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Abstract

Public procurement laws designed to reduce the scope for corruption and collusion when government entities purchase goods and services may come at a cost if the exercise of discretion by procuring authorities could reduce contract award prices. Theory suggests a tradeoff between restricting discretion and average procurement costs in countries with high government effectiveness. We use detailed data on procurement awards in 33 European countries to assess the relationship between law and observed practice regarding exercise of discretion and average procurement costs, as well as the probability small firms win contracts. Procurement law disciplines pertaining to discretion are not associated with average procurement costs, which contrasts with a positive, significant relationship between more restrictive practice towards exercise of discretion and contract prices, especially in countries with above average government effectiveness. The likelihood that small and medium enterprises will win contracts increases with more restrictions on the exercise of discretion.

Keywords: Public procurement, value for money, discretion, regulation, government effectiveness

JEL Classifications: H57; O31; O32

ملخص

قد تأتي قوانين الاشتراء العمومي المصممة للحد من نطاق الفساد والتواطؤ عندما تشتري الكيانات الحكومية سلعا وخدمات بتكلفة إذا كان من شأن ممارسة السلطات المشتريّة لسلطتها التقديرية أن تخفض أسعار منح العقود. تقترح النظرية وجود مقايضة بين تقييد السلطة التقديرية ومتوسط تكاليف الشراء في البلدان ذات الفعالية الحكومية العالية. ونحن نستخدم بيانات مفصلة عن قرارات التحكيم المتعلقة بالمشتريات في 33 بلداً أوروبياً لتقييم العلاقة بين القانون والممارسة المرصودة فيما يتعلق بممارسة السلطة التقديرية ومتوسط تكاليف المشتريات، فضلاً عن احتمال فوز الشركات الصغيرة بالعقود. ولا ترتبط ضوابط قانون الاشتراء المتعلقة بالسلطة التقديرية بمتوسط تكاليف الاشتراء، الذي يتناقض مع العلاقة الإيجابية الهامة بين الممارسة الأكثر تقييداً تجاه ممارسة السلطة التقديرية وأسعار العقود، ولا سيما في البلدان التي تزيد فيها فعالية الحكومة عن المتوسط. ويزداد احتمال فوز المؤسسات الصغيرة والمتوسطة بعقود مع فرض المزيد من القيود على ممارسة السلطة التقديرية.

1. Introduction

European Union (EU) countries spend the equivalent of 14% of GDP (€1.9 trillion annually) on public procurement (PP), allocated by over 250,000 public authorities responsible for acquiring services, works and supplies (Gourdon and Messent, 2019). The associated contracts are awarded through legally mandated procedures that are intended to identify and select suppliers that can satisfy the terms of a contract at lowest cost to the government. A central objective of PP legislation and related procedures is to achieve ‘value for (taxpayer) money’. The associated laws and regulations limit the discretion of authorities in awarding PP contracts by requiring competitive bidding for contracts and use of processes that minimize the potential for rent-seeking behavior, collusion, corruption, and fraud.¹

Drawing on the extant literature, in this paper we analyze the relationship between the regulation of discretion in procurement processes and outcomes using detailed information on procurement awards for 33 European countries and indicators characterizing prevailing procurement law and practice in these countries constructed by Bosio et al. (2022). We investigate two research questions relating to tradeoffs between limiting the scope for exercise of discretion in awarding PP contracts and PP outcomes. The first concerns the relationship between discretion and average procurement costs. The question here, drawing on recent procurement literature, is whether, conditional on the overall quality of governance (measured by World Bank government effectiveness indicators), greater scope to exercise discretion in awarding procurement contracts is associated with lower contract prices. The underlying mechanism for such a potential relationship is that procuring entities in countries with high government effectiveness may be able to utilize discretion to select high quality bidders using information and processes such as negotiation that otherwise would not be feasible under the procedures that apply to procurement awards.

The second question concerns the tradeoff between the ‘value for money’ objective motivating much of procurement regulation and the participation of small firms in public procurement. Because regulation of the process of procurement involves fixed costs that may be more challenging for small firms to incur, and efficiency (cost minimization) may be associated with larger procurement contracts (e.g., because of economies of scale), small firms may be at a disadvantage in bidding for and winning procurement contracts. In many jurisdictions, procurement policy includes measures such as price preferences for small firms or reservation of a share of procurement for small or otherwise disadvantaged firms. In the EU context that we focus on, policy seeks to attenuate such de facto discrimination against small firms through a requirement that large contracts be subdivided, unless this increases costs significantly.² Given that in practice the implementation of such measures will increase costs for procuring entities, conditional on value for money being the main goal they can be expected to prefer to simply allocate contracts to the lowest cost bidder. In countries where government effectiveness is high, greater scope to exercise discretion in the award of contracts may then be associated with fewer contracts being won by small firms. We therefore analyze whether restrictions on the exercise of discretion reflected in formal procurement regulation and laws or in applied practice are associated with a higher probability that small and medium-sized enterprises (SMEs) win public contracts and continue to participate in procurement markets, again conditioning on government effectiveness.

We find that although the restrictiveness of procurement regulations towards the exercise of discretion is not associated with average procurement contract prices, there is a statistically significant positive relationship between contract prices and restrictions on the extent to which discretion is applied in practice. The association between restrictiveness of applied PP practices and contract prices is larger in countries with higher government effectiveness, suggesting that in these jurisdictions PP practices that restrict discretion may impede the scope for public officials to eliminate low-quality bidders. We also find that in countries in which procurement practices are characterized by more restrictions on the

¹ The United Nations Office on Drugs and Crime (UNODC) (2013) estimated that “... 10-25 per cent of a public contract’s value may be lost to corruption”. The direct cost of corruption in public procurement in the EU has been estimated at some €120 billion per year (European Commission, 2014).

² The EU regime is described in Hoekman and Taş (2020).

exercise of discretion, there is a higher probability that SMEs win contracts, and that this relationship is stronger in countries with below average government effectiveness. We also find that the probability that SMEs continue to participate in procurement markets is higher. The results suggest that discretion-restricting PP regulation induces more awards for SMEs than would obtain absent such controls.

The paper is organized as follows. Section 2 discusses the literature to which this paper contributes. Section 3 describes the datasets used and presents the conceptual framework and hypotheses that motivate the empirical analysis. Section 4 reports estimation results, focusing on the relationship between PP law and practice scores and outcomes, measured as average PP contract prices and SME participation in procurement. Section 5 undertakes several robustness checks. Section 6 briefly considers the implications of our findings for countries in the MENA region. Section 7 concludes.

2. Related literature

There is a substantial literature on the law and economics of public procurement. Much of this is motivated by governance concerns – the design of procurement mechanisms to attain efficient outcomes and reduce the scope for collusion, corruption, and theft (e.g., Laffont and Tirole, 1993; Vagstad, 1995; Tadelis, 2012; Hassami, 2014; Gnip, 2022). This paper contributes to research on the economic effects of discretion in public procurement. It relates to two strands of literature: the design on processes to attain value for money objectives in government contracting, and (ii) the use of government demand for goods and services to assist small firms by enhancing the prospects that such firms participate in procurement opportunities. The latter is a common element of economic development policy.

2.1 Discretion and efficient public procurement

Most of the literature on discretion and public procurement focuses on potential implications of discretion on corruption and collusion. Although there is substantial evidence that procurement regulation constraining the ability to exercise discretion is associated with attaining value for money objectives (e.g., Coviello and Mariniello, 2014; Baldi et al. 2016; Knack et al. 2019), public entities may be able to lower procurement costs or to increase the quality of bids by engaging in negotiations with firms. Studies like Banerjee and Duflo (2000) and Malcomson (2013) highlight the importance of reputation of suppliers and productive long-term relationships between firms and public officials. Reputable firms are more likely to provide high quality products and have lower probabilities of cost overruns. Accordingly, greater scope for discretion may result in better PP outcomes by allowing authorities to select higher quality suppliers.

Using data for Italy, Bandiera et al. (2009) and Coviello et al. (2018) find that procurement costs are lower when public officials can exercise discretion. Coviello et al. (2018) employ a regression discontinuity model to examine the effect of increasing procuring entities' ability to exercise discretion on PP outcomes in Italy. They find that greater discretion lowers the duration of works and cost overruns. Carril (2022) analyzes the trade-off between rules and discretion in the context of US federal procurement. As in the case of the EU data analyzed in this paper, in the United States procurement contracts below threshold values may be awarded using procedures subject to fewer and less stringent rules and oversight. Carril documents substantial bunching of contracts at the relevant threshold value and shows that rules constraining discretion distort the award amount of some contracts, while discouraging other purchases altogether, and that contracts subject to more scrutiny perform worse ex-post. Based on a model that is consistent with these findings, a simulation exercise indicates that raising the threshold value will leave the government better off. Fazio (2023) exploits a shift in policy in Brazil that permitted greater use of discretion and finds that this resulted in higher average prices and higher quality, supporting an inefficiency-quality trade-off of discretion in public procurement. Best et al. 2023 using data on 16 million public purchases in Russia, show that 39 percent of the variation in prices paid for narrowly defined items is due to the individual bureaucrats and organizations who manage procurement, and that low-price buyers display higher spending quality. They show that bid preferences

for domestic suppliers substantially improves procurement performance, but only when implemented by ineffective bureaucrats.

On the other side of the debate, Baltrunaite et al. (2021) use Italian data on municipal public works tendered in the period 2009–13 to evaluate a policy reform in 2011 that expanded the scope of bureaucratic discretion. They find that the share of contracts awarded to politically connected firms increases after the reform and that the labor productivity of winning firms decline, suggesting increased discretion is associated with a potential increase in misallocation of public funds. The effects on supplier selection are primarily concentrated among less qualified and less transparent public administrations.³ Palguta and Pertold (2017) find that introduction of minimum value thresholds in the Czech Republic that determine when procurement regulations apply caused manipulation of estimated costs. Officials set procurement values just below thresholds to be able to avoid open competition and use discretion when awarding contracts, resulting in an increase in contracts awarded to “anonymous” firms, and higher prices. Taş (2023) concludes that up to 13% of examined EU authorities manipulate estimated costs so as to be able to use discretion.

Decarolis et al. (2020) argue there is a tradeoff in the design of PP regulation between allowing for more discretion by procuring entities that may permit attainment of greater efficiency and the associated potential for creating more opportunities for fraud or theft. Bosio et al. (2022) suggest that this tradeoff is likely to be greater in contexts characterized by high government effectiveness and control of corruption. They show that stricter procurement practice is positively correlated with the integrity and quality of PP in lower-income jurisdictions with weaker public sector capacity, but negatively associated with better outcomes in those that with higher per capita incomes and stronger public sector capacity. They find that PP laws tend to be stricter than applied practice in lower capacity countries, but less strict than applied practice in higher capacity jurisdictions, and that in countries with high government effectiveness, discretion is less likely to result in fraud or corruption so that exercise of discretion may result in better PP outcomes. More specifically, they conclude that regulation of discretion is effective in enhancing PP quality and integrity in countries with low public sector capacity but not in high-capacity countries because restrictive PP regulation may constrain the ability of procuring entities to exercise discretion to exclude low quality bidders.

Bosio et al. (2022) base their empirical analysis on a survey of expert practitioners regarding a hypothetical road maintenance project. They did not have access to granular data on actual procurement contract awards for the large cross-section of countries covered in their policy dataset. The lack of such data led them to investigate the relationship between PP law and the exercise of discretion by focusing on measures of (i) procurement quality (time between decision to procure and the start of work by the winning bidder; delays associated with contract management; cost overruns; and frequency of contract execution not meeting technical specifications), and (ii) integrity (frequency of procuring entities interpreting selection criteria to favor a specific bidder; payment of bribes to circumvent public procurement rules; prevalence of collusion to exclude competitors; and incidence of noncompetitive procurement methods).

2.2 Public procurement and SMEs

Specific characteristics of SMEs may inhibit participation in bidding for public contracts. SMEs may have limited capacity to incur the cost of lengthy payment delays, satisfy bid security, minimum turnover or experience requirements, or difficulties in obtaining loans for the working capital needed to bid for or execute a contract on a timely basis. Both financial and human resource capacity constraints are likely to be more severe for SMEs than for large firms, with implications for the capability to incur the

³ Bessonova (2022) finds similar misallocation results for the case of Russia. See also Hassami (2014) for evidence for OECD countries.

(opportunity) costs of dealing with the administrative requirements associated with bidding for public contracts.⁴

Policy in many countries often aims to support SMEs, with public procurement used as one mechanism to pursue this goal. Open competitive bidding procedures and the associated administrative requirements are likely to be associated with a greater likelihood that larger, more efficient firms win contracts, reflecting scale economies and ability to incur procurement process related transactions costs. To help offset this dynamic, procurement policies in the EU aim to increase participation by SMEs in public contracts by encouraging procuring entities to reduce the average size of contracts where possible; consider subdivision of contracts into smaller lots where this is not detrimental to the realization of project objectives; and (iii) ensure timely payments (Hoekman and Tas, 2022). All such measures imply a reduction in discretion on the part of procuring entities.

3. Data

Our data pertain mostly to EU member states and European Economic Area (EEA) signatories (Iceland, Liechtenstein, and Norway) where EU procurement legislation applies. We source procurement contract data for the 27 EU member states, the UK,⁵ EEA countries, Switzerland, and the Former Yugoslav Republic of Macedonia from TED. This database covers three categories of PP: purchases of (contracts for) services, supplies (goods) and works (construction and infrastructure-related projects). TED reports data on the number and value of contracts issued by procuring entities for each of these three categories, as well as the procurement procedure that applies to each call for tender. These include open (competitive) bidding, restricted procedures, and so-called competitive dialogue. The first two procedures account for the largest share of procurement opportunities. Under open procedures, contracting authorities are required to publish procurement opportunities in the Official Journal of the EU, specify the technical criteria that bidders must satisfy and evaluate bids and allocate contracts on the basis only of the bids received. Restricted procedures, used for higher-value contracts, involve a process where contracts are awarded based on competition between pre-qualified suppliers that express interest in participating. Some 85 percent of PP contracts are allocated through open procedures in the EU and EEA countries, accounting for about three-fifths of total PP by value (Kutlina-Dimitrova and Lakatos, 2016).

Public authorities are obliged to publish their tender invitations on TED for all contracts exceeding EU public procurement thresholds. For the period under analysis the thresholds were €135,000 for public sector supply and service contracts issued by central government entities (€209,000 for other authorities); €431,000 for all supplies and service contracts; and €5,382,000 for construction works and services concession contracts. Many contracts that fall below the thresholds are reported in TED, as authorities often use TED to publicize tenders independent of contract values. The TED data are available online in CSV format starting in 2006.⁶ The European Commission extracts the data from standard forms pertaining to the initial contract notice and final contract award notice that must be provided by each procuring authority.⁷ For each contract, the TED database includes fields for the estimated contract value (determined by the procuring entity), the actual contract (award) price, the sectoral Common Procurement Vocabulary (CPV) code that applies to the subject of procurement,⁸ the

⁴ See Hoekman and Taş (2022) for a discussion of the relevant literature.

⁵ We assume the UK in 2019 still applies EU procurement laws and regulations.

⁶ We use the contract award notices csv files available at: <https://data.europa.eu/euodp/data/dataset/ted-csv>.

⁷ The standard forms are available at <http://simap.ted.europa.eu/web/simap/standard-forms-for-public-procurement>.

⁸ The CPV establishes a single classification system for public procurement aimed at standardizing the references used by contracting authorities and entities to describe the subject of procurement contracts. The economic sector that contracts are associated with is identified by the first two digits of the CPV code. The CPV distinguishes 45 major sectors. See <https://simap.ted.europa.eu/web/simap/cpv>.

procurement method used, type(s) of contracting authority, and the names and locations of both the procuring agencies and the winning firms.

Procurement law and practice scores are sourced from Bosio et al. (2022). These authors construct indicators for 187 countries on the degree to which (i) the exercise of discretion by public entities is constrained by procurement legislation and (ii) actual procurement practice differs from what is mandated by formal procurement regulations. These indicators are available for all the countries in TED. They are based on expert surveys in which national procurement specialists with detailed knowledge and experience regarding a specific type of procurement (a hypothetical US \$2.5 million road maintenance project). The survey instrument included questions regarding the applicable legal framework for transparency, competition, exclusion of bidders, and integrity of contracts, and views on the extent to which the legal requirements were applied in practice, allowing for both less than full application and more than full compliance.⁹

Figure 1 plots the Bosio et al. law and practice scores for all countries included in TED, sorted on their law scores, where the lower scores reflect greater latitude for the exercise of discretion by procuring entities when deciding on contract awards. The indices can range between 0 and 4. Higher values indicate more regulation (less discretion). Switzerland (0.82), Denmark (0.84), Finland (1.01) and Norway (1.01) have the least restrictive laws. The countries with the highest law scores (most control of discretion) are Portugal (2.81), Italy (2.92), Latvia (2.92) and Greece (3.01). Figure 1 reveals that law and practice differ substantially in many countries. This difference tends to be greater in countries where the legal framework permits more discretion, i.e., countries where regulation permits discretion do not utilize this “policy space.” In one third (two-thirds) of the countries in the sample, laws are more (less) strict than applied practice (Figure 2). The mean of law score across countries is 2.09, with a standard deviation of 0.63. The mean and standard deviation of the practice score is 2.73 and 0.55, respectively.

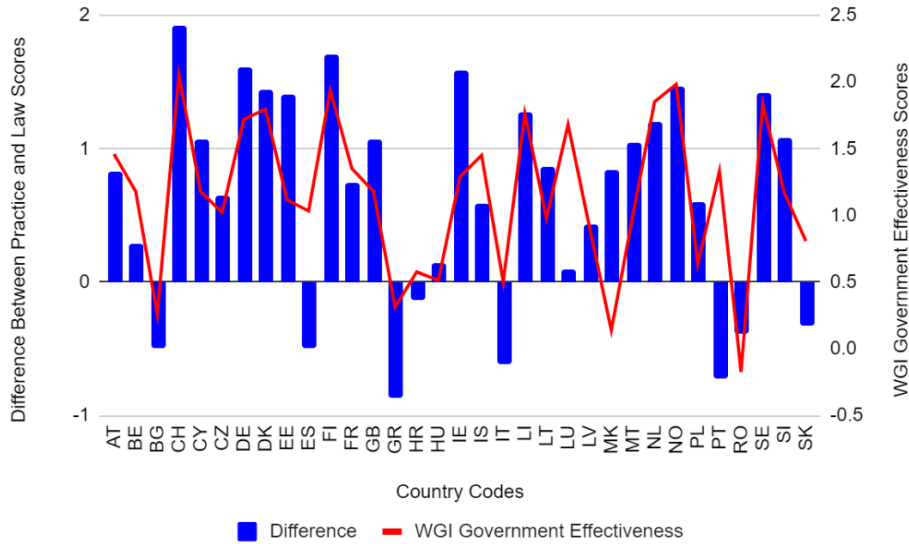
Figure 1: Law and practice scores of EU countries



Note: Lower law or practice scores reflect greater scope for exercise of discretion.
Source: Bosio et al. (2022).

⁹ Bosio et al. (2022) also construct measures of procurement outcomes, including practitioner assessments of process integrity and quality. In the analysis below we use data on actual contract prices.

Figure 2: Difference between PP practice and law scores and government effectiveness



As our measure of general (country-wide) government effectiveness, we use the indicators compiled in World Bank Worldwide Governance Indicators dataset.¹⁰ Notwithstanding that our sample spans mostly high-income European nations, there is substantial heterogeneity across countries regarding government effectiveness (see Appendix Table 1). Figure 2 plots the difference between PP practice and law scores and the World Bank government effectiveness measures. EU countries with high government effectiveness scores have high practice and low law scores. In other words, public officials in high government effectiveness countries refrain from exercising discretion (PP practice is more restrictive than the applicable legal framework).¹¹

3.1 Empirical strategy

We examine PP contracts that have estimated costs (contract prices) that are less than the value thresholds specified in EU procurement regulation above which procurement must comply with the various requirements specified in EU PP law.¹² In principle, all EU and EEA member states must apply the same PP processes and criteria to calls for tender and contract awards that exceed the EU-determined threshold values, but whether these apply to below-threshold procurement is at the discretion of national authorities. For below EU threshold contract values, nationally determined administrative processes and requirements apply. These are heterogeneous across countries.¹³

We estimate the following equation using OLS:

$$Price_c = \beta_0 + \beta_1 law(practice)_c + \beta_2 openprocedure_c + \beta_3 estimatedcost_c + \sum_{a=2}^9 \beta_{a+3} authority_a + \sum_{s=2}^{45} \beta_{s+12} sector_s + \varepsilon_c \quad (1)$$

where contract price ($Price_c$) is the dependent variable and β_1 is the coefficient associated with law or practice scores, respectively. We use dummies to control for whether competitive open procedures (first-

¹⁰ <https://databank.worldbank.org/source/worldwide-governance-indicators>

¹¹ The correlation between the difference in practice and law scores and government effectiveness is 0.69.

¹² I.e., pertaining to transparency, publication, use of open competitive bidding, etc.

¹³ Because common PP regulatory requirements do not apply to below threshold value contracts, procuring entities may have incentives to structure projects to fall below applicable thresholds, in itself an exercise in discretion. Insofar as this is the case there may be ‘bunching’ of contracts just below threshold values. We evaluate the extent of such bunching in our sample data in Section 4.3.

price auction) are used,¹⁴ the type of public authority issuing a call for tender and type of goods or services that are procured using the first two digits of the sectoral CPV codes reported for contract awards. As discussed, we only examine contracts that have estimated project costs below EU thresholds. We focus on PP contracts awarded in 2019 since the survey data reported in Bosio et al. (2022) is for 2019, but also undertake an analysis using data for the 2016-19 period as a robustness exercise.

To evaluate the relationship between PP law and practice scores and the likelihood that a SME wins a procurement contract, we estimate the following logistic regression equation, where all variables are the same as those in equation (1), as follows:

$$Prob(SME\ winner = 1)_c = \beta_0 + \beta_1 law(practice)_c + \sum_{a=2}^9 \beta_{a+3} authority_a + \sum_{s=2}^{45} \beta_{s+12} sector_s + \varepsilon_c \quad (2)$$

4. Results

4.1 Contract Prices

Results of estimating equation (1) indicate that PP law scores are not significant in any regression specifications (Table 1). Conversely, more restrictive PP practice is associated with higher contract prices, with a coefficient estimate that is statistically significant at the 1% level. This positive relationship increases in magnitude for the sub-sample of countries with above median government effectiveness but is also observed for countries with below median government effectiveness, albeit with a coefficient estimate that is only significant at the 5% level. In line with the theoretical arguments of Bosio et al. (2022), limiting discretion of public officials is associated with higher contract prices, with the relationship being stronger in countries with high government effectiveness.

Table 1: PP law, practice and contract prices

| | All Countries | Countries with Low GE | Countries with High GE |
|------------------------|------------------|-----------------------|------------------------|
| Law Score | -6.13 (4.55) | -.42 (8.98) | -8.68 (5.31) |
| Practice Score | 6.66 (1.89)** | 6.20 (2.06)* | 9.31 (3.90)* |
| Number of observations | 167,993 | 130,019 | 37,974 |
| Sector dummy | YES | YES | YES |
| Procurement type dummy | YES | YES | YES |
| Authority dummy | YES | YES | YES |

Notes: GE: government effectiveness (from WGI dataset); low (high) = below (above) the median. Standard errors clustered at country level reported in parentheses. Outliers with extreme values of the ratio of contract price to estimated price are removed. The BACON outlier detection mechanism detects contracts with ratio above 3 and below 0.5 as outliers. * p<0.05; ** p<0.01.

4.2 Probability of an SME winning a contract

Table 2 reports the estimated coefficients of regression equation (2) for SMEs. There is a strong positive association between practice scores and the probability that an SME will win a contract. Distinguishing between low and high government effectiveness countries shows that this result is driven by states with low government effectiveness. Law scores are not associated with the likelihood that a SME wins a contract. Thus, the exercise of discretion would be accompanied by fewer SMEs winning bids, consistent with the presumption that discretion may increase the quality of winning bids.

¹⁴ 94.6 percent of the contracts in the sample are awarded using open procedure.

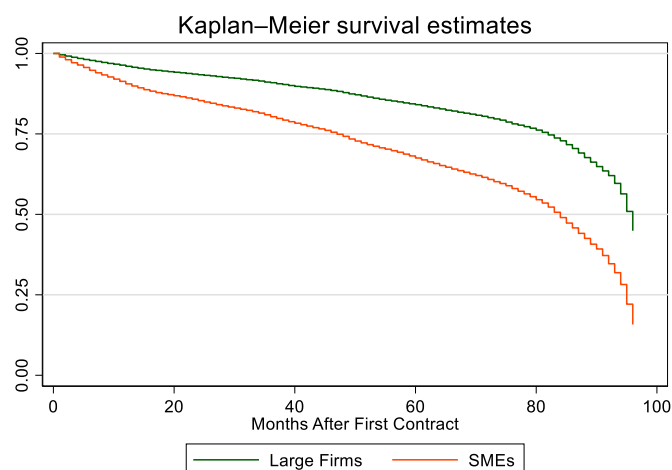
Table 2: Probability of a SME winning a contract

| | All Countries | Countries with Low GE | Countries with High GE |
|------------------------|------------------|-----------------------|------------------------|
| Law Score | 0 (0.37) | 0.25 (1.52) | -0.21 (0.2) |
| Practice Score | 1.89 (0.61)** | 2.74 (0.67)** | 0.62 (0.38) |
| Number of Observations | 196,378 | 152,394 | 43,983 |

Notes: GE: government effectiveness (from WGI dataset). All regressions include procurement procedure, sector and procuring authority dummies. Standard errors clustered at country level reported in parentheses. * p<0.05; ** p<0.01. Constant not reported.

4.3 Survival of SMEs in the public procurement market

Discretion may not only influence the probability of SMEs winning contracts, but it may also be associated with survival rates, i.e., continued participation in procurement – winning additional contracts. We find that 175,278 SMEs (72.58%) could not survive in the PP market and win another contract following their first contract observed in the sample period. Following De Silva et al. (2009), we employ survival regression methods to compare the duration of participation of SMEs and large firms in the PP market – defined as the total number of months between the first and last win of a contract. The Kaplan-Meier survival probabilities of SMEs and large firms in the PP market are plotted in Figure 3. This reveals large firms are substantially more likely to survive in the PP market than SMEs.

Figure 3. Survival probabilities of SMEs and large firms

The results of a survival regression analysis motivated by the difference in survival probabilities using a SME dummy variable as an explanatory variable are reported in Table 3. We use both the Weibull distribution function to model hazard rates (the workhorse in survival analysis to model hazard rates that decrease with time – Upadhyay and Gupta, 2010) and the Cox proportional hazards model, which does not require specifying the distribution function. The coefficient of the SME dummy variable measures the probability of the event of winning a new contract will end. The results obtained using the two models are virtually identical. The probability of leaving the EU PP market is higher for SMEs. Large firms survive longer and keep winning new contracts.

Table 3: Probability of leaving the EU PP market

| | Weibull Distribution | Cox Model |
|------------------------|----------------------|-----------------|
| SME | 0.79 (0.09)** | 0.8 (0.09)** |
| Number of Observations | 130,555 | 130,555 |

Notes: Constant not reported. Standard errors clustered at country level reported in parentheses. * p<0.05; ** p<0.01.

Of relevance to our research question is whether PP law and practice scores play a role in the survival of SMEs in the EU PP market. We explore this by using the law and practice scores as explanatory variables in the survival regression specification, focusing on SMEs. Results, reported in Table 4, are consistent with previous findings that the law scores do not influence the survival probability of SMEs. The coefficient estimate for the practice score variable is negative and statistically significant across all regression specifications: the probability that a SME will exit PP (does not survive) decreases as the practice score increases. The coefficient estimate is larger (double) for countries with low government effectiveness. Thus, practices that restrict discretion beyond what is stipulated in PP regulations both increase the probability that a SME will win a bid and reduce the subsequent exit probability.

Table 4: Probability of SMEs leaving the EU PP market

| | <i>Weibull Distribution</i> | | |
|------------------------|-----------------------------|-----------------------|------------------------|
| | All Countries | Countries with Low GE | Countries with High GE |
| Law Score | 0.10 (0.11) | 0.41 (0.57) | 0.06 (0.20) |
| Practice Score | -0.80 (0.21)** | -1.06 (0.32)** | -0.52 (0.09)** |
| | <i>Cox Model</i> | | |
| | All Countries | Countries with Low GE | Countries with High GE |
| Law Score | 0.07 (0.12) | 0.49 (0.58) | 0.06 (0.19) |
| Practice Score | -0.81 (0.20)** | -1.06 (0.31)** | -0.50 (0.09)** |
| Number of Observations | 64,035 | 37,643 | 26,392 |

Notes: GE: government effectiveness (from WGI dataset). Standard errors clustered at country level. * p<0.05; ** p<0.01. Constant not reported.

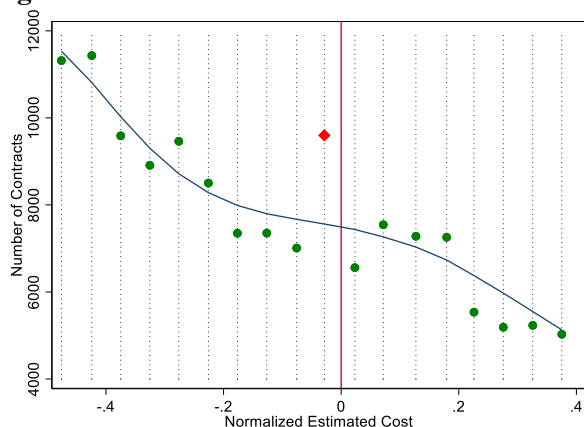
4.4 Bunching below thresholds

We now turn to the possibility that public officials may seek to reduce the estimated cost of planned procurement to fall below the contract value thresholds that determine when EU procurement regulations apply. Officials may seek to set estimated costs just below thresholds to be able to use discretion. Empirical studies for the Czech Republic, Hungary and EU member state procurement markets more broadly have found that some public authorities engage in such manipulation in the call for tender (see Palguta and Pertold, 2017; Szucs, 2023; and Taş 2023, respectively). We draw on the approach used by Taş (2023) and employ the regression discontinuity manipulation test suggested by Cattaneo, Jansson, and Ma (2020) to calculate bunching manipulation test statistics for individual public officials, focusing on officials that awarded more than thirty contracts during 2016-2019. The resulting sample spans 1,928 officials and 496,850 contract awards.¹⁵

Figure 4 plots the distribution of the normalized estimated costs for all contracts using counterfactual densities of 496,850 contracts (Chetty et al. 2011). We normalize contract prices with respect to value thresholds to be able to visualize the difference between estimated costs and threshold values. The solid line reflects the counterfactual density. Although the number of contracts declines monotonically as the normalized estimated contract cost increases, there is a significant increase in the number of contracts just below the threshold, represented by the (red) diamond in Figure 4, providing evidence for bunching behavior in public procurement contracts in the countries covered by TED in the 2016-2019 period.

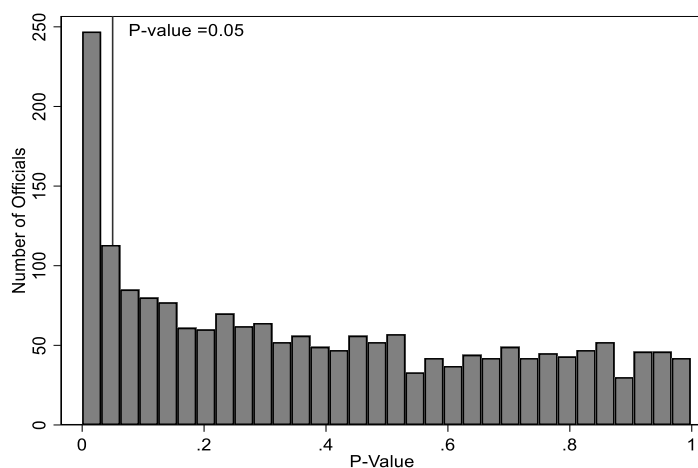
¹⁵ Appendix Table 2 provides descriptive statistics on the number of contracts and officials covered by country.

Figure 4: Distribution of total number of contracts with respect to normalized estimated cost



To analyze potential bunching manipulation, we calculate the p-values for manipulation tests for this sample of officials. Figure 5 plots the results of this exercise. Manipulation test p-values are below 5% for 314 of the 1,928 of officials, i.e., 16% of officials in the sample potentially manipulated estimated costs to stay below thresholds.

Figure 5: Histogram of manipulation test P-Values



Finally, we use logistic regression with law and practice scores as explanatory variables to examine whether stricter law and PP practices regarding discretion affect the probability of bunching manipulation, using instances where an official has a p-value of 0.05 or lower to identify potential manipulation. Table 5 presents the results. High law and practice scores – i.e., greater scope to exercise discretion – reduces the probability of bunching associated with action to ensure contract values are below thresholds. This result applies independent of government effectiveness. This finding is consistent with the presumption that manipulation of contract values to fall below applicable thresholds is not needed if officials have more discretion in awarding contracts.

Table 5: Probability of manipulation of estimated contract values

| | All Countries | Countries with Low GE | Countries with High GE |
|------------------------|-------------------|-----------------------|------------------------|
| Law Score | -0.68 (0.07)** | -0.75 (0.12)** | -0.38 (0.03)** |
| Practice Score | -0.61 (0.06)** | -0.77 (0.05)** | -0.3 (0.04)** |
| Number of Observations | 1,928 | 986 | 942 |

Notes: Manipulative GE: government effectiveness (from WGI dataset). Standard errors clustered at country level. * p<0.05; ** p<0.01. Constant not reported for brevity.

5. Robustness

To assess the robustness of our results, we re-run the analysis limiting the sample of procurement awards to road maintenance projects. We do so because the survey data generated by Bosio et al. (2022) on perceptions of the restrictiveness of law and practice towards exercise of discretion is based on a survey instrument that is organized around “a hypothetical \$2.5 million road maintenance project” (page 1092). We therefore focus on the contracts for the CPV codes related to “Highway maintenance work”, “Road-maintenance work” and “Road-repair works”.¹⁶ We identify 4,925 contracts for road-maintenance work. Price and information about whether winners are SMEs is available for 638 contracts. Only 8 contracts out of 4,925 are awarded to foreign firms. Results reported in Table 6 are similar to those obtained for the full sample. More restrictive practice towards discretion increases average procurement costs. The coefficient estimate is substantially larger than for the full sample, with statistical significance exceeding the 1% percent level. As in the full sample, the law score does not have a significant effect. Law and practice scores do not influence the probability that an SME will win a road-maintenance contract.

Table 6: Road-maintenance work contracts, 2019

| | Contract Prices | SME Winning | SME Survival |
|------------------------|---------------------|----------------|-------------------|
| Law Score | -72.79 (220.56) | 0.34 (0.63) | -0.3 (0.69) |
| Practice Score | 292.06 (73.97)** | 0.61 (0.73) | -1.67 (0.55)** |
| Number of Observations | 638 | 638 | 212 |
| Authority Dummy | YES | YES | YES |

Notes. Standard errors clustered at country level. * p<0.05; ** p<0.01. Constant not reported. Weibull distribution results are presented for SME Survival regressions.

Although the PP restrictiveness indicators are only available for 2019, we expect there to be little change in years just prior to 2019. As a second robustness exercise we re-run the analysis for data spanning the 2016-19 period. We limit the period because the EU implemented measures to promote SME participation in new procurement legislation in 2014, with implementation to be completed in 2015. Table 7 reports the results of the analysis of contract prices and probability of SMEs winning a contract using data for 2016-2019, again distinguishing between low and high government effectiveness countries. These confirm the robustness of the results presented in Section 4. Contract prices are higher in countries with high PP practice scores and high government effectiveness. The sign and significance of coefficient estimates for law and practice scores for countries with low government effectiveness remain the same. Table 7 also reports results for the likelihood that SMEs win contracts. Practice scores are again strongly associated with the likelihood of SMEs winning contracts in high government effectiveness countries.

Table 7: Contract prices and probability of SME win (2016-2019)

| | Low GE | |
|------------------------|------------------|------------------|
| | Contract Prices | p (SME win) |
| Law Score | 0.32 (7.05) | 0.06 (1.16) |
| Practice Score | 3.67 (1.47)* | 2.22 (0.72)** |
| Number of Observations | 458,021 | 345,101 |
| High GE | | |
| Law Score | -9.29 (5.07) | -0.05 (0.20) |
| Practice Score | 8.58 (2.82)** | 0.57 (0.34) |
| Number of Observations | 111,805 | 115,670 |

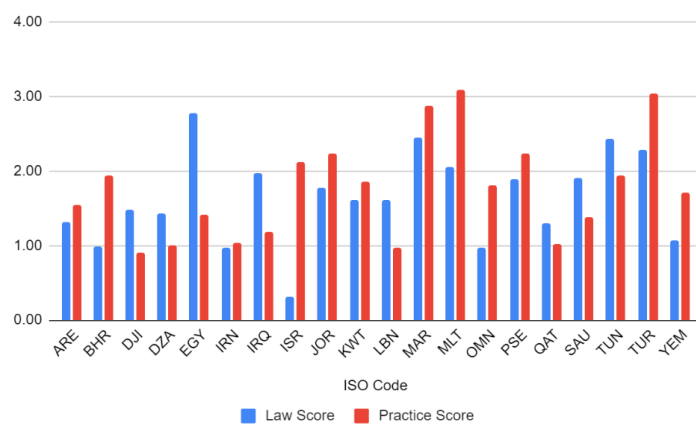
Notes. Standard errors clustered at country level. * p<0.05; ** p<0.01. Constant not reported.

¹⁶ The corresponding CPV codes are 45233139-3, 45233140-2, 45233141-9, and 45233142-6.

6. Implications for countries in the MENA region

There are no cross-country panel datasets such as TED that span the Middle East and North African countries, precluding an analysis of the type undertaken above. In this section we briefly discuss the potential implications of our findings for MENA countries¹⁷ and Turkey based on the PP law and practice scores reported in Bosio et al. (2022).¹⁸ Figure 6 plots the PP law and practice scores. In slightly more than half (11/20) of the countries considered, practice is more restrictive than applicable PP law or regulation. Law and practice scores are far below those of TED countries. Algeria, Egypt, Iraq and Lebanon are countries where there is much greater discretion in practice than implied by prevailing PP legislation.

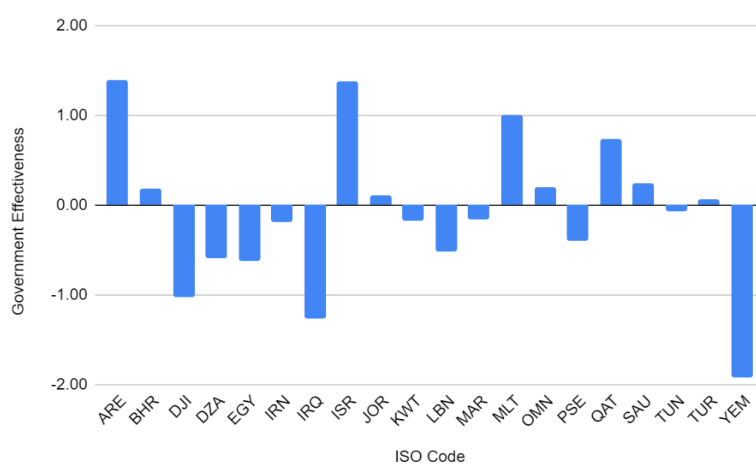
Figure 6: Law and practice scores of MENA countries and turkey



Source: Bosio et al. (2022).

WGI Government Effectiveness scores differ substantially across the countries in the sample, but there is a pattern that countries where PP law is more restrictive than practice are often those with lower government effectiveness scores (Figure 7). Most government effectiveness scores are low or negative, including Algeria, Egypt, Iraq & Lebanon.

Figure 7: MENA government effectiveness (WGI)



¹⁷ MENA countries are those defined by the World Bank at

<https://datahelpdesk.worldbank.org/knowledgebase/articles/906519-world-bank-country-and-lending-groups>

¹⁸ The scores of individual countries are reported in Appendix Table A.1.

Table 8 reports correlations between PP law and practice, and government effectiveness scores. This reveals a negative relationship between PP law and government effectiveness. Governments with higher effectiveness have less restrictive laws. In comparison, the PP practice scores of countries with more effective governments are higher. Effective governments appear to apply more restrictive public procurement practices.

Table 8: Correlation between PP law, practice and government effectiveness scores

| | Law | Practice | Government Effectiveness |
|--------------------------|-------|----------|--------------------------|
| Law | 1 | | |
| Practice | 0.3 | 1 | |
| Government Effectiveness | -0.22 | 0.34 | 1 |

In many cases both law and practice scores well below those of the European sample, pointing to a general strengthening of PP processes as a policy priority. The empirical results for the set of countries included in TED suggest that countries with low government effectiveness can benefit more from higher PP practice scores. As many MENA countries have very low or negative WGI government effectiveness scores, this suggests that these countries can benefit from putting in place government procurement practices that do more to restrict the potential for procuring entities to exercise discretion in implementation of government procurement – i.e., focus more on applied practice.

7. Conclusion

In this paper we examine the effect of the ability of procuring authorities to exercise discretion in the process of awarding public procurement contracts on outcomes, including contract prices and win rates for SMEs. We distinguish between procurement laws and applied practices as assessed by national procurement experts and compiled by Bosio et al. (2022). We find that differences in the extent to which PP laws restrict discretion are not associated with PP costs, but that there is a significant and positive relationship between more restrictive practice towards the exercise of discretion and contract award prices. Our empirical results suggest that limiting discretion of public officials may increase PP costs, especially in countries with high government effectiveness. The association between the practice score and PP contract prices is larger in countries with higher government effectiveness, suggesting stricter PP practices may impede the scope for public officials to use discretion to eliminate low-quality bidders.

Additionally, we find that in countries with more restrictive practices towards discretion there is a greater probability that small and medium enterprises win contracts, and that this is associated with higher survival probabilities. These findings suggest that more restrictive practice towards the exercise of discretion may act to attenuate incentives to allocate contracts to larger (non-SME) firms. An implication of these results is that tradeoffs between discretion and value for money go beyond the cost margins that are the focus of much of the literature. There are also tradeoffs in terms of the extent to which European countries realize the public policy objective of facilitating participation in procurement by SMEs.

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Appendix

Appendix Table 1: Summary statistics, 2019

| Authority Country Code | Total Number of Contracts | Number of Below Threshold Contracts | WGI Government Effectiveness Score | WGI Category | Law Score | Practice Score | SME Winner Below Threshold |
|------------------------------|---------------------------------|--|---|-----------------|--------------|-------------------|----------------------------------|
| AT | 4438 | 235 | 1.46 | High | 1.65 | 2.48 | 157 |
| BE | 8538 | 483 | 1.18 | High | 2.22 | 2.50 | 159 |
| BG | 15605 | 6761 | 0.26 | Low | 2.72 | 2.22 | 5041 |
| CH | 4059 | 3 | 2.06 | High | 0.82 | 2.74 | 2 |
| CY | 793 | 86 | 1.18 | High | 1.86 | 2.93 | 45 |
| CZ | 27961 | 7812 | 1.02 | Low | 2.45 | 3.10 | 6517 |
| DE | 67429 | 6468 | 1.72 | High | 1.46 | 3.07 | 3851 |
| DK | 7221 | 554 | 1.80 | High | 0.84 | 2.29 | 191 |
| EE | 6087 | 1 | 1.12 | Low | 2.14 | 3.55 | 0 |
| ES | 36774 | 12320 | 1.03 | Low | 2.61 | 2.11 | 6312 |
| FI | 8571 | 172 | 1.94 | High | 1.01 | 2.71 | 116 |
| FR | 109154 | 9578 | 1.35 | High | 2.47 | 3.21 | 4838 |
| GB | 38796 | 11073 | 1.18 | High | 1.86 | 2.93 | 5134 |
| GR | 7690 | 3797 | 0.31 | Low | 3.00 | 2.14 | 1811 |
| HR | 9532 | 6619 | 0.58 | Low | 2.72 | 2.59 | 2991 |
| HU | 8211 | 2822 | 0.51 | Low | 2.76 | 2.90 | 1804 |
| IE | 2931 | 153 | 1.29 | High | 1.30 | 2.88 | 104 |
| IS | 398 | 7 | 1.45 | High | 2.05 | 2.64 | 7 |
| IT | 24146 | 6799 | 0.50 | Low | 2.92 | 2.31 | 2465 |
| LI | 41 | 2 | 1.76 | High | 1.49 | 2.76 | 2 |
| LT | 11385 | 611 | 0.98 | Low | 2.13 | 2.99 | 461 |
| LU | 1485 | 59 | 1.68 | High | 2.35 | 2.45 | 41 |
| LV | 10645 | 4197 | 0.90 | Low | 2.92 | 3.36 | 3924 |
| MK | 1649 | 383 | 0.14 | Low | 2.06 | 2.90 | 184 |
| MT | 839 | 21 | 1.00 | Low | 2.05 | 3.10 | 15 |
| NL | 8115 | 824 | 1.85 | High | 1.85 | 3.05 | 551 |
| NO | 4320 | 184 | 1.98 | High | 1.01 | 2.48 | 116 |
| PL | 123360 | 73101 | 0.63 | Low | 2.41 | 3.01 | 44886 |
| PT | 7156 | 2908 | 1.33 | High | 2.80 | 2.09 | 909 |
| RO | 52094 | 40383 | -0.17 | Low | 2.47 | 2.09 | 2019 |
| SE | 17414 | 1579 | 1.84 | High | 1.65 | 3.07 | 1039 |
| SI | 38566 | 9070 | 1.17 | High | 2.45 | 3.52 | 7179 |
| SK | 3003 | 785 | 0.81 | Low | 2.27 | 1.95 | 612 |
| Total | 668406 | 209850 | | | | | 103483 |

Source: TED, World Bank Governance Indicators and Bosio et al. (2022) (for public procurement law and practice scores)

Appendix Table 2: Bunching below thresholds manipulation

| Authority Country code | Number of Contracts examined | Number of Authorities responsible |
|------------------------|------------------------------|-----------------------------------|
| AT | 333 | 4 |
| BE | 1407 | 10 |
| BG | 9996 | 61 |
| CY | 603 | 3 |
| CZ | 30399 | 117 |
| DE | 3767 | 46 |
| DK | 717 | 9 |
| EE | 3745 | 21 |
| ES | 41061 | 259 |
| FI | 160 | 3 |
| FR | 21039 | 179 |
| GR | 5957 | 26 |
| HR | 22678 | 51 |
| HU | 10214 | 55 |
| IE | 660 | 7 |
| IT | 21807 | 148 |
| LT | 386 | 4 |
| LU | 92 | 2 |
| LV | 10412 | 32 |
| MK | 487 | 3 |
| MT | 72 | 1 |
| NL | 1517 | 18 |
| NO | 1042 | 13 |
| PL | 202134 | 418 |
| PT | 3755 | 19 |
| RO | 66540 | 225 |
| SE | 6727 | 53 |
| SI | 12654 | 57 |
| SK | 3261 | 15 |
| UK | 13271 | 70 |
| Total | 496850 | 1928 |

Source: TED.