the average treatment effect (ATE) of the tribunal-appointed expert. The identification concern is that the use of an outside expert is endogenous. The arbitrators choose to use an expert. It may very well be that the circumstances under which one is chosen to be used may be causing the outcomes observed, rather than the use of the expert directly. This serious concern makes it impossible to use an OLS approach for Equation (1).

To deal with the endogeneity problem, we use the inverse probability weighted regression adjustment (IPWRA) estimator (Imbens & Wooldridge, 2009). This approach is particularly attractive when analysing a treatment characterized by the absence of randomization of assignment (Narita et al., 2023). The basic idea behind this approach is to match each treated statistical unit with a similar untreated unit and then measure the average difference in the outcome variables between the treated and untreated groups. The approach works by creating a pseudo-population in which each individual is assigned a weight that represents the inverse of the probability of receiving the treatment or exposure based on their observed covariates. This weighting effectively balances the distribution of covariates between the treated and untreated groups, making it as if the treatment was randomly assigned. After creating the pseudo-population, a regression model is used to estimate the effect of the treatment on the outcome variable, adjusted for the covariates. The estimated effect in the pseudo-population is then reweighted by the inverse probability weights to obtain an estimate of the average treatment effect in the population of interest. Notably, this double (robust) procedure increases protection against model misspecification (Funk et al., 2011).

The doubly robust standardization follows a two-step procedure (Uysal, 2015). First, a logistic regression is fitted to investigate the likelihood of treatment assignment, controlling for the variables provided in Table 1 together with region and time fixed-effects. For each group, treated and untreated, predictions ($\hat{p}_{irt} = Pr(Expert_{irt} = 1|X_{irt})$ are obtained for each arbitration proceeding i based on the fitted model, and these are used to derive the weights, as follows:

$$w_{irt} = \begin{cases} \dfrac{1}{\hat{p}_{irt}}, & if \;\; Expert_{irt} = 1 \\ \dfrac{1}{1-\hat{p}_{irt}}, & if \;\; Expert_{irt} = 0 \end{cases} \quad (2)$$

The second step is to run the linear model of Equation (1), using the weights as calculated in the first step. Table A1 provides the odds ratios of the treatment model. As expected, an increase in the number of panelists with a technical background reduces the likelihood of appointing an external expert. The complexity of the claim, *Queries*, is positively correlated with the probability of observing the use of an expert during an arbitration. The opportunity cost, represented by variable *Revenues*, appears to reduce the probability of using an expert. This is consistent with

the expectations of the private party who has the incentive to reduce the duration of the claim. On the contrary, the health of the company's balance sheet (*Equity*) is more likely to be associated with the use of an expert. The size of the municipality, proxied by *Population*, is positively associated with the likelihood of appointing an expert. Finally, contracts for public works projects seem to use the outside expert more during the claim (*Public Works*).[23] Overall, the fitting of the model is remarkably high, and the signs of the treatment model coefficients are consistent with our expectations.

Table 2 shows the resulting improvement of the balance in the sample after applying the inverse probability weighting. Panel A shows the covariate balance before weighting. The very high *t*-statistics indicate that two groups, treated and untreated, are significantly different in many dimensions. Statistically significant differences are observed for the following variables: *Technical panel*, *Queries*, *Public works* and *Equity*. Panel B provides the regressors balance after weighting. The balance in Panel B is certainly better than the original data for all variables under study. In fact, there is a drastic reduction in all *t*-statistics. Now no difference turns out to be statistically significant.

As a further check, we also employ the inverse probability weighting (IPW) estimator and the augmented IPW estimator (AIPW). The former models the treatment assignment process using a propensity score, which is the probability of receiving treatment given a set of covariates, without specifying a model for the outcome. These weights are then used to estimate the average treatment effect. The latter models both the outcome and the treatment to account for the nonrandom treatment assignment, as does the IPWRA estimator. The AIPW estimator also includes a bias-correction term in the treatment model to correct for any misspecification in the model. The bias-correction term is calculated as the difference between the observed outcome and the predicted outcome from the treatment model, multiplied by the inverse of the propensity score. The AIPW estimator reduces to the IPW estimator if the treatment model is correctly specified. Thus, the bias-correction term gives the AIPW estimator the same double-robust property as the IPWRA estimator (see StataCorp. 2013 for a detailed discussion). All analyses are performed using the command 'teffects' in STATA17.

5 | RESULTS

First, we establish our main finding that the use of an outside expert slows down the arbitration process. Table 3 presents the results with $Y = Duration$.

The naive OLS regression (1) shows a positive and highly statistically significant relationship between the use of an outside expert and the duration of the arbitration proceeding. Using the descriptive statistics presented in Table 1, this represents an increase in the duration by about 221 days, which corresponds to $\frac{2}{3}$ths of a standard deviation. Since the measure of duration is a nonnegative number, a Poisson count model is estimated confirming the positive impact of experts on the arbitration process. These findings are robust to using the propensity score approaches (see Columns (3)–(7)), whose estimates range between 217.986 and 220.163. The treatment effects in Columns (4) and (6) are calculated using a linear outcome model, while Columns (5) and (7) employ a Poisson count outcome model. In the Appendix section, all the (outcome) regressions are fully provided (see Tables A2, A3 and A4).

Turning to the decisions of the arbitral tribunal, it is reasonable to ask whether the use of an expert tends to favour one side over another. Table 4 duplicates the results presented in the top panel of Table 3, but uses *Award* as the dependent variable. The only difference is Column (2), which provides an estimate of the Fractional Regression Model (FRM) because the dependent variable is between zero and one.

[23]It is interesting to note that, despite the frequent technical nature of disputes concerning public works, only about 20% of cases of the latter type are managed by a panel involving at least one member with a technical background. This is in contrast to only one case out of the 41 observed where the subject matter of the contract concerns the provision of services or goods. Similarly, the utilization of an expert is, on average, higher in disputes concerning public works projects compared to other types of contracts (65.36% vs. 46.34%).

TABLE 2 Covariates balance.

	Before weighting (A)			After weighting (B)		
	Expert			Expert		
	= 0	= 1	*t*-test	= 0	= 1	*t*-test
Duration	331.4247	567.6577	−7.0948***			
Award	0.3285	0.3750	−0.9540			
Unanimity	0.8904	0.8108	1.4501			
Technical panel	0.3835	0.1441	2.7454***	0.2103	0.1667	0.6023
Value	6.1665	20.2659	−1.6246	9.4583	15.2566	−0.9136
Queries	8.8356	12.2522	−2.6492***	10.0887	10.9306	−0.5765
Public works	0.7380	0.8602	−2.2227**	0.8785	0.8216	0.1057
Revenues	95.2359	49.6830	1.4011	72.0785	67.7313	0.1009
Equity	8.6744	20.4837	−1.8360*	16.4035	18.7137	−0.4551
Population	9.6561	13.6429	−1.1528	13.4533	12.8360	0.1409
Corruption index	0.2420	0.2635	−0.7107	0.2512	0.2519	−0.0175
Obs.	73	111		73	111	

Note: Values reported are the means of treated (Expert=0) and treated (Expert=1) groups under common support, calculated as in (Nagle, 2019). Panel A presents the unweighted no-constant OLS regression of the given variable on the treatment dummy, namely, *Expert*. Panel B presents the weighted no-constant OLS regression of the given variable on *Expert*. The *t*-test is based on the null hypothesis that the two coefficients are equal to each other. The weights are calculated by estimating a logit treatment model in which *Expert* is regressed on *Technical Panel*, *Value*, *Queries*, *Public Works*, *Revenues*, *Equity*, *Population*, *Corruption Index*, year indicators and region fixed effects.
*$p < .1$, **$p < .05$, and ***$p < .01$.

There is no consistent relationship between the use of an expert and the award made by the arbitrators. The nonstatistically significant effect obtained with the OLS and FRM model (Columns (1) and (2)) are confirmed when propensity score approaches are used (Columns (3)-(7)). Ultimately, we take this as inconclusive evidence of an effect on the award.

Further, we consider the results relative to the uncertainty amongst the arbitrators as proxied by the dependent variable *Unanimity*. These are presented in Table 5.[24] As before, there is no evidence for the effect of the expert on the variable of interest. Across all specifications, the use of an expert is unrelated with agreement amongst the three arbitrators.

Taken together, the use of an expert, which is employed at the discretion of the arbitrators selected to resolve the dispute and—amongst other covariates— is inversely correlated with the technical composition of the panel, slows down the speed at which a decision is reached but does not have a measurable effect on the award of the dispute or on the level of agreement of the final decision. Our findings suggest that the principal-agent problem is indeed present in public procurement contract disputes in Italy. Panelists, acting as agents, exercise discretion in appointing an expert, yet this seems to have no impact on the desired arbitration outcomes requested by the principal, such as the *Award* and the *Unanimity*. Instead, it only serves to increase costs, proxied by the duration of the disputes, without enhancing the quality of outcomes.

As discussed previously, the three approaches for analysing treatment effects for observational data, namely IPW, AIPW and IPWRA, lead to the same result. Thus, our result is not sensitive to the treatment-effects estimators employed.

[24]The coefficient in column (2) is estimated using a logit model because the dependent variable is binary.

TABLE 3 Treatment effect: Duration.

	(1) OLS (naive)	(2) Poisson	(3) IPW	(4) AIPW	(5) AIPW	(6) IPWRA	(7) IPWRA
Expert	221.177***	0.498***	218.062***	220.163***	218.070***	219.872***	217.986***
(1 vs. 0)	(26.042)	(0.0564)	(26.171)	(29.463)	(26.029)	(33.069)	(25.496)
Dispute characteristics?	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Parties characteristics?	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Year controls?	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Region fixed effects?	Yes	Yes	Yes	Yes	Yes	Yes	Yes
R^2	0.717						
Pseudo R^2		0.667					
Obs.	220	220	184	184	184	184	184

Note: Dependent variable is the duration of the dispute (expressed in days). The variables *Technical Panel*, *Value*, *Queries*, *Public Works*, *Revenues*, *Equity*, *Population*, *Corruption Index*, year indicators and region fixed effects are included in both outcome and treatment regressions for the AIPW and IPWRA estimations, while only in the treatment regression for the IPW estimator. Columns (4) and (6) are estimated using a linear outcome model, while columns (5) and (7) employ a poisson outcome model. IPW, AIPW and IPWRA estimates are obtained using a logit treatment model. Columns (3)–(7) observations have been trimmed to ensure common support across the two groups. Region-clustered standard errors presented in parentheses.
*$p < .1$, **$p < .05$, and ***$p < .01$.

Our findings suggest that agency costs, which are inherent in the delegation of discretion, are indeed present in public procurement contract disputes in Italy. Panelists, acting as agents, exercise discretion in appointing an expert, yet this seems to have no impact on the desirable arbitration outcomes expected by the principal, such as the *Award* and the *Unanimity*. Instead, it only affects costs, proxied by the duration of the disputes, leaving unaltered the quality of the outcomes. These results add an important piece of evidence on the role of court-appointed experts in judicial proceedings. In a common law environment, neutral experts are seldom used because they weaken the adversarial system and this is believed to promote a less accurate fact-finding (Sidak, 2013); however, even in a civil law framework the use of tribunal-appointed experts may raise some concern. The parties may distrust the experts because they feel that they are unable to control the manner in which a critical element in their case will be presented; besides, by relying on the expert's conclusions, the panelists unduly delegate at least partially their decisions-making functions to persons other than the ones agreed upon by the parties to resolve their dispute (Arocca, 2021). Further insights can be gleaned by looking at the remuneration of the panel for the proceedings under study, which depends on the value of the controversy (with brackets involving a minimum and a maximum) and cannot in any case exceed the amount of 100,000 Euro. It is apparent that holding meetings and hearings help to stay close to the upper limit of the given bracket. At the same time, reputational concerns may favour the packaging of expert-backed reports in order to maximize the likelihood of future appointments. In our view, these agency costs call attention to the importance of calibrating the composition of the tribunal, for instance by ensuring the presence of nonlegal panelists when the legal points to be addressed are intertwined and indistinguishable from complex technical issues.

TABLE 4 Treatment effect: Award.

	(1) OLS (naive)	(2) FRM	(3) IPW	(4) AIPW	(5) AIPW	(6) IPWRA	(7) IPWRA
Expert	0.0552	0.273	0.0448	0.0338	0.0370	0.0190	0.0340
(1 vs. 0)	(0.0720)	(0.314)	(0.0728)	(0.0735)	(0.0776)	(0.0855)	(0.0830)
Dispute characteristics?	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Parties characteristics?	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Year controls?	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Region fixed effects?	Yes	Yes	Yes	Yes	Yes	Yes	Yes
R^2	0.240						
Pseudo R^2		0.0973					
Obs.	220	220	184	184	184	184	184

Note: Dependent variable is the size of the arbitral award, normalized by the total value of the dispute. The variables *Technical Panel*, *Value*, *Queries*, *Public Works*, *Revenues*, *Equity*, *Population*, *Corruption Index*, year indicators and region fixed effects are included in both outcome and treatment regressions for the AIPW and IPWRA estimations, while only in the treatment regression for the IPW estimator. Columns (4) and (6) are estimated using a linear outcome model, while columns (5) and (7) employ a fractional logit outcome model. IPW, AIPW and IPWRA estimates are obtained using a logit treatment model. Columns (3)–(7) observations have been trimmed to ensure common support across the two groups. Region-clustered standard errors presented in parentheses.
Abbreviation: FRM, fractional regression model.
*p < .1, **p < .05, and ***p < .01.

TABLE 5 Treatment effect: Unanimity.

	(1) OLS (naive)	(2) Logit	(3) IPW	(4) AIPW	(5) AIPW	(6) IPWRA	(7) IPWRA
Expert	−0.0676	−0.646	−0.0535	−0.0856	−0.1025	−0.0985	−0.0958
(1 vs. 0)	(0.0578)	(0.648)	(0.0469)	(0.0775)	(0.0782)	(0.0691)	(0.0796)
Dispute characteristics?	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Parties characteristics?	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Year controls?	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Region fixed effects?	Yes	Yes	Yes	Yes	Yes	Yes	Yes
R^2	0.170						
Pseudo R^2		0.186					
Obs.	220	220	184	184	184	184	184

Note: Dependent variable is equal to one if the arbitrators did not make a unanimous decision, zero otherwise. The variables *Technical Panel*, *Value*, *Queries*, *Public Works*, *Revenues*, *Equity*, *Population*, *Corruption Index*, year indicators and region fixed effects are included in both outcome and treatment regressions for the AIPW and IPWRA estimations, while only in the treatment regression for the IPW estimator. Columns (4) and (6) are estimated using a linear outcome model, while columns (5) and (7) employ a logit outcome model. IPW, AIPW and IPWRA estimates are obtained using a logit treatment model. Columns (3)–(7) observations have been trimmed to ensure common support across the two groups. Region-clustered standard errors presented in parentheses.
*p < .1, **p < .05, and ***p < .01.

6 | CONCLUSION

Economic exchange requires dispute resolution mechanisms. The design of a dispute resolution mechanism ultimately trades off accuracy in decisions with the costs. As market participants can be expected to differ in the relative importance of these two considerations, a uniform publicly provided court system is unlikely to be preferable in all contracting environments. Hence, arbitration serves as an alternative dispute resolution for those who value cost mitigation relatively more. Arbitration mechanisms, though, leave important discretionary decisions to the arbitrators. This opens up the possibility of a principal-agent problem as they may find greater benefits to high-cost, prolonged disputes that search for the most accurate decision. We explore this concern in a data set of public procurement contract disputes in Italy. Italy, in particular, suffers from a slow public court system and, hence, arbitration is potentially valuable. An important discretionary decision within arbitration is whether outside experts are hired to testify in these cases. Using an inverse-probability weighting estimator approach we identify the causal impact of the use of experts. We show that the speed at which a dispute is resolved, an important measure of arbitration costs, slows down considerably when the arbitrators choose to bring in experts. Further, we show that the use of tribunal-appointed experts has no significant impact on the arbitral award decided nor does it have a consistent impact on the uncertainty of the proceedings, as proxied by a unanimous vote by the panel of arbitrators. Thus, while the expectation is that the use of these experts might improve the correctness of the decisions, our results suggest that this choice creates costs without a measurable benefit.

The implication of these findings is that if institutional designers are interested in providing an alternative mechanism to publicly provided courts that economizes on the deadweight loss created by conflict, they may want to consider the incentives of the arbitrators and whether they align with the goals of the disputants. To this end, it may help to point out a feature of the ADR environment which, though not unique of our case study, bears directly on the results of the paper, namely the dominance of lawyers in the arbitration panels. The latter have always three members and in nearly all cases are all-lawyer tribunals. Under these circumstances, experts are involved in order to assist on technical issues only. Not surprisingly, their use enhances the likelihood of delay but not the other dimensions of the adjudication. Then, is it really necessary for all three members of an arbitration panel to have the same professional background? This question raises thorny issues, but according to our evidence the answer is no. Disputes on public contracts at the execution stage, in particular, involve issues of fact as much as issues of law, implying that a panel with professionals from other disciplines or respected contractors may handle most effectively questions of lost productivity, performance of suppliers, assessment of damages, not to mention the choice of, and interaction with, tribunal-appointed experts.

As argued by Stipanowich (2014, p. 326) 'the dominance of attorneys amongst the ranks of leading arbitrators reflects broader "legalizing" trends in the realm of commercial arbitration'. Under this growing tendency, a move towards a multi-disciplinary composition of arbitral panels is very unlikely to occur. Even more so when in order to enter the pool of candidates to be arbitrators only few nonlegal backgrounds are allowed. This is exactly our case (the current list of admissible categories is basically the same as footnote 11). As of today, three-fourths of the 247 enrolled professionals are attorneys (122) or tenured law professors (49) or public manager with a legal degree (13), the rest are engineers (50) and architects (10). No chartered accountants or economists or experienced contractors. As the chair of the public contract arbitration disputes must be selected from this list, in our opinion, an effective policy to mitigate the inefficient use of experts documented here should at least promote more diversity and quality of the panels by revising these rules.

We feel that this observation complements well previous analysis on the incentive effects created by arbitration mechanism design decisions, but there are a few limitations worth acknowledging. For one, we only observe disputes that make their way to the arbitration tribunal. We do not know how many disputes were resolved privately through renegotiations of the contracts. It is possible that the use of experts affects pre-arbitration bargaining. Further, contract authorities choose whether to include a clause in the original contract that requires a dispute, if it were to arise,

to be taken to arbitration. Ultimately, our results are conditioned on the dispute occurring in a contract that requires arbitration that is not privately resolved. Nevertheless, we feel it is unlikely that these selection effects will negate our findings.

Finally, although our findings do not isolate a specific policy response, the potential solution, as with any principal-agent problem, will hinge on either being able to monitor the agent's decisions directly, or to create incentives for the agent that line up with the principal's objectives. Fee structures that encourage meetings and a lengthier process, as flat per-meeting fees would create, can be expected to suffer from the principal-agent problem identified here.

ACKNOWLEDGEMENTS

Insightful comments from two anonymous reviewers are greatly acknowledged. Marco Vannini gratefully acknowledges support for this research from the University of Sassari under 'Fondo di Ateneo per la ricerca 2019' and the Visiting Professor Programme of the University of Corsica. Claudio Detotto acknowledges the Visiting Professor Programme of the University of Sassari and the University of Naples Parthenope for providing kind hospitality and necessary arrangements during his stay at the Department of Business and Economics, where a part of this work was conducted. We would like to thank Ferruccio Auletta and ANAC for providing us with valuable data on the arbitration procedures.

DATA AVAILABILITY STATEMENT

The data that support the findings of this study are available from the corresponding author upon reasonable request.

ORCID


Claudio Detotto https://orcid.org/0000-0003-3801-2202

REFERENCES

ANAC (2015). *Relazione annuale 2014*. Tipografia Tiburtini.

Arocca, J. P. L. (2021). Rethinking the structure of construction arbitration: A dispute systems design approach to the position of experts. *Harvard Negotiation Law Review*, *27*(43), 43–92.

Ashenfelter, O., & Bloom, D. E. (1984). Models of arbitrator behavior. *American Economic Review*, *74*(1), 111–124.

Ashenfelter, O., & Dahl, G. B. (2012). Bargaining and the role of expert agents: An empirical study of final-offer arbitration. *Review of Economics and Statistics*, *94*(1), 116–132.

Baldi, S., Bottasso, A., Conti, M., & Piccardo, C. (2016). To bid or not to bid: That is the question: Public procurement, project complexity and corruption. *European Journal of Political Economy*, *43*, 89–106.

Baltrunaite, A., Giorgiantonio, C., Mocetti, S., & Orlando, T. (2020). Discretion and supplier selection in public procurement. *The Journal of Law, Economics and Organization*, *37*(1), 134–167.

Benatti, F. (2016). Expert's report in arbitration proceedings: A practical analysis. *Giurisprudenza Arbitrale*, *1*(1), 128–135.

Bloom, D. E., & Cavanagh, C. L. (1986). An analysis of the selection of arbitrators. *American Economic Review*, *76*(3), 408–422.

Celentani, M., Garcia-Posada, M., & Gomez, F. (2010). The Spanish business bankruptcy puzzle. *FEDEA Documento de Trabajo*, *11*, 1–52.

Coviello, D., & Mariniello, M. (2014). Publicity requirements in public procurement: Evidence from a regression discontinuity design. *Journal of Public Economics*, *109*, 76–100.

Coviello, D., Moretti, L., Spagnolo, G., & Valbonesi, P. (2018). Court efficiency and procurement performance. *Scandinavian Journal of Economics*, *120*(3), 826–858.

De Berti, G. (2011). Experts and expert witnesses in international arbitration: Adviser, advocate or adjudicator. In Klausegger, C., Klein, P., Kremslehner, F., Petsche, A., Pitkowitz, N., Power, J., Welser, I., & Zeiler, G. (Eds.), *Arbitration yearbook* (53rd ed., pp. 53–63). Kluwer.

Decarolis, F., Fisman, R., Pinotti, P., & Silvia, V. (2020). Rules, discretion, and corruption in procurement: Evidence from italian government contracting. (*28209*). NBER Working Paper Series.

Deck, C., Farmer, A., & Zeng, D.-Z. (2007a). Amended final offer arbitration outperforms final-offer arbitration. *American Law and Economics Review*, *9*(2), 384–407.

Deck, C., Farmer, A., & Zeng, D.-Z. (2007b). Amended final offer arbitration over an uncertain value: A comparison of CA and FOA. *Experimental Economics*, *10*(4), 439–454.
Detotto, C., Serra, L., & Vannini, M. (2019). Did specialised courts affect the frequency of business bankruptcy petitions in Spain? *European Journal of Law and Economics*, *47*, 125–145.
Dou, W. W., Taylor, L. A., Wang, W., & Wang, W. (2021). Dissecting bankruptcy frictions. *Journal of Financial Economics*, *142*, 975–1000.
European Commission (2019). Scoreboard 2019. EU Justice Scoreboard, 1–68.
European Parliament (2014). Legal instruments and practice of arbitration in the EU. Directorate-General for Internal Policies, 1–312.
Farber, H. S. (1980). An analysis of final-offer arbitration. *Journal of Conflict Resolution*, *24*(4), 683–705.
Farmer, A., & Pecorino, P. (1998). Bargaining with informative offers: An analysis of final-offer arbitration. *Journal of Legal Studies*, *27*(2), 415–432.
Farmer, A., & Pecorino, P. (2003). Bargaining with voluntary transmission of private information: Does the use of final offer arbitration impede settlement? *Journal of Law, Economics, and Organization*, *19*(1), 64–82.
Farmer, A., & Pecorino, P. (2013). Discovery and disclosure with asymmetric information and endogenous expenditure at trial. *Journal of Legal Studies*, *42*(1), 223–247.
Feerick, J. D., & Gerstel, L. (2019). The role of arbitration counsel in ensuring legitimacy and efficiency. *New York Law Journal*, *261*(102), 24–26.
Funk, M. J., Westreich, D., Wiesen, C., Stürmer, T., Brookhart, M. A., & Davidian, M. (2011). Doubly robust estimation of causal effects. *American Journal of Epidemiology*, *173*(7), 761–767.
Gambetta, D. (2018). Why is italy disproportionally corrupt?: A conjecture, *Institutions, governance and the control of corruption*. Springer, pp. 133–164.
Gershoni, N. (2021). Individual vs. group decision-making: Evidence from a natural experiment in arbitration proceedings. *Journal of Public Economics*, *201*, 104479.
ICC (2017). Techniques for controlling time and costs in arbitration. ICC Abitration Commission Report, 1–20.
Imbens, G. W., & Wooldridge, J. M. (2009). Recent developments in the econometrics of program evaluation. *Journal of Economic Literature*, *47*(1), 5–86.
Iossa, E., & Martimort, D. (2013). Corruption in public-private partnerships, (1st ed.). In de Vries, P., & Yehoue, E. B. (Eds.), *The Routledge companion to public-private partnerships* (pp. 207–223). Routledge.
Marselli, R., McCannon, B. C., & Vannini, M. (2015). Bargaining in the shadow of arbitration. *Journal of Economic Behavior & Organization*, *117*, 356–368.
McCannon, B. C. (2018). Arbitration in classical Athens. *Constitutional Political Economy*, *29*(4), 413–423.
Menezes, A. P. (2014). Debt resolution and business exit: Insolvency reform for credit, entrepreneurship, and growth. Public policy for the private sector Note *343*, World Bank Group, Washington D.C. 1–9.
Nagle, F. (2019). Open source software and firm productivity. *Management Science*, *65*(3), 1191–1215.
Nakabayashi, J. (2013). Small business set-asides in procurement auctions: An empirical analysis. *Journal of Public Economics*, *100*, 28–44.
Narita, K., Tena, J. T., & Detotto, C. (2023). Causal inference with observational data: A tutorial on propensity score analysis. *The Leadership Quarterly*, *34*(3), 101678.
Nifo, A., & Vecchione, G. (2014). Do institutions play a role in skilled migration? The case of Italy. *Regional Studies*, *48*(10), 1628–1649.
Pauwelyn, J. (2002). The use of experts in WTO dispute settlement. *International and Comparative Law Quarterly*, *51*(2), 325–364.
Putnam, R. D. (1993). *Making democracy work: Civic traditions in modern Italy*. Princeton University Press.
Sidak, J. G. (2013). Court-appointed neutral economic experts. *Journal of Competition Law and Economics*, *9*(2), 359–394.
StataCorp. (2013). *Stata treatment-effects reference manual: Potential outcomes/counterfactual outcomes*. StataCorp LP.
Stipanowich, T. J. (2014). Reflections on the state and future of commercial arbitration: Challenges, opportunities, proposals. *The American Review of International Arbitration*, *25*(3-4), 298–394.
Uysal, S. D. (2015). Doubly robust estimation of causal effects with multivalued treatments: An application to the returns to schooling. *Journal of Applied Econometrics*, *30*(5), 763–786.
Webb, S., & Wagar, T. (2018). Expedited arbitration: A study of outcomes and duration. *Industrial Relations*, *73*(1), 146–173.

How to cite this article: Detotto, C., Marselli, R., McCannon, B. C., & Vannini, M. (2024). Experts and arbitration outcomes: Insights from public procurement contract disputes. *Kyklos*, 1–22. https://doi.org/10.1111/kykl.12399

APPENDIX A

Table A1 displays the results of the treatment model in which the binary treatment variable, namely *Expert*, is regressed on *Technical Panel*, *Value*, *Queries*, *Public Works*, *Revenues*, *Equity*, *Population*, *Corruption Index*, year indicators and region fixed effects. The model is estimated using a logit regression. Tables A2, A3 and A4 provide the outcome model results using *Duration*, *Award* and *Unanimity* as response variable, respectively. The full set of covariates is employed in all specifications. Column (1) gives the naive OLS estimates. The Column (2) of Tables A2, A3 and A4 provide the treatment effect using a Poisson model, fractional regression model and logit regression, respectively. Then, Columns (3) and (5) of Tables A2, A3 and A4 are estimated using a linear outcome model. Finally, Columns (4) and (6) of Tables A2, A3 and A4 are obtained using a Poisson model, fractional regression model and logit regression, respectively.

TABLE A1 Treatment model: Expert.

Variables	Coefficient	OR
Technical panel	−1.1858***	0.3054
	(0.2978)	
Value	0.0018	1.0018
	(0.0010)	
Queries	0.0654*	1.0676
	(0.0352)	
Public works	1.1376***	3.1194
	(0.4373)	
Revenues	−0.0024**	0.9975
	(0.0010)	
Equity	0.0174***	1.0175
	(0.0056)	
Population	0.0149*	1.0150
	(0.0083)	
Corruption index	1.8952	6.6542
	(1.4034)	
Constant	1.8924	
	(1.2207)	
Year controls?	Yes	
Region fixed effects?	Yes	
Log-likelihood	−94.9160	
McFadden R^2	0.232	
Count R^2	0.750	
Obs.	184	

Note: Treatment model: Logit. Dependent variable is the size of the treatment indicator, *Expert*. Column OR provides the odds ratio values. Region-clustered standard errors presented in parentheses.
*$p < .1$, **$p < .05$, and ***$p < .01$.

TABLE A2 Outcome model: Duration.

	(1) OLS (Naive)	(2) Poisson	(3) AIPW		(4) AIPW		(5) IPWRA		(6) IPWRA	
			Expert = 0	Expert = 1	Expert = 0	Expert = 1	Expert = 0	Expert = 1	Expert = 0	Expert = 1
Expert	221.2***	0.499***								
	(26.04)	(0.0564)								
Technical Panel	33.70	0.0575	52.94***	−36.75	0.203***	−0.0820	62.31***	−18.04	0.234***	−0.0703
	(24.41)	(0.0539)	(17.11)	(43.39)	(0.0353)	(0.0695)	(16.74)	(49.60)	(0.0375)	(0.0716)
Value	−0.271***	−0.000155***	−0.340	−0.381**	−0.00269	−0.000884*	−0.335	−0.346**	−0.00260	−0.000866*
	(0.0371)	(1.63e-05)	(1.125)	(0.187)	(0.00344)	(0.000487)	(1.183)	(0.173)	(0.00379)	(0.000482)
Queries	4.765***	0.00623***	5.177	6.393***	0.0181*	0.0105***	5.882**	8.473***	0.0194*	0.0129***
	(0.912)	(0.00127)	(3.289)	(1.742)	(0.0102)	(0.00313)	(2.993)	(1.836)	(0.00994)	(0.00232)
Public Works	−113.9**	−0.231***	−96.54***	−148.1***	−0.260***	−0.253***	−104.2***	−188.4**	−0.267***	−0.302**
	(43.82)	(0.0728)	(25.36)	(51.83)	(0.0717)	(0.0721)	(31.35)	(95.46)	(0.0911)	(0.125)
Revenues	−0.0303	−4.03e-05	−0.0101	−0.105	1.15e-06	−0.000187	−0.00644	−0.0670	3.82e-05	−9.93e-05
	(0.0557)	(0.000102)	(0.0474)	(0.178)	(0.000133)	(0.000346)	(0.0332)	(0.100)	(0.000119)	(0.000176)
Equity	0.0222	0.000315	0.0448	−0.00341	0.000369	0.000192	0.228	−0.144	0.00149	4.84e-05
	(0.171)	(0.000394)	(0.0960)	(0.672)	(0.000535)	(0.00126)	(0.307)	(0.687)	(0.00185)	(0.00125)
Population	−1.619***	−0.00327***	−0.750*	−3.708***	−0.00214*	−0.00493***	−0.643	−5.302***	−0.00181	−0.00694***
	(0.233)	(0.000456)	(0.419)	(0.424)	(0.00120)	(0.000849)	(0.498)	(1.713)	(0.00146)	(0.00213)
Corruption Index	−303.7**	−0.617***	−305.3***	−301.6**	−1.181***	−0.515***	−380.9***	−260.8**	−1.456***	−0.443**
	(115.4)	(0.162)	(37.83)	(132.0)	(0.118)	(0.188)	(88.91)	(131.8)	(0.228)	(0.188)
Constant	279.0***	5.597***	403.3***	613.3***	5.929***	6.432***	394.4***	611.9***	5.958***	6.454***
	(76.44)	(0.0445)	(83.09)	(28.48)	(0.211)	(0.0471)	(75.33)	(36.57)	(0.203)	(0.0571)

(Continues)

TABLE A2 (Continued)

	(1) OLS (Naive)	(2) Poisson	(3) AIPW		(4) AIPW		(5) IPWRA		(6) IPWRA	
			Expert = 0	Expert = 1	Expert = 0	Expert = 1	Expert = 0	Expert = 1	Expert = 0	Expert = 1
Year Controls?	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Region Fixed Effects?	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Obs.	220	220	73	111	73	111	73	111	73	111

Note: Dependent variable is the duration of the dispute (expressed in days). The AIPW and IPWRA estimates are calculated using the weighting scores calculated by the treatment model. Columns (3) and (5) are estimated using a linear outcome model, while columns (4) and (6) employ a Poisson outcome model. Columns (3)–(6) observations have been trimmed to ensure common support across the two groups. Region-clustered standard errors presented in parentheses.
*p < .1, **p < .05, and ***p < .01.

TABLE A3 Outcome model: Award.

	(1) OLS (Naive)	(2) FRM	(3) AIPW		(4) AIPW		(5) IPWRA		(6) IPWRA	
			Expert = 0	Expert = 1	Expert = 0	Expert = 1	Expert = 0	Expert = 1	Expert = 0	Expert = 1
Expert	0.0553	0.273								
	(0.0721)	(0.315)								
Technical Panel	0.000578	−0.0123	−0.0942	0.0236	−0.460	0.0994	−0.113*	−0.0145	−0.621	−0.0934
	(0.0537)	(0.231)	(0.0600)	(0.0827)	(0.333)	(0.382)	(0.0607)	(0.0920)	(0.378)	(0.445)
Value	−0.000252***	−0.00315***	−0.000990	−0.000688***	−0.0304	−0.00339***	2.69e-05	−0.000727***	−0.0190	−0.00363***
	(3.13e-05)	(0.000701)	(0.00447)	(0.000211)	(0.0266)	(0.00103)	(0.00383)	(0.000240)	(0.0240)	(0.00122)
Queries	−0.00558***	−0.0289**	−0.00914	−0.00137	−0.0588	−0.00917	−0.0132	0.000851	−0.0993	0.00228
	(0.00172)	(0.0123)	(0.0119)	(0.00224)	(0.0803)	(0.0134)	(0.0104)	(0.00195)	(0.0858)	(0.0116)
Public Works	−0.0346	−0.126	−0.0105	0.0502	−0.324	0.265	0.0604	0.0630	0.161	0.263*
	(0.0889)	(0.380)	(0.110)	(0.0409)	(0.536)	(0.179)	(0.125)	(0.0419)	(0.674)	(0.182)
Revenues	0.000181	0.000778*	0.000299***	−0.000226*	0.00138*	−0.00105	0.000360***	−0.000297***	0.00132	−0.00158***
	(0.000108)	(0.000438)	(0.000101)	(0.000116)	(0.000777)	(0.000787)	(9.94e-05)	(5.09e-05)	(0.000924)	(0.000458)
Equity	0.000929***	0.00654***	0.00112***	0.000619	0.0140	0.00328	0.000787	0.00159	0.00654	0.00782
	(0.000157)	(0.00170)	(0.000211)	(0.00127)	(0.0165)	(0.00569)	(0.000561)	(0.00122)	(0.00605)	(0.00547)
Population	0.00271**	0.0131**	−0.000853	0.00640***	−0.00445	0.0334***	−0.000876	0.00654***	−0.00875	0.0368***
	(0.00126)	(0.00624)	(0.00162)	(0.000442)	(0.00885)	(0.00345)	(0.00104)	(0.000576)	(0.00897)	(0.00461)
Corruption Index	0.233**	1.139***	0.737***	−0.110	4.316**	−0.463	0.728**	−0.181	4.264*	−0.822
	(0.103)	(0.393)	(0.285)	(0.179)	(1.841)	(0.770)	(0.329)	(0.153)	(2.553)	(0.682)
Constant	−0.460***	−14.41***	0.305	0.733***	2.468*	−1.015***	0.452**	0.764***	3.394***	−1.250***
	(0.154)	(0.869)	(0.256)	(0.0609)	(1.334)	(0.304)	(0.227)	(0.0790)	(1.162)	(0.283)

(Continues)

TABLE A3 (Continued)

	(1) OLS (Naive)	(2) FRM	(3) AIPW		(4) AIPW		(5) IPWRA		(6) IPWRA	
			Expert = 0	Expert = 1	Expert = 0	Expert = 1	Expert = 0	Expert = 1	Expert = 0	Expert = 1
Year Controls?	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Region Fixed Effects?	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Obs.	220	220	73	111	73	111	73	111	73	111

Note: Dependent variable is the size of the arbitral award, normalized by the total value of the dispute. The AIPW and IPWRA estimates are calculated using the weighting scores calculated by the treatment model. Columns (3) and (5) are estimated using a linear outcome model, while columns (4) and (6) employ a Poisson outcome model. Columns (3)–(6) observations have been trimmed to ensure common support across the two groups. Region-clustered standard errors presented in parentheses.
Abbreviation: FRM, fractional regression model.
*$p < .1$, **$p < .05$, and ***$p < .01$.

TABLE A4 Outcome model: Unanimity.

	(1) OLS (Naive)	(2) Logit	(3) AIPW		(4) AIPW		(5) IPWRA		(6) IPWRA	
			Expert = 0	Expert = 1	Expert = 0	Expert = 1	Expert = 0	Expert = 1	Expert = 0	Expert = 1
Expert_Witness	−0.0676	−0.646								
	(0.0578)	(0.648)								
Tecnhnical Panel	−0.0488	−0.583	−0.0337	−0.0872	−0.529	−0.854	−0.0260	−0.0289	−0.740	−0.341
	(0.0588)	(0.546)	(0.0749)	(0.117)	(0.706)	(1.139)	(0.0765)	(0.108)	(0.796)	(1.056)
Value	−9.49e-05	−0.00315	−0.00175	−0.00108***	0.00888	−0.00590***	−0.000204	−0.00117***	0.0405	−0.00628**
	(6.24e-05)	(0.00218)	(0.00429)	(0.000352)	(0.0818)	(0.00216)	(0.00561)	(0.000444)	(0.0704)	(0.00295)
Queries	0.00193	0.0501*	0.00284	0.00654***	0.0123	0.0771*	0.00261	0.00675**	−0.0110	0.0672
	(0.00119)	(0.0272)	(0.0109)	(0.00254)	(0.228)	(0.0432)	(0.0147)	(0.00327)	(0.233)	(0.0411)
Public_Works	0.0491	0.727	−0.0180	0.158	0.564	0.738	−0.0767	0.162	0.693	0.730
	(0.101)	(0.802)	(0.0967)	(0.107)	(1.166)	(0.932)	(0.0997)	(0.111)	(1.062)	(0.847)
Revenues	0.000113	0.00191	0.000119	4.42e-06	0.000887	−0.000193	−2.30e-05	2.63e-05	−0.000777	0.000495
	(7.85e-05)	(0.00164)	(7.89e-05)	(0.000167)	(0.00142)	(0.00221)	(0.000135)	(0.000138)	(0.00170)	(0.00186)
Equity	−0.000797	−0.0205**	−0.000417	−0.00252	−0.0270	−0.0105	−0.00135	−0.00245**	−0.0460***	−0.0120
	(0.000806)	(0.0103)	(0.000378)	(0.00167)	(0.0269)	(0.0130)	(0.00112)	(0.00120)	(0.0135)	(0.0120)
Population	−0.00162	−0.0135	−0.000530	−0.00606***	−0.00170	−0.0491**	−0.00120	−0.00448***	−0.00357	−0.0467*
	(0.00114)	(0.00829)	(0.00125)	(0.000718)	(0.0110)	(0.0223)	(0.00140)	(0.000986)	(0.0182)	(0.0258)
Corruption_Index	−0.214	−1.804*	−0.196	−0.00581	−0.0283	−1.883	−0.237	0.00520	1.012	−1.726
	(0.212)	(1.086)	(0.325)	(0.221)	(2.644)	(2.742)	(0.329)	(0.252)	(3.832)	(2.613)
Constant	1.122***	0.877	1.110***	1.150***	2.296	1.160	1.258***	1.153***	3.466***	1.229
	(0.129)	(1.450)	(0.207)	(0.108)	(1.801)	(1.047)	(0.357)	(0.102)	(1.747)	(1.032)

(Continues)

TABLE A4 (Continued)

	(1) OLS (Naive)	(2) Logit	(3) AIPW		(4) AIPW		(5) IPWRA		(6) IPWRA	
			Expert = 0	Expert = 1	Expert = 0	Expert = 1	Expert = 0	Expert = 1	Expert = 0	Expert = 1
Year Controls?	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Region Fixed Effects?	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Obs.	220	220	73	111	73	111	73	111	73	111

Note: Dependent variable is equal to one if the arbitrators did not make a unanimous decision, zero otherwise. The AIPW and IPWRA estimates are calculated using the weighting scores calculated by the treatment model. Columns (3) and (5) are estimated using a linear outcome model, while columns (4) and (6) employ a Poisson outcome model. Columns (3)–(6) observations have been trimmed to ensure common support across the two groups. Region-clustered standard errors presented in parentheses.
*$p < .1$, **$p < .05$, and ***$p < .01$.