Manipulation of Procurement Contracts: Evidence from the Introduction of Discretionary Thresholds

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Introduction

- It has been recognized that giving high discretion to public officials can adversely affect public service provision.

- Public servants can abuse discretionary power to pursue their private interests vs. bureaucrats can use valuable information about the provision of public services.

- Trade-off in open auctions:
- Increase transparency, boost competition and promote equal access among potential contractors vs. reduction in flexibility and generation of additional administrative and time costs

- Many countries use thresholds (US, EU): If the anticipated value of procurement does not exceed a certain threshold, procurement can be allocated using flexible contract-allocation procedures - firms selected by the officials submit their bids

Research Questions

Do legislative thresholds affect public officials' decisions regarding:

- **the value of a given procurement**
- **the selection of a contractor**

Motivation

- 40 % of the total value in European construction works procurement is below the threshold level

- The expenditures under the US simplified acquisition threshold (excluding micro-purchases) totaled about USD 19 billion in 2014

Institutional Background

- Before 2006 Czech procurement agencies had to run open auctions in wide range of procurement values
- The reform of July 2006 introduced a new type of simplified negotiating - introduced several new thresholds into the procurement code
- If the anticipated value of the procurement was set below the threshold, the officials were allowed to autonomously approach potential contractors themselves instead – save time and administration costs
- Thresholds differ for construction work, goods and services
- Procuring agencies estimate the anticipated value on their own
- Czech Republic: high corruption, weak oversight, low accountability of public officials

Data

- Data on public procurement contracts from public registry includes the characteristics of all the procurements awarded in the Czech Republic from 2005 to 2010
- Over 46, 000 procurement contracts, the total procurement value 1,043 billion (approximately USD 52.2 billion).
- Characteristics of the procured goods/ services/ construction works, type of contract-awarding process, the characteristics of procuring agencies, the anticipated value and the final contractual price of procurements.
- Winning suppliers (ownership structure of winners, size – workers, capital structure)

Descriptive Statistics

Characterization:	January 2005 - June 2006		July 2006 – Dec 2010	
	Volume (CZK billion)	(%)	Volume (CZK billion)	(%)
By main object:				
- Goods	21.56	12.45	102.71	11.87
- Services	37.87	21.87	192.17	22.21
- Construction works	113.71	65.68	570.33	65.92
By procurement procedure:				
- Open	146.52	84.58	580.45	68.00
- Restricted	26.69	15.42	82.23	9.63
- Simplified Negotiations or Negotiations with Prior Public Notice	N/A*	N/A*	98.56	11.55
- Negotiations without Prior Public Notice	N/A*	N/A*	92.36	10.82
By procuring agency type:				
- National Procurers	117.89	68.09	560.63	64.80
- Regional Public Bodies	55.25	31.91	304.57	35.20
By Anonymity of Suppliers:				
- Anonymous Owner	3.26	1.88	18.78	2.17

Notes: Descriptive statistics are provided both by the number of procurement projects and by procurement volume (in billion CZK; 20 CZK ≈ 1 USD). * The N/A mark indicates the non-applicability of a statistic for a given observation period.

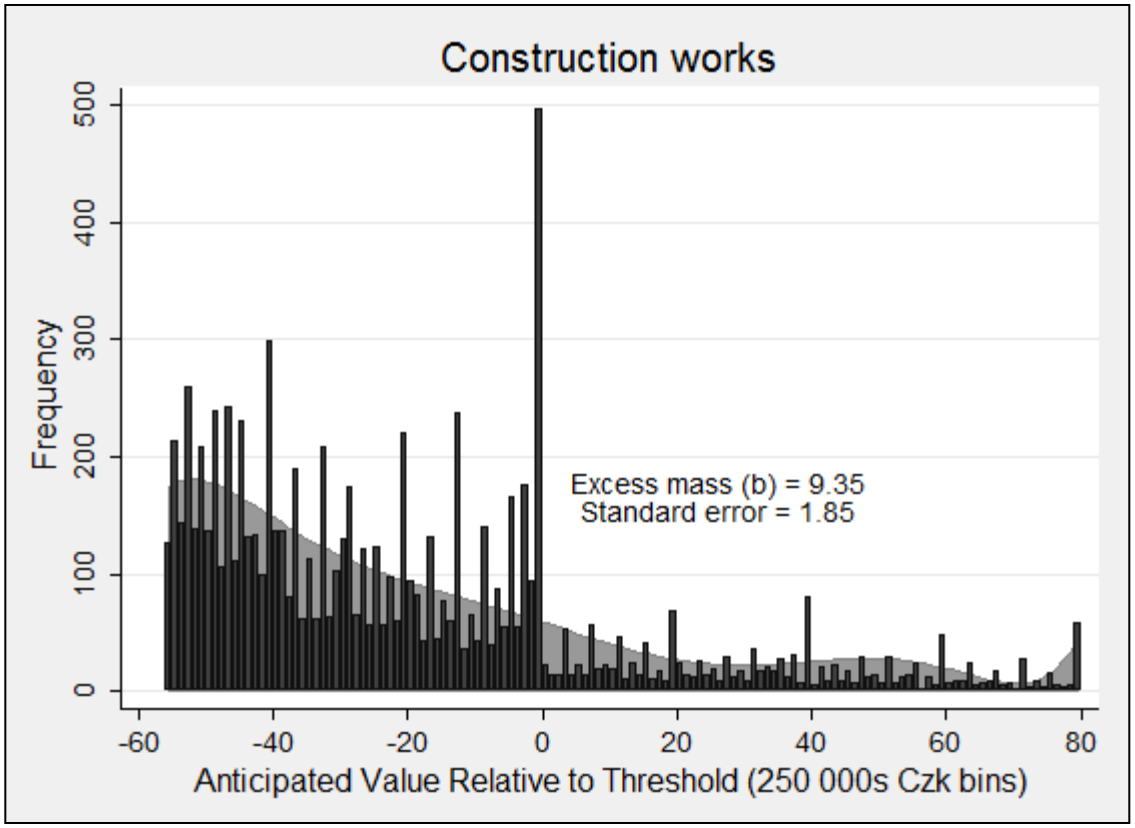
Empirical Strategy for Detecting Manipulation of Values

- Based on Chetty et al. (2011) - we focus on repeated cross-sectional density distributions of the anticipated value of procurements.
- The identification assumption: density distributions of the anticipated value would be smooth if more restrictive tendering procedures did not affect officials' behavior

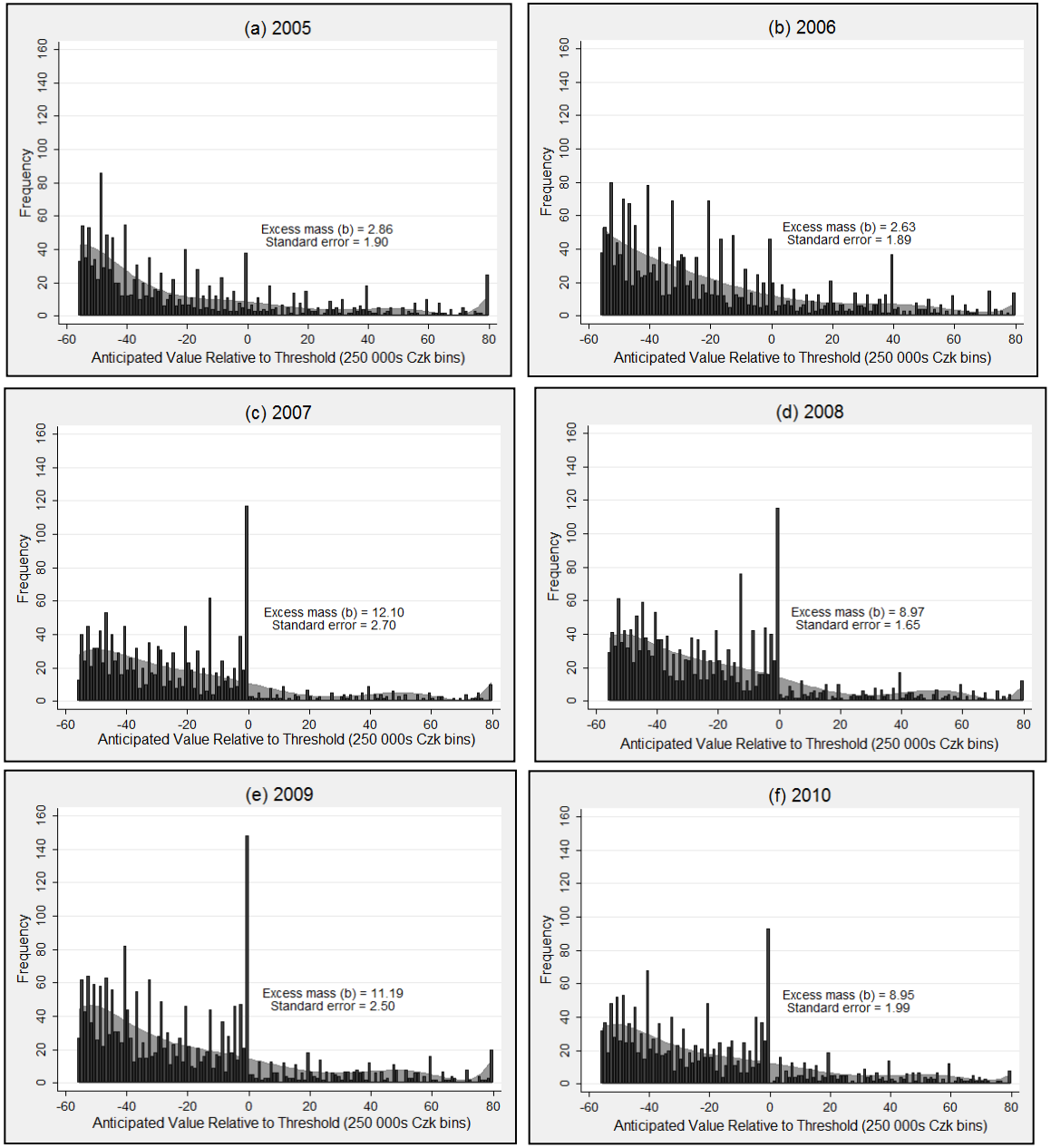
Our extension:

- relaxes the assumption of the smooth counterfactual density distribution by exploiting the timing of introducing new thresholds into the procurement system.
- We assume that the density distribution after the reform would look the same as before the reform, if the reform had not established procurement thresholds.

Anticipated value of distribution around the procurement threshold after the reform - cross-sectional analysis



Anticipated Value Density Distribution around the Procurement Threshold – Identification using Policy Change


(a) 2005
Frequency
Excess mass (b) = 2.86
Standard error = 1.90
Anticipated Value Relative to Threshold (250 000s Czk bins)
(b) 2006
Frequency
Excess mass (b) = 2.63
Standard error = 1.89
Anticipated Value Relative to Threshold (250 000s Czk bins)
(c) 2007
Frequency
Excess mass (b) = 12.10
Standard error = 2.70
Anticipated Value Relative to Threshold (250 000s Czk bins)
(d) 2008
Frequency
Excess mass (b) = 8.97
Standard error = 1.65
Anticipated Value Relative to Threshold (250 000s Czk bins)
(e) 2009
Frequency
Excess mass (b) = 11.19
Standard error = 2.50
Anticipated Value Relative to Threshold (250 000s Czk bins)
(f) 2010
Frequency
Excess mass (b) = 8.95
Standard error = 1.99
Anticipated Value Relative to Threshold (250 000s Czk bins)

Regression results

TABLE 1

Estimated Excess Mass below the Threshold by Year and Main Object

	Construction Works		**Goods**		**Services**	
Year	Excess Mass Estimates	SE	Excess Mass Estimates	SE	Excess Mass Estimates	SE
2005	2.861	[1.902]	0.410	[0.552]	- 0.025	[0.577]
2006	2.628	[1.891]	1.635***	[0.257]	0.800***	[0.294]
2007	12.100***	[2.697]	1.389***	[0.427]	3.162***	[0.460]
2008	8.965***	[1.651]	1.799***	[0.494]	2.121***	[0.478]
2009	11.190***	[2.504]	1.901***	[0.522]	2.503***	[0.561]
2010	8.954***	[1.990]	2.362***	[0.360]	2.852***	[0.371]

Table 5 shows the estimates of excess masses of contracts bunched by their anticipated value below the thresholds for simplified negotiations, estimated using equation (1). Legislative reform that established new thresholds into the procurement legislation occurred in midyear 2006. A seventh-degree polynomial and CZK 750,000 excluded window located just below the threshold were used to predict the counterfactual density of the anticipated value of procurements. Estimates represent the estimated excess mass of contracts relative to the average density at thresholds. Standard errors are presented in brackets. ***Estimates significant at the 1% level.

Before-after Identifications

Estimates of Excess Mass below the Threshold Using a Fixed-Effects Strategy

	Construction	**Goods**	**Services**
$\hat{\gamma}_{-1}$	0.942***	0.758***	1.037***
	[0.038]	[0.057]	[0.064]
$\hat{\gamma}_{-2}$	1.478***	0.295***	0.006
	[0.038]	[0.057]	[0.064]
$\hat{\gamma}_{-3}$	1.205***	0.571***	0.188***
	[0.038]	[0.057]	[0.064]
Histogram Bin FE	YES	YES	YES
Year FE	YES	YES	YES
N	816	990	996

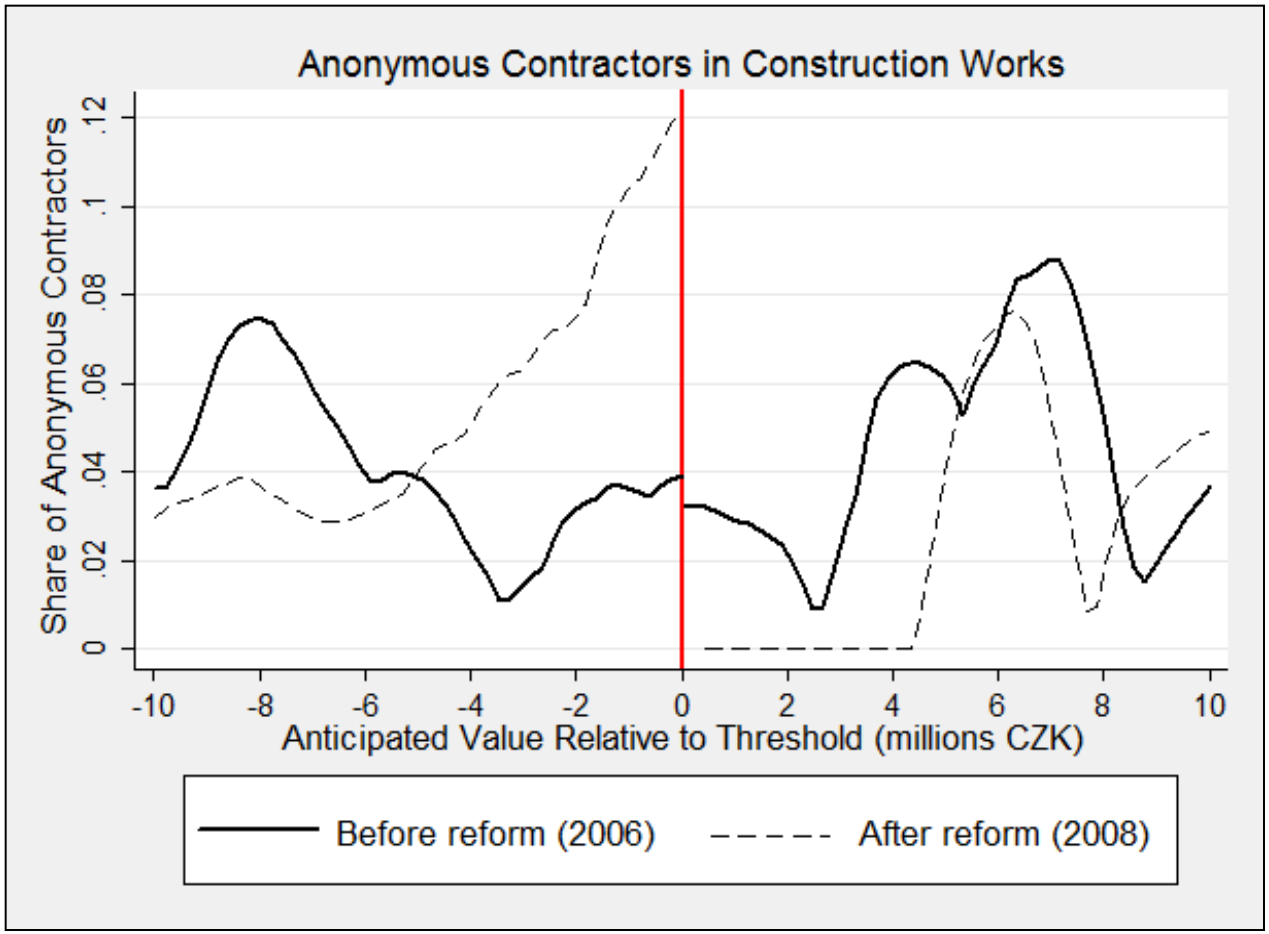
Table 6 reports the estimates of excess masses of contracts bunched by their anticipated value below thresholds estimated using equation (5) and Poisson conditional fixed-effects QML. The basic unit of observation in all the regressions is a histogram bin from empirical annual distributions of the anticipated value of contracts. The number of contracts awarded in each bin and year serves as the outcome variable that is regressed on the interaction between the indicator for bins located just below the thresholds (R=3) and indicator for validity of the 2006 reform. All regressions include histogram bin fixed effects and annual fixed effects. Coefficient estimates are interpreted as (exp($\hat{\gamma}_i$)-1)*100 percentage change. Robust standard errors, clustered at the histogram bin level, are presented in brackets, *** p<0.01, ** p<0.05, * p<0.1

Manipulation Detections – Discussion

- All methods can not reject bunching of procurements projects below the threshold
- Several robustness checks (inflationary adjusted thresholds, alternative density test support the results)
- The manipulation is to largest among construction projects and services

Further question: How is the manipulation related to the selection of suppliers?

Share of Construction Contracts Awarded to Anonymous Firms, by Year



The Manipulation with Values and the Choice of Supplier

The Impact of Manipulation on Contractor Choice

Outcome variable: Indicator that Contractor is Anonymously Owned						
	Construction works		**Services**		**Goods**	
Contracts in Bins Just below D x 2006 Reform	.027** [.012]	.029** [.012]	.011* [.006]	.013* [.008]	-.006 [.015]	-.004 [.015]
Histogram Bin FE	YES	YES	YES	YES	YES	YES
Year FE	YES	YES	YES	YES	YES	YES
Procurement Procedure Dummies	NO	YES	NO	YES	NO	YES
Procurement Subject (CPV code) Dummies	NO	YES	NO	YES	NO	YES
R^2	0.01	0.01	0.06	0.11	0.02	0.04
N	11,863	11,585	7,118	7,017	7,494	7,398

What do we know about anonymous firms?

Contractor Characteristics, by Type of Ownership

	All companies	**Traceable companies**	**Anonymous companies**	**Difference**
Capital stock (mill. CZK) [a] (S.D.)	334	396	78.2	- 317.8**
Median year of incorporation [b]	1997	1996	1999	***
Number of employees [C]				
- 0 – 24 employees	28.77	25.04	44.04	+19.0***
- 25 – 99 employees	32.46	34.48	24.19	-10.3***
- 100 – 249 employees	17.36	18.96	10.83	-8.13***
- 250 – 999 employees	12.83	13.49	10.11	-3.38*
- 1000 and more	4.61	5.20	2.17	-3.04**
- not specified	3.97	2.82	8.66	+5.84***

Manipulation and the Selection of Suppliers - Summary

- Anonymous firms are three times more likely to be selected after the reform in construction
- This is in line with the active waste and potential collusion of supplier and public procurement official
- Hard to explain by efficiency reasons – anonymous firms do not offer higher quality and are more likely empty shells
- How does not procurement allocated to anonymous firms look like?

Anonymous Firms and Contractual Price

Anonymous Contractors and Procurement Prices

Outcome variable: Difference Between the Contractual Price and Anticipated Value of Procurement (in % of Anticipated Value)						
	Construction works		**Services**		**Goods**	
Contracts in Bins Just below D x Anonymous Firm	.082**	.089***	.084***	.063**	-.066	-.051
	[.034]	[.029]	[.026]	[.029]	[.045]	[.053]
Anonymous Firm	-.016	-.014	-.000	.019	.045	.033
	[.018]	[.015]	[.026]	[.024]	[.035]	[.041]
Histogram Bin FE	YES	YES	YES	YES	YES	YES
Year FE	YES	YES	YES	YES	YES	YES
Procurement Procedure Dummies	NO	YES	NO	YES	NO	YES
Procurement Subject (CPV code) Dummies	NO	YES	NO	YES	NO	YES
R^2	0.01	0.06	0.04	0.05	0.01	0.01
N	8,241	7,976	6,069	5,971	6,051	5,958

Notes: The estimates multiplied by 100 can be interpreted as percentage point changes. Robust standard errors, clustered at the bin level, are presented in brackets, *** p<0.01, ** p<0.05, * p<0.1.

Main Findings

- Using natural experiment in the Czech Republic we provide evidence how legislative thresholds
  - lead to behavioral distortions of public officials mainly in construction and services
  - Distortions are revealed by bunching of procurement values just below the thresholds
  - Manipulation of procurement values is associated with an increased probability that procurements with higher contractual price are allocated to firms hiding their owners

- We illustrate how endogenous sorting below discretionary thresholds may invalidate regression discontinuity designs previously used in the literature

Concluding Remarks and Policy Implications

- We provide evidence and methodology for detecting manipulation and its association with the selection of winning firms and final price
- Manipulation is associated with the increase in the probability of awarding contracts to firms with concealed owners by 8 percentage points and a further increase in the final price of procurements by 8 percentage points
- Policy implications: we should be worry about too much discretion of public officials especially when stakes are high and corruption is prevalent
- Open competition leads to more optimal allocation of contracts
- Legislation should not introduce threshold with substantial differences in rules above and below

Thank you for your attention

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