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ABSTRACT

We study the extent of a one-size-fits-all approach in the design of public procurement (PP) tenders using comprehensive data from Finland. We show that crucial PP design features related to auction and contract rules tend to have significant lack of variation across different tenders for different industries within a contracting authority. We show that this organizational rigidness is due to both organizational level culture and individual employee level work habit formation with the latter being more important. We find that both greater organizational rigidity and deviating from the national industry norms are associated with lower number of bids and higher probability of zero-bid tenders, pointing to a potential efficiency loss from organizational rigidness in PP, and offering a solution that buyers should mimic how other organizations typically buy similar products rather than how they themselves buy very different products. Keywords: public procurement, organizational culture

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1. Introduction

When designing a public procurement (PP) tender, authorities must specify several crucial design features related to the auction and contract rules. Using comprehensive data from Finland, this paper documents a pervasive 'one-size-fits-all' approach in designing PP tenders. We show that key design features exhibit significant homogeneity across industries within a given organization. This finding of organizational rigidness is critical, as PP constitutes one of the largest sectors of government activity and includes some of the most frequent and high-stakes decisions made in the public sector.[1]

At a broader level, our research examines the formation and influence of organizational practices within the contracting authority (or in simpler words, a *public buyer*).[2] We study whether the mechanism behind organizational rigidness relates to organizational culture and norms or individual employee level habit formation. Additionally, we are interested in how such organizational practices influence PP outcomes?

Although the scope of this paper is only a correlational study, we are able to explore ∼18,000 tenders, 275,000 auctions and 705,000 bids made in public procurement in Finland. We investigate several aspects of the procurement procedure. In particular, we examine the use of various PP features by contracting authorities in designing tender invitations and awarding contracts. The features are: whether to use price-only or scoring auction as an allocation rule; whether to divide the contract into lots, that is, accepting multiple bids (for different lots) from the same bidder and accepting multiple winners; whether to announce engineer estimates of the total value of the contracts; and whether to allow additional purchasing options in tenders. To verify if the use of these features is associated with organizational practices, we examine how prone the procuring office of a contracting authority is to use the same feature repeatedly across tenders across different industries. To elucidate, if we know that contracting authority A uses a scoring allocation rule for a given tender in the construction industry, then how likely is A to use the same allocation rule for its other tenders in other industries?

Our key findings imply that a one-size-fits-all approach is common in designing PP tenders, i.e. that there is a significant lack of variation in the use of the procurement design features within organizations. We investigate the origins of this organizational rigidness (OR) in two ways. First, we use data on the personal names of tender initiators to decompose this pattern and determine if it stems from organizational culture (i.e., employees copying the behavior of coworkers, which we refer to with OC) or work habit formation (i.e., employees replicating their own behavior across the tenders, which we refer to with HF). Our results indicate that both channels are present, but the effect of HF is substantially larger.

Second, we investigate the association between organizational rigidness and PP outcomes, in particular competition. One desirable cost-saving mechanism in PP that uses the public tendering process is higher

[1] In 2022, PP was estimated to account for about 12% of the GDP of OECD countries. In 2018, the total value of PP in Finland was above the average of OECD countries, accounting for roughly 18% of its GDP (≡ 47 billion euros), of which two-thirds were subject to public tendering process (Merisalo et al., 2021).

[2] A *contracting authority* could be a state- or municipal authority, joint municipal authority or a body governed by public law. Bodies governed by public law may include municipality-owned or state-owned limited liability companies.

competition, which likely exerts a downward pressure on prices (Bulow and Klemperer, 1996; Klemperer, 2000; Onur and Tas, 2019).[3] We find that organizational rigidness is associated with a lack of competition in bids. This result sheds light on a pertinent policy concern - the inadequacy in tender design that may cause inefficiencies within public procurement from the standpoint of the competition. Our finding also aligns with previous scholarly concerns (Besley and Ghatak, 2005; Kautsch et al., 2015) regarding organizational culture's tendency to induce conservatism and stagnation within organizations. What may seemingly be a conventional or cost-saving approach to public procurement, adopted by contracting authorities, might inadvertently hinder competition and potential price gains. Our empirical section confirms both that a one-size-fits-all approach to PP tenders and deviating from nationwide industry norms is associated with less competition.

This paper is organized as follows. In Section 2 we define the relevant concepts and review the literature. In Section 3, we describe the institutional settings of PP in Finland. In Section 4, we introduce the data and our empirical strategy. These are followed by our main results in Section 5 and further analyses on robustness and validity in Section 6. Finally, we discuss and conclude in Section 7.

2. Conceptual framework and literature review

In this section, we discuss three possible mechanisms that can lead to rigidness in organizations. Anecdotally PP officials call an extreme example of rigidness as the so-called "changing-the-date" phenomenon. In this case, the past purchasing procedures drive the current choice such that a buyer only changes minor features such as the date (and of course the description of what is to be purchased) of the old tender documents without tailoring the contract features and auction rules to the current needs. Such behavior may arise from both organizational and individual employee level mechanisms.

Organizational culture can be defined as the often-observed and repeated functions and outcomes of organizations that result from their adopted goals, ideals, norms, standards, principles and premises. From what probably starts historically as a set of values, over time become assumptions underlying the organization's functioning and are thus taken for granted (Schein, 1988).

Drawing on literature in various disciplines, we summarize here some mechanisms that could be linked to the evolution of organizational culture in PP. One of them is "mission motivation" (or "mission alignment"), a concept that emerges both in economics and public administration literature. It highlights that employees (particularly in public organizations) often have their individual interests aligned with the organization's ideals and goals (Besley and Ghatak, 2005; Akerlof and Kranton, 2005; Dur and Zoutenbier, 2014; Cowley and Smith, 2014). It is plausible that if employees are mission-motivated, they would not hesitate to comply

[3] Though this "competition effect" is just one side of the theoretical predictions in auction theory, other sides of the theory backed by empirical evidence argue for a countervailing effect through factors like the "common values effect" (Bulow et al., 1999; Hong and Shum, 2002), the "affiliation effect" (Pinkse and Tan, 2005; Hubbard et al., 2012), and the "entry effect" (Li and Zheng, 2009).

with the pre-established practice of designing contracts in that office. Public administration scholars further argue that when employees have strongly aligned personal and organizational interests and goals, they tend to avoid potential threats of policy failure that may arise from adopting any new strategy. This concept is documented in the literature as "prevention focus" (Kuehnhanss et al., 2017; Tukiainen et al., 2024), and could apply to some extent in our context, i.e. PP officials avoiding potential threats of choosing a strategy different from what is already an established practice within the organization.[4] Organizational culture could also stem from "peer effects" in the workplace. Empirical evidence based on both laboratory experiments and real-world data from firms, confirms the effect of peers or co-workers on productivity and output (Herbst and Mas, 2015; Falk and Ichino, 2006; Cornelissen et al., 2017).

Our exploration of OC relates to several significant branches. The closest literature in economics and finance that our study cuts across is that of corporate culture (Hermalin, 1999; Gorton et al., 2021). Some of the established theoretical concepts of corporate culture that are related to our study are culture as a *stock of knowledge* à la Crémer (1993) and culture as *shared beliefs* à la Van den Steen (2010). Crémer's conceptualization of the firm's organization of information across the employees through the diffusion of firm-specific pertinent facts and rules of behavior is somewhat relatable to our case. It means that it is shared knowledge among the officials in a procuring unit that tenders are usually issued with a standard common set of features. Van den Steen's modeling of corporate culture is not as shared knowledge but as shared beliefs. When beliefs are shared via a homogeneous culture, employees jointly focus on the organization's goals, which results in less monitoring, faster coordination, higher motivation and more communication, whereas the costs are less experimentation.

Finally, our paper adds to nascent literature in quantitative studies exploring the link between OC and organizational choices and outcomes. Notably, Martinez et al. (2015) study OC both as a determinant and a consequence of economic activities. Through intervention in healthcare practices, they show how subtle cultural adjustments can solve adaptive challenges and thus improve outcomes, while acknowledging the difficulty in altering deeply rooted practices. Curry et al. (2018) provide evidence of strategic changes in OC that support high performance and help hospitals in their efforts to improve clinical outcomes. It is important to note, however, that our focus here does not encompass the evolution or shaping of culture over time (for a comprehensive overview, refer to Ali et al. (2021)). Our present objective centers solely on studying OC's role in shaping organizational choices and outcomes. In line with prior studies, the suggestive implication of our study is that if OC is less adaptive, it can have adverse effects on organizational outcomes.

Work habit formation is defined as learned, repeated employee actions that occur automatically without awareness or intention in similar work circumstances Renn et al. (2024). There is a large literature relevant to work habit formation in various disciplines, mostly psychology. Renn et al. (2024) synthesizes a

[4]While the explanation on the alignment of individual goals with organization's interests could well be valid in our case, it also implies that PP sector could run the risk of becoming conservative and rigid with lack of innovation (Besley and Ghatak, 2005). This negative aspect of PP is evident from the findings by Kautsch et al. (2015) in the Polish healthcare sector, where conservative OC within hospitals could act as a barrier to adopting new procurement approaches.

vast body of literature to argue that employee work habits are a distinct, powerful, and yet under-studied construct. Wood and Rünger (2016) and Wood (2017) argue that these habits are learned, automatic, and context-triggered, distinguishing them from general habits by their direct impact on organizational effectiveness, their embedding in the organizational context, and their association with organizational rewards (Johns (2006), Elsbach (2004)).

Work habits are formed when goal-directed behaviors are repeated in a stable context with initial rewards (Wood and Rünger (2016)). This process leverages neuroscientific insights, where unexpected rewards create a "reward prediction error," releasing dopamine that stamps the new habit into memory (Sambrook and Goslin (2015) and the references therein). A critical finding from the literature is that once firmly established, habits become independent of the original goals and rewards, making them remarkably difficult to change (Wood and Neal (2007)). While habits may reduce cognitive and emotional burden and unnecessary effort at the workplace, they can also hinder experimentation and tailoring the tenders to specific product-specific needs.

Shirking While these above mechanisms could be well valid, we cannot preclude the possibility of the workers in public offices simply shirking from effort (Delfgaauw and Dur, 2008) or being too busy to invest in optimizing purchase procedures due to exhausting daily job demand (Bakker, 2015). The administrative burden (Kang and Miller, 2022) of tailoring new tender and contract structures could also be a discouraging factor and thus lead them to follow a standard code of doing their tasks. Bucciol et al. (2020) find that the competence level of a contracting authority in dealing with regulated business-to-government procedures through competitive bidding is positively associated with the size of its procuring office (measured by overall personnel costs), implying that the competence of the procuring office can be compromised in the absence of sufficient personnel and other resources. Under such circumstances, organizational rigidness could merely be analogous to a bad equilibrium in which organizations end up due to sub-optimal resources.[5]

3. Institutional setting

3.1. PP regulations in Finland

The European Union Procurement Directive 2014/24/EU is transposed to the Act on Public Procurement and Concession Contracts (1397/2016) in Finland. The European Union (EU) and national rules require that all contracts exceeding predetermined EU thresholds are concluded based on specific predetermined procedures. In addition, national procurement acts may set requirements for those purchases below EU thresholds. These rules set out obligations for contracting authorities, i.e., state and local agencies, congregations and enterprises owned by public authorities.

[5]It underlines the classic principal-agent problem where in the absence of suitable incentives (or, monitoring) from the principal, the PP officials (agents) avoid effort and responsibilities, or make poor decisions, especially when the workload is already high. This, in turn, conflicts with the final goal of the task.

A typical procurement procedure is as follows. When a public entity (=contracting authority) decides to make a purchase that exceeds the threshold value, it must advertise the contract notice and the *Invitation To Tender* (ITT) on a public electronic notice board. The ITT includes all information about the purchase, timeline of the procurement and allocation rule, thus, ensuring complete and transparent dissemination of information to all potential bidders. If the contract exceeds the EU threshold value, the contract notice is also advertised in the EU's online contract notice service - Tenders Electronic Daily (TED). The procedure is the same across the EU; however, each member state has its own national contract notice online services. Finland has only one national online platform for contract notices used by public authorities and entities. This online platform is called *Hilma*.

3.2. Public procurement contract features

In this section, we highlight the general features that are used in contracting and advertised in an invitation to tender (ITT) by the contracting authority. Here, we focus on the features which are used in our study. We use these features for three reasons. First, we observe them for all the tenders. Second, also the potential bidders observe them as they are transparent in Hilma. Third, they are important design features.

Two different award allocation rules are dominantly used in public procurement in Finland. The first mechanism "price only" chooses the lowest price from all the bidders who fulfill the minimum (quality) requirements. The second rule "scoring" allocates the contract to the "most economically advantageous bidder or in other words, to the bidder with the best price-quality ratio". In practice, this means using a scoring auction rule to evaluate quality criteria (Asker and Cantillon, 2008, 2010). In the scoring auction, the buyer assigns scores to different criteria (e.g. quality, price) and determines how those scores are combined to make a final comparison index that determines the winner(s). Typically, each criterion is assigned a weight that reflects its perceived relative importance to the buyer. In both rules, sealed bids are submitted and the winner receives their price bid as compensation. This feature is probably the most important one. From bidder perspective, the rules will influence production costs and bidder asymmetry. Scoring may also add complexity, and thus, influence entry costs. Moreover, it is crucial the from consumers' perspective how quality components are incentivized.

Another common PP feature is the possibility to submit partial bids. This feature implies that a bidder can bid for only a part of the tender. Therefore, it mechanically captures the tenders divided into multiple lots; any bidder is able to bid on a subset of such a tender. In other words, allowing for partial bids (equivalently, subcontracts) in an ITT means the possibility of having multiple winners. For example, such a tender is often seen in healthcare services when the contracting authority issues a tender requiring, for example, dentistry and physiotherapy services. Rarely one firm can supply both. Under such circumstances, the provision of partial bids allows firms to bid for a subset of the tender essentially separating it into different auctions. When the products are so different that firms can only bid on one lot, it does not matter much whether the lots are combined under same tender or if they were separate tenders. However, when the lots are to some extent similar, such as different types of office accessories, there may be complementarities and scale economies related to combining the lots under same tender.

It is also common to inform about the estimated value of the procurement (i.e. the "engineer estimate"). The engineer estimate typically serves as a baseline for evaluating bids; bidders provide their bids based on their own cost calculations, and these bids are compared to the engineer estimate to assess if they are reasonable and competitive. While engineer estimate is not a formal reservation price, bids are almost always below it. Thus, it can be seen as an implicit reservation price and therefore a key design feature.

Finally, the option for additional purchases can be also included in the tender invitation. This feature allows the contracting authority the flexibility to purchase more items or services (beyond the initial scope specified in the contract) from the winning supplier without initiating another new procurement process. This feature may create some uncertainty to the final value of the tender and increase the final value above the engineer estimate.

3.3. Public procurement office features

In this section, we discuss what a typical public procurement office looks like, which sheds some light on their "culture". Tukiainen et al. (2024) offers a perception of the dynamics from a nationally representative survey of ∼400 public procurement officials in Finland. Their findings reveal that approximately 70% of PP officials operate within offices with a maximum of ten employees, with only a scant 5% representing office sizes exceeding 100 employees. About 96% of the officials have permanent contracts, indicating high job stability. There is also evidence of low mobility within this job sector, with an average experience of 8.5 years in the current office and 11.6 years in PP in general. Encouragingly, a majority of officials express contentment with the competence of their respective offices. In Finland, a PP official is 70% likely to have worked in tender planning and 80% likely to have set up tenders. The officials are only 15% likely to be negatively affected by the workload.

These statistics on low mobility within the office/sector and the core responsibilities encourage us to speculate that PP offices may have a sense of monotonicity and repetitiveness in their tasks[6]. In addition, the high job stability and trust in the competence level of one's own organization hint that the officials may have a sense of dependency on the way their organization functions. Perception of competence may also lead them to trust their habits. While low mobility out of the office and the sector, along with trust in the organization could mirror intrinsic motivation in public service, the monotonicity in task nature could bring in peer effects in task execution (discussed in Section 1), which can form the basis of their office culture. At the same time, the instance of workload is less prominent. While that level does not completely rule out the role of administrative burden in building organizational rigidness, it indicates that perhaps shirking is not

[6]While we lack data on the specific daily tasks or comprehensive involvement of employees in tenders, greater employee involvement in all steps of the tenders may be a factor. As suggested by a referee, employees in small municipalities may be more involved in diverse, broad and stimulating tasks related to city development, which could mitigate the observed effects. Table **??** in the Appendix shows the results separately for small municipalities, and we do in fact observe some heterogeneity regarding organizational rigidness.

the primary reason for it. While not all plausible mechanisms can be examined in this study, Section 5.2 provides a glimpse into understanding these mechanisms to a certain degree.

4. Data, summary statistics and empirical analysis

4.1. Data

In addition to *Hilma*, which is used only for publishing notices, public sector entities are required to use an electronic procurement software to conduct the procurement process. A substantial share of public sector entities use software provided by a single private firm Cloudia Oy[7] to conduct procurement auctions. Since the inception of Cloudia's software in the late 2000s, a gradually rising number of municipalities and other public sector agents have used the platform. We use Cloudia's data for public procurement auctions held in Finland between June 2010 - September 2017, with a large part of the data coming from more recent years.[8]

These data contain ∼18,000 ITTs with at least one bidder registration, 275,000 auctions and 705,000 bids.[9] This universe of data is rich with information on multiple lots/separate auctions within a tender, of which every bid can be tracked with bidder information. The latest full year in Cloudia's database (2016) contains about 30% of all the ITTs for that year (in Hilma), totalling 5.3 billion euros in expected costs.[10]

The industry classifications are obtained from the common procurement vocabulary (CPV) classification codes - a standardized single classification system for PP in the EU. Moreover, the information on the bidders also lets us infer their related industry for the Finnish data.

The stages of public procurement unfold in the following sequence: Initially, a contracting entity decides to proceed with procurement and selects the approach for conducting it. During this phase, a significant portion of data related to the procurement process is generated, encompassing distinct variables relevant to the Invitation to Tender (ITT). These variables include details about the items or services to be procured, the engineer-estimated cost, the method of allocation (whether based on scoring or solely on price), and the decision on whether bidders are allowed to bid on a subset of auctions. All the tenders within our dataset adhere to an open procedure.

Subsequently, potential bidders voluntarily express their interest in the ITT by registering in the Cloudia system via a link in Hilma. With recommendations from civil servants conducting public procurement and Cloudia employees, we rely on this registration as a viable approximation for a potential bidder. The act of registering entails a minimal level of effort, though not completely negligible, and grants bidders access to the complete tender information, which remains inaccessible until registration is completed. Registration

[7] `cloudia.com`. Subsequent to our data collection, Cloudia has been acquired by Mercell: `https://info.mercell.com/fi-fi/public-buyers`.

[8] Figures A1-A4 in the Online Appendix provide an overview of the sample of unique tenders (ITTs) obtained from Cloudia.

[9] We drop most of the ITTs with no registration for our analysis as it is hard to understand whether they are real tenders, mistakes or some tests in Cloudia's system. However, if the ITTs with zero registration can be linked to the Hilma database, we include them. We obtained Hilma data from the Ministry of Economic Affairs and Employment: Public Procurement Notices 2010-2017 [dataset], Finnish Social Science Data Archive [distributor].

[10] (Jääskeläinen and Tukiainen, 2019) conduct an extensive exercise to cross-reference the final sample from Cloudia with the database of Hilma and finally reach this quantitative comparison.

constitutes a mandatory prerequisite before entering bids and facilitates informed decision-making by the bidding firms on whether to bid. All bids featured in our dataset are submitted as sealed bids, with the successful bidder obligated to abide by the price they bid. Our dataset encompasses information pertaining to all registered companies involved in an ITT, as well as the bids submitted during the auctions. Additionally, instances, where no bids are placed, are also observed. Lastly, the contracting entity concludes the process by awarding a contract to one or potentially multiple economic operators who have submitted bids.

However, there are some limitations in our data. First, the engineer estimate measures the total value of the contract whereas the bids are often in unit prices. Moreover, we do not in most cases observe the procured quantities, meaning that we typically cannot compare the winning price to the engineer estimate. Second, our data does not contain any information on what happens after the auction stage such as renegotiations or cost-overruns.

4.2. Summary statistics

From our Cloudia sample of PP in Finland during 2010-2017, we observe that two different award allocation rules are dominant - *price only* and *scoring*; about half of the ITTs that announce the allocation rule, use scoring. About 25% of the tenders allow for partial bids, about 86% ITTs announce an engineer estimate and 44% allow for additional purchase option.[11] Table 1 Panel A summarizes this information. To give a sense of scale, the average contract value in the dataset is 1.39 million euro, with a standard deviation of 8.24 million euro. Panel B shows the descriptive statistics for the Organizational Rigidness (OR) variables (definitions follow in the next section).

Table 1: Descriptive statistics of the typical features announced in an Invitation To Tender and the organizational rigidness measures.

Variables	Mean	Std Dev	Min	Max	Observations
Panel A					
Scoring	0.50	0.50	0.00	1.00	11571
Partial bid	0.25	0.43	0.00	1.00	13784
Engineer estimate	0.86	0.34	0.00	1.00	13784
Add. purchase option	0.44	0.50	0.00	1.00	8734
Panel B					
Scoring OR	-0.029	0.17	-0.82	0.59	11571
Partial bid OR	-0.00003	0.09	-0.75	0.91	13784
Engineer estimate OR	0.004	0.12	-0.74	0.65	13784
Add. purchase option OR	0.002	0.19	-0.76	0.76	8734

Notes: Data used from the Cloudia database (2010-2017), on unique ITTs in public procurement in Finland. Panel A reports the summary statistics of the main binary variables on the PP features. Panel B reports the summary statistics of their corresponding organizational rigidness (OR) variables which are continuous (details on the formulation of the OR variable provided in Section 4.3). We describe the sample used in the estimation, that is, control variables and fixed effects used in Table 2 need to be observed.

[11] In the Cloudia data, about 30% ITTs are missing any information on the allocation rule and 47% ITTs miss information on purchase options.

4.3. Empirical strategy

We aim to understand if there is a lack of variation in various PP features across the different tenders that a contracting authority publishes. These features encompass the chosen allocation rule, the availability of engineer-estimated costs, the inclusion of an option for partial bids, and the provision for additional purchase alternatives. Should such uniformity in the selection of features be observed, we designate it as an organizational rigidness contributing to this persistence in choices. For this analysis, we utilize a simple econometric framework as follows:

$$y^f_{ijk} = \beta_0 + \beta_1 rigidness^f_{ik} + \beta_2 c_j + \mu_t + \lambda_r + \sigma_k + \gamma_p + \epsilon_{ijk} \quad (1)$$

Here, y^f_{ik} is the dependent variable denoting the use of PP feature f by a contracting authority i for a given tender j for industry k. We have a separate regression for each PP feature f which refer to the use of (1) scoring allocation rule, (2) engineer estimate, (3) partial bids, and (4) additional purchase option. Each of the four outcome variables is denoted as a binary variable, taking the value of one if the feature is used in the tender and otherwise zero.

$rigidness^f_{ik}$ is the prevalence of "rigidness" of using PP feature f in contracting authority i for tenders related to industry k, and is given by

$$rigidness^f_{i,k} = share^f_{i,-k} - share^f_{National(-k)} \quad (2)$$

Here $share^f_{i,-k}$ is i's share of PP feature f in all other industries $l \neq k$ and $share^f_{National(-k)}$ is the national share of f in those other industries $l \neq k$. From now on, we will refer to $rigidness^f_{ik}$ as OR variables in text and the tables. The summary statistics are shown in Table 1 Panel B.

To re-iterate, when studying for example the use of scoring by contracting authority i in industry k, we compute how often i uses scoring in its tenders outside industry k and adjust this number by the average use of scoring outside industry k by all the contracting authorities. The variable $rigidness^{scoring}_{i,k}$ therefore measures an organization's relative propensity to use scoring in tenders outside industry k. A positive value indicates the organization uses scoring more than an average organization, while a negative value indicates less use. A value near zero signifies average behavior. Correcting for the national average is crucial, as it controls for inherent and fairly large differences in scoring practices across industries. This centers $rigidness^k_{i,k}$ around zero for each industry k, making it a reliable, industry-neutral predictor.

This definition of OR essentially helps us determine how likely (or unlikely) the contracting authority is to repeat the PP feature which it uses in its other tenders for other industries ($\neq k$), in a given ITT j in the industry k, and by how much this tendency to repeat the same feature varies from the respective national-level prevalence in those industries.[12] We note that the "national prevalence" of a PP feature only comes

[12]We argue that this measure is better than an alternative that incorporates the same industry k within the culture variable, as the former is more effective in addressing endogeneity concerns.

from the tenders in the Cloudia sample. Although Cloudia does not encompass all the public procurement that went through a public tendering process in Finland during 2010-2017, it is nevertheless a representative sample of all PP in Finland recorded in the Hilma database. (Jääskeläinen and Tukiainen (2019) conduct an exercise to validate this representability.)

c_{ij} is ITT-specific control on the inaccuracy of ITT notice, which is measured by the number of zeroes present in the cpv code used in the ITT notice; the more the number of zeroes the less accurate the ITT notice.[13] μ_t is the time fixed effect, λ_r is the region fixed effect, σ_k is the industry fixed effect, and γ_p is the procurer-type fixed effect[14]. These fixed effects control for all the observed and unobserved characteristics at those respective levels. Finally, ϵ_{ijk} is the error term.

β_1 in Equation (1) is our coefficient of interest. It implies that for each percentage point difference in the contracting authority's tendency to use a certain PP feature in all its other tenders from the respective industry average, the contracting authority's probability to use the same PP feature in a given tender should change by β_1 percentage points.[15]

5. Results

5.1. Findings on organizational rigidness

For each outcome variable of our interest, we start with a parsimonious specification without any controls and then add various fixed effects and ITT characteristics. We start with the outcome variable of the scoring criteria. Our findings, summarized in Table 2 Column 1, confirm the presence of office-level rigidness in the choice of scoring as an allocation rule. Each percentage point difference in the contracting authority's tendency to use scoring in all its other tenders from their respective industry average is associated with 0.53 percentage points (pp.) ($p < 0.001$) increase in the contracting authority's chance of using scoring in a given tender for a given industry. With the inclusion of fixed effects controls (Column 2) and further ITT-specific characteristics (Column 3), the magnitude changes to about 0.26 pp. ($p < 0.05$). However, the implication does not change.

We define the binary variable on partial bidding to take the value one if the ITT invites bidding possibility on subsets in the contract. Our estimate in Table 2 Column 6 confirms that the office culture of using partial bids in all other tenders for other industries is associated with a 0.21 pp. ($p < 0.05$) increase in repeating the same feature in a given tender in a given industry. This estimate is obtained after controlling for various fixed

[13]This follows from the hierarchical structure of cpv codes where at the least accurate level the procured category is denoted by 2 digits followed by zeroes (e.g. 03000000-1 for agricultural, farming, fishing, forestry and related products). The more detailed the description is, the fewer zeroes we typically have in the code (i.e. 03222111-4 for bananas). In our data, we notice that often the contracting authority omits a more detailed cpv code despite one existing. This combined with the fact that many bidders have alerts configured based on these cpv codes, means we can use this as a form of proxy for the imprecision of the procurement notice.

[14]Procurer-type denotes contracting authorities that procure at different geographical levels, i.e. capital area, government, large municipality, small municipality and region.

[15]Table 1 Panel B provides a summary statistics of the culture variables.

effects and tender-specific factors and is somewhat conservative yet more reliable compared to the simpler models given by Columns 4 and 5.

Our findings in Table 2 Columns 7-9 suggest that the practice of announcing the engineer estimate in all other tenders in other industries associates with a 0.49 pp. ($p < 0.001$) rise in chances of announcing it in a given tender for a given industry by the contracting authority.

Finally, similar to the findings on the other contract features, we see that in the case of additional purchase option, there is a significant association with its organization-level culture in contract planning. The related coefficients are reported in Table 2 Columns 10-12.

In order to assess the model fit, the columnns in Table 2 include Predicted Residual Sum of Squares (PRESS) as a measure of how well a regression model predicts new data points.[16].

[16]The formula for the statistics is given by PRESS $= \sum_{i=1}^{n}(y_i - \hat{y}_{i(i)})^2$ where n is the number of observations, y_i is actual value of the i-th observation and $\hat{y}_{i(i)}$ is the predicted value for the i-th observation when the model was trained without it. The PRESS statistics is essentially a form of cross-validation used to assess a model's predictive power and to prevent overfitting. A model with a lower PRESS statistic is generally considered to have better predictive ability.

Table 2: Organizational rigidness in public procurement.

Dependent variable	Scoring			Partial bid			Engineer Estimate			Add.purchase option		
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)
Scoring OR	0.531***	0.256**	0.256**									
	(0.104)	(0.124)	(0.124)									
Partial bid OR				0.663***	0.214**	0.210**						
				(0.111)	(0.093)	(0.093)						
Engineer estimate OR							0.823***	0.490***	0.492***			
							(0.121)	(0.104)	(0.102)			
Add. purchases OR										0.714***	0.528***	0.530***
										(0.069)	(0.058)	(0.058)
Observations	11571	11571	11571	13784	13784	13784	13784	13784	13784	8734	8734	8734
R-sq.	0.033	0.273	0.273	0.020	0.125	0.126	0.086	0.155	0.156	0.073	0.233	0.233
Predicted R-sq.	0.033	0.262	0.262	0.020	0.114	0.115	0.085	0.144	0.145	0.072	0.217	0.218
Mean of outcome variable	0.503	0.503	0.503	0.252	0.252	0.252	0.861	0.861	0.861	0.444	0.444	0.444
Controls	No	No	Yes	No	No	Yes	No	No	Yes	No	No	Yes
Year FE	No	Yes	Yes	No	Yes	Yes	No	Yes	Yes	No	Yes	Yes
Month FE	No	Yes	Yes	No	Yes	Yes	No	Yes	Yes	No	Yes	Yes
Region FE	No	Yes	Yes	No	Yes	Yes	No	Yes	Yes	No	Yes	Yes
Industry FE	No	Yes	Yes	No	Yes	Yes	No	Yes	Yes	No	Yes	Yes
Procurer-type FE	No	Yes	Yes	No	Yes	Yes	No	Yes	Yes	No	Yes	Yes

Notes: The unit of observation in the regressions is a unique tender (ITT) in Cloudia's sample during 2010-2017. The dependent variables are binary: taking value 1 if the respective PP feature is used in the tender and zero otherwise. The main predictor variables measure the average use of the same procurement feature in all other industries. Controls include ITT-specific variable: inaccuracy of the ITT notice. Clustered standard errors at the industry (2-digit cpv) level within parentheses. ***, **, and * indicate statistical significance at confidence levels of 1%, 5%, and 10%, respectively.

5.2. Contracting authority heterogeneity

A potential limitation of the previous analysis is that it does not richly account for the differences between different types of contracting authorities. To address this, we study whether the associations of interest are heterogeneous in contracting authority characteristics.

First, we highlight that our earlier specification already incorporated procurer-type fixed effects (including categories such as government organizations, regional organizations, large municipalities, small municipalities, and organizations in the capital area), which inherently accounts for some omitted variables concerns. Building upon this foundation, we develop the following measures for PP offices: (i) organization size based on the number of tenders processed, (ii) busyness (workload intensity) measured by deviations from predicted number of tenders for that organization, and (iii) procurement's value relative to the median procurement value on organization-year level. We categorize each of these three measures into binary indicators. Maintaining otherwise the econometric framework specified in Equation (1), we then examine interaction effects between these organizational characteristics and our OR variable. The results are shown in Table 3 and we discuss each measure in turn below.

Big procurer: We derive a proxy measure of the organization's size by constructing a distribution that represents the maximum over the per year counts of tenders for each contracting authority. We then split this distribution over organizations at the median value to categorise these entities into big and small procuring units[17]. This approach is motivated by, first, there potentially being substantial over-time variation within a unit (owing to factors such as longer-duration contracts, especially prevalent in the construction sector), and second, selection into our sample that varies over time for the unit. We argue that this metric effectively approximates the resources available within the procurement office to manage such a volume of tenders throughout the year.[18]

For the procurement features - scoring, partial bids and engineer estimate - the baseline association of the rigidness variable remains positive, and statistically significant for the first two (columns (1) and (4) in Table 3). The feature - additional purchase option - yields a statistically significant negative baseline association of rigidness and a statistically significant positive interaction with the big size. A positive interaction implies that the big offices have a more persistent or rigid culture of allowing additional purchase option in all their tenders. Assuming that big procurement offices do not suffer from resource constraints, it is plausible that this persistent culture more likely stems from mission motivation (Besley and Ghatak, 2005; Akerlof and Kranton, 2005; Dur and Zoutenbier, 2014; Cowley and Smith, 2014) or prevention focus (Kuehnhanss et al., 2017; Tukiainen et al., 2024) where employees align their interests and goals with that of the organization

[17]Table **??** shows that the big vs small procuring offices do not vary significantly in terms of the estimated value of their tenders on average (= engineer estimate). However, the number of industries they procure from differs significantly across the office size of the contracting authorities. This is natural, as PP organizations that issue more tenders are likely to also cover more industries. (This same issue, however, should not affect the formulation of our original OR measure, which accounts for the average of a PP choice across the tenders in different industries within each contracting authority.)

[18]Bucciol et al. (2020) proxies the procurer's office size with the personnel costs or the size of the procurement, in a setting where they study the public procurement of medical devices in Italy.

and avoid potential risks of policy failure from choosing innovative strategy. The interaction effects in the cases of engineer estimate, scoring and partial bid are statistically insignificant.

Busy year: We construct this measure by first estimating separate regressions for each PP office, with number of annual tenders as the dependent variable and year as the independent variable. We then classify a given year as a "busy year" whenever the actual number of tenders exceeds its predicted value from the regression. This methodology offers two key advantages: (1) the measure dynamically adjusts over time for each organization, and (2) it provides a more accurate workload indicator than simple tender counts, particularly when procurement staff numbers remain constant. A limitation of this approach is the exclusion of organizations with fewer than three years of observations.[19]

For the procurement features - scoring, engineer estimate and additional purchase option - the baseline association of the culture variable remains positive and statistically significant (columns (2), (8) and (11) in Table 3). For the feature – partial bids – the baseline association becomes statistically insignificant while the estimate remains positive (column (5)). Our results further reveal that busy years baseline (workload fluctuations) only significantly impact one procurement aspect: organizations exhibit a reduced propensity to provide engineering estimates during busy years. Importantly, all the interaction terms of interest are insignificant indicating that shirking is unlikely to drive the organizational rigidness results.

High value: We construct this variable by computing each procurer's annual median engineering estimate. For individual tenders, the variable takes a value of 1 if the stated engineering estimate exceeds the procurer's annual median, and 0 otherwise. This methodological approach captures tender-specific variation and reveals potential strategic differences in how procurement offices design tenders when dealing with above-median-value contracts for their organization.

We exclude observations lacking engineering estimates since these are essential for determining contract values. Additionally, we omit the engineering estimate column from Table 3 due to interpretational ambiguities in these estimates.

The results from this specification are shown in columns (3), (6) and (12) of Table 3. Consistent with expectations, we observe significantly greater use of scoring, partial purchases, and additional purchase options in above-median-value tenders. Moreover, the interaction terms between the OR variables and the high value contract dummy reveal that the relationship between rigidness and tender design depends on contract value for two features. For scoring, cultural rigidness is weaker in high-value contracts, while for partial bids, it's stronger. For additional purchase options, contract value has no significant effect.

[19]Robustness checks confirm that reducing the sample size in this manner does not affect our main results.

Table 3: Heterogeneity of organizational rigidness in PP.

Dependent variable	Scoring			Partial bid			Engineer Estimate			Add.purchase option		
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)
OR	0.309***	0.326**	0.306**	0.367***	0.185	0.070	0.304	0.457***	NA	-0.343***	0.561***	0.455***
	(0.107)	(0.160)	(0.146)	(0.111)	(0.154)	(0.116)	(0.183)	(0.112)	NA	(0.121)	(0.088)	(0.084)
Big procurer	-0.081*			0.039			-0.059**			0.190***		
	(0.043)			(0.040)			(0.024)			(0.048)		
OR × big procurer	-0.077			-0.206			0.204			0.952***		
	(0.126)			(0.140)			(0.158)			(0.114)		
Busy year		-0.012			-0.009			-0.021**			-0.019	
		(0.012)			(0.011)			(0.009)			(0.021)	
OR × busy year		-0.113			-0.020			0.136			-0.087	
		(0.076)			(0.118)			(0.111)			(0.086)	
High value			0.070***			0.117***			NA			0.125***
			(0.022)			(0.023)			NA			(0.014)
OR × high value			-0.125*			0.223**			NA			0.150
			(0.070)			(0.102)			NA			(0.093)
Observations	11,571	11,104	10,144	13,784	13,197	11,869	13,784	13,197	NA	8,734	8,268	8,669
R-sq.	0.274	0.265	0.297	0.127	0.126	0.143	0.157	0.161	NA	0.240	0.226	0.244
Mean of outcome variable	0.503	0.510	0.496	0.252	0.257	0.233	0.861	0.858	NA	0.444	0.449	0.440
Controls	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	-	Yes	Yes	Yes
Year FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	-	Yes	Yes	Yes
Month FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	-	Yes	Yes	Yes
Region FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	-	Yes	Yes	Yes
Industry FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	-	Yes	Yes	Yes
Procurer-type FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	-	Yes	Yes	Yes

Notes: The table shows results from a heterogeneity analysis based on three dummy variables. Variable *Big procurer* is a binary variable taking value 1 if the maximum number of tenders procured annually by the contracting authority is above the median of its distribution. Variable *Busy year* is a dummy variable measuring if the number of ITTs for a given year was above the trend for that organization. Variable *High value* is a dummy variable measuring if the value of that ITT was above the annual median ITT value for that organization. The unit of observation in the regressions is a unique tender (ITT) in Cloudia's sample during 2010-2017. The dependent variables are binary: taking value 1 if the respective PP feature is used in the tender and zero otherwise. The main predictor variable, denoted by *OR*, measure the average use of the same PP feature in all other industries. Controls include ITT-specific variable: inaccuracy of ITT notice. Clustered standard errors at the industry (2-digit cpv) level within parentheses. ***, **, and * indicate statistical significance at confidence levels of 1%, 5%, and 10%, respectively.

5.3. Organizational culture versus habit formation

Our main results demonstrate a significant persistence in procurement feature design across a diverse range of goods, despite the expectation that these goods would require distinct tender characteristics. To better understand the underlying mechanisms of this pattern, our analysis shifts from the aggregate organization level to the individual level, examining the behavior of the employees responsible for initiating each tender notice. For this purpose, we collected data identifying the individuals responsible for initiating each tender notice.

We implement a name-cleaning procedure, retaining unambiguous personal names while excluding entries containing only departmental identifiers or other institutional references. Despite some missing values and non-personal entries, our name coverage remains remarkably comprehensive. For example, in our baseline scoring regression sample of 11,571 observations, we successfully identified names for individuals initiating tenders for 8,585 cases (74.2% coverage), preserving a substantial majority of the original sample for this part of the analysis.

5.3.1. Construction of Alternative Independent Variables

We use employee names to construct two alternative independent variables to test whether employees working at the PP offices tend to imitate their peers of whether they tend to replicate their own past actions. The first scenario aligns with the literature on organizational culture where rigid practices in initiating PP tenders are adopted from coworkers. The second scenario, however, suggests habit formation, where individuals primarily replicate their own prior behavior.

We construct two alternative independent variables:

Variable based on worker's own tenders: For each employee and each industry k, we calculate the share of employee's use of PP feature f in all other industries $l \neq k$, and subtract the national-level prevalence of the PP feature in those industries ($share^{f}_{National(-k)}$ in equation (2)). Thus, the methodology mirrors the specification used in the baseline aggregate level regressions but is applied at the individual employee level rather than the entire contracting authority.

Variable based on coworkers' tenders: Similarly, for a given employee and each industry k, we calculate the share of the employee's coworkers' use of PP feature f in all other industries $l \neq k$, and subtract the national-level prevalence of the PP feature in those industries. This approach parallels the baseline variable construction but aggregates data at the coworker level instead of the whole contracting authority level[20]

[20] The coworker calculations include all unnamed employees within the organization, as we derive coworker activity by subtracting the focal employee's tenders from the organization's total tenders.

Table 4: Sources of procurement style persistence: own vs. coworker behavior.

	Scoring			Partial Bid			Engineer Estimate			Add. Purchase Option		
	All tenders	Worker's own tenders	Coworkers' tenders	All tenders	Worker's own tenders	Coworkers' tenders	All tenders	Worker's own tenders	Coworkers' tenders	All tenders	Worker's own tenders	Coworkers' tenders
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)
Culture	0.256**	0.346***	-0.094*	0.210**	0.276***	0.030	0.492***	0.376***	0.153***	0.530***	0.334***	0.368***
	(0.124)	(0.033)	(0.053)	(0.093)	(0.033)	(0.076)	(0.102)	(0.079)	(0.052)	(0.058)	(0.031)	(0.060)
Observations	11,571	7,192	8,529	13,784	8,884	10,151	13,784	8,884	10,151	8,734	4,865	6,185
R-squared	0.273	0.247	0.270	0.126	0.139	0.129	0.156	0.224	0.171	0.233	0.260	0.239
Mean Dep. Var.	0.503	0.532	0.519	0.252	0.275	0.263	0.861	0.840	0.849	0.444	0.436	0.427

Notes: The unit of observation in the regressions is a unique tender (ITT) in Cloudia's sample during 2010-2017. The dependent variables are binary: taking value 1 if the respective PP feature is used in the tender and zero otherwise. The main predictor variable, denoted by *Culture*, measure the average use of the same procurement feature in all other industries. The first column reproduces the main results from Table 2 for convenience. Column "Worker's own tenders" shows results when the predictor variable is constructed using only the worker's own cross-industry tenders. Column "Coworker's tenders" shows results when the predictor variable is constructed using the cross-industry tenders of the coworkers. Controls include ITT-specific variable: inaccuracy of ITT notice. Clustered standard errors at the industry (2-digit cpv) level within parentheses. ***, **, and * indicate statistical significance at confidence levels of 1%, 5%, and 10%, respectively.

Table 4 presents the regression results using the alternative independent variables. For each PP feature, the first column replicates the main regression result, the second column displays the outcome when the independent variable is based solely on the employee's own tenders, and the third column reports the results when the independent variable is based solely on the tenders of the coworkers.

The interpretation of the findings is as follows. When the estimate for worker's own tenders is statistically significant and close in magnitude to the estimate for all tenders, this points to habitual behavior, indicating that employees are more likely to replicate their own past actions rather than imitate their peers. On the other hand, if the estimate for coworkers' tenders is significant and of a similar magnitude to the main estimate, this lends support to the organizational culture explanation where the initiation of PP tenders adheres to rigid, socially learned norms shaped by coworkers.

As shown in Table 4, the overall organizational rigidness results are explained by a combination of employees replicating their own behavior (habit formation) and replicating their coworkers' behavior (organizational culture), and the predominant influence is specific to each PP feature.

For scoring and partial bids, the main result is primarily driven by employees replicating their own behavior, not that of their coworkers. In fact, for scoring the negative and significant coefficient on coworkers' tenders indicates that employees act in ways that diverge from their peers. For partial bids, the statistically insignificant estimate for coworkers confirms that the effect is solely attributable to the replication of an employee's own past actions.

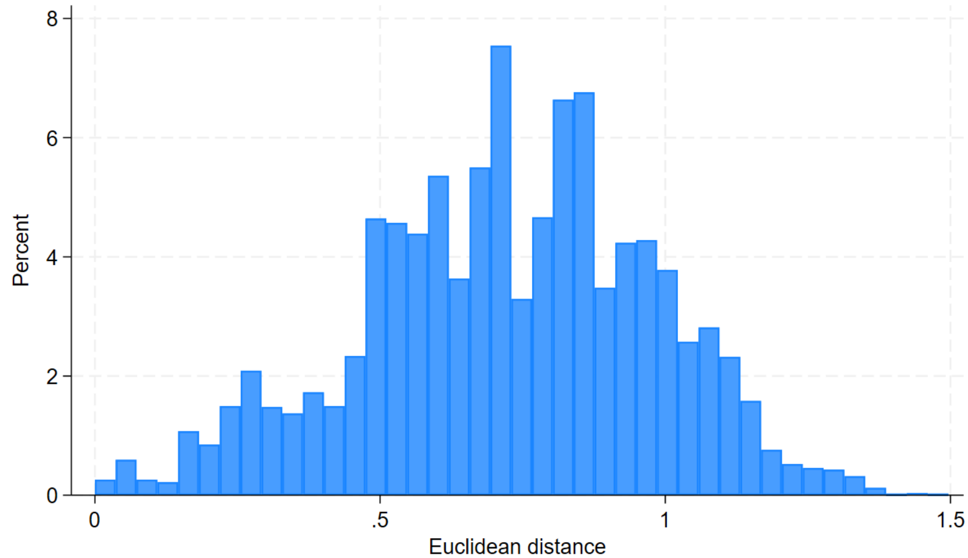
For engineering estimate and additional purchase option, the estimates for alternative variables yield positive and statistically significant estimates. For engineering estimate, the effect from worker's own tenders dominates in magnitude. For additional purchase options, the influences through the two alternative mechanisms are approximately equal in magnitude. Both of these features where organizational culture matters relate more to project budgets than the other two features. It may be that budget decision are made more at organization level rather than individual employee level, and thus, the culture is more important for those.

5.4. Organizational rigidness and procurement outcomes

In PP, efficiency gains are essentially generated from competitive pressure. Consequently, a primary objective in improving efficiency in PP (which is subject to public tendering process), revolves around enhancing competition among bidders, a factor closely associated with driving prices downward. This dynamic is rooted in the standard auction theory, asserting that typically increased competitiveness necessitates more assertive bidding, leading to advantageous price outcomes (Bulow and Klemperer, 1996; Klemperer, 2000). In this section, we explore whether tenders characterized by strong OR succeed in attracting substantial competition. To simplify the exercise, we create a composite measure of culture, employing the Euclidean distance (ED) and incorporating the four PP features of our interest.

To construct this composite metric of culture, we consider the four PP features and calculate the centroid for each contracting authority. The centroid is the mean vector represented by the mean value of each variable

Figure 1: Distribution of the composite rigidness measured as Euclidean distance.



Notes: Data used from Cloudia's sample of ITTs during 2010-2017. The figure shows the distribution of the Euclidean distance measured for each ITT. The Euclidean Distance is calculated with respect to the mean vector of scoring, partial bids, engineer estimate and provision of add. purchases, where the mean vector is measured across ITTs within each contracting authority.

and is unique for each contracting authority. Subsequently, for each tender observation, we calculate the ED from the centroid of the four PP dimensions within a contracting authority. Our goal is to see whether the procurement outcomes perform worse if ED from the centroid of the contracting authority decreases.[21] This measure can be formally expressed as:

$$ED_{ij} = \sqrt{(Scoring_{ij} - \overline{Scoring}_i)^2 + (Partial_{ij} - \overline{Partial}_i)^2 + (EE_{ij} - \overline{EE}_i)^2 + (Option_{ij} - \overline{Option}_i)^2} \quad (3)$$

Here, ED_{ij} is the ED for tender j of contracting authority i; X_{ij} where $X \in$ *(Scoring, Partial, EE, Option)*, is the PP feature for tender j of contracting authority i; and $\bar{X}_i$ is the corresponding mean over tenders within contracting authority i.

Figure 1 presents the distribution of the ED in our Finnish sample. The value ranges from 0 to 1.49, with 0 indicating no deviation from the centroid of culture within the contracting authority; whereas, the farther from 0, the more the deviation from the centroid. Therefore, a small value indicates strong organizational rigidness and large value indicates tailoring.

To study the association between ED and procurement outcomes, we use the following econometric

[21]This technique is commonly applied in clustering algorithms, like k-means, where the distance between data points and centroids is used to assign points to clusters (MacQueen et al., 1967; Everitt et al., 2011). However, we do not go to the extent of defining clusters and only use it to measure the distances.

specification:

$$y_{ij} = \beta_0 + \beta_1 ED_{ij} + \mu_t + \lambda_r + \sigma_k + \gamma_p + \epsilon_{ij} \quad (4)$$

Here, y_{ij} is the procurement outcome of tender j of contracting authority i. ED_{ij} is the ED measure of each tender from the centroid within each contracting authority, as expressed in Equation (3). μ_t is the time fixed effect, λ_r is the region fixed effect, σ_k is the industry fixed effect, and γ_p is the procurer-type fixed effect. The coefficient of interest is β_1, which gives the standard deviation of the combination of PP features in a tender from the centroid. The argument here is that among the tenders issued by a contracting authority, the more prevalent the organizational rigidness is (i.e. the more they use similar PP features across tenders), the closer the ED measure of each tender is to the mean of all its tenders.

The five different outcome variables related to procurement that we examine here are - (1) if the tender had no bidder, (2) the share of auctions in a tender that received zero or one bid, (3) the number of potential bids (registrations) in a tender, (4) the number of actual bids[22] in a tender, and (5) winning bidder's historical success rate. The historical success rate—calculated as the ratio of wins to total participation during 2010-2016—is analyzed using only the 2017 sample. This measure is intended to proxy the efficiency of the winning bidder.

In Table 5, the findings are reported. Column 1 reports the association of the ED measure with the probability that the tender receives no bidder. We find that farther away from the centroid of the "culture" of the contracting authority, the probability that the tender receives no bidder decreases. In other words, the closer the combination of choices of the four PP features in a tender is to the mean choice by the contracting authority across their tenders (i.e. more the culture), the more likely it is that the tender receives no bidder. In Column 2, we look into the share of auctions within a tender receiving zero or one bid. The coefficient of ED measure in Column 2 implies that as the distance from the centroid increases, the share of auctions within the tender that receives zero or one bid decreases. The result of the first outcome variable is statistically significant at 1.6% level, whereas that of the latter is not. Nevertheless, these findings together imply that a careful design of ITT with customized PP features could attract more competition.

In columns 3 and 4 we observe that a higher average distance from the centroid of the "rigidness" of the contracting authority is associated with more potential and actual bidders per tender. In column 5 we get a statistically insignificant result.

We suspect that the degree to which an organization's behavior diverges from industry norms may also influence procurement outcomes. To test this, we construct an Industry Deviation (ID) measure, formally

[22] If there are several auctions within the tender, we use the average number of bids across auctions.

Table 5: Procurement outcomes and composite culture.

	(1) If tender gets no bidder	(2) Share of auctions with 0-1 bids	(3) Number of registrations	(4) Number of bids	(5) Share of previous wins by winner
ED	-0.087**	-0.027	4.337***	0.477**	0.02
	(0.034)	(0.033)	(0.528)	(0.187)	(0.025)
Observations	13,784	13,784	13,784	13,784	1,689
R-squared	0.076	0.046	0.110	0.048	0.12
Mean outcome	0.305	0.491	6.949	2.396	0.24
Year FE	Yes	Yes	Yes	Yes	Yes
Region FE	Yes	Yes	Yes	Yes	Yes
Industry FE	Yes	Yes	Yes	Yes	Yes
Procurer-type FE	Yes	Yes	Yes	Yes	Yes

Notes: The unit of observation in the regressions is a unique tender (ITT) in Cloudia's sample during 2010-2017. The dependent variables are (1) a binary variable indicating if the tender received no bid from any bidder at all, (2) the share of auctions within a tender that received zero or one bid, (3) the number of registrations in a tender, (4) the number of bids in a tender, and (5) winning bidder's historical success rate. The historical success rate—calculated as the ratio of wins to total participation during 2010-2016—is analyzed using only the 2017 sample. Variable ED is the Euclidean distance of a contracting authority's four PP features from their own mean vector. Clustered standard errors at the contracting authority level within parentheses. ***, **, and * indicate statistical significance at confidence levels of 1%, 5%, and 10%, respectively.

expressed as:

$$ID_{ijk} = \sqrt{\left(rigidness_{i,k}^{scoring}\right)^2 + \left(rigidness_{i,k}^{partial}\right)^2 + \left(rigidness_{i,k}^{EE}\right)^2 + \left(rigidness_{i,k}^{option}\right)^2} \quad (5)$$

The intuition for this measure stems from the fact that the rigidness variables are approximately centered around zero. Thus, higher ID values indicate organizations that deviate more substantially from industry averages in their use of the four PP measures. In our baseline regression, organization-industry pairs farther from the origin have a greater regression leverage and are more influential in determining coefficient significance than those near the origin.

Table 6 reports the results for procurement inefficiency using our alternative metric. Firms with cultures that deviate more substantially from industry averages are significantly more likely to receive no bids (Column 1), have a higher share of tenders with at most one bid (Column 2), and attract fewer potential and actual bids (Columns 3 and 4). These findings strongly complement those in Table 5, showing the expected opposite relationship. Notably, the estimate in Column 2 becomes statistically significant in this specification. However, the coefficient in Column 5 remains small and statistically insignificant.

Taken together, the results in this section imply that both greater organizational rigidity and deviating from the national industry norms are associated with lower number of bids and higher probability of zero-bid tenders. These point to a potential efficiency loss from organizational rigidness in PP. Moreover, they offer a very simple solution that buyers should mimic how other organizations typically buy similar products rather than how they themselves buy very different products. This should be fairly easily achieved as in many countries there are public databases and procurement notice boards that allow a view on how other organizations buy. Moreover, collecting and analyzing such data is becoming increasingly cheap with AI tools.

Table 6: Procurement outcomes and industry culture deviation.

	(1) If tender gets no bidder	(2) Share of auctions with 0-1 bids	(3) Number of registrations	(4) Number of bids	(5) Share of previous wins by winner
ID	0.173*	0.187**	-2.669***	-1.022**	0.055
	(0.098)	(0.081)	(0.686)	(0.458)	(0.064)
Observations	13,784	13,784	13,784	13,784	1,689
R-squared	0.076	0.048	0.096	0.048	0.12
Mean outcome	0.305	0.491	6.949	2.396	0.24
Year FE	Yes	Yes	Yes	Yes	Yes
Region FE	Yes	Yes	Yes	Yes	Yes
Industry FE	Yes	Yes	Yes	Yes	Yes
Procurer-type FE	Yes	Yes	Yes	Yes	Yes

Notes: The unit of observation in the regressions is a unique tender (ITT) in Cloudia's sample during 2010-2017. The dependent variables are (1) a binary variable indicating if the tender received no bid from any bidder at all, (2) the share of auctions within a tender that received zero or one bid, (3) the number of registrations in a tender, (4) the number of bids in a tender, and (5) winning bidder's historical success rate. The historical success rate—calculated as the ratio of wins to total participation during 2010-2016—is analyzed using only the 2017 sample. Variable ID is the Euclidean distance of the original OR variables. Clustered standard errors at the contracting authority level within parentheses. ***, **, and * indicate statistical significance at confidence levels of 1%, 5%, and 10%, respectively.

6. Robustness and external validity

6.1. Robustness

The robustness of our main rigidness regression is assessed through a series of checks. A full set of checks is provided in the Online Appendix. We briefly summarize the findings below.

Weighted average of industry shares (reported in Table A1 in the Online Appendix): Recall that the OR measure considered in Equation (1) is given by the difference between a contracting authority's share of the PP feature in all other industries than the one considered and the national share of the same feature in those other industries. As the first robustness test, instead of using a simple average to account for the share of a PP feature used in all other industries, we now use a weighted average utilizing the share of tenders issued for each of those other industries by the contracting authority (out of all its tenders). The same weights are also used on the national average of the PP feature for each industry; it means that now the national average value within a given industry will vary across contracting authorities based on the share of tenders they have in those industries. Repeating the same regression model (given by Equation (1) by using this weighted OR measure, we find that the results do not change meaningfully. The estimates are, however, slightly more conservative than before.

Subsamples of organizations above and below the industry norm (reported in Table A2 in the Online Appendix): In the next exercise, we explore if a similar associations exists when separately considering sub-samples of contracting authorities which are *always more likely* than the national industry average to use the respective PP features in *all* their tenders vis-à-vis those contracting authorities which are *always less likely* than the national industry average in using the PP features in *all* their tenders. To explain further, in the first regression, we only consider the contracting authorities that have *all* their tenders with the respective rigidness measure > 0, and in the second regression, we consider the contracting authorities that have a rigidness measure < 0 in all their tenders. Those contracting authorities that have varying signs of the culture measure across their tenders are not considered for this exercise. In the case of scoring and engineer estimate, we find that in both sub-samples, the association holds significantly and in the same expected direction; however, in the case of partial bids and additional purchase option features, the results differ. We also note something rather interesting from the number of observations in the case of each PP feature. For scoring and engineer estimate, we see that the numbers of observations in the two sub-samples add up to the total observations in the whole sample (as in Table 2), thus indicating that each contracting authority is using scoring and engineer estimate either *always more* than the national industry average in all their tenders for all industries or *always less* than the national industry average. This implies that the use of scoring as an allocation rule and announcing the engineer estimate have a relatively more persistent OR within contracting authorities in Finland. On the contrary, although we see OR manifested on average in the use of partial bids and additional purchase option (Table 2), we do not see a similar pattern when zooming into the sub-samples. From the number of observations of the sub-samples, it is revealed that there is relatively more variation in the culture measure of partial bids and additional purchase option across the tenders of a contracting authority, i.e. they are not *always* more (or less) likely than the national industry average to use those features in all their tenders (i.e. the numbers of observations in the sub-samples do not add up to the total observations in the full sample for partial bids and additional purchase option).

Industry classification codes (reported in Table A3 in the Online Appendix): In this robustness check, we redefine the industry classification from 2-digit cpv codes to 3-digit cpv codes. It means that we are now able to explore the industry classification within the OR measure at a more granular level.[23] More detailed cpv codes are in particularly useful for determining the industry specific national averages that are used to scale the OR variable more accurately. We see that the main results on OR are robust to this change.

Logistic regression (reported in Table A5 in the Online Appendix): We carried out the main regression

[23]For example, the 2-digit cpv code "45" accounts for the industrial classification of "construction works", and the 3-digit classifications 451, 452, and so forth account for sub-categories within construction. In our Finnish sample, the variety of industries at 2-digit cpv level among the tenders issued by a contracting authority ranges from 1 to 43. When we consider industry classification at 3-digit cpv level, the variety of industries in the tenders issued by a contracting authority ranges from 1 to 122.

using the logistic regression instead of the simple ordinary least squares regression. The logistic model may accommodate better the binary outcome variable. Our conclusion is that the results remain the same after this modification.

Sources of procurement style persistence: own behavior for active procurement officers (reported in Table A6 in the Online Appendix): The results in this table provide a complementary view to the results in Table A6 by examining further the behavior of the individuals initiating the tenders. We replicate the main regression in A6, but including only individuals who have been involved in at least 10 tenders. Therefore, we are interested whether our estimates are attributable to a smaller subset of employees who organize a disproportionately high number of tenders. We conclude that the results are robust in the restricted sample.

Regressions by year (reported in Table A7 in the Online Appendix): The main results, estimated for the 2013-2017 subsample, remain remarkably consistent and often statistically significant despite a substantially smaller annual sample sizes. The estimates are particularly robust for the later period (2015-2017), which benefits from a larger number of observations.

Regressions by procurer type (reported in Table A8 in the Online Appendix): We estimate the model separately for five organizational subsamples: government, regional, and large, medium, and small municipalities. The purpose is to test for heterogeneous effects of organizational rigidness. The results are broadly consistent across groups.

Regressions by industry (reported in Table A9 in the Online Appendix): The analysis reveals that the observed pattern is strongest in "Goods and equipment" and "Other services." Notably, the effect disappears in the "Construction work and services" industry. This seems natural as construction projects are likely the most complicated on average, which may force rethinking of culture and habits when designing them.

Regressions by Expenditure and Number of Employees (reported in Table A10 in the Online Appendix): This table further illustrates how the effects vary based on two new variables. *High expenditure* is an indicator[24] for organizations with annual expenditure above the yearly median. *High nr employees* is an indicator for organizations with employee counts above the yearly median. Overall, the split-sample analysis reveals strikingly consistent results. The sole exception is among high-expenditure organizations, where the effect is no longer observed for scoring.

Panel Data: Within vs. Between (reported in Table A11 in the Online Appendix): To perform a within-between analysis, we constructed annualized versions of the OR variables. The results of this analysis show distinct patterns of variation for the different OR measures. For all four variables, the standard deviation is decomposed into "between" variation (differences across organizations) and "within" variation (changes over time within the same organization). The "Scoring OR" variable exhibits the strongest per-

[24]The variable is constructed in two steps. First, we impute missing engineering estimates by regressing them on procurement organization and industry (CPV code) dummies, using the resulting predicted values. Second, we calculate each organization's total annual procurement expenditure. Observations are classified as 'high expenditure' if this value exceeds the annual median.

sistent differences between organizations, as evidenced by the larger "between" standard deviation (0.199) compared to its "within" standard deviation (0.143). This suggests that an organization's propensity to use scoring is a relatively stable trait. Conversely, for the other three variables—Partial Bid, Engineer Estimate, and Additional Purchase Option—the "within" and "between" standard deviations are more balanced, indicating that these practices are subject to more considerable fluctuation over time within the same organization. Furthermore, the wide overall ranges, especially the negative minimum values, confirm significant heterogeneity in all OR measures across the sample.

6.2. External validity

In this section, we discuss if the findings on OR in Finnish PP are valid in another country context. For an external validity check, we choose Sweden, which is relatable to Finland in its institutional settings.

The Swedish Act on Public Procurement (Lag (2016:1145) om offentlig upphandling) is based on the EU Procurement Directive 2014/24/EU. The typical features of Swedish public procurement are similar to those of Finland (described in Section 3.1). The contract features are also similar (see Section 3.2); however, data is limited when it comes to examining various PP-related features.

For this exercise, we obtain data from Visma Commerce AB (henceforth, Visma). It is one of the four private market operators providing a platform for public procurement notices in Sweden. Visma collects data by its own initiative through sourcing systems, databases, web pages of contracting authorities, contract documents, contract award documents and court case documents. This database contains information on most contract notices advertised in Sweden during 2012-2018. Our analysis is limited to a subset of the data from only normal contract notices meant for competitive bidding. The database contains information on the contracting authority and some details on contract awards, such as the contract award criteria (i.e. whether they use the best price-quality ratio (i.e. scoring) or price only to decide on the winner). The data also contain information on bidder identity but lacks information on bids, winning price and expected value of contract award, even though the latter is mandatory to be included in a contract notice according to national and EU rules. Finally, in the Swedish sample, one bidder is observed at most once per contract award, even though the same bidder could have submitted multiple bids on the same contract in some rare cases even when the contract award was not divided into many lots. The data is also limited in terms of understanding the lots within divided contracts, thus providing no insight into whether a bidder had submitted a bid for a single or several lot(s) within the contract tender. As a result, it is impossible to compare the number of bidders with the number of bids submitted (although, this ambiguity is alleviated to some extent by controlling for the observation of multiple winners).

In the Swedish sample, we can observe only two tender-level outcome variables: (1) the use of scoring and (2) having multiple winners (which is equivalent to partial bids). Table 7 summarizes the findings. We observe the presence of rigidness in the use of scoring criteria across all model specifications (Columns 1-3). In the simplest model in the Swedish case, we find that the OR coefficient for the use of scoring is 0.733 ($p < 0.01$), with no substantial change in the value as we control for more factors. In the case of multiple winners (Columns 4-6), we find similar evidence of organizational culture in the use of this feature across all tenders for all industries.

Table 7: External validity: Organizational rigidness in PP in Sweden.

Dependent variable	Scoring			Many winners		
	(1)	(2)	(3)	(4)	(5)	(6)
Scoring OR	0.733***	0.699***	0.704***			
	(0.035)	(0.031)	(0.031)			
Many winners OR				0.644***	0.549***	0.465***
				(0.089)	(0.060)	(0.072)
Observations	120233	120233	120233	130528	130528	130528
R-sq.	0.071	0.164	0.167	0.029	0.072	0.131
Mean of outcome variable	0.471	0.471	0.471	0.166	0.166	0.166
Controls	No	No	Yes	No	No	Yes
Year FE	No	Yes	Yes	No	Yes	Yes
Month FE	No	Yes	Yes	No	Yes	Yes
Region FE	No	Yes	Yes	No	Yes	Yes
Industry FE	No	Yes	Yes	No	Yes	Yes
Procurer-type FE	No	Yes	Yes	No	Yes	Yes

Notes: The unit of observation in the regressions is a unique tender (ITT) in Visma's sample during 2012-2018. The dependent variables are binary: taking value 1 if the respective PP feature is used in the tender and zero otherwise. The main predictor variable is the respective measure of the organizational culture of that PP feature. Controls include ITT-specific variables: contract length, TED dummy, and number of cpv codes reported. Clustered standard errors at the industry (2-digit cpv) level within parentheses. ***, **, and * indicate statistical significance at confidence levels of 1%, 5%, and 10%, respectively.

7. Discussion and Conclusion

In this article, we study the extent of a one-size-fits-all approach in the design of public procurement tenders using rich data from Finland. We explore whether contracting authorities consistently rely on the same practices irrespective of the characteristics of the procured goods when choosing the key procurement features of the auction rule, dividing tender into lots, announcing engineer estimates of the contract, and allowing multiple purchasing options. As our primary measure to understand the rigidness in public procurement within a contracting authority, we explore how often (relative to the national industry-level means) the organization uses a given PP feature (e.g. scoring auction) in tenders for other industries than the industry of a given tender. In a simple OLS framework, we then study how the tendency of using a PP feature in all its other tenders associates with choosing the same PP feature in a given tender by a contracting authority. We find a strong positive association in the case of all four PP features studied here, thus confirming the presence of a strong organizational rigidness within contracting authorities in their practice of designing tenders and awarding contracts in PP.

Having established our main result at the organizational level, we investigate its micro-foundations using data on individual employees responsible for tender design. Our regressions decompose tender behavior into a component explained by the employees' own habits in other industries (habit formation) and a component explained by their colleagues' behavior (organizational culture). We find that while both factors matter, habit formation (individuals copying their own behavior) is the more dominant driver of the observed one-size-fits-all pattern. To our knowledge this is the first study to document organizational rigidness and its drivers in public organizations.

Our study is in the context of PP, and a fundamental way of achieving efficiency in PP is by enhancing competition among bidders. Therefore we are interested in whether rigid tender design is associated with procurement outcomes, in particular, the level of competition. Using two alternative measures of organizational culture, we find that a rigid procurement culture is associated with an increase in the share of zero-bid tenders and reduction in the number of potential and actual bids. Therefore, we provide evidence that OR in PP could have adverse implications in terms of organizational outcomes. Moreover, we show that deviating from nationwide industry norms is associated with decreased competition, suggesting that a very easy improvement in PP practices would be that organization and their employees would not follow their own habits but rather the typical nationwide industry practices. We do not find any confirmatory evidence that OR rigidity might arise from "negative" factors, such as administrative burdens or deficiencies in competence and resources within organizations.

I sum, we have utilized a large and rich data on PP in Finland and novel measurement to confirm a strong presence of OR in various key PP features. The main finding is robust to many alternative formulations and specifications. Interestingly, we also see the result traveling to the context of Sweden. We also showed that rigidness results more from habit formation than organizational culture and that rigidness is associated with less competition. All these are novel findings in the context of public organizations.

Nevertheless, this study has its limitations too. Due to the unavailability of data, we are unable to thoroughly investigate the underlying mechanism for the reasons behind organization culture and habit formation. Future research could explore the dynamics within organizations at a deeper level both quantitatively and qualitatively. Moreover, we do not have a research design to study our questions causally. However, given the OR measures are calculated using data only from the other tenders (in other industries) than the outcome observation, the analysis to some extent addresses some endogeneity concerns. Future research should address causal inference challenges with alternative research designs.

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Online Appendix

for

Organizational Culture and Habit Formation in Public Procurement

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This online appendix contains supplementary figures and tables for the main article.

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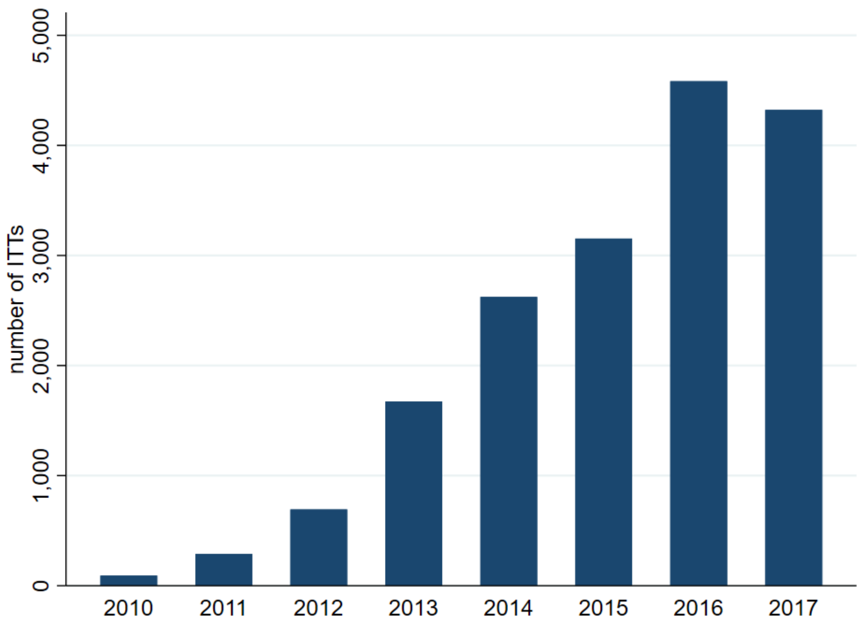
Table of Contents

The appendix is organized as follows:

All figures and tables in this appendix are labeled with the prefix “A” (e.g., Figure A1, Figure A2) to distinguish them from tables in the main article.

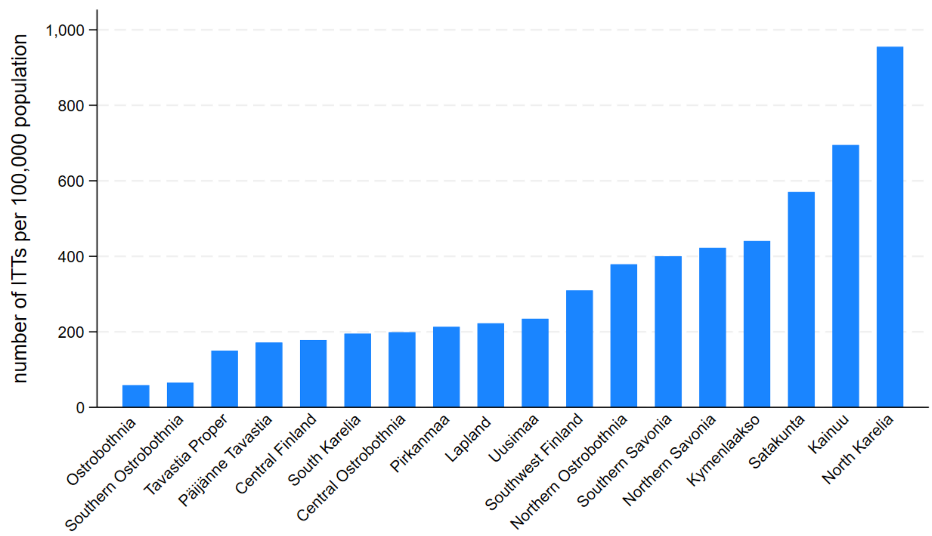
1 Additional Figures

Figure A1: ITTs in Cloudia over time



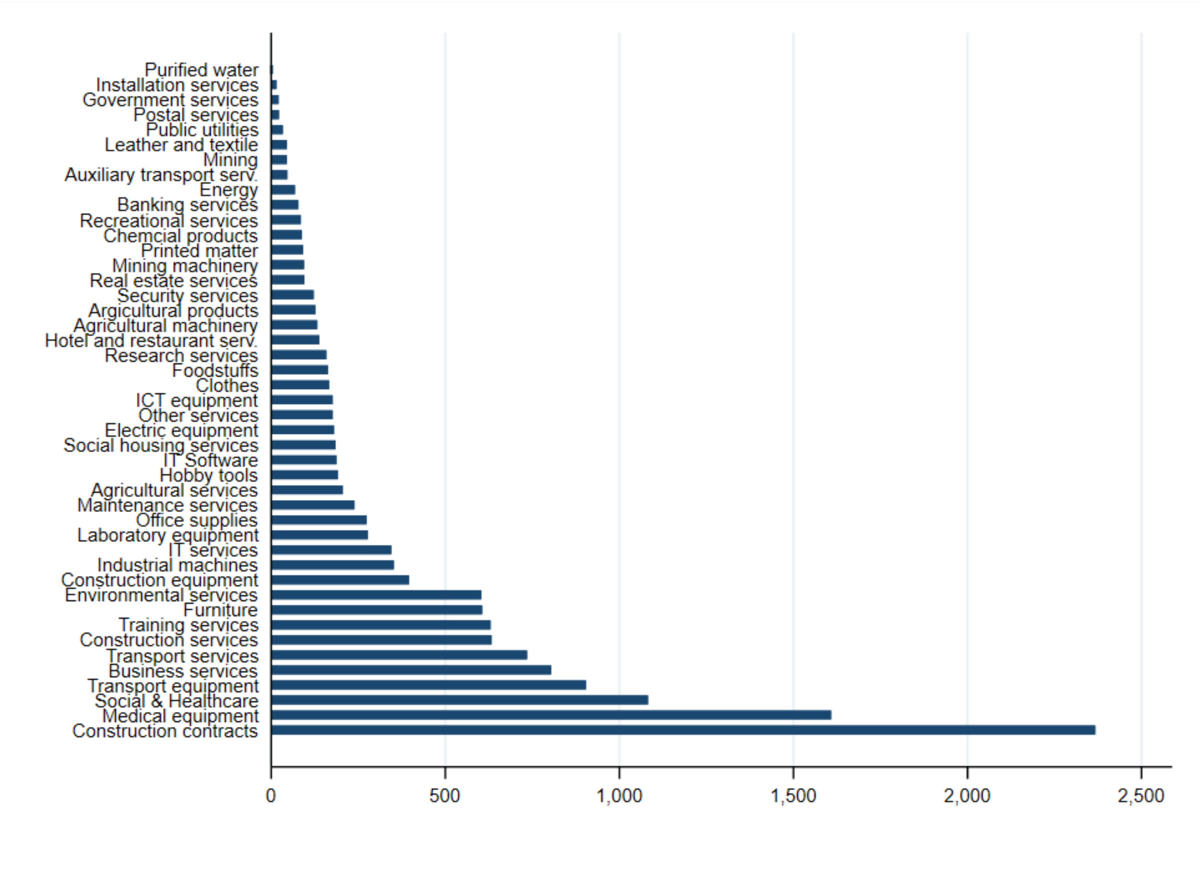
Notes: The Cloudia database contains information on ∼18,000 unique tenders (ITTs) of public procurement published through their electronic system during 2010-2017. The figure shows the number of ITTs published across the years.

Figure A2: ITTs in Cloudia over regions



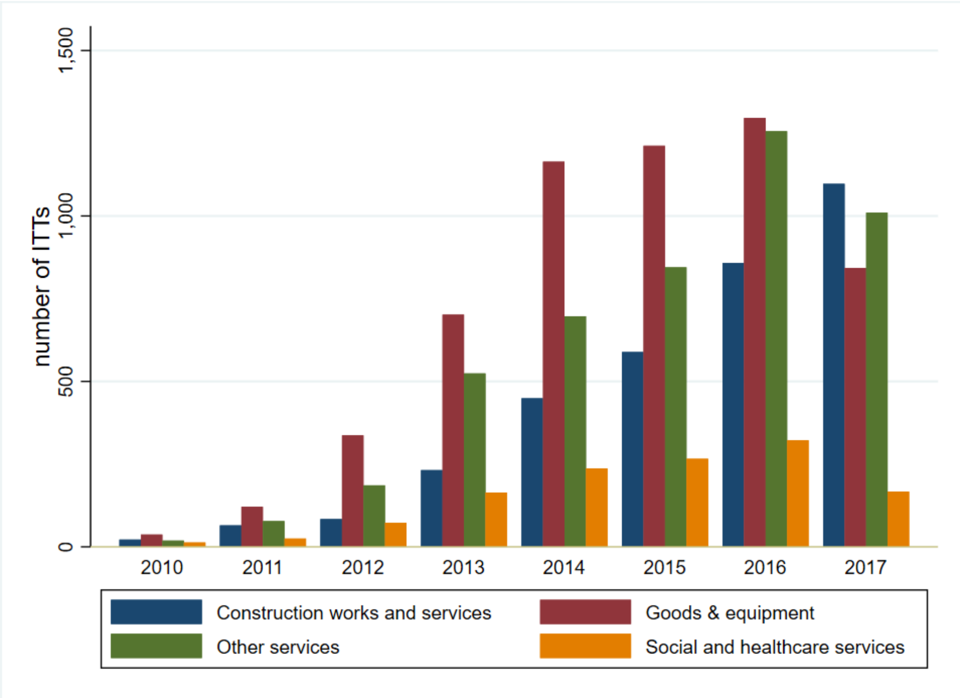
Notes: The Cloudia database contains information on ∼18,000 unique tenders (ITTs) of public procurement published through their electronic system during 2010-2017. The figure shows the number of ITTs (per 100,000 population) across the regions. In this figure, when normalising with region-level population data, we do not distinguish which geographical level (e.g. municipality vs entire region) the ITT and contract are meant for. (Population data for 2021 is obtained from Statistics Finland.)

Figure A3: ITTs in Cloudia across industries (2-digit cpv code)



Notes: The Cloudia database contains information on ∼18,000 unique tenders (ITTs) of public procurement published through their electronic system during 2010-2017. The figure shows the number of ITTs in different industries. The industry classifications are obtained from the Common Procurement Vocabulary (cpv) classification codes - a standardized single classification system for PP in the EU. For this figure, the 2-digit cpv code classifications are used.

Figure A4: ITTs in Cloudia across primary industry types over time



Notes: The Cloudia database contains information on ∼18,000 unique tenders (ITTs) of public procurement published through their electronic system during 2010-2017. The figure shows a yearly representation of ITTs in four primary industry categories. The four primary industry categories considered are (a) Construction works and services, (b) Goods and equipment, (c) Other services, and (d) Social and healthcare services.

2 Additional Tables

Table A1: Organizational rigidness in PP in Finland - with OR measure weighted by shares of industries in tenders

Dependent variable	Scoring			Partial bids			Engineer Estimate			Add.purchase option		
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)
Scoring OR	0.458***	0.168**	0.168**									
	(0.115)	(0.071)	(0.071)									
Partial bid OR				0.443***	0.160*	0.159*						
				(0.077)	(0.089)	(0.089)						
Engineer estimate OR							0.721***	0.304***	0.308***			
							(0.092)	(0.094)	(0.095)			
Add. purchases OR										0.561***	0.413***	0.418***
										(0.183)	(0.136)	(0.136)
Observations	11571	11571	11571	13784	13784	13784	13784	13784	13784	8734	8734	8734
R-sq.	0.021	0.271	0.271	0.007	0.124	0.125	0.049	0.145	0.146	0.021	0.216	0.217
Mean of outcome variable	0.503	0.503	0.503	0.252	0.252	0.252	0.861	0.861	0.861	0.444	0.444	0.444
Controls	No	No	Yes	No	No	Yes	No	No	Yes	No	No	Yes
Year FE	No	Yes	Yes	No	Yes	Yes	No	Yes	Yes	No	Yes	Yes
Month FE	No	Yes	Yes	No	Yes	Yes	No	Yes	Yes	No	Yes	Yes
Region FE	No	Yes	Yes	No	Yes	Yes	No	Yes	Yes	No	Yes	Yes
Industry FE	No	Yes	Yes	No	Yes	Yes	No	Yes	Yes	No	Yes	Yes
Procurer-type FE	No	Yes	Yes	No	Yes	Yes	No	Yes	Yes	No	Yes	Yes

Notes: The unit of observation in the regressions is a unique tender (ITT) in Cloudia's sample during 2010-2017. The dependent variables are binary: taking value 1 if the respective PP feature is used in the tender and zero otherwise. The main predictor variable is the respective weighted measure of the organizational culture of that PP feature. (The weighting is done by the share of tenders a contracting authority has in each industry among all its tenders.) Controls include ITT-specific variable: inaccuracy of the ITT notice. Clustered standard errors at the industry (2-digit cpv) level within parentheses. ***, **, and * indicate statistical significance at confidence levels of 1%, 5%, and 10%, respectively.

Table A2: Organizational rigidness in PP in Finland - sub-sample analysis

Dependent variable	Scoring		Partial bids		Engineer Estimate		Add.purchase option	
	$+ve$ OR	$-ve$ OR	$+ve$ OR	$-ve$ OR	$+ve$ OR	$-ve$ OR	$+ve$ OR	$-ve$ OR
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Scoring OR	0.355*	0.174**						
	(0.206)	(0.068)						
Partial bid OR			-0.857**	-0.680***				
			(0.351)	(0.211)				
Engineer estimate OR					0.365***	0.593***		
					(0.076)	(0.129)		
Add. purchases OR							0.232**	-0.254
							(0.104)	(0.340)
Observations	5073	6498	4018	5282	7755	6029	2756	3680
R-sq.	0.294	0.292	0.143	0.144	0.080	0.153	0.211	0.165
Mean of outcome variable	0.582	0.442	0.376	0.156	0.938	0.762	0.665	0.280
Controls	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Year FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Month FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Region FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Industry FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Procurer-type FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes

Notes: The unit of observation in the regressions is a unique tender (ITT) in Cloudia's sample during 2010-2017. The dependent variables are binary: taking value 1 if the respective PP feature is used in the tender and zero otherwise. The main predictor variable is the respective measure of the organizational culture of that PP feature. The sample in the "$+ve$ OR" column is restricted to only those contracting authority's tenders which always have an OR measure > 0 for that particular PP feature. The sample in the "$-ve$ OR" column is restricted to only those contracting authority's tenders which always have an OR measure < 0 for that particular PP feature. Controls include ITT-specific variable: inaccuracy of the ITT notice. Clustered standard errors at the industry (2-digit cpv) level within parentheses. ***, **, and * indicate statistical significance at confidence levels of 1%, 5%, and 10%, respectively.

Table A3: organizational rigidness in PP in Finland - using 3-digit cpv codes for industry classification

Dependent variable	Scoring			Partial bids			Engineer Estimate			Add.purchase option		
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)
Scoring OR	0.721***	0.406***	0.404***									
	(0.090)	(0.094)	(0.094)									
Partial bid OR				0.720***	0.252***	0.252***						
				(0.089)	(0.079)	(0.079)						
Engineer estimate OR							0.894***	0.546***	0.546***			
							(0.091)	(0.081)	(0.081)			
Add. purchases OR										0.793***	0.568***	0.569***
										(0.085)	(0.054)	(0.054)
Observations	11571	11571	11571	13784	13784	13784	13784	13784	13784	8734	8734	8734
R-sq.	0.053	0.325	0.326	0.019	0.170	0.170	0.088	0.195	0.195	0.080	0.281	0.282
Mean of outcome variable	0.503	0.503	0.503	0.252	0.252	0.252	0.861	0.861	0.861	0.444	0.444	0.444
Controls	No	No	Yes	No	No	Yes	No	No	Yes	No	No	Yes
Year FE	No	Yes	Yes	No	Yes	Yes	No	Yes	Yes	No	Yes	Yes
Month FE	No	Yes	Yes	No	Yes	Yes	No	Yes	Yes	No	Yes	Yes
Region FE	No	Yes	Yes	No	Yes	Yes	No	Yes	Yes	No	Yes	Yes
Industry FE	No	Yes	Yes	No	Yes	Yes	No	Yes	Yes	No	Yes	Yes
Procurer-type FE	No	Yes	Yes	No	Yes	Yes	No	Yes	Yes	No	Yes	Yes

Notes: The unit of observation in the regressions is a unique tender (ITT) in Cloudia's sample during 2010-2017. The dependent variables are binary: taking value 1 if the respective PP feature is used in the tender and zero otherwise. The main predictor variable is the respective measure of the organizational culture of that PP feature. Controls include ITT-specific variable: inaccuracy of the ITT notice. Clustered standard errors at the industry (3-digit cpv) level within parentheses. ***, **, and * indicate statistical significance at confidence levels of 1%, 5%, and 10%, respectively.

Table A4: Summary statistics of contracting authorities by the size of their PP office

Variable	Small		Big		
	Mean (1)	Std Dev (2)	Mean (3)	Std Dev (4)	Mean diff. (5)
Scoring rule used	0.62	0.49	0.50	0.50	0.12***
Partial bids used	0.21	0.41	0.25	0.43	-0.04*
Engineer estimate used	0.94	0.23	0.86	0.35	0.08***
Additional purchase option used	0.34	0.47	0.45	0.50	-0.11***
Procurement volume (in million, euros)	0.73	5.94	1.03	7.17	-0.29
Number of different industries (2-digit cpv codes) procured from	5.90	4.02	28.99	10.90	-23.09***
Inaccuracy of ITT notice (= number of zeroes in cpv code)	4.63	1.63	4.54	1.64	0.09
Procured from industry:					
Construction	0.22	0.41	0.23	0.42	-0.01
Goods and service	0.36	0.48	0.39	0.49	-0.03
Other services	0.37	0.48	0.29	0.45	0.07***
Social and healthcare	0.06	0.23	0.08	0.28	-0.03*
Contracting authority type:					
Capital area	0.04	0.20	0.16	0.37	-0.12***
Government	0	0	0.05	0.21	-0.05***
Large municipality	0.61	0.49	0.56	0.49	0.05*
Small municipality	0.13	0.34	0.01	0.08	0.13***
Region	0.21	0.41	0.22	0.41	-0.01

Notes: Data used from the Cloudia database (2010-2017), on unique ITTs in public procurement in Finland. The Big offices are the contracting authorities above the median in the distribution of the maximum number of tenders annually published by them. The Small office represents below the median. Column (5) gives the difference in means. ***, **, and * indicate statistical significance at confidence levels of 1%, 5%, and 10%. and are obtained from a two-sided t-test.

Table A5: Logistic regression: organizational rigidness in PP in Finland

Dependent variable	Scoring			Partial bid			Engineer Estimate			Add.purchase option		
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)
Scoring OR	2.215***	1.591***	1.591***									
	(0.473)	(0.515)	(0.514)									
Partial bid OR				3.553***	1.202**	1.190**						
				(0.802)	(0.536)	(0.537)						
Engineer estimate OR							6.267***	4.332***	4.352***			
							(0.383)	(0.443)	(0.450)			
Add. purchases OR										3.121***	2.879***	2.894***
										(0.379)	(0.281)	(0.281)
Observations	11571	11571	11571	13784	13782	13782	13784	13492	13492	8734	8732	8732
R-sq.	0.025	0.226	0.226	0.018	0.115	0.116	0.097	0.204	0.205	0.055	0.187	0.188
Mean outcome variable	0.503	0.503	0.503	0.252	0.252	0.252	0.861	0.858	0.858	0.444	0.444	0.444
Controls	No	No	Yes	No	No	Yes	No	No	Yes	No	No	Yes
Year FE	No	Yes	Yes	No	Yes	Yes	No	Yes	Yes	No	Yes	Yes
Month FE	No	Yes	Yes	No	Yes	Yes	No	Yes	Yes	No	Yes	Yes
Region FE	No	Yes	Yes	No	Yes	Yes	No	Yes	Yes	No	Yes	Yes
Industry FE	No	Yes	Yes	No	Yes	Yes	No	Yes	Yes	No	Yes	Yes
Procurer-type FE	No	Yes	Yes	No	Yes	Yes	No	Yes	Yes	No	Yes	Yes

Notes: This table replicates the main specification from Table 2 using logistic regression. The unit of observation in the regressions is a unique tender (ITT) in Cloudia's sample during 2010-2017. The dependent variables are binary: taking value 1 if the respective PP feature is used in the tender and zero otherwise. The main predictor variables measure the average use of the same procurement feature in all other industries. Controls include ITT-specific variable: inaccuracy of the ITT notice. Clustered standard errors at the industry (2-digit cpv) level within parentheses. ***, **, and * indicate statistical significance at confidence levels of 1%, 5%, and 10%, respectively.

Table A6: Sources of procurement style persistence: own behavior for active procurement officers

Dependent variable	Scoring			Partial bid			Engineer Estimate			Add.purchase option		
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)
Scoring OR	0.598***	0.373***	0.372***									
	(0.051)	(0.048)	(0.048)									
Partial bid OR				0.471***	0.287***	0.288***						
				(0.094)	(0.031)	(0.031)						
Engineer estimate OR							0.639***	0.413***	0.415***			
							(0.111)	(0.081)	(0.080)			
Add. purchases OR										0.609***	0.329***	0.328***
										(0.067)	(0.062)	(0.062)
Observations	6780	6780	6780	7894	7894	7894	7894	7894	7894	4772	4772	4772
R-sq.	0.088	0.29	0.29	0.033	0.151	0.152	0.123	0.222	0.222	0.103	0.257	0.258
Mean outcome variable	0.527	0.527	0.527	0.265	0.265	0.265	0.839	0.839	0.839	0.431	0.431	0.431
Controls	No	No	Yes	No	No	Yes	No	No	Yes	No	No	Yes
Year FE	No	Yes	Yes	No	Yes	Yes	No	Yes	Yes	No	Yes	Yes
Month FE	No	Yes	Yes	No	Yes	Yes	No	Yes	Yes	No	Yes	Yes
Region FE	No	Yes	Yes	No	Yes	Yes	No	Yes	Yes	No	Yes	Yes
Industry FE	No	Yes	Yes	No	Yes	Yes	No	Yes	Yes	No	Yes	Yes
Procurer-type FE	No	Yes	Yes	No	Yes	Yes	No	Yes	Yes	No	Yes	Yes

Notes: This table displays results from a subsample analysis of active officers ($\geq$ 10 ITTs). The main predictor in this specification is constructed using only the procurement office's own cross-industry tenders. The unit of observation in the regressions is a unique tender (ITT) in Cloudia's sample during 2010-2017. The dependent variables are binary: taking value 1 if the respective PP feature is used in the tender and zero otherwise. Controls include ITT-specific variable: inaccuracy of the ITT notice. Clustered standard errors at the industry (2-digit cpv) level within parentheses. ***, **, and * indicate statistical significance at confidence levels of 1%, 5%, and 10%, respectively.

Table A7: Organizational rigidness in PP in Finland by year

	Year				
	2013	2014	2015	2016	2017
Scoring OR	0.447***	0.228	0.271*	0.168	0.329*
	(0.163)	(0.140)	(0.146)	(0.130)	(0.181)
Observations	1506	2448	2812	2840	1883
R-Squared	0.236	0.266	0.258	0.338	0.482
Mean Dep. Var.	0.569	0.531	0.494	0.526	0.389
Partial bid OR	-0.108	-0.196	0.343**	0.305**	0.297***
	(0.238)	(0.191)	(0.154)	(0.138)	(0.108)
Observations	1519	2450	2812	3410	2635
R-Squared	0.164	0.150	0.157	0.147	0.165
Mean Dep. Var.	0.290	0.278	0.279	0.229	0.191
Engineer estimate OR	0.476**	0.630***	0.636***	0.424***	0.320**
	(0.188)	(0.213)	(0.165)	(0.137)	(0.153)
Observations	1519	2450	2812	3410	2635
R-Squared	0.269	0.206	0.245	0.132	0.218
Mean Dep. Var.	0.826	0.827	0.810	0.921	0.858
Add. purchases OR	0.733***	0.707***	0.458***	0.375***	0.427***
	(0.161)	(0.119)	(0.133)	(0.095)	(0.117)
Observations	941	1574	1801	2260	1704
R-Squared	0.351	0.337	0.260	0.251	0.242
Mean Dep. Var.	0.498	0.461	0.475	0.467	0.368

Notes: This table shows results from regressions estimated separately for each year. The unit of observation in the regressions is a unique tender (ITT) in Cloudia's sample during 2010-2017. The dependent variables are binary: taking value 1 if the respective PP feature is used in the tender and zero otherwise. The main predictor variables measure the average use of the same procurement feature in all other industries. The regressions control for the inaccuracy of the ITT notice, as well as for month, region, industry, and procurer-type fixed effects. Clustered standard errors at the industry (2-digit cpv) level within parentheses. ***, **, and * indicate statistical significance at confidence levels of 1%, 5%, and 10%, respectively.

Table A8: Organizational rigidness in PP in Finland by procurer type

	Procurer type				
	Government	Region	Large municipality	Medium municipality	Small municipality
Scoring OR	0.578***	0.649***	0.579***	0.466***	0.673***
	(0.119)	(0.171)	(0.18)	(0.144)	(0.093)
Observations	1351	2585	3583	2125	2725
R-squared	0.553	0.342	0.247	0.292	0.215
Mean outcome variable	0.612	0.554	0.473	0.571	0.394
Partial bid OR	0.457***	0.472***	0.449***	0.259	0.337***
	(0.147)	(0.129)	(0.121)	(0.219)	(0.112)
Observations	1828	3056	4219	2772	3113
R-squared	0.385	0.148	0.142	0.132	0.151
Mean outcome variable	0.212	0.295	0.245	0.281	0.235
Engineer estimate OR	0.425**	0.906***	0.630***	0.715***	0.527***
	(0.189)	(0.150)	(0.211)	(0.139)	(0.145)
Observations	1828	3056	4219	2772	3113
R-squared	0.234	0.226	0.138	0.151	0.109
Mean outcome variable	0.862	0.772	0.824	0.945	0.902
Add. purchases OR	0.635***	0.578***	0.967***	0.560***	0.380***
	(0.206)	(0.117)	(0.080)	(0.153)	(0.133)
Observations	1074	1649	2614	1719	2198
R-squared	0.274	0.225	0.319	0.235	0.287
Mean outcome variable	0.539	0.37	0.508	0.442	0.393

Notes: This table shows results from regressions estimated separately for each type of the procurer. Population thresholds define municipality types: Large (over 100,000), Medium (50,000 to 100,000), Small (50,000 or fewer). The unit of observation in the regressions is a unique tender (ITT) in Cloudia's sample during 2010-2017. The dependent variables are binary: taking value 1 if the respective PP feature is used in the tender and zero otherwise. The regressions control for the inaccuracy of the ITT notice, as well as for month, year and industry fixed effects. The main predictor variables measure the average use of the same procurement feature in all other industries. Controls include ITT-specific variable: inaccuracy of the ITT notice. Clustered standard errors at the industry (2-digit cpv) level within parentheses. ***, **, and * indicate statistical significance at confidence levels of 1%, 5%, and 10%, respectively.

Table A9: Organizational rigidness in PP in Finland by industry

	Industry			
	Construction works and services	Goods and equipment	Other services	Social and healthcare services
Scoring OR	0.113	0.502***	0.477***	0.468
	(0.099)	(0.077)	(0.081)	(0.187)
Observations	2,800	4,561	3,329	881
R-squared	0.291	0.215	0.257	0.158
Mean outcome variable	0.236	0.628	0.578	0.425
Partial bid OR	0.266	0.261***	0.385**	0.03
	(0.126)	(0.084)	(0.141)	(0.043)
Observations	3,184	5,386	4,038	1,176
R-squared	0.122	0.080	0.167	0.118
Mean outcome variable	0.127	0.288	0.244	0.457
Engineer estimate OR	0.329	0.593***	0.723***	0.464*
	(0.214)	(0.077)	(0.069)	(0.040)
Observations	3,184	5,386	4,038	1,176
R-squared	0.130	0.168	0.204	0.202
Mean outcome variable	0.937	0.846	0.804	0.920
Add. purchases OR	0.427**	0.726***	0.506***	0.402***
	(0.085)	(0.081)	(0.074)	(0.006)
Observations	2,462	3,081	2,354	837
R-squared	0.172	0.189	0.114	0.288
Mean outcome variable	0.284	0.343	0.643	0.725

Notes: This table shows results from regressions estimated separately for each industry. The unit of observation in the regressions is a unique tender (ITT) in Cloudia's sample during 2010-2017. The dependent variables are binary: taking value 1 if the respective PP feature is used in the tender and zero otherwise. The main predictor variables measure the average use of the same procurement feature in all other industries. The regressions control for the inaccuracy of the ITT notice, as well as for month, year, region, industry (2-digit cpv), and procurer-type fixed effects. Clustered standard errors at the industry (2-digit cpv) level within parentheses. ***, **, and * indicate statistical significance at confidence levels of 1%, 5%, and 10%, respectively.

Table A10: Regressions by expenditure and nr of employees

	Subsample				
	All	**High expenditure**	**Low expenditure**	**High nr employees**	**Low nr employees**
Scoring OR	0.517***	0.315	0.478***	0.456***	0.445***
	(0.100)	(0.232)	(0.094)	(0.162)	(0.123)
Observations	12,330	5,932	6,398	5,886	6,483
R-squared	0.254	0.236	0.299	0.280	0.252
Mean outcome	0.505	0.483	0.526	0.494	0.515
Partial bid OR	0.445***	0.544**	0.365***	0.074	0.449***
	(0.088)	(0.202)	(0.068)	(0.257)	(0.066)
Observations	14,936	7,328	7,608	7,015	7,973
R-squared	0.131	0.173	0.107	0.144	0.139
Mean outcome	0.256	0.278	0.234	0.238	0.272
Engineer estimate OR	0.588***	0.615***	0.510***	0.639***	0.572***
	(0.111)	(0.158)	(0.105)	(0.163)	(0.108)
Observations	14,936	7,328	7,608	7,015	7,973
R-squared	0.138	0.164	0.123	0.168	0.144
Mean outcome	0.859	0.831	0.887	0.822	0.887
Add. purchases OR	0.679***	0.767***	0.629***	0.742***	0.593***
	(0.043)	(0.119)	(0.045)	(0.103)	(0.048)
Observations	9,254	4,306	4,948	4,326	4,928
R-squared	0.223	0.216	0.256	0.237	0.239
Mean outcome	0.447	0.497	0.404	0.478	0.420

Notes: The table shows results from a heterogeneity analysis based on two dummy variables. Variable *High expenditure* is an indicator for organizations with annual procurement expenditure above the yearly median. Variable *High nr employees* is an indicator for organizations with employee counts above the annual median. The unit of observation in the regressions is a unique tender (ITT) in Cloudia's sample during 2010-2017. The dependent variables are binary: taking value 1 if the respective PP feature is used in the tender and zero otherwise. The main predictor variable measure the average use of the same procurement feature in all other industries. The regressions control for the inaccuracy of the ITT notice, as well as for month, year, industry (2-digit cpv), and procurer-type fixed effects. Clustered standard errors at the industry (2-digit cpv) level within parentheses. ***, **, and * indicate statistical significance at confidence levels of 1%, 5%, and 10%, respectively.

Table A11: Panel data: within vs between

	Mean	Std. dev.	Min	Max	Observations
Scoring OR					
Overall	-0.008	0.223	-0.843	0.782	
Between		0.199	-0.843	0.576	
Within		0.143	-0.512	0.567	
Partial bid OR					
Overall	-0.005	0.174	-0.469	0.827	
Between		0.147	-0.287	0.827	
Within		0.125	-0.346	0.642	
Engineer estimate OR					
Overall	0.015	0.160	-0.927	0.366	
Between		0.141	-0.594	0.311	
Within		0.100	-0.412	0.553	
Add. Purchase OR					
Overall	-0.038	0.239	-0.772	0.691	
Between		0.190	-0.514	0.526	
Within		0.164	-0.672	0.583	
Sample					
Observations	561				
Nr of PP offices	192				
Average time periods	2.92				

Notes: The table shows results from a standard within-between analysis for the four OR variables. For this analysis, we constructed annualized versions of the OR variables and then averaged them by organization and year to create a panel dataset.

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