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# Doing It by the Book: Political Contestability and Public Contract Renegotiations*

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**Abstract**

We present a public procurement model in which contractual flexibility and political tolerance for contractual deviations determine renegotiations. In the model, contractual flexibility allows for adaptation without formal renegotiation, while political tolerance for deviations decreases with political competition. We then compare renegotiation rates of procurement contracts in which the procurer is either a public administration or a private corporation. We find robust evidence consistent with the model predictions: public-to-private contracts are renegotiated more often than comparable private-to-private contracts, and that this pattern is more salient in politically contestable jurisdictions. The frequent renegotiation of public contracts results from their inherent rigidity and provides a relational quality of adaptability to contingencies in politically contestable environments.

*Keywords:* Procurement, Political Contestability, Contractual Rigidity, Renegotiations

*JEL Classification:* D23, D72, D73, D78, H57

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# 1 Introduction

Why are public contracts so often renegotiated? Guasch (2004) provides numerous examples of renegotiations in public-private agreements. By studying more than 1,000 public-private long-term contracts signed in Latin American countries between the mid-1980s and 2000, Guasch found that 78 percent of transportation contracts and 92 percent of water and sewage contracts were renegotiated. Guasch's findings also show that renegotiations occur shortly after the award (on average, after 2.2 years) and often, at first glance, favor the private party.

Guasch (2004) suggests that renegotiations are a consequence of aggressive bidding. Because the government cannot credibly restrain from renegotiation and firms learn their type *vis-à-vis* competitors (i.e., cost structure, capabilities) after bidding, bid winning firms will be prone to renegotiate loss-bearing contracts (Laffont and Tirole 1993). Similarly, Ryan (2020) shows that connected firms opportunistically choose less flexible contracts and engage in sophisticated strategies with renegotiations to maximize the value of the whole-of-life transaction. Decarolis and Palumbo (2015) shows that design-and-build contracts—which are associated with less project specification detailing during the tender—reduce time-to-completion renegotiations but increase price renegotiations. Coviello and Gagliarducci (2017) find that time-to-completion renegotiations increase with the mayor's tenure in office, which increases the likelihood of collusion between government officials and local bidders. Alternative explanations of frequent renegotiations point to government-led renegotiations (Guasch, Laffont, and Straub 2007), imperfect enforcement by the public agent (Guasch, Laffont, and Straub 2008), lack of commitment by the contractor (Gagnepain, Ivaldi, and Martimort 2013), and enabling incumbent governments to circumvent budgetary rules before elections (Engel, Fischer, and Galetovic 2019).

Regardless of the framework mobilized to analyze public contracts, the high rates of renegotiation always come as bad news (Gagnepain, Ivaldi, and Martimort 2013; Ryan 2020) and have raised doubts about the viability of the public-private partnership model in developing countries (Guasch, Laffont, and Straub 2008) but also developed countries (see, e.g., Engel, Fischer, and Galetovic 2011 for the case of the United States, NAO 2003 for the United Kingdom, and Athias and Saussier 2007 for France). A notable exception is Beuve and Saussier (2021), who show that the probability of renewing a public contract with the same contractor is concave in renegotiations, implying that the contracting parties can make contracts adaptable over time. These studies, however, are agnostic about the political contestability dimension of public officials.

We challenge the industrial organization view on public contract renegotiation. As argued by Spiller (2009, 2010), public contracts are characterized by intrinsic differences stemming from a substantial amount of supervision and control by political opponents and interest groups, who hold a stake in challenging and disrupting a contractual relationship. Consequently, unlike private contracting, a grasp on politics becomes paramount in understanding public contracting.

Public contracts are awarded through a set of rule-based bureaucratic procedures. Rigid bureaucratic proceduralization imposes *ex post* stringent enforcement, intolerance to adaptation, and penalties for deviation. Moszoro and Spiller (2019) and Beuve, Moszoro, and Saussier (2019) showed that public contracts tend to be more rigid when public agents face tighter political competition and fear opportunistic challenges to their contractual decisions. From the public agent's perspective, contractual rigidity minimizes the risk of politically motivated challenges (Moszoro and Spiller 2012, 2014). From the contractor's perspective, contractual rigidity minimizes the risk of governmental opportunism, including unfair administrative treatment and creeping expropriation (Spiller 2013; Moszoro and Spiller 2014, 2016).

We conjecture that tight political competition, by increasing rigidity, leads to more frequent formal renegotiation of public contracts. When faced with unexpected circumstances, private-to-private contractual parties tend to adapt through informal adaptation. Because relational (*informal*) adaptations (Macaulay 1963) will normally lead to political (and potential judicial) challenges—particularly in jurisdictions of the type just described (Spiller 2009, 2010; Moszoro and Spiller 2019)—renegotiations of public contracts will tend to take the form of formal amendments.[1] In other words, the political hazards—third-party and governmental opportunism—that induce higher rigidity in public contracts may also be conducive to more frequent formal renegotiations. The frequent renegotiation of public contracts, instead of being a sign of weakness and lack of commitment (Guasch 2004; Gagnepain, Ivaldi, and Martimort 2013), provides a "relational quality" (Spiller 2008; Spiller 2013) and indicates that the contractual parties are willing to adapt through time.

Previous studies on contract renegotiations (Bajari, McMillan, and Tadelis 2009; Bajari, Houghton, and Tadelis 2014; Crocker and Reynolds 1993; Hart and Moore 1988; Hart, Shleifer, and Vishny 1997; Hart 2003; Saussier 2000) have stressed complete versus incomplete contract-

[1] In this paper, *informal* means agreed verbally without written amendment to the contract (not *secretive*). A secretive renegotiation will increase the public agent's risk of losing political trust and judicial conviction.

ing, where a complete contract precisely describes all possible states of the world and the expected outcomes and an incomplete contract vaguely describes the possible states of the world and expected outcomes. In contrast, we focus on the *rigidity* versus *flexibility* dimension of contracts—i.e., a flexible contract leaves room for possible deviation and *ex-post* adaptation, whereas a rigid contract does not—under political scrutiny. As a result, contractual rigidity and completeness (analogously, contractual flexibility and incompleteness) covary but do not equate (e.g., a contract may foresee all states of the world and still leave the parties to flexibly agree on the expected outcomes once the states of the world materialize).

We focus on public contracts for standard off-the-shelf items. These contracts are characterized by a local monopsony with competing contractors who concurrently deliver services for multiple monopsonies in other jurisdictions in repeated interactions. The negative externalities for contractors from opportunistic behavior would be prohibitive, including loss of reputation within a given jurisdiction and *vis-à-vis* possible buyers in other jurisdictions. Thus, the possible opportunistic behavior of the contractors is not a concern in our setup.

This paper complements Beuve, Moszoro, and Saussier (2019). Both papers use the same dataset and address the impact of political contestatibility on contract design. Whereas Beuve, Moszoro, and Saussier (2019) is discursive and focuses *ex-ante* public contract design, the current paper presents a formal model of contractual rigidity and addresses *ex-post* contract renegotiations.

In this paper, (a) we model the public agent's choice to informally adapt through contractual flexibility or renegotiate in politically contestable jurisdictions and—accordingly—(b) we revisit the empirical evidence on public contract renegotiations. Our study contributes to the public contracting literature by advancing a novel set of hypotheses based on political hazards specific to public procurers. The results indicate that previous empirical studies pointing to the inefficiencies of public contracts related to high renegotiation rates may have overlooked part of the story. Such inefficiencies may not be remediable (Williamson 1999), as the frequent renegotiations observed in public contracts can be understood as a consequence of their specific rigid nature instead of a manifestation of governmental opportunism or government incapacity to avoid renegotiation when dealing with opportunistic private corporations.

## 2 Contract Flexibility and Political Tolerance

Let $\mathbb{X}^C \subseteq \mathbf{R}_+$ be the set of contractual terms at $t_0$ (e.g., cost, quality, attributes, and delivery time) and $\mathbb{S} \subseteq \mathbf{R}_+$ be the set of possible states of the world upon contract delivery at $t_1$. The reference point $\bar{s}$ is the first-best contract in the absence of uncertainty. Without loss of generality, let $\mathbb{X}^C = [0, x^C]$ and $\mathbb{S} = [0, s]$, where $x^C$ and $s$ are the measures of the sets. Complete contracting—i.e., a contract with contingency clauses mapping all possible states of the world—is not possible due to the contractual parties' boundary rationality, thus $\mathbb{X}^C \subset \mathbb{S}$.

Let us further define contractual flexibility $\mathbb{X}^F = [0, x^F] = [0, \phi x^C]$ as the tolerance deviation from $\mathbb{X}^C$, where $\phi > 1$ is a constant denoting flexibility.[2] $\phi$ is higher for less standardized contracts and uncertain environments. As long as the realized state of the world $s_i \subset \mathbb{S}$ is contained within the vicinity of the reference point of the contract, the *status quo* remains valid (i.e., contract continuation, with eventual informal adaptations). Technical contract renegotiation ($\nu = 0$) happens when the realized state of the world $s$ is outside the contractual terms and tolerated deviations, i.e.:

$$\nu = \begin{cases} 1 & \text{if } s_i \in \mathbb{X}^F \ \text{ (contract continuation)} \\ 0 & \text{if } s_i \notin \mathbb{X}^F \ \text{ (contract renegotiation)} \end{cases} \tag{1}$$

The public administration must provide essential public goods and services one way or another regardless of $s_i$. Contractual flexibility accommodates contingencies not contained explicitly in the contract and allows to avoid costly renegotiation. When renegotiations do not conclude satisfactorily for both sides, the contract is terminated and tendered anew at a high cost. Thus, contractual flexibility preserves the contractual relationship as long as it is beneficial for the parties (Macaulay 1963).

Contractual flexibility, however, makes public contracts susceptible to (the whiff of) corruption. Neither the voters (i.e., the super-principal who gives the mandate to the public agent) nor the political opponents have perfect information about the public agent's actions and motivations. The information asymmetry regarding the public agent's actions is conducive to probity challenges from political opponents—sometimes in good faith, but often opportunistically. Regardless whether a challenge is successful at court, it usually casts a shadow on the incumbent public agent's integrity. In anticipation, the public agent will deliberately self-constrain her

[2] E.g., $\phi = 1.2$ means that there is 20 percent technical deviation tolerance before the contract is renegotiated.

contractual flexibility and adopt rigid procedures to reduce the information asymmetry between her perceived and actual actions and to prove probity (Moszoro and Spiller 2019), even when it is not her intent to so behave.

Let $\mathbb{X}^P = [0, x^P]$ be the political tolerance for deviations from the contractual reference point $\bar{s}$. Political tolerance is given by the cultural setup (including trust in institutions), the rule of law, and foremost political contestability: high political competition correlates with low political tolerance, as political opponents will take advantage to overturn the incumbent public agent. The public agent can negotiate with the contractor a contract $\mathbb{X}^C$ which is outside of $\mathbb{X}^P$ due to imperfect information about the public agent's actions and imperfect *ex-ante* enforcement by the voters. If the realized state of the world $s_i$ is outside the political tolerance $\mathbb{X}^P$, the incumbent public agent is replaced ($\lambda = 0$), i.e.:

$$\lambda = \begin{cases} 1 & \text{if } s_i \in \mathbb{X}^P \text{ (public agent continuation)} \\ 0 & \text{if } s_i \notin \mathbb{X}^P \text{ (public agent turnover)} \end{cases} \tag{2}$$

Uncertainty over the probability space $\mathbb{S}$ may result in technically-triggered renegotiations ($\nu = 0$) if contractual flexibility $\mathbb{X}^F$ is low. Likewise, political opportunism may lead to politically-triggered renegotiations ($\lambda = 0$) if political tolerance $\mathbb{X}^P$ is low, e.g., in politically contestable jurisdictions where political scrutiny and competition is salient.

We advance the following propositions:

**Proposition 1** *The probability of contract continuation rises in the set of* ***contractual terms****: i.e.,* $\partial\, \mathbb{E}(\Pr[\nu = 1])/\partial x^C > 0$.

**Proof**

Let $\mathbb{S}$ be a compact space with full-support (continuous) and $s_{1,2,...}$ be the possible states of the world uniformly or normally distributed with mean $\bar{s}$ (reference point).

Let $\mu$ be the probability space such that:

$$\mu(\mathbb{X}^C) = \pi(x^C)^n = \mathbb{E}(\Pr[\nu = 1]) \tag{3}$$

where $x^c$ is the maximum distance between the reference point $\bar{s}$ and the states of the world contemplated in the contract space $\mathbb{X}^C$, and $n$ the contract dimensionality.

The expected probability of contract continuation probability $\mathbb{E}(\Pr[\nu = 1])$—i.e., that the realized state of the world $s$ is within $\mathbb{X}^C$—rises in contractual completeness $x^c$ and the contrac-

tual space $\mathbb{X}^C$:

$$\frac{\partial \mathbb{E}(\Pr[\nu = 1])}{\partial x^C} > 0 \quad \blacksquare \tag{4}$$

In vernacular terms, the probability of hitting the target rises with the size of the target.

**Proposition 2** *The probability of contract continuation rises in* ***contractual flexibility****: i.e.,* $\partial \mathbb{E}(\Pr[\nu = 1])/\partial x^F > 0$.

**Proof**

$X^F$ is a multiple of $X^C$: i.e., $\mathbb{X}^F = [0, \phi x^C]$, with scalar $\phi > 1$. Thus, analogously to the proof of Proposition 1:

$$\frac{\partial \mathbb{E}(\Pr[\nu = 1])}{\partial x^F} > 0 \quad \blacksquare \tag{5}$$

I.e., hitting the frame of the target is also considered to be a "hit" for contract continuation. *Ceteris paribus*, a corruptive environment will be conducive to higher contractual flexibility $\mathbb{X}^F$.

**Proposition 3** *The probability of a politician's continuation in office rises in* ***contractual rigidity****: i.e.,* $\partial \mathbb{E}(\Pr[\lambda = 1])/\partial x^C < 0$.

**Proof**

Holding $x^P$ constant, an expansion of the probability space $\mu(\mathbb{X}^C)$ expands the probability space $\mu(\mathbb{X}^C - \mathbb{X}^P) = 1 - \mathbb{E}(\Pr[\lambda = 1])$. Therefore,

$$\frac{\partial \mathbb{E}(\Pr[\lambda = 1])}{\partial x^C} < 0 \quad \blacksquare \tag{6}$$

I.e., keeping the political tolerance for deviations from the reference point constant, the probability of hitting the "donut" space between the actual contractual terms and the politically tolerated states of the world increases. A *Machiavellian* public agent will maximize lexicographic utility over office tenure and welfare: she wants to stay in office as long as possible, and conditional on staying in office, she wants to maximize welfare through contract continuation. Consequently, a public agent averse to the risk of losing office will increase political safety by increasing contractual rigidity.

**Proposition 4** *The probability of a politician's continuation in office rises in* ***political tolerance****: i.e.,* $\partial \mathbb{E}(\Pr[\lambda = 1])/\partial x^P > 0$.

**Proof**

Conversely to the proof of Proposition 3, holding $x^C$ constant and expanding the probability space $\mu(\mathbb{X}^P)$ shrinks the probability space $\mu(\mathbb{X}^C - \mathbb{X}^P) = 1 - \mathbb{E}(\Pr[\lambda = 1])$. Therefore,

$$\frac{\partial\, \mathbb{E}(\Pr[\lambda = 1])}{\partial x^P} > 0 \quad \blacksquare \tag{7}$$

I.e., political tolerance increases the space of hits considered to be close enough to the reference point. *Ceteris paribus*, a corruptive environment will lead to a higher degree of political tolerance $\mathbb{X}^P$, consequently lower contractual rigidity.

A politician benefits from office tenure and contract continuation. Calling $O$ the benefits from office tenure and $Q$ the benefits from contract performance,[3] the public agent will maximize her expected utility $U$ by strategically choosing contractual terms $\mathbb{X}^C$.[4] Formally:

$$\max_{x^C} \mathbb{E}(U) = u\left[\mathbb{E}(\lambda)O + \mathbb{E}(\lambda)\,\mathbb{E}(\nu)Q\right] - C(x^C) \tag{8}$$

where $C$ is the contracting cost which rises in the set of contractual terms (i.e., $\partial C/\partial x^C > 0$). Note that $\mathbb{E}(\lambda) > \mathbb{E}(\lambda)\,\mathbb{E}(\nu)$, i.e., contract continuation requires public agent's continuation and, *a contrario*, if the public agent's turnover is due to a politically-motivated challenge to the contract, that contract will be renegotiated by the challenger once she is in office.

Figure 1 depicts a graphical representation of the contractual space. Some contractual dimensions are undesirable for the contracting party in only one direction (e.g., higher price), while other dimensions are undesirable when deviations occur on either side of the reference point (e.g., too low or too high pressure and pH level of tap water). For generalization, we illustrate the contractual space in a two-dimensional $\mathbf{R}^2_+$ with possible negative and positive deviations from the reference point and normalized axis scales, hence concentric areas.

The left graph shows a contractual environment with large political tolerance (e.g., private-to-private contracting). The different realized states of the world $s_{1,2,\ldots}$ reflect deviations from the reference point $\bar{s}$ in either dimension and direction.[5] Realizations $s_{1,2,3}$ at $t_1$ are within $\mathbb{X}^C$,

[3] In management parlance, $O$ are the extrinsic incentives from office tenure, including perquisites and corruption rents (Kwon 2014; Liu and Tang 2011; Wright 2007) and $Q$ are the intrinsic incentives from contract continuation, e.g., stable and reliable service for the constituencies (Dur and Zoutenbier 2015; Friebel, Kosfeld, and Thielmann 2019).

[4] See Appendix A for a generalization of the public agent's utility function.

[5] For example, $s_1$ and $s_4$ represent positive deviations in both dimensions from the reference point, $s_2$ and $s_5$

thus contractually safe; $s_4$ is outside the contractual space but within the contractual tolerance $\mathbb{X}^F$. If state $s_5$ is realized, albeit politically tolerable, the contract will be subject to renegotiation because it is outside the contractual tolerance $\mathbb{X}^F$.

The right graph shows a contractual environment with political scrutiny (e.g., public-to-private contracts). As political tolerance $\mathbb{X}^P$ shrinks, a politician will prefer more rigid contracts, decreasing the contractual $\mathbb{X}^C$ and flexibility $\mathbb{X}^F$ spaces and increasing the states of the world subject to renegotiation. If the realized state of the world at $t_1$ is $s_1 \in \mathbb{X}^P$, the contract is technically and politically safe ($\nu, \lambda = 1$), and will continue. If $s_2$ is realized, the contract is within the technical contractual terms ($\nu = 1$) but politically contestable ($\lambda = 0$), and the incumbent policymaker may be under political pressure to renegotiate the contract. If $s_3$ is realized, the contract is still technically viable (the contractor is willing to adapt, $\nu = 1$), but politically contestable ($\lambda = 0$): the incumbent policymaker will be under political pressure to renegotiate the contract. If $s_4$ or $s_5$ is realized, the contract is technically and politically unviable ($\nu, \lambda = 0$) and will be renegotiated.

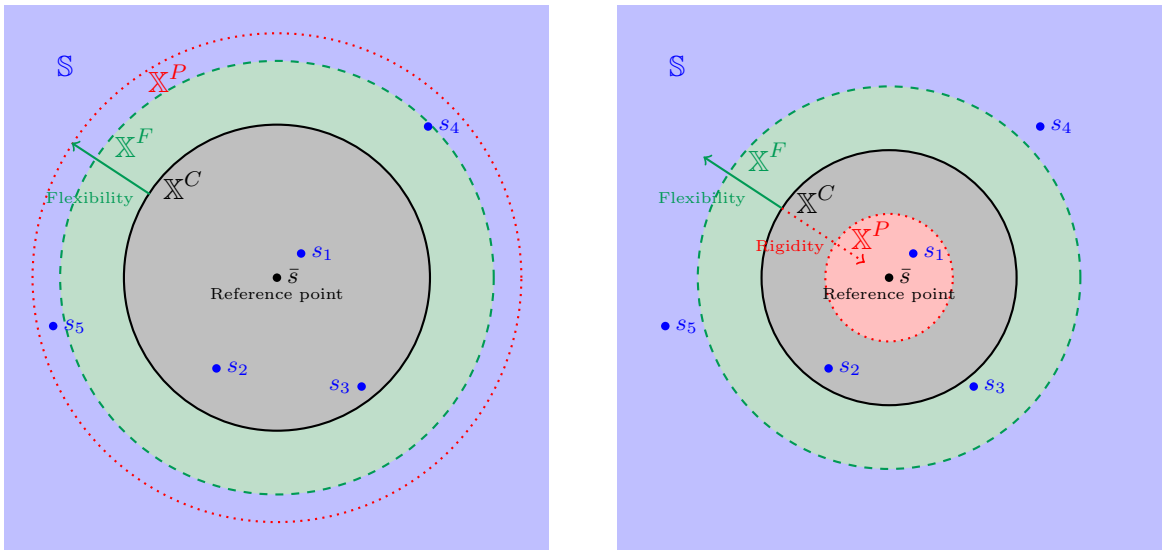
Contractual flexibility $\phi$ and political tolerance $\mathbb{X}^P$ are exogenous to the contractual parties (i.e., long-term path dependent).[6] The parties negotiate over $\mathbb{X}^C$. The set of contractual terms increases as $\mathbb{X}^C$ expands, thus lowering the likelihood of technical renegotiation as more states of the world are contemplated in the contract. On the other hand, contract rigidity increases as $\mathbb{X}^C$ shrinks towards the reference point, lowering the likelihood of political challenges.

This simple framework yields two testable hypotheses. Political scrutiny is irrelevant for most private-to-private contracts (i.e., in private-to-private setups, $\mathbb{X}^P$ is large or non-applicable). Conversely, public agents will trade the set of contractual terms for contractual rigidity (i.e., lower $\mathbb{X}^C$) to keep political challenges at bay. From Propositions 2 and 3, therefore:

represent negative deviations in both dimensions from the reference point, and $s_3$ represents a positive deviation in one dimension and a negative deviation in the other dimension. Note that the contractual space of quality-price can be reduced to the North-West quadrant from the reference point, i.e., tolerance decreases in lower quality and higher price than contracted.

[6] We assume flexibility parameter $\phi$ to be exogenous for model parsimony and tractability. However, whether $\phi$ is exogenous or correlated with contractual terms (Baker, Gibbons, and Murphy 1994) will affect the probability of contract continuation $\mathbb{E}(\Pr[\nu = 1])$ but not the probability of a politician's continuation in office $\mathbb{E}(\Pr[\lambda = 1])$.

**Figure 1:** This figure presents a two-dimensional contractual space $\mathbf{R}^2_+$. $\mathbb{S}$ is the set of all possible states of the world upon contract delivery at $t_1$ and $s_{1,2,...}$ are examples of realizations of states of the world at $t_1$. $\mathbb{X}^C$ (grey and red areas) is the set of contractual terms at $t_0$ (e.g., cost, quality, attributes, and delivery time). $\mathbb{X}^F$ (green area) is the contractual flexibility, i.e., the tolerance deviation from $\mathbb{X}^C$. $\mathbb{X}^P$ (red area) is the political tolerance for deviations from the contractual reference point. $\mathbb{X}^F$ and $\mathbb{X}^P$ are exogenous, and the parties negotiate over $\mathbb{X}^C$. The set of contractual terms increases as $\mathbb{X}^C$ expands (solid green arrow). Contract rigidity increases as $\mathbb{X}^C$ shrinks towards the reference point (red dotted arrow). The left graph shows a contractual environment with large political tolerance (e.g., private-to-private contracting). The right graph shows a contractual environment with political scrutiny (e.g., public-to-private contracts).




**Hypothesis 1** *For comparable goods, public-to-private contracts are formally renegotiated more often than private-to-private contracts.*

Political contestability increases third-party opportunistic challenges (Moszoro and Spiller 2019), thus decreases political tolerance $\mathbb{X}^P$. Politicians respond to lower political tolerance with higher contractual rigidity. Consequently, from Propositions 1 and 4:

**Hypothesis 2** *The rate of contract renegotiation increases in political contestability.*

# 3 Data

We focus on the car park sector in France, which is particularly suitable for our purposes. First, parking management is a standard service with verifiable quality. Second, France displays a homogenized legal and administrative regime at the subnational level. Thus, car park contracts in France are comparable across providers and contracting administrations.

### 3.1 Sector Characteristics

Throughout the world, cities are generally tasked with providing on-street and off-street parking spaces. The positive externalities and social benefits (e.g., intermodality and urban development) derived from high-quality construction and efficient parking management, as well as the negative externalities resulting from increased traffic volumes, justify their remittance to local authorities. While the public authorities are legally obliged to retain ownership of parking spaces, they can outsource the provision of infrastructure and services through public-private arrangements.

In France, outsourcing the construction and management of parking lots to private operators is widespread. According to the French Ministry of Sustainable Development, in 2019, about 72 percent of parking lots were organized through outsourced management, and 28 percent were provided in-house through public provision.

The French car park sector is characterized by a growing level of competitive pressure between French firms (local operators as well as larger companies) and, more recently, between national and foreign operators (ANFA 2019).[7] Additionally, the competitive pressure also comes from the threat of municipalization when contracts end (i.e., contracting parties are not locked in through specific investments at the contract renewal). The absence of bilateral dependency between municipalities and operators is possible because parking management is a standard product. According to a survey of public managers' perceptions, parking lots appear among the least asset-specific activities in the public management domain (Brown and Potoski 2003).[8]

On the other hand, recent studies on public procurement highlight that parking services are associated with a medium level of resident sensitivity and that the price of public parking is one of the front-page topics before local elections in France (Beuve and Le Squeren 2016). Consequently, the parking sector is susceptible to political interference. For example, in June 2015, the daily regional press reported that the city council majority in Saint-Etienne, France, raised prices by renegotiating underground parking contracts entrusted to private partners to comply with a new legislative framework—the "Hamon Law" on consumption adopted on March

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

[8] For reference, the asset specificity associated with parking lots was 2.36/5, whereas the asset specificity associated with urban transport and water sectors was equal to 3.35 and 3.94, respectively (Brown and Potoski 2003). Levin and Tadelis (2010) and Hefetz and Warner (2012) replicate similar levels of asset specificity for the US using the same type of survey.

18, 2014—which required pricing for every 15 minutes to allow car drivers to pay amounts closer to their actual consumption. The new price schedule was then submitted to the vote of the city council. The opposition rejected the motion and publicly blamed the city council majority for conducting negotiations as "surrogates." A political opponent of the mayor even declared that the contract was "either a gift or poorly negotiated." The city council majority replied by blaming the former mayor for the absence of contract enforcement in the past.[9]

On the other hand, citizen sensitivity—albeit salient—is not a confounding factor for our identification, given that we deal with one sector (i.e., car parks) across jurisdictions with a similar institutional setup and legal system (i.e., French municipalities).

In sum, the car park sector is a suitable arena to investigate the impact of the political dimension of public contracts.

### 3.2 Contract Characteristics

Three main contractual arrangements encompass the parking sector in France: concession contracts, operating contracts, and provision-of-services contracts.

*Concession Contracts* are used for greenfield (new) and brownfield (renovated) parking developments. 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 collects user fees. In our dataset and in real life, concession contracts are utilized by municipalities and not by private procurers. We have only two concession contracts among the private contracts in our data, and hence we excluded concession contracts from our sample to avoid overidentification.

*Operating Contracts* are used when parking infrastructure is already built but requires a significant level of investment to renovate and maintain. These contracts are shorter in time than concession contracts (18.2 years on average in our dataset). The operator bears the demand risk and collects user fees. Operating contracts are also subject to political, economic, social, and technological changes during the contract's execution.

*Provision-of-Services Contracts* manage existing on-street parking lots, which require no investments. These contracts are the shortest in time (3.2 years on average in our dataset).

[9] See: Xavier Alix, "Parkings stéphanois: une renégociation plus ou moins bonne?", *L'Essor*, June 10, 2015. Available at: https://www.lessor42.fr/parkings-une-renegociation-plus-ou-moins-bonne-10303.html, accessed June 26, 2018.

### 3.3 Contractual and Political Data

The French car park sector is not regulated by a national authority, and data is not centralized. We use the same dataset as in Beuve, Moszoro, and Saussier (2019), which includes almost 1,000 contracts signed by the leading company in the French car parking sector (42 percent of market share among private operators and 31 percent of total market share) between 1963 and 2008. This leading company has been in the market for a long time, which helps our identification and partials out the confounding effects of contractual dynamics of newer companies with different corporate governance.

As mentioned earlier, we exclude concession contracts and focus on operating and provision-of-services contracts to fairly compare different contract rigidity levels. Municipal election data are available since 1983, which further narrows our sample to 491 contracts signed between 1985 and 2008. Finally, we also excluded observations from tiny municipalities for which the elections data are not available and metropolitan areas—i.e., Paris, Lyon, and Marseille—where the electoral system is organized in administrative districts (i.e., *arrondissements*), thus precluding the univocal mapping of contractual and electoral data.

We end with 293 contractual arrangements signed by the leading parking service provider across 58 departments (out of 96) in metropolitan France. The procurers include 132 municipalities and 24 private companies (hospitals, shopping malls, amusement parks, and airports).

The political data we gathered concern the outcomes of all municipal elections from 1983 through 2008.[10] Elections are organized (in principle) every six years to elect the mayor and the members of the city council by a majority vote. If a majority vote is not achieved in the first round, a second round takes place. Each mayoral candidate presents a list of potential deputies (as many deputies as the number of seats on the city council). The list that obtains the most votes obtains 50 percent of the seats on the city council. The remaining seats are distributed among all lists of potential deputies (including the majority list) which received at least 5 percent of the votes cast.

The city council, chaired by the mayor, collectively has the legislative authority to manage the municipality's affairs through its decisions. Her scope of authority spans from approving budgets, determining local tax rates, creating or canceling communal jobs, acquiring and dispos-

[10] Municipal elections in France were held in 1983, 1989, 1995, 2001, and 2008. The data were obtained through the Center for Socio-Political Data (CDSP).

ing of communal property, approving loans, grants, and subsidies to setting tariffs for communal services and on-street parking.

# 4 Empirical Strategy

Our sample presents the ideal characteristics to test our hypotheses, as there is only one contractor and parking represents a standard product. Therefore, a large part of the heterogeneity in our dataset comes from the procurer's organizational type (public versus private) and the cross-sectional and time-varying political contestability in the public administrations.

## 4.1 Dependent Variables

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 renegotiation terms embedded in original contracts or the contractual parties' talks after the contract was signed.

Instead, we focus on the *ex post* outcomes of renegotiations 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 (if expired) or the time elapsed since closing the contract (if still active) in years, which yields the average number of formal renegotiations per year per contract.

## 4.2 Public versus Private Contracts

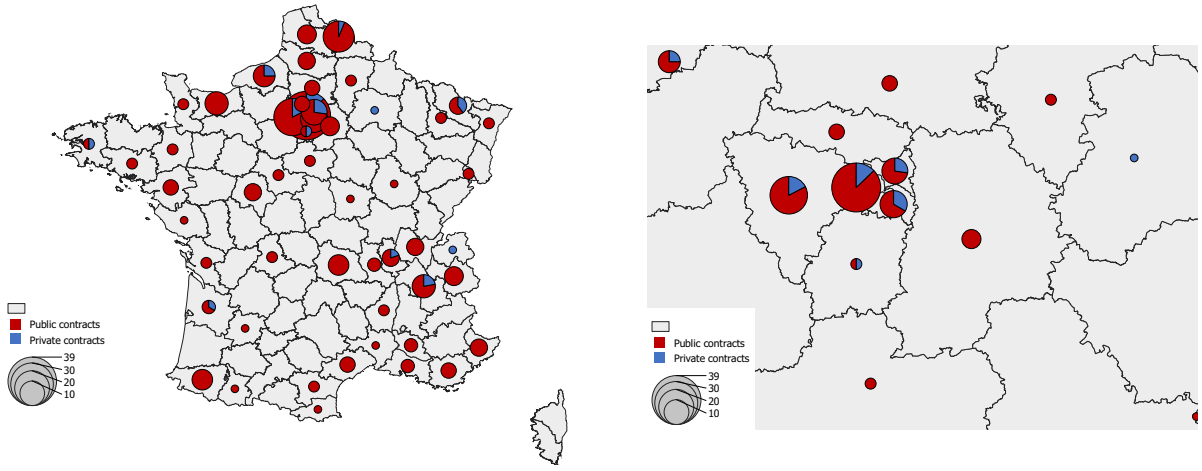
Moszoro, Spiller, and Stolorz (2016) showed that political contestability leads to rigidity and also to more renegotiations using contracts filled through the SEC's Edgar system. They studied contracts in regulated versus non-regulated industries, both in the private-sector domain, thus blurring their measure of "publicness." In the dataset used in this paper, the public-sector versus private-sector domains are clearly identified.

To ensure that we correctly classified public versus private contracts, we hand-coded a dummy variable *public* that equals one when the contract is signed between a private contractor and a public administration, and zero when the contract is signed between a private contractor and a private procurer. Consequently, a private contract does not involve elected officials, and

the standard regulations of the industry delimit public accountability.

Public-private and private-private contracts may differ along many unobserved dimensions, including the nature of services, location, type and history of clients, pricing schemes, and subsidies. Our methodology addresses these concerns. First, comparability is validated by the fact that parking agreements correspond to a standard product (cf. section 3.1). It is similar to manage a car park for a public hospital and a private clinic or to manage private and public car parks located near airports. Moreover, parking lots located close to shopping centers are alternately managed through public and private contracts. Second, our sample is relatively well distributed geographically, covering half of the French departments (see Figure 2). Lastly, given the industry's competitiveness, the assignment of the procurer's type—public or private—is random: i.e., from the contractor's perspective, the arrival of contracts from public or private procurers is independent of the contractor.

**Figure 2:** This figure presents the number of public and private contracts by department in our sample. The left graph plots pie charts for all of France. The right graph zooms in Île-de-France, the most populous French region located in the North-center and often called *région parisienne* ("Paris region") because of its proximity to the city of Paris. The red color in the pie charts corresponds to public contracts, the blue color corresponds to private contracts, and the pie size corresponds to the number of contracts by department in our sample.




## 4.3 Contract Rigidity

To assess the rigidity levels of our contracts, we follow Moszoro, Spiller, and Stolorz (2016) and construct "dictionaries" by which we machine-read rigidity categories: arbitration, certification, evaluation, litigation, penalties, termination, and contingencies. The dictionaries and dataset

are the same as in Beuve, Moszoro, and Saussier (2019).

The rigidity categories capture relevant contractual clauses intended to signal probity and lower the likelihood of challenges by third parties. Table 1 presents the list of search terms clustered into seven rigidity categories[11] and their total count.

These terms univocally relate to their corresponding categories. Arbitration clauses submit plausible disputes to an arbitrator instead of a court.[12] Certification clauses regulate the contractor regarding certification requirements. Evaluation clauses introduce duties regarding delivery. Litigation clauses appear as triggers to a lawsuit. Penalty clauses describe the damages and sanctions for contract breaching. Termination clauses signal ways to resolve intractable contract disruptions. Finally, contingency clauses make provisions for future possible but uncertain events and circumstances. We created as many variables as rigidity dimensions.

**Table 1:** This table presents the search terms grouped into rigidity categories.

| | | |
|---|---|---|
| ***Arbitration*** | appeal, arbitration, conciliation, guarantee, intervention, mediation, settlement, warranty, whereas[13] | 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 |
| **Total** | | 34,572 |

Similarly to Beuve, Moszoro, and Saussier (2019), we then used the normalized frequencies (i.e., $z$-values) of the total count of search terms in each category to measure the degree of difference between contracts. For example, we transformed the total word count of search terms

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

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

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

in the *Arbitration* category by calculating:

$$zArbitration = \frac{Arbitration - \mu}{\sigma} \tag{9}$$

where $\mu$ is the mean and $\sigma$ is the standard deviation of the count of *Arbitration* search terms across all contracts. This gives us a global rigidity measure, *zRigidity*:

$$\begin{aligned} zRigidity = zArbitration + zCertification + zEvaluation + zLitigation \\ + zPenalties + zTermination + zContingencies \end{aligned} \tag{10}$$

### 4.4 Political Contestability

In their seminal contributions about the effect of political competition on policy in US states, Besley and Case (2003) and Besley, Persson, and Sturm (2010) measure the distance fraction of seats held by one party to 0.5. This measure fits well in bipartisan political setups. In France, political fragmentation is usually higher: even if two parties can be legitimately defined as dominant (i.e., the left-wing party *Parti Socialiste* and the right-wing parties *Les Républicains*),[14] other political forces—extremist, centrist, and green parties—play an important role, and it is common to have city mayors who belong to one of these not-dominant parties. Consequently, we adopt different measures of political competition to capture party fragmentation.

Following Laakso and Taagepera (1979), Ferraz and Finan (2011), Berliner and Erlich (2015), and Beuve, Moszoro, and Saussier (2019), we base our measure on the Herfindhal-Hirschman Index ($HHI$) and effective number of parties. The *Number of Effective Parties* ($NEP$) is defined as the inverse of the sum of squared vote shares for each party ($HHI$):

$$HHI_{m,t} = \sum_{i=0}^{n} {P_{i,m,t}}^2 \tag{11}$$

$$NEP_{m,t} = \frac{1}{HHI_{m,t}} \tag{12}$$

where $P_{i,m,t}$ is the vote share of each party $i$ in municipality $m$ at time $t$ during the first round of municipal elections preceding the date of signature. $NEP$ lower than two corresponds to a single-party domination, while increasing values beyond that reflect the extent to which effective competition is between two or more than two parties. $NEP$ is an intuitive measure of political

[14] The name of the actual party *Les Républicains* had changed many times during the period under study: *Rassemblement Pour la République, Union Pour la Majorité Présidentielle, Les Républicains.*

concentration and displays a normal distribution, whereas $HHI$ is right-skewed. According to our Hypothesis 1, we expect politically competitive municipalities to utilize more rigid contracts and renegotiate them at a higher rate.

The $NEP$ index does not take into account that the party with the highest vote share in the first round may not win the election in the second round. Moreover, political contestability could be higher in the case of a dominant party but multiple political contenders, facilitating scrutiny and hampering collusion. To address this issue, we define a second variable to capture the opposition's strength. 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. Analogously to $NEP$, the variable *Number of Residual Effective Parties* ($NREP$) is defined as the inverse of $Residual\_HHI_{m,t}$ in municipality $m$ at time $t$ and allows to measure the strength of political opposition:

$$Residual\_HHI_{m,t} = \frac{\sum_{j=0}^{n} {NWP_{j,m,t}}^2}{\left(1 - WP_{m,t}\right)^2} \tag{13}$$

$$NREP_{m,t} = \frac{1}{Residual\_HHI_{m,t}} \tag{14}$$

### 4.5 Control Variables

We include the set of control variables identified by Beuve, Moszoro, and Saussier (2019) that can affect contractual rigidity. First, we take into account two different contract types described in section 3.2: $Operating_{i,t}$, and $Provision\_of\_Services_{i,t}$. In the estimations, provision-of-services contracts are compared to operating contracts through a dummy variable. Because these contractual arrangements correspond to different levels of investment and complexity, we should observe that provision-of-services contracts are less rigid than operating contracts.

Second, contractual requirements can also vary among the same contract types. We take into account 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. The type of service is orthogonal to the contract types—provision-of-services and operating contracts—thus these variables add to the strength of our analysis.

Third, our dataset is comprised of closed and ongoing contracts. In the former case, we are considering renegotiations over the whole contract duration; in the latter case, we are considering

renegotiations over the elapsed duration of the contract. To avoid assuming that renegotiations occur uniformly over contract life—an assumption that would go against empirical evidence provided by Guasch (2004)—we include the variable $Expired_{i,t}$ which takes value 1 if the contract is expired and 0 if is still ongoing.

Fourth, we control for the possible influence of a corrupted environment on public contracts. The sizable financial flows involved make public procurement particularly susceptible to fraud and corruption. Our variable *Corruption*—obtained from Transparency International France—measures the number of cases of corruption implicating the mayor or a member of the municipal council in the three years preceding the date the contract was signed. This measure is conditional on corruption cases being detected and prosecuted, which does not necessarily reflect endemic corruption.

Fifth, we control for the city's size (measured by the natural logarithm of the number of inhabitants, $Inhabitants_{i,t}$) and the political leaning of the city's mayor ($Left\_Wing_{i,t}$ or $Right\_Wing_{i,t}$) where the parking lot was located.

Sixth, we introduce several variables to control for path dependency arising from cumulative knowledge or procedural inertia. $Renewed_{i,t}$ is a dummy equal to zero for original contracts and 1 for renewed (follow-up) contracts; $Experience_{i,t}$ represents the relationship length between the contractual parties in years (i.e., the difference between the dates that the contract was signed and their first bilateral contract); and $Past\_Contracts_{i,t}$ captures the number of all common contracts up to the observation date.

Seventh, since the estimation results may be driven by unobserved characteristics of the sector, which may have evolved over such a long period (24 years), we control for potential biases by introducing year fixed effects corresponding to the year in which the contract was signed.[15]

Finally, we cluster our estimations at the departmental level (58 jurisdictions). Descriptive statistics of the variables used in the empirical tests are provided in Table 2.

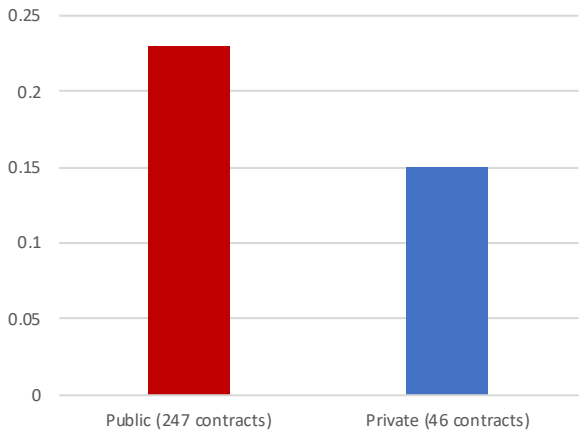
[15] Contracts tend to become more rigid over time, which may be indicative of a learning process and "red tape" inertia by public administrations, where subsequent arrangements replicate the contractual clauses of previous contracts and add new ones. In unreported regressions, we use a time trend to see whether this learning process (i.e., *cumulative rigidity*) from public administrations could affect our estimates. The results remained qualitatively the same.

# 5 Identification

Moszoro and Spiller (2019) argue that the specific nature of public contracts 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 be more formally renegotiated. Since relational contracting is not an option for public contracts in highly contested political environments, each renegotiation should be traduced into a formal amendment. Consequently, we should observe two trends: on the one hand, public contracts are more renegotiated than private contracts; on the other hand, public contracts are more renegotiated in environments of political contestability.

At first glance, figure 3 confirms that the frequency of renegotiations is higher for public contracts than for private contracts.

**Figure 3:** This figure presents the frequency of renegotiations defined as the number of formal amendments to a contract divided by the time elapsed since its signing. Public are contracts signed between a municipality and a contractor; private are contracts signed between a private-sector procurer and a contractor.




To test Hypothesis 1, we estimate a linear OLS model:

$$Frequency\ of\ renegotiations_{i,t} = \alpha + \beta_1 Public_{i,t} + \gamma Y_{i,t} + \epsilon_{i,t} \tag{15}$$

where $Frequency\ of\ renegotiations_{i,t}$ is the number of amendments divided by the duration of the contract $i$, $Public_{i,t}$ is the dummy variable indicating whether contract $i$ signed at date $t$ is a public contract, and $Y$ is a vector of control variables and $\epsilon_{i,t}$ is the error term.

Next, we test Hypothesis 2 using a 2SLS system of equations:

$$\begin{cases} Frequency\ of\ renegotiations_{i,t} = \beta_0 + \beta_1 Contractual\ Rigidity_{i,t} + \gamma_j Y_{i,t} + \epsilon_{i,t} \\ Contractual\ rigidity_{i,t} = \beta_2 + \beta_3 Public_{i,t} \times Political\ Contestability_{i,t} + \gamma_k Y_{i,t} + \zeta_{i,t} \end{cases} \tag{16}$$

where $Contractual\ rigidity_{it}$—i.e., rigidity level of contract $i$ at date of contract signing $t$—is instrumented using measures of political contestability described in section 4.4.

# 6 Results

## 6.1 Public contract renegotiations

To test Hypothesis 1 on whether public contracts are renegotiated more often than private contracts, we regress the frequency of contract renegotiations on a dummy variable equal to 1 for public contracts and zero for private contracts. Table 3 presents the results of OLS regressions estimating equation (15). On average, public-to-private contracts are renegotiated 7–13 percent more often than private-to-private contracts.

The results are economically and statistically significant and robust to the inclusion of covariates and controls (see models 2–3). Renewed (follow-up) contracts are renegotiated less often than original contracts since renewed contracts may have already been renegotiated at renewal time. The coefficient associated with our variable *Expired* is positive and statistically significant, suggesting that renegotiations do not occur uniformly over contract life but rather more frequently towards their end. Interestingly, contracts for larger parking lots measured by the number of places are renegotiated less frequently than contracts for smaller parking lots (see model 2); this relationship, however, vanishes when adding further controls (see model 3).

## 6.2 Public contract renegotiations and political contestability

To test Hypothesis 2 on whether the frequency of public contract renegotiations rises with political contestability through contractual rigidity, we instrument contractual rigidity with measures of public scrutiny and political competition, which precede the signing of the contract. Beuve, Moszoro, and Saussier (2019) showed that political contestability causes public (but not private) contractual rigidity (i.e., the relevance restriction holds). Thus, political contestability is a suitable instrument for contractual rigidity since contractual rigidity cannot cause a contract to become public or increase the *ex-ante* number of parties in an electoral race (i.e., the exclusion restriction holds).

Table 4 presents the results of 2SLS estimations of equation (16). The first stage estimates contractual rigidity with a dummy variable equal to 1 for contracts in the public domain (model 1), the number of equal parties in a municipal election race defined as the inverse of the sum of squared vote shares for each party (model 2), and the number of equal opposition parties in a municipal election race defined as the inverse of the sum of squared vote shares for each opposition party, i.e., without the winning party vote share (model 3). The first-stage estimations show that political contestability is correlated with public contract rigidity.

Further, second-stage regressions show that the frequency of renegotiations increases with contractual rigidity. Our contractual rigidity measure is the sum of seven $z$-scores. Thus, the point estimates show that an increase in one standard deviation in each category of contractual rigidity increases contract renegotiation by 7.7–10.5 percent, a substantial increase from an unconditional average of 22 percent. In sum, public contracts are renegotiated more often because their level of rigidity is much higher. The reason why few private contracts get renegotiated is that their average rigidity is low (as compared to public contracts), and only those contracts which are rigid get renegotiated. The results associated with the control variables *Places*, *Renewed*, and *Expired* remain similar to the ones reported in Tables 3 and 4.

### 6.3 Robustness Checks

The distinction between public and private contracts—as employed to test in Hypothesis 1—can be blurred in some cases. For example, the CEO of the airport may be appointed by the local government and replaced after a partisan swing in the local elections. The incumbent CEO may anticipate her unstable job situation and choose higher contractual rigidity to avoid probity challenges. There are only two situations of such mixed governance—one airport and one train station—in our data. Our results remain identical after excluding these two observations.

Our variable *Contractual rigidity* plays an important role in testing Hypothesis 2 on whether the frequency of public contract renegotiations rises with political contestability through contractual rigidity. Following Beuve, Moszoro, and Saussier (2019), this variable is constructed as a linear combination of our seven categories (see Table 1). Such a measure might be challenged because it encompasses different types of rigidity and assumes equal weighting of the seven categories. As a robustness check, we implement the following procedure to fine-tune our measure of rigidity. First, we re-estimate our 2SLS system of equations for each of the seven rigidity

categories and identify the relevant—i.e., statistically significant—categories. Four variables (categories) are salient: arbitration, penalties, litigation, and contingencies. These variables account for two-thirds of the word count. We construct an alternative rigidity measure, *Alt_rigidity* as the sum of the identified salient categories:

$$Alt\_rigidity = zArbitration + zLitigation + zPenalties + zContingencies \tag{17}$$

We then re-estimate our 2SLS system of equations with our new synthetic indicator of rigidity. The results of the estimates of Equation 16 using these alternative measures of rigidity—reported in Table 5—are stronger than the previous estimations, reassuring us about the robustness of our results concerning the effect of political contestability on public contract rigidity and the subsequent effect on renegotiations.

# 7 Discussion and Conclusions

We advance a theoretical framework for a novel set of hypotheses regarding the high rate of public contract renegotiation based on third-party political hazards. We find evidence that public contracts are renegotiated 7–13 percent more frequently than comparable private contracts due to their higher procedural rigidity, which is how public agents minimize the risks of opportunistic challenges from political competitors.

The model also captures relevant features beyond the scope of our data for further research:

(a) Technology shocks and severe economic crises move the contractual reference point; thus, they will likely induce renegotiations. During our sample period, the car park sector was not subject to major supply- or demand-side shocks. The advancement of electro-mobility may trigger renegotiations of car park contracts (e.g., to include electric chargers). Likewise, extended lockdown periods during the Covid-19 pandemic—when car parks remained largely idle—can foster price and land use renegotiations.

(b) Corruption implicates a certain degree of collusion among the political establishment and higher tolerance among political opponents, consequently lower contractual rigidity. On the other hand, corruption increases graspable rents from tenure $O$ and may trigger government-initiated opportunistic renegotiations described by Guasch, Laffont, and Straub (2007). This is not a concern for our identification, however, as corruption in France does not seem to affect contractual features in the car park sector (Beuve, Moszoro, and Saussier 2019).

The results suggest that previous empirical studies pointing to the inefficiencies of public contracts related to high renegotiation rates are flawed. Frequent renegotiations observed in public contracts can be understood in part as a consequence of their non-remediable rigid nature instead of a manifestation of opportunistic behavior, whether by bidders or public agents.

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## Appendix A Generalization of the Utility Function

The optimal contract will depend on the distribution of the probability space $\mathbb{S}$—which determines $\mathbb{E}(\lambda)$ and $\mathbb{E}(\nu)$—and the ratio $Q/O$.

Recalling equation (8) and assuming away $C(x^C)$, for $\mathbb{E}(\lambda) > \mathbb{E}(\nu)$ and $O \geq Q$ (i.e., when the gains from office tenure $O$ are not smaller than the gains from contract continuation $Q$), $\mathbb{E}(\lambda)O > \mathbb{E}(\lambda)\,\mathbb{E}(\nu)Q \;\forall\; \mathbb{E}(\lambda), \mathbb{E}(\nu)$. Therefore, the optimal contract will be the corner solution of a politically safe contract $\mathbb{X}^C = \mathbb{X}^P$. Beyond $\mathbb{X}^P$, the marginal decrease in expected gains from office $O\frac{\partial\,\mathbb{E}(\lambda)}{\partial x^C}$ is absolutely larger than the marginal increase in expected gains from contract continuation $Q\left[\frac{\partial\,\mathbb{E}(\lambda)}{\partial x^C}\,\mathbb{E}(\nu) + \mathbb{E}(\lambda)\frac{\partial\,\mathbb{E}(\nu)}{\partial x^C}\right]$.

For $\mathbb{E}(\lambda) > \mathbb{E}(\nu)$ and $O < Q$ (i.e., the gains from contract continuation $Q$ are larger than the gains from office tenure $O$), the optimal contract will be $\mathbb{X}^C \supset \mathbb{X}^P$ (i.e., in the space outside the politically safe contract). Normalizing $O = 1$ in equation (8) and taking the derivative with respect to $x^C$, we obtain:

$$\frac{\partial\,\mathbb{E}(U)}{\partial x^C} = \frac{\partial\,\mathbb{E}(\lambda)}{\partial x^C} + Q\left[\frac{\partial\,\mathbb{E}(\lambda)}{\partial x^C}\,\mathbb{E}(\nu) + \mathbb{E}(\lambda)\frac{\partial\,\mathbb{E}(\nu)}{\partial x^C}\right] \tag{18}$$

From the F.O.C. and solving for $Q$, we obtain:

$$Q = \frac{-\frac{\partial\,\mathbb{E}(\lambda)}{\partial x^C}}{\frac{\partial\,\mathbb{E}(\lambda)}{\partial x^C}\,\mathbb{E}(\nu) + \mathbb{E}(\lambda)\frac{\partial\,\mathbb{E}(\nu)}{\partial x^C}} \tag{19}$$

Since $\mathbb{S}$ is a compact space, the slope of $\mathbb{E}(\lambda)$ outside $\mathbb{X}^P$ mirrors the slope of $\mathbb{E}(\nu)$, thus

$$-\frac{\partial\,\mathbb{E}(\lambda)}{\partial x^C} = \frac{\partial\,\mathbb{E}(\nu)}{\partial x^C} \tag{20}$$

Replacing (20) in (19) and generalizing to $Q/O$, we obtain:

$$\frac{Q}{O} = \frac{1}{\mathbb{E}(\lambda) - \mathbb{E}(\nu)} \tag{21}$$

I.e., the ratio of $Q/O$ raises exponentially in $x^C$, which lowers $\mathbb{E}(\lambda)$ and increases $\mathbb{E}(\nu)$. In other words, as the contract becomes flexible, the gains from contract continuation have to be very high to compensate for the likely loss of office. Conversely, public contracts will be less rigid when public agents put more weight on social welfare and intrinsic incentives (higher $Q/O$).

**Table 2:** This table presents descriptive statistics of the variables used in the empirical tests. Frequency of renegotiations is the number of formal contract amendments divided by the duration of the contract. Contractual rigidity is the normalized measure of procedural terms in a contract. Public is a dummy variable equal to 1 when the contract was signed between a municipality and a private-sector contractor, and zero when the contract was signed between two private-sector parties. NEP is the number of equal parties in a municipal election race defined as the inverse of the sum of squared vote shares for each party. NREP is the number of equal opposition parties in a municipal election race defined as the inverse of the sum of squared vote shares for each opposition party, i.e., without the winning party vote share. Provision-of-services is a dummy variable equal to 1 when the contract is for short-term contracts that do not require investments and zero when the contract is a medium- or long-term operating contract where the investor bears demand risk and collects user fees. Contract duration is the intended duration of the contract in years. Places is the number of parking units in thousands. Corruption is the number of cases of corruption implicating a municipal official in the three years preceding the date the contract was signed, registered by Transparency International France. Renewed is a dummy variable equal to zero for original contracts and 1 for renewed (follow-up) contracts. Inhabitants is the natural logarithm of the number of inhabitants in the municipality. Left-wing mayor and right-wing mayor are dummy variables if the incumbent mayor at the time of renegotiation was left-wing or right-wing leaning, respectively. Experience is the difference between the dates that the contract was signed and their first contract. Past contracts is the number of all common contracts up to the observation date. Year of contract signing is the year the contract was signed.

| **Variables** | **Mean** | **Std** | **Min** | **Max** |
|---|---|---|---|---|
| Frequency of renegotiations | 0.22 | 0.36 | 0 | 2 |
| Contractual rigidity | 1.90 | 18.06 | -27.62 | 73.62 |
| Public | 0.84 | 0.36 | 0 | 1 |
| NEP | 2.93 | 0.86 | 1 | 4.82 |
| NREP | 2.23 | 0.38 | 1.51 | 3.11 |
| Provision-of-services | 0.47 | 0.50 | 0 | 1 |
| Contract duration | 12.81 | 8.36 | 1 | 33 |
| Places (thousand) | 0.20 | 1.42 | 0.00 | 24.16 |
| Corruption | 1.88 | 1.09 | 0 | 9.75 |
| Renewed | 0.19 | 0.39 | 0 | 1 |
| Expired | 0.28 | 0.45 | 0 | 1 |
| Inhabitants | 10.51 | 1.39 | 8.09 | 14.08 |
| Left-wing mayor | 0.11 | 0.31 | 0 | 1 |
| Righ-wing mayor | 0.33 | 0.47 | 0 | 1 |
| Experience | 8.46 | 11.54 | 0 | 43 |
| Past contracts | 2.99 | 9.23 | 0 | 68 |
| Year of contract signing | 2002 | 6.54 | 1985 | 2008 |

**Table 3:** This table presents results of OLS regressions of the determinants of the frequency of contract renegotiations. The dependent variable is the **frequency of contract renegotiations** defined as the number of formal contract amendments divided by the duration of the contract. Public is a dummy variable equal to 1 when the contract was signed between a municipality and a private-sector contractor, and zero when the contract was signed between two private-sector parties. Provision-of-services is a dummy variable equal to 1 when the contract is for short-term contracts that do not require investments and zero when the contract is a medium- or long-term operating contract where the investor bears demand risk and collects user fees. Contract duration is the intended duration of the contract in years. Places is the number of parking units in thousands. Corruption is the number of cases of corruption implicating a municipal official in the three years preceding the date the contract was signed, registered by Transparency International France. Renewed is a dummy variable equal to zero for original contracts and 1 for renewed (follow-up) contracts. Other controls include the number of inhabitants, the political leaning of the city's mayor, experience, past contractual relationship, and year fixed effects. The contract sample period is 1985-2008 and election data period is 1983-2008. Heteroskedasticity-robust $t$-statistics clustered at the municipal level are reported in parenthesis; * denotes significance at 10%, ** significance at 5%, and *** significance at 1%.

| | (1) | (2) | (3) | (4) |
|---|---|---|---|---|
| Public | 0.078* | 0.078* | 0.130** | 0.106* |
| | (0.043) | (0.044) | (0.058) | (0.057) |
| Provision-of-services | | 0.055 | 0.036 | 0.042 |
| | | (0.046) | (0.050) | (0.049) |
| Contract duration | | -0.002 | -0.004 | 0.003 |
| | | (0.003) | (0.004) | (0.005) |
| Places | | -0.014*** | -0.005 | -0.009** |
| | | (0.003) | (0.004) | (0.004) |
| Corruption | | -0.004 | -0.008 | -0.000 |
| | | (0.018) | (0.019) | (0.018) |
| Renewed | | -0.221*** | -0.213*** | -0.171*** |
| | | (0.041) | (0.043) | (0.044) |
| Expired | | | | 0.183*** |
| | | | | (0.062) |
| Controls | No | No | Yes | Yes |
| $N$ | 293 | 293 | 293 | 293 |
| $r^2$ | 0.006 | 0.067 | 0.094 | 0.123 |

**Table 4:** This table presents results of 2SLS regressions of the determinants of the frequency of contract renegotiations instrumenting contractual rigidity with measures of political contestability. The dependent variable is the **frequency of contract renegotiations** defined as the number of formal contract amendments divided by the duration of the contract. Provision-of-services is a dummy variable equal to 1 when the contract is for short-term contracts that do not require investments and zero when the contract is a medium- or long-term operating contract where the investor bears demand risk and collects user fees. Contract duration is the intended duration of the contract in years. Places is the number of parking units in thousands. Corruption is the number of cases of corruption implicating a municipal official in the three years preceding the date the contract was signed, registered by Transparency International France. Renewed is a dummy variable equal to zero for original contracts and 1 for renewed (follow-up) contracts. As instruments of contractual rigidity, we use: Public, NEP, and NREP, where the baseline is private contracts. Public is a dummy variable equal to 1 when the contract was signed between a municipality and a private-sector contractor, and zero when the contract was signed between two private-sector parties. NEP is the number of equal parties in a municipal election race defined as the inverse of the sum of squared vote shares for each party. NREP is the number of equal opposition parties in a municipal election race defined as the inverse of the sum of squared vote shares for each opposition party, i.e., without the winning party vote share. Other controls include the number of inhabitants, the political leaning of the city's mayor, experience, past contractual relationship, and year fixed effects. The contract sample period is 1985-2008 and election data period is 1983-2008. Heteroskedasticity-robust $t$-statistics clustered at the municipal level are reported in parenthesis; * denotes significance at 10%, ** significance at 5%, and *** significance at 1%.

| | (1) | | (2) | | (3) | |
|---|---|---|---|---|---|---|
| | First stage | IV | First stage | IV | First stage | IV |
| Contractual rigidity | | 0.014* | | 0.011** | | 0.012* |
| | | (0.007) | | (0.005) | | (0.007) |
| Provision-of-services | -9.207*** | 0.113 | -9.170*** | 0.090 | -9.429*** | 0.104 |
| | (2.531) | (0.084) | (2.498) | (0.072) | (2.823) | (0.086) |
| Contract duration | -0.110 | -0.004 | -0.156 | -0.004 | -0.193 | -0.005 |
| | (0.162) | (0.004) | (0.159) | (0.004) | (0.183) | (0.004) |
| Places | 2.784*** | -0.048* | 2.764*** | -0.039* | 11.671*** | -0.180 |
| | (0.755) | (0.027) | (0.747) | (0.023) | (4.476) | (0.136) |
| Corruption | 0.123 | -0.006 | 0.151 | -0.004 | 0.027 | 0.002 |
| | (0.928) | (0.023) | (0.922) | (0.022) | (0.971) | (0.023) |
| Renewed | -2.020 | -0.175*** | -1.717 | -0.181*** | -2.158 | -0.133* |
| | (2.667) | (0.068) | (2.640) | (0.063) | (2.980) | (0.071) |
| Expired | -4.526* | 0.200*** | -4.405* | 0.188*** | -4.711* | 0.172*** |
| | (2.341) | (0.065) | (2.330) | (0.059) | (2.552) | (0.067) |
| Controls | Yes | Yes | Yes | Yes | Yes | Yes |
| **First-stage instruments** | | | | | | |
| Public | 11.884*** | | | | | |
| | (3.464) | | | | | |
| NEP | | | -3.379** | | | |
| | | | (1.654) | | | |
| NEP × Public | | | 4.332*** | | | |
| | | | (0.993) | | | |
| NREP | | | | | -2.148 | |
| | | | | | (3.322) | |
| NREP × Public | | | | | 5.077*** | |
| | | | | | (1.576) | |
| F-statistics | 11.77 | - | 9.51 | - | 5.35 | - |
| $p$-value | 0.001 | - | 0.001 | - | 0.005 | - |
| $N$ | 293 | 293 | 293 | 293 | 293 | 293 |
| $r^2$ | 0.216 | 0.297 | 0.236 | 0.141 | 0.195 | 0.195 |

**Table 5:** This table presents results of 2SLS regressions of the determinants of the frequency of contract renegotiations instrumenting contractual rigidity with measures of political contestability. The dependent variable is the **frequency of contract renegotiations** defined as the number of formal contract amendments divided by the duration of the contract. Provision-of-services is a dummy variable equal to 1 when the contract is for short-term contracts that do not require investments and zero when the contract is a medium- or long-term operating contract where the investor bears demand risk and collects user fees. Contract duration is the intended duration of the contract in years. Places is the number of parking units in thousands. Corruption is the number of cases of corruption implicating a municipal official in the three years preceding the date the contract was signed, registered by Transparency International France. Renewed is a dummy variable equal to zero for original contracts and 1 for renewed (follow-up) contracts. As instruments of contractual rigidity, we use: Public, NEP, and NREP, where the baseline is private contracts. Public is a dummy variable equal to 1 when the contract was signed between a municipality and a private-sector contractor, and zero when the contract was signed between two private-sector parties. NEP is the number of equal parties in a municipal election race defined as the inverse of the sum of squared vote shares for each party. NREP is the number of equal opposition parties in a municipal election race defined as the inverse of the sum of squared vote shares for each opposition party, i.e., without the winning party vote share. Other controls include the number of inhabitants, the political leaning of the city's mayor, experience, past contractual relationship, and year fixed effects. The contract sample period is 1985-2008 and election data period is 1983-2008. Heteroskedasticity-robust $t$-statistics clustered at the municipal level are reported in parenthesis; * denotes significance at 10%, ** significance at 5%, and *** significance at 1%.

| | (1) | | (2) | | (3) | |
|---|---|---|---|---|---|---|
| | First stage | IV | First stage | IV | First stage | IV |
| Alternative contractual rigidity | | 0.018** | | 0.017** | | 0.018* |
| | | (0.009) | | (0.008) | | (0.010) |
| Provision-of-services | -4.351*** | 0.064 | -4.209*** | 0.057 | -4.181*** | 0.065 |
| | (1.401) | (0.064) | (1.387) | (0.061) | (1.568) | (0.068) |
| Contract duration | -0.040 | -0.005 | -0.051 | -0.005 | -0.048 | -0.007* |
| | (0.090) | (0.004) | (0.089) | (0.003) | (0.102) | (0.004) |
| Places | 1.287*** | -0.032 | 1.271*** | -0.030 | 6.773*** | -0.161 |
| | (0.418) | (0.020) | (0.415) | (0.019) | (2.486) | (0.120) |
| Corruption | 0.555 | -0.014 | 0.603 | -0.013 | 0.532 | -0.007 |
| | (0.513) | (0.022) | (0.512) | (0.021) | (0.539) | (0.023) |
| Renewed | -1.968 | -0.167*** | -1.768 | -0.171*** | -2.686 | -0.112 |
| | (1.476) | (0.063) | (1.466) | (0.061) | (1.655) | (0.070) |
| Expired | -2.553** | 0.184*** | -2.430* | 0.179*** | -2.750* | 0.164*** |
| | (1.296) | (0.056) | (1.294) | (0.055) | (1.417) | (0.060) |
| Controls | Yes | Yes | Yes | Yes | Yes | Yes |
| **First-stage instruments** | | | | | | |
| Public | 9.064*** | | | | | |
| | (1.917) | | | | | |
| NEP | | | -2.229** | | | |
| | | | (0.919) | | | |
| NEP × Public | | | 2.905*** | | | |
| | | | (0.552) | | | |
| NREP | | | | | -2.477 | |
| | | | | | (1.845) | |
| NREP × Public | | | | | 3.647*** | |
| | | | | | (0.875) | |
| F-statistics | 22.35 | | 13.86 | | 8.70 | |
| $p$-value | 0.000 | | 0.001 | | 0.001 | |
| $N$ | 293 | 293 | 293 | 293 | 293 | 293 |
| $r^2$ | 0.269 | 0.287 | 0.263 | 0.167 | 0.232 | 0.195 |