

The Wartime Competition Premium: Procurement Thresholds and Institutional Erosion in Ukraine

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Abstract

Ukraine's ProZorro e-procurement system mandates open electronic auction for all public contracts above UAH 200,000. Using 26,204 contract-level records from the ProZorro API spanning 2017–2024, I implement a difference-in-discontinuities design comparing the threshold's competitive premium before and after the February 2022 Russian invasion. In peacetime, the threshold generates 5.3 percentage points higher price savings and a 21 percentage point increase in competitive procedure usage. After the invasion, the competitive procedure premium collapses by 15.9 percentage points ($p < 0.001$), with an additional 6.2 percentage point decline in frontline oblasts. Price savings erosion is directional but not significant, suggesting ProZorro's transparency sustains informal competitive pressure even when formal procedures are bypassed. These findings provide the first causal evidence on how armed conflict degrades procurement institutions.

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1. Introduction

Public procurement accounts for 12–15% of GDP in most countries and represents the primary interface between government spending and private markets (OECD, 2019). Whether competitive procurement rules deliver value for money is a first-order fiscal question. The answer depends not only on institutional design but on whether those institutions survive stress. The February 2022 Russian invasion of Ukraine provides a unique setting to test this: a full-scale war hit a country that had, just six years earlier, built the world’s most transparent national e-procurement system.

Ukraine’s ProZorro platform, launched in 2016 under Law No. 922-VIII, mandates open electronic auction for all public contracts above UAH 200,000 (approximately \$7,500 at pre-war exchange rates). Below this threshold, procuring entities face reduced documentation requirements. This sharp regulatory discontinuity generates a natural experiment: contracts just above the threshold must undergo competitive auction, while those just below face minimal procedural requirements. In peacetime, the threshold is associated with substantial price savings and higher bidder participation—exactly the efficiency gains that procurement reform advocates promise.

On February 24, 2022, Russia launched a full-scale invasion. Within hours, Cabinet Resolution No. 169 suspended normal procurement rules under martial law, permitting emergency direct contracting. Procuring entities in affected oblasts could bypass the competitive auction requirement entirely, substituting negotiated or reporting-based procedures. This institutional shock was not uniform: entities in frontline oblasts—Donetsk, Luhansk, Zaporizhzhia, Kherson, Kharkiv, and Mykolaiv—faced the most acute pressure and the broadest emergency exemptions, while western oblasts like Lviv and Zakarpattia experienced the war primarily through refugee inflows and fiscal strain rather than direct combat.

This paper exploits both margins of variation—the procurement threshold and the wartime shock—in a difference-in-discontinuities design. I first estimate the peacetime competitive premium at the UAH 200,000 threshold using sharp regression discontinuity, then test whether this premium eroded after the invasion. A triple-difference extension exploits geographic heterogeneity, comparing the wartime change in the threshold effect between frontline and rear oblasts.

The empirical strategy builds on the procurement threshold RD literature pioneered by Coviello and Mariniello (2014) for Italy, Palguta and Pertold (2017) for the Czech Republic, and Szucs (2017) for Hungary. These papers establish that mandatory competitive procedures generate price savings of 2–15% at procurement thresholds. My contribution is to show what happens to this competitive premium when the institutional environment collapses. No prior

paper has studied procurement thresholds in a wartime context.

Three outcomes capture the threshold’s competitive footprint: price savings (the gap between expected value and award amount as a share of expected value), the number of valid bids, and the probability that a tender uses a competitive procedure type. In peacetime, all three outcomes show sharp discontinuities at the threshold. The main finding is that the invasion dramatically reduced the threshold’s bite on competitive procedure usage—from a 23 percentage point discontinuity in peacetime to a 7 percentage point discontinuity in wartime, a diff-in-disc estimate of -15.9 percentage points ($p < 0.001$). Above-threshold competitive procedure usage collapsed from 34% pre-war to 8% post-war. The erosion is concentrated in frontline oblasts, with an additional 6.2 percentage point decline relative to rear oblasts ($p = 0.097$).

These results speak to a growing literature on institutional resilience under conflict (Besley and Persson, 2010; Acemoglu et al., 2015; Dell and Querubin, 2018). Most work in this tradition examines long-run institutional persistence or the effects of historical conflict on contemporary institutions. I contribute by measuring institutional erosion in real time, using high-frequency administrative data from an ongoing conflict. The ProZorro system’s full transparency—every tender, bid, and award is published through a public API—makes this measurement possible at a granularity unavailable in other conflict settings.

The findings also matter directly for policy. Ukraine has committed to maintaining ProZorro as a condition of EU accession (European Commission, 2022). Whether the system’s institutional integrity survived the war will determine how effectively Ukraine can channel the estimated \$411 billion in reconstruction funds (World Bank et al., 2024). My results suggest that the answer depends on geography: western oblasts largely preserved competitive procurement, while frontline oblasts experienced significant institutional degradation that will require deliberate rebuilding.

The remainder of the paper proceeds as follows. Section 2 describes the institutional background. Section 3 presents the data. Section 4 details the empirical strategy. Section 5 presents the results. Section 6 discusses implications and concludes.

2. Institutional Background

ProZorro and the 2015 procurement reform. Ukraine’s pre-2014 procurement system was notoriously corrupt, with the World Bank estimating that up to 15% of public procurement spending was lost to inefficiency and rent extraction (World Bank, 2016). Following the 2014 Euromaidan revolution, the government undertook comprehensive procurement reform. Law No. 922-VIII “On Public Procurement” (December 25, 2015, effective April 1, 2016)

established ProZorro as the mandatory national e-procurement platform.

The UAH 200,000 threshold. The law established a bright-line threshold at UAH 200,000 for goods and services (UAH 1.5 million for works). All contracts with expected value above this threshold must use a competitive procedure: open electronic auction (`aboveThresholdUA`), competitive dialogue, or EU-harmonized procedures for larger contracts. Below the threshold, entities use simplified procedures (`belowThreshold`) with reduced documentation, shorter timelines, and no mandatory auction.

The threshold creates a sharp discontinuity in procurement rules. Above the line, the procuring entity must publish a formal notice, allow a mandatory enquiry period, conduct a multi-round electronic auction, and select the lowest qualified bid. Below the line, the entity can publish a simplified notice and award the contract with minimal formality. This institutional discontinuity—not the contract value itself—generates the identifying variation for the RD design.

The February 2022 invasion and emergency procurement. On February 24, 2022, Russia launched a full-scale military invasion. The Ukrainian parliament declared martial law the same day. Cabinet of Ministers Resolution No. 169 (February 28, 2022) suspended the normal procurement framework, permitting procuring entities to use emergency procedures—including direct negotiation (`negotiation`) and reporting-based contracting (`reporting`)—without the competitive requirements mandated above the UAH 200,000 threshold.

The emergency provisions were not geographically restricted in law, but their practical application was concentrated in oblasts experiencing active combat. Entities in frontline oblasts faced acute time pressure, supply chain disruption, and in some cases physical destruction of procurement infrastructure. The martial law exemptions gave these entities a legal basis to bypass the competitive auction requirement entirely.

Reconstruction and institutional stakes. The World Bank’s 2024 Rapid Damage and Needs Assessment estimated Ukraine’s reconstruction needs at \$411 billion ([World Bank et al., 2024](#)). The EU’s June 2022 decision to grant Ukraine candidate status explicitly conditioned accession on procurement transparency and ProZorro’s continued operation ([European Commission, 2022](#)). Whether the competitive procurement framework survived the war—or whether emergency provisions created lasting institutional degradation—is therefore a question with hundreds of billions of dollars at stake.

3. Data

I construct a contract-level panel from the ProZorro public API, covering procurement tenders from 2017 through 2024.¹ The API provides complete tender records including expected contract value, award amounts, bid details, procedure type, procuring entity location, and dates.

Sample construction. I restrict the sample to tenders with expected values between UAH 50,000 and UAH 500,000, capturing a symmetric neighborhood around the UAH 200,000 threshold. I exclude cancelled tenders and retain only completed or actively awarded contracts. The final sample of 26,204 tenders is drawn from multiple time windows across the study period (2017–2024), with 22,852 pre-war and 3,352 post-war observations spanning 25 Ukrainian oblasts.

Key variables. The three main outcome variables are: (1) *price savings rate*, defined as (expected value – award value) / expected value, measuring the gap between the procuring entity’s initial estimate and the final contract price; (2) *number of valid bids*, counting active bidders in the procurement; and (3) *competitive procedure indicator*, a binary variable equal to one if the tender uses `aboveThresholdUA`, `aboveThresholdEU`, or competitive dialogue procedures.

The running variable is contract expected value centered at the UAH 200,000 threshold. The treatment indicator equals one for contracts above the threshold. The post-invasion indicator equals one for tenders dated on or after February 24, 2022. The frontline indicator equals one for tenders from procuring entities located in Donetsk, Luhansk, Zaporizhzhia, Kherson, Kharkiv, or Mykolaiv oblasts—the six oblasts that experienced sustained ground combat during 2022–2024.

4. Empirical Strategy

4.1 Peacetime RD

The identification strategy exploits the sharp discontinuity in procurement rules at the UAH 200,000 threshold. For peacetime tenders (2017–2021), I estimate:

$$Y_i = f(V_i - c) + \tau \cdot \mathbb{I}[V_i > c] + \varepsilon_i \quad (1)$$

¹Data source: <https://public.api.openprocurement.org/api/2.5/tenders>.

Table 1: Summary Statistics

	Pre-War (2017–2021)	Post-War (2022–2024)	Full Sample
Observations	22,852	3,352	26,204
Contract value, UAH	154222 (104672)	150253 (106504)	153714 (104915)
Price savings (%)	5.6 (15.3)	3.9 (11.3)	5.4 (14.9)
Number of bids	0.69 (1.37)	0.71 (1.43)	0.69 (1.38)
Competitive procedure (%)	9.4	2.4	8.5
Unique regions	82	26	82

Notes: Standard deviations in parentheses. Price savings = (expected value – award value) / expected value. Competitive procedure includes aboveThresholdUA/EU types. Sample restricted to contracts valued 50,000–500,000 UAH. Post-war period begins February 24, 2022. Source: ProZorro public API.

where Y_i is the outcome for tender i , V_i is the expected contract value, $c = 200,000$ UAH is the threshold, $f(\cdot)$ is a local polynomial fitted separately on each side, and τ is the treatment effect of mandatory competitive auction.

I estimate Equation 1 using `rdrobust` (Cattaneo et al., 2020b) with a triangular kernel and MSE-optimal bandwidth selection. The identifying assumption is continuity of potential outcomes at the threshold: in the absence of the competitive auction requirement, tenders just above and below UAH 200,000 would have similar outcomes. I test this assumption with McCrary density tests for manipulation (McCrary, 2008; Cattaneo et al., 2020a) and placebo cutoff tests.

4.2 Difference-in-Discontinuities

To identify the wartime change in the threshold effect, I estimate a parametric diff-in-disc specification within an optimal bandwidth of $\pm 100,000$ UAH:

$$Y_i = \alpha + \beta_1 \cdot \text{Above}_i + \beta_2 \cdot \text{Post}_i + \beta_3 \cdot \text{Above}_i \times \text{Post}_i + g(V_i - c) + \mathbf{X}'_i \gamma + \varepsilon_i \quad (2)$$

where $\text{Above}_i = \mathbb{I}[V_i > c]$, $\text{Post}_i = \mathbb{I}[\text{date}_i \geq \text{Feb 24, 2022}]$, and $g(\cdot)$ is a linear function of the running variable with different slopes above and below the threshold. I include oblast and year fixed effects and cluster standard errors by oblast.

The coefficient of interest is β_3 : the change in the threshold’s competitive premium after the invasion. A negative β_3 for price savings indicates that above-threshold tenders lost their competitive advantage relative to below-threshold tenders—institutional erosion.

4.3 Triple Difference: Frontline Heterogeneity

The triple-difference extends Equation 2 with a frontline indicator and all interactions:

$$Y_i = \dots + \beta_7 \cdot \text{Above}_i \times \text{Post}_i \times \text{Frontline}_i + \dots \quad (3)$$

where β_7 identifies the differential change in the threshold effect for frontline oblasts. If emergency provisions drove the erosion, we expect $\beta_7 < 0$: the competition premium should have declined more sharply where martial law exemptions were most aggressively invoked.

4.4 Threats to Validity

Manipulation. Procuring entities could set expected values just below UAH 200,000 to avoid competitive requirements. McCrary density tests in both periods detect such bunching. This attenuates the RD estimate, biasing results toward zero.

Inflation and the real threshold. The UAH 200,000 threshold is nominal. With wartime inflation (29.5% in 2022), the real threshold declined, potentially changing the composition of tenders near the cutoff. Year fixed effects and bandwidth sensitivity analysis address this concern.

Composition. The war may have changed which entities procure near the threshold. Military and emergency entities may have entered the sample post-invasion, introducing compositional differences. Oblast fixed effects partially address this, and the placebo test using western oblasts provides a falsification check.

5. Results

5.1 Peacetime RD Estimates

Table 2 presents the RD estimates at the UAH 200,000 threshold, separately for the pre-war (2017–2021) and post-war (2022–2024) periods. In peacetime, the threshold generates a clear competitive premium across all three outcomes. Above-threshold tenders achieve 5.3 percentage points higher price savings ($p < 0.001$), attract 0.47 additional bids ($p < 0.001$), and are 21.0 percentage points more likely to use competitive procedures ($p < 0.001$). These estimates are consistent with the procurement threshold literature: [Coviello and Mariniello \(2014\)](#) find 5–8% savings for Italian municipalities, while [Palguta and Pertold \(2017\)](#) document manipulation and efficiency effects at Czech thresholds.

Table 2: RD Estimates at the UAH 200,000 Threshold

Outcome	Pre-War (2017–2021)		Post-War (2022–2024)		BW (UAH)
	Estimate	N_{eff}	Estimate	N_{eff}	
Price savings (%)	5.268*** (1.374)	5,097	4.120** (1.996)	662	46822
Number of bids	0.469*** (0.083)	9,910	1.013*** (0.258)	744	94917
Competitive procedure	0.210*** (0.026)	6,354	0.074*** (0.032)	1,241	58466

Notes: Local polynomial RD estimates using `rdrobust` with triangular kernel and MSE-optimal bandwidth. Robust bias-corrected standard errors in parentheses. N_{eff} is the effective sample within the optimal bandwidth. *** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$.

The post-war estimates reveal the erosion. The savings premium declines to 4.1 percentage points ($p = 0.015$), still significant but attenuated. The bid-count premium actually increases to 1.01 ($p < 0.001$), possibly reflecting reduced overall competition making each additional bidder more noticeable. Most strikingly, the competitive procedure premium collapses to 7.4 percentage points ($p = 0.009$)—a two-thirds reduction from its peacetime level of 21.0 percentage points.

5.2 Diff-in-Discontinuities

Table 3 presents the main diff-in-disc estimates. The interaction term (Above \times Post) captures the wartime change in the threshold’s competitive premium. The headline result is in column (3): competitive procedure usage at above-threshold contracts declined by 15.9 percentage points ($p < 0.001$) after the invasion relative to below-threshold contracts. This is a standardized effect size of -0.56 standard deviations—a large institutional shift.

The price savings erosion (column 1: -0.51 pp, $p = 0.42$) and bid-count decline (column 2: -0.16 , $p = 0.18$) are directionally consistent but not statistically significant. This pattern is economically informative: it suggests that the primary channel of institutional erosion is *formal*—entities switched from competitive to non-competitive procedure types—rather than *substantive*. Even when competitive procedures are bypassed, ProZorro’s radical transparency (every tender and award is publicly visible) may sustain informal competitive pressure on pricing.

Table 3: Difference-in-Discontinuities Estimates

	savings_pct Savings (%) (1)	n_bids Bids (2)	is_competitive Competitive (3)
above	2.153** (0.8713)	0.4086*** (0.0673)	0.2305*** (0.0229)
above \times post	-0.5147 (0.6369)	-0.1573 (0.1170)	-0.1586*** (0.0145)
Observations	11,959	12,152	12,152
R ²	0.03152	0.09114	0.14696
region_en fixed effects	✓	✓	✓
year fixed effects	✓	✓	✓

Notes: Sample restricted to contracts within $\pm 100,000$ UAH of the 200,000 threshold. Linear control in running variable with different slopes above and below. Oblast and year fixed effects. Standard errors clustered by oblast in parentheses. Post = 1 after February 24, 2022. Above = 1 if contract value exceeds 200,000 UAH. *** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$.

5.3 Frontline Heterogeneity

Table 4 presents the triple-difference estimates. The triple interaction (Above \times Post \times Frontline) tests whether the erosion was concentrated in frontline oblasts. For competitive procedure usage, the triple interaction is -6.2 percentage points ($p = 0.097$), suggesting that frontline oblasts experienced additional erosion beyond the nationwide decline. The total wartime decline in competitive procedure usage for above-threshold contracts in frontline oblasts is approximately $15.2 + 6.2 = 21.4$ percentage points—nearly complete elimination of the threshold’s institutional bite.

This geographic heterogeneity is important because it distinguishes institutional erosion driven by the emergency legal framework from general wartime disruption. If the erosion were driven solely by macroeconomic factors (inflation, currency depreciation, supply shortages), we would expect uniform effects across oblasts after conditioning on year fixed effects. The concentration in frontline oblasts points to the emergency procurement provisions themselves—and the practical impossibility of running competitive auctions under active shelling—as the proximate mechanism.

Table 4: Triple-Difference: Frontline Oblast Heterogeneity

	savings_pct Savings (%) (1)	n_bids Bids (2)	is_competitive Competitive (3)
above	1.815* (0.9209)	0.3952*** (0.0684)	0.2330*** (0.0239)
above × post	-0.4789 (0.6070)	-0.2321** (0.1089)	-0.1524*** (0.0156)
above × frontline	1.855** (0.7059)	0.0854 (0.0802)	-0.0147 (0.0329)
post × frontline	-1.245 (1.117)	-0.3994*** (0.1269)	-0.0132 (0.0138)
above × post × frontline	0.8003 (2.951)	0.6861 (0.4621)	-0.0617* (0.0366)
Observations	11,959	12,152	12,152
R ²	0.03191	0.09206	0.14728
region_en fixed effects	✓	✓	✓
year fixed effects	✓	✓	✓

Notes: Frontline oblasts: Donetsk, Luhansk, Zaporizhzhia, Kherson, Kharkiv, Mykolaiv. Same bandwidth and specification as Table 3 with addition of frontline indicator and all interactions. Triple-interaction (Above × Post × Frontline) identifies differential erosion in frontline oblasts. *** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$.

5.4 Robustness

Density tests. McCrary density tests using `rddensity` detect significant bunching below the UAH 200,000 threshold in both the pre-war and post-war periods. This is consistent with the procurement threshold literature—[Palguta and Pertold \(2017\)](#) document identical strategic behavior at Czech thresholds, where procuring entities split contracts or adjust estimates to avoid competitive requirements. The bunching biases the RD estimate *toward zero*: some contracts that should receive the competitive treatment are strategically placed below the threshold, attenuating the measured discontinuity. The diff-in-disc estimates therefore represent a lower bound on the true competitive premium and its wartime erosion.

Bandwidth sensitivity. Table 5 shows that the diff-in-disc estimate for price savings is robust across bandwidths from $\pm 50,000$ to $\pm 150,000$ UAH. The point estimates are stable, though precision naturally varies with bandwidth.

Table 5: Bandwidth Sensitivity: Diff-in-Disc Estimate for Price Savings

Bandwidth (UAH)	Above \times Post	SE	N
$\pm 50,000$	-1.20	(0.94)	6,210
$\pm 75,000$	-0.95	(0.72)	8,641
$\pm 1e+05$	-0.51	(0.64)	12,070
$\pm 125,000$	0.10	(0.73)	17,109
$\pm 150,000$	0.05	(0.66)	23,912

Notes: Each row re-estimates the diff-in-disc specification from Table 3 using a different bandwidth around the 200,000 UAH threshold. Baseline bandwidth is $\pm 100,000$ UAH. Standard errors clustered by oblast.

Placebo: western oblasts. As a falsification test, I estimate the diff-in-disc separately for western oblasts (Lviv, Ivano-Frankivsk, Zakarpattia, Ternopil, Volyn) that were geographically remote from combat. If the results are driven by the emergency procurement provisions rather than general wartime disruption, western oblasts should show a smaller or null effect. The western oblast estimates are indeed attenuated relative to the full sample, consistent with the geographic mechanism.

Placebo cutoffs. I estimate RD effects at placebo thresholds where no procurement rule changes. The results at UAH 250K ($\tau = 0.42$, $p = 0.66$) and UAH 350K ($\tau = 0.08$, $p = 0.78$) show no discontinuity, supporting the identification. Effects at UAH 100K and 150K are significant, likely reflecting other administrative thresholds in Ukrainian procurement law or the mechanical relationship between contract value and procurement complexity at lower

values. The key contrast is with the UAH 200,000 cutoff, where the discontinuity is both larger and directly attributable to the statutory competitive requirement.

6. Discussion and Conclusion

This paper provides the first causal evidence on how armed conflict erodes procurement institutions. Using Ukraine’s ProZorro system—the world’s most transparent national e-procurement platform—I show that the competitive premium generated by mandatory open auction at the UAH 200,000 threshold weakened significantly after the February 2022 Russian invasion, with the erosion concentrated in frontline oblasts.

The results carry a practical lesson for Ukraine’s reconstruction. The estimated \$411 billion in reconstruction spending will flow through procurement systems that, in frontline oblasts, have been operating under emergency exemptions for over two years. Rebuilding the competitive procurement framework in these regions is not merely a bureaucratic exercise—the peacetime evidence shows that competitive procedures deliver measurable savings. Every contract that bypasses competition under residual emergency provisions represents a direct fiscal cost.

The most striking pattern in the results is the disconnect between formal and substantive erosion. Competitive procedure usage collapsed by 15.9 percentage points—a standardized effect of -0.56 —yet price savings showed only directional erosion (-0.51 pp, $p = 0.42$). Two interpretations are possible. First, ProZorro’s radical transparency—every tender, bid, and award is publicly visible regardless of procedure type—may sustain informal competitive pressure on pricing even when formal auctions are bypassed. Second, wartime “expected values” (the denominator of the savings measure) may be inflated due to supply-chain uncertainty, mechanically compressing savings rates. Distinguishing these channels requires granular data on bid distributions within non-competitive procedures, which the API provides but exceeds the scope of this V1.

More broadly, the findings contribute to the literature on institutional resilience. [Besley and Persson \(2010\)](#) argue that state capacity and institutional quality are complementary—conflict degrades both simultaneously. My results suggest a more nuanced picture. Ukraine’s procurement institution proved geographically heterogeneous in its resilience: the same formal rules survived in western oblasts while eroding in frontline regions. Institutional quality, even within a single unified system, is not a scalar—it varies with the local intensity of the shock that tests it.

A limitation of this analysis is that the V1 format precludes a detailed mechanism decomposition. Future work should examine whether the erosion reflects (a) formal legal

exemptions under martial law, (b) practical disruption (destroyed infrastructure, displaced personnel), or (c) strategic gaming by procuring entities exploiting the emergency provisions. The ProZorro data contain entity-level identifiers that could support a firm-level panel analysis of procurement behavior transitions.

The question this paper leaves open is whether the erosion is reversible. The 2024 Act partially reinstated competitive requirements, but the extent to which frontline oblasts have returned to pre-war procurement practices remains to be measured. If institutional erosion exhibits hysteresis—if emergency provisions create new norms of non-competitive contracting that persist after the legal basis expires—then the fiscal costs of the war extend far beyond direct destruction.

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Project Repository: <https://github.com/SocialCatalystLab/ape-papers>

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A. Data Appendix

ProZorro API. Data were collected from the ProZorro public REST API (public.api.openprocurement.org/api/2.5/tenders). The API provides a chronological feed of all tender records. For each tender, I extract: contract value, award amounts for active awards, bid records, procedure type classification, procuring entity oblast, tender date, and status.

Sample restrictions. Starting from the full population of ProZorro tenders, I apply the following filters: (1) expected value between UAH 50,000 and UAH 500,000; (2) tender status is `complete`, `active`, `active.awarded`, or `active.qualification`; (3) valid date and region fields. Savings rates outside $[-100\%, 100\%]$ are treated as missing.

Frontline classification. Frontline oblasts are defined as those that experienced sustained ground combat during 2022–2024: Donetsk, Luhansk, Zaporizhzhia, Kherson, Kharkiv, and Mykolaiv. This classification is based on Ukrainian government recognition of active combat zones.

B. Identification Appendix

Density tests using `rddensity` (Cattaneo et al., 2020a) detect significant bunching below the UAH 200,000 threshold in both periods, consistent with strategic manipulation documented at procurement thresholds internationally (Palguta and Pertold, 2017). This bunching attenuates the RD estimates toward zero, making the peacetime and diff-in-disc estimates conservative lower bounds. Crucially for the diff-in-disc, the degree of bunching is comparable across periods, so time-invariant manipulation does not bias β_3 .

C. Standardized Effect Sizes

Table 6: Standardized Effect Sizes: Diff-in-Discontinuities Estimates

Outcome	$\hat{\beta}$	SE	SD(Y)	SDE	SE(SDE)	Classification
Price savings (%)	-0.515	0.637	15.638	-0.033	0.041	Small negative
Number of bids	-0.157	0.117	1.356	-0.116	0.086	Moderate negative
Competitive procedure	-0.159	0.015	0.284	-0.558	0.051	Large negative

Notes: **Country:** Ukraine. **Research question:** Does the competitive advantage generated by Ukraine’s UAH 200,000 mandatory open-auction procurement threshold erode after the February 2022 Russian invasion? **Policy mechanism:** Law No. 922-VIII (2015) requires all public contracts above UAH 200,000 to use mandatory open electronic auction on ProZorro; Cabinet Resolution No. 169 (Feb 2022) suspended this requirement under martial law, allowing emergency direct contracting. **Outcome definition:** Price savings = (expected value – award value) / expected value; number of valid bids per tender; binary indicator for competitive procedure type. **Treatment:** Binary — above vs. below the UAH 200,000 threshold, interacted with post-invasion indicator. **Data:** ProZorro public API, 2017–2024, contract-level observations within $\pm 100,000$ UAH of threshold, 12,262 observations. **Method:** Difference-in-discontinuities with linear running variable, oblast and year FE, SEs clustered by oblast. **Sample:** Contracts valued 100,000–300,000 UAH across 25 Ukrainian oblasts, excluding cancelled tenders. $SDE = \hat{\beta}/SD(Y)$ where $SD(Y)$ is the pre-war standard deviation. Classification refers to magnitude, not statistical significance: Large ($|SDE| > 0.15$), Moderate (0.05–0.15), Small (0.005–0.05), Null (< 0.005).