The Interplay of Discretion and Complexity in Public Contracting and Renegotiations

Fernando Deodato Domingos
Sao Paulo School of Business Administration, Fundação Getúlio Vargas (FGV-EAESP)
Blavatnik School of Government, University of Oxford
R. Itapeva, 432 - Bela Vista, São Paulo - SP, 01332-000, Brazil
fernando.domingos@fgv.br

Carolyn J. Heinrich
Vanderbilt University
202 Payne Hall, PMB 414
230 Appleton Place
Nashville, TN 37203, United States
carolyn.j.heinrich@vanderbilt.edu

Stéphane Saussier
Sorbonne Business School, University Paris I Panthéon-Sorbonne
8 bis Rue de la Croix Jarry, 75013 Paris, France
stephane.saussier@iae.pantheonsorbonne.fr

Mehdi Shiva
RAND Europe
Blavatnik School of Government, University of Oxford
Eastbrook, Shaftesbury Rd, Cambridge CB2 8BF, United Kingdom
mshiva@randeurope.org

Acknowledgments

An earlier version of this paper was presented at the Berkeley-Padova-Paris Eighth Organizational Economics Workshop (2022), the Public Management Research Conference (PMRC, 2022), and the Brazilian Academy of Management (EnANPAD, 2023). We are thankful for the insightful comments we have received at all these conferences and academic seminars at the Blavatnik School of Government and FGV-EAESP. Further, we especially acknowledge the invaluable support by TED for granting access to relevant data. Special thanks to Milena Arsenijevic and Fernando Fincatti for their invaluable contributions as research assistants, and editor and reviewers for incredible guidance.

Data Availability Statement: Data derived from a source in the public domain

The data supporting this article are sourced from TED (Tenders Electronic Daily, Supplement to the Official Journal of the EU): https://ted.europa.eu/en/. Structured data for Contract Award Notices can be accessed here: https://data.europa.eu/data/datasets/ted-csv?locale=en. Data for Contract Modification Notices are available via the advanced search feature, accessible at: https://ted.europa.eu/en/advanced-search. Additionally, we use supplementary data derived from the Oxford COVID-19 Government Response Tracker. More details are available at: https://www.bsg.ox.ac.uk/research/covid-19-government-response-tracker. Finally, the coding routines developed by the authors and used for the analysis can be found on GitHub: https://github.com/fdeodatodomingos/fdeodatodomingos-JPART_discretion_complexity.

Abstract

This article investigates how the use of discretion in public-private contracts interplays with transactional complexity in influencing contract renegotiations. Motivations for contract renegotiations may be positive, negative (e.g., opportunistic), or neutral, and we argue that allowing discretion at the award stage may promote a more relational approach to contracting that fosters cooperation and productive adaptation. Using a dataset of 12,189 renegotiated contracts from the Tenders Electronic Daily (TED) eProcurement platform—based on European Union public procurement directives—we apply regression analyses and propensity score matching to examine how contracts are awarded and renegotiated. Our findings suggest that contracts awarded with government discretion are associated with renegotiations that are viewed more positively and less likely to be perceived as opportunistic. However, this beneficial role for discretion appears to be mitigated by contract transactional complexity, making this a critical consideration in efforts to improve the governance of provider relationships and increase public value. By integrating insights from incomplete and relational contracting theories, this study contributes to the public administration and management literature by demonstrating how discretion and complexity jointly shape contract renegotiation dynamics, informing governance strategies that balance flexibility and accountability in public procurement.

Keywords: relational contracting, contract renegotiations, public discretion, transactional complexity.

Resumo

Este artigo explora como a discricionariedade governamental e a complexidade transacional em contratos público-privados influenciam as renegociações contratuais. As renegociações podem ter motivações positivas, negativas (como oportunistas), ou neutras. Argumentamos que permitir discricionariedade na fase de adjudicação (quando o contrato é formalmente atribuído ao vencedor) pode promover uma abordagem mais relacional, incentivando a cooperação e a adaptação produtiva. Utilizando um conjunto de dados com 12.189 contratos renegociados da plataforma de eProcurement *Tenders Electronic Daily* (TED), baseada nas diretrizes de contratação pública da União Europeia, aplicamos análises de regressão e *propensity score matching* para examinar como os contratos são concedidos e renegociados. Nossos resultados indicam que contratos com discricionariedade governamental estão associados a renegociações percebidas de forma mais positiva e menos oportunistas. No entanto, o papel benéfico da discricionariedade é mitigado pela complexidade transacional, destacando a importância de considerar esse aspecto ao aprimorar a governança de parcerias privadas e aumentar o valor público. Ao integrar *insights* das teorias de contratos incompletos e relacionais, este estudo contribui para a literatura em administração pública e gestão ao demonstrar como discricionariedade e complexidade moldam conjuntamente a dinâmica das renegociações contratuais, informando estratégias de governança que equilibram flexibilidade e responsabilidade na contratação pública.

Palavras-chave: contratos relacionais, renegociações contratuais, discricionariedade pública, complexidade transacional.

Résumé

Cet article examine comment l'usage de la discrétion dans les contrats public-privé interagit avec la complexité transactionnelle pour influencer les renégociations contractuelles. Les motivations des renégociations peuvent être positives, négatives (par exemple, opportunistes) ou neutres. Nous soutenons que permettre une certaine discrétion à l'étape de l'attribution du contrat peut favoriser une approche plus relationnelle, encourageant la coopération et une adaptation efficace du contrat. En utilisant un ensemble de données comprenant 12189 contrats renégociés issus de la plateforme de passation électronique *Tenders Electronic Daily* (TED), basée sur les directives européennes en matière de marchés publics, nous proposons une analyse économétrique et un *propensity score matching* pour examiner comment les contrats sont attribués et renégociés. Nos résultats montrent que les contrats attribués avec discrétion gouvernementale sont associés à des renégociations perçues de manière plus positive et moins susceptibles d'être jugées opportunistes. Cependant, ce rôle bénéfique de la discrétion semble atténué par la complexité transactionnelle des contrats, soulignant l'importance de prendre en compte cet aspect pour améliorer la gouvernance des relations avec les prestataires et accroître la valeur publique. En intégrant les perspectives des théories des contrats relationnels et incomplets, cette étude contribue à la littérature en administration publique et en gestion en démontrant comment discrétion et complexité façonnent conjointement la dynamique des renégociations contractuelles, informant ainsi les stratégies de gouvernance qui équilibrent flexibilité et responsabilité dans la passation des marchés publics.

Mots-clés: contrats relationnels, renégociations contractuelles, discrétion publique, complexité transactionnelle.

INTRODUCTION

Contracting for public goods and services with the aim to deliver value to the public is increasingly executed through complex arrangements such as public-private partnerships (PPPs). With government purchases of goods and services from the private sector estimated at 12-14 percent (on average) of a country's Gross Domestic Product (GDP), there is considerable potential for increasing public value by getting off on the right contractual footing in PPPs (Bosio et al., 2022; Brown et al., 2016; Bruce et al., 2019; Bryson et al., 2014; Cabral et al., 2013; Frydlinger et al., 2019; Quelin et al., 2019). Allowing discretion in award criteria and contracting procedures provides public procurers with more flexibility in deciding winning bidders and may be one way to potentially foster greater cooperation at the outset of a PPP and cultivate relational governance structures to support its execution (Brown et al., 2010; Brunjes, 2020; Brunjes & Rodriguez- Plesa, 2024; Decarolis et al., 2020).

In practice, public-private contracts often consist of a complex series of transactions executed in dynamic contexts, where it is not easy to anticipate future events that may disturb relationships in a PPP. Therefore, a collaborative orientation at the start of a PPP may aid the partners in navigating challenges (Brown et al., 2013, 2016; George et al., 2023; Hart & Moore, 1988; Heinrich & Choi, 2007). Contracts governing public procurement are frequently renegotiated in the face of contingencies and often involve large amounts of public money and deadline extensions (Athias & Saussier, 2007; Beuve et al., 2023; Brogaard et al., 2021; Gagnepain et al., 2013; Guasch et al., 2008; Ryan, 2020). In this regard, renegotiations are sometimes interpreted as a sign of a flaw or failure in the contractual relationship. In such cases, it is not unusual for sizable cost overruns to appear in the press (Guasch et al., 2008). One prominent case, for example, involved the payment by results outsourcing of probation services in England: £467 million in additional payments were made to providers above the

original contract terms between 2016 and 2020, and the contract was terminated early (House of Commons Public Accounts Committee, 2019).

Alternatively, renegotiations may facilitate necessary adaptations to fill in contractual blanks or address inadequacies in the initial agreement or to contend with unforeseen events (e.g., legislative changes, economic crises, technological innovations, pandemics, war, etc.) (Grossman & Hart, 1986). In such cases, renegotiations may lead to better or more efficient outcomes and may instead be associated with greater surplus for the public (Beuve & Saussier, 2021), such as when renegotiations contribute to improved contractual mechanisms, relationships, or cooperation among the contracting parties (Heinrich & Choi, 2007), while minimizing the costs of making changes (Oliveira et al., 2022; Tadelis, 2012).

This research focuses on the use of discretion in public contracting procedures and how it affects the subsequent execution of procurement, particularly contract renegotiation outcomes and public value. Drawing on the theoretical literature on public contracting and renegotiations, we form testable hypotheses about how the use of discretion in contract award procedures to foster relational aspects of the contract influences the renegotiation orientation (or sentiment at the time of renegotiation) and time to renegotiation (Brown et al., 2010; Brunjes, 2020). As theory suggests, there should be fewer risks associated with discretion and lower costs of adapting in less complex contracts (Frydlinger et al., 2019; Oliveira et al., 2022). We therefore also investigate empirically the interplay of contract transactional complexity with discretion on these two renegotiation outcomes.

Empirical data and research on contract renegotiations in public procurement and their net benefits or costs for the public has largely lagged behind theoretical and qualitative understandings of their intent and implications. Yet European Union (EU) directives—voted in 2014 and applied since 2016 throughout Europe—now require public contractors to publish information on major contract modifications as notices in the Official Journal of the

European Union. We web-scraped over 80,000 of these contract modification notices that were published on the Tenders Electronic Daily (TED) website between January 2016 and August 2021. TED is the online version of the "Supplement to the Official Journal" of the EU, dedicated to European public procurement (eProcurement platform). The TED contract award notices also provided information about contracts that were not renegotiated over this period.

In regression analyses of these data, we find associations between contract award criteria and procedures and how contracts are renegotiated. When contracts are awarded through criteria involving some government discretion, not only are renegotiations viewed more positively by the contracting parties, but the time to renegotiation is also longer. However, contract transactional complexity moderates this relationship, dampening the positive influence of discretion on renegotiation orientation, possibly because more "guardrails" are placed on the renegotiations. This complexity moderation effect might alternatively be interpreted as socially desirable if the guardrails, in turn, limit hazards from opportunistic interests or prevent corruption that is potentially enabled by discretion (Beuve et al., 2019; Brogaard et al., 2021; Ryan, 2020). To further unpack these mechanisms in a post-hoc fashion, we conduct analyses to rule out alternative explanations related to opportunistic behavior or corrupt intentions and do not find evidence of misallocation of funds deriving from discretionary criteria.

THEORETICAL BACKGROUND

Public procurement and contract renegotiations

A contract is a formal and legally binding agreement that is a focal instrument in the formation of strategic alliances between private partners (e.g., Bakker, 2016) and also at the interface of private businesses and government in public contracting and PPPs (e.g., Bruce et al., 2019; George et al., 2023; Quelin et al., 2019). Prior research has investigated how

private and public capabilities can enhance public value in synergistic ways, while also recognizing the importance of contract execution dynamics that might either safeguard societal interests (e.g., monitoring capacity) or impede contract success (e.g., moral hazard issues) (e.g., Lazzarini, 2022). In this study, we focus on the interplay of *discretion* and *transactional complexity* during contract execution and how they shape a key contractual outcome, namely, the contract renegotiations.

When awarded through a call for bids, public contracts emerge from a competitive process that helps reveal the contractor's costs (i.e., lessening adverse selection issues). The contract also generally includes clauses to incentivize the contractor to perform efficiently during the contract execution, i.e., addressing moral hazard issues (Bruce et al., 2019). With public procurement becoming more complex and PPPs playing an increasingly central role in the delivery of public services, contract renegotiations are becoming more common (Beuve et al., 2023; Beuve & Saussier, 2021; Brogaard et al., 2021; Ryan, 2020). Not only are contracts inherently incomplete, but complex products and services bring additional uncertainties that complicate contractual arrangements and their execution (Brown et al., 2018; Bruce et al., 2019; Cabral et al., 2013). In many cases, turbulent times may render renegotiations unavoidable, such as with global crises (e.g., COVID-19 pandemic, Great Recession) or other challenges associated with economic, political or social disruptions that vary across countries and contexts (Heinrich & Choi, 2007; Schwartz, 2020). Adaptation costs generated by one or more rounds of renegotiation can be substantial, as also evidenced within private alliances (Bakker, 2016). Bajari et al. (2014), for example, questioned economists' emphasis on private information and moral hazard as primary sources of inefficiency, when they found in their study of Californian highway paving contracts that renegotiations imposed significantly higher adaptation costs in comparison.

On the one hand, if the initial contract design achieves the desired objectives, then contract renegotiations might distort the established safeguards and incentives in the original arrangements and diminish the effectiveness of the contractual relationship (Gagnepain et al., 2013; Guasch et al., 2008). Negative characterizations of contract renegotiations dominate the scant empirical literature. Typical explanations for the need to renegotiate include: ill-conceived contracts, unforeseen events, opportunistic behavior, and winner's curse issues (i.e., the winning bid is overly optimistic, and the party will subsequently have to renegotiate). Other reasons include government corruption and political influence, such as when firms that win bids are also politically connected in ways that help them to quickly renegotiate contracts (Brogaard et al., 2021; Guasch, 2004; Ryan, 2020), or when government-led renegotiations enable incumbent governments to circumvent budgetary rules (Engel et al., 2009). Oversights, omissions, or ambiguities in contracts may also contribute to behaviors on the part of contracting parties that are counter-productive to constructive collaboration and may compel renegotiations in an antagonistic setting (Covey & Merrill, 2006).

On the other hand, while acknowledging that complex public contracts are more susceptible to renegotiations, Brown et al. (2010) argue that the prospect of renegotiations also opens the door for the contracting parties to explore cooperative strategies to achieve their goals. The literature on public procurement and contracting has long recognized the importance of relying on relational mechanisms, such as trust, reputation, and reciprocity, to manage contractual dynamics and minimize the likelihood of adversarial relationships emerging among the partners, particularly in complex contracting arrangements (Bertelli & Smith, 2010; Brunjes, 2020). Moreover, the research base also suggests that formal contract design will differ when relational contracting mechanisms are available to the contracting parties (Gil & Zanarone, 2018). Developing relational aspects of contracts—such as "guiding

principles" that allow parties to use judgment as circumstances change and other informal incentives to sustain cooperation—can help to reduce contractual disputes and reliance on formal contract specifications (e.g., clauses, stipulations), while increasing the prospects of win-win adaptations for the contracting parties (Frydlinger et al., 2019, 2021; Oliveira et al., 2022).

Conceptualizing key aspects in relational contracting: discretion, cooperation, and complexity

Following the recent work of scholars investigating how public procurement procedures at the contract award stage may promote the selection of contractors better suited to developing relational aspects of contracts and cooperating in turbulent times (e.g., Brunjes, 2020; Brunjes & Rodriguez- Plesa, 2024; Coviello et al., 2018), we aim to advance this knowledge base by unpacking the consequences of discretion in contract execution. More specifically, we expect discretionary criteria that do not require selection of the lowest-price bidder—and the consequent use of qualitative criteria in the calls for bids and awarding of contracts—to encourage cooperative behavior at the start and reduce opportunistic or "shading behaviors" (e.g., free-riding or deliberately undermining cooperation) when renegotiations occur (Frydlinger et al., 2019, 2021). This could contribute to less costly renegotiations, more "win-win" outcomes, and even the rewarding of cooperative behaviors in contract renewals.

We also recognize the potential for complexity in the contractual arrangements between public and private partners to interact with discretion or mediate the relationship between discretionary contract award procedures and the outcomes of contract renegotiations (Brown et al., 2010, 2013; Brunjes, 2020; Brunjes & Rodriguez- Plesa, 2024). For instance, contracts with multiple (more than two) parties are known to increase the complexity of decision-making (Huxham & Vangen, 2013). Moreover, as costs, risks and rewards have to be allocated across multiple parties—at the award stage and as the work evolves—this can

increase uncertainties and contract stipulations intended to address them, while also making the stakeholders more risk-averse in any renegotiations (Brown et al., 2018). Eggleston et al. (2000) suggest that all contracts are inherently complex because of pervasive uncertainty about environments and the future (e.g., an infinitely large number of events that could affect the contract value), and thus, transactional complexity should be measured on a continuum where contracts present either more or less complexity.

The contracting literature proposes a wide variety of definitions of complexity, with empirical operationalizations inevitably shaped by context or constrained by data availability, and increasingly calls for multidimensional measures of complexity. Eggleston et al. (2000), for example, defined contract complexity theoretically according to the number of "state contingencies" the parties may face, the variability in payments under different contingencies, and the "cognitive load" it imposes on the parties to understand the contract. Barthélemy and Quélin's (2006) operationalization of contract complexity, in turn, recognizes that state contingencies affect contract design, that is, the extent to which procurement contracts are composed of elaborate clauses (control, incentive, price, flexibility, and end of contract clauses) to address risk and uncertainty. Reuer and Ariño (2007) similarly identified eight classes of contract provisions or "alliance safeguards" to assess the stringency and complexity of contractual provisions and found enforcement-oriented and coordination provisions to be two distinctive classes of primary importance.

Another factor regularly identified in the literature as contributing to contract complexity is the extent to which the contracting parties make specialized investments in the primary work of the contract, where assets brought to the exchange relationship cannot be utilized in another contract (Brown et al., 2010; Hefetz & Warner, 2012; Petersen et al., 2019). The parties making these investments will want to ensure that they realize the expected returns and will guard against risks of the relationship terminating early through

actions by the other parties. A typical way to address these risks and protect their investment in the relationship is again by building conditions (e.g., of contractual breach) into the contract, stipulations for roles and responsibilities and penalties for nonperformance of responsibilities, and other required actions or procedures for dispute resolution (Reuer & Ariño, 2007). These provisions will also increase the costs associated with crafting and enforcing the contract (Potoski et al., 2023; Spiller & Moszoro, 2014; Williamson, 1985). Brown and Potoski (2003) observe that services contracts are more likely to involve specialized investments, and their outcomes are also more difficult to assess (a lower level of service measurability), adding to complexity and the costs associated with writing a formal contract. Relatedly, Brunjes and Rodriguez- Plesa (2024) assessed *task* complexity using perceptual data from contracts and a scale designed by Kim et al. (2016, p. 795) that assesses perceptions of complexity as "the ease or difficulty of specifying the product's attributes and requirements," assuming more complex tasks will require more oversight and encounter more performance challenges.

Zhang et al. (2023) link these dimensions of contract complexity to the theoretical constructs of control, coordination, and adaptation, pointing out that the desire for control (deriving from transaction cost theory) contributes to the motivation to protect investments in the contractual relationship and to construct safeguards against opportunistic interactions (Lumineau & Quélin, 2012). They also point out that even if the contracting parties act in good faith, coordination failures or missteps in complex, multiparty exchanges can undermine the arrangements. Coordination is critical for clarity of roles, unity of effort, and addressing the unanticipated contingencies that may require renegotiations and adaptations to achieve goals. It is also suggested that fostering trust among the contracting parties will encourage a reciprocal approach to renegotiations and help to overcome the limits to the adaptability of elaborate, highly structured contracts (Poppo & Zenger, 2002).

In their empirical investigation of contract complexity in construction contracts, Zhang et al. (2020) investigated the relationship between contract complexity and relational governance, testing if trust reduces perceptions of vulnerability and risk among contracting parties in the face of contract complexity, and if complexity leads the parties to feel constrained in the relationship, contributing to the deterioration of cooperation and trust. Using a 10-item Likert scale measure of complexity (based on procurement managers' perceptions),[1] they found that a relational approach to contracting reduces negative perceptions that arise from contract complexity. Using a comparable but objective machine-learning generated measure of complexity, Zhang et al. (2023) found that while the subjective measures of contract complexity were directly related to contract performance, the effects of complexity measured objectively were indirect (moderated) through their interaction with trust. Their findings also point to coordination as a key dimension of contract (transactional) complexity that could be alleviated by relational elements such as trust among the contracting parties.

The EU contract modifications and renegotiations data do not allow for the construction of comparable *subjective* measures of complexity or measures of contract specifications such as clauses or related measures of contract rigidity. However, these data allow for empirical description of the transactional arrangements among the contracting parties and the nature of their work that may pose challenges for control, coordination, and adaptation. The next section provides institutional details of this research setting and elaborates on the mechanisms through which discretion and complexity might interact in a relational approach to public procurement renegotiations to shape renegotiation outputs.

[1] The 10-item scalar measure of complexity was based on survey responses from contract managers in China (and the previous work of Chen et al., 2018) that address the extent to which the contract: (1) defines rights and responsibilities of both parties, (2) specifies provisions about monitoring and controlling, (3) defines provisions about insurance and guarantee, (4) specifies penalties, (5) defines risk allocation, (6) defines procedures of dispute resolution, (7) defines management procedures, (8) defines the scope of work, (9) defines technical specifications the project should follow, and (10) defines provisions of variations and adjustments..

INSTITUTIONAL BACKGROUND

Public procurement contracts are designed and awarded with a baseline contract value and reference points for the cost of services (e.g., Hart & Moore, 2008). These are standard procedures worldwide for a two-party agreement: on one side, the public procurers act as contracting authorities, and on the other side, the winning bidders are typically private providers of services (or suppliers). These contracts, however, often undergo renegotiations related to the original reference points and baseline agreements, including in the European Economic Area and elsewhere (Athias & Saussier, 2007; Beuve et al., 2023; Brogaard et al., 2021; Gagnepain et al., 2013; Guasch et al., 2008; Ryan, 2020). The EU recently increased transparency around contractual renegotiations through directives voted on in 2014 and applied since 2016 all over Europe (European Parliament, 2014), generating newly available data on renegotiations that we employ in this research and combine with existing information on the overall contracts.

In the EU, the first step toward a new public contract is the publication of "prior information notices" or "contract notices." Prior information notices make known the contract authorities' intentions of planned procurements, while contract notices are used to call for competition. The contract notice should include all of the contract performance conditions, including the award criteria. As stated in the directive 2014/24/EU, "the minimum requirements to be set by the contracting authority are those conditions and characteristics (particularly physical, functional and legal) that any tender should meet or possess in order to allow the contracting authority to award the contract in accordance with the chosen award criteria." (European Parliament, 2014).

Following the decision to award the contract, contract award notices are published with the results of the procurement procedure. Contracts awarded in Europe range from simpler procurement to more complex public-private partnerships involving multiple partners

(Quelin & Duhamel, 2003). Data on award notices cover information regarding the contracting parties, objective of the contract, and award criteria procedures used. These data are used to gauge (operationalize) the level of discretion and contract transactional complexity across contracts, recognizing that governments worldwide distinguish the "lowest price" award criterion from the "most economically advantageous tender" (MEAT), where discretion is greater for awarding the latter. Alternatively, there may be different dimensions of discretion in the contracting procedures used across countries, as well as different elements of transactional complexity. These components of discretion and complexity themselves are not subject to negotiation, therefore, the constructs should remain constant throughout a given contract's duration (European Parliament, 2014).

Additionally, the public procurer and service provider will bring subjective reference points to the relationship regarding the value they assign to particular contract outcomes, which will influence their expectations about how the contract should change in any renegotiations and their judgment about what is an acceptable outcome (Hart & Moore, 2008). We establish the expectation that the public procurer and provider can negotiate (and further renegotiate) the contract orientation, intended outcomes, and value. Importantly, however, in the EU there is an upper bound value aligned with public procurement renegotiation directives, mandating that contract modifications should not increase the contract value by more than 50 percent of the original award value. Therefore, partners can renegotiate the contract terms beyond the original reference points, but are subject to the EU directives for contract modifications that require publication of notice without a new procurement procedure (described in article 72 of directive 2014/24/EU) (European Parliament, 2014).

Since 2016, when these directives were applied, data on contract modification notices have been published in TED (the online version of the official journal of the EU dedicated to

European public procurement). Complementing the information on discretion and complexity extracted from the contract award notices, contract modification notices allow us to assess information on renegotiation orientation. Contracts are renegotiated for a myriad of reasons, which can be endogenous or exogeneous. For instance, renegotiations might follow demands from either public or private partners for developments associated with technical issues, regulatory and legal frameworks, unexpected costs, or more specific reasons such as COVID-related disruptions or Green Public Procurement (GPP) initiatives related to sustainability concerns. Contract modification notices might also primarily represent the perspective of procurers rather than the private providers. We assume, for simplicity, that the public procurer acts benevolently to maximize value for the public in the contractual relationship and that political considerations or corruption do not factor weightily into the public-private party interactions (Spiller & Moszoro, 2014).[2] Nevertheless, we also explore mechanisms related to opportunism or misconduct that deviate from relational practices (e.g., Baltrunaite et al., 2021; Spiller & Moszoro, 2014).

RESEARCH HYPOTHESES

The theory and institutional background discussed above inform our research hypotheses. It suggests that the use of discretion in contracting procedures allows selection of providers at the start better suited to developing relational aspects and cooperating in unforeseen events (Brunjes, 2020; Coviello et al., 2018). It also suggests that a higher level of discretion is often enabled by relying upon the MEAT criterion instead of the "lowest price" criterion (e.g., Decarolis et al., 2020). Therefore, fostering a relational approach at the contract award stage—i.e., using MEAT vs. lowest-price bidder criterion for contract selection—should incentivize collaborative behavior during contract execution and discourage opportunistic behaviors in the event of renegotiations (Frydlinger et al., 2019, 2021; Frydlinger & Hart,

[2] Spiller and Moszoro (2014) point out that even in contracts that are legally and honestly executed, public agents will anticipate politically-oriented challenges and accordingly make contract design adjustments that tend toward greater specificity and rigidity in the contract (with costly implications).

2023). Accordingly, the first hypothesis exploring these relationships of discretion to the first renegotiation outcome is:

Hypothesis 1a: The higher the levels of discretion accorded to the government at the contract award stage, the higher the likelihood that the contracting parties will approach renegotiations with a positive, cooperative sentiment vs. a negative, noncooperative orientation.

Simply put, public procurement procedures that allow greater government discretion in making contract awards will contribute to more cooperation among partners when compared to more rigid procedures (e.g., Brunjes, 2020; Frydlinger et al., 2019, 2021; Frydlinger & Hart, 2023).

Similarly, greater discretion in making contract awards (allowing a more cooperative approach to execution of the contract work) should increase the length of time to the first contract renegotiation, assuming that the parties would be less likely to renegotiate in the face of smaller shocks to the arrangements or to opportunistically call for renegotiations. Indeed, rapid renegotiations frequently suggest opportunistic behavior and flawed concessions or regulatory design (Guasch, 2004; Guasch et al., 2008). As articulated in H1b:

Hypothesis 1b: The higher the levels of discretion accorded to the government at the contract award stage, the longer the time to the first renegotiation of the contract.

The second set of hypotheses infer from the theoretical and institutional discussion above that greater *transactional* complexity will likely contribute to more safeguards and rigidities in the formal contract design and its execution. We accordingly explore how this specific, objectively measured type of complexity interacts with the allowance for discretion in government procurement at the contract award stage to influence the orientation of contract renegotiations. Brown et al. (2018) argued that complex contracts will not "bear

fruit" in the absence of a cooperative approach to the relationship that discourages the parties from acting in self-interested, opportunistic ways (e.g., exploiting ambiguities or information asymmetries inherent in complex contracts). This is not at odds with the idea that the benefits of a more relational approach can be inhibited by transactional complexity. If transactional complexity constrains coordination (Zhang et al., 2023) and leads the contracting parties to layer on more rules, clauses, and schedules at the outset of the relationship, i.e., guardrails against opportunism and uncertainties (Kivleniece & Quelin, 2012; Spiller & Moszoro, 2014), it may depress the influence of discretion and reduce the likelihood that the parties approach renegotiations positively. In relation to renegotiation orientation, the next hypothesis submits:

Hypothesis 2a: Higher levels of transactional complexity will dampen (reduce) the positive association of discretion with the parties' (cooperative) sentiment toward renegotiations.

Similarly, if transactional complexity contributes to more circumstances requiring adjustments to the contract arrangements, it could dampen the effects of discretion and reduce the time to renegotiations. Prior research indicates that particularly when there is weak regulatory capacity, more complex cost pass-through clauses might be needed to avoid opportunistic behavior (Bosio et al., 2022; Guasch et al., 2008). The final hypothesis sets forth:

Hypothesis 2b: Higher levels of transactional complexity will dampen (reduce) the positive association of discretion with the length of time to contract renegotiations.

Also of broad interest is how the interplay of discretion and complexity, as hypothesized above in terms of renegotiation outcomes, influences *value* for the public. Incomplete contracts present a trade-off between using first-price auctions—the "lowest

price" instead of MEAT criterion to obtain a more competitive price—and poor ex-post performance that induces renegotiations (Decarolis, 2014). Relational ties and resulting increased prospects of contracting in the future could create incentives for the parties to withstand larger costs in turbulent times without renegotiating, expanding the range of perturbations for which contracts are self-enforcing (Klein, 1996). Alternatively, it is possible that a more relational approach to contracting—afforded by greater discretion at the contract award stage—allows for larger changes in the contract value *through* renegotiations, if the parties are less constrained by complexities of the contractual arrangements and associated contract rigidities (Brown et al., 2010). We, therefore, employ additional data to investigate, in a post-hoc fashion, these different pathways to renegotiated *contract values*. We also use proxies for "red flags" (warning signs or indicators suggesting the possibility of misconduct or corruption) to rule out alternative explanations regarding opportunistic behavior.

STUDY DATA AND METHODS

Empirical data, sample and measures

The empirical data on public procurement within the European Economic Area (drawn from the publicly available TED data) encompass information on both renegotiated contracts and those that were not renegotiated (see additional details in Online Appendix A). Our analytic sample includes all of the TED contract award notices from 2016 to 2020 and their respective contract modification notices through the end of September 2021 (for those that have been renegotiated). TED publicized the award notices in structured spreadsheets that are easily accessible to researchers. The contract modification notices, however, had to be web-scraped and subsequently matched with information from the award notices. We used the Python library *BeautifulSoup* to extract data from the TED website. This library enables parsing and navigating HTML documents, allowing efficient retrieval of the specific features of every contract modification notice needed for this research. The *Pandas* library, also in Python, was

then used to clean and organize the data into a structured format. The data were double-checked by manually visiting the TED website.

We disregard information from contract award notices before 2016, as older contracts could have been renegotiated before the new European directives were in place; the directives were voted on in 2014 but did not apply all over Europe until 2016. This assures that we only have contract award notices that, if renegotiated, should have the respective contract modification notices listed in our database.

The data cleaning process excluded contracts: i) with more than 10 associated contract modification notices, which accounted for less than 1% of the total number of contracts[3]; ii) with contract award values smaller than 1,000 Euros (approximately 3% of the sample); and iii) those with contract value renegotiations that reduced or increased the value by more than 90% (less than 2,000 observations).[4] The initial sample size of 745,410 contract award notices was then intentionally restricted to the 12,189 contract award notices with observed renegotiations within the study sample (1.6%), corresponding to a total of 21,117 contract modification notices (after data cleaning). We underline, however, that renegotiations are not as uncommon as these numbers might suggest. Awards that comprise long-term contracts might be renegotiated later, or minor renegotiations may not require a modification notice (see Online Appendix A for the EU directives). And in contracts that are simpler and short-term, renegotiations are generally not expected (Macneil, 1982)

Given that contract duration was not a mandatory field of the contract award notices in TED, contract end dates could only be identified for contracts with a contract modification

[3] This corresponds to 3% of our renegotiated contracts. We exclude those observations as they likely refer to duplicates in the data that reflect misreporting or sequential renegotiations related to multiple contract lots. The contract with most associated renegotiations had 285 contract modification notices. Although there were only 428 contracts with more than 10 renegotiations, they corresponded to 12,553 contract modification notices.

[4] These outliers in contract award value and further change might represent misreporting because of wrongly inputting the contract award or renegotiated values in 'millions,' for instance. We rather drop these observations to be sure our data is precisely representing the percentage change in renegotiations.

notice (i.e., those renegotiated within the timeframe of this study). This precludes any reliable two-stage modeling that would first predict the likelihood of renegotiation and then use this information in a second-stage model of renegotiation outcomes to adjust for selection. We instead compare contracts for which we do not observe an end date (or renegotiation) over the study period with those in our analytic sample. We find that the contracts excluded from our analytic sample had lower average contract values (see Figure 1) and were more likely to be supply contracts and less likely to be work contracts. They were also significantly more likely to be framework agreements[5] and to be awarded by a central purchasing body, and they were significantly less likely to be subcontracted or to involve joint procurement. Importantly, we did not find any statistically significant difference in whether discretion was allowed in the contract procedures by whether or not there is an end date for the contracts.

[Figure 1 about here]

There is a wide distribution of the proportion of renegotiations across the EU countries, suggesting the importance of controlling for country fixed effects in the analysis of how contract award discretion relates to renegotiations.[6] In addition, it appears that the number of renegotiations was relatively higher during COVID (through the end period of our data, August 2021). In fact, more than 10% of all contract modification notices within the sample directly referred to the pandemic as a reason for contract renegotiation. Although contract modification notices were most often related to "construction work", per the 2-digit initial Common Procurement Vocabulary (CPV) code[7], different CPV-type contracts were renegotiated with comparable frequency at an average of about four renegotiations per contract.

[5] A framework agreement is an "umbrella" agreement executed with one or more providers that enables the buyer to place orders for services without lengthy full tendering exercises.

[6] Focusing on the subsample of contracts that were renegotiated, the average number of renegotiations per renegotiated contract ranged from one to approximately four, with Germany, the Netherlands and Czechoslovakia topping the rest of the EU countries.

[7] Standard system of classification for public procurement (https://simap.ted.europa.eu/web/simap/cpv).

Dependent variable measures. We constructed multiple dependent variables for the analysis of how discretion in contract awards affects renegotiations. The proxies for cooperative behavior are the *perceived sentiment* of the renegotiations—considering the stated reasons for contract modification and employing natural language processing frameworks to assess sentiment (Nelson et al., 2021)—and the *time to renegotiation*. Both of these proxies have been used in previous studies to assess the extent to which contract renegotiations were oriented toward cooperative or opportunistic purposes (Domingos et al., 2024; Guasch, 2004; Guasch et al., 2008)

The sentiment at the time of renegotiation captures whether the renegotiations were more positive or negative, relying on a sentiment analysis (Jockers & Thalken, 2020) of the stated reasons for contract modification. The information for this measure was drawn from an open text field ("reasons for modification") that describes the motivation for renegotiations from the perspective of the contracting parties. These data were used to generate average *polarity scores*, where polarity score values less (more) than zero indicate negative (positive) sentiments, and a value of zero represents a neutral sentiment (i.e., interval [-1,+1]). This method draws on a dictionary following a natural language processing framework[8] for sentiment analysis (Nelson et al., 2021). Since the contracts in the analytic sample involve numerous European countries and include textual information in various local languages, we translated them into English to allow for consistent text analysis using the Python library *deep-translator*, which automates the use of Google Translate.

In this approach to classification, "positive" renegotiations were assumed to be "cooperative," while "negative" renegotiations were regarded as adversarial. For instance, previous research has shown that public procurers who renegotiate for sustainability reasons, following Green Public Procurement initiatives, follow a more cooperative approach to

[8] This is based on open-source Python's *TextBlob* library for sentiment analysis.

managing renegotiations, which are perceived more positively (Domingos et al., 2024). Along these lines, while renegotiations classified as negative often refer to deadlines, emergencies, and "massive disturbances," positive renegotiations typically indicate joint efforts to achieve collaboration, such as "a careful and administratively coordinated process of purchasing", "safety-relevant requirements" and "changes due to quality assurance." Neutral renegotiations are often brief and generic, for instance, "circumstances were known only after starting construction."

The second outcome measure, *time to renegotiation*, is constructed as the time in days from the date of the contract award to the date of the first contract renegotiation; we take the logged value of the number of days to renegotiation, given the long right-hand tail (skew) in the distribution of this measure. An alternative measure is the time to renegotiation as a proportion of the contract duration, with the caveat noted above that some information on the "expected end of contract" is missing. The frequency of renegotiations is also considered, as a high number of renegotiations for a given contract could signal contract mismanagement (Brogaard et al., 2021). To construct this measure, the data are aggregated at the contract level to identify the total number of renegotiations, instead of more granularly analyzing data at the renegotiation level.

Independent variables. In identifying the level of *discretion* in the contract award procedures, we followed the work of Brunjes and Rodriguez- Pleset al. (2024) and Decarolis et al. (2020). The main measure, *award criteria*, distinguishes the "lowest price" criterion from the "most economically advantageous tender" (MEAT), where discretion is greater for the latter and should allow the contract manager more flexibility in the contract design. We simplify this information by constructing a binary measure that takes a value of 1 for higher discretion awards (labeled as *high-discretion*) and 0 if the lowest price criterion was applied. The *procedure type* is an alternative proxy for discretion; more details are provided when

presenting the post-hoc analyses and robustness checks. All information about the award criteria and procedure is available on the contract award notice.

The other primary independent variable of interest is a measure of *transactional complexity*, which we operationalize using multiple indicators that describe the number of parties to the arrangement, the configurational complexity, and the primary work of the contract, which affect the control, coordination, and adaptation functions of the contractual arrangements or partnership (Zhang et al., 2023). Following Eggleston et al.'s (2000) conceptual thinking that complexity should be measured on a continuum (of more or less complex contracts), we combined these indicators into a scalar measure that takes on values from zero (no transactional complexity) to five, considering the following dimensions. First, indicators of multiple contract authorities, multi-country contracts, and group awards were used to create a measure of (i) multi-party contracts. The configurational components of complexity were captured with measures of whether the contract was (ii) subcontracted, if it was a (iii) framework agreement, and whether it involved (iv) joint procurement. Lastly, we distinguished simple supply (procurement) contracts from more complex (v) work or service contracts, in which the parties may be more likely to bring contract-specific investments to the relationship (Brown & Potoski, 2003). This information is also available in the award notices. Importantly, these transactional features, although determined by the time of the contract notice, should remain constant throughout the contracts' duration.

About 4 percent of the contracts in the analytic sample were not complex on these dimensions (0 on the scalar measure); approximately 30 percent of the contracts were complex along one of these dimensions; a little over 44 percent had two dimensions of complexity, and the rest (slightly over 20 percent) had three or more dimensions of complexity. The most common aspect of complexity was a work or service contract (about 79 percent of the contracts), followed by multiparty awards and subcontracted arrangements

(about 21 percent of the contracts each). Descriptive analysis shows that in contracts with no transactional complexity and when discretion was allowed in the contract award procedures, the polarity score (assessing sentiment at renegotiations) was significantly higher.

Control variables. The control variables represent key factors that might mediate the relationship between discretion in contract awards and the renegotiation orientation, including *renegotiation reasons or context* and *contract features*.

First, we identified two types of award procedures – "open procedures" (OPE) and "restricted procedures" (RES) – that do not involve rounds of negotiation with the bidders. As these two are distinct from other procedures that allow for negotiation with bidders during the procurement process, a binary variable *negotiation rounds* takes the value of 0 for OPE and RES, and 1 otherwise (alternative procedures with negotiation rounds include competitive dialogue, negotiated procedures with prior publication, and negotiated procedures without prior publication). As detailed in our post-hoc analyses, we combine this information on the procedure type with award criteria to generate our alternative measure for discretion.

Next, although we did not construct measures for every possible reason for renegotiations, we distinguished two reasons that were particularly relevant for our period of study. One is a binary measure that indicates whether the renegotiation happened in the context of the COVID-19 pandemic, and the other binary measure accounts for Green Public Procurement (GPP) initiatives that have shaped procurement decisions for sustainability-related reasons. Both of these control variables were generated based on word searches of the web-scraped data that included the "reasons for modification" and "modification description". The COVID-19 context coding includes specific keywords related to the pandemic (i.e., COVID, pandemic, lockdown, SARS). As COVID-19 occurred at different

times across countries, we examined each contract modification to assess whether it pointed to COVID-19 as a reason for renegotiation.

Another context variable—the Stringency Index from the Oxford Covid-19 Government Response Tracker (Hale et al., 2020)—indicates the level of government containment measures in response to COVID-19 at the time of renegotiation, based on nine response indicators of school closures, workplace closures, and travel bans, re-scaled to the range of 0-100 (where 100 = strictest). In coding sustainability-linked renegotiations, we followed Badell and Rosell (2021) and executed a word search for "environment" and "sustainable" (which would be related to GPP).

The final set of control variables describes specific contract features, including the contract initial value, whether the supplier was a small or medium enterprise (SME), the contracting authority type (also following TED coding[9]), the country in which the contract was based, and the CPV code. The 2-digit CPV code was used for procurement class fixed effects, along with controls for contract signature and renegotiation dates (specific months as time fixed effects) in the empirical models.[10]

In our post-hoc analyses and robustness checks, we first explore how discretion is associated with contract value changes in renegotiations through two metrics, the *spot modification percentage change*, reflecting the value just after a modification, and the *cumulative value change*, considering all prior modifications. Alternative explanations for the findings on the relationship of discretion with renegotiation outcomes, including those potentially linked to opportunistic behavior, are investigated next. More specifically, the EU directive allows renegotiations below a 50% threshold without new procurement; thus, renegotiation values exceeding this threshold may signal a red flag. We also consider an

[9]The types of contracting authority in the TED database consider 10 different categories, including 'regional or local authority', 'national or deferral agency', and more specific ones such as 'water, energy, transport and telecommunication sectors'.

[10] We also used the 3-digit CPV code for procurement class fixed effects, and the results were very similar with no differences in coefficient sign or significance.

award-stage indicator—the *number of bidders*, derived from the TED data per EU Integrity Watch guidelines[11]—that gauges the competition level to ensure the efficacy of competitive public procurement. A situation with a low number of tenderers could be at odds with the purpose of competitive public procurement procedures, another red flag.

Table 1 presents descriptive statistics for each measure used in this study for the sample of renegotiated contracts. The last two columns show the mean and standard deviation when only the observations with no missing information for any of the measures are used (i.e., "full data" represents the set of observations used in regression analysis). We find no statistically significant differences between these and the full sample metrics.

[Table 1 about here]

Methods

Ordinary Least Squares (OLS) regression analyses, including regressions with and without fixed effects, are employed to test the hypotheses that assert a relationship between the level of discretion in the contract award and renegotiation sentiment (H1a) and time to renegotiation (H1b). To strengthen confidence in the results, although not claiming causality, regressions with matched samples (using propensity score matching, PSM) and subsample analyses are also estimated. The OLS estimation for investigating H1a uses the polarity score as the dependent variable to capture the sentiment of renegotiations (negative/neutral/positive), with the combined discretion measure as the key independent variable of interest, while including controls for the other measures described above. Similarly, an OLS model with time to renegotiation as the dependent variable is estimated with discretion as the key independent variable and the same set of control variables to test H1b. To assess how transactional complexity interacts with discretion in influencing the parties' sentiment toward renegotiations (H2a) and time to renegotiation (H2b), we added the interaction term of the combined measure of discretion and the scalar measure of

[11] See http://redflags.integritywatch.eu/.

transactional complexity to these models. Robust standard errors were clustered at the contract award notice level. Of the 21,117 contract modification notices, there are 12,224 clusters, of which 37 percent were renegotiated only once, and 22% twice (median=2, mean=2.8, s.d.=2.2).

ANALYSES AND RESULTS

Renegotiation orientation: sentiment and timing of renegotiation

Sentiment of renegotiations. In Table 2, we present the OLS results assessing the relationship between discretion (or a relational approach to contracting) and the sentiment of the renegotiations. The five alternative specifications include: (1) no controls; (2) interaction with complexity added; (3) controls added, (4) fixed effects (FE) added for country, contracting authority, CPV, contract modification notices dates, and CAN dates, and (5) estimation with the matched (PSM) sample.

[Table 2 about here]

The findings in Table 2 provide support for H1a; the coefficient for *high-discretion* is statistically significant and precisely estimated ($p < 0.01$) across specifications, with a coefficient value of $\beta = 0.014$ in the final specification, using the matched sample and including the interaction with complexity, controls, and fixed effects. Given the mean value of the polarity score (0.045), the estimated association represents an increase of one-third in the positive sentiment toward renegotiations, not considering the interaction with transactional complexity. While the scalar measure of complexity is not a statistically significant predictor in this model, the coefficient on the interaction between complexity and discretion is negative in sign and statistically significant at $p < 0.02$ in the second and third specifications (although not in the specifications including FEs and the PSM, p=0.2). This finding lends partial support to H2a that higher levels of transactional complexity may reduce the positive association of discretion with the parties' (cooperative) orientation toward renegotiations. Figure 2 plots the marginal effects of our discretion measure across different

levels of complexity. It shows positive and statistically significant associations at lower levels of complexity, although these estimates become less precise as transactional complexity increases.

[Figure 2 about here]

Interestingly, both COVID-19 and sustainability – as reasons for modifications – are also statistically significant predictors, albeit with opposite signs. While renegotiations for COVID-related reasons are negatively associated with the renegotiation sentiment—perhaps due to their difficult, forced circumstances—sustainability-related renegotiations are positively associated with the sentiment at renegotiation, consistent with recent research suggesting their role in increasing societal benefits and reducing transaction costs (Domingos et al., 2024). Renegotiations with SMEs were likewise positively and statistically significantly associated with the polarity (sentiment) score.

In the analysis using the subsample of COVID-related renegotiations, all renegotiations occur, at least to some extent, because of the pandemic. The results for specifications 1 to 5 in Online Appendix B mirror those presented in Table 2 using the full sample. Although with a much smaller sample size, previously statistically significant predictors (SME and sustainability-related) are no longer significant, our hypothesized relationship with *high-discretion* is still statistically significant ($p < 0.1$ across specifications 2 to 5), with a coefficient value of $\beta = 0.025$ (p=0.066) in the fifth specification. Considering this final specification, the interaction between complexity and discretion is again negative in sign and weakly statistically significant ($p < 0.10$), confirming the hypothesized moderating effect of transactional complexity. The analysis employing alternative measures for discretion show remarkably similar findings (available upon request).

Time to renegotiations. Table 3 presents the findings of the model that estimates the relationship between a high level of discretion at the time of the contract award to the time to

renegotiation (in days, logged values) to test H1b. The interaction term with transactional complexity is added to this model to test H2b. The specifications are similar to the model for renegotiation sentiment; the fifth specification uses a new matched sample for the dependent variable *time to renegotiations*.

[Table 3 about here]

Focusing on the fifth specification in Table 3 (including the interaction with complexity, controls, and fixed effects), a high level of discretion is a positive and statistically significant predictor (at p = 0.055) of the time to renegotiation, providing support for H1b. Given that our dependent variable is log transformed (without considering the interaction with complexity), the coefficient 0.0451 implies *high-discretion* is associated with a 4.6 percent increase over the mean time to renegotiation in the contract award process. Transactional complexity is a statistically significant predictor of time to renegotiation ($p <$ 0.01 across specifications), and when interacted with discretion, the coefficient value is negative (and statistically significant at $p < 0.01$). This finding affirms hypothesis (H2b) that higher levels of complexity have a dampening effect on the positive association of discretion with time to renegotiation. We find similar results using the alternative measures for discretion. Using as our dependent variable the frequency of renegotiations (instead of time to renegotiation) and contracts as unit of analysis (instead of renegotiations), we similarly find that *high-discretion* is associated with less frequent renegotiations and is negatively moderated by transactional complexity.

Figure 3 presents the marginal effects of discretion on time to renegotiation at different levels of complexity. The complexity effect is so strong that it even reverses the sign of the relationship between discretion and time to renegotiation. For medium- to high-complexity transactions, not only are the positive effects of discretion reduced, but discretion may be related to more rapid renegotiations that have been associated in other studies with

misconduct (Guasch, 2004; Guasch et al., 2008). In this context, discretion could interact with complexity as a double-edged sword, something we further investigate the next section.

[Figure 3 about here]

Post-hoc analyses and robustness checks

We first explore the association between a high level of discretion in the contract award process and the change in contract value through renegotiations, beginning with the contract value change measured as the spot modification percentage change. The model specification is similar to those estimated previously, including the same control variables, fixed effects, and the interaction with transactional complexity, estimated on a matched (PSM) sample considering the renegotiated value. The final specification in Online Appendix C shows a positive, statistically significant relationship between a high level of discretion and the percentage (spot) change in contract value at renegotiation. Given the mean percentage change in contract value of 3.71, the coefficient on the discretion variable—1.54 for the final specification—suggests that discretion increases the percentage point change in contract value by almost 50 percent. As discussed above, one possible explanation is that public procurement with higher discretion (a more relational approach) is less likely to turn to formal contract revisions when anticipated changes in value are small (Greif, 1993; Klein, 1996), i.e., minor adaptations would be made collaboratively, whereas larger changes would involve renegotiation of the contract (Beuve et al., 2019; Brogaard et al., 2021; Frydlinger et al., 2019; Oliveira et al., 2022; Ryan, 2020).

We also investigate "red flags" and contract renegotiation values to clarify mechanisms and rule out opportunistic behavior. Because the EU directive allows renegotiations below a 50% threshold without new procurement, exceeding this limit may signal a red flag. To assess this, we created a binary variable that identifies renegotiated values exceeding the 50% threshold (at the contract modification level). Online Appendix D presents the model findings, which show that there is no statistically significant association

between the measure of renegotiated value exceeding the 50% threshold and the main effect of discretion or its interaction with complexity.

In addition, we assess competition—based on the assumption that a low number of tenderers is counter to the purpose of competitive public procurement—using the number of bidders during the award stage (using TED data from EU Integrity Watch). We also estimate this model at the contract modification level and focus only on the first instance of renegotiation. The findings reported in Appendix E show there is no statistically significant association between discretion and the number of bidders, although we do find that the interaction of discretion with transactional complexity is positively and significantly associated with the number of bidders during the award stage. Consistent with related research on competition in complex contracting (Carril et al., 2022), this suggests that the use of discretion in procurement when contracts are transactionally complex may attract or involve more bidders.

While we do not argue that this constitutes conclusive evidence that discretion (interacting with complexity) does not lead to opportunistic behavior, taken together, the findings lend support to the explanation that discretion may cultivate positive aspects of relational approaches, while transactional complexity generally moderates (reduces) these associations. We also assessed the sensitivity of these findings using a model with the *cumulative contract value change* as the dependent variable, which considers the total effect of successive renegotiations on the contract value in a sample with records for all modifications collapsed to the contract level (similar to Brunjes & Rodriguez- Plesa, 2024). We likewise found no statistically significant predictors (red flags) for discretion or its interaction with complexity (tables for these robustness checks are all available upon request).

The additional description of our data distribution and robustness checks presented in Online Appendix F—for specific country influence, alternative CPV-types, and different time trends and other controls—indicate that the results of our main analyses are maintained or strengthened. The analyses with alternative measures of discretion rely on the information on the procedure type combined with award criteria (Decarolis et al., 2020). Specifically, "open procedures" and "restricted procedures" should allow fewer opportunities for contracting authorities to exercise discretion, as these do not involve rounds of negotiation with the bidders. While open procedures are considered a one-stage process through which any organization can respond to the advertised contract notice and submit a tender, in restricted procedures, suppliers are first shortlisted, and then all tenders are evaluated in line with the award criteria and methodology set out in the tender documentation. Therefore, instead of considering the binary variable "negotiation rounds" as a control variable (as employed in our main analyses), we also test a measure of the level of discretion (for robustness purposes) that considers *both* the contract award procedure and award criteria in characterizing discretion in renegotiations: (i) no discretion on these dimensions, (ii) discretion associated with either procedure type or award criteria, and (iii) discretion in both procedure type and award criteria. All of these analyses showed a similar pattern in the results and are available from the authors upon request.

DISCUSSION AND CONCLUSIONS

This research draws on new EU data and contributes to our understanding of the dynamics of contract execution and renegotiations in public-private partnerships (e.g., Bruce et al., 2019; George et al., 2023; Quelin et al., 2019) for delivering public goods and services (Bosio et al., 2022; Bryson et al., 2014; Cabral et al., 2013; Lazzarini, 2022). We find evidence suggesting an association between discretion in public procurement and renegotiation outcomes, i.e., the sentiment toward and time to contract renegotiations, implying there is potential to improve

the governance of provider relationships and increase public value (Brunjes, 2020; Coviello et al., 2018; Decarolis et al., 2020). Our renegotiation outcome measures and analysis contribute to the body of research that addresses relational contracting and argues for the importance of relational governance, e.g., guiding principles for renegotiations (Frydlinger et al., 2019, 2021; Oliveira et al., 2022), and their implications for (renegotiated) contract outcomes (e.g., Brogaard et al., 2021; Brunjes & Rodriguez- Plesa, 2024; Ryan, 2020).

Second, joining with other scholars who have recognized the relevance of contract complexity (e.g., Brown et al., 2010, 2016; Spiller & Moszoro, 2014), we developed an original, theory-informed empirical measure of contract transactional complexity and assessed how it interacts with discretion (that facilitates a relational approach to contracting) to influence renegotiation sentiment and outcomes. We find, as the literature predicts, that complexity moderates the advantages of discretion in contracting, although it does not overwhelm them. In general, our study findings suggest that governments that are beholden to strict public procurement rules that discourage discretion at the contract award stage may be forgoing important benefits of procurement discretion that could improve contracting efficiencies and outcomes, particularly in contexts in which governments and private partners require flexibility and adaptation (e.g., in turbulent times).

Third, this study also makes useful theoretical contributions in weaving together bodies of research at the intersection of economics and public administration and connecting studies that explore formal relational contracting (Bertelli & Smith, 2010; Frydlinger et al., 2019, 2021; Frydlinger & Hart, 2023) with complex public contracts (e.g., Brown et al., 2016). For example, we have illuminated reasons for renegotiations from these literatures and shown that future research should consider both the spot (temporal-specific) and successive or cumulative contract modifications when considering how relational elements in public contracting processes shape contract outcomes. Our evidence suggests that high-discretion

procurement—often associated with relational approaches to contracting—may be more exposed to future uncertainties (Williamson, 1985); yet this may still improve the sentiment toward renegotiations and limit their frequency, since discretion allows the parties to informally work through smaller shocks to the contract execution (Brown et al., 2018; Frydlinger et al., 2021; Kim & Brown, 2012). In addition, our research substantiates that contract complexity imposes challenges for collaboration in contracting, but it also suggests that typical responses of layering on more formal procedures or rigidities to construct "guardrails" on renegotiations may undermine the benefits of discretion, which are not entirely forgone in the face of complexity.

It is also important to acknowledge limitations of our study. First, our data limit us to exploring *associations* of discretionary criteria and procedures with outcomes in complex, relational contracts rather than causal relationships. We also lack information on the end dates for contracts that were not renegotiated, which constrained our analysis to a sample of public procurement contracts that had been renegotiated at least once. Our measure of contract complexity does not capture details of the contract specifications that would allow us to empirically assess rigidity, but rather it focuses on the structural and transactional arrangements of the parties to the contract and the nature of the work they undertake. And, of course, there may be other important features of the public procurement contracts that are not observable in our data, leaving our models subject to the potential criticism of omitted variable bias. We also acknowledge that our empirical measure, like other studies that have been published, is necessarily limited by the data available to us (from the EU). There is no current consensus in the literature on the best way to measure complexity, and thus, we contribute to the ongoing discussion and empirical efforts on this front.

In addition, our data are drawn from contracting in the EU, which undoubtedly differs in practices and contexts from elsewhere in the world. For instance, Bosio et al. (2022)

suggest that a socially optimal exercise of discretion that excludes low-quality bidders might be more viable for high-capacity countries, whereas more rigid regulation might be more effective in low-capacity countries. Having publicly available data outside of the EU to conduct similar research would be valuable for generalizing these understandings to a broader, global context.

Future research that is qualitative in nature could also help to unpack how both contracting authorities and private providers perceive these renegotiations, disentangling what are potential relational benefits (if any) and/or challenges associated with opportunistic behavior and corruption concerns. On the one hand, Decarolis and Giorgiantonio (2022) highlight that, although public discretion may interplay with contract complexity, contracting authorities relying on discretionary criteria can navigate this by clearly defining objectives and using "measurable" parameters that are not as easily manipulated. On the other hand, recent research also illustrates how, in Italian municipalities, extending the discretion of public managers might lead to misallocation of public funds (Baltrunaite et al., 2021).

Research endeavors might also explore whether dictionaries used in constructing our measure of the sentiment of renegotiations can be reliably used in coding complex text and exploratory concepts (Nelson et al., 2021). We fully acknowledge that our analyses addressing public procurement discretion and contract complexity draw on concepts that are still unsettled in the literature. Another avenue for further investigation (contingent on available data) could consider whether networks and prior relational ties between contracting partners influence renegotiation outcomes. This could help us to better understand the benefits and challenges of a relational approach to contracting, including the potential of a "formal relational" approach that cultivates relational governance to enhance cooperation among parties (Frydlinger et al., 2019, 2021; Frydlinger & Hart, 2023; Oliveira et al., 2022).

REFERENCES

Athias, L., & Saussier, S. (2007). Un partenariat public-privé rigide ou flexible ? Théorie et application aux concessions routières à péage. *Revue économique*, *58*(3), 565- 576.

Badell, D., & Rosell, J. (2021). Are EU Institutions Still Green Actors? An Empirical Study of Green Public Procurement. *JCMS: Journal of Common Market Studies*, *59*(6), 1555- 1572. https://doi.org/10.1111/jcms.13204

Bajari, P., Houghton, S., & Tadelis, S. (2014). Bidding for incomplete contracts : An empirical analysis of adaptation costs. *American Economic Review*, *104*(4), 1288- 1319.

Bakker, R. M. (2016). Stepping in and stepping out : Strategic alliance partner reconfiguration and the unplanned termination of complex projects. *Strategic Management Journal*, *37*(9), 1919- 1941.

Baltrunaite, A., Giorgiantonio, C., Mocetti, S., & Orlando, T. (2021). Discretion and supplier selection in public procurement. *The Journal of Law, Economics, and Organization*, *37*(1), 134- 166.

Barthélemy, J., & Quélin, B. V. (2006). Complexity of outsourcing contracts and ex post transaction costs : An empirical investigation. *Journal of Management Studies*, *43*(8), 1775- 1797.

Bertelli, A. M., & Smith, C. R. (2010). Relational contracting and network management. *Journal of Public Administration Research and Theory*, *20*(suppl_1), i21- i40.

Beuve, J., Moszoro, M. W., & Saussier, S. (2019). Political contestability and public contract rigidity : An analysis of procurement contracts. *Journal of Economics & Management Strategy*, *28*(2), 316- 335.

Beuve, J., Moszoro, M. W., & Spiller, P. T. (2023). Doing It by the Book : Political Contestability and Public Contract Renegotiations. *The Journal of Law, Economics, and Organization*, *39*(1), 281- 308.

Beuve, J., & Saussier, S. (2021). Renegotiations and Renewals of Public Contracts. *Review of Industrial Organization*, *59*(3), 461- 482.

Bosio, E., Djankov, S., Glaeser, E., & Shleifer, A. (2022). Public Procurement in Law and Practice. *American Economic Review*, *112*(4), 1091- 1117. https://doi.org/10.1257/aer.20200738

Brogaard, J., Denes, M., & Duchin, R. (2021). Political influence and the renegotiation of government contracts. *The Review of Financial Studies*, *34*(6), 3095- 3137.

Brown, T. L., & Potoski, M. (2003). Managing contract performance : A transaction costs approach. *Journal of Policy analysis and Management*, *22*(2), 275- 297.

Brown, T. L., Potoski, M., & Slyke, D. V. (2016). Managing complex contracts : A theoretical approach. *Journal of Public Administration Research and Theory*, *26*(2), 294- 308.

Brown, T. L., Potoski, M., & Van Slyke, D. M. (2010). Contracting for complex products. *Journal of public administration research and theory*, *20*(suppl_1), i41- i58.

Brown, T. L., Potoski, M., & Van Slyke, D. M. (2013). *Complex contracting*. Cambridge University Press.

Brown, T. L., Potoski, M., & Van Slyke, D. M. (2018). Complex contracting : Management challenges and solutions. *Public Administration Review*, *78*(5), 739- 747.

Bruce, J. R., de Figueiredo, J. M., & Silverman, B. S. (2019). Public contracting for private innovation : Government capabilities, decision rights, and performance outcomes. *Strategic Management Journal*, *40*(4), 533- 555.

Brunjes, B. M. (2020). Competition and federal contractor performance. *Journal of Public Administration Research and Theory*, *30*(2), 202- 219.

Brunjes, B. M., & Rodriguez- Plesa, E. (2024). Equity in government contracting : Analyzing the performance of small disadvantaged businesses. *Public Administration Review*, *84*(3), 484- 499.

Bryson, J. M., Crosby, B. C., & Bloomberg, L. (2014). Public value governance : Moving beyond traditional public administration and the new public management. *Public administration review*, *74*(4), 445- 456.

Cabral, S., Lazzarini, S. G., & De Azevedo, P. F. (2013). Private entrepreneurs in public services : A longitudinal examination of outsourcing and statization of prisons. *Strategic Entrepreneurship Journal*, *7*(1), 6- 25.

Carril, R., Lira, A. G., & Walker, M. S. (2022). *Competition under incomplete contracts and the design of procurement policies* (Vol. 1). Universitat Pompeu Fabra, Department of Economics and Business.

Chen, Y., Wang, W., Zhang, S., & You, J. (2018). Understanding the multiple functions of construction contracts : The anatomy of FIDIC model contracts. *Construction management and economics*, *36*(8), 472- 485.

Covey, S. R., & Merrill, R. R. (2006). *The speed of trust : The one thing that changes everything*. Simon and schuster.

Coviello, D., Guglielmo, A., & Spagnolo, G. (2018). The effect of discretion on procurement performance. *Management Science*, *64*(2), 715- 738.

Decarolis, F. (2014). Awarding price, contract performance, and bids screening : Evidence from procurement auctions. *American Economic Journal: Applied Economics*, *6*(1), 108- 132.

Decarolis, F., Fisman, R., Pinotti, P., & Vannutelli, S. (2020). *Rules, discretion, and corruption in procurement : Evidence from italian government contracting*. National Bureau of Economic Research.

Decarolis, F., & Giorgiantonio, C. (2022). Corruption red flags in public procurement : New evidence from Italian calls for tenders. *EPJ Data Science*, *11*(1), 16.

Domingos, F. D., Heinrich, C. J., Saussier, S., & Shiva, M. (2024). Navigating contract renegotiations with sustainability at the helm : Societal benefits and transaction costs. *Journal of Strategic Contracting and Negotiation*.

Eggleston, K., Posner, E. A., & Zeckhauser, R. (2000). The design and interpretation of contracts : Why complexity matters. *Nw. UL Rev.*, *95*, 91.

Engel, E., Fischer, R., & Galetovic, A. (2009). *Soft budgets and renegotiations in public-private partnerships*. National Bureau of Economic Research.

European Parliament. (2014). *Directive 2014/24/EU of the European Parliament and of the Council*. Official Journal of the European Union. https://eur-lex.europa.eu/legal-content/EN/TXT/PDF/?uri=CELEX:32014L0024

Frydlinger, D., & Hart, O. (2023). Overcoming contractual incompleteness : The role of guiding principles. *The Journal of Law, Economics, and Organization*, ewac027.

Frydlinger, D., Hart, O., & Vitasek, K. (2019). A new approach to contracts : How to build better long-term strategic partnerships. *Harvard Business Review*, *97*(5), 116- 126.

Frydlinger, D., Vitasek, K., Bergman, J., & Cummins, T. (2021). *Contracting in the New Economy : Using Relational Contracts to Boost Trust and Collaboration in Strategic Business Relationships*. Springer.

Gagnepain, P., Ivaldi, M., & Martimort, D. (2013). The cost of contract renegotiation : Evidence from the local public sector. *American Economic Review*, *103*(6), 2352- 2383.

George, G., Fewer, T. J., Lazzarini, S., McGahan, A. M., & Puranam, P. (2023). Partnering for grand challenges : A review of organizational design considerations in public–private collaborations. *Journal of Management*, 01492063221148992.

Gil, R., & Zanarone, G. (2018). On the determinants and consequences of informal contracting. *Journal of Economics & Management Strategy*, *27*(4), 726- 741.

Greif, A. (1993). Contract enforceability and economic institutions in early trade : The Maghribi traders' coalition. *The American economic review*, 525- 548.

Grossman, S. J., & Hart, O. D. (1986). The costs and benefits of ownership : A theory of vertical and lateral integration. *Journal of political economy*, *94*(4), 691- 719.

Guasch, J. L. (2004). *Granting and renegotiating infrastructure concessions : Doing it right*. World Bank Publications.

Guasch, J. L., Laffont, J.-J., & Straub, S. (2008). Renegotiation of concession contracts in Latin America : Evidence from the water and transport sectors. *International Journal of Industrial Organization*, *26*(2), 421- 442.

Hale, T., Webster, S., Petherick, A., Phillips, T., & Kira, B. (2020). Oxford COVID-19 government response tracker (OxCGRT). *Last updated*, *8*, 30.

Hart, O., & Moore, J. (1988). Incomplete contracts and renegotiation. *Econometrica: Journal of the Econometric Society*, 755- 785.

Hart, O., & Moore, J. (2008). Contracts as reference points. *The Quarterly journal of economics*, *123*(1), 1- 48.

Hefetz, A., & Warner, M. E. (2012). Contracting or public delivery ? The importance of service, market, and management characteristics. *Journal of public administration research and theory*, *22*(2), 289- 317.

Heinrich, C. J., & Choi, Y. (2007). Performance-based contracting in social welfare programs. *The American Review of Public Administration*, *37*(4), 409- 435.

House of Commons Public Accounts Committee. (2019). *Transforming Rehabilitation : Progress Review*.

Huxham, C., & Vangen, S. (2013). *Managing to collaborate : The theory and practice of collaborative advantage*. Routledge.

Jockers, M. L., & Thalken, R. (2020). *Text Analysis with R : For Students of Literature*. Springer International Publishing. https://doi.org/10.1007/978-3-030-39643-5

Kim, Y. W., & Brown, T. L. (2012). The importance of contract design. *Public Administration Review*, *72*(5), 687- 696.

Kim, Y. W., Roberts, A., & Brown, T. (2016). Impact of product characteristics and market conditions on contract type : Use of fixed-price versus cost-reimbursement contracts in the US Department of Defense. *Public Performance & Management Review*, *39*(4), 783- 813.

Kivleniece, I., & Quelin, B. V. (2012). Creating and capturing value in public-private ties : A private actor's perspective. *Academy of management review*, *37*(2), 272- 299.

Klein, B. (1996). Why hold- ups occur : The self- enforcing range of contractual relationships. *Economic inquiry*, *34*(3), 444- 463.

Lazzarini, S. G. (2022). *The right privatization : Why private firms in public initiatives need capable governments*. Cambridge University Press.

Lumineau, F., & Quélin, B. V. (2012). An empirical investigation of interorganizational opportunism and contracting mechanisms. *Strategic Organization*, *10*(1), 55- 84.

Macneil, I. R. (1982). The new social contract : An inquiry into modern contractual relations. *Ethics*, *93*(1).

Nelson, L. K., Burk, D., Knudsen, M., & McCall, L. (2021). The future of coding : A comparison of hand-coding and three types of computer-assisted text analysis methods. *Sociological Methods & Research*, *50*(1), 202- 237.

Oliveira, N., Argyres, N., & Lumineau, F. (2022). The role of communication style in adaptation to interorganizational project disruptions. *Journal of Operations Management*, *68*(4), 353- 384.

Petersen, O. H., Baekkeskov, E., Potoski, M., & Brown, T. L. (2019). Measuring and Managing Ex Ante Transaction Costs in Public Sector Contracting. *Public Adm. Rev.*, *79*(5), 641- 650. https://doi.org/10.1111/puar.13048

Poppo, L., & Zenger, T. (2002). Do formal contracts and relational governance function as substitutes or complements? *Strategic management journal*, *23*(8), 707- 725.

Potoski, M., Petersen, O. H., & Brown, T. L. (2023). Same product, different price : Experimental evidence on the transaction cost expenditures of selling to governments and firms. *Public Adm. Rev.*, *83*(3), 623- 638. https://doi.org/10.1111/puar.13551

Quelin, B. V., Cabral, S., Lazzarini, S., & Kivleniece, I. (2019). The private scope in public–private collaborations : An institutional and capability-based perspective. *Organization Science*, *30*(4), 831- 846.

Quelin, B. V., & Duhamel, F. (2003). Bringing together strategic outsourcing and corporate strategy : Outsourcing motives and risks. *European management journal*, *21*(5), 647- 661.

Reuer, J. J., & Ariño, A. (2007). Strategic alliance contracts : Dimensions and determinants of contractual complexity. *Strategic management journal*, *28*(3), 313- 330.

Ryan, N. (2020). Contract enforcement and productive efficiency : Evidence from the bidding and renegotiation of power contracts in India. *Econometrica*, *88*(2), 383- 424.

Schwartz, A. A. (2020). Contracts and COVID-19. *Stanford Law Review Online*, *73*, 48- 60.

Spiller, P. T., & Moszoro, M. (2014). *Third-party opportunism and the theory of public contracts : Operationalization and applications*.

Tadelis, S. (2012). Public procurement design : Lessons from the private sector. *International Journal of Industrial Organization*, *30*(3), 297- 302.

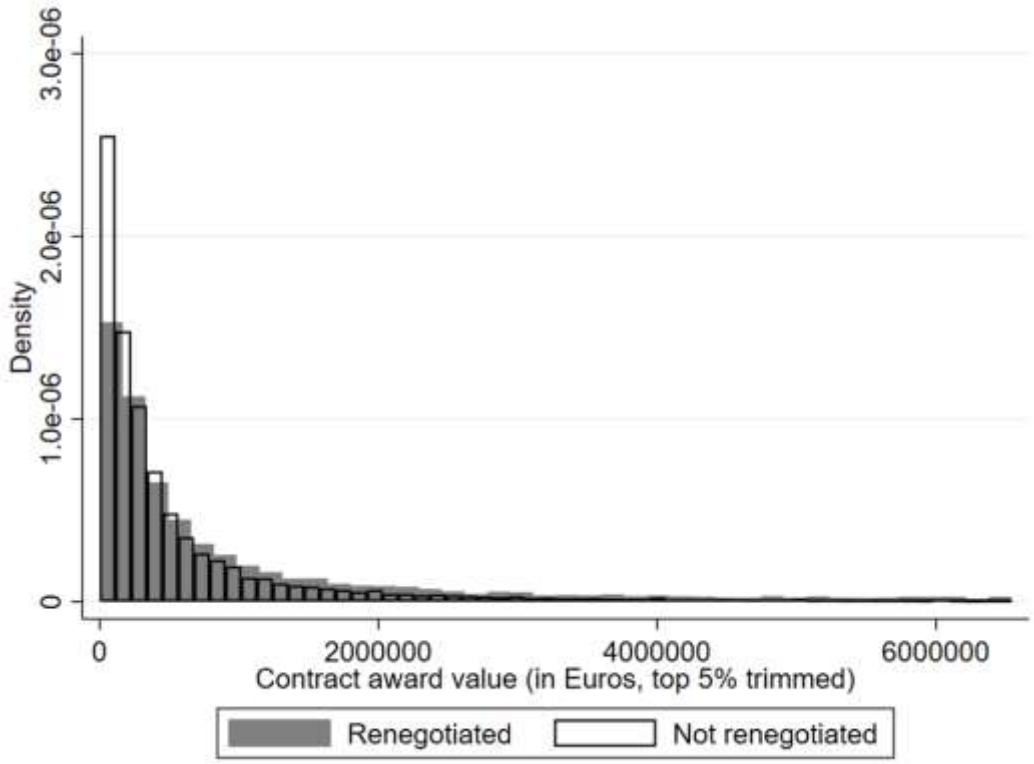
Williamson, O. E. (1985). *The economic institutions of capitalism. New York : Free Press*.

Zhang, L., Yao, H., Fu, Y., & Chen, Y. (2023). Comparing Subjective and Objective Measurements of Contract Complexity in Influencing Construction Project Performance : Survey versus Machine Learning. *Journal of Management in Engineering*, *39*(4), 04023017.

Zhang, S. B., Chen, J., & Fu, Y. (2020). Contract complexity and trust in construction project subcontracting. *Engineering, construction and architectural management*, *27*(9), 2477- 2500.

FIGURES AND TABLES

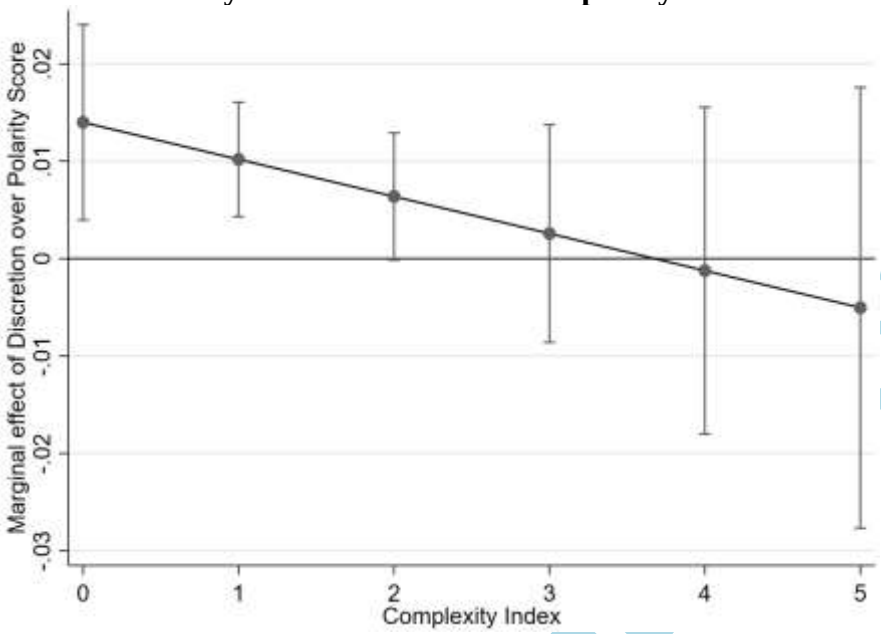
Figure 1 – Contract award values for renegotiated and non-renegotiated contracts (CAN-level data)



Notes: Histogram showing the distribution of contract award values (in Euros) with the top 5% trimmed.

ALT TEXT: Histogram showing the distribution of contract award values (in Euros) with the top 5% trimmed. The x-axis represents contract award values, ranging from 0 to 6,000,000 Euros, and the y-axis represents density. The data is divided into two categories: renegotiated contracts (shown in dark gray) and non-renegotiated contracts (shown in white). Both distributions are highly skewed towards smaller contract values, with the density decreasing as the value increases.

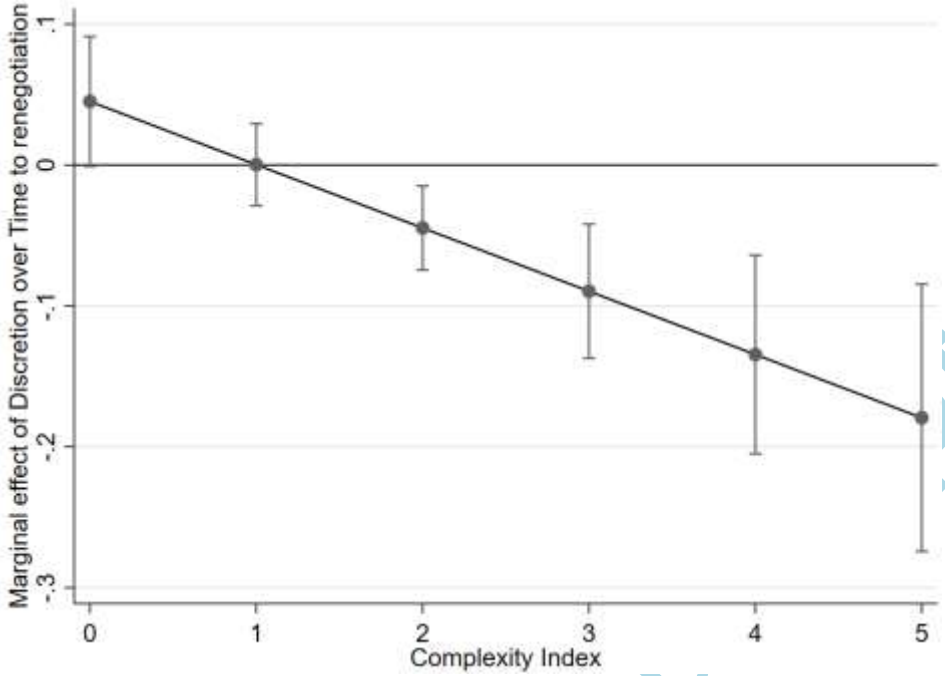
Figure 2 – Marginal effects of *High-discretion* over *Polarity Score* (sentiment) by the level of contract complexity



Notes: The figure shows 95% confidence intervals. Standard errors are estimated by the delta method.

ALT TEXT: Line graph showing the marginal effect of discretion on polarity score as a function of the complexity index. The x-axis represents the complexity index, ranging from 0 to 5, and the y-axis represents the marginal effect of discretion over polarity score, ranging from -0.03 to 0.02. The line slopes downward, indicating a decreasing marginal effect as complexity increases. Error bars are included at each point along the line, showing the confidence intervals around the marginal effect estimates. The effect loses significance near a complexity index of 3.

Figure 3 – Marginal effects of *High-discretion* over *Time to renegotiation* by the level of contract complexity



Notes: The figure shows 95% confidence intervals. Standard errors are estimated by the delta method.

ALT TEXT: Line graph showing the marginal effect of discretion on time to renegotiation as a function of the complexity index. The x-axis represents the complexity index, ranging from 0 to 5, and the y-axis represents the marginal effect of discretion on time to renegotiation, ranging from -0.3 to 0.1. The line slopes downward, indicating a decreasing marginal effect as complexity increases. Error bars are included at each point along the line, showing the confidence intervals around the marginal effect estimates. The effect crosses zero near a complexity index of 1, indicating a shift from positive to negative marginal effects.

Table 1 – Descriptive statistics

Variables	Obs	Mean	Std. Dev.	Mean Full data, w/ no missing (n=16,555)	Std. Dev.
Sentiment of Renegotiation (Polarity Score)	20958	.045	.119	.044	.119
Time to Renegotiation (days)	21112	522.282	358.191	527.715	347.702
Δ Contract Value (%, spot modification)	20487	3.71	21.14	3.542	21.289
Δ Contract Value (%, cumulative)	20483	7.62	26.26	7.326	26.06
High-Discretion (binary, CAN-level)	21117	.578	.494	.596	.491
Transactional Complexity (CAN-level)	17164	1.356	.915	1.358	.918
Negotiation rounds (binary)	21117	.136	.343	.111	.314
COVID-Related (binary)	21117	.1	.3	.097	.296
Sustainability-Related (binary)	21117	.029	.167	.031	.174
Stringency Index (Hale et al., 2020)	21117	30.883	31.727	28.665	31.254
Contract Award Value (Euros, CAN-level)	20507	10651477	1.783e+08	10255619	1.832e+08
SME (binary, CAN-level)	20841	.566	.496	.591	.492

Notes: Notes: All these observations consider the contract modification notice as the unit of analysis, but some of the measures refer to the CAN (such as the discretion and complexity measures). Other control variables included in regression specifications as fixed effects are: country, contracting authority type (following TED dataset, 10 categories including, for instance, 'regional or local authority' and 'ministry or any other national or federal authority'), CPV code (2-digit), and CAN and contract modification notice dates (year and month interactions).

Table 2 – Associations between discretion, transactional complexity and sentiment of renegotiation (H1a and H2a)

DV: Sentiment of Renegotiation (Polarity Score)	(1) No Controls	(2) Add interaction	(3) Controls	(4) FE	(5) PSM
Hypothesized Relationships					
(H1a) High-Discretion (binary)	0.0102	0.0204	0.0214	0.0144	0.0140
	(0.0001)	(0.0001)	(0.0000)	(0.0036)	(0.0063)
Transactional Complexity (index)	0.0002	0.0046	0.0047	0.0026	0.0026
	(0.8784)	(0.0603)	(0.0549)	(0.2967)	(0.2908)
(H2a) High-Discretion * Transactional Complexity		-0.0077	-0.0074	-0.0039	-0.0038
		(0.0136)	(0.0172)	(0.1822)	(0.2205)
Control variables					
Negotiation rounds (binary)			0.0107	0.0040	0.0035
			(0.0088)	(0.2551)	(0.3514)
COVID-Related (binary)			-0.0198	-0.0164	-0.0176
			(0.0000)	(0.0001)	(0.0002)
Sustainability-Related (binary)			0.0146	0.0096	0.0097
			(0.0035)	(0.0638)	(0.0880)
Stringency Index			0.0000	0.0001	0.0000
			(0.2328)	(0.6921)	(0.8904)
Contract Award Value			0.0000	-0.0000	-0.0000
			(0.7798)	(0.4976)	(0.0019)
SME (binary)			0.0083	0.0095	0.0102
			(0.0009)	(0.0001)	(0.0001)
Country, contracting authority, CPV, Contract award and modification dates FE	N	N	N	Y	Y
Constant	0.0382	0.0330	0.0260	0.3496	-0.0223
	(0.0000)	(0.0000)	(0.0000)	(0.0000)	(0.6640)
Observations	16,592	16,592	16,573	16,570	14,948
R-squared	0.0019	0.0027	0.0071	0.0631	0.0653

Notes: The table presents OLS regression estimates explaining the renegotiation sentiment, proxied by the polarity score (as detailed in the methodological section). Specifications 1 to 4 differ only by the set of regressors included, while specification 5 considers a matched sample as detailed in the methodology (PSM). Robust standard errors are clustered at the CAN level (p-values in parentheses).

Table 3 – Associations between discretion, transactional complexity and time to renegotiation (H1b and H2b)

DV: Time to Renegotiation (logged value of the number of days to renegotiation)	(1) No Controls	(2) Add Interaction	(3) Controls	(4) FE	(5) PSM
Hypothesized Relationships					
(H1b) High-Discretion (binary)	0.0371	0.0909	0.0713	0.0451	0,0451
	(0.0739)	(0.0248)	(0.0497)	(0.0476)	(0.0548)
Transactional Complexity (index)	0.1779	0.2011	0.1911	0.0496	0.0530
	(0.0000)	(0.0000)	(0.0000)	(0.0000)	(0.0000)
(H2b) High-Discretion * Transactional Complexity		-0.0406	-0.0515	-0.0458	-0.0449
		(0.0883)	(0.0181)	(0.0003)	(0.0006)
Control variables					
Negotiation rounds (binary)			0.0569	0.0149	0.0173
			(0.0419)	(0.3568)	(0.3033)
COVID-Related (binary)			0.0944	0.0541	0.0580
			(0.0000)	(0.0001)	(0.0002)
Sustainability-Related (binary)			0.1608	0.0399	0.0330
			(0.0003)	(0.1438)	(0.2685)
Stringency Index			0.0139	-0.0017	-0.0020
			(0.0000)	(0.0003)	(0.0001)
Contract Award Value			0.0000	-0.0000	-0.0000
			(0.0280)	(0.6566)	(0.0001)
SME (binary)			-0.0622	-0.0016	-0.0076
			(0.0005)	(0.8774)	(0.4946)
Country, contracting authority, CPV, Contract award and modification dates FE	N	N	N	Y	Y
Constant	5.6955	5.6680	5.3158	4.1020	4.2036
	(0.0000)	(0.0000)	(0.0000)	(0.0000)	(0.0000)
Observations	16,731	16,731	16,712	16,712	15,214
R-squared	0.0286	0.0290	0.2352	0.7388	0.7397

Notes: The table presents OLS regression estimates explaining the time to renegotiation, proxied by the logged value of the number of days to renegotiation (as detailed in the methodological section). Specifications mirror the ones in Table 2; i.e., specifications 1 to 4 differ only by the set of regressors included, while specification 5 considers a matched sample as detailed in the methodology (PSM). Robust standard errors are clustered at the CAN level (p-values in parentheses).