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# TRANSPARENCY, SINGLE BIDDING, AND BUDGET SAVINGS IN PUBLIC PROCUREMENT: EVIDENCE FROM UZBEKISTAN

Sardorbek Akhmedjanov

Tashkent State University of Economics, Tashkent, Uzbekistan

**Abstract.** This study examines which institutional and market factors are associated with budget savings in public procurement across the regions of Uzbekistan. A balanced regional framework was constructed for 14 territorial units over 2019–2024, yielding 84 region-year observations. The dependent variable is the budget-saving rate, measured as the percentage difference between planned and contracted procurement expenditure. Eight explanatory variables capture electronic procurement, participation by small and medium-sized enterprises, publication openness, bidder intensity, single-bid contracting, procurement-cycle duration, staff qualification, and the use of framework agreements. A regional fixed-effects model is estimated to isolate within-country variation while controlling for time-invariant regional characteristics.

**Keywords:** public procurement; transparency; single bidding; budget savings; e-procurement; SMEs; Uzbekistan

**Аннотация.** В данном исследовании рассматриваются институциональные и рыночные факторы, связанные с экономией бюджетных средств в сфере государственных закупок в регионах Узбекистана. Для 14 территориальных единиц за период 2019–2024 годов была сформирована сбалансированная региональная база данных, включающая 84 наблюдения «регион–год». Зависимой переменной является уровень экономии бюджетных средств, измеряемый как процентная разница между запланированными и контрактными расходами на закупки. Восемь объясняющих переменных охватывают электронные государственные закупки, участие субъектов малого и среднего предпринимательства, открытость публикации информации, интенсивность участия поставщиков, заключение контрактов на основе единственной заявки, продолжительность закупочного цикла, квалификацию персонала и использование рамочных соглашений. Для выявления внутристрановых изменений при контроле неизменных во времени региональных характеристик была оценена модель с региональными фиксированными эффектами.

**Ключевые слова:** государственные закупки; прозрачность; закупки с единственной заявкой; экономия бюджетных средств; электронные государственные закупки; МСП; Узбекистан.

## INTRODUCTION

Public procurement is both a spending mechanism and a market-shaping institution. Governments use procurement to obtain goods, works, and services, while tender design also determines which firms can enter public markets, how strongly they compete, and whether public budgets achieve value for money. This dual role is especially important in transition economies, where the state is a major purchaser and procurement reform proceeds alongside digitalization, private-sector development, and improvements in fiscal governance. Greater transparency and stronger competition in tendering can contribute to more efficient use of public resources, while well-designed procurement rules can lower purchasing costs and improve service quality (Bandiera et al., 2009; Bosio et al., 2022).

Uzbekistan offers a useful setting for studying this relationship. The public procurement system has moved toward electronic procedures and a unified legal framework, notably through the Law on Public Procurement adopted in 2021. Aggregate indicators show rapid market expansion. Total procurement increased from UZS 147.4 trillion in 2021 to UZS 307.9 trillion in 2025, while the electronic share rose from 50.3 to 61.6 percent. The number of participating suppliers nearly doubled, from 160,852 to 316,608. At the same time, the cancellation rate increased from 5.5 to 8.5 percent, while single-supplier and direct procedures continued to represent

a notable share of procurement activity. These patterns indicate that further strengthening competition and transparency alongside expanding digital coverage may contribute to additional fiscal savings and procurement efficiency.

The central research question is therefore: which observable features of regional procurement systems are associated with higher budget savings? The study tests six substantive hypotheses concerning e-procurement, SME participation, publication openness, bidder intensity, single bidding, and procurement-cycle duration, while also evaluating staff qualifications and framework agreements. It uses a region-level panel covering 2019–2024 and estimates a fixed-effects specification. The contribution is threefold. First, it provides subnational evidence from Central Asia, a region that remains relatively less represented in empirical procurement research. Second, it distinguishes the existence of electronic infrastructure from the transparency and contestability that such infrastructure is expected to support. Third, it translates regression evidence into operational priorities for further improvement without treating savings as the only dimension of procurement performance.

## LITERATURE REVIEW

Economic research treats procurement performance as the product of rules, administrative capacity, and market response. Bandiera et al. (2009) distinguish active waste, which provides utility to the public decision-maker, from passive waste, which does not. Bosio et al. (2022) show that procurement quality depends not only on formal law but also on practice. This distinction matters for digital reform: an electronic platform may standardize transactions, yet savings arise only if information is accessible, firms can enter, and contracting authorities use competitive procedures effectively.

Transparency can expand the pool of informed suppliers and strengthen accountability and external scrutiny. Using a discontinuity in publicity requirements, Coviello and Mariniello (2014) find that wider publicity increases participation and improves procurement outcomes. Open announcements reduce search costs, provide time to prepare bids, and permit external scrutiny. The first key expectation is therefore that a higher share of openly announced tenders is associated with greater budget savings. Relatedly, single bidding can serve as an indicator of limited contestability. It may reflect specialized demand, but persistent single-bid awards are also widely used as a procurement risk signal (Fazekas and Kocsis, 2020). The corresponding hypothesis predicts a negative association between single-bid contracting and savings.

Digital procurement can reduce information and transaction costs and limit face-to-face discretion. However, international evidence cautions against equating digitization with lower prices. Lewis-Faupel et al. (2016) find that e-procurement improved quality and timeliness in India and Indonesia but did not reduce prices. The expected effect is thus positive but potentially indirect, operating through disclosure and competition. Bidder entry should intensify price competition, although additional bidders may also differ in quality and contract-performance risk. Decarolis (2014) demonstrates that aggressive price competition can create post-award trade-offs, while Coviello et al. (2018) show that greater discretion can affect supplier selection by increasing the probability of repeated wins without worsening, and potentially improving, observed procurement outcomes.

SME participation is another policy objective. Smaller firms can widen the supply base, particularly when lots and qualification requirements are proportionate. Hoekman and Taş (2022) find that higher-quality procurement regulation is associated with stronger SME participation and a greater probability of SME contract awards. Nevertheless, SME participation need not immediately translate into lower prices if firms face financing constraints, delayed payments, or high compliance costs. Framework agreements may improve planning and repeated purchasing, but they can either support entry or concentrate awards depending on their design. These mixed mechanisms motivate an empirical rather than purely normative assessment.

## RESEARCH METHODOLOGY

The empirical dataset covers 14 territorial units: Tashkent City, 12 regions, and the Republic of Karakalpakstan. Annual observations for 2019–2024 produce 84 region-year records. Data were compiled from the national electronic procurement portal, official fiscal reports, and the national statistical system. Source completeness was reported at 92 percent; missing observations were reconstructed through interpolation and expert assessment. Because imputation may attenuate or amplify relationships, the estimates are interpreted as structured evidence from administrative aggregates rather than definitive causal effects.

Table 1. Variable definitions and expected effects

| Variable                | Operational definition                                                                  | Expected sign |
|-------------------------|-----------------------------------------------------------------------------------------|---------------|
| Y Budget savings        | Difference between planned and contracted expenditure as a share of planned expenditure | Outcome       |
| X1 E-procurement        | Electronic procurement as a share of total procurement                                  | +             |
| X2 SME participation    | SME participation share in public procurement                                           | +             |
| X3 Open announcements   | Share of procurement notices published openly                                           | +             |
| X4 Bidders              | Average number of bids per procedure                                                    | +             |
| X5 Single bidding       | Share of procurement based on one bid                                                   | -             |
| X6 Cycle duration       | Average procurement-cycle duration in days                                              | -             |
| X7 Qualified staff      | Share of procurement staff classified as qualified                                      | +             |
| X8 Framework agreements | Framework agreements as a share of procurement                                          | +             |

Source: Author compilation based on the dissertation dataset and official procurement sources.

Budget savings are used because they are measurable across all regions and directly relevant to fiscal efficiency. They are not a complete welfare measure: low prices may coexist with poor quality, delays, or costly renegotiation. The analysis therefore treats savings as one performance dimension. Descriptive statistics show meaningful cross-regional and temporal variation. Average savings equal 12.96 percent, with a range of 2–28 percent. Open announcements average 49.85 percent, while single bidding averages 43.68 percent. The close proximity of the means and medians and absolute skewness below one suggest no severe distributional asymmetry.

Table 2. Descriptive statistics

| Variable                     | Mean  | Median | SD    | Min   | Max   |
|------------------------------|-------|--------|-------|-------|-------|
| Budget savings percent       | 12.96 | 13.05  | 5.89  | 2.00  | 28.00 |
| E-procurement percent        | 50.43 | 50.38  | 18.78 | 18.84 | 86.22 |
| SME participation percent    | 36.41 | 35.18  | 7.04  | 21.96 | 54.36 |
| Open announcements percent   | 49.85 | 49.06  | 13.60 | 25.50 | 82.58 |
| Average bidders              | 3.52  | 3.56   | 0.94  | 1.61  | 5.82  |
| Single bidding percent       | 43.68 | 44.53  | 11.12 | 20.57 | 67.96 |
| Cycle duration days          | 37.35 | 38.48  | 7.99  | 17.36 | 55.26 |
| Qualified staff percent      | 24.69 | 24.52  | 7.46  | 12.30 | 41.47 |
| Framework agreements percent | 10.56 | 10.72  | 6.51  | 0.00  | 24.43 |

Notes:  $N = 84$  region-year observations. SD denotes standard deviation.

The estimated specification is  $Y_{it} = \alpha + \beta X_{it} + \mu_i + \epsilon_{it}$ , where  $i$  indexes regions,  $t$  indexes years,  $X$  is the vector of eight procurement variables, and  $\mu_i$  captures time-invariant regional heterogeneity. The regional fixed effects absorb persistent differences such as geography, industrial structure, and administrative traditions. The reported model has 62 residual degrees of freedom, consistent with eight regressors and regional effects. Pre-estimation work included distributional review, correlation analysis, and multicollinearity checks, with limited use of artificial intelligence tools, accounting for no more than 10 percent of the article preparation process. Statistical significance is evaluated at the 1, 5, and 10 percent levels. Because procurement policy and outcomes may be jointly determined, coefficients are interpreted as conditional associations.

## ANALYSIS AND RESULTS

The fixed-effects model is jointly significant ( $F = 42.449$ ;  $p < 0.001$ ). Its R-squared of 0.935 and adjusted R-squared of 0.913 indicate that the included covariates and regional effects account for a large share of the observed variation in budget savings. High explanatory power does not itself establish causal validity, especially in a short panel, but it confirms that procurement design and regional heterogeneity are closely associated with fiscal outcomes.

Table 3. Regional fixed-effects estimates for budget savings

| Predictor            | Coefficient | SE     | t      | p value | Std beta |
|----------------------|-------------|--------|--------|---------|----------|
| Constant             | 11.1598     | 5.9529 | 1.875  | 0.0655  | -        |
| E-procurement        | 0.0205      | 0.0394 | 0.520  | 0.6050  | 0.065    |
| SME participation    | 0.0760      | 0.0617 | 1.230  | 0.2232  | 0.091    |
| Open announcements   | 0.1804      | 0.0470 | 3.835  | 0.0003  | 0.416    |
| Average bidders      | 0.1588      | 0.4777 | 0.332  | 0.7407  | 0.025    |
| Single bidding       | -0.1565     | 0.0553 | -2.831 | 0.0063  | -0.295   |
| Cycle duration       | -0.0358     | 0.0601 | -0.595 | 0.5542  | -0.048   |
| Qualified staff      | -0.1276     | 0.0823 | -1.551 | 0.1259  | -0.162   |
| Framework agreements | 0.1585      | 0.0793 | 1.999  | 0.0500  | 0.175    |

Notes: Regional fixed effects included.  $N = 84$ ;  $R^2 = 0.9350$ ; adjusted  $R^2 = 0.9129$ ;  $F = 42.449$ ;  $p(F) < 0.001$ .  $p < 0.01$ ;  $p \leq 0.10$ , with framework agreements exactly at  $p = 0.0500$ .

Open announcements have the largest standardized effect and a precisely estimated positive coefficient. Holding the other variables and time-invariant regional characteristics constant, a one-percentage-point increase in publication openness is associated with a 0.1804-percentage-point increase in budget savings. A ten-percentage-point increase would therefore correspond to approximately 1.8 percentage points of additional savings within the model's observed range. This result supports the transparency hypothesis and is consistent with the mechanism identified by Coviello and Mariniello (2014): publicity broadens access to tender information and strengthens scrutiny.

Single bidding is the second strongest determinant. A one-percentage-point increase in the share of single-bid procedures is associated with a 0.1565-percentage-point reduction in savings. The result supports the competition-risk hypothesis and aligns with evidence that single bidding is an informative risk indicator when used alongside other indicators (Fazekas and Kocsis, 2020). The estimate should not be interpreted as evidence that every single-bid award is inefficient. Some procurements involve unique technologies or emergency needs. Rather, a persistently high regional share may indicate limited contestability and may warrant additional review.

Framework agreements have a positive coefficient of 0.1585 and are significant at the 5 percent level. This may reflect reduced repetition costs, demand aggregation, and more predictable purchasing. However, framework design remains important, as highly concentrated arrangements may limit opportunities for new suppliers. The coefficients for e-procurement and SME participation are positive but statistically insignificant. Likewise, bidder numbers are positive and cycle duration is negative, as expected, but neither is statistically significant. Qualified staff has an unexpected negative coefficient that is also statistically insignificant. This sign may reflect reverse assignment, whereby more qualified staff are deployed to more complex purchasing environments, or differences between formal certification and actual capability.

Of the six principal hypotheses, two receive clear empirical support: open publication is positively associated with savings, and single bidding is negatively associated with savings. The other four do not show statistically significant independent effects in the estimated model. Importantly, the statistically insignificant e-procurement coefficient does not imply that digital systems lack value. Electronic coverage may operate through greater openness and reductions in single-bid procedures, leaving little independent price effect after those channels are included in the same model. This interpretation is consistent with Lewis-Faupel et al. (2016), who find benefits of e-procurement in non-price dimensions rather than automatic price reductions.

The two significant coefficients are economically meaningful when compared with the sample mean of 12.96 percent savings. A simultaneous ten-percentage-point increase in open publication and a ten-percentage-

point reduction in single bidding corresponds mechanically to approximately 3.37 percentage points of higher predicted savings, with other factors held constant. This calculation is an illustrative within-sample comparison rather than a forecast, because the two indicators may move jointly and policy changes may alter bidder behavior. Even so, it illustrates why improvements in disclosure and contestability can be relevant at the scale of public expenditure.

Inference should also reflect the structure of the data. The fixed-effects estimator relies on within-region changes over six years, so variables that evolve slowly will be estimated less precisely. The short time dimension limits dynamic analysis, and the available output does not establish that errors are independent across years within each region. Accordingly, the reported p-values are retained from the source estimation and are not relabeled as cluster-robust. A replication could report region-clustered or wild-bootstrap inference and compare complete-case results with alternative multiple-imputation specifications. These steps would help assess whether the central findings remain robust under more conservative uncertainty estimates.

The results shift attention from inputs to functions. Installing an electronic platform is an input; publishing complete, timely, and machine-readable tender information is a function. Similarly, registering more suppliers is an input; ensuring that multiple qualified firms submit bids is a function. In this context, Uzbekistan's procurement reform agenda could place greater emphasis on monitoring conversion rates across the procurement funnel: notices published, firms viewing opportunities, bids submitted, valid bids received, contracts awarded competitively, and contracts completed on time.

Three policy implications follow from the findings. First, open publication could be treated as a measurable performance dimension across the full procurement cycle, including planning, tender documents, amendments, awards, contract implementation, and final payments. Second, a high incidence of single bidding may justify proportionate risk-based review. Authorities may compare specifications with market capacity, assess whether qualification criteria are proportionate, provide adequate response periods, and divide large requirements into functionally coherent lots where appropriate. Such an approach can accommodate legitimate sole-source cases while supporting broader contestability. Third, framework agreements may be designed to preserve opportunities for supplier entry through multiple suppliers, periodic reopening, transparent call-off rules, and publication of realized prices.

SME policy also requires a broader lens. The statistically insignificant direct coefficient may reflect financing and capability constraints rather than an absence of economic value. Smaller firms may register and bid but may still face challenges related to guarantees, working capital, payment timing, or the size of procurement lots. Accordingly, procurement arrangements may benefit from considering the interaction between lot design, invoice-based finance, proportionate bid security, predictable payment, and supplier development. Hoekman and Taş (2022) similarly emphasize that regulatory quality and contract structure shape effective SME participation.

The study has several limitations. The sample covers only six years, and eight percent of the source matrix was reconstructed rather than directly observed. Aggregate regional indicators may conceal differences across goods, works, and services. Savings based on planned and contracted values may also be influenced by differences in initial price-setting practices and do not capture quality, delivery, life-cycle cost, or renegotiation. Finally, the fixed-effects model reduces potential bias arising from stable regional characteristics but cannot fully address simultaneity, policy endogeneity, or time-varying omitted variables. Future research could use contract-level data, year effects, clustered standard errors, alternative imputation rules, and quasi-experimental reforms. Linking award data with firm finance, employment, contract execution, complaints, and payment delays could permit a more comprehensive assessment of developmental procurement.

## CONCLUSION AND SUGGESTIONS

Regional evidence from Uzbekistan indicates that the fiscal performance of public procurement is more closely associated with transparency and contestability than with digital coverage alone. Across 84 observations for 2019–2024, open announcements are strongly associated with higher budget savings, while single-bid procurement is associated with lower savings. Framework agreements show a positive effect at the margin of statistical significance. E-procurement, SME participation, bidder numbers, cycle duration, and staff qualification do not display statistically significant independent coefficients once regional fixed effects and the other procurement features are considered.

The practical implication is not to reduce the pace of digitalization, but to further strengthen its functional outcomes. Digital systems can be evaluated by the extent to which they disclose usable information, facilitate competing bids, identify single-bid risk, support proportionate lotting, and document contract execution. A procurement dashboard built around these outcomes could provide a useful management tool alongside reporting on transaction volumes. For Uzbekistan and comparable transition economies, this approach can

help connect fiscal discipline with broader market access: greater transparency may contribute to more efficient use of budget resources, while contestable and appropriately structured tenders can widen opportunities for capable firms. The evidence remains associational, but it provides a useful empirical basis for further targeted improvements and more rigorous contract-level evaluation.

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