The Rigidity of Public Contracts[*]

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Abstract

We applied algorithmic data reading and textual analysis to compare the complexity of public contracts in regulated industries subject to public scrutiny with relational private contracts. We show that public contracts are larger, feature more arbitration, evaluation, litigation, and termination clauses, and their renegotiation is formalized in amendments with more arbitration clauses. We sustain that the higher rigidity of public contracts is a political risk adaptation of public agents by which they lower the likelihood of success of third-party opportunistic challenges.

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Contracting is at the basis of every economic activity and has been an important subject of study at law, economics, and business schools. Yet there has been a scant number of empirical studies on contract features (Schwartz and Scott 2010).

Previous works focused on contract completeness (Schwartz and Scott 2003; Shavell 2006), particularly on contract interpretation. The cost of writing a contract is increasing in the number of contingencies (Dye 1985). Incompleteness arises endogenously from insufficient description of the parties' behavior (discretion) and insufficient contingency of the parties' obligations to external states (rigidity) (Battigalli and Maggi 2002). Optimal complex contracts can be too costly to design by the parties and enforce by the law's interpretive rules, thus induce parties to use simple contracts (Schwartz and Watson 2004). There is a positive correlation between complexity (e.g., measured by contract length) and the probability that parties choose arbitration (Drahozal and Ware 2010), and arbitration is preferred for contracts with more "implicit" terms (Drahozal and Hylton 2003).

Schwartz and Watson (2012) tackled the question about the institutional environment where there is a preference for arbitration. Arbitration is less costly than court trials, but require more accurate contracts. They provided a model, supported by empirical evidence, where a welfare-maximizing enforcer induces the contracting parties to make socially efficient trade-offs between interpretation accuracy and cost of contract writing, i.e., between trial cost and investment in the deal.

Spiller (2008) and Moszoro and Spiller (2012) present an complementary rationale for public contracts. Even if the enforcer is a welfare maximizer, the public agent is subject to political hazards. Therefore public contracts are more rigid—have more "explicit" terms— than purely private contracts as a political risk adaptation of the public agent to overweight plausible challenges by third parties and the increased cost of contract writing is externalized to the public at large.

There is strong anecdotical evidence on the rigidity of public contracts,[1] but no comprehensive empirical study. Our approach is similar to Schwartz and Watson (2012). We use the same data source (SEC filings) and analogous algorithmic data reading, but our study differs in its filters, treatment, and testable predictions. Data scraping and word clustering from

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[1] For rigidity in the contracting practice at a municipal utility see Appendix A.

almost 100,000 contracts from SEC's EDGAR database, we test Moszoro and Spiller's (2012) hypothesis of higher rigidity of public contracts compared with purely private contracts.

1 A Model of Contractual Rigidity

Contracting cost rises exponentially in contract rigidity and determines the trade-off between interpretation accuracy and cost of contract writing, as shown by Schwartz and Watson (2012).

In Moszoro and Spiller (2012), the lack of flexibility in public procurement design and implementation reflects public agents' political risk adaptation to limit hazards from opportunistic third parties—political opponents, competitors, interest groups—while externalizing the associated adaptation costs to the public at large. Public agents minimize both contracting and political costs given by:

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

where $K(R)$ are adaptation costs rising exponentially in contract rigidity, ρ is the likelihood of a challenge by an opportunistic third party, τ is the likelihood of success of an opportunistic challenge, and T_0 is the public agent's cost if a challenge by third parties is successful. Third parties observe benefits from opportunistic challenge, but the public agent does not know *ex ante* the particular value of these benefits for third parties. Third parties' overall benefits from an opportunistic challenge correspond to a random normally distributed variable $\widetilde{T_0}$.

Moszoro and Spiller (2012) show that in equilibrium third parties challenge a contract only if expected gains $\widetilde{T_0}\zeta\tau$ are bigger than litigation costs $c(R)$:

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

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

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

(b) 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 design depending on the characteristics of the contracting parties:

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

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

2 Data and Methodology

2.1 Background of the SEC's EDGAR Database

All companies, foreign and domestic, are required to file registration statements, periodic reports, and other forms electronically through the U.S. Securities and Exchange Commission's (SEC) EDGAR System. Filing requirements for compliance with SEC's regulations are described in (Overdahl 1991). A modern index to forms is available at: http://www.sec.gov/info/edgar/forms/edgform.pdf. Although this information is available to the public, research on contracting has been stymied by a lack of parametrization.

The Contracting and Organizations Research Institute (CORI) based at the University of Missouri-Columbia facilitates access to EDGAR database. CORI's K-Base library contains over 690,000 contracts. Most of the contracts in the collection are executed agreements made available in public disclosure filings or in filings with a regulatory agency. The required disclosure filings made by publicly traded companies frequently contain contracts that are of material interest to investors. CORI extracted and categorized these contract filings to make them more directly available.

2.2 Data Treatment

Step 1: Rough Data

An issuer must file as Exhibit 10 to a registration statement or periodic report "material contracts" described in items 601(b)(10) of Regulation S-K and Regulation S-B. Examples of

types of material contracts include: Asset Purchase Agreements; Bridge Loan Agreements; Cash Bonus Plans; Director Fee Agreements; Director Indemnification Plans; Employment Agreements; Executive Compensation Plans and Incentive Plans; Financial Services Agreements; Joint Venture Agreements; Lease Agreements; Letters of Intent; License Agreements; Pension Plans; Profit Sharing Plans; Purchase Agreements; Stock Option Agreements; Stock Purchase Agreements; and Termination Agreements.

We recovered material contracts through the Securities & Exchange Commission's FTP server. The data in this system consists of electronic filings by corporations and individual filers to the SEC. These filings are disseminated to the public through the EDGAR Dissemination Service. The EDGAR indexes facilitate FTP retrieval listing the following information for each filing: Company Name, Form Type, CIK, Date Filed, and File Name (including folder path).

In the "full-index" folder, year and quarter subfolders contain these data fields sorted by company name, form type, and Central Index Key (CIK) number. We used the form type index to identify "Exhibit 10" documents included with the filing of forms 10-K, 10-K/A, 10-Q, and 10-Q/A which require the inclusion of material contracts and then retrieve each exhibit 10 from the location indicated in the filing index.

We retrieved almost 100,000 contracts dated from 2001 to 2007 and translated all files to machine-readable ASCII text format. We measured contract length by character count. HTML-formatted files were converted to ASCII-equivalent dividing character count by a bloat factor of 1.6. We then use the natural logarithm of character count for file length normalization.

Step 2: Company Identification

By data scraping, we identified each filing company by the Stock Exchange Commission's Central Index Key (CIK) embedded in the file and linked it to the company's ticker, Standard Industrial Classification (SIC) code, and location by ZIP code.[2] We dropped 81,254 filings to which no CIK or SIC code was associated.

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[2] See http://www.sec.gov/edgar/searchedgar/cik.htm and http://www.sec.gov/edgar/searchedgar/companysearch.html (accessed on September 24, 2012) for a list of CIK and SIC codes. Some companies do not have a SIC code at all.

Step 3: Public vs. Private

We classified the contracts as *"Utilities"* and *"Quasi-regulated"* (i.e., where there is one public agency, state, county, or municipality involved) vs. purely *"Private"* by the SIC code.[3]

(a) Filing companies whose SIC code starts with 6 (Finance) and 9 (Administration) were filtered out

(b) *"Utilities":* filing companies whose SIC code is between 4900 and 4999, i.e., electric, gas & sanitary services, electric services, natural gas transmission, natural gas transmission & distribution, natural gas distribution, electric & other services combined, gas & other services combined, water supply, sanitary services, refuse systems, hazardous waste management, steam & air-conditioning supply,[4] cogeneration services & small power producers

(c) *"Quasi-regulated industries":* filing companies whose SIC code is between 4000 and 4499 and between 4800 and 4899, i.e., railroad switching & terminal establishments, local & suburban transit, interurban highway passenger transportation, trucking & courier services (no air), trucking (no local), public warehousing & storage, terminal maintenance facilities for motor freight transport, water transportation, deep sea foreign transportation of freight, telephone communications (no radiotelephone), telegraph & other message communications, radio broadcasting stations, television broadcasting stations, cable & other pay television services, communications services

(d) *"Private":* filing companies whose SIC code starts with 1, 2, 3, 5, 7, and 8

We distilled 3,325 public contracts and 12,066 private contracts.

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[3] See, e.g., Matsumoto (2002) for a treatment of SIC codes regarding regulation. We modified his treatment and classified companies whose SIC code is between 4800 and 4899 to *"quasi-regulated industries"*. See http://www.sec.gov/info/edgar/siccodes.htm for the Standard Industrial Classification (SIC) Code List description.

[4] For the sake of clarity, SIC code 4961: Steam & Air-conditioning Supply refers to establishments engaged in the production and/or distribution of steam and heated or cooled air for sale, not to commercial and industrial air-conditioning equipment. Its equivalent NAICS Code is 221330. For a manual of SIC codes, see: https://www.osha.gov/pls/imis/sic_manual.html.

Step 4: Word Count and Categorization

We complemented Schwartz and Watson's (2012) keyword list of arbitration clauses—arbitration (and variants), whereas, court, appeal, mediation, litigation, warranty, guaranty, specification, and deposition—with 28 new keywords, grouped them into six rigidity categories: *Arbitration, Certification, Evaluation, Litigation, Penalties,* and *Termination.* We also counted conjunctions introducing conditional clauses that indicate *Contingencies.* We provided an algorithmic keyword count by data scraping. Table (1) presents keywords clustered in rigidity categories.

Table 1: This table presents the keywords searched and grouped into contract rigidity categories. Plurals (e.g., penalties) and variations (e.g., penalized) are also counted.

Arbitration	**Certification**	**Evaluation**	**Litigation**
appeal, arbitration, conciliation, guarantee, intervention, mediation, settlement, warranty, whereas[5]	certification, permit, regulation	accountability, control, covenant, obligation, quality, specification, scrutiny	court, dispute, indictment, jury, lawsuit, litigation, pleading, prosecution, trial
Penalties	**Termination**	**Contingencies**	
damage, fine, indemnification, penalty, sanction	breach, cancel, dissolution, separation, termination	if, provided that, providing that, subject to, whenever, whether	

We counted 782,333 keywords overall: arbitration 79,222; certification 135,158; evaluation 204,854; litigation 33,026; penalties 107,378; and termination 222,695.

Step 5: Descriptive Contract Categories

We scraped keywords contained in the subject metafile of contracts to match descriptive categories to the categories presented in table (2). We identified categories for 11,491 files: agreement 779; material contracts 475; "exhibit 10" 4,214; amendment 1,265; compensation/employment 2,419; consulting 171; finance 926; and miscellaneous 1,040.

Table (3) presents the summary statistics of the distilled and classified dataset.

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

3 Contract Features and Hypotheses

The contract features that we use as proxies of complexity are: length, clusters of rigidity clauses, and number of amendments to contracts. Sector and descriptive categories are used as control variables for fixed effects. We were unable to extract the duration and value of the contracts.

We advance the following hypotheses:

Hypothesis 1 *Public contracts are larger than private contracts.*

Hypothesis 2 *Public contracts have more rigidity clauses than private contracts.*

Hypothesis 3 *Public contracts are renegotiated through formal processes, thus have more amendments than private contracts and amendments show more rigidity clauses than in private contracts.*
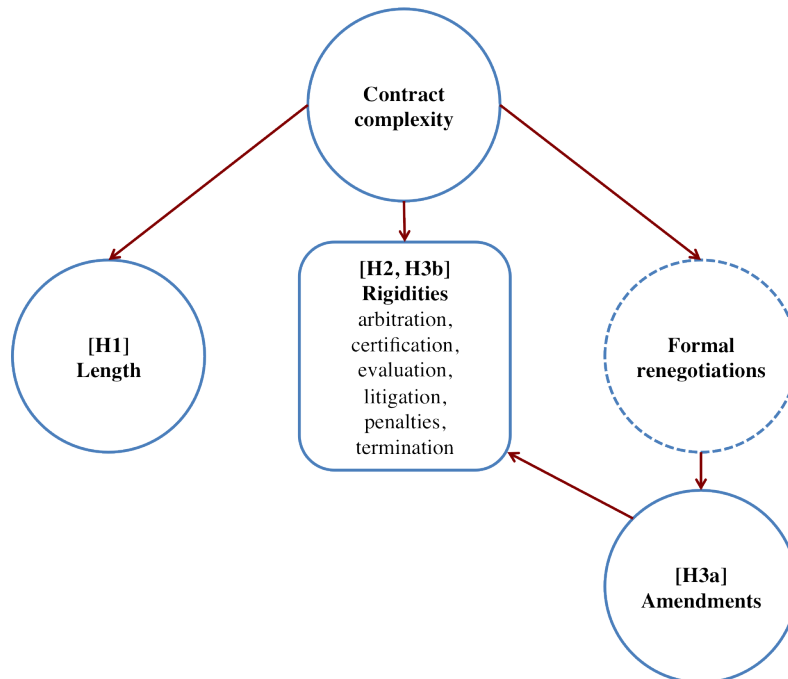
Figure (1) maps these hypotheses graphically.

Figure 1: This graph maps the hypotheses and research approach.

4 Identification Strategy

As "predictors" of complexity of public contracts we use length (hypothesis (1)) and frequency of rigidity clauses (hypothesis (2)). We test these hypotheses with OLS and logit regressions and OLS regressions for each rigidity category as described in equations(3) and (4), and (5) respectively:

$$Length_i = \alpha_0 + \alpha_1 Utilities_i + \alpha_2 Quasi\_regulated_i + \alpha_3 Group_{i,k} + Controls_i + \varepsilon_i \quad (3)$$

$$Utilities_i = \alpha_0 + \alpha_1 Length_i + \alpha_2 Group_{i,k} + Controls_i + \varepsilon_i$$

$$Quasi\_regulated_i = \alpha_0 + \alpha_1 Length_i + \alpha_2 Group_{i,k} + Controls_i + \varepsilon_i \quad (4)$$

$$Rigidities_{i,l} = \alpha_0 + \alpha_1 Utilities_i + \alpha_2 Quasi\_regulated_i + \alpha_3 Group_{i,k} + Controls_i + \varepsilon_i \quad (5)$$

where i is the contract index, $Utilities_i$ is a dummy variable that is equal to 1 when the contract i is a utilities contract and 0 otherwise, $Quasi\_regulated_i$ is a dummy variable that is equal to 1 when the contract i is a quasi-regulated contract and 0 otherwise, thus when both $Utilities_i$ and $Quasi\_regulated_i$ equal zero, it is a private-to-private contract, $Length_i$ is the natural logarithm of character count of contract i, $Group_{i,k}$ is a set of dummies for descriptive groups k—agreement, material contracts, exhibit 10, amendments, compensation/employment, consulting, finance, and miscellaneous—of file i, and $Rigidity_{i,l}$ is the frequency of rigidity keywords clustered in clauses l—arbitration, certification, evaluation, litigation, penalties, termination, as shown in table (1)—calculated as the count of rigidity keywords times 1,000 divided by $Length$ of file i, i.e.,

$$Rigidity_{i,l} = \frac{\text{Count of keywords of rigidity clause } l \text{ in file } i \times 1,000}{Length_i} \quad (6)$$

We control for industry (one-digit SIC) fixed effects, long contracts (without low decile files in length), and material contracts only (agreement, material contracts, exhibit 10).

To prove hypothesis (3), we apply OLS and logit regressions of amendments on contract characteristics, controlling for contract length and industry (one-digit SIC) fixed effects, as specified in equation (7):

$$Amendment_i = \alpha_0 + \alpha_1 Utilities_i + \alpha_2 Quasi\_regulated_i + \alpha_3 Length_i + Controls_i + \varepsilon_i \quad (7)$$

Additionally, we test for rigidity clauses in amendments with analogous OLS equations to equation (5), filtering for amendments, as shown in equation (8).

$$(Rigidities_{i,l} \mid Amendment_i = 1) = \alpha_0 + \alpha_1 Utilities_i + \alpha_2 Quasi\_regulated_i +$$
$$\alpha_3 Group_{i,k} + Controls_i + \varepsilon_i \tag{8}$$

5   Empirical Results

We find that utility contracts are larger, have more arbitration, litigation, and termination clauses, and have more amendments with more arbitration clauses than private contracts. Contracts in quasi-regulated industries are shorter, but exhibit more arbitration, litigation, and termination clauses than private contracts. When controlling for long contracts and material contracts only, public contracts show also more evaluation clauses than private contracts.

Tables (4) and (5) show that public utilities contracts are significantly larger than private contracts. Table (4) presents results of OLS and logit regressions for all files. Table (5) presents results for files classified as material contracts—where the identified descriptive group was agreement, material contract, or exhibit 10, and controlling for files below 3,000 characters, i.e., ca. one-page long. Contracts are larger when the filing entity is a public utility and the likelihood of a filing company being a public utility is higher when the contract is larger. Also, we cannot statistically reject the hypothesis that contracts of quasi-regulated companies are larger than private contracts.

Tables (6), (7), and (8) show results of OLS regression of rigidity clauses on contract characteristics. Public utilities contracts feature more rigidity clauses than private contracts. When controlling for material contracts and large files, public contracts feature more arbitration, evaluation, litigation, and termination clauses. Negative coefficients of contractual rigidity clauses—i.e., opposite to expected—are statistically insignificant.

Table (9) shows that amendments are correlated with public contacts and that the likelihood of an amendment is higher for public utilities and companies in quasi-regulated industries. Table (10) shows that amendments in public utilities contracts feature more arbitration clauses. We conjecture that public contracts are renegotiated formally through amendments instead of relationally.

6 Contractual Response to Political Contestability

Political contestability is the "extent to which a collective political actor or a system of such political actors possesses attributes, resources, positions, or other factors, in themselves or in their environments, that promote the ability to compete effectively in the political process" (Mitnick 1993, 12). If a political system is characterized by contestability, then it is rational for interest groups to petition the government on behalf of their members (Getz 1997). In fact, in the United States and in other democracies, interest groups do convey the concerns of their members to government officials and thus are a means by which citizens can influence government (Mundo 1992).

A contract is politically contestable when contractual decisions are subject to influence by potential (opportunistic) protesters.[6]

If the political opposition is fragmented, benefits from a challenge can go to any of the political competitors, not necessarily to the challenger who bears the cost of challenge c in equation (2). Public agents will respond to higher political contestability with higher contractual rigidity to lower the likelihood of a challenge (Moszoro and Spiller 2012). When the political opposition is dispersed, there will be no challenges from third parties, which resembles a single party or autocratic system.

Analogously to our previous hypotheses, we test within the regulated and quasi-regulated contracts sample the following hypothesis:

Hypothesis 4 *In politically contestable markets, public contracts:*

(a) are larger,

(b) have more rigidity clauses, and

(c) are renegotiated through formal processes, thus have more amendments and amendments show more rigidity clauses

than in less politically contestable markets.

We use the outcome of secondary elections for governor elections for political contesta-

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[6] In Capitol Hill jargon, political contestability is usually referred as the "Washington Post test," a commonly used phrase in D.C. when working on a project—"How would it look on the front page on the Washington Post?"

bility.[7]

We define several complementary measures of political contestability:

$$Color_{z,t} = \{0, 1\} \tag{9}$$

where 0 is left-wing and 1 right-wing winner in district z at time t;

$$Swings_{z,t} = \sum_{j=0}^{2} |Color_{z,t-j} - Color_{z,t-j-1}| \tag{10}$$

$$Swings_{z,t}^2 = \left(\sum_{j=0}^{2} |Color_{z,t-j} - Color_{z,t-j-1}| \right)^2 \tag{11}$$

$$Swings_{z,t}^2 = \sum_{j=0}^{2} [|Color_{z,t-j} - Color_{z,t-j-1}| \cdot (3-j)] \tag{12}$$

i.e., the simple, square, and time-weighted sum of changes in *color* in district z in the last three elections;

$$Margin_{z,t} = |A_{z,t} - B_{z,t}| \tag{13}$$

$$Margin_{z,t}^2 = (A_{z,t} - B_{z,t})^2 \tag{14}$$

$$Margin\ dummy_{z,t} = \begin{cases} 1 & \text{if} \quad |A_{z,t} - B_{z,t}| < \lambda \\ 0 & \text{if} \quad \text{else} \end{cases} \tag{15}$$

where $A_{z,t}, B_{z,t}$ are the winning and runner-up parties' vote share in district z at time t, and λ is an *a priori* threshold for political contestability (usually 10% in the U.S.);

$$Residual_{z,t} = (1 - A_{z,t}) \tag{16}$$

$$Residual\ concentration_{z,t} = \left(B_{z,t}^2 + C_{z,t}^2 + D_{z,t}^2 + \dots \right) \tag{17}$$

i.e., the Herfindahl-Hirschman Index (HHI) of residual (non-winning) parties in primaries in district z at time l; and

$$Residual\ strength_{z,t} = (1 - A_{z,t}) \times \left(B_{z,t}^2 + C_{z,t}^2 + D_{z,t}^2 + \dots \right) \tag{18}$$

i.e., the strength of the opposition measured as the residual votes weighted by their concentration in primaries in district z at time t.

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[7] We are thankful to Jeremy Mayer and Edward Rhodes for their insights on the mechanisms of American politics.

We test hypothesis (4) running in-sample regressions with similar specifications to the previously used, but changing the public-private identification variable for our measures of political contestability:

$$Length_{i,t} = \alpha_0 + \alpha_1 PC_{i,t} + \alpha_2 Group_{i,k,t} + Controls_{i,t} + \varepsilon_{i,t} \tag{19}$$

$$Rigidities_{i,l,t} = \alpha_0 + \alpha_1 PC_{i,t} + +\alpha_2 Group_{i,k,t} + Controls_{i,t} + \varepsilon_{i,t} \tag{20}$$

$$Amendment_{i,t} = \alpha_0 + \alpha_1 PC_{i,t} + \alpha_2 Length_{i,t} + Controls_{i,t} + \varepsilon_{i,t} \tag{21}$$

$$(Rigidities_{i,l,t} \mid Amendment_{i,t} = 1) = \alpha_0 + \alpha_1 PC_{i,t} + \alpha_3 Group_{i,k,t} + Controls_{i,t} + \varepsilon_{i,t} \tag{22}$$

where i is the contract index, PC_i are our political contestability instrumental variables (equations 9–18) in the district of contract i matched by the ZIP code, $Length_i$, $Group_{i,k}$, and $Rigidity_{i,l}$ are as defined in section 4. We control for industry (one-digit SIC) fixed effects, long contracts (without low decile files in length), and material contracts only (agreement, material contracts, exhibit 10).

7   Scope and Limitations of the Research

Our results are robust to a series of tests controlling for length, industry, and type of document. Results may be driven by sector/industry specificity, e.g., public utilities contracts have more of certain rigidity clauses than private contracts. Furthermore, utilities have been around for a longer period and may have learned to contract differently to survive. It is precisely this evolution into contract rigidities what we are trying to capture and endogenize. Public contracts are subject to third-party challenges, therefore public agents have learned to minimize political hazards with contract rigidities.

Our results are, however, limited by the nature and sourcing of our data. Moszoro and Spiller (2012) theory of higher rigidity of public contracts relates to similar goods/services procured by public vs. private agents, whereas 10-Q & 10-K of public utilities and private companies are not necessarily for similar goods/services. We believe that the large sample of contracts in our collection lessens this object bias.

Contract complexity is correlated with duration, geographical scope, and value of the contracts. Due to data treatment constraints, we were not able to excerpt and control for these variables.

Results are also stained by two other implicit biases: subject and sample biases. As for the subject bias, we identified contracts of public utilities as public contracts. "Truly" public contracts would include procurement contracts from public agencies, government-sponsored enterprises, and governments—municipalities, counties, states, and federal government. These institutions, however, do not fill 10-Q and 10-K and their records are not standardize and directly comparable.

As for the sample bias, it seems SEC's EDGAR—although large—is not (yet) a comprehensive contract set. The large ratio of unidentified companies by CIK raises concerns on sample bias as well. We assume, however, that the filings and our sample are heterogeneous and representative of the whole contract population.

Contracting markets and political markets overlap only partially. Perfect overlapping implies local administrative or natural monopolies. Our measures of political contestability are determined by political districts, whereas contracting markets are given by the area covered by the companies.

Finally, conclusions from our algorithmic data reading and word clustering methodology may differ by jurisdictions—between civil and common law worlds, and even within the common law system—limiting thereby there scope of appliance.

8   Concluding Remarks

Textual analysis of contractual clauses is a young, but promising avenue of research. It enables testing a variety of contractual theories and bridging law and economics research and practice.

In particular, we are interested in public contracts compared to purely private contracts. Following Moszoro and Spiller (2012), we sustain that the higher rigidity of public contracts is a political risk adaptation of public agents by which they lower the likelihood of success of third-party opportunistic challenges. Our results verify this theory.

Prospect research includes enlarging the database to up to date (ca. 1 million files) and testing within sample—i.e., within utilities contacts—the rigidity of public contracts depending on the outcome of political elections. If the political opposition is fragmented, benefits from a challenge to the incumbent political agent can go to any of the political

competitors, not necessarily to the challenger who bears the litigation costs. Our prediction is, therefore, that in contestable political markets, contracts show more rigidity clauses than in monopolized or atomized political markets.

Appendix A   Rigidity in Public Contracting at a Municipal Utility[8]

Public agencies in the State of California follow the California Public Contract Code (PCC) for procurement of materials and supplies, professional, and general services and construction contracts. The exact provisions of the contract vary by type and by agency. Almost universally, materials and supplies are awarded on a low bid basis, and professional and general services on a qualifications basis. The Public Contract Code has very limited applicability for Design-Build contracting (contracts for construction that are awarded to a designer and contractor on a the basis of a qualifications based construction process). Contracts must exceed a certain dollar threshold, be of a certain type (buildings, certain public works), and must follow guidelines for a selection process and then final reporting to State agencies.

The letter and intention of the public contract code is to provide for equity and fairness in contracting and eliminate favoritism and collusion. To that end, public contracting procedures and contract documents contain provisions to comply with these requirements and guiding principals.

Public utilities have contract templates that have been developed over a period of several decades. Those utilities with active in-house design and contracting groups maintain their contract templates so that they comply with current legal requirements.

A list of standard contractual features, which ensure fairness and minimize collusion and protests is presented below:

1. Public works construction contracts over a certain dollar threshold (in the case of the EBMUD, $70,000) must be publicly advertised and bid. Bids are publicly opened in an agency's Board Room or similar public room, after being stamped and dated in the agency's Purchasing Division. Bids documents are available for review by any interested party immediately after bid opening, and afterwards upon request. Bid results are summarized and posted online within one business day.

2. Employees with a financial interest in a company cannot be involved in a selection process that involves or potentially involves that company. Elected board officials cannot vote on contracts where they have a financial involvement. All supervisors and managers whose job involves public procurement decisions must file a "Statement of Economic Interests" annually with the Secretary of the District—this is a public record, available for public review.

3. Bids are objective and compared based on a total bid cost. Bid exceptions are not allowed. To make this possible, prescriptive specifications are developed to give clear, objective criterion on which bidders can base their bid. On occasion, "performance based" specifications are used, but enough specificity is provided to allow bidders to prepare a fixed price bid. Sole-source contracts are used on a very limited basis and are only allowed in limited circumstances under the Public Contract Code. Internal procedures exist to evaluate and approve the appropriateness of any sole-source specification. Regarding the bids themselves, official bid forms must be used, which include:

   (a) A bid form with line items including either lump sum or unit cost bid; line items such as "allowances" are rarely used, and if used, it is in minor amounts with clear guidelines on how funds are to be authorized—in writing, after receiving and reviewing an estimate, only for specific tasks, etc.

   (b) A description of bid items, describing the basis for evaluation of bids

   (c) A signed and notarized bidder's bond

   (d) A signed and notarized proposal form, signed by an authorized agent of the company

   (e) A declaration on non-collusion

   (f) A declaration of eligibility to work on public works project

   (g) Designation of subcontracts

   (h) Contract Equity program documents—usually specific to an agency, containing documentation of compliance with any local, small, or minority and women owned business requirements

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[8] We are grateful to Elisabeth Bialek for first-hand insights into the practice of public contracting at East Bay Municipal Utility District, Oakland, California.

4. Bids are evaluated and reference documents checked, and ultimately formally awarded by the agency's regulating Board:

   (a) Bids can only be withdrawn in limited circumstances, as defined in the Public Contract Code (clerical error). This ensures fairness and stops the case of bidders testing the waters with a low bid and withdrawing if they find that they are significantly lower than other bidders

   (b) Bids with irregularities cannot be accepted (errors in bid documents that would allow a bidder to withdraw cannot be accepted, even if the bidder does not withdraw)

   (c) Insurance, performance bonds and eligibility to work on public works projects are checked

5. Contracts are administered by construction management professionals. To track progress, make appropriate payments and ensure completion of the project and that it meets appropriate standards, the following contract features are included:

   (a) Payment and Performance Bonds for the full contract value

   (b) Liability, Workers Compensation, and Builders Risk Insurance (the later only if applicable)

   (c) Payment procedures, including requirements for schedule submittals, and Documentation of Charges, including payment of prevailing wages (required for all Public Works Contracts)

   (d) Submittal procedures (for verifying if materials and equipment conform to specifications—prior to ordering and installation)

   (e) Construction Inspection and Independent Materials Testing

   (f) Change Order procedures (usually issued on a lump sum basis, based on a contractor quote, reviewed and approved by an engineer, and signed off by a senior or manager, as appropriate for the amount of the change order; time and materials/force account change orders are used in limited circumstances)

   (g) Claims and Dispute Resolution procedures

   (h) Liquidated Damages procedures for unapproved delays in contract completion (vary from $1,000 to several thousands per day, depending on actual damages)

   (i) Contracts are audited periodically

6. On higher-risk projects (higher risk due to cost, liability, and criticality of infrastructure) the following procedures are sometimes included:

   (a) Expanded Evaluation of Bidder's and Qualifications—in essence, a pre-qualification procedure. Contractors are selected on a low-bid basis, but must meet more stringent qualifications requirements

   (b) Higher insurance thresholds

   (c) Escrow Bid Documents: contractors submit their actual bid documents to the awarding agency after award; these are sealed by the contractor, stored in escrow, and only opened by both parties in the presence of a third party in case of a dispute. This aids in the equitable resolution of disputes

   (d) Higher liquidated damages (must be based on realistic estimates of damages)

   (e) Alternate Dispute Resolution procedures, involving appointed resolution boards, binding or non-binding arbitration, mediation, etc.

   (f) Specific processing provisions for third party claims

   (g) Detailed pre-construction surveys on a property-by-property basis

   Regarding cost specifics:

1. Typical Planning, Design, and Construction Management costs amount to 10–15 percent of the total construction cost. These numbers vary based on job complexity and scale. Overall, smaller, more complex jobs have higher design and administration costs on a percentage basis.

2. Actual Change Order percentages for contracts tend to be around 5 percent (EBMUD budgets for 5–10 percent).

3. Protests on bids typically cost an agency $5,000–15,000, not including the differential cost to go to the next lowest bid. If a protest raises questions that are legitimate enough to question the low bid, but not definitive enough to reject the low bid without the risk of a counter-protest or further litigation, the option of re-bid (re-advertise and solicit for new bids) is usually chosen. If a re-bid is required, costs are $20,000–30,000, which does not include any possible increases in contract cost, even without scope changes.

4. Bid amount or ultimate contract cost as compared to Engineer's Estimate (EE) varies. The PCC requires that agencies demonstrate that adequate funding is available for a public works project before it is advertised. To comply with this, an in-house engineer's estimate is prepared prior to advertising a project for award. When bids are received, if there is more than a 10 percent deviation between the low bid and engineer's, the specifics are investigated. It is not uncommon to have a wider deviation. After an evaluation, if bids are deemed reasonable, adequate funding exists, and the work is deemed necessary, projects are awarded, even if they exceed the engineer's estimate. Typical reasons for cost deviation are:

   (a) When multiple bids (over 3 to 5) are received, costs tend to be lower

   (b) In crisis times—like the current economy—favorable bids are received for most projects, since private sector work has significantly slowed over the past 2–3 years. In calendar years 2009-2010, bids on average, were 18 percent below the EE. In calendar year 2011, bids, on average were 3 percent under the EE. Part of this may reflect an improvement in the economy and more work available for bidders (therefore less need to bid low on public works projects). Part may be due to the agency's adjustment of EE to reflect current market costs.

   (c) It seems to be consistently difficult to estimate costs on projects with extensive electrical work, instrumentation/controls or other technology projects or work that the agency does not typically bid out.

   (d) Certain commodities' costs fluctuate widely (e.g. concrete, metals), and so bids may be higher when costs are up or expected to widely fluctuate for the duration of the project. Contractors bid high to minimize their risk.

   (e) Certain commodities have widely varying costs based on the quantity purchased (e.g. paving, fencing, concrete)

   (f) Certain services, such as rock, concrete, asphalt and soil disposal vary widely in cost and based on local market. These services range in cost from free, to being a revenue source or being a liability with a high cost per ton for disposal.

   (g) On occasion, elements may be underestimated or overestimated by the agency due to an error with data or assumptions.

5. It is difficult to quantify costs for minimizing political risks. Agency projects are developed under the California Environmental Quality Act, which requires public input to projects and mitigation of adverse effects. There is a political influence to shaping projects. Mitigation measures always add costs to a project (tree re-plantings, habitat restoration, longer pipeline routings to minimize traffic impacts, sound barriers, limited work hours, noise mitigations, etc.). These costs are scrutinized during project development, and a balance is made between the need to minimize impacts and responsibly spend public funds. Agencies may have internal guidelines for what constitutes appropriate and not excessive mitigation measures.

References

Battigalli, P. and G. Maggi (2002). Rigidity, discretion, and the costs of writing contracts. *American Economic Review 92*(4), 798–817.

Drahozal, C. R. and K. N. Hylton (2003). The economics of litigation and arbitration. *Journal of Legal Studies 32*(2), 549–584.

Drahozal, C. R. and S. J. Ware (2010). Why do businesses use (or not use) arbitration clauses? *Ohio State Journal on Dispute Resolution 25*(2), 433–476.

Dye, R. A. (1985). Costly contract contingencies. *International Economic Journal 26*(1), 233–250.

Getz, K. A. (1997). Research in corporate political action: Integration and assessment. *Business & Society 36*(1), 32–72.

Matsumoto, D. A. (2002). Management's incentives to avoid negative earnings surprises. *The Accounting Review 77*(3), 483–514.

Mitnick, B. M. (1993). Political contestability. In B. M. Mitnick (Ed.), *Corporate Political Agency: The Construction of Competition in Public Affairs*, pp. 11–66. Newbury Park, CA: Sage.

Moszoro, M. and P. T. Spiller (2012). Third-party opportunism and the nature of public contracts. *NBER Working Paper No. 18636.*

Mundo, P. A. (1992). *Interest Groups: Cases and Characteristics.* Chicago: Nelson-Hall.

Overdahl, J. A. (1991). A researcher's guide to the contracts of firms filing with the sec. *Journal of Law and Economics 34*(October), 695–701.

Schwartz, A. and R. E. Scott (2003). Contract theory and the limits of contract law. *Yale Law Journal 113*, 541–619.

Schwartz, A. and R. E. Scott (2010). Contract interpretation redux. *Yale Law Journal 119*, 926–964.

Schwartz, A. and J. Watson (2004). The law and economics of costly contracting. *Journal of Law, Economics, and Organization 20*(1), 2—31.

Schwartz, A. and J. Watson (2012). Conceptualizing contractual interpretation. *Yale Law & Economics Research Paper No. 447.*

Shavell, S. (2006). On the writing and the interpretation of contracts. *Journal of Law, Economics, and Organization 22*(2), 289–314.

Spiller, P. T. (2008). An institutional theory of public contracts: Regulatory implications. *NBER Working Paper* (14152).

Table 2: This table presents the keywords used for file subject identification and descriptive category grouping.

Descriptive group	Keywords in file subject
Agreement	agreement; agreement and; agreement between; agreement dated; agreement for; agreement of; agreement with; agreement, dated; letter agreement; unit agreement
Material contracts	sale; asset purchase; license agreement; purchase agreement; purchase; purchase plan; sale agreement; supply agreement; to purchase
Exhibit 10	exhibit 10; exhibit 10.1; exhibit 10.11; exhibit 10.12; exhibit 10.13; exhibit 10.14; exhibit 10.15; exhibit 10.16; exhibit 10.17; exhibit 10.18; exhibit 10.19; exhibit 10.2; exhibit 10.21; exhibit 10.22; exhibit 10.23; exhibit 10.24; exhibit 10.25; exhibit 10.26; exhibit 10.27; exhibit 10.28; exhibit 10.29; exhibit 10.3; exhibit 10.31; exhibit 10.32; exhibit 10.33; exhibit 10.34; exhibit 10.35; exhibit 10.36; exhibit 10.37; exhibit 10.38; exhibit 10.4; exhibit 10.5; exhibit 10.6; exhibit 10.7; exhibit 10.8; exhibit 10.9
Amendment	amended &; amended and; amendment no.; amendment to; and release; and restated; as amended; change in; change of; fifth amendment; first amendment; fourth amendment; modification agreement; second amended; second amendment; third amendment; to amended
Compensation/Employment	award agreement; bonus plan; compensation agreement; compensation plan; deferred compensation; director compensation; director stock; employee stock; employment agreement; employment agreement,; employment contract; equity incentive; executive employment; executive officer; executive retirement; incentive compensation; incentive plan; incentive stock; indemnification agreement; long-term incentive; management agreement; management incentive; non-employee director; of director; of employment; of executive; option agreement; option grant; option plan; plan for; plan, as; restated employment; restricted stock; retention agreement; retirement plan; savings plan; separation agreement; service agreement; services agreement; settlement agreement; severance agreement; stock agreement; stock award; stock incentive; stock option; stock plan; stock purchase; supplemental executive; term incentive; to employment
Consulting	consulting agreement
Finance	credit agreement; lease agreement; loan agreement; loan and; of credit; pledge agreement; promissory note; restated credit; revolving credit; to credit; to lease; to loan; to revolving
Miscellaneous	for all other descriptive categories

Table 3: This table presents statistics of the dataset at each step.

Step	Treatment	Count
1	Readable files	99,998
	Filing companies	1,608
	Average files per company	62
	Average file length (characters)	22,013
2	Sample industry diversity: identified different 4-code SIC	320
	Dropped files with no CIK or SIC codes identified	81,254
	Dropped files SIC 6*** (Finance) and SIC 9*** (Administration)	3,353
	Public utilities contracts (SIC 4800–4999)	3,033
	Quasi-regulated industries contracts (SIC 4000–4499)	292
	Distilled public contracts	**3,325**
	Distilled private contracts	**12,066**
4	Keywords count overall	782,333
	Arbitration	79,222
	Certification	135,158
	Evaluation	204,854
	Litigation	33,026
	Penalties	107,378
	Termination	222,695
5	Files with identified categories	11,491
	Agreement	779
	Material contracts	475
	Exhibit 10	4,214
	Amendment	1,265
	Compensation/Employment	2,419
	Consulting	171
	Finance	926
	Miscellaneous	1,040

Table 4: This table presents results from cross section regressions. Models (1) and (2) present OLS regressions of contract length on contract attributes: public vs. private. Models (3) and (4) present logit regressions of utilities dummies and Models (5) and (6) present logit regressions of quasi-regulated dummies on contract length. Controls include: descriptive groups—agreement, material contracts, exhibit 10, amendments, compensation/employment, consulting, finance, and miscellaneous—and industry (one-digit SIC). In models (2), (4), and (6) we excluded short files only (below 3,000 characters). Data is from SEC's EDGAR database. Sample period is 2001-2007. In this and subsequent tables, standard errors are in parenthesis; * denotes significance at 10%, ** significance at 5%, and *** significance at 1%.

Length of Public Contracts: All Files

	(1) OLS Length	(2) OLS Length	(3) Logit Utilities	(4) Logit Utilities	(5) Logit Quasi-regulated	(6) Logit Quasi-regulated
Utilities	0.214*** (3.28)	0.103* (1.76)				
Quasi-regulated	-0.190* (-1.78)	-0.128 (-1.31)				
Length			0.0900*** (3.17)	0.0482 (1.38)	-0.0822* (-1.81)	-0.0778 (-1.26)
Constant	9.647*** (202.33)	10.12*** (238.75)	0.946*** (3.51)	1.320*** (3.78)	-0.0663 (-0.15)	-0.142 (-0.23)
Controls						
Main contracts only	No	No	No	No	No	No
Short files included	Yes	No	Yes	No	Yes	No
Descriptive group	Yes	Yes	Yes	Yes	Yes	Yes
One-digit SIC	Yes	Yes	Yes	Yes	Yes	Yes
Observations	15391	13184	3682	3143	966	801
Adjusted R^2	0.064	0.044				
Pseudo R^2			0.068	0.064	0.058	0.073

Table 5: This table presents results from cross section regressions. Models (1) and (2) present OLS regressions of contract length on contract attributes: public vs. private. Models (3) and (4) present logit regressions of utilities dummies and Models (5) and (6) present logit regressions of quasi-regulated dummies on contract length. Controls include: industry (one-digit SIC), filtering for material contracts (agreement, material contracts, and exhibit 10; excluding amendments, compensation/employment, consulting, finance, and miscellaneous files). In models (2), (4), and (6) we excluded short files (below 3,000 characters). Data is from SEC's EDGAR database. Sample period is 2001-2007.

Length of Public Contracts: Material Contracts

	(1) OLS Length	(2) OLS Length	(3) Logit Utilities	(4) Logit Utilities	(5) Logit Quasi-regulated	(6) Logit Quasi-regulated
Utilities	0.533***	0.292***				
	(5.37)	(3.39)				
Quasi regulated	-0.206	-0.0847				
	(-1.22)	(-0.55)				
Length			0.248***	0.159***	-0.0760	-0.0512
			(5.98)	(3.08)	(-1.12)	(-0.53)
Constant	10.04***	10.35***	-1.593***	-0.781	-0.431	-0.746
	(314.31)	(371.80)	(-3.82)	(-1.47)	(-0.65)	(-0.76)
Controls						
Material contracts only	Yes	Yes	Yes	Yes	Yes	Yes
Short files included	Yes	No	Yes	No	Yes	No
One-digit SIC	Yes	Yes	Yes	Yes	Yes	Yes
Observations	3939	3616	1230	1008	446	386
Adjusted R^2	0.022	0.012				
Pseudo R^2			0.025	0.008	0.003	0.001

Table 6: This table presents results from OLS cross section regressions of frequency of rigidity clauses on contract attributes: public vs. private and contract length. Controls include: descriptive groups—agreement, material contracts, exhibit 10, amendments, compensation/employment, consulting, finance, and miscellaneous—and industry (one-digit SIC). Data is from SEC's EDGAR database. Sample period is 2001-2007.

Rigidity Clauses in Public Contracts: All Files

	(1) Arbitration	(2) Certification	(3) Evaluation	(4) Litigation	(5) Penalties	(6) Termination
Utilities	106.3***	-78.40	82.79	45.93***	-33.83	65.22
	(4.31)	(-1.40)	(1.09)	(2.68)	(-0.87)	(1.09)
Quasi-regulated	366.9***	12.87	193.5	131.2***	-23.84	357.1***
	(9.09)	(0.14)	(1.56)	(4.68)	(-0.37)	(3.66)
Length	320.0***	628.7***	871.2***	146.2***	428.0***	819.1***
	(104.89)	(90.80)	(92.67)	(68.99)	(88.98)	(110.94)
Constant	-2681.7***	-5330.6***	-7430.6***	-1270.0***	-3594.4***	-6882.1***
	(-77.69)	(-68.05)	(-69.86)	(-52.98)	(-66.04)	(-82.38)
Controls						
Main contracts only	No	No	No	No	No	No
Short files included	Yes	Yes	Yes	Yes	Yes	Yes
Descriptive group	Yes	Yes	Yes	Yes	Yes	Yes
One-digit SIC	Yes	Yes	Yes	Yes	Yes	Yes
Observations	15391	15391	15391	15391	15391	15391
Adjusted R^2	0.433	0.400	0.410	0.256	0.369	0.466

Table 7: This table presents results from OLS cross section regressions of frequency of rigidity clauses on contract attributes: public vs. private and contract length. Controls include: industry (one-digit SIC), filtering for material contracts only. Data is from SEC's EDGAR database. Sample period is 2001-2007.

Rigidity Clauses in Public Contracts: Material Contracts

	(1) Arbitration	(2) Certification	(3) Evaluation	(4) Litigation	(5) Penalties	(6) Termination
Utilities	108.3***	-30.43	163.3**	63.22***	-7.155	72.27
	(4.19)	(-0.54)	(2.04)	(3.36)	(-0.18)	(1.18)
Quasi-regulated	410.4***	4.728	166.0	117.8***	-35.20	353.4***
	(9.28)	(0.05)	(1.21)	(3.65)	(-0.51)	(3.37)
Length	306.5***	591.2***	830.0***	148.9***	412.5***	774.8***
	(90.79)	(79.70)	(79.24)	(60.45)	(78.16)	(96.81)
Constant	-2576.9***	-5031.5***	-6966.5***	-1270.5***	-3409.1***	-6364.1***
	(-76.73)	(-68.19)	(-66.85)	(-51.83)	(-64.94)	(-79.94)
Controls						
Main contracts only	No	No	No	No	No	No
Short files included	Yes	Yes	Yes	Yes	Yes	Yes
One-digit SIC	Yes	Yes	Yes	Yes	Yes	Yes
Observations	11274	11274	11274	11274	11274	11274
Adjusted R^2	0.425	0.363	0.360	0.248	0.353	0.457

Table 8: This table presents results from OLS cross section regressions of frequency of rigidity clauses on contract attributes: public vs. private and contract length. Controls include: long contracts (above 3,000 characters) and industry (one-digit SIC), filtering for material contracts only. We excluded short files (below 3,000 characters). Data is from SEC's EDGAR database. Sample period is 2001-2007.

Rigidity Clauses in Public Contracts: Material Contracts and Large Files

	(1) Arbitration	(2) Certification	(3) Evaluation	(4) Litigation	(5) Penalties	(6) Termination
Utilities	149.6***	-0.764	250.2***	84.93***	10.58	132.2*
	(5.16)	(-0.01)	(2.74)	(3.88)	(0.23)	(1.91)
Quasi-regulated	516.3***	-18.02	190.1	142.8***	-57.21	424.0***
	(10.09)	(-0.16)	(1.18)	(3.70)	(-0.70)	(3.47)
Length	418.2***	851.5***	1145.3***	208.9***	560.6***	1026.1***
	(89.87)	(83.77)	(78.22)	(59.46)	(75.48)	(92.38)
Constant	-3782.1***	-7822.6***	-10355.4***	-1916.5***	-4996.4***	-9063.0***
	(-78.68)	(-74.51)	(-68.48)	(-52.82)	(-65.13)	(-79.00)
Controls						
Main contracts only	Yes	Yes	Yes	Yes	Yes	Yes
Short files included	No	No	No	No	No	No
One-digit SIC	Yes	Yes	Yes	Yes	Yes	Yes
Observations	9337	9337	9337	9337	9337	9337
Adjusted R^2	0.467	0.431	0.398	0.278	0.381	0.481

Table 9: This table presents results from OLS and logit cross section regressions of amendments on company attributes. Controls include: length and industry (one-digit SIC). Data is from SEC's EDGAR database. Sample period is 2001-2007.

	Amendments in Public Contracts	
	(1) OLS	(2) Logit
	Amendment	Amendment
Utilities	0.0566***	1.718***
	(4.86)	(5.01)
Quasi-regulated	0.0556***	1.700***
	(2.90)	(4.17)
Length	0.00210	0.0284
	(1.49)	(1.50)
Constant	0.0826***	-2.441***
	(5.08)	(-11.45)
Controls		
One-digit SIC	Yes	Yes
Observations	15391	15391
Adjusted R^2	0.007	
Pseudo R^2		0.015

Table 10: This table presents results from OLS cross section regressions of frequency of rigidity clauses in amendments on company attributes: public vs. private. Controls include: length and industry (one-digit SIC). Data is from SEC's EDGAR database. Sample period is 2001-2007.

	Rigidity Clauses in Public Contracts Amendments					
	(1)	(2)	(3)	(4)	(5)	(6)
	Arbitration	Certification	Evaluation	Litigation	Penalties	Termination
Utilities	118.4***	-151.0	-93.19	17.17	-2.116	96.32
	(2.70)	(-1.56)	(-0.75)	(0.62)	(-0.04)	(1.03)
Quasi-regulated	62.94	109.8	102.2	25.55	-15.25	17.52
	(0.48)	(0.38)	(0.27)	(0.31)	(-0.10)	(0.06)
Length	325.9***	632.9***	874.0***	119.3***	397.3***	742.1***
	(27.66)	(24.30)	(26.14)	(16.09)	(29.38)	(29.66)
Constant	-2826.6***	-5608.4***	-7706.9***	-1056.8***	-3421.2***	-6332.6***
	(-24.13)	(-21.66)	(-23.19)	(-14.34)	(-25.44)	(-25.45)
Controls						
One-digit SIC	Yes	Yes	Yes	Yes	Yes	Yes
Observations	1265	1265	1265	1265	1265	1265
Adjusted R^2	0.387	0.319	0.353	0.172	0.410	0.416