Using computational methods to distinguish formal and relational enforcement clauses in government contracts

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Abstract

Research into relational contracting – its attributes, its advantages over orthodox, "formal" methods of contracting, and its limitations – has long been constrained by the lack of scalable methods for measuring relational practices in applied settings. Using conventional social science methods, it is difficult, time-consuming and expensive to reliably discern nuanced differences in contracting behaviour for anything other than a small handful of cases. However, rapid advances in computational techniques, coupled with the growing availability of big data on government purchasing, raises the prospect of new, larger-scale research into relational contracting practices and outcomes. We begin to explore that potential by developing an automated approach to distinguishing formal and relational enforcement clauses in 10,174 contracts issued by Danish local and regional governments during 2021-2025. Formal enforcement uses the (threat of) sanction by third parties to reduce opportunism; relational enforcement rests upon norms, reputation, and the promise of future business. We develop, trial and refine a promptbook that enables an off-the-shelf large language model to identify formal and relational enforcement mechanisms in a large corpus of government contracts. Initial results suggest that formal enforcement clauses strongly dominate public contracts, and that enforcement design varies little with transaction hazards such as quality measurement problems and asset-specific investments.

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1. Introduction

There is presently great interest, among both professional managers and researchers working in a variety of disciplines, in the potential benefits of relational contracting (Baker, Gibbons, and Murphy, 2002; Gil et al., 2022; Macchiavello, 2022; Gutiérrez-Meave et al., 2025; Malatesta & Cheema, 2026). More cooperative and less adversarial relations during the process of economic exchange are thought likely to support a wide variety of desirable outcomes – from greater flexibility and adaptability to increased innovation and reduced transaction costs (Macneil 1978; Barron et al. 2020). What is more, the informal negotiation, iterative problem solving, and private and "soft" enforcement practices that characterise the relational approach are thought by many to far more accurately describe how contracting parties actually interact, rather than by invoking the legal adjudications provisioned in the written contract (Macaulay, 1963; Bernstein 1992, ; McLeod 2007). As Macaulay (1963, p. 58) explains, "Businessmen often prefer to rely on 'a man's word' in a brief letter, a handshake, or 'common honesty and decency' – even when the transaction involves exposure to serious risks."

Nonetheless, despite this significant, long-standing, and increasing interest in relational contracting and its interaction with the formal orthodox model, empirical research and knowledge accumulation have been held back by the lack of systematic measures of formal and relational practices in applied contexts. Formal economic modelling has long examined enforcement in incomplete contracts, particularly where performance remains partly at the discretion of the contracting parties and cannot be fully specified ex ante (Hart and Moore, 1988; Hart, Shleifer, and Vishny, 1997; Baker et al., 2002; Hart, 2017). A central assumption in this literature is that important aspects of contractual

performance are often non-verifiable by external third parties, such as courts, but observable to the contracting parties themselves, which suggests that parties should rely more heavily on relational enforcement under complex contracting conditions (MacLeod, 2007; Baker, Gibbons, and Murphy, 2022). However, to robustly test some of these core claims requires evaluation using large datasets consisting of a great many cases of inter-organisational contracting. And such datasets have been hard to establish using conventional social science methods, given the difficultly, time and costs of reliably discerning nuanced differences in contract governance for anything other than a handful of cases. Thus, many questions requiring larger-scale answers have remained unasked.

Recent developments are now raising the prospect of addressing this challenge. The increasing digitalization of administrative systems, which has made large volumes of administrative data from governments – who are major contractual players – available for the first time (Rogger and Schuster, 2025). Government procurement data is now electronically available across many parts of the world, including via Tenders Electronic Daily (TED) in the European Union, the Federal Procurement Data System (FPDS) in the United States, Find a Tender Service in the United Kingdom, and initiatives supported by the Open Contracting Partnership in a range of countries in the Global South (Warren, 2014; Adam, Fazekas, and Tóth, 2020; Potoski, Lund-Sørensen, and Petersen, 2026). What is more, advances in computation methods, including Robot Process Automation (RPA), mean that even where proprietary datasets are unavailable, researchers can increasingly build their own (as we do in this paper). In consequence, large volumes of contracting data are becoming available to researchers for the first time (e.g., Rahal &

Mohan, 2025). The main challenge is no longer access, but rather how to collect, store, and analyze these data in pursuit of advancing contracting theory and practice.

Together, these new sources of data and scalable computational techniques raise the prospect of conducting large-scale research into formal and relational contracting practices and outcomes that hitherto proved impossible. And in this paper, we begin to explore that potential by developing an automated approach to distinguishing formal and relational enforcement clauses in 10,174 unique contracts (259,953 pages of contract text) issued by Danish local and regional governments during 2021-2025. We regard enforcement as the range of mechanisms by which contracting parties seek to curb each other's opportunism. Formal enforcement uses the (threat of) sanction by third parties – that is, courts. Relational enforcement rests upon norms, reputation, and the promise of future business – sometimes known as the "private" enforcement mechanism (Klein and Leffler, 1981). Contracts typically combine both formal and relational means of curbing opportunism and enabling coordination (Klein, 1996). As Klein and Leffler (1981, p. 635) write: "Some elements of performance will be specified and enforced by third-party sanction and other elements enforced without invoking the power of some outside party to the transaction by merely by the threat of termination…".

Our aim in this paper is therefore to develop, trial, and refine a promptbook that enables an off-the-shelf large language model to reliably identify enforcement clauses in a corpus of government contracts and then categorise them as formal or relational on this basis. We aim for a fast, reliable and scalable tool that can be used to produce variables for use in new theoretical and empirical research into contracting. Our initial analyses

indicate that public contracts rely heavily on formal rather than relational enforcement clauses. Formal enforcement is concentrated around termination, material breach, preservation of contractual control, and liability, fines, or penalties, while relational enforcement is concentrated around extension and renewal, discretionary adjustment, and cure or rectification. Moreover, by linking enforcement terms to data on transaction hazards, we also examine whether buying government adapt enforcement clauses to exchange circumstances. Our preliminary findings suggest limited adaptation: buying governments appear to use similar enforcement approaches when purchasing products that vary substantially in complexity and associated risk of opportunism.

The remainder of the paper proceeds as follows. The second section defines the core concepts used in our promptbook: enforcement, and its formal and relational subtypes. The third section explains the data source used to trial the prompt, and the fourth describes the iterative process for its development, testing, refinement and validation. The fifth section presents results, and the sixth discusses implications.

2. Formal and relational enforcement: Clarifying the concepts

A contract contains two interdependent elements: planning and enforcement (Macaulay, 1963, p. 56).[2] (Hence, as Douglass North (1984, p. 256) writes, transaction costs represent "the costs of [i] *specifying* and [ii] *enforcing* the contracts that underlie exchange" [emphasis added].) Within each contract, planning clauses specify matters such as price, quantity, and quality of the goods or service being bought; how it is to be

[2] Some of contractual rights and obligations are defined by general law or sector-specific regulation, which applies regardless of whether they are explicitly written into the contract.

delivered; how the parties will communicate and manage their relationship; and how adjustments to the contract terms will be made during the contract period. Planning is thus future-orientated, establishing rights and duties "in the present towards an expected economic production or consumption [in future]," as Commons (1934, p. 697) emphasises (see also Hodgson, 2025, pp. 4-5). Enforcement is similarly future-orientated but is about ensuring that the transaction is carried out as agreed by deterring opportunism by either party. Enforcement provisions thus specify how service quality and quantity are to be monitored, and how each party's behavior will be disciplined in order to promote coordination rather than defection. Explicit sanctions may be mentioned, but subtler protections are also possible.

Planning and enforcement can each be approached from a more formal or more relational standpoint, and it is in this manner that some of the interrelation between planning and enforcement is revealed. For example, formal contracts typically seek to plan as many specific elements of the transaction as possible (Baker, Gibbons, and Murphy, 2022). This usually involves detailed input, output, or outcome specifications, as well as predefined responses to a wide range of potential future contingencies. The aim is to achieve the highest possible degree of specificity, partly because parties are mistrustful of one another – but partly because formal contracts rely on third-party enforcement mechanisms, like courts, to deter opportunism (MacLeod, 2007). And in order for that third party to successfully adjudicate disputes, the exchange must have been planned in sufficient detail so that the meeting or violation of obligations by either party can be independently verified by an outsider (the court) which has not been privy to any verbal communication and informal agreements between buyer and seller.

Hence, the degree of planning in a contract is significantly determined by the expected enforcement mechanism.

Relational contracts, on the other hand, avoid the use of legal third parties to enforce the terms of the exchange, and so do not need to plan the exchange in such minute and verifiable detail (Baker, Gibbons, and Murphy, 2002). Instead, they emphasize principles for how the parties will adjust the service, price, and their relationship over the contract period (Frydlinger, Hart, and Vitasek, 2019). This has the advantage of increased adaptability to changing circumstances, and lower ex-ante transaction costs (MacLeod, 2007). The goal is not exhaustive specification, but the articulation of shared principles or intentions that guide adaptation in response to unforeseen contingencies. As for relational enforcement: in the absence of recourse to a third-party, several alternative strategies can be used to protect each party and deter opportunism. Most well-known is the promise of future business (Macaulay, 1963; Klein and Leffler, 1981; Klein, 1996; Macchiavello, 2022). As Klein and Leffler (1981, p. 616) explain, "this private-contract enforcement mechanism relies upon the value to the firm of repeated sales to satisfied customers as a means of preventing nonperformance." In the case of repeat custom from an existing buyer, this relational enforcement mechanisms works so long as there are alternative suppliers available so that the threat to terminate is credible (Klein and Murphy, 1988). In the case of potential future customers, the incentive to coordinate rather than defect is more contingent on reputation (Bernstein 1992).

Beyond the imperative of securing future business, relational enforcement can also involve adherence to social norms and agreed principles of good conduct. Norms play a

central role in disciplining behavior in social exchange (Axelrod, 1986; Crawford and Ostrom, 1995). They are often directly linked to consequences, as Axelrod writes: "*A norm exists in a given social setting to the extent that individuals usually act in a certain way and are often punished when seen not to be acting in this way*" (1986; 1097, emphasis in original). In repeated exchange relationships, such as ongoing delivery contracts, norms can support a self-enforcing equilibrium in which neither party has an incentive to deviate from shared principles such as fair pricing or adequate performance (MacLeod, 2007). Moreover, recent economic theory suggests that exchange parties may also be inclined to follow accepted norms of good conduct and to act with loyalty or integrity (Frydlinger and Hart, 2024). Formally, this means that the parties incorporate some weight on the other party's payoff into their own utility function, leading them to take account of the welfare of others. Frydlinger and Hart (2024) show in a formal model how such norms can become self-enforcing, and how the force of norms is strengthened when they are written into the formal contract.

Most contracts typically combine both formal and relational means of curbing opportunism and enabling coordination and adaptation (Klein & Leffler, 1981; Klein, 1996; Domingos et al., 2025; Heinrich et al., 2026). However, the factors affecting the relative emphasis of enforcement styles remain underexplored, largely because central mechanisms of contract governance have so far defied systematic measurement, as discussed above. There is also a long line of research suggesting that enforcement practices specified on paper and realised in practice differ quite significantly (Macaulay, 1963; Lamothe and Lamothe, 2012), but again this has not yet been tested at scale. Despite extensive interest in relational contracting practices, including their expression

in contractual clauses, advantages, and limitations (Baker, Gibbons, and Murphy, 2002; Frydlinger and Hart, 2024), research has not yet been able to examine central assumptions across large numbers of contracts. In the next section, we explain how we develop, trial, and refine a promptbook that enables us to identify enforcement mechanisms in a large corpus of government contracts.

3. Data and methods: Measuring contract enforcement at scale

In this section, we describe how we constructed a dataset of all public procurement contracts in Danish local and regional governments from 2021 to 2025 using automated data collection combined with weekly manual (human) validation. We then explain how we developed and refined an LLM-based coding procedure to identify enforcement clauses in the large corpus of contract texts and classify them as formal or relational.

3.1 Building a large contract dataset

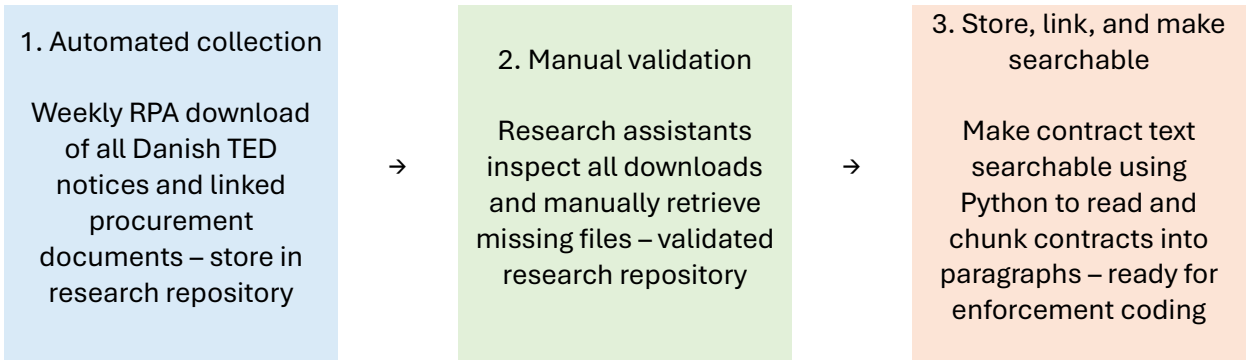
First, we developed a set of software robots using Robotic Process Automation (RPA), a technology that replicates rule-based human work processes. These robots were used to systematically collect procurement data at scale, as seen in Figure 1. On a weekly basis, we retrieved all Danish public procurement notices from Tenders Electronic Daily (TED), the official platform for public procurement in the European Union. We retrieved notices for all products, services, and public works contract notices. Each contract notice was structured into a dataset with one observation per tender, including key variables such as contracting authority, contract object, procurement procedure, and estimated contract value. Each tender notice contains a unique URL linking to the underlying procurement documents, including contracts, requirement specifications,

and supplementary materials. Using these links, the software robots automatically downloaded all available contract documents and stored them in a centralized research repository.

Second, because RPA operates by executing predefined workflows and is sensitive to changes in webpage interfaces or file formats, all automated downloads were manually inspected by research assistants. In cases where the automated process failed, for example due to irregular file formats, login restrictions, or other technical issues, documents were retrieved manually. This combined automated collection and manual validation process was repeated weekly all year around including periods of holidays to build a full dataset of public procurement contracts for everything being purchased by local and regional governments above the EU threshold values.

Third, we organized all contract documents using a unique identifier for each tender, allowing each contract document to be linked to a specific procurement in our contract database. This procedure resulted in a searchable population dataset covering all municipal and regional public procurement contracts in Denmark over a five-year period from 1 January 2021 to 31 December 2025. We use Python code to read all contract documents (typically PDF or Word files) and to chunk each contract into paragraphs that can be coded for enforcement clauses. The dataset includes 10,174 contracts for purchases above the EU threshold values and 259,953 pages of contract text. To our knowledge, this is the most comprehensive dataset of contract texts for scholarly analysis worldwide to date.

Figure 1. Overview of the data collection process for building the Danish public contract dataset.



3.2 Training and validating the LLM

Large language models (LLMs) are computational models trained on large volumes of text and designed to identify, classify, summarize, and generate language-based information. For research purposes, they offer a way to scale text analysis that previously required intensive human coding. Recent work in economics, management science, and related fields has used LLMs to classify documents, extract concepts, and construct variables from large text corpora. Their main advantage for our purposes is that they can help identify theoretically meaningful contract language across thousands of contracts, including language too nuanced for simple keyword searches. At the same time, LLM-based coding requires caution. LLMs can misclassify text, apply concepts inconsistently, or infer meanings not explicitly present in the text data. We therefore treat the LLM as a coding instrument that must be prompted, tested, compared against human coding, revised, and validated before use for full-scale measurement.

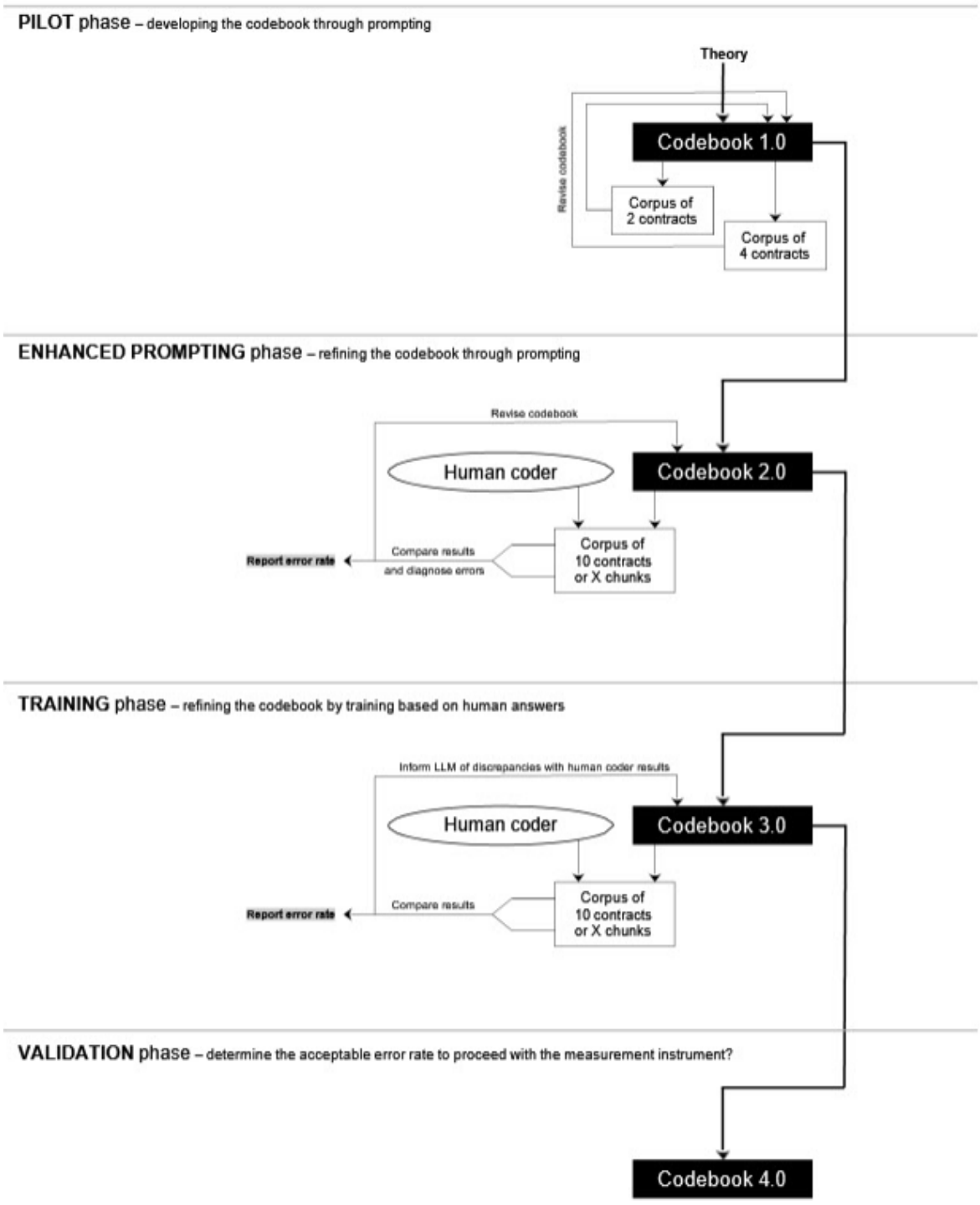
Figure 2 summarizes our coding process. At the current stage of the project, we have completed the pilot phase and the enhanced prompting phase and are preparing the

training and validation phases. In the pilot phase, we developed an initial codebook based on the theoretical distinction between formal and relational enforcement. We then tested this codebook on a small corpus of contracts and revised it iteratively when the LLM either missed relevant enforcement clauses or incorrectly coded non-enforcement clauses as enforcement. In the enhanced prompting phase, we compared LLM outputs with human coding. Human coders reviewed selected contracts and identified false positives, false negatives, and classification errors. These discrepancies were used to refine the codebook and the prompts. This process was repeated until the LLM produced sufficiently consistent results for the next stage of coding.

The coding procedure is organized around three tasks. The first task is to distinguish enforcement clauses from non-enforcement clauses. The second task is to classify enforcement clauses as formal, relational, both, or ambiguous. The third task is to distinguish subtypes of formal and relational enforcement. Each task follows the same logic: develop a theoretically grounded codebook, test it on a limited corpus, compare the LLM output with human coding, revise the promptbook, and repeat until performance is satisfactory. The next step is to complete the training and validation phases, including systematic estimation of error rates before applying the coding procedure to the full contract population. Because we are still in the enhanced prompting and training phases, the results reported in this paper should be interpreted as preliminary. We present initial evidence on formal and relational enforcement clauses from an LLM-based analysis of a random sample of 500 contracts drawn from the complete 2021-2025 contract dataset. These results illustrate the potential of the

approach and provide an early indication of the empirical patterns the full analysis is designed to examine.

Figure 2. Flowchart for developing and validating an LLM for distinguishing formal and relational enforcement terms.



5. Initial results (I): Measuring formal and relational enforcement terms

We present preliminary results on the use of formal and relational enforcement from an LLM-based analysis of a random sample of 500 contracts drawn from the complete 2021-2025 contract dataset. These initial results are based on our refined codebook, which we used to prompt the LLM to identify and classify formal and relational enforcement terms in each contract. We consider the sample sufficient for illustrating initial patterns, while emphasizing that the results remain preliminary because the LLM has not yet been fully trained and validated.

Figure 3 reports the distribution of enforcement terms across all 500 randomly drawn contracts and separately for service, supply, and public works contracts.[3] Across all contracts, 82.0 percent of enforcement terms are formal, 15.6 percent are relational, and 2.3 percent are both formal and relational. This pattern is highly similar across contract types with formal enforcement ranging from 81.0 percent of enforcement terms in service contracts to 82.9 percent in supply contracts. Similarly, relational enforcement varies only modestly from 14.7 percent in supply contracts to 16.8 percent in service contracts. These initial findings indicate a strong predominance of formal contract enforcement provisions, with relational enforcement present but clearly secondary in all contract categories.

[3] The subgroups in Figure 2 do not sum to 500 contracts because the sample also includes mixed service and supply contracts, as well as contracts that could not be classified by contract type.

Figure 3. Distribution of formal and relational enforcement terms.

Figures 4 and 5 provide a more fine-grained view of the specific types of formal and relational enforcement terms in the random sample of 500 contracts. These results are based on an untrained version of the LLM and should therefore be interpreted as an initial classification of enforcement subtypes, which we will further develop and validate in the next stages of this project.

Figure 4 reports the most common subtypes of formal enforcement terms. The largest category is termination and material breach, followed by provisions concerning contract control and rights preservation, liability, indemnity, and security, breach or default classification, and fines or penalties. Together, these categories indicate that formal enforcement in public contracts is strongly centered on legal exit, preservation of

contractual rights, liability allocation, and monetary sanctions. Less frequent formal enforcement subtypes include dispute resolution and law, and cost recovery or substitute performance. These less common categories are still theoretically important because they show that formal enforcement is not limited to termination and penalties but also includes mechanisms for third-party dispute settlement and replacement performance at the supplier's expense.

Figure 4. Formal enforcement sub-types.

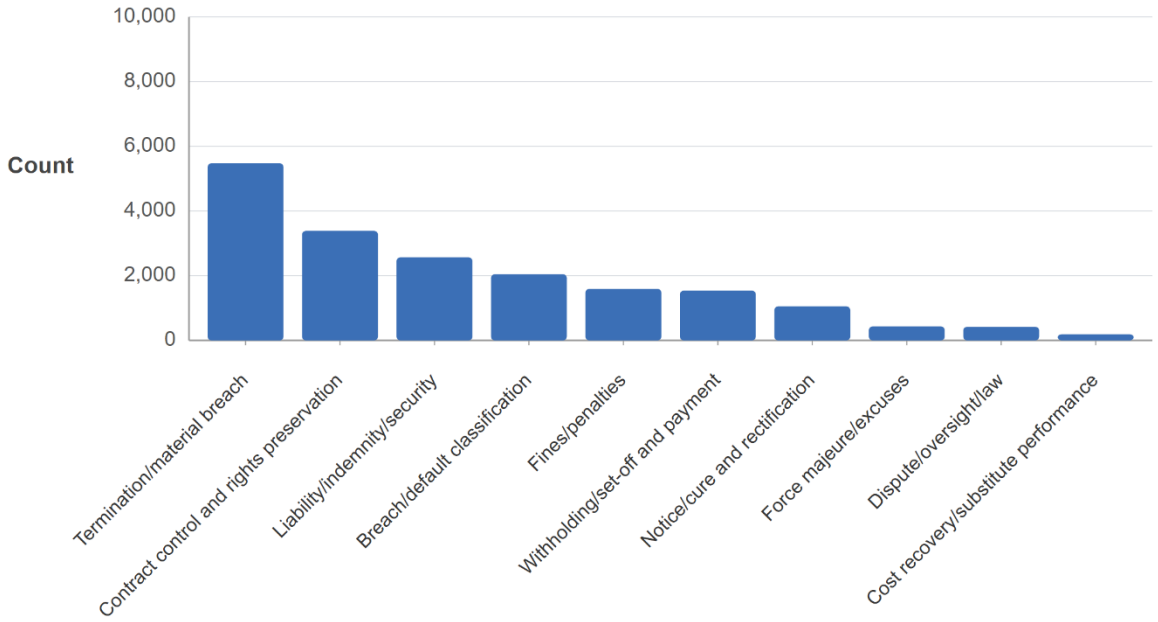
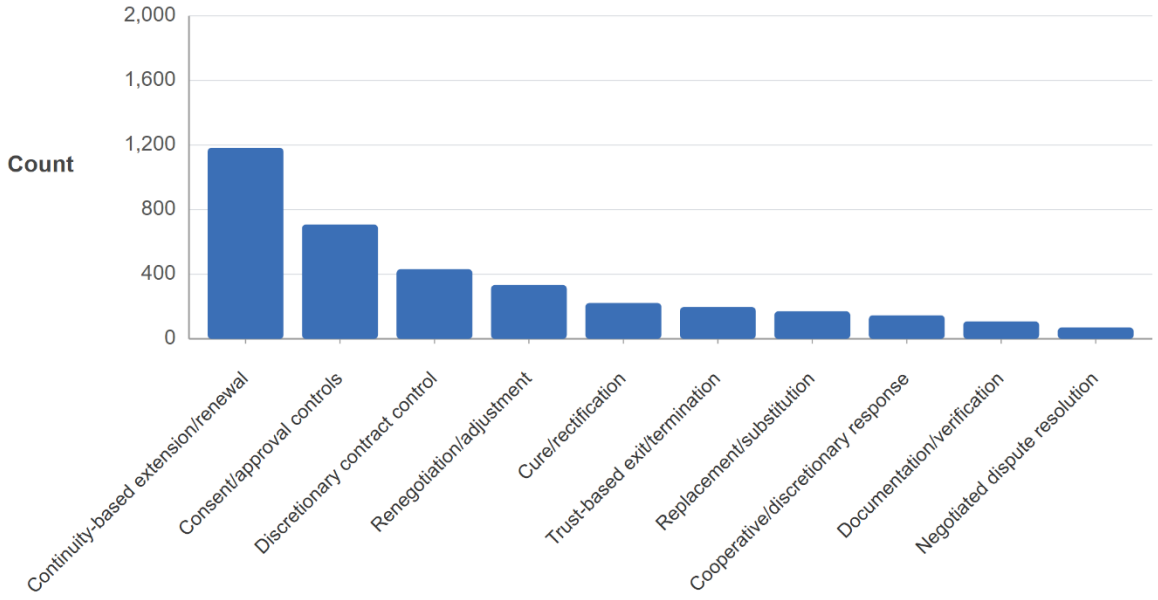


Figure 5 reports the corresponding subtypes of relational enforcement terms. The largest category is continuity-based extension and renewal, followed by consent and approval controls, discretionary contract control, renegotiation and adjustment, and cure or rectification. These categories suggest that relational enforcement is primarily organized around future contractual treatment, discretionary control of the ongoing relationship, and adjustment mechanisms that allow the parties to respond to changing circumstances without immediately invoking formal sanctions. Less frequent relational

enforcement subtypes include documentation and verification, and negotiated dispute resolution. These categories indicate that relational enforcement also appears in more procedural forms, although less often than extension, approval, and adjustment mechanisms.

Figure 5. Formal enforcement sub-types.



6. Initial results (II): Enforcement and transaction hazards

A central question in economic and legal contract research is whether governance structures are adapted to exchange circumstances (Macneil, 1985; Williamson, 1996; Levin and Tadelis, 2010). We provide the first analysis of whether enforcement terms in public sector contracts vary systematically with the transaction cost characteristics of the products being contracted for. Specifically, drawing on Williamson (1979, 1996) and later developments in public management research (Brown and Potoski, 2003; Hefetz and Warner, 2012), we examine whether formal and relational enforcement varies with

the transaction hazards of the exchange. We expect formal enforcement to be more used when performance can be specified and verified ex ante, whereas relational enforcement should be more widespread when service quality is difficult to measure and exchanges involve large asset-specific investments that amplify hold-up problems (Macneil, 1985; Williamson, 1996; Baker, Gibbons, and Murphy, 2022; Frydlinger and Hart, 2024).

Building on recent advances in measuring these concepts through machine learning and LLM-based classification (Potoski, Lund-Sørensen, and Petersen, 2026), we add transaction hazard scores to our dataset of enforcement terms. The first variable, Measurability, is measured on a scale from 1 to 5, where 1 indicates very low challenges in measuring or verifying quality, and 5 indicates very high challenges. The second variable, Asset Specificity, is also measured on a scale from 1 to 5, where 1 indicates very low asset-specific investments and 5 indicates high asset-specific investments. To measure the balance between formal and relational enforcement, we calculate the following index:

$$\text{Formal/Relational Enforcement} = \frac{N_{relational} - N_{formal}}{N_{relational} + N_{formal} + N_{both}}$$

Negative values indicate contracts dominated by formal enforcement, positive values, indicate contracts dominated by relational enforcement terms, terms, and values around 0 indicate balance between formal and relational enforcement.

Figure 6 plots the relationship between measurability and the formal/relational enforcement index. The observations are concentrated below zero, showing that formal enforcement dominates across almost the full range of measurability scores. The linear trend line has a very small positive slope and an R2 of 0.003. This suggests that contracts with more difficult-to-measure quality are not systematically more likely to rely on relational enforcement.

Figure 6. Measurability and enforcement terms.

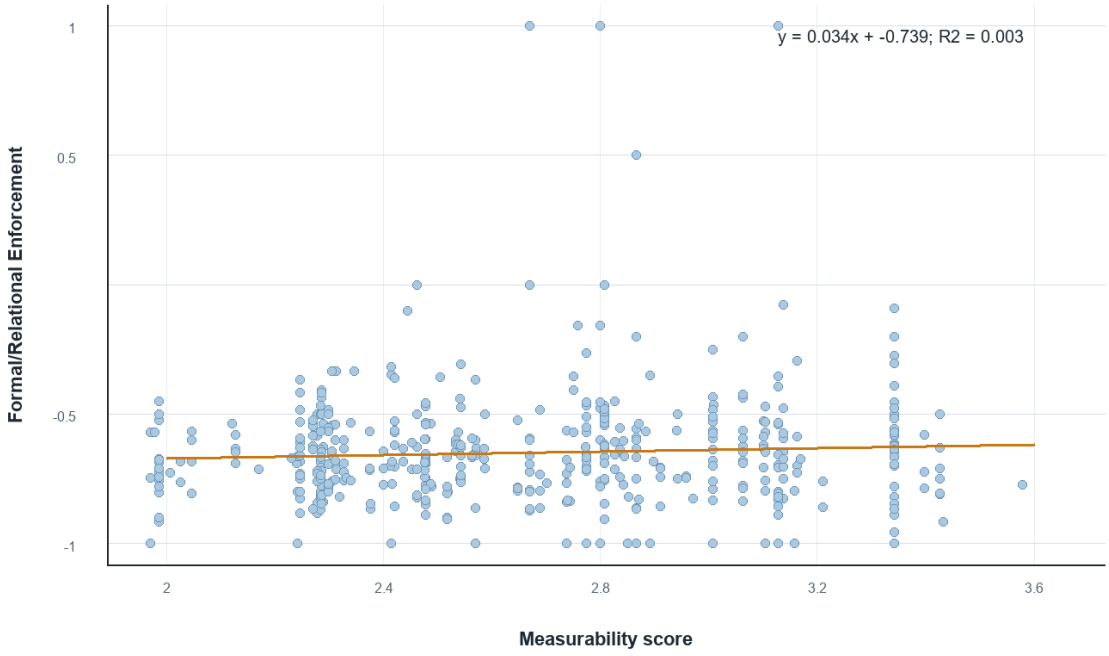
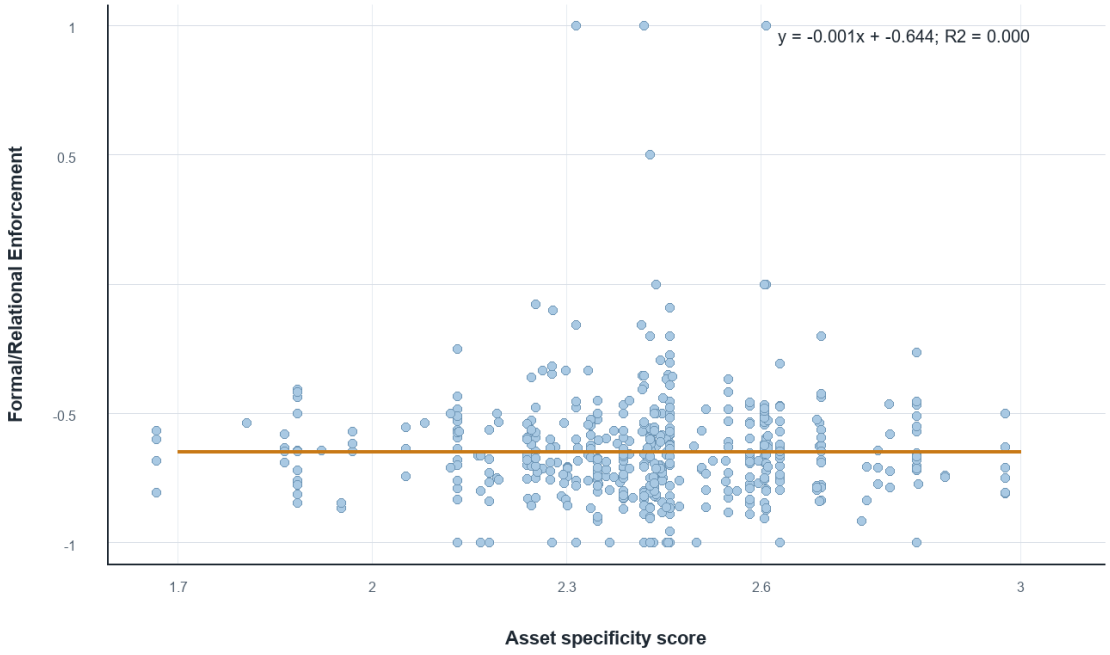


Figure 6 presents the corresponding relationship for asset specificity. Again, most contracts are located below zero on the enforcement index, indicating a predominance of formal enforcement terms. The fitted line is essentially flat, with a coefficient close to zero and an R2 of 0.000. Despite theoretical expectations that more difficult-to-

measure and more asset-specific exchanges should call for greater reliance on relational governance, the contracts in our sample remain strongly formal. Taken together, these initial results suggest that public organizations do not systematically adjust enforcement terms to the transaction hazards of the exchange.

Figure 7. Asset specificity and enforcement terms.



6. Discussion and next steps

Every contract, partnership, or alliance depends, at least to some extent, on whether the parties can hold each other to the agreement they have entered into (MacLeod, 2007). That is, the parties must be able to expect that the promises and commitments made at the time of planning will be, or at least could potentially be, enforced as the relationship develops. Yet enforcement sits somewhat uneasily in existing contracting

research. Formal economic modelling often assumes third-party enforcement at zero transaction costs (Hart and Moore, 1988, 2008; Hart and Holmstrom, 2010). Legal research has focused mainly on enforcement and dispute resolution through the judicial system, although Macneil's (1978, 1985) Bernstein's (1992, 2019) work offer an important foundation for thinking about enforcement beyond the courts. Finally, the limited empirical research suggests that businesses rarely rely use formal governance mechanisms to enforce contacts and instead rely more on shared norms, repeated interaction, and the value of ongoing relationships (Macaulay 1963). A key challenge across these literatures has been the lack of systematic measures of enforcement terms across large sets of contracts.

This paper takes initial steps toward addressing this limitation by (i) developing a promptbook that enables an off-the-shelf LLM to identify formal and relational enforcement mechanisms, (ii) deploying robot process automation methods to build and analyze a population-level dataset of Danish public procurement contracts above the EU thresholds. We use the fact that contracts are now available at scale and present an approach for collecting, downloading, cleaning, and analyzing theoretically important contractual concepts using large volumes of contract text. This enables us, to our knowledge for the first time, to systematically document the use of formal and relational enforcement terms across a large sample of public contracts.

Three findings from our initial analyses stand out. First, public contracts rely heavily on formal rather than relational enforcement terms. Second, the subtype analysis shows that formal enforcement is concentrated around termination and material breach,

preservation of contractual control and rights, and liability, fines or penalties. Relational enforcement is concentrated around continuity-based extension and renewal, consent and approval controls, discretionary adjustment, and cure or rectification. Third, by linking these findings to data on transaction hazards, we show how large-scale contract text analysis can be used to test central questions in the theory of the firm and the governance of economic organization (Coase 1937; Williamson). Our findings suggest very limited adaptation of enforcement types to exchange circumstances, with buying governments appearing to use similar enforcement approaches when purchasing products that vary substantially in complexity and associated risk of opportunism.

The analyses presented here are preliminary. We are still training the LLM, validating the codebook, and updating the analyses for the full 2021-2025 population of contracts. The next steps are therefore methodological as well as substantive. Methodologically, we will complete the training and validation process, assess inter-coder agreement between the LLM and human coding, and refine the classification of enforcement subtypes. Substantively, we will extend the analysis to the full dataset, test whether the initial patterns hold across all contracts, and examine whether enforcement terms vary with contract type, transaction hazards, and buyer characteristics. We also consider further exploring whether under what conditions formal and relational enforcement operate as substitutes, complements, or independent features of contracts (Poppo and Zenger, 2002).

List of references

Adam, I., Fazekas, M., & Tóth, B. (2020). Measuring the benefits of open contracting. Government Transparency Institute. Available at https://hivos.org/assets/2021/02/OC-benefits-research.pdf

Axelrod, R. (1986). An evolutionary approach to norms. American political science review, 80(4), 1095-1111.

Baker, G., Gibbons, R., & Murphy, K. J. (2002). Relational Contracts and the Theory of the Firm. Quarterly Journal of Economics, 117(1), 39-84.

Baker, G., Gibbons, R. S., & Murphy, K. J. (2022). From incentives to control to adaptation: Exploring interactions between formal and relational governance (April 2022). CEPR Discussion Paper No. DP17240, Available at SSRN: https://ssrn.com/abstract=4121423.

Barron, D., Gibbons, R., Gil, R., & Murphy, K. J. (2020). Relational adaptation under reel authority. Management Science, 66(5), 1868-1889.

Bernstein, L. (1992). Opting out of the legal system: Extralegal contractual relations in the diamond industry. *The Journal of Legal Studies*, *21*(1), 115-157.

Bernstein, L. (2019). Contract governance in small-world networks: The case of the Maghribi traders. *Nw. UL Rev.*, *113*, 1009.

Brown, T. L., & Potoski, M. (2003). Transaction costs and institutional explanations for government service production decisions. Journal of Public Administration Research and Theory, 13(4), 441-468.

Coase, R. H. (1937). The Nature of the Firm. Origins, Evolution, and Development. New York, Oxford.

Commons, J. R. (1934). Institutional economics; its place in political economy. The Macmillan company.

Crawford, S. E., & Ostrom, E. (1995). A grammar of institutions. American Political Science Review, 89(3), 582-600.

Domingos, F. D., Heinrich, C. J., Saussier, S., & Shiva, M. (2025). The interplay of discretion and complexity in public contracting and renegotiations. Journal of Public Administration Research and Theory, 35(2), 148-163.

Frydlinger, D., & Hart, O. (2024). Overcoming contractual incompleteness: The role of guiding principles. The Journal of Law, Economics, and Organization, 40(3), 625-647.

Frydlinger, D., Hart, O., & Vitasek, K. (2019). A new approach to contracts. Harvard Business Review, 97(5), 116-126.

Gil, R., Kim, M., & Zanarone, G. (2022). Relationships Under Stress: Relational Outsourcing in the U.S. Airline Industry After the 2008 Financial Crisis. Management Science, 68(2), 1256-1277.

Gutiérrez-Meave, R., Zhang, S., Carr, J. B., & Siciliano, M. D. (2025). Integrating Formal and Relational Contracting: The Link Between Network Structure and Contract Design in Interlocal Collaboration Agreements. Public Administration, 103(4), 1080-1096.

Hart, O. (2017). Incomplete contracts and control. American Economic Review, 107(7), 1731-1752.

Hart, O., & Holmstrom, B. (2010). A theory of firm scope. The Quarterly Journal of Economics, 125(2), 483-513.

Hart, O., & Moore, J. (1988). Incomplete contracts and renegotiation. Econometrica, 755-785.

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

Hart, O., Shleifer, A., & Vishny, R. W. (1997). The proper scope of government: theory and an application to prisons. The Quarterly Journal of Economics, 112(4), 1127-1161.

Heinrich, C. J., Malatesta, D., Carter, E., Gibson, M., & Ball, N. (2026). Contracting for Public Value: New Thinking for More Effective, Accountable, and Sustainable Public Service Contracts. Oxford University Press.

Hefetz, Amir, and Mildred E. Warner. 2012. Contracting or Public Delivery? The Importance of Service, Market, and Management Characteristics. Journal of Public Administration Research and Theory 22(2): 289–317.

Hodgson, G. M. (2025). Transactions and legal institutionalism: part I – six leading thinkers. Journal of Institutional Economics, 21, e13, Article e13.

Klein, B. (1996). WHY HOLD-UPS OCCUR: THE SELF-ENFORCING RANGE OF CONTRACTUAL RELATIONSHIPS. Economic Inquiry, 34(3), 444-463.

Klein, B., & Leffler, K. B. (1981). The Role of Market Forces in Assuring Contractual Performance. The Journal of political economy, 89(4), 615-641.

Klein, B., & Murphy, K. M. (1988). Vertical Restraints as Contract Enforcement Mechanisms. The Journal of Law and Economics, 31(2), 265-297.

Lamothe, M., & Lamothe, S. (2012). What determines the formal versus relational nature of local government contracting?. Urban Affairs Review, 48(3), 322-353.

Levin, J., & Tadelis, S. (2010). Contracting for government services: Theory and evidence from US cities. The Journal of Industrial Economics, 58(3), 507-541.

Macaulay, S. (1963). Non-Contractual Relations in Business: A Preliminary Study. American Sociological Review, 28(1), 55-67.

Macchiavello, R. (2022). Relational Contracts and Development. Annual Review of Economics, 14(Volume 14, 2022), 337-362.

MacLeod, W. B. (2007). Reputations, relationships, and contract enforcement. Journal of Economic Literature, 45(3), 595-628.

Macneil, I. R. (1978). Contracts: Adjustment of long-term economic exchange relations under classical, neoclassical and relational contract law. Northwestern University law review, 72(6), 854-905.

Macneil, I. R. (1985). Relational contract: What we do and do not know. Wisconsin. Law Review, 483.

Malatesta, D., & Cheema, F. S. (2026). Dual Anchors in the Shadow of the Future: How Renewal Expectations and Relational History Govern Behavior in Public Contracts. Journal of Public Administration Research and Theory.

North, D. C. (1984). Government and the Cost of Exchange in History. The Journal of Economic History, 44(2), 255-264.

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., Lund-Sørensen, B., & Petersen, O. H. (2026). Measuring Transaction Costs in Public Sector Contracting Through Machine Learning and Contract Text. Public Administration Review, 86(1), 199-216.

Rahal, C., & Mohan, J. (2025). The role of the third sector in public health service provision: evidence from 25,338 heterogeneous procurement datasets. Journal of the Royal Statistical Society Series A: Statistics in Society, 188(4), 1085-1106.

Rogger, D., & Schuster, C. (2025). How scholars can support government analytics: Combining employee surveys with more administrative data sources towards a better understanding of how government functions. Public Administration Review, 85(2), 267-279.

Warren, P. L. (2014). Contracting officer workload, incomplete contracting, and contractual terms. The RAND Journal of Economics, 45(2), 395-421.

Williamson, O. E. (1979). Transaction-cost economics: the governance of contractual relations. The Journal of Law and Economics, 22(2), 233-261.

Williamson, O. E. 1996. The mechanisms of governance. Oxford: Oxford University Press.