Renegotiation in Public Procurement

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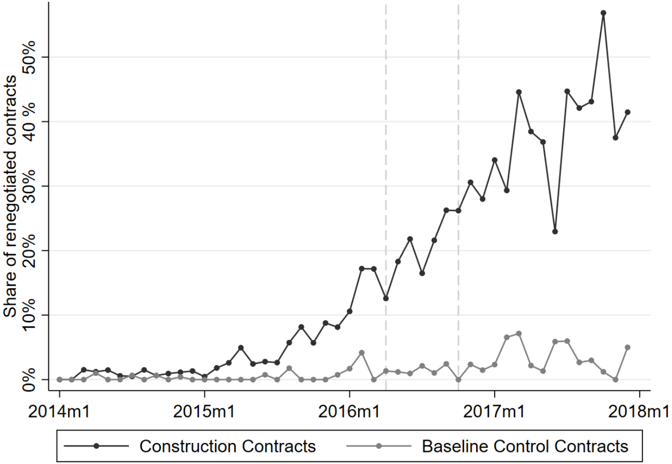
Background

- 12% of GDP and roughly 25% of general government spending in OECD countries
- Often incomplete contracts with a need for renegotiation
- Czech policy reform in 2016
  - Made renegotiation among construction contracts easier
  - Affected already awarded contracts

Preview of Results

- Develop a theoretical model to study the role of renegotiation in public procurement
- Use a change in renegotiation rules in Czechia
- Show that the possibility of renegotiation:
  - decreased the average winning bids by 3 p.p. of the estimated price
  - increased the final price only if firms could not adjust their bidding strategy (by 2.1 p.p. of the estimated price)
  - did not change the final price if firms could adjust their bidding strategy

Share of Contracts Renegotiated by Industry over Time

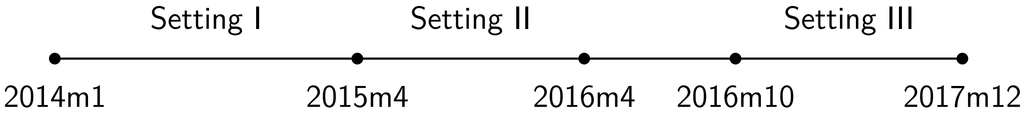


Research Questions

Did the possibility of renegotiation . . .

- lead firms to adjust their bidding strategies?
- increase the final price (= after renegotiation) of contracts?
- change the allocation of contracts?

Reform and Three Settings



Setting I: baseline; no renegotiation possible
Setting II: renegotiation become possible after the contract was awarded
Setting III: firms know renegotiation will be possible when bidding

Model I

- *First-price sealed bid auction*, where bidders face an idiosyncratic probability of cost overrun
- Equilibrium: risk-neutral bidder bids the **expected** second-lowest **cost**, depending on this bidder having lowest cost

Model II

- **Setting I:** $\textit{Expected Cost} = \textit{Baseline Cost} + \text{Prob}(\textit{Cost Overrun})*\textit{Cost Overrun}$
- **Setting II:** the same bid/Expected Cost
- **Setting III:** $(\textit{Net})\ \textit{Expected Cost} = \textit{Baseline Cost} + \text{Prob}(\textit{Cost Overrun})*(\textit{Cost Overrun} - \textit{Renegotiation Profit})$
  - *Renegotiation Profit* depends on the bargaining power
  - Higher bargaining power $\Rightarrow$ lower bid

Model Predictions

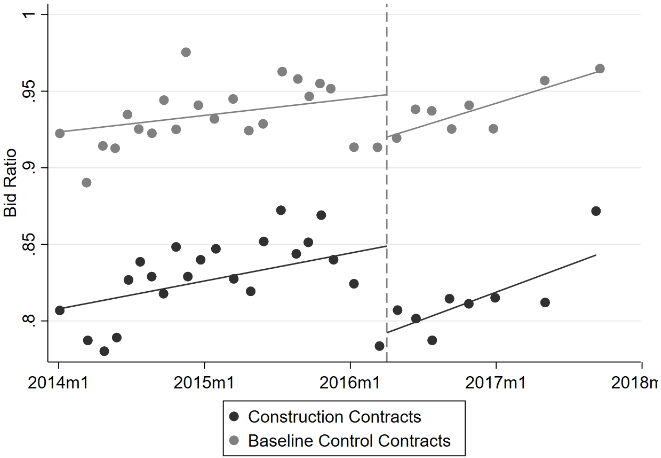
	Setting I compared to II	Setting II compared to III
Probability of renegotiation	$\Pi_{II} > \Pi_{I} = 0$	$\Pi_{III} > \Pi_{II}$
Average winning bid	$E[p^A_{II}] = E[p^A_{I}]$	$E[p^A_{III}] < E[p^A_{II}]$
Average final price	$E[p_{II}] > E[p_{I}]$	$E[p_{III}] \lesseqgtr E[p_{II}]$

Difference-in-Differences Specification

- Outcomes: $\textit{Bid Ratio} = \frac{\textit{Winning Bid}}{\textit{Estimated Price}}$ and $\textit{Price Ratio} = \frac{\textit{Final Price}}{\textit{Estimated Price}}$
- Treatment group: construction contracts
- Control group: other contracts (Machinery, Transport, Energy...)
- Post-treatment: T = 1 for observations from subsequent Setting

$$y = \delta_1 \; T + \delta_2 \; \textit{Construction} + \beta \; \textit{Construction} * T + \gamma X + \varepsilon, \tag{1}$$

Bid Ratio in Construction and Non-construction Contracts



Decrease in the Average Winning Bid

	(1) Bid Ratio	(2) Bid Ratio	(3) Bid Ratio
T=1	0.003	0.007	0.010**
	(0.005)	(0.005)	(0.005)
Construction=1	-0.113***		
	(0.003)		
T=1 × Construction=1	-0.026***	-0.031***	-0.032***
	(0.006)	(0.006)	(0.006)
Industry FE	No	Level 4	Level 6
N	13572	13502	13263

Standard errors in parentheses

* $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$

- **Firms bid 3 p.p. of the expected cost lower** as a consequence of the reform allowing renegotiation.

Increase in Final Price between *Settings I* and *II*

	(1) Price Ratio	(2) Price Ratio	(3) Price Ratio
T=1	0.0146***	0.0102*	0.0113*
	(0.0055)	(0.0057)	(0.0060)
Construction=1	-0.127***		
	(0.0045)		
T=1 × Construction=1	0.0141**	0.0211***	0.0162**
	(0.0069)	(0.0070)	(0.0073)
Industry FE	No	Level 4	Level 6
N	9182	9109	8871

Standard errors in parentheses
* $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$

- Allowing renegotiation in the period when firms didn't take the possibility into account while bidding leads to **a 1.6 p.p. price increase**.

Decrease in Final Price between *Settings II* and *III*

	(1) Price Ratio	(2) Price Ratio	(3) Price Ratio
T=1	0.00448	0.00643	0.0115
	(0.0071)	(0.0074)	(0.0081)
Construction=1	-0.113***		
	(0.0052)		
T=1 × Construction=1	-0.0136	-0.0204**	-0.0214**
	(0.0095)	(0.0097)	(0.0104)
Industry FE	No	Level 4	Level 6
N	5218	5137	4950

Standard errors in parentheses

* $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$

- Subsequently, **the price decreases to (roughly) its previous levels**.

No effect on Final Price between *Settings I* and *III*

	(1) Price Ratio	(2) Price Ratio	(3) Price Ratio
T=1	0.0215***	0.0210***	0.0243***
	(0.0071)	(0.0074)	(0.0082)
Construction=1	-0.128***		
	(0.0047)		
T=1 × Construction=1	-0.000177	-0.00429	-0.00779
	(0.0095)	(0.0098)	(0.0104)
Industry FE	No	Level 4	Level 6
N	6996	6919	6712

Standard errors in parentheses

* $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$

- **The overall effect** of allowing renegotiation on **the final price is 0.**

Renegotiation Changed Allocation of Contracts

Model: bargaining power $\Rightarrow$ lower bids and more renegotiation.

Propensity to Renegotiate = the share of renegotiated contracts on all contracts supplied by the firm at hand before the reform.

We define for firms with high propensity ($>$ 90 percentile) and test:
$High\ Propensity \sim Setting\ 3$

19% higher chance of winning for High Propensity firms after the reform ($t - stat = 11$)

Next steps? Study the characteristics of the firms that win more after the reform (productivity etc.).

Conclusion

- The possibility of renegotiation decreases the average winning bid among construction contracts
- The final price increases temporarily
- No effect on the final price (no information about quality etc. yet)
- Good re-negotiators replace other firms