Political Contestability and Contract Rigidity: An Analysis of Procurement Contracts*

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Abstract

We compare procurement contracts where the procurer is either a public agent or a private corporation. Using algorithmic data reading and textual analysis on a rich dataset of contracts for a standardized product and service from a single provider, we find that public contracts feature more rigidity clauses than private-to-private contracts and their renegotiation is formalized more frequently in amendments. We further compare in-sample public contracts and find similar patterns rising in political contestability using several measures. We argue that a significant part of the contractual rigidity difference between purely private and public contracts due to the specific nature of public contracts which are more permeable to the political environment.

Keywords: Contractual Rigidity, Private and Public Procurement, Political Contestability, Renegotiation

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1 Introduction

Public-sector and private-sector contracts have been studied extensively in their domain. The prevailing view is that private contracts encapsulate most of contractual hindrances and public contracts represent special cases where specific values rooted in equity, corruption distortions, and "red tape" are more salient. There is, however, no overarching theory that explains the idiosyncrasies of public vis-à-vis private contracts. This gap is due in part to the difficulty in comparing contractual objects across public and private spheres.

A fundamental feature of public contracts is that they are subject to public oversight because they deal with public monies. As argued by Spiller [2008] and Moszoro and Spiller [2012], public contracts are characterized by intrinsic differences stemming from the fact that a substantial amount of supervision and control is done by political contesters and interest groups who have a stake in challenging and disrupting the contractual relationship. Thus, although politics is normally not necessary to understand private contracting, it becomes fundamental to understanding public contracting.

Public contracting is characterized by formalized, standardized, bureaucratic, and rigid procedures, partly because politics must be secured against opportunistic third parties. What we call "contract rigidity" refers to rule-based (bureaucratic) implementation; i.e., the addition of contractual provisions and specifications that impose *ex post* stiff enforcement, intolerance to adaptation, and penalties for deviation.[1] Therefore, contract rigidity differs from Arrow-Debreu's [1954] state-contingent contracts, which point to the *ex ante* complexity of the subject and the completeness of the clauses, technical provisions, and processing costs [Laffont and Tirole, 1993]. From the contractor's perspective, contractual rigidity minimizes the risk of governmental opportunism [Moszoro and Spiller, 2014], i.e., unfair administrative treat and unfavorable renegotiations (e.g., creeping expropriation).

Moreover, when faced with unforeseen or unexpected circumstances, private parties—as long as the relationship remains worthwhile—adjust their required performance without the need for costly and formal renegotiation [Baker et al., 2002]. Conversely, public agents will be more likely to have these contractual changes formalized in amendments. The same insulation mechanism that triggers higher rigidity of public contracts compared to purely private contracts induces formalization of renegotiations through written amendments.

We analyze the difference in public versus private procurement on a large number of contracts. Building on the aforementioned characteristics of public contracting, we derived three testable propositions. First, public contracts are more rigid than equivalent transactions governed under private contracting. Second, contracts signed with public authorities in politically contestable jurisdictions are characterized by more rigid procedures than other public contracts; i.e., public authorities subject to third-party challenges increase the *proceduraliza-*

[1] In this regard, contract rigidity is the opposite of "best efforts" or "reasonable adaptation" clauses.

tion of contractual agreements to insulate themselves from plausible politically motivated challenges. Third, public contracts renegotiations are more frequently formalized through amendments because of their initial rigidity (i.e., no relational adaptation) and as a means to avoid charges of discretionary misuse of public funds.

To test these propositions we collected unique data and used a cutting-edge methodology. Our data concern car park contracts signed between 1985 and 2009 in France. We analyzed 396 contracts (and 793 amendments) signed between one private operator and 24 private procurers (which we call "private contracts") and between the same private operator and 152 public authorities (which we call "public contracts"). In addition, we also collected data on local elections and proposed several measures of political contestability. Because there is only one contractor and car parks arguably entail a standardized product and service, a large part of the contractual heterogeneity comes from the procurers' characteristics and time-varying political contestability.

Analogously to Schwartz and Watson [2012], we characterized this rich sample of contracts using algorithmic data reading and textual analysis. We find that public contracts feature more rigidity clauses and their renegotiation is formalized in amendments. We further compare in-sample public contracts and find similar patterns rising in political contestability. We argue that a significant part of the contractual rigidity difference between purely private and public contracts is a signaling device and political risk adaptation of the public agent to keep at bay plausible challenges from political contesters and interest groups. Complementarily, where firms anticipate a politically unstable environment that may lead to (incremental) expropriation, they will require rigid terms to minimize governmental opportunism.[2] We also find, as expected, that public contracts are more frequently renegotiated than private contracts.

Understanding public contracting is of utmost relevance for the economics, legal, and political science professions alike: public procurement accounts for for approximately 13% of GDP in OECD member countries,[3] it is the government activity most vulnerable to waste, fraud, and corruption due to the size of the financial flows involved, and the assessment of its efficiency is a substantial component in voters' political choices.

Our study contributes to contract theory and organizational economics by advancing a novel set of propositions based on hazards faced by public-sector, but not by private-sector procurers. Organizations which are characterized by high degrees of "publicness" differ from "private" organizations because they are more permeable to the political environment [Meier

[2]See Spiller [2008] and Moszoro and Spiller [2014] for an explanation of the interplay between third-party and governmental opportunism in public contracting. The disentangling of the two channels of rigidity, however, is empirically hard.

[3]Cf. http://www.oecd.org/gov/ethics/public-procurement.htm. In the EU, the public purchase of goods and services has been estimated to account for 16% of GDP; http://ec.europa.eu/trade/policy/accessing-markets/public-procurement/.

and O'Toole, 2011; Ring and Perry, 1985]. In this paper, we empirically test this permeability, focusing in particular on the degree of contractual formalism. Also, our results suggest that previous studies that surfaced public contracts' inefficiencies related to high renegotiation rates [Guasch, 2004; Guasch et al., 2008] might be somewhat misleading. Frequent renegotiations observed in public contracts can be understood as a consequence of their specific nature instead of a manifestation of opportunism: "In a sense, [...] the frequency of contract renegotiation may provide concessions a 'relational' quality" [Spiller, 2008, p. 22]. An important corollary is that the perceived inefficiency of public contracting is largely the result of contractual adaptation to different inherent hazards and thus is not directly remediable.

Our study is related to Moszoro et al.'s [forthcoming, 'MSS' hereinafter] paper in that they provide empirical work on the implications of public oversight on contracts using a similar methodology. We differ from their work in terms of identification strategy, depth of analysis, and scope of results. In particular, MSS studied contracts in regulated versus non-regulated industries filed through the SEC's Edgar system and compared across products and services with many cofounding factors in their estimates. I.e., their procedure traded sample size for accuracy and arrived to "commercial contracts" by means of exclusion and filtering. In MSS, contracting markets and political markets overlap only partially: their measures of political contestability are determined by states, whereas contracting markets are given by the area covered by the utilities which can go beyond the state. In contrast, in our setup there is a clear distinction of public and private procurers and all contracts are for a single standardized product—car parks—from one contractor. Our measures of political competition are granular (municipalities) and perfectly overlap with the contracting markets for car parking. Moreover, we control for type of contract, size, and complexity and also deal with the impact of corruption on rigidity. Thus, we believe that we contribute to the literature by empirically testing the difference between a private-private and a public-private contract for a standard product in a cross-section and time-varying political environment.

Our setup and results are extendable to different jurisdictions and types of law. In all countries politicians face similar risks, which refer not only to the legal indictments at court, but foremost to politically motivated challenges that affect public agents' reputation. Furthermore, we provide a replicable protocol to empirically assess public contract rigidity in politically competitive jurisdictions.

The paper is organized as follows: In section 2, we return to the specificities of public contracting and third-party opportunism, and derive propositions concerning rigidity and political contestability of public contracts. In section 3, we present our data and our empirical strategy to test our propositions. Section 4 is dedicated to the results and robustness checks. Section 6 concludes.

2 The Specific Nature of Public Contracts

2.1 Third-Party and Governmental Opportunism

According to Ring and Perry [1985], public organizations are much more permeable to the external environment than private organizations, because they must cope with the scrutiny of media and constituents. Moreover, public managers are subject more often to artificial time constraints (i.e., elections) than private managers. More recently, authors in political economy [Moszoro and Spiller, 2012, 2014; Spiller, 2008] put forward a complementary type of argument: public contracts differ from private contracts because the contracting partners are subject to an additional type of hazard, namely third-party opportunism. Politics, which is normally not involved in understanding private contracting, becomes fundamental to understanding public contracting. As a consequence, (opportunistic) third parties prevent the use of relational contracts for public-private arrangements.

Many examples can be found illustrating third-party opportunism and its consequences on contractual practices. Engel et al. [2014, Box 3.1] gave the example of a forestry company in Latin America that contracted for the construction and maintenance of a 60-kilometer (37-mile) road network of six roads for heavy trucks within its forests. The contract specified the contract duration, a unit price per kilometer and the payment schedule, building standards (such as width and thickness of asphalt), service standard requirements, and penalties for deviations from these requirements. This private road construction contract was ten pages long. A comparable public contract usually has several hundred pages [Engel et al., 2014]. This example illustrates the difficulty to rely on relational contracts for transactions involving the public sector.

Similarly, Hennessey [2012, p. 7] illustrates how public contracts are subject to political hazards alien to private contracts. He relates that Michael O'Shaughnessy, chief engineer of the Hetch Hetchy Aqueduct—an astounding water and power system comprising of 60 miles of tunnels through solid granite, 280 miles of pipelines, four major dams and powerhouses, two treatment plants, and 11 reservoirs—commented in his account of the project that he "never handled any proposition where the engineering problems were so simple and the political ones so complex."

Examples of political interferences in public procurement can also be found in France. In the city of Saint-Etienne, the daily regional press reported in June 2015 that the city counsel majority raised prices by renegotiating underground car parks contracts entrusted to private partners to comply with a new legislative framework.[4] The new price schedule was then submitted to the vote of the city council. The motion was refuted by the opposition, which publicly blamed the majority for conducting negotiations as "altar boys." One of

[4]The "Hamon Law" on consumption was adopted in March 18, 2014. The new law requires pricing for every 15 minutes to allow car drivers to pay closer to their actual consumption.

the political opponents of the mayor even declared that the contract was "either a gift, or poorly negotiated." The city counsel majority replied by blaming the former mayor about the absence of contract enforcement in the past.[5]

Public contracts' openness to scrutiny is intended to avoid corruption and graft. This scrutiny is undertaken not only by designated agencies in charge of contract supervision, but also carried out by interested third parties that may behave opportunistically and challenge the *probity* of a public agent. Opportunistic challenges are not specific to public contracting; in the face of third-party opportunism, however, private companies normally rely on inter-firm relationships to support contracting [Macaulay, 1963] through informal and continuous adaptations.[6]

On top of that, private contractors are concerned about the risk of governmental opportunism—i.e., the ability of governments to change the rules of the game through the standard use of administrative powers to extract quasi-rents from investors [Spiller, 1995]. The existence of sunk investments makes governmental opportunism a fundamental hazard in government–investor interactions. Sunk investments provide politicians with the opportunity to behave opportunistically *vis-à-vis* the investing company, exposing it to the risk of (creeping) expropriation. Facing the threat of governmental opportunism, investors will require particular safeguards to deploy capital, i.e., the development of institutional arrangements that limit the government's ability to behave opportunistically once the investor undertook its investment program.[7]

The exposure to third-party and governmental opportunism increases the risk to both the public agent and the private party. In response, both will have incentives to increase the rigidity of these contracts as compared to equivalent contracts in the private sphere. Because of their nature, public contracts are born with less flexibility than purely private contracts [Spiller, 2008, p. 21].

2.2 Renegotiations

Renegotiation refers both to the process and outcome that changes the original agreed contractual terms. Long-term contracts generally define *ex ante* the triggers, scope, and manner in which eventual changes to agreed terms take place. In this study, we do not report the

[5] Xavier Alix, "Parkings stéphanois: une renégociation plus ou moins bonne?", *L'Essor*, June 10, 2015. Available at: http://lessor.fr/parkings-une-renegociation-plus-ou-moins-bonne-10303.html (accessed July 31, 2015).

[6] Relational contracts are defined as informal commitments governing non-contractible actions and sustained by the value of future transactions [Bull, 1987; Baker et al., 2002]. When the discounted payoff stream from commitment to this informal agreement is higher than the discounted payoff stream from deviation, a relational contract is sustainable and allows avoiding *ex post* opportunism.

[7] For example, safeguards will have to stipulate price setting and conflict resolution procedures (arbitration or judicial), investment policies, quality controls, etc., that are both difficult for the government to by-pass and limited in their discretionary interpretation. In other words, regulatory procedures, if credible, must restrain the government from opportunistically expropriating the investor's sunk investments [Spiller, 2013].

renegotiation terms embedded in original contracts nor the talks the parties held after the contract was signed; we focus instead on the *ex post* outcomes of renegotiations when they were formalized in written amendments to the original contracts. Specifically, we define the frequency of formal renegotiations as the sum of amendments of a particular contract divided by its length in years, which yields average number of formal renegotiations per year per contract.

Guasch [2004] provides numerous examples of renegotiations in public-private agreements. By studying more than 1,000 concession contracts signed in Latin American countries between the mid-1980s and 2000, he found that 78% of transportation contracts and 92% of water and sanitation contracts were renegotiated. Guasch's findings also confirmed that renegotiations occur shortly after the award (on average, after 2.2 years) and often, at first glance, favor the private party. Guasch [2004] suggested that renegotiations are a consequence of aggressive bids in the context of an *ex ante* lack of commitment from the government. Because the government cannot commit not to renegotiate and because firms only learn their types after bidding, if a firm wins a call for tender and discovers it is inefficient (i.e., it would lead to losses), it would be tempted to renegotiate [Laffont, 2003; Guasch and Straub, 2006; Guasch et al., 2008].

Other scholars have explored alternative explanations, including government-led renegotiations [Guasch et al., 2007] and renegotiations without hold-up that enable incumbent governments to circumvent budgetary rules before elections [Engel et al., 2009]. As Guasch et al. [2008, p. 421] stated, however, "such high rates of contract renegotiation have raised serious questions about the viability of the concession model in developing countries."

It is fair to recognize that high rates of renegotiation are not specific to developing countries. Other studies have reported very high renegotiation rates in the United Kingdom [NAO, 2003], United States [Engel et al., 2011], and France [Athias and Saussier, 2007; Beuve et al., 2014]. Regardless of the theoretical framework mobilized to analyze public-private contracts, the high rate of renegotiation always comes as bad news. Recognizing the specific nature of public contracts changes the perspective on contractual renegotiations and leads to a new set of propositions.

2.3 Propositions

In this section, we highlight trade-offs at stake when third-party opportunism is introduced.[8] On the one hand, contracting costs rise exponentially with contract rigidity and determine the trade-off between interpretation accuracy and cost of contract writing [Schwartz and Watson, 2012]. On the other hand, Moszoro and Spiller [2012] found that the lack of flexibility in public procurement design and implementation reflects public agents' political risk adaptation

[8]This section follows Moszoro and Spiller [2012].

to limit hazards from opportunistic third parties—political opponents, competitors, interest groups—while externalizing the associated adaptation costs to the public at large. Thus, public agents trade contracting and political costs, expressed as:

$$\underset{R}{\text{minimize}}\ \Phi = T_0\ \rho(R)\tau(R) + K(R) \tag{1}$$

where $K(R)$ is adaptation costs rising exponentially in contract rigidity R, ρ is the likelihood of a challenge by an opportunistic third party and τ is the likelihood of success of an opportunistic challenge decreasing in contract rigidity, and T_0 is the public agent's (political) cost if a challenge by third parties succeeds.

Third parties observe benefits from opportunistic challenges, but the public agent does not know *ex ante* the particular value of these benefits to third parties. Third parties' overall benefits from an opportunistic challenge correspond to a random normally distributed variable $\widetilde{T_0}$. Equation (2) shows that in equilibrium third parties challenge a contract only if expected gains $\widetilde{T_0}\zeta\tau$ are bigger than litigation costs $c(R)$:

$$\rho \equiv \Pr[\widetilde{T_0}\zeta\tau(R) > c(R)], \tag{2}$$

where $\zeta \in [0, 1]$ is a political contestability parameter. If $\zeta = 1$, the opportunistic challenger's benefits are symmetrical to the incumbent public agent's costs (e.g., a bipartisan political market); if $\zeta < 1$, the political market is fragmented and the challenger does not internalize all benefits from a successful contract protest, i.e., if political contestability is low, the probability of an opportunistic challenge will be also low. Political contestability ζ is universal parameter: It is inversely correlated to the ruling party's strength (e.g., measured by electoral race winning margins) and the costs of oversight (e.g., captured by the number of partisan lists in an election), and proportional to the probability of a partisan swing.[9]

Litigation costs $c(R)$ rise in R. Reduced flexibility limits the likelihood of an opportunistic challenge by lowering third parties' expected gains and increasing litigation costs. Any deviation from equilibrium rigidity R^* makes the public agent worse off:

1. If $R < R^*$, then $\tau(R) > \tau(R^*), c(R) < c(R^*)$, therefore $\rho > \rho^*$ and $T_0\ \rho(R)\tau(R) - T_0\ \rho(R^*)\tau(R^*) > K(R^*) - K(R)$ (increase in political cost offsets gains in decreased contracting cost)

2. If $R > R^*$, then $T_0\ \rho(R^*)\tau(R^*) - T_0\ \rho(R)\tau(R) < K(R) - K(R^*)$ (contracting cost increase outmatches gains in political cost decrease)

Moszoro and Spiller's [2012] model yields two testable predictions on the contractual features, depending on the characteristics of the contracting parties:

[9] In our empirical strategy in section 3, we use several political measures that capture different aspects of political oversight and competition.

Proposition 1. *In the absence of political costs, equilibrium contract rigidity is lower than when political costs are high; therefore contracts subject to public scrutiny have more rigidity clauses than purely private relational contracts.*

Proposition 2. *In contestable political markets (high ζ), contracts have more rigidity clauses than in monopolized or atomized political markets (low ζ).*

Furthermore, rule-based contracts imply that they are less adaptable to unforeseen contingencies. Due to public oversight, public contract adaptations will need to be introduced through formal amendments. Therefore, we can draw a third prediction regarding public versus private contracts:

Proposition 3. *Public contracts are more likely to be renegotiated through formal amendments than private contracts.*

We test these propositions using a novel dataset comprised of public-private and purely private contracts for car parks in France. Our focus is on contract characteristics and third-party scrutiny.

3 Empirical Analysis

3.1 Sector and Contract Characteristics

In many European countries, as in many other places around the world, cities are responsible for providing on-street and off-street car parks. The positive externalities and social benefits (e.g., environmental concerns, intermodality, urban development) derived from high-quality construction and efficient management of car parks justify their remit to local authorities. Although the public authorities must retain ownership and control of car parks, they can outsource the provision of such infrastructure and services through public-private arrangements. In France, outsourcing car parks construction and/or management to private operators has been widespread.[10] As a consequence, the sector is characterized by strong competition between national and international companies[11] as well as local firms [Baffray and Gattet, 2009]. Moreover, the competitive pressure also comes from the possibility of municipalities returning to in-house provision when contracts end.

The sector is characterized by the existence of three main contractual arrangements: "concession contracts," "operating contracts," and "provision of services contracts." A brief description of these contracts is enclosed below.

[10] According to the French Ministry of Sustainable Development, in 2009 73% of car parks were organized *via* outsourced management and 27% were provided in-house through public provision.

[11] Vinci Park, Q-Park, Epolia, Efia, Interparking, Parking de France, UrbisPark, AutoCité and SAGS are the most frequent bidders in France.

Concession Contracts: For greenfield and substantial brownfield car park developments, municipalities use concession contracts. These are long-term contracts (30 years on average in our dataset), which provide sufficient time for private operators to invest and pay off debt. In such contracts, the operator bears the demand risk and is remunerated with user fees. The direct consequence is that long-term contracts are subject to the political, economic, social, and technical changes that may occur during the execution of the contract. Such changes may be exogenous to the contract (e.g., technological developments, economic shocks, changes in legislation or legal interpretation), or may directly result from internal drivers (e.g., evolving business requirements) or contract maladaptations (e.g., inappropriate initial contractual design). Such changes may then involve adaptations to the service.

Operating Contracts: When the car park is already built and requires a significant level of investment to renovate and maintain, operating contracts are used. These contracts are shorter than concession contracts (18.2 years on average in our dataset). As with concession contracts, the operator bears the demand risk and is remunerated with user fees. Likewise, operating contracts are subject to the political, economic, social, and technical changes that may occur during execution of the contract.

Provision of Services Contracts: For on-street and already built car parks which require no investments, provision of services contracts are used. These are shorter contracts (3.2 years on average in our dataset).

3.2 Contractual and Political Data

In the French car parking sector, there is no regulatory authority and data are not centralized. To generate the dataset used in this study, we gathered all contracts signed by the leading company in the French market (42% market share among private operators; 30.6% total market share) between 1985 and 2009. Overall, we assessed 396 contracts and 793 amendments to contracts with 152 municipalities and 24 private contractees dispersed in 58 departments (out of 96) in metropolitan France.

Concerning political data, we gathered the outcome of all municipal elections from 1983 through 2008.[12] Elections are organized (in principle) every six years to elect the mayor and the members of the city council by a majority vote over two rounds (direct universal suffrage). Each mayoral candidate presents a list of potential deputies (as many deputies as number of seats on the city council). The list which obtains the higher result obtains 50% of the seats on the city council. The remaining seats are distributed among all lists of potential deputies (including the majority list) who received at least 5% of the votes cast.

[12] I.e., 1983, 1989, 1995, 2001, and 2008. The data were obtained through the Center for Socio-Political Data (CDSP).

The city council, chaired by the mayor, collectively has the legislative authority over municipal territory. I.e., the council has jurisdiction to manage the affairs of the municipality through its decisions. Hence, the city council approves the budget prepared by the mayor and her deputies, determines local tax rates, creates or cancels communal jobs, allows acquisitions and disposals of communal property, approves loans, grants subsidies, and sets tariffs for communal services and on-street car parks.

Putting our variables in perspective, Propositions 1 and 3 build on the differences between public versus private contracts samples, while Proposition 2 builds on the in-sample time-varying and cross-section political contestability heterogeneity in municipalities.

3.3 Empirical Strategy

Our sample presents the ideal characteristics to test our propositions: there is only one contractor and car parks represent a standardized product. Therefore, a large part of the heterogeneity in our dataset comes from the procurer's characteristics (public versus private) as well as the cross-section and time-varying political contestability in the public administrations.

3.3.1 Dependent Variables

(a) Contractual Rigidity

To assess the rigidity level of our contracts we follow Schwartz and Watson [2012], and introduce rigidity categories—arbitration, certification, evaluation, litigation, penalties, contingencies, design, and termination—and construct "dictionaries" by which we machine-read contractual dimensions.[13]

These rigidity categories capture relevant contractual clauses that lower the likelihood of a challenge by opportunistic third parties. Our rationale for the use of rigidity categories instead of the simple aggregate is to open the black box on contractual rigidity and assess its magnitude and significance at a granular level. Table (1) presents the list of words we searched for. These words univocally relate to their corresponding categories.

Arbitration clauses submit plausible disputes to an arbitrator instead of a court.[14] Cer-

[13]See, for example, Parkhe [1993] for an application of categories for the analysis of contracts in the management literature and Loughran and McDonald [2011] for an analysis of corporate filings in the finance and accounting literature. Parkhe used dummy variables for periodic written reports of relevant transactions, prompt written notice of departures from the agreement, the right to examine and audit relevant records a firm of certified public accountants, designation of certain information as proprietary and subject to confidentiality provisions of the contract non-use of proprietary information even after termination of agreement, termination of agreement, arbitration clauses, and lawsuit provisions in a small contract sample. Loughran and McDonald used word count of negative words, positive words, uncertainty words, litigious words, strong modal words, and weak modal words in a large number of SEC filings.

[14]Contracts submitting to arbitration have more details because there will be less deposition opportunities. Public contracts may have more arbitration clauses to minimize the risks of (unfavorable) court decisions. Public agents may also prefer arbitration because it is faster and more confidential than courts, so they are

tification clauses regulates the contractor. Evaluation clauses introduce duties regarding delivery. Litigation clauses appear in triggers to a lawsuit. Termination clauses signal ways to resolve intractable contract disruption. Contingency clauses make provisions for future possible, but uncertain events and circumstances. Finally, design clauses impose product or service features. Table 1 presents keywords clustered in eight rigidity categories[15] and the total number of counted keywords for each of them. We created as many variables as rigidity dimensions.

Table 1: Keywords searched and grouped into contract rigidity categories.

Arbitration	appeal, arbitration, conciliation, guarantee, intervention, mediation, settlement, warranty, whereas[16]	10,241
Certification	certification, permit, regulation	3,263
Evaluation	accountability, control, covenant, obligation, quality, specification, scrutiny	8,090
Litigation	court, dispute, indictment, jury, lawsuit, litigation, pleading, prosecution, trial	2,479
Penalties	damage, fine, indemnification, penalty, sanction	5,431
Termination	breach, cancel, dissolution, separation, termination, unilateral	580
Contingencies	contingent, if, provided that, providing that, subject to, whenever, whether	4,488
Design	anticipation, event, scenario, plan	109
Total		34,681

In the present study, we used the normalized frequencies of word categories (i.e., z-values) to measure the degree of difference between contracts. For instance, we transformed the word count result of *Arbitration* by calculating:

$$zArbitration = \frac{Arbitration - \mu}{\sigma} \tag{3}$$

where μ is the mean and σ is the standard deviation of the count of *Arbitration* words across all contracts. This gives us a global rigidity measure, *zRigidity*:

$$\begin{aligned} zRigidity = zArbitration + zCertification + zEvaluation + zLitigation \\ + zPenalties + zTermination + zContingencies + zDesign \end{aligned} \tag{4}$$

As an alternative measure of global rigidity, we also take the contracts' size into account,

less exposed to third parties.

[15] We machine-read "stemmed" words, i.e., plurals (e.g., penalties) and variations (e.g., penalized) are also included.

[16] See Schwartz and Watson [2012] for an explanation of the appropriateness of "whereas" as an arbitration keyword.

i.e., the total number of words in the contracts. We make a double transformation by dividing the word count by the total number of words, then by using the normalized frequencies of word categories (i.e., y-values). Thus, we transformed the word count result of *Arbitration* in the following way:

$$xArbitration = \frac{Arbitration}{\ln(\text{total number of words})} \qquad yArbitration = \frac{xArbitration - \mu}{\sigma} \tag{5}$$

where μ is the mean and σ is the standard deviation of the count of *xArbitration* words across all contracts. This gives us an alternative global rigidity measure, *yRigidity*:

$$\begin{aligned} yRigidity = yArbitration + yCertification + yEvaluation + yLitigation \\ + yPenalties + yTermination + yContingencies + yDesign \end{aligned} \tag{6}$$

Our algorithmic data reading procedure is a rudimentary form of textual analysis. According to contract law scholars and practitioners, however, it is highly unlikely that these words would be used in a context expressing the opposite of our classification category.[17] Therefore, we are confident that our algorithm proxies and estimates the frequency of relevant contractual clauses in each contract.

(b) Contract Renegotiations

To capture the frequency of formal renegotiations, we created the variable *Average_Amendments*$_{i,t}$ which corresponds to the number of amendments of contract i divided by its duration. Thus, this variable is the average number of formal renegotiations per year of contract i, which seems to better suit our purpose than the plain count of amendments per contract: renegotiating four times a two-year contract is not the same as a twenty-year contract. To avoid biasing our observations in favor of past and expired contracts, we divided the number of amendments by the contract's duration elapsed by 2009 for contracts that go beyond this year.

Our textual analysis procedure does not allow to identify which type of amendment we have at hand (e.g., changes in price, capacity, or quality features). We only identify the number of amendments per contract, controlling for the characteristics of the contract (public or private procurer, type of contract, and municipal characteristics).

The links between contract rigidity and renegotiations are not obvious. On the one hand, increasing *ex ante* contract rigidity is intended to decrease the necessity to renegotiate *ex post* and avoid potential opportunistic renegotiations. On the other hand, the mere observation of *ex post* formalized amendments does not mean that the original contracts are less rigid.

[17] For instance, the word "arbitrator" is most likely to be embedded in an arbitration clause. Similarly, if the word "termination" appears, it is unlikely that it would be to derogate a termination clause (e.g., as in "we are not going to terminate this contract").

E.g., public contracts may contain clauses that lower *ex post* renegotiation costs and facilitate *ex post* compensation in otherwise difficult to measure cases. In other words, some clauses aiming to facilitate *ex post* renegotiation and amendments are negotiated and written *ex ante* to serve a purpose. This is a possible source of endogeneity: more clauses in initial contracts may lead to less or more frequent renegotiations. What we measure, though, is the frequency in which renegotiations are concretized in formal amendments.

3.3.2 Public versus Private Contracts

We created a dummy variable *Public* that equals 1 when the contract is signed between the operator and a municipality, and 0 when the contract is signed with a private contractee (e.g., a corporation or shopping center). Compared to previous studies, it is a strong guarantee that our identification of public- versus private-sector contracts is unambiguous.[18]

3.3.3 Political Contestability

In order to study the influence of the political environment in public contracts, we define a set of different proxies that capture the level of political contestability at the city level. The first variable we define, $HHI_{m,t}$, is the Herfindahl-Hirschman index of the first round of elections preceding the date of signature:

$$HHI_{m,t} = \sum_{i=0}^{n} {P_{i,m,t}}^2 \tag{7}$$

where $P_{i,m,t}$ is the share of vote of each party i in municipality m at time t during the first round of municipal elections. According to our Proposition 2, we expect that a politically concentrated municipality will lead to less rigid contracts. Nevertheless, this Herfindahl-Hirschman index does not take into account the fact that the party with the highest share of votes at the first round is not necessarily the winner of the election.

As a consequence, we define a second variable to better capture the opposition force to the final winning party. We exclude the winning party $WP_{m,t}$ and look at the concentration of all non-winning parties $NWP_{j,m,t}$, where j stands for all the non-winning parties during the first round of elections. Thus, the variable $Residual\_HHI_{m,t}$ in municipality m at time t measures the strength of political opposition. We expect here that the stronger the political

[18] Moszoro et al. [forthcoming] studied contracts in regulated versus non-regulated industries, both in the private domain. Thus, their measure of "publicness" is blurred. They also compared across products and services, which introduces biases to their estimates.

opposition, the more rigid the contract.

$$Residual\_HHI_{m,t} = \frac{\sum_{j=0}^{n} NWP_{j,m,t}{}^2}{(1 - WP_{m,t})^2} \tag{8}$$

Another usual way to measure political contestability is the margin of victory of the winning party. We thus take into account the margin of victory $Win\_Margin_{m,t}$ between the winning party ($WP_{m,t}$) and the runner-up party ($RUP_{m,t}$) expressed as a percentage of the total number of votes.

$$Win\_Margin_{m,t} = \frac{WP_{m,t} - RUP_{m,t}}{\sum_{i=0}^{n} P_{i,m,t}} \tag{9}$$

We also introduce a square term of the variable $Win\_Margin^2_{m,t}$ to identify a possible non-linear effect, e.g., the winning party may be concerned if margins are narrow or support is large, but less for intermediate states.

Lastly, as political competition generally becomes fiercer when elections get closer, we expect the political contestability to be related with the distance to the next election. We define $Distance_{m,t}$, as the time between the date of signature of the contract and the date of the future election. This variable simultaneously captures the closeness of the next elections and the mayor's tenure in office in the political cycle. Again, we introduce a square term $Distance^2_{m,t}$ since a non-linear effect could legitimately be expected. The intuition is that we may find more rigid contracts closer to upcoming election years and less rigid contracts when elections are more distant in time.

These set of variables are complementary. Political scientists ofter refer to political competition and its implication in general terms. The rationale for using several measures is to measure the qualitatively graspable, but quantifiably tricky notion of political contestability.

3.3.4 Control Variables

Aside from the nature of the contract (public versus private) and the level of political contestability, other factors can be mobilized to explain contractual rigidity. Thus, we include a set of control variables. First, we take into account the three different contract types described in section 3.1 through dummy variables: $Concession_{i,t}$, $Operating_{i,t}$, and $Provision\_of\_Services_{i,t}$. In the estimations, concession and provision of services contracts are compared to operating contracts. Because these contractual arrangements correspond to different levels of investment and complexity, we should observe that concession contracts are more rigid and provision of services less rigid, both compared to operating contracts.

Second, contractual requirements can also vary among the same contract types. We take

into account characteristics of services through the number of parking places ($Places_{i,t}$) and the type of service ($On\text{-}street_{i,t}$, $Underground_{i,t}$, or $Both\_Services_{i,t}$) managed by the contract. Service characteristics are not related to the type of contracts described above, thus these variables add to the strength of our analysis.

Third, we introduce variables controlling for the size of the city concerned with the contract (measured through the logarithm of the number of inhabitants, $Inhabitants_{i,t}$) and the political color of the mayor ($Left\_Wing_{i,t}$ versus $Right\_Wing_{i,t}$).

Fourth, the observed level of heterogeneity could also come from the fact that contractors had a different level of common history. To control for path dependency, we introduce the variables $Renewed_{i,t}$, which is a dummy equals to 1 if the contract is a renewed one, and $Experience_{i,t}$ and $Past\_Contracts_{i,t}$, which stand for the number of years the two contractors know each other (i.e., the difference between the date of signature and the date of signature of their very first common contract) and the number of contracts they had already signed together in the past, respectively.

Fifth, since the estimation results may be driven by unobserved characteristics of the sector which may had evolved over such a long period (24 years), we control for potential biases by introducing the variable $Trend_{i,t}$, which corresponds to the year of signature of the contract. Finally, we also cluster our estimations at departmental level (58 jurisdictions).

Descriptive statistics of the variables used in the empirical tests are provided in table 4.

3.3.5 Identification Strategy

Our goal is to explore how public and private contracts differ concerning their level of rigidity. To do so, we estimate the following model:

$$Rigidity_{i,t} = \alpha + \beta Public_{i,t} + \sum_j \beta_j X_{i,t,j} + \epsilon_{i,t} \tag{10}$$

where $Rigidity_{i,t}$ refers to our two measures of the rigidity level of contract i at date of contract signature t, $Public_{i,t}$ is the dummy variable indicating whether it is a public contract, X is a vector of control variables, and $\epsilon_{i,t}$ is the error term (we assume that $\epsilon_{i,t} \rightsquigarrow (0, \Sigma)$).

Then, we introduce our political variables to explore the impact of political contestability on the contractual rigidity. Hence, we estimate the following model:

$$Rigidity_{i,t} = \alpha + \sum_j \beta_j X_{i,t,j} + \sum_k \beta_k Y_{i,t,k} + \epsilon_{i,t} \tag{11}$$

where $Rigidity_{i,t}$ are our two measures of the rigidity level of contract i signed at date t and Y is a vector of variables measuring political contestability.

Finally, we analyze the following model on the average number of amendments:

$$Average\_Amendments_{i,t} = \alpha + \beta Public_{i,t} + \sum_j \beta_j X_{i,t,j} + \epsilon_{i,t} \tag{12}$$

where $Average\_Amendments_{i,t}$ is the number of amendments divided by the duration of the contract i and $Public_{i,t}$ is the dummy variable indicating whether contract i signed at date t is a public contract.

4 Results

4.1 Public versus Private Contract Rigidity

4.1.1 Total Rigidity

We first estimate the contract rigidity of public versus private contracts. Results are given in table 5. Model 1, which provides the simplest estimation, supports our first proposition. Indeed, the coefficient associated with our variable *Public* is positive and significant, meaning that public contracts are more rigid than private contracts. For the car park sector, our data show that public contracts are, on average, of longer duration than private contracts (see table 2). Thus, if public and private contracts differ in their duration, so may investments; hence, contract duration can explain the more frequent use of words trying to define the transaction and the way to govern it, which leads to more rigid contracts. Consequently, contracts' publicness would not be the driver of rigidity.

Table 2: This table presents the count and frequency of public and private car parks contracts in our sample tabulated by duration in years.

	Public Contracts			Private Contracts		
Duration	N	%	Cumul. %	N	%	Cumul. %
0–2	67	19,2	*19,2*	16	34,0	*34,0*
2–4	50	14,3	*33,5*	12	25,5	*59,6*
4–10	66	18,9	*52,4*	16	34,0	*93,6*
10–20	44	12,6	*65,0*	2	4,3	*97,9*
20–30	67	19,2	*84,2*	1	2,1	*100,0*
30–65	55	15,8	*100,0*	0	0,0	*100,0*
Total	349	100,0		47	100,0	

To address this concern, in model 2 we include contract duration as a regressor. Although the variable *Duration* is positively correlated with the level of contract rigidity, the impact of contracts' publicness still remains. In model 3, we introduce another set of control variables

related to services managed through the contract and the common history of contractors. While the introduction of further control variables induces a slight decrease in significance, we observe that contracts' publicness still remains a driver of higher rigidity.

As an additional robustness check, we also excluded concession contracts from our data. Since we counted only two private concession contracts (2% of the concession contracts sample), our results may be driven by the over-representation of public concession contracts. Thus, focusing on operating and provision of services contracts allows for a fairer comparison among different levels of contract rigidity. Results provided in models 4–6 (which replicate models 1–3 excluding concession contracts) are similar.

Finally, models 7–12 in table 5 present the same regressions as in models 1–6, but using our alternative measure of contract rigidity. All results are similar.

Control variables provide interesting insights. Provision of services contracts are much less rigid than operating contracts. In contrast, we do not find significant differences between operating and concession contracts. We also find that contracts managing off-street car parks (*Underground*) and both on-street and off-street car parks (*Both_Services*) are more rigid than contracts for on-street car parks only.

Finally, our variable $Trend$ indicates that contracts tend to become more rigid over time. This may be an indication of a learning process and/or "red tape" inertia by public administrations, where subsequent arrangements replicate the rigidities of previous contracts and add new ones.

4.1.2 Rigidity by Categories

Results provided in table 6 focus on the different categories of contractual rigidity we defined previously. As indicated by our results, publicness of contracts is correlated with three over eight categories we defined. More precisely, public contracts are more rigid than private contracts in the following dimensions: Arbitrage, Penalties, and Litigation. These results are consistent with what we observe from descriptive statistics in Figure 1 and in table 3. Indeed, Welsh' unequal variances t-test indicates that public and private contracts significantly differs in those three categories.

At the rigidity by categories level, control variables also provide interesting insights. The duration of the contract is also correlated with two of the eight categories, notably Termination. It suggest that contracts tend to incorporate more precisions about terms and condition for termination when partners commit in the long run.

Consistently with the results concerning the total level of rigidity, results on rigidity categories suggest that contracts are less rigid for simpler contracts (*Provision_of_Services*) and more rigid over time (*Trend*).

4.2 Public Contract Rigidity and Political Contestability

We now turn to investigate how political contestability affects the rigidity of public contracts. We adopt a three-step approach. First, we run estimations in the sub-sample of public contracts in order to explore the impact of the set of political contestability measures defined in section 3.3.3. We start from the fully specified model of table 5 (model 3) and then consecutively test our proxies of political contestability on contract rigidity. We also introduce two additional control variables: the participation rate in the municipal elections preceding the date of contract signature (*Election_Participation*) and the number of cases of corruption implicating the mayor or a member of the municipal council in the three years preceding the date of contract signature (*Corruption*). The first variable allows us to account for the sensitivity of the population to the municipal political life. The second variable, obtained from Transparency International France, allows us to take into consideration the possible influence of a corrupted environment on public contracts.

Table 7 provides the results. All our models specifications suggest that political contestability affects public contract rigidity. According to Proposition 2, the more concentrated the political power in the municipality is, the less rigid the contract signed by the winning party will be, as illustrated by the positive and significant impact of our variable HHI in model 1. Nevertheless, as previously stated, the Herfindahl-Hirschman index is limited in the sense that it fails to take into account the strength of the political opposition to the winning party. For this reason, we included an alternative measure of political contestability in model 2 where we look at the concentration of all non-winning lists. The positive and significant correlation between our variable *Residual_HHI* and *zRigidity* indicates that contracts are more rigid when the political opposition is stronger.

Similarly, we find a significant relationship between the rigidity of public contracts and the margin of victory in electoral races (model 3). Our variables *Win_Margin* and Win_Margin^2 indicate that contracts are more flexible when political contestability is weak and become more rigid when political contestability is high. Coefficients associated with the variables *Distance* and $Distance^2$ indicate that public contracts tend to be more rigid closer to election time. Thus, models 1–4 lead to results consistent with Proposition 2. Results are almost identical when we use our alternative measure of total rigidity which takes contract size into account contract length (*yRigidity*, models 5–8).

In the second step, we run exactly the same set of estimations on the sub-sample of private contracts only. As we argue that political permeability of contracts is related to its publicness, expected results of this "placebo test" should be absolutely no impacts of political variables on the level of private contracts' rigidity. This is precisely what we observe in table 8: whatever the political contestability variable we use, there is no effect on private contract rigidity—for both rigidity measures, i.e., *zRigidity* (models 1–4) and *yRigidity* (models 5–8).

Lastly, in the third step we use the whole dataset (public and private contracts) and include interacting terms between our political contestability variables and private contracts (*Private*) to see if there is a differentiated effect. Results provided in table 9 confirm the existence of a political effects on public contracts, but no effect on private contracts. Indeed, because we are capturing the effect of considering a private contract (variable *Private*) and the interaction between our political contestability variables and signing a private contract, our political contestability variables are now measuring the impact of political contestability on public contracts. When we use our alternative measure of contract rigidity (*yRigidity*), we note, however, a lost of significance for the variables HHI and *Distance*.

There are many indicators of political contestability and the choice of one indicator over another is not trivial. Nevertheless, our measures—which correspond to the most frequently used in the political economy literature[19]—supports the hypothesis the political environment on various dimensions has an impact on public car park contracts' rigidity in France. Moreover, what appears to be two most relevant ones, i.e. $Residual\_HHI$ and Win_Margin are strongly significant and stable across estimations.

As a robustness check, we rerun our estimations with clustered standard errors at the city level. The large majority of our results remain unchanged. The only difference regards *Distance*, which looses statistical significance at commonly accepted levels when clustered at the city level.[20]

4.3 Renegotiations of Public Contracts

Our set of results makes us confident about the specific nature of public contracts that leads them to a higher level of rigidity than private contracts. Due to third-party opportunism that pushes for rigid contracts at their initial stage, the same political hazards should also make public contracts more prone to formal renegotiations: since relational contracting is not an option in public contracts, each renegotiation should redound to a formal amendment. We put our Proposition 3 to the test and show results in table 10. The first model presents our basic specification. Model 2 includes election participation and corruption variables. Model 3 excludes concession contracts for the reasons already discussed above. In all specifications, the positive and significant coefficient associated with the variable *Public* indicates that public contracts are more often formally renegotiated in amendments than private contracts.

As previously stated, there is potential endogeneity between contract rigidity and renegotiations (see Section 3.3.1). A higher level of contract rigidity should be a means to decrease the necessity to renegotiate *ex post*, but can also serve to lower *ex post* renegotiation costs and facilitate *ex post* compensation in otherwise difficult to measure cases. In order to tackle this

[19] See, e.g., Le Maux et al. [2011] for the use of Herfindal-Hirschman Index and Solé-Ollé [2006] for the use of winning margins as measures of political fragmentation and competition, respectively.

[20] These tables are available from the Authors upon request.

issue, models 4 and 5 provides two stage least squares estimations of contractual renegotiations with the variable $zRigidity$ instrumented by the variables Win_Margin and contract types (previously identified as the most significant explanatory variables of contractual rigidity).[21] Results suggest that, with (model 4) or without (model 5) concession contracts, the impact of contract publicness remains positive and significant while contract rigidity is negatively and significantly related to the average number of amendments. It seems to suggest that investing more *ex ante* to increase contractual rigidity could be a way to diminish the number of *ex post* renegotiations.

Interestingly, table 10 also suggests that contracts are less renegotiated when they correspond to renewed contracts (*Renewed*) and when they involve parties which have already contracted in the past ($Past\_Contracts$). Such findings indicates that even if public contracts cannot rely on purely relational mechanisms, past experiences is not of no impact on contract execution. Proposition 3 does not state that public contracts are unconditionally renegotiated more often than private contracts (which we do not observe); it states more humbly that, conditional on a renegotiation taken place, public contracts' renegotiations are formalized more frequently in written amendments than private contracts' renegotiations (which we do observe and capture in our variable). As with rigidity clauses, public agents devise written amendments to signal probity and lower the likelihood of *ex post* challenges by opportunistic third parties.

Overall, results corroborate our Proposition 3. A possible explanation is that public renegotiations must be translated into formal amendments, in contrast to private contracts which can rely on informal procedures.

5 A Note on Corruption

The sizable financial flows involved makes public procurement particularly susceptible to fraud and corruption. For corruption to be an equilibrium, it requires the durable cooperation between briber and bribee. In our setup, corruption would be more likely in less politically contestable jurisdictions. Lower political contestability could presumably lead to higher corruption, and higher corruption could be associated with lower contractual rigidity.

Nevertheless, as reported in tables 8–10, corruption is not correlated with neither contract rigidity nor renegotiation frequency. Obviously, this measure is conditional on corruption cases being detected and prosecuted, which does not necessarily reflect endemic corruption.[22] Notwithstanding the limitations of this measure, our unique empirical setup renders corruption of lesser concern in explaining contract rigidity for several reasons. First, third-party

[21] We also run regressions using other measures of political contestability as instruments and results are analogous.

[22] For this reason, Transparency International normally reports the Corruption *Perception* Index.

opportunism refers to signaling probity *ex ante* in corruptive environments. In the absence of corruption, contractual rigidity becomes obsolete. Thus, corruption could be also associated with more rigidity.[23]

Second, we analyze actual signed contracts, not bid specifications. While over-detailed bid specifications could point to a particular contractor and preclude competition [Lambert-Mogiliansky and Kosenok, 2009], there is no use for a corrupted public agent to restrict the favored bidder at the contracting stage. Thus, corruption (if any) would bias our estimates towards less rigidity in public contracting.

Third, our dataset contains contracts between a single contractor and public administrations and private companies. This contractor is the largest car park company in France: Unless the whole sector is effectively monopolized by this operator, the overall reputational spillovers of corruption charges can easily be assumed to overweight the plausible gains from local unlawful practices.

Fourth, we are confident of the limited ability of corporations to buy favors through donations to political candidates or parties. According to French law, no legal entity is allowed to participate in financing a political candidate, party, or group unless the legal entity is a political party or a political group. Financing is not allowed in any form whether direct (e.g., by donating money or properties) or indirect (e.g., by rendering services, providing products below regular market fees or prices), or granting favors or advantages to political candidates, parties, groups, their financial representatives, or associations. Parties are funded exclusively through the central budget.[24]

6 Conclusions

In this paper, we investigated the specific nature of public versus private contracts. We compared procurement contracts where the procurer was either a public (governmental) entity or a private corporation, and used algorithmic data reading and textual analysis on a dataset of car parks contracts to determine the level of contractual rigidity. We found that public contracts feature more rigidity clauses and that this rigidity rises in political contestability. We argue that a significant part of differences in contractual rigidity between purely private and public contracts is a political risk adaptation of public agents to curb plausible challenges from political contesters and interest groups.

A natural consequence of public contract rigidity is that such contracts are characterized by more frequent renegotiations and formal amendments. We found empirical evidences that public contracts are more frequently renegotiated in formal amendments than private

[23] Although not significant, the corruption index estimates are positively associated with contract rigidity (see table 7).

[24] See: Library of Congress, *Campaign Finance, France*, http://www.loc.gov/law/help/campaign-finance/france.php (accessed February 24, 2015).

contracts.

The depth of our research is limited in several ways. First, algorithmic textual analysis is still in its early stage and is not yet close to human interpretation, especially when it comes to legal nuances. The strong results we obtained even with imperfect methods, however, are indicative that our propositions are not spurious. We expect that the construction of better algorithms and "dictionaries" in the future will corroborate these findings. Second, corruption could be an important confounding factor. As discussed in section 5 and shown in tables 7 and 10, corruption does not play a major role in our setting and, if present, would weaken (not strengthen) our results. Third, there might be omitted factors that correlate with both the characteristics of the contractor and of the municipality that determine the probability of winning a procurement contract, and which, therefore, determines the probability of being in our sample. In our opinion, our one-contractor sample provides the ideal experiment to test public versus private contractual heterogeneity. Moreover, the reputation of the contractor[25] silences much of the potential sample conditionality. Fourth, private contract specifications may be embedded in ancillary documentation—e.g., scope of work or service level agreements—instead of master agreements. Should this be the case, the story of rigidity clauses as a signaling device of probity in the public sector would be reinforced; i.e., both public and private contracts are of the comparable rigidity nature, but public agents prefer to highlight those clauses in master agreements. Fifth, there are other factors which we are not able to control for and which could influence our results, foremost, different demand stochasticity (risk) in municipalities that could drive contract characteristics and pricing strategies that would correspond to demand risk. Unfortunately, we do not have data nor good variables to proxy demand stochasticity, neither car park prices at the municipal level across time. We assume that year and geographic fixed effects take care of part of this heterogeneity.

To our knowledge, this paper is the first to investigate the intrinsic properties of public contracts using data for the procurement of a standardized product with a clear-cut public/private procurer divide and measures of contract rigidity, frequency of amendment, and political contestability. It opens novel research avenues for exploration. One of these promising avenues involves investigating how the frequency of amendments in public contracts affects the quality of the contractual relationship and the willingness of the parties to continue and renew their relationship. What can be interpreted, at first glance, as a sign of weakness (i.e., frequent amendments) might well be good news indicating that the contracting parties can make the contract adaptable through time.

[25] The contractor is the largest car park provider in France.

Figure 1: This figure presents the mean score of word frequency obtained by public (black) and private (grey) contracts on each rigidity category.

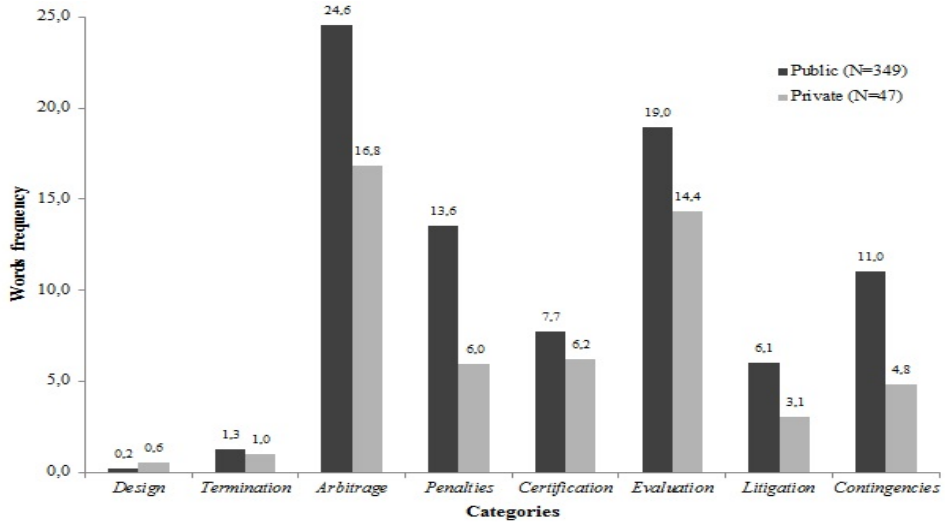

Table 3: This table presents summary statistics of rigidity categories in public and private contracts.

	Public Contracts					Private Contracts					T-test[a]
	N	μ	σ	min	max	N	μ	σ	min	max	
Design	349	0.19	0.49	0	3	47	0.55	1.84	0	9	1.352
Termination	349	1.28	1.54	0	8	47	1.02	1.22	0	5	-1.187
Arbitrage	349	24.56	14.25	0	98	47	16.83	26.86	2	137	-1.634
Penalties	349	13.57	8.56	0	68	47	5.96	6.02	0	27	-6.991
Certification	349	7.72	6.47	0	36	47	6.21	8.09	0	40	-0.573
Evaluation	349	18.96	11.10	0	76	47	14.36	21.30	0	110	-1.082
Litigation	349	6.05	3.65	0	22	47	3.09	2.95	0	13	-5.917
Contingencies	349	10.96	6.84	0	39	47	4.83	5.28	0	25	-7.841

[a] As public and private contracts' samples have unequal variances and unequal sizes, we report here the "Welch's unequal variances t-test".

Table 4: This table present descriptive statistics of our contract and political variables and controls, broken down by type of contract.

	All sample					Operating Contracts					Provision of Services Contracts					Concession Contracts				
	N	μ	σ	min	max	N	μ	σ	min	max	N	μ	σ	min	max	N	μ	σ	min	max
Public	396	0.88	0.32	0.00	1.00	160	0.82	0.39	0.00	1.00	146	0.88	0.32	0.00	1.00	90	0.99	0.11	0.00	1.00
zRigidity	396	2.21	16.31	-27.64	80.22	160	6.45	18.11	-23.51	80.22	146	-3.70	14.33	-27.64	42.91	90	4.24	12.89	-27.35	41.51
zDesign	396	0.04	1.52	-0.50	13.55	160	0.34	2.05	-0.50	13.55	146	-0.19	0.89	-0.50	5.37	90	-0.11	1.11	-0.50	4.83
zTermination	396	0.08	3.43	-2.40	24.02	160	0.65	3.59	-2.40	14.46	146	-0.63	2.91	-2.40	13.50	90	0.20	3.74	-2.40	24.02
zArbitrage	396	0.50	3.61	-4.77	21.13	160	0.90	4.14	-4.43	21.13	146	0.05	3.47	-4.77	17.26	90	0.52	2.63	-4.48	10.80
zPenalties	396	0.43	3.61	-4.75	20.60	160	1.33	3.70	-4.75	20.60	146	-1.53	2.70	-4.75	8.39	90	2.03	3.35	-4.75	8.14
zCertification	396	0.34	3.21	-3.00	18.25	160	0.73	3.42	-3.00	15.79	146	-0.23	3.41	-3.00	18.25	90	0.56	2.23	-3.00	6.10
zEvaluation	396	0.50	4.24	-5.61	24.11	160	1.40	4.62	-5.39	24.11	146	-0.04	4.09	-5.61	22.34	90	-0.21	3.45	-5.61	11.90
zLitigation	396	0.28	3.55	-4.63	19.36	160	0.86	3.43	-4.63	11.89	146	-0.68	3.71	-4.63	19.36	90	0.82	3.20	-4.63	17.03
zContingencies	396	0.04	2.76	-2.45	17.64	160	0.21	3.39	-2.45	17.64	146	-0.58	2.00	-2.45	10.55	90	0.72	2.40	-2.45	10.41
yTotRigid	396	2.22	17.18	-27.24	87.73	160	6.54	19.29	-23.35	87.73	146	-3.93	14.96	-27.24	47.10	90	4.52	13.41	-27.08	43.36
Renewed	396	0.16	0.37	0.00	1.00	160	0.12	0.32	0.00	1.00	146	0.28	0.45	0.00	1.00	90	0.03	0.18	0.00	1.00
Inhabitants	396	10.83	1.59	8.09	14.08	160	10.80	1.40	8.25	14.08	146	10.16	1.26	8.09	14.00	90	11.96	1.74	9.12	14.08
Left_Wing	396	0.15	0.35	0.00	1.00	160	0.16	0.37	0.00	1.00	146	0.04	0.20	0.00	1.00	90	0.29	0.46	0.00	1.00
Right_Wing	396	0.28	0.45	0.00	1.00	160	0.33	0.47	0.00	1.00	146	0.36	0.48	0.00	1.00	90	0.09	0.29	0.00	1.00
Trend	396	2 000	7.41	1 985	2 009	160	2 000	7.36	1 985	2 009	146	2 005	3.20	1 986	2 009	90	1 994	6.73	1 985	2 009
Duration	396	15.00	15.12	1.00	65.00	160	16.61	14.67	1.00	65.00	146	3.59	4.81	1.00	40.00	90	30.67	11.25	2.00	65.00
Places	393	1 694	12 297	9.00	241 600	160	1 331	2 763	83.00	23 481	143	2 636	20 174	9.00	241 600	90	844	790	30.00	4 330
Experience	396	9.85	12.33	0.00	46.00	160	8.06	11.70	0.00	42.00	146	8.62	11.02	0.00	43.00	90	15.03	14.02	0.00	46.00
Past_Contracts	396	5.46	13.07	0.00	68.00	160	3.33	10.55	0.00	65.00	146	2.47	7.02	0.00	68.00	90	14.12	19.51	0.00	62.00
Average_Amendments	396	0.19	0.33	0.00	2.00	160	0.18	0.29	0.00	1.71	146	0.24	0.41	0.00	2.00	90	0.12	0.20	0.00	1.40
Election_Participation	329	0.59	0.08	0.35	0.90	136	0.59	0.09	0.44	0.90	139	0.56	0.06	0.35	0.78	54	0.63	0.08	0.47	0.80
Corruption	347	0,24	0,79	0,00	5,00	151	0,18	0,64	0,00	5,00	141	0,08	0,28	0,00	1,00	55	0,57	1,26	0,00	5,00
HHI	347	0,39	0,12	0,20	1,00	151	0,38	0,11	0,20	0,67	141	0,39	0,14	0,20	1,00	55	0,40	0,09	0,20	0,62
Residual_HHI	347	0,42	0,25	0,00	1,00	151	0,43	0,23	0,03	1,00	141	0,37	0,26	0,00	1,00	55	0,53	0,24	0,09	1,00
Win_Margin	347	20,82	16,30	0,15	100,00	151	20,11	14,65	0,31	63,43	141	22,29	19,14	0,15	100,00	55	18,90	11,93	0,31	49,80
Distance	347	2,60	2,61	0,00	6,00	151	2,68	1,84	0,00	6,00	141	2,54	1,87	0,00	6,00	55	2,56	1,37	0,00	5,00

Table 5: This table presents results from panel OLS regressions of two measures of global rigidity (*zRigidity* and *yRigidity*) on contract characteristics and controls described in table 4. Clustered standard errors (at the department level) are in parentheses. Levels of significance: * 10%, ** 5%, and *** 1%.

Dependent variable	Model 1	Model 2	Model 3	Model 4	Model 5	Model 6	Model 7	Model 8	Model 9	Model 10	Model 11	Model 12
			zRigidity						***yRigidity***			
Public	10.878***	9.581**	9.366*	11.610***	10.245**	9.383*	11.723**	10.362**	10.193*	12.424**	11.013**	10.152*
	(4.049)	(4.056)	(5.271)	(4.339)	(4.174)	(5.340)	(4.444)	(4.424)	(5.718)	(4.768)	(4.563)	(5.791)
Renewed	-2.946	-2.819	-2.727	-3.079	-2.892	-2.731	-3.217	-3.084	-2.921	-3.184	-2.991	-2.782
	(2.127)	(2.138)	(2.021)	(2.421)	(2.387)	(2.194)	(2.284)	(2.298)	(2.129)	(2.556)	(2.519)	(2.295)
Provision_of_Services	-13.391***	-11.997***	-10.490***	-13.312***	-11.907***	-10.351**	-13.944***	-12.481***	-10.802***	-13.885***	-12.432***	-10.714**
	(2.960)	(3.150)	(3.578)	(3.374)	(3.613)	(4.105)	(3.185)	(3.388)	(3.821)	(3.626)	(3.882)	(4.391)
Concession	-0.917	-2.241	-1.179	-	-	-	-0.672	-2.060	-0.962	-	-	-
	(1.999)	(1.981)	(1.760)	-	-	-	(2.180)	(2.177)	(1.934)	-	-	-
Inhabitants	0.158	0.164	0.319	0.697	0.704	0.579	0.127	0.133	0.280	0.648	0.655	0.497
	(0.664)	(0.656)	(1.297)	(0.954)	(0.949)	(1.444)	(0.697)	(0.692)	(1.376)	(1.022)	(1.017)	(1.558)
Left_Wing	-0.235	-1.172	0.089	1.038	-0.230	0.841	-0.301	-1.284	0.018	1.015	-0.296	0.938
	(1.934)	(1.858)	(1.883)	(3.218)	(2.926)	(2.829)	(1.976)	(1.914)	(1.907)	(3.385)	(3.102)	(2.965)
Right_Wing	2.293	2.117	0.789	2.574	2.484	1.201	2.133	1.949	0.583	2.545	2.451	1.120
	(2.007)	(1.981)	(2.118)	(2.162)	(2.141)	(2.284)	(2.113)	(2.084)	(2.243)	(2.246)	(2.222)	(2.385)
Trend	0.523***	0.684***	0.685***	0.590**	0.765***	0.744***	0.558***	0.727***	0.728***	0.623**	0.804***	0.786***
	(0.159)	(0.163)	(0.165)	(0.243)	(0.251)	(0.256)	(0.172)	(0.174)	(0.177)	(0.263)	(0.270)	(0.274)
Duration	-	0.181**	0.180**	-	0.193**	0.200**	-	0.190**	0.188**	-	0.199**	0.206**
	-	(0.086)	(0.081)	-	(0.094)	(0.093)	-	(0.089)	(0.084)	-	(0.099)	(0.096)
Places	-	-	0.001***	-	-	0.001***	-	-	0.001***	-	-	0.001***
	-	-	(0.000)	-	-	(0.000)	-	-	(0.000)	-	-	(0.000)
$Places^2$	-	-	-0.000***	-	-	-0.000***	-	-	-0.000***	-	-	-0.000***
	-	-	(0.000)	-	-	(0.000)	-	-	(0.000)	-	-	(0.000)
Underground	-	-	3.050	-	-	2.827	-	-	3.537	-	-	3.309
	-	-	(2.038)	-	-	(2.138)	-	-	(2.119)	-	-	(2.237)
Both_Services	-	-	5.238*	-	-	5.300*	-	-	6.036*	-	-	6.111*
	-	-	(2.863)	-	-	(3.143)	-	-	(3.030)	-	-	(3.328)
Experience	-	-	0.065	-	-	0.072	-	-	0.052	-	-	0.062
	-	-	(0.137)	-	-	(0.155)	-	-	(0.143)	-	-	(0.162)
Past_Contracts	-	-	-0.135	-	-	-0.141	-	-	-0.125	-	-	-0.132
	-	-	(0.092)	-	-	(0.100)	-	-	(0.096)	-	-	(0.106)
N	396	396	393	306	306	303	396	396	393	306	306	303
r^2	0.160	0.170	0.224	0.174	0.184	0.242	0.159	0.169	0.226	0.171	0.180	0.242

Table 6: This table presents results from panel OLS regressions of rigidity by categories (z and y categories) on contract characteristics and controls described in table 4. Clustered standard errors (at the department level) are in parentheses. Levels of significance: * 10%, ** 5%, and *** 1%.

Dependent variables	***zDesign***	***zTermination***	***zArbitration***	***zPenalties***	***zCertification***	***zEvaluation***	***zLitigation***	***zContigencies***
Public	-0.851	0.429	2.096*	2.859***	0.140	1.781	2.236***	0.758
	(0.679)	(0.845)	(1.102)	(0.732)	(0.808)	(1.419)	(0.681)	(0.542)
Renewed	-0.187	-0.535	-0.318	-0.406	0.499	-0.456	-0.849	-0.413
	(0.172)	(0.460)	(0.422)	(0.373)	(0.530)	(0.491)	(0.543)	(0.248)
Provision_of_Services	-0.882**	-1.311**	-1.347**	-2.335***	-1.235	-2.096**	-0.943*	-0.231
	(0.374)	(0.516)	(0.655)	(0.404)	(0.828)	(0.813)	(0.541)	(0.366)
Concession	0.031	-0.434	-0.075	-0.115	0.403	-0.686	-0.628	0.363
	(0.221)	(0.598)	(0.362)	(0.533)	(0.439)	(0.532)	(0.543)	(0.462)
Inhabitants	-0.136	0.074	-0.010	-0.079	0.101	0.246	0.146	0.045
	(0.133)	(0.183)	(0.266)	(0.159)	(0.232)	(0.485)	(0.249)	(0.152)
Left_Wing	-0.086	-0.387	-0.008	1.056**	-0.347	-0.392	-0.207	0.436
	(0.255)	(0.843)	(0.375)	(0.483)	(0.363)	(0.695)	(0.512)	(0.527)
Right_Wing	0.029	0.448	0.206	0.096	0.669*	-0.115	-0.097	-0.442
	(0.277)	(0.552)	(0.483)	(0.418)	(0.395)	(0.721)	(0.463)	(0.343)
Trend	0.041*	0.090*	0.133***	0.050	0.104***	0.204***	0.048	0.003
	(0.024)	(0.053)	(0.033)	(0.037)	(0.032)	(0.045)	(0.050)	(0.030)
Places	-0.000	0.000	0.000	0.000*	0.000	0.000***	0.000***	0.001***
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
$Places^2$	0.000	-0.000	0.000	-0.000	-0.000	-0.000***	-0.000**	-0.000***
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
Underground	-0.355**	-0.537	1.135**	0.602	-0.074	0.641	0.964**	0.713**
	(0.162)	(0.346)	(0.460)	(0.425)	(0.473)	(0.452)	(0.452)	(0.311)
Both_Services	-0.301	-0.302	1.175*	1.086*	0.237	0.898	1.181*	1.230**
	(0.206)	(0.607)	(0.657)	(0.543)	(0.609)	(0.761)	(0.595)	(0.467)
Experience	0.015*	0.037	-0.003	-0.002	0.003	0.005	0.022	-0.011
	(0.009)	(0.024)	(0.029)	(0.030)	(0.018)	(0.038)	(0.026)	(0.016)
Past_Contracts	-0.006	-0.028	-0.002	0.002	-0.025	-0.050	-0.039*	0.016
	(0.007)	(0.017)	(0.018)	(0.019)	(0.019)	(0.033)	(0.022)	(0.019)
Duration	0.005	0.044*	0.004	0.043**	0.036	0.022	0.036	-0.003
	(0.008)	(0.024)	(0.017)	(0.021)	(0.022)	(0.031)	(0.026)	(0.021)
N	393	393	393	393	393	393	393	393
r^2	0.099	0.081	0.116	0.290	0.103	0.220	0.131	0.211

Dependent variables	***yDesign***	***yTermination***	***yArbitration***	***yPenalties***	***yCertification***	***yEvaluation***	***yLitigation***	***yContigencies***
Public	-0.827	0.503	2.224*	2.954***	0.199	1.980	2.360***	0.881
	(0.701)	(0.855)	(1.152)	(0.753)	(0.876)	(1.537)	(0.735)	(0.536)
Renewed	-0.186	-0.534	-0.343	-0.446	0.447	-0.472	-0.889	-0.435*
	(0.172)	(0.468)	(0.436)	(0.369)	(0.537)	(0.502)	(0.554)	(0.256)
Provision_of_Services	-0.898**	-1.338**	-1.415**	-2.359***	-1.298	-2.122**	-0.988*	-0.271
	(0.389)	(0.523)	(0.688)	(0.424)	(0.850)	(0.864)	(0.564)	(0.381)
Concession	0.031	-0.421	-0.085	-0.063	0.419	-0.646	-0.566	0.399
	(0.226)	(0.596)	(0.376)	(0.554)	(0.448)	(0.529)	(0.555)	(0.465)
Inhabitants	-0.140	0.073	0.009	-0.081	0.073	0.228	0.148	0.040
	(0.139)	(0.187)	(0.280)	(0.160)	(0.245)	(0.492)	(0.261)	(0.148)
Left_Wing	-0.075	-0.398	-0.039	1.024**	-0.349	-0.384	-0.249	0.450
	(0.261)	(0.842)	(0.374)	(0.483)	(0.356)	(0.697)	(0.515)	(0.516)
Right_Wing	0.043	0.418	0.197	0.045	0.640	-0.151	-0.148	-0.454
	(0.278)	(0.554)	(0.473)	(0.418)	(0.404)	(0.739)	(0.466)	(0.353)
Trend	0.042*	0.095*	0.139***	0.057	0.109***	0.209***	0.056	0.011
	(0.025)	(0.054)	(0.034)	(0.038)	(0.032)	(0.047)	(0.051)	(0.031)
Places	-0.000	0.000	0.000	0.000**	0.000	0.000***	0.000***	0.001***
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
$Places^2$	0.000	-0.000	0.000	-0.000**	-0.000	-0.000***	-0.000**	-0.000***
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
Underground	-0.300*	-0.505	1.191**	0.669	-0.023	0.777*	1.029**	0.736**
	(0.158)	(0.344)	(0.472)	(0.424)	(0.477)	(0.456)	(0.457)	(0.306)
Both_Services	-0.250	-0.286	1.323*	1.243**	0.298	1.053	1.315**	1.305***
	(0.208)	(0.609)	(0.679)	(0.569)	(0.622)	(0.777)	(0.609)	(0.473)
Experience	0.016*	0.036	-0.005	-0.003	0.001	0.001	0.021	-0.014
	(0.009)	(0.024)	(0.030)	(0.031)	(0.018)	(0.038)	(0.026)	(0.016)
Past_Contracts	-0.007	-0.026	-0.001	0.003	-0.022	-0.047	-0.039*	0.016
	(0.008)	(0.017)	(0.019)	(0.019)	(0.019)	(0.033)	(0.022)	(0.019)
Duration	0.005	0.046*	0.006	0.044**	0.037*	0.023	0.037	-0.003
	(0.008)	(0.024)	(0.018)	(0.020)	(0.022)	(0.031)	(0.027)	(0.020)
N	393	393	393	393	393	393	393	393
r^2	0.098	0.083	0.123	0.294	0.104	0.222	0.139	0.213

Table 7: This table presents results from panel OLS regressions of two measures of global rigidity (*zRigidity* and *yRigidity*) on contract characteristics, political contestability variables, and controls described in table 4 for **the subsample of public contracts**. Clustered standard errors (at the department level) are in parentheses. Levels of significance: * 10%, ** 5%, and *** 1%.

Dependent Variable	Model 1	Model 2	Model 3	Model 4	Model 5	Model 6	Model 7	Model 8
		zRigidity				***yRigidity***		
Renewed	-2.782	-3.336	-3.025	-3.050	-3.019	-3.676	-3.269	-3.334
	(2.683)	(2.878)	(2.766)	(2.822)	(2.830)	(3.024)	(2.911)	(2.949)
Provision_of_Services	-10.651***	-10.706***	-10.435***	-10.510***	-11.007***	-11.006***	-10.782***	-10.797***
	(2.965)	(3.023)	(3.021)	(3.001)	(3.103)	(3.147)	(3.159)	(3.123)
Concession	-1.243	-1.977	-1.751	-1.625	-1.125	-1.900	-1.632	-1.500
	(2.306)	(2.243)	(2.287)	(2.210)	(2.468)	(2.379)	(2.440)	(2.359)
Inhabitants	0.423	1.544	0.926	1.340	0.422	1.565	0.918	1.329
	(1.370)	(1.486)	(1.366)	(1.446)	(1.390)	(1.518)	(1.387)	(1.467)
Left_Wing	-0.630	-0.733	0.042	-0.494	-0.676	-0.824	0.010	-0.552
	(2.953)	(2.758)	(3.042)	(2.828)	(2.993)	(2.800)	(3.107)	(2.863)
Right_Wing	-0.006	1.003	-0.899	-0.027	-0.258	0.947	-1.163	-0.245
	(2.451)	(2.562)	(2.425)	(2.512)	(2.580)	(2.707)	(2.558)	(2.649)
Duration	0.154*	0.174*	0.165*	0.163*	0.156*	0.178*	0.168*	0.166*
	(0.090)	(0.089)	(0.088)	(0.086)	(0.093)	(0.092)	(0.091)	(0.089)
Trend	0.743***	0.843***	0.814***	0.702***	0.791***	0.897***	0.864***	0.737***
	(0.213)	(0.223)	(0.209)	(0.220)	(0.228)	(0.236)	(0.223)	(0.231)
Election_participation	18.336	7.913	14.932	12.638	19.678	8.074	16.373	13.605
	(15.650)	(14.616)	(14.860)	(17.099)	(16.658)	(15.384)	(15.721)	(17.915)
Corruption	2.264	2.233	2.109	2.168	1.946	1.946	1.791	1.865
	(1.669)	(1.984)	(1.980)	(2.156)	(1.679)	(1.987)	(1.959)	(2.143)
Places	0.002**	0.002**	0.003***	0.003**	0.003**	0.003***	0.003***	0.003***
	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)
$Places^2$	-0.000	-0.000	-0.000	-0.000	-0.000	-0.000*	-0.000*	-0.000*
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
Underground	3.091	3.565	3.480	3.482	3.597	4.071	3.974	3.975
	(2.742)	(2.590)	(2.612)	(2.737)	(2.837)	(2.653)	(2.708)	(2.819)
Both_Services	6.460**	6.563**	6.770**	6.395**	7.265**	7.394**	7.567**	7.202**
	(2.862)	(3.026)	(2.962)	(3.036)	(2.984)	(3.126)	(3.091)	(3.142)
Experience	0.079	0.080	0.100	0.104	0.057	0.059	0.079	0.086
	(0.165)	(0.165)	(0.173)	(0.171)	(0.174)	(0.172)	(0.182)	(0.179)
Past_Contracts	-0.587	-0.696	-0.742	-0.837	-0.519	-0.640	-0.678	-0.794
	(0.882)	(0.864)	(0.849)	(0.866)	(0.933)	(0.914)	(0.900)	(0.923)
Political Contestability Variables								
HHI	-17.266**	-	-	-	-17.035**	-	-	-
	(6.667)				(6.856)			
Residual_HHI	-	8.223*	-	-	-	9.437**	-	-
	-	(4.193)	-	-	-	(4.391)	-	-
Win_Margin	-	-	0.224*	-	-	-	0.230*	-
	-	-	(0.123)	-	-	-	(0.129)	-
Win_Margin^2	-	-	-0.004***	-	-		-0.004***	-
	-	-	(0.001)		-	-	(0.001)	-
Distance	-	-	-	-2.662*	-	-	-	-2.968**
	-	-	-	(1.393)	-	-	-	(1.439)
$Distance^2$	-	-	-	0.387*	-	-	-	0.430*
	-	-	-	(0.226)	-	-	-	(0.234)
N	300	300	300	300	300	300	300	300
r^2	0.265	0.268	0.276	0.263	0.266	0.272	0.276	0.266

Table 8: This table presents results from panel OLS regressions of two measures of global rigidity (*zRigidity* and *yRigidity*) on contract characteristics, political contestability variables, and controls described in table 4 for **the subsample of private contracts**. Clustered standard errors (at the department level) are in parentheses. Levels of significance: * 10%, ** 5%, and *** 1%.

Dependent Variable	Model 1	Model 2	Model 3	Model 4	Model 5	Model 6	Model 7	Model 8
		zRigidity				***yRigidity***		
Renewed	9.436	-15.537	8.310	12.263	9.736	-17.175	8.602	12.766
	(10.111)	(16.574)	(13.196)	(10.368)	(10.907)	(17.951)	(14.257)	(11.017)
Provision_of_Services	15.308	11.708	28.853**	26.229**	14.468	10.590	28.747**	26.509**
	(9.000)	(12.789)	(11.685)	(9.541)	(9.520)	(13.637)	(13.108)	(9.924)
Concession	16.387	-6.566	10.352	-2.356	18.392	-6.348	11.947	-2.117
	(10.614)	(11.070)	(10.971)	(4.858)	(11.530)	(12.002)	(11.931)	(5.553)
Inhabitants	-2.469	-11.989	-5.261	-5.456	-2.816	-13.080	-5.845	-6.014
	(2.802)	(7.825)	(5.212)	(5.432)	(3.058)	(8.488)	(5.690)	(5.888)
Left_Wing	12.708	14.545	15.988	30.622	14.049	16.039	17.702	33.522
	(10.289)	(15.811)	(17.073)	(24.689)	(11.096)	(17.271)	(18.523)	(26.593)
Right_Wing	-4.155	13.322	1.914	3.584	-4.880	13.964	1.737	3.473
	(6.103)	(8.934)	(7.382)	(6.660)	(6.531)	(9.809)	(8.147)	(7.293)
Duration	-0.771	-0.595	-0.889	-1.198	-0.741	-0.552	-0.872	-1.201
	(0.691)	(0.716)	(0.895)	(1.071)	(0.748)	(0.775)	(0.969)	(1.153)
Trend	0.185	0.596	0.647	0.793	0.396	0.839	0.883	1.056
	(0.880)	(1.349)	(1.397)	(1.874)	(0.941)	(1.463)	(1.502)	(1.999)
Election_Participation	66.866	106.844	35.341	226.251	69.295	112.389	36.368	244.362
	(91.207)	(112.089)	(78.882)	(169.618)	(97.852)	(121.714)	(85.476)	(184.866)
Corruption	-1.361	3.759	-1.224	-3.634	-1.601	3.918	-1.428	-4.142
	(5.381)	(4.408)	(9.347)	(4.398)	(5.844)	(4.654)	(10.125)	(4.804)
Places	-0.007	0.006	-0.001	0.006	-0.007	0.006	-0.001	0.006
	(0.008)	(0.005)	(0.008)	(0.006)	(0.009)	(0.006)	(0.008)	(0.006)
$Places^2$	0.000	-0.000	-0.000	-0.000	0.000	-0.000	-0.000	-0.000
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
Underground	14.460	28.972	10.535	9.836	14.142	29.775	9.878	9.104
	(9.722)	(17.977)	(9.119)	(11.969)	(10.528)	(19.474)	(9.945)	(13.020)
Both_Services	-5.822	-2.988	0.281	-13.720	-7.736	-4.691	-1.483	-16.189
	(5.297)	(9.138)	(13.187)	(15.172)	(5.797)	(9.682)	(13.943)	(16.098)
Experience	0.909	1.883	0.247	0.390	0.968	2.017	0.257	0.408
	(1.048)	(1.384)	(0.984)	(1.050)	(1.133)	(1.494)	(1.089)	(1.130)
Past_Contracts	-1.026	-1.602	-0.437	-0.435	-1.058	-1.678	-0.426	-0.418
	(0.782)	(1.012)	(0.725)	(0.797)	(0.846)	(1.094)	(0.802)	(0.857)
Political Contestability Variables								
HHI	123.745	-	-	-	133.506	-	-	-
	(101.934)	-	-	-	(109.580)	-	-	-
Residual_HHI	-	85.043	-	-	-	91.646	-	-
	-	(49.194)	-	-	-	(53.089)	-	-
Win_Margin	-	-	1.823	-	-	-	1.915	-
	-	-	(1.378)	-	-	-	(1.516)	-
Win_Margin^2	-	-	-0.024	-	-	-	-0.025	-
	-	-	(0.028)	-	-	-	(0.031)	-
Distance	-	-	-	6.003	-	-	-	6.438
	-	-	-	(7.941)	-	-	-	(8.456)
$Distance^2$	-	-	-	0.022	-	-	-	0.053
	-	-	-	(0.965)	-	-	-	(1.015)
N	47	47	47	47	47	47	47	47
r^2	0.431	0.428	0.312	0.354	0.431	0.429	0.309	0.360

Table 9: This table presents results from panel OLS regressions of two measures of global rigidity (*zRigidity* and *yRigidity*) on contract characteristics, political contestability variables, and controls described in table 4 for the **whole sample of public and private contracts**. Clustered standard errors (at the department level) are in parentheses. Levels of significance: * 10%, ** 5%, and *** 1%.

Dependent Variable	Model 1	Model 2	Model 3	Model 4	Model 5	Model 6	Model 7	Model 8
		zRigidity				***yRigidity***		
Renewed	-2.602	-4.004	-3.323	-3.241	-2.845	-4.393*	-3.576	-3.525
	(2.232)	(2.511)	(2.308)	(2.322)	(2.336)	(2.614)	(2.427)	(2.400)
Provision_of_Services	-3.630	-3.643	-3.332	-3.557	-3.768	-3.751	-3.426	-3.653
	(2.672)	(2.716)	(2.494)	(2.735)	(2.813)	(2.854)	(2.618)	(2.872)
Concession	-0.260	-1.254	-0.803	-1.024	-0.094	-1.154	-0.630	-0.875
	(2.475)	(2.234)	(2.407)	(2.329)	(2.673)	(2.382)	(2.584)	(2.498)
Inhabitants	0.901	-0.362	-0.225	0.283	0.942	-0.497	-0.314	0.227
	(1.054)	(1.873)	(1.404)	(1.301)	(1.064)	(2.012)	(1.489)	(1.359)
Left_Wing	-0.213	-0.405	-0.137	-0.065	-0.276	-0.489	-0.228	-0.083
	(2.397)	(2.261)	(2.567)	(2.420)	(2.430)	(2.275)	(2.620)	(2.444)
Right_Wing	1.056	3.223	0.714	1.562	0.794	3.255	0.478	1.371
	(2.229)	(2.684)	(2.244)	(2.361)	(2.328)	(2.868)	(2.347)	(2.481)
Duration	0.254***	0.272***	0.260***	0.249***	0.262***	0.281***	0.269***	0.256***
	(0.080)	(0.076)	(0.076)	(0.074)	(0.082)	(0.078)	(0.078)	(0.076)
Trend	0.603***	0.549**	0.570**	0.460*	0.664***	0.604***	0.624***	0.507*
	(0.221)	(0.213)	(0.220)	(0.244)	(0.233)	(0.220)	(0.229)	(0.253)
Election_Participation	11.877	-2.992	6.120	8.345	13.919	-2.713	7.797	10.237
	(15.181)	(14.730)	(15.697)	(18.127)	(15.916)	(15.375)	(16.377)	(19.020)
Corruption	1.421	0.159	0.370	0.618	1.173	-0.197	0.008	0.322
	(2.151)	(3.314)	(2.915)	(2.804)	(2.162)	(3.361)	(2.946)	(2.811)
Places	0.002*	0.002***	0.002**	0.002**	0.002**	0.003***	0.003**	0.003***
	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)
$Places^2$	-0.000	-0.000	-0.000	-0.000	-0.000	-0.000	-0.000	-0.000
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
Underground	-3.493	-5.289**	-4.597*	-5.427**	-4.087	-6.004**	-5.259**	-6.168***
	(2.586)	(2.249)	(2.379)	(2.164)	(2.675)	(2.310)	(2.460)	(2.211)
Both_Services	4.262	2.463	3.901	2.844	4.436	2.530	4.063	2.947
	(2.636)	(2.893)	(2.684)	(2.731)	(2.797)	(3.078)	(2.836)	(2.900)
Experience	0.113	0.181	0.164	0.151	0.097	0.170	0.151	0.136
	(0.133)	(0.151)	(0.142)	(0.144)	(0.138)	(0.158)	(0.149)	(0.148)
Past_Contracts	-0.470**	-0.546*	-0.479**	-0.444**	-0.446**	-0.530*	-0.453**	-0.414*
	(0.198)	(0.276)	(0.215)	(0.220)	(0.209)	(0.291)	(0.225)	(0.231)
Private	-42.308*	-11.281	-17.474*	-10.863	-45.494*	-12.419	-19.622*	-11.878
	(22.434)	(8.478)	(10.067)	(9.683)	(24.223)	(8.832)	(10.698)	(10.328)
Political Contestability Variables								
HHI	-13.884*	-	-	-	-13.369	-	-	-
	(7.913)	-	-	-	(8.181)	-	-	-
*HHI*Private*	103.023	-	-	-	110.336	-	-	-
	(79.573)	-	-	-	(86.234)	-	-	-
Residual_HHI	-	9.180**	-	-	-	10.434**	-	-
	-	(4.175)	-	-	-	(4.339)	-	-
*Residual_HHI*Private*	-	11.188	-	-	-	12.458	-	-
	-	(31.654)	-	-	-	(33.601)	-	-
Win_Margin	-	-	0.232*	-	-	-	0.238*	-
	-	-	(0.130)	-	-	-	(0.136)	-
Win_Margin^2	-	-	-0.005***	-	-	-	-0.005***	-
	-	-	(0.001)	-	-	-	(0.001)	-
*Win_Margin*Private*	-	-	0.844	-	-	-	0.978	-
	-	-	(1.142)	-	-	-	(1.244)	-
Win_Margin^2 *Private*	-	-	-0.010	-	-	-	-0.012	-
	-	-	(0.020)	-	-	-	(0.021)	-
*Distance*Private*	-	-	-	0.047	-	-	-	-0.017
	-	-	-	(5.250)	-	-	-	(5.633)
Distance	-	-	-	-2.836*	-	-	-	-3.116*
	-	-	-	(1.617)	-	-	-	(1.668)
$Distance^2$	-	-	-	0.372	-	-	-	0.412
	-	-	-	(0.276)	-	-	-	(0.286)
$Distance^2$ *Private*	-	-	-	0.282	-	-	-	0.323
	-	-	-	(0.850)	-	-	-	(0.921)
N	347	347	347	347	347	347	347	347
r^2	0.222	0.195	0.208	0.190	0.226	0.200	0.212	0.194

Table 10: This table presents results from panel OLS and 2SLS regressions of average number of amendements (*Average_Amendements*) on contract characteristics and controls described in table 4. In models 4 and 5, the variables used to instrument *zRigidity* are the winning margin and the type of contract. Clustered standard errors (at the department level) are in parentheses. Levels of significance: * 10%, ** 5%, and *** 1%.

	Model 1	Model 2	Model 3	Model 4	Model 5
Dependent Variable			AverageReneg		
	OLS	OLS	OLS	2SLS	2SLS
Public	0.107*	0.100*	0.121*	0.172*	0.208*
	(0.059)	(0.059)	(0.063)	(0.100)	(0.114)
Renewed	-0.160***	-0.151***	-0.152***	-0.163***	-0.163**
	(0.045)	(0.044)	(0.053)	(0.055)	(0.064)
Inhabitants	0.009	0.012	0.027	0.030	0.043
	(0.020)	(0.019)	(0.020)	(0.025)	(0.029)
Left_Wing	-0.006	-0.009	-0.052	-0.032	-0.060
	(0.031)	(0.035)	(0.069)	(0.055)	(0.085)
Right_Wing	0.024	0.032	0.032	0.038	0.042
	(0.050)	(0.050)	(0.056)	(0.056)	(0.063)
Duration	-0.010***	-0.009***	-0.011***	-0.009***	-0.009***
	(0.002)	(0.002)	(0.003)	(0.002)	(0.003)
Places	-0.000	-0.000	-0.000	0.000**	0.000**
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
$Places^2$	0.000	0.000	0.000	-0.000**	-0.000**
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
Underground	-0.055	-0.064	-0.051	-0.018	0.002
	(0.050)	(0.051)	(0.058)	(0.053)	(0.058)
Both_Services	0.000	0.004	0.002	0.043	0.042
	(0.052)	(0.055)	(0.061)	(0.066)	(0.067)
Experience	-0.000	-0.000	-0.000	0.002	0.001
	(0.002)	(0.002)	(0.002)	(0.002)	(0.003)
Past_Contracts	-0.004*	-0.004*	-0.005**	-0.013**	-0.012**
	(0.002)	(0.002)	(0.002)	(0.006)	(0.006)
Provision_of_Services	0.043	0.057	0.068*	-	-
	(0.040)	(0.039)	(0.038)	-	-
Concession	-0.019	-0.017	-	-	-
	(0.038)	(0.040)	-	-	-
Election_Participation	-	-0.094	0.044	0.159	0.168
	-	(0.276)	(0.345)	(0.325)	(0.377)
Corruption	-	0.003	0.001	-0.058	-0.074
	-	(0.012)	(0.021)	(0.048)	(0.047)
Trend	-0.019***	-0.020***	-0.023***	-0.015***	-0.017***
	(0.004)	(0.004)	(0.005)	(0.004)	(0.006)
zRigidity	-	-	-	**-0.007***	**-0.008***
	-	-	-	(0.004)	(0.004)
N	393	393	303	347	294
r^2	0.199	0.201	0.192	0.170	0.141

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