Organisational Culture in Public Procurement*

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Abstract

We study the extent of organisational culture in public procurement using comprehensive data from Finland. We show that crucial procurement design features, such as using scoring as an allocation rule, accepting multiple bids, announcing engineer estimates of contracts, and allowing additional purchasing option in tenders, tend to have a significant lack of variation across different tenders for different industries within a contracting authority. This argues for the presence of strong organisational culture within contracting authorities in their practice of designing invitations to tender (ITT) and awarding contracts, and thus, suggests one channel of inefficiency in optimal contract design. Accordingly, we show that the closer the choice of PP feature in a given ITT is to the contracting authority's overall culture, the less likely it is that the tender receives any bidder, thus suggesting a potential efficiency loss from organisational culture in public procurement with competitive bidding.

Keywords: public procurement, organisational culture

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1. Introduction

The conceptualisation of organisational culture started evolving in the 1950s-60s, mainly within the discipline of psychology with influence from sociology and anthropology. As the need to explain various patterns of behaviour and levels of stability within groups and organisations grew, the need to rationalise the concept of "culture" gradually took shape in organisations within society. Over the years, as the concept of organisational culture (henceforth, OC) has become well-grounded, the sphere of it in exploring questions in economics, business administration and management science has expanded. The classical definition of OC formulated by management theorist Schein (1985) describes it as a shared collective construct:

"a pattern of basic assumptions, invented, discovered, or developed by a given group, as it learns to cope with its problems of external adaptation and internal integration, that has worked well enough to be considered valid and, therefore is to be taught to new members as the correct way to perceive, think, and feel in relation to those problems."

If OC is so fundamental in organisations, it is crucial to study it within public organisations, the functioning of which is pivotal in building state capacity. In this paper, we investigate the role of OC in public organisations in the context of public procurement (henceforth, PP). Our motivation to study OC, particularly in PP, arises from the fact that it 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] More importantly, these decisions are executed through the potentially shared goals and values of public servants working within the same organisation.

In particular, we are interested in studying how certain ways of executing tasks within the procurement office of a contracting authority[2] (in simpler words, a *public buyer*) can become a practice, and hence become a "culture", and how, in turn, that culture associates with PP-related decisions and outcomes. By analysing comprehensive data from Finland, we find that these offices tend to use similar procurement rules across different PP tender invitations despite purchases concerning services and products in different industries. This is indicative of the presence of some norm or standard within PP organisations. 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: using scoring auction as an allocation rule, accepting partial bids, announcing engineer estimates of contracts, and allowing multiple purchasing option in tenders. To verify if the use of these features is associated with office-level norms (= organisational culture), we examine how prone the procuring office of a contracting authority is to use the same feature

[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.

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 OC is likely at play in designing PP tender invitations issued by contracting authorities. We find that there is a significant lack of variation in the use of procurement features, such as the use of scoring as an allocation rule, allowing for multiple bids, providing an estimated value of the procurement, and allowing for additional purchase option across different tender invitations issued by a given contracting authority.

The often-observed functions and outcomes of organisations result from their adopted goals, ideals, norms, standards, principles and other untestable premises. From what probably starts historically as a set of values, over time, become assumptions underlying the organisation's functioning and are thus taken for granted (Schein, 1988). This argument on OC is quite evident in our findings, as we see a significantly low variation in the contract features in tender invitations across industries issued by a given contracting authority.[3] However, how these goals and strategies are adopted and manifest over time as the organisation's "culture" is hard to pin down.

Exploring relevant literature in various disciplines, we summarise here a few concepts that we believe could be linked to the evolution of OC 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 organisations) often have their individual interests aligned with the organisation'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 with the pre-established practice of designing contracts in that office. Public administration scholars further argue that when employees have strongly aligned personal and organisational 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., 2021), 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 organisation.[4]

Our finding on culture could also stem from "peer effects" in the workplace. Empirical evidence in economics, 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), through a series of lab experiments, confirm that working in pairs increases average outputs, where outputs within

[3]Anecdotes shared with us by PP officials suggest the prevalence of the so-called "changing-the-date" phenomenon in which 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.

[4]While the explanation on the alignment of individual goals with organisation's interests could be well-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.

pairs tend to be similar. With respect to real-world data, Cornelissen et al. (2017) confirm the presence of significant peer effects in low-skilled and monotonous occupations, with the effect size reducing in high-skilled occupations. Our context of issuing PP tender invitations could fit here in terms of the monotonicity of the task and thus induce significant peer effects such that PP officials consult with each other and repeat similar procurement features across all tender notices they publish.

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 optimising 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, OC could merely be analogous to a bad equilibrium in which organisations end up due to sub-optimal resources.[5]

To understand better what drives OC in our context, we delve deeper into its association with the size of the procuring office of a contracting authority. We assume that the size of the procuring office offers a reliable approximation of its resources. Should OC be stronger in smaller units, that would indicate one channel where its rigidity might be attributed to administrative constraints; conversely, if OC is stronger in bigger units, it has a more prominent influence of mission-driven motivation. We find somewhat mixed evidence: while big offices have a more rigid culture in their choice of allowing for additional purchase option, the results for the other features are statistically insignificant.

Finally, we investigate the association between OC and outcomes in procurement auctions, such as competition. One desirable cost-saving mechanism in PP that uses the public tendering process is higher competition, which likely exerts a downward pressure on prices (Bulow and Klemperer, 1996; Klemperer, 2000). 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). In our study, we find that OC 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 effect. Our finding also aligns with previous scholarly concerns (Besley and Ghatak, 2005; Kautsch et al., 2015) regarding OC's propensity to induce conservatism and stagnation

[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.

within organisations. 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.

Shifting our attention to a broader academic literature, our exploration of OC converges with 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).[6] 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 conceptualisation of the firm's organisation of information across the employees through the diffusion of firm-specific pertinent facts and rules of behaviour 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 modelling 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 organisation's goals, which results in less monitoring, faster coordination, higher motivation and more communication, whereas the costs are less experimentation. In line with this, if faster coordination and more delegation are the priorities in PP offices of contracting authorities, then a homogeneous culture with less experimentation is instrumental in achieving that.

Moreover, within the sphere of organisational behaviour literature, which spans psychology, sociology, and anthropology, a noteworthy perspective stemming from OC's evolution is the concept of "culture types". This framework assesses various facets of culture and their impact on organisational effectiveness. The four culture types – *clan, adhocracy, market,* and *hierarchy* – express an organisation's core values. Our findings indicate that Finnish PP organisations lean towards fostering a collaborative and team-oriented atmosphere ("clan") and prioritise consistency, formalisation, and structure ("hierarchy") while showing less inclination towards risk-taking and creativity ("adhocracy") (Quinn and Kimberly, 1984).

Finally, in terms of contributions, our paper adds to nascent literature in quantitative studies exploring the link between OC and organisational 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 OC over time (for a comprehensive overview, refer to Ali et al. (2021)). Our present objective centres solely on studying OC's role in shaping organisational 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 organisational outcomes.

[6] While studies on empirical measures and applications of corporate culture in economics and finance have progressed impressively over the decades (e.g. in explaining mergers and acquisitions, risk-taking and ethics in corporate behaviour, etc.), research in theoretical models on corporate culture still has more scope to build a new framework for how economics and finance situates a firm or organisation within a market economy.

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

2. Institutional setting

2.1. 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.

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*.

2.2. 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.

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 fulfil the minimum (quality) requirements. The second rule "scoring" allocates the contract to the "most economically advantageous bidder". 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.

Another common PP feature is the provision of partial bids. This feature implies that a bidder can bid for a part of the contract. Therefore, it mechanically captures the contracts divided into multiple lots; any bidder

is able to bid on a subset of such a contract. For example, such an ITT is often seen in healthcare services when the contracting authority issues a tender requiring 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 contract. In other words, allowing for partial bids (equivalently, subcontracts) in an ITT means the possibility of having multiple winners.

Among other typical features, 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.

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.

2.3. 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. (2021) offers a good 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 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. In addition, the high job stability and trust in the competence level of one's own organisation hint that the officials may have a sense of dependency on the way their organisation functions. While low mobility out of the office and the sector, along with trust in the organisation 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, though less prominent, does not rule out the role of administrative burden in building OC. While not all plausible mechanisms can be examined in this study, Section 4.2 provides a glimpse into understanding these mechanisms to a certain degree.

3. Data, summary statistics and empirical analysis

3.1. 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 standardised 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 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

[7] `cloudia.com`

[8] The figures in Appendix A 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.

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.

3.2. 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 only 44% allow for additional purchase option.[11] Table 1 Panel A summarises this information.

Table 1: Typical features announced in an Invitation To Tender and their Organisational Culture

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 OC	-0.029	0.17	-0.82	0.59	11571
Partial bid OC	-0.00003	0.09	-0.75	0.91	13784
Engineer estimate OC	0.004	0.12	-0.74	0.65	13784
Add. purchase option OC	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 organisational culture (OC) variables which are continuous (details on the formulation of the OC variable provided in Section 3.3).

3.3. 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 organisation-level practice or culture contributing to this persistence in choices. For this analysis, we utilise a simple econometric framework as follows:

$$y_{ijk} = \beta_0 + \beta_1 culture_{ik} + \beta_2 c_j + \mu_t + \lambda_r + \sigma_k + \gamma_p + \epsilon_{ijk} \tag{1}$$

Here, y_{ik} is the dependent variable denoting the use of some PP feature by a contracting authority i for a given tender j for industry k. We have separate regressions for outcomes y which are the use of (1) scoring

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

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.

$culture_{ik}$ is the prevalence of "culture" in contracting authority i for tenders related to industry k, and is given by the difference between i's share of the particular PP feature in all other industries $l \neq k$ and the national share of that feature in those other industries $l \neq k$. For example, when studying the use of the *scoring* by contracting authority i in its tender j for industry k, the relevant culture variable on *scoring* can be formally represented as follows:

$$scoringculture_{i,k} = scoringshare_{i,-k} - scoringshare_{National(-k)} \tag{2}$$

To be precise, $scoringculture_{i,k}$ in Equation (2) is the $culture_{ik}$ in Equation (1) when we are interested in studying scoring culture within a contracting authority. The equations are updated when studying the OC of each of the other three features.

This definition of OC 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 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

[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.

[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.

change by β_1 percentage points.[15]

4. Results

4.1. Findings on organisational culture

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, summarised in Table 2 Column 1, confirm the presence of office-level culture 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 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 organisation-level culture in contract planning. The related coefficients are reported in Table 2 Columns 10-12.

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

Table 2: Organisational culture 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 OC	0.531***	0.256**	0.256**									
	(0.104)	(0.124)	(0.124)									
Partial bid OC				0.663***	0.214**	0.210**						
				(0.111)	(0.093)	(0.093)						
Engineer estimate OC							0.823***	0.490***	0.492***			
							(0.121)	(0.104)	(0.102)			
Add. purchases OC										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
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 organisational culture of that PP feature. Controls include ITT-specific variable: inaccuracy of the ITT notice. Clustered standard errors at the industry (2-digit cpv) level within parentheses. $^{*}p < 0.10,^{**} p < 0.05,^{***} p < 0.01$

4.2. Rigidness of culture

In this section, we investigate if the prevalence of culture is heterogeneous across PP office types. We derive a proxy measure of the organisation'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 organisations at the median value to categorise these entities into big and small procuring units. 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.[16]

In the same econometric specification given by Equation (1), we additionally interact the office size variable with the OC variable.[17] For the procurement features - scoring, partial bids and engineer estimate - the main effect of the culture variable remains positive, and statistically significant for the first two (in Table 3). The feature - additional purchase option - yields a statistically significant negative main effect of culture and a statistically significant positive interaction effect with the big size. A positive interaction effect 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., 2021) where employees align their interests and goals with that of the organisation 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.

Our descriptive results clearly cannot distinguish between various motives and constraints due to which OC in PP arises or becomes more rigid. Moreover, we cannot preclude the possibility that these channels intermingle with other factors such as peer effects (Herbst and Mas, 2015; Falk and Ichino, 2006; Cornelissen et al., 2017) in how tasks are conducted in the office. By offering some insights through our study, we believe that future research could delve more rigorously into investigating the underlying factors responsible for the origin of culture in an organisation and its rigidity.

4.3. Organisational culture and procurement outcomes

In PP, efficiency gains are essentially generated from cost savings. Consequently, a primary objective in improving efficiency in PP (which is subject to public tendering process), revolves around enhancing

[16]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.

[17]Table A1 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 organisations that issue more tenders are likely to also cover more industries. (This same issue, however, should not affect the formulation of our original OC measure, which accounts for the average of a PP choice across the tenders in different industries within each contracting authority.)

Table 3: Rigidness of culture in PP in Finland

Dependent variable	Scoring	Partial bid	Engineer estimate	Add. purchase option
	(1)	(2)	(3)	(4)
Culture	0.309***	0.367***	0.304	-0.343***
	(0.107)	(0.111)	(0.183)	(0.121)
Big procurer	-0.081*	0.039	-0.059**	0.190***
	(0.043)	(0.040)	(0.024)	(0.048)
Culture*big procurer	-0.077	-0.206	0.204	0.952***
	(0.126)	(0.140)	(0.158)	(0.114)
Observations	11571	13784	13784	8734
R-sq.	0.274	0.127	0.157	0.240
Mean outcome variable	0.503	0.252	0.861	0.444
Controls	Yes	Yes	Yes	Yes
Year FE	Yes	Yes	Yes	Yes
Month FE	Yes	Yes	Yes	Yes
Region FE	Yes	Yes	Yes	Yes
Industry FE	Yes	Yes	Yes	Yes
Procurer-type FE	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 organisational culture of that PP feature. The 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. Controls include ITT-specific variable: inaccuracy of ITT notice. Clustered standard errors at the industry (2-digit cpv) level within parentheses. $^{*}p < 0.10,^{**} p < 0.05,^{***} p < 0.01$

competition among bidders, a factor closely associated with driving prices downward. This dynamic of price optimisation is rooted in the standard auction theory, asserting that increased competitiveness necessitates more assertive bidding, leading to advantageous price outcomes (Bulow and Klemperer, 1996; Klemperer, 2000). In this section, we explore if the efficiency of PP is influenced by OC. Specifically, we inquire whether tenders characterised by strong OC 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 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.[18] This

[18]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.

measure can be formally expressed as:

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

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.

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

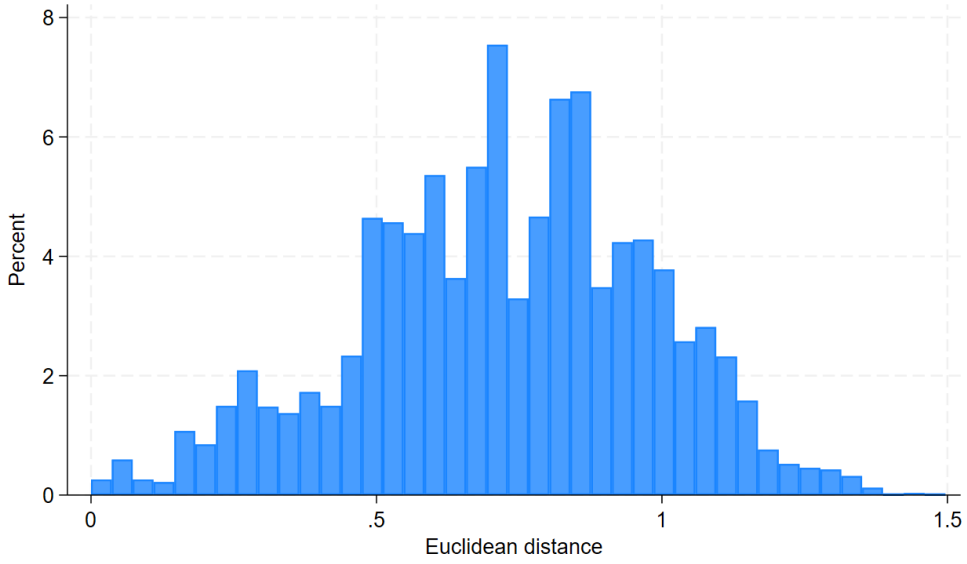
$$y_{ij} = \beta_0 + \beta_1 ED_{ij} + \mu_t + \lambda_r + \sigma_k + \gamma_p + \epsilon_{ij} \tag{4}$$

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 culture 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 two different outcome variables related to procurement that we examine here are - (1) if the tender had no bidder, and (2) the share of auctions in a tender that received zero or one bid.

In Table 4, 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 customised PP features could attract more competition.

Figure 1: Distribution of the composite culture measured as Euclidean distance - (Finnish sample)



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.

Table 4: Culture and procurement outcomes in Finland

Dependent variable	If tender gets no bidder (1)	Share of auctions in a tender with 0-1 bids (2)
Euclidean Distance	-0.084**	-0.027
	(0.034)	(0.033)
Observations	13784	13784
R-sq.	0.078	0.046
Mean of outcome variable	0.313	0.491
Year FE	Yes	Yes
Month FE	Yes	Yes
Region FE	Yes	Yes
Industry FE	Yes	Yes
Procurer-type FE	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 (in Column (1)) and (2) the share of auctions within a tender that received zero or one bid (in Column (2)). The predictor variable is the Euclidean distance calculated from the mean vector of all the four PP features within a contracting authority. Clustered standard errors at the contracting authority level within parentheses. $^{*}p < 0.10,^{**}p < 0.05,^{***}p < 0.01$

5. Robustness and external validity

5.1. Robustness

Recall that the OC 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 utilising 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 OC measure, we find that the results do not change meaningfully (Table 5). The estimates are, however, relatively more conservative than before.

In the next exercise, we explore if a similar association exists by 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 a culture measure > 0, and in the second regression, we consider the contracting authorities that have a culture 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. Table 6 reports the findings. In the case of scoring and engineer estimate, we find that in both sub-samples, the association holds significantly and in the 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 OC within contracting authorities in Finland. On the contrary, although we see OC 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).

As a final 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 OC measure at a more granular level,[19] since it can be argued that the PP features in contracting and tender designing can vary at

[19]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 with a mean of ∼29. When we consider industry classification at 3-digit cpv level, the variety of industries in the tenders issued by a contracting

the 3-digit cpv level too. We see that the main result on OC is robust to this change (reported in Table 7).

authority ranges from 1 to 122 with a mean of ∼68.

Table 5: Organisational culture in PP in Finland - with OC 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 OC	0.458***	0.168**	0.168**									
	(0.115)	(0.071)	(0.071)									
Partial bid OC				0.443***	0.160*	0.159*						
				(0.077)	(0.089)	(0.089)						
Engineer estimate OC							0.721***	0.304***	0.308***			
							(0.092)	(0.094)	(0.095)			
Add. purchases OC										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 organisational 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. $^{*}p < 0.10, ^{**}p < 0.05, ^{***}p < 0.01$

Table 6: Organisational culture in PP in Finland - sub-sample analysis

Dependent variable	Scoring		Partial bids		Engineer Estimate		Add.purchase option	
	$+ve$ OC	$-ve$ OC	$+ve$ OC	$-ve$ OC	$+ve$ OC	$-ve$ OC	$+ve$ OC	$-ve$ OC
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Scoring OC	0.355*	0.174**						
	(0.206)	(0.068)						
Partial bid OC			-0.857**	-0.680***				
			(0.351)	(0.211)				
Engineer estimate OC					0.365***	0.593***		
					(0.076)	(0.129)		
Add. purchases OC							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 organisational culture of that PP feature. The sample in the "$+ve$ OC" column is restricted to only those contracting authority's tenders which always have an OC measure > 0 for that particular PP feature. The sample in the "$-ve$ OC" column is restricted to only those contracting authority's tenders which always have an OC 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. $^{*}p < 0.10,^{**}p < 0.05,^{***}p < 0.01$

Table 7: Organisational culture 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 OC	0.721***	0.406***	0.404***									
	(0.090)	(0.094)	(0.094)									
Partial bid OC				0.720***	0.252***	0.252***						
				(0.089)	(0.079)	(0.079)						
Engineer estimate OC							0.894***	0.546***	0.546***			
							(0.091)	(0.081)	(0.081)			
Add. purchases OC										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 organisational 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. $^{*}p < 0.10,^{**} p < 0.05,^{***} p < 0.01$

5.2. External validity

In this section, we discuss if the findings on OC in Finnish PP are valid in other country contexts. 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 2.1). The contract features are also similar (see Section 2.2); 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 8 summarises the findings. We observe the presence of culture 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 office culture 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 organisational culture in the use of this feature across all tenders for all industries.

6. Discussion and Conclusion

In this paper, we study the extent of organisational culture in public procurement using rich data from Finland. We explore if the key procurement features, such as using scoring as an allocation rule, accepting partial bids, announcing engineer estimates of the contract, and allowing multiple purchasing option (which

Table 8: Organisational culture in PP in Sweden

Dependent variable	Scoring			Many winners		
	(1)	(2)	(3)	(4)	(5)	(6)
Scoring OC	0.733***	0.699***	0.704***			
	(0.035)	(0.031)	(0.031)			
Many winners OC				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 organisational 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. $^{*}p < 0.10$,** $p < 0.05$,*** $p < 0.01$

are usually decided while drafting tender invitations), tend to have any organisational culture. As our primary measure to understand the culture in public procurement within a contracting authority, we explore how often (relative to the national industry-level means) the organisation uses a given PP feature (e.g. scoring) in tenders for other industries than the industry of a given tender. In a simple OLS framework, we then study how the culture 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 organisational culture within contracting authorities in their practice of designing tenders and awarding contracts in PP.

Our understanding of the literature suggests that OC could stem from a "positive" approach like *mission motivation* where employees' personal aspirations and objectives align harmoniously with the overarching goals of the organisation. It is especially relevant for public organisations and their workforce. Our evidence of more rigid OC in some PP features (e.g. additional purchase option) in big organisations highlights that plausible pathway. However, we do not find any confirmatory evidence that OC rigidity might arise from "negative" factors, such as administrative burdens or deficiencies in competence and resources within smaller organisations.

Lastly, our study is in the context of PP, and a fundamental way of achieving efficiency in PP is by enhancing competition among bidders. We find that organisations with stronger culture fail to attract bidders more often. Therefore, we provide evidence that OC in PP could have adverse implications in terms of organisational outcomes, such as enhancing competition among bidders.

Summarising the strong aspects of this study, it utilises a universe of data on PP in Finland to confirm a

strong presence of OC in various PP features, which are typical in designing tenders and awarding contracts. The main finding is robust to some alternative formulations of our OC measure. Most interestingly, we also see the result transposing in the context of Sweden.

Nevertheless, this study has its limitations too. Due to the unavailability of data, we are unable to thoroughly investigate the underlying mechanism of the heterogeneity of OC across PP organisation types. Future research could explore the dynamics within organisations at a deeper level. Moreover, we do not have a research design to study our questions causally. Another caveat of this study is that it does not consider the temporal nature of the development of OC. In a more sophisticated framework, it would be interesting to incorporate dynamic evolution in OC. However, we abstract away from that here because the degree of use of Cloudia for procurement purposes by contracting authorities increased only gradually over the years. It is likely that by trying to capture the temporal change in OC through this sample, we would end up with a measurement error.

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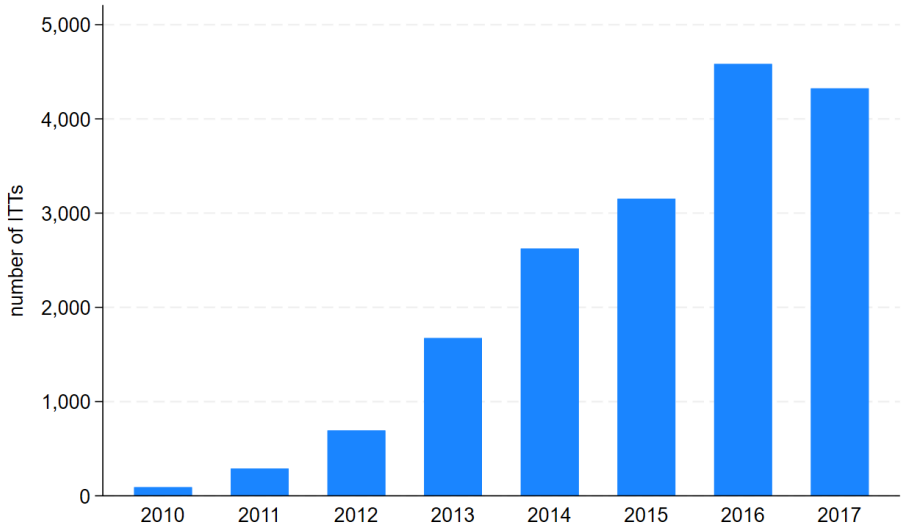
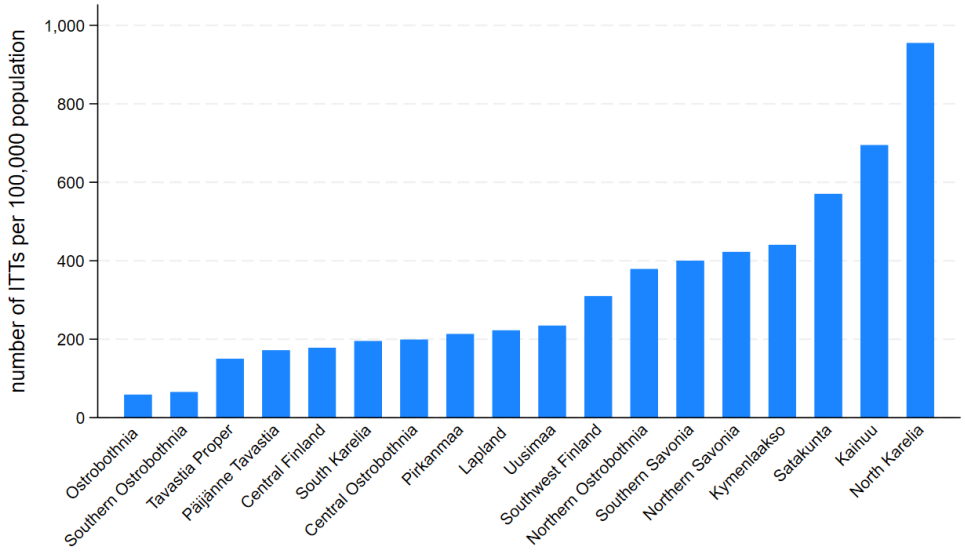
Appendix A

Figure A1: ITTs in Cloudia over time



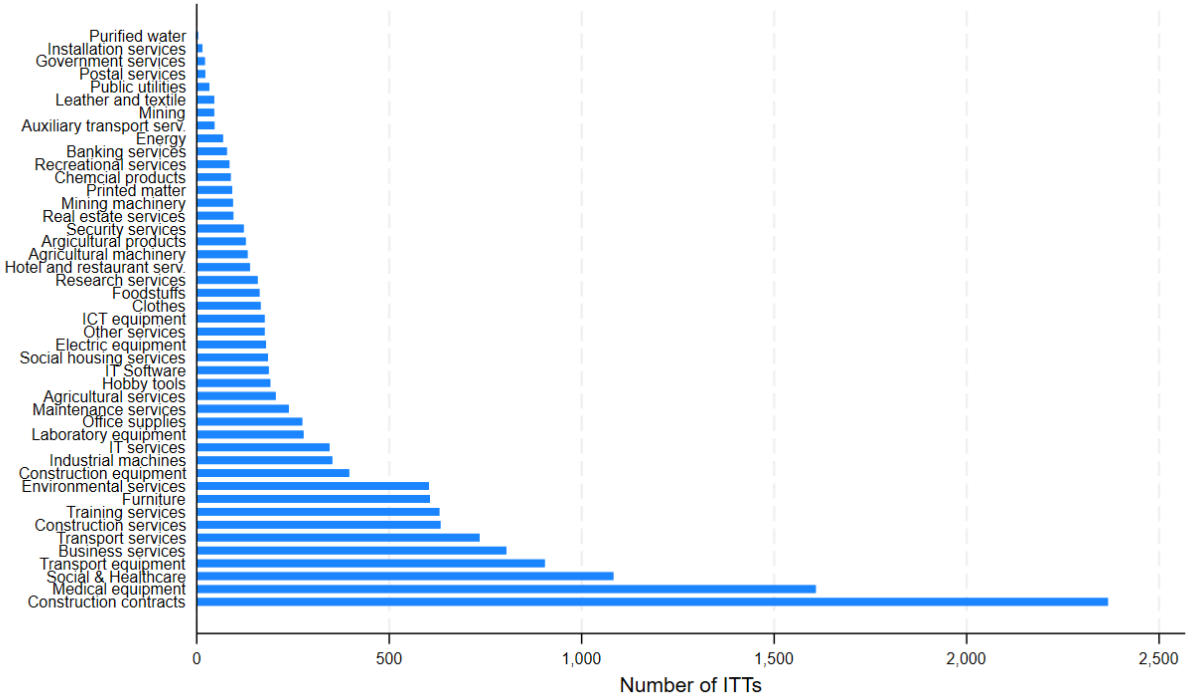
Notes: The Cloudia database contains information on ∼18,000 unique tenders (ITTs) of public procurement published through their electronic system during 2010-2017. The figure shows the number of ITTs published across the years.

Figure A2: ITTs in Cloudia over regions



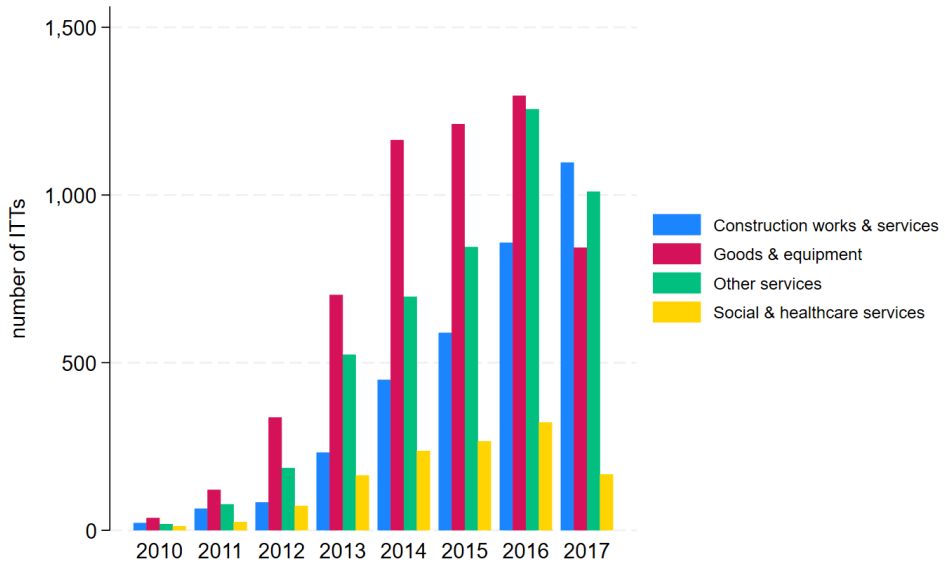
Notes: The Cloudia database contains information on ∼18,000 unique tenders (ITTs) of public procurement published through their electronic system during 2010-2017. The figure shows the number of ITTs (per 100,000 population) across the regions. In this figure, when normalising with region-level population 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 standardised 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.

Table A1: Summary statistics of contracting authorities by the size of their PP office

Variable	Small		Big		
	Mean	Std Dev	Mean	Std Dev	Mean diff.
	(1)	(2)	(3)	(4)	(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. $^{*}p < 0.10,^{**}p < 0.05,^{***}p < 0.01$ are obtained from a two-sided t-test.