Competition and Contract Performance
Evidence from U.S. Defense Procurement

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Contracting and Competition

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    - The Department of Defense alone grants contracts for $500 billion

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- Importantly, this reasoning assumes the unit of transaction is a commodity, and that there is no heterogeneity between contractors other than costs.

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    (from 1983 hearings before the Senate)

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- If contracts are relatively complex, negotiations with only qualified vendors, are superior to competitive bidding (Goldberg 1977, Bajari-McMillan-Tadelis, 2009)

- Empirical fact: buyers choose to award the majority of contracts –even the ones that are complex– using competitive bidding

    - e.g., 60% of *construction works*, 81% of *facility operations*, etc.

This Paper

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        $\rightarrow$ targeted information diffusion counteracts adverse competition effects

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        - → targeted information diffusion counteracts adverse competition effects

- We test this hypothesis by leveraging a regulation threshold on online publicity requirements:

    - Document that this policy creates a discontinuous change in the extent of competition

    - Estimate effects on contract award prices, contractor characteristics and ex-post performance

    - Exploit rich heterogeneity across contracts to assess the role of contract incompleteness

Related Literature

1. **Competition for incomplete contracts**

   Goldberg (1977); Bulow-Klemperer (1996); Bajari, McMillan and Tadelis (2008); Leffler et al. (2007)

2. **Competition Policies**

   Athey-Coey-Levin (2013), Krasnokutskaya-Seim (2011), Li-Zheng (2009, 2012)

3. **The value of discretion**

   Kelman (1990); Coviello-Guglielmo-Spagnolo (2018); Duflo- Greenstone-Pande-Ryan (2018); Bandiera-Best-Khan-Prat (2019); Kang-Miller (2018); Carril (2019)

4. **Identification leveraging policy discontinuities**

   Saez (2010), Chetty et al. (2011), Kleven Waseem (2013), Doyle (2007)

Outline

Publicizing Contract Opportunities

- Federal Acquisition Regulation (FAR Part 5) mandates "publicizing contract actions" to:
    - *"Increase competition [...] broaden industry participation [...]; and assist small businesses (and other minority groups) in obtaining contracts"*

- In particular, contracting officers are required to "synopsize" contracts expected to exceed $25,000 in `http://FedBizOpps.gov` `Website`
    - Only in 2018, the DOD publicized contract solicitations in FedBizOpps valued in $ 5.56 billion

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- In practice, public buyers:
  - Are allowed to also post solicitations expected to fall below the threshold
  - Can avoid the requirement above the threshold by filling paperwork claiming an exception on the base urgency, national security, etc.

Summary Statistics

- Data sources:
  - Federal Procurement Data System (FPDS): universe of federal contracts
  - FedBizOpps.gov: single government point-of-entry for federal contract opportunities

	Mean
Contract Characteristics	
Award Amount	21,973
Fixed-Price Contract	0.999
Competition	
Number of Offers	2.524
One Offer	0.524
Contracting Office Characteristics	
Navy	0.425
Army	0.399
Air Force	0.135
Awarded Firm Characteristics	
Foreign	0.090
Within-State Firm	0.730
Small Business	0.629
Sample	
No. of Contracts	287,977
No. of Contracting Offices	786
No. of Firms	66,462

Top Product Categories

	Goods		Services	
Rank	Name	N Contracts/year	Name	N Contracts/year
1	ADP Equipment and Software	3,005	Maintenance/Repair of Equipment	2,430
2	Medical Equipment and Supplies	2,998	Support Services (Professional)	1,187
3	Laboratory Equipment	1,643	Utilities And Housekeeping	1,096
4	Electrical Equipment Compontents	1,593	Transport, Travel, Relocation	854
5	Communication/Coherent Radiation	1,202	ADP and Telecommunications	806
6	Furniture	810	Lease/Rent Equipment	753
7	Power Distribution Equipment	697	Maintenance of Real Property	688
8	Ship And Marine Equipment	574	Education And Training	560
9	Hardware And Abrasives	530	Construct Of Structures/Facilities	335
10	Construction And Building Material	459	Social Services	286

Note: Products are classified with one of 1,918 codes, which can be aggregated into 101 categories.

Empirical Strategy

- The policy introduces a discrete jump in the share of publicized contracts at \$25,000

- We leverage this discontinuity, proceeding in two steps:

  1. We study contract price densities to:

     - Gauge the extent of contract price "manipulation"
     - Estimate effects of publicizing contracts on award prices due to increased competition
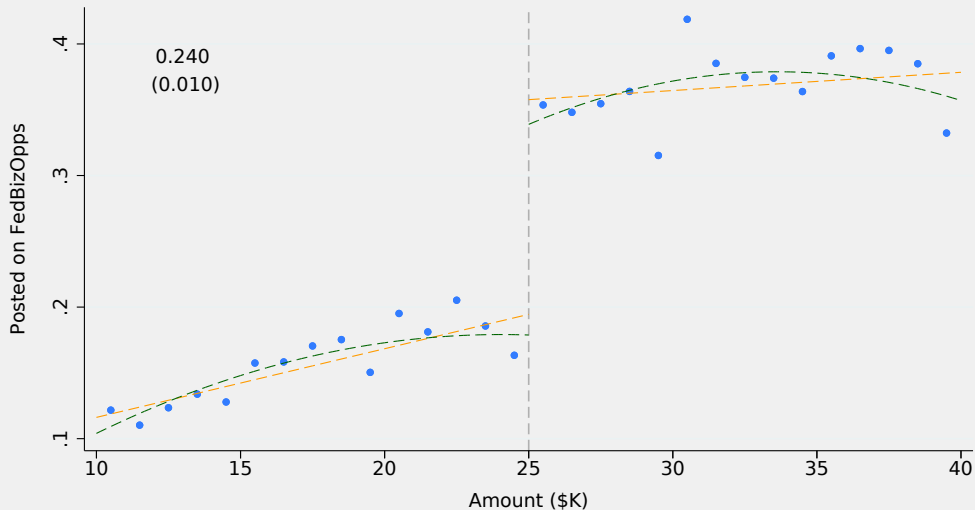
     $\rightarrow$ omitted today

     `Density Analysis` `Density Estimates` `Price Distribution`

  2. Using RDD we estimate effects of publicity on contract outcomes

- Based on these estimates, we discuss policy implications of promoting competition in this setting

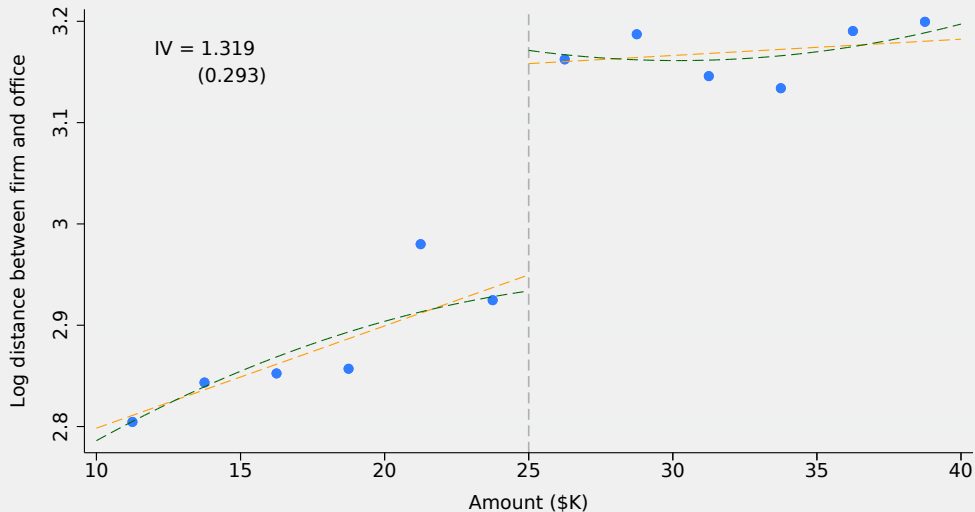# Fraction of Contracts Posted in FedBizOpps (First Stage)

RDD: Outcomes

- We estimate the effect of publicizing contract solicitations on a series of outcomes
- Different outcomes speak to different specific questions
  - Does extending information diffusion increase competition for public contracts?
    - Number of offers
  - Do characteristics of the awardee change?
    - Firm's previous history
    - Geographic location
  - How does publicity affect ex-post contract performance?
    - Performance: *delays* and *cost-overruns*

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# Intensity of Competition: Number of Offers Received
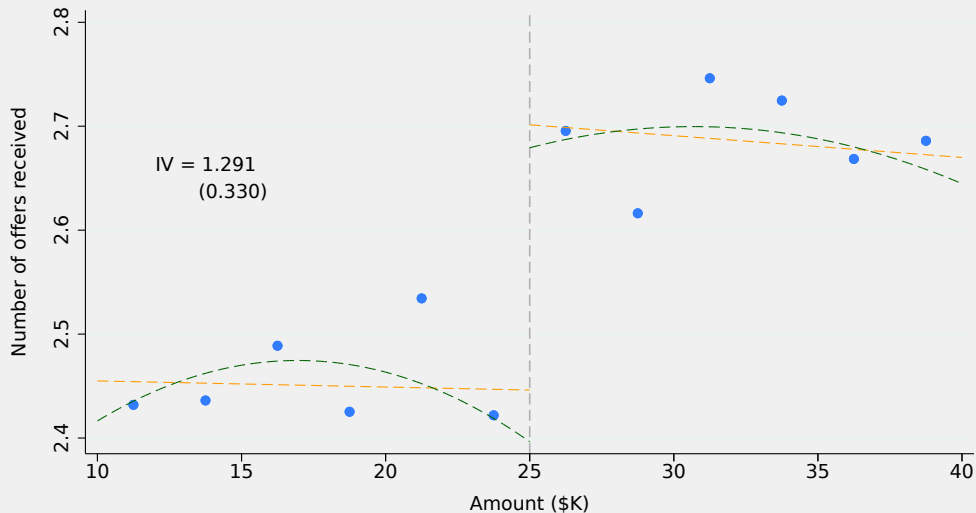
IV = 1.291
(0.330)

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Firm's History with the Office: Share of previous Dollars
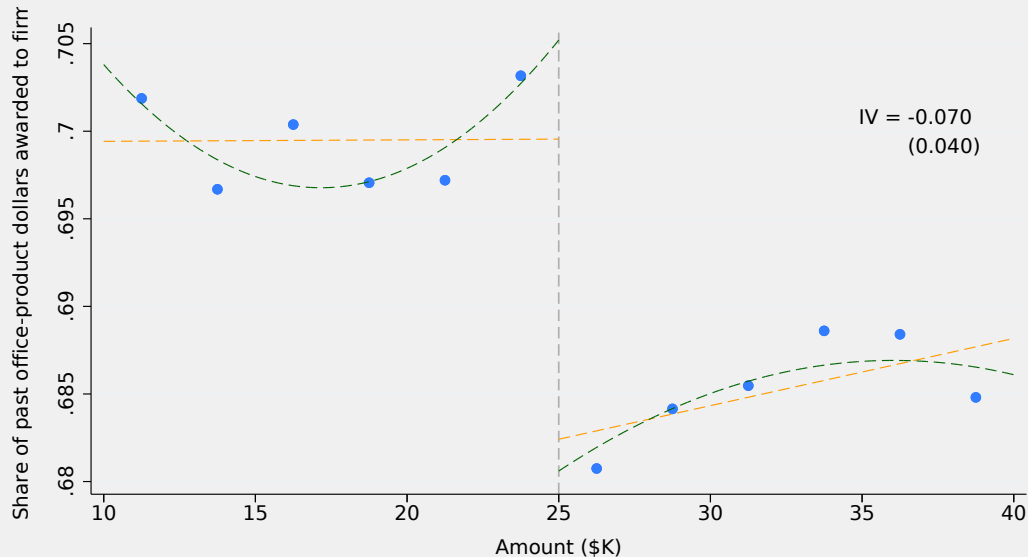
Geographic Location of the Winner: log-distance

Geographic Location of the Winner: Foreign Firm
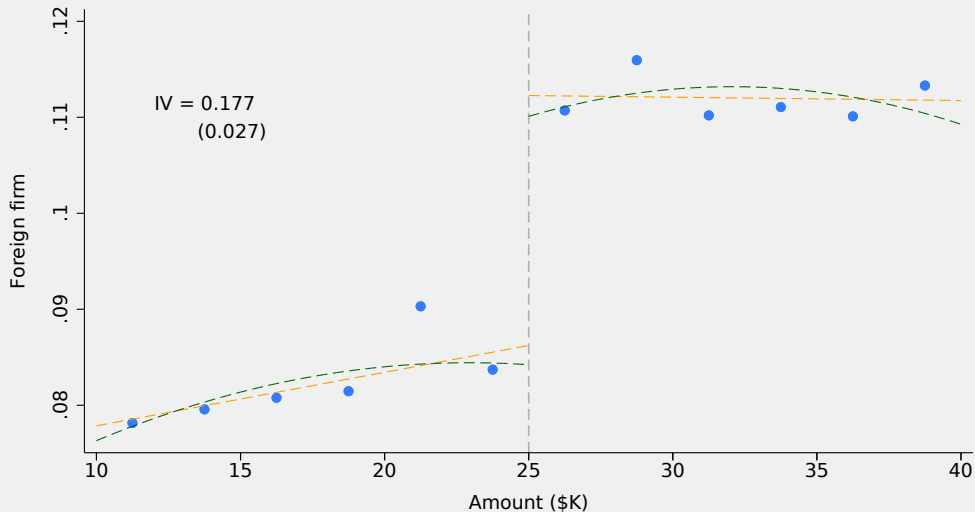
IV = 0.177
(0.027)

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    - Performance: *delays* and *cost-overruns*

Performance: Delays (in days)
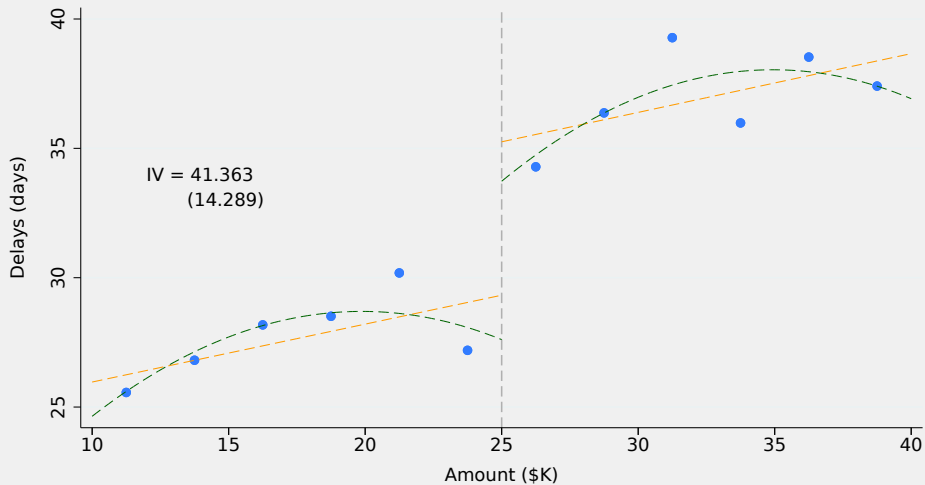
Performance: Cost Overruns
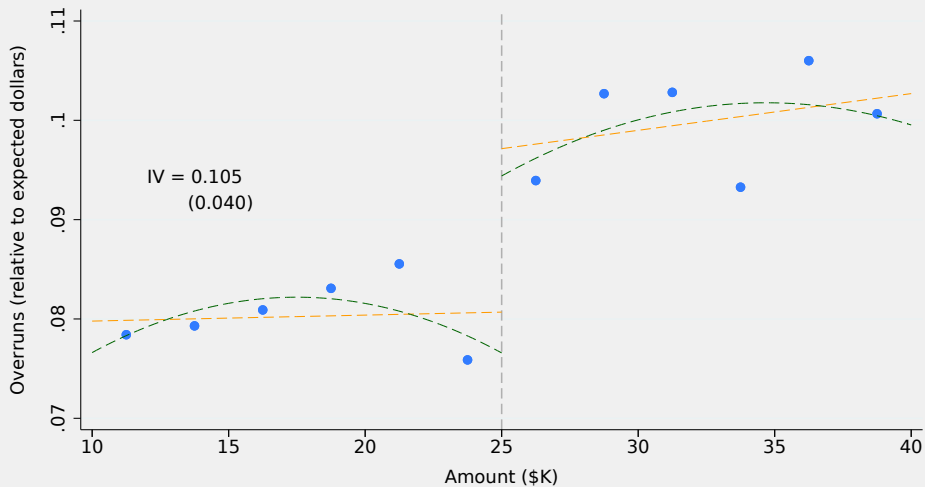
Heterogeneity on Contract Complexity

- Some products are difficult to specify into well defined contracts

- There's substantial heterogeneity on expected ex-post adaptations

		Goods			Services		
Rank	Name	Average Cost-Overrun	Average Delay	Name		Average Cost-Overrun	Average Delay
Low							
1	Fuels, Lubricants, Oils, Waxes	-0.003	0.009	Transport, Travel, Relocation		0.016	0.029
2	Musical Inst/Phonograph/Home Radio	-0.001	0.016	Construct Of Structures/Facilities		0.026	0.131
3	Valves	-0.000	0.016	Installation Of Equipment		0.027	0.090
High							
1	Chemicals And Chemical Products	0.037	0.062	Operation Of Govt Owned Facility		0.758	0.703
2	Ammunition And Explosives	0.034	0.110	Utilities And Housekeeping		0.343	0.320
3	Office Mach/Text Process/Visib Rec	0.030	0.045	Medical Services		0.270	0.269

# Performance Effects by Contract Complexity
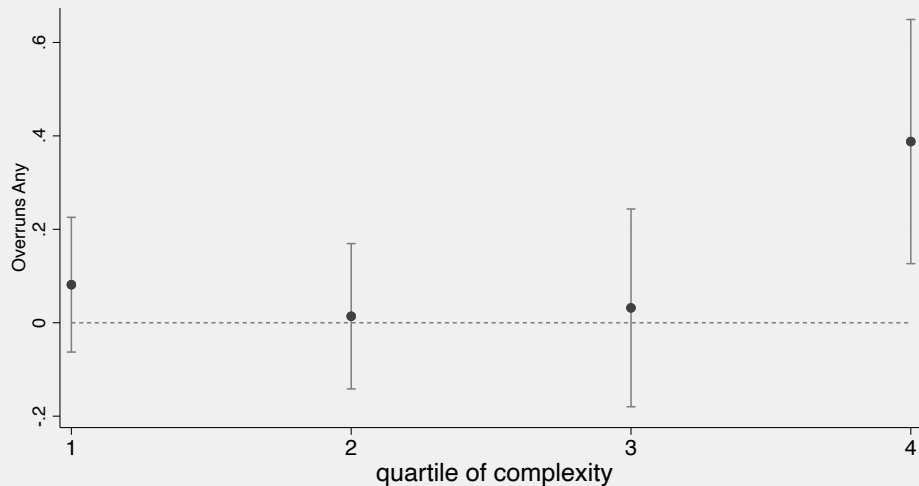
Recap

- Publicizing contract solicitations:
    - Increases competition: more offers are received
    - Reduces award prices, in average, by 2%
    - Leads to a different pool of suppliers:
        - With less previous history with the office, geographically more distant
    - And also to worst contract performance ex-post:
        - Increases in cost-overruns and delays
        - Effects are driven by goods and services that are relatively more "complex"
        - Highlights role of contract incompleteness

Tradeoff: Price Reductions Ex-Ante vs. Cost Overruns Ex-Post

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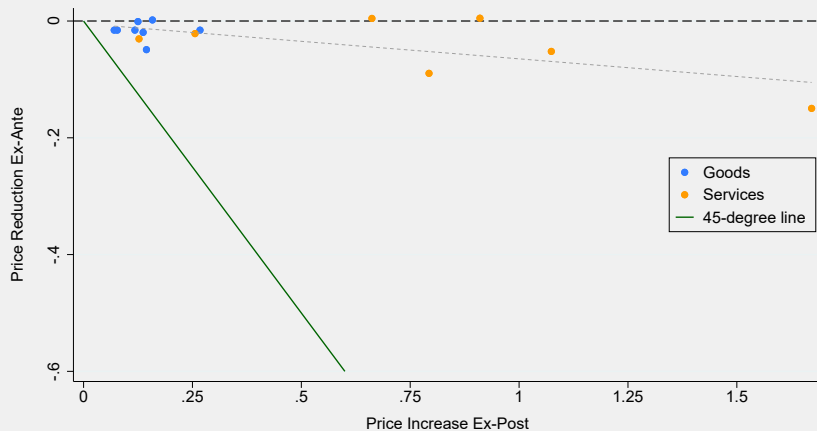
- Correlation between price reductions and increased overruns
- Reductions in prices *ex-ante* ≪ Increased costs *ex-post*!

Discussion

- From a policy perspective, the consequences of regulation that mandates contract publicity (FAR Part 5) are important:

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        $\rightarrow +$ \$111.4 million of annual spending of taxpayer's money

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- Important **heterogeneity** of publicity effects by product category

    - Emphasize the role contract complexity (incompleteness) on trade-off

    - A more "customized" policy is likely welfare enhancing

Ongoing Work

- Procurement setting is not simple; any policy improvements require a better understanding of:

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  2. Sellers' "types" and decisions

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- Ongoing work: equilibrium model to recover behavioral parameters and asses policy counterfactuals:

    1. Alternative policy designs
    2. Alternative officer's incentives

Thank you!

andres.gonzalez@berkeley.edu

Buyers: Login | Register   Vendors: Login | Register   ⊘ Accessibility

Opportunities
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1 - 20 of 98851

Opportunity	Agency/Office/Location ▼	Type ▼ / Set-aside ▼	Posted On ▲
⊘ **Blanket Purchase Agreement for Appraisals, TX, LA, & NM** W912GG19R0042 R -- Professional, administrative, and management support services	**Department of the Army** U.S. Army Corps of Engineers USACE District, Fort Worth	Presolicitation (Modified) / Total Small Business	Feb 13, 2019
⊘ **NOTICE OF INTENT TO AWARD SOLE SOURCE CONTAINERIZED RESTROOMS** N66001_SNOTE_00108D4A	**Department of the Navy** Space and Naval Warfare Systems Command SPAWAR Systems Center Pacific	Special Notice	Feb 13, 2019
⊘ **Athletic Socks** W90VNB-19-R-0008 84 -- Clothing, individual equipment & insignia	**Department of the Army** Army Contracting Command, CSBs 411TH CSB (W90VN8) RCO CAMP HUMPHREYS	Combined Synopsis/Solicitation	Feb 13, 2019
⊘ **Base Operations and Support Services (BOS) at Homestead ARB, FLA** FA664819R0001 R -- Professional, administrative, and management support services	**Department of the Air Force** Air Force Reserve Command HQ AF Reserve Command	Solicitation (Modified) / Service-Disabled Veteran-Owned Small Business	Feb 13, 2019
⊘ **W-FY19 Vehicle Lease Agreement MRF-D, Darwin, Australia** N6274219T6578 W -- Lease or Rental of equipment	**Department of the Navy** Naval Facilities Engineering Command NAVFAC Pacific, Site Thailand	Award	Feb 13, 2019
⊘ **AFICA/AFGSC Technical Order Library and Maintenance Data Support (TOLMDS) (formerly FA6800-18-R-0002)** FA6800-19-R-A001 D -- Information technology services, including telecommunications services	**Department of the Air Force** AFICA AFICA - CONUS	Combined Synopsis/Solicitation (Modified) / Total Small Business	Feb 13, 2019
⊘ **C--IDIQ CONTRACT FOR ARCHITECT-ENGINEER SERVICES FOR ARCHITECTURAL PROJECTS AT VARIOUS LOCATIONS UNDER THE COGNIZANCE OF NAVAL FACILITIES ENGINEERING COMMAND, HAWAII** N6247819R5029 C -- Architect and engineering services	**Department of the Navy** Naval Facilities Engineering Command NAVFAC Hawaii	Presolicitation (Modified)	Feb 13, 2019
⊘ **Sewing Services for Katusa Training Academy** W91QVN19R0073 J -- Maintenance, repair & rebuilding of equipment	**Department of the Army** Army Contracting Command, CSBs 411TH CSB (W91QVN) RCC YONGSAN	Combined Synopsis/Solicitation (Modified)	Feb 13, 2019

Buyers: Login | Register   Vendors: Login | Register   🔵 Accessibility

Athletic Socks
Solicitation Number: W90VN8-19-R-0008
Agency: Department of the Army
Office: Army Contracting Command, CSBs
Location: 411TH CSB (W90VN8) RCO CAMP HUMPHREYS

U.S. ARMY

| Notice Details | Packages | Interested Vendors List |

🖨 Print   📄 Link

⚠ **Note:** This opportunity allows for electronic responses. Click here to log in and submit a response.

🌐 **Original Synopsis**
Feb 13, 2019
9:54 pm

Return To Opportunities List   Watch This Opportunity
Add Me To Interested Vendors

Solicitation Number: **Notice Type:**
W90VN8-19-R-0008   Combined Synopsis/Solicitation

Synopsis:
Added: Feb 13, 2019 9:54 pm
This RFP/RFQ is for the purchase of Athletic socks, see solicitation for
requirements and additional details.

💡 Please consult the list of document viewers if you cannot open a file.

🌐 **W90VN8-19-R-0008**

Type: Other (Draft RFPs/RFIs, Responses to Questions, etc..)
Posted Date: February 13, 2019

🌐 W90VN8-19-R-0008_Solicitation_Athletic_Socks__.pdf (382.70
Kb)
Description: Solicitation

Contracting Office Address:
Unit #15289
APO, Non-U.S. 96205-5289
Korea, South

Place of Performance:

ALL FILES

🌐 W90VN8-19-R-0008 📄
Feb 13, 2019
🌐 W90VN8-19-R-0008_Sol...

GENERAL INFORMATION
Notice Type:
Combined Synopsis/Solicitation

Posted Date:
February 13, 2019

Response Date:
Feb 20, 2019 11:59 pm Eastern

Archiving Policy:
Manual Archive

Archive Date:
-

Original Set Aside:
N/A

Set Aside:
N/A

Classification Code:
84 -- Clothing, individual equipment
& insignia

NAICS Code:
316 -- Leather and Allied Product
Manufacturing/316210 -- Footwear
Manufacturing

Back

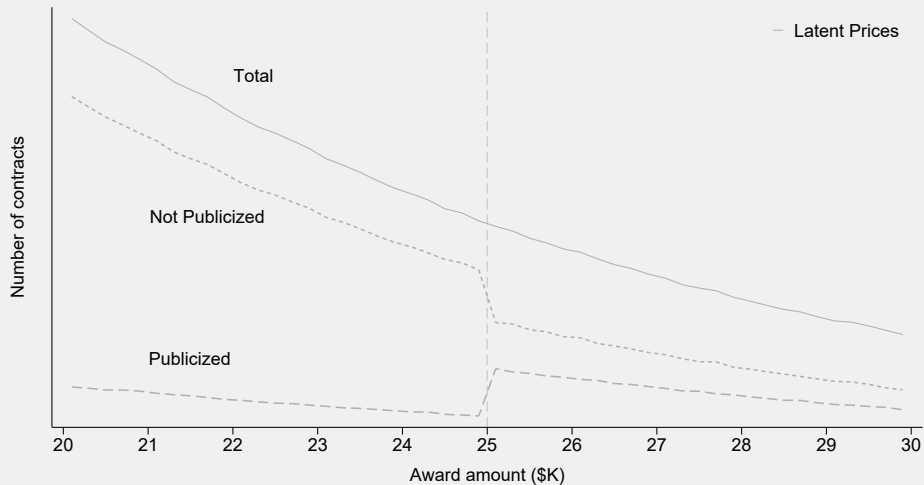# Distribution Contract Prices

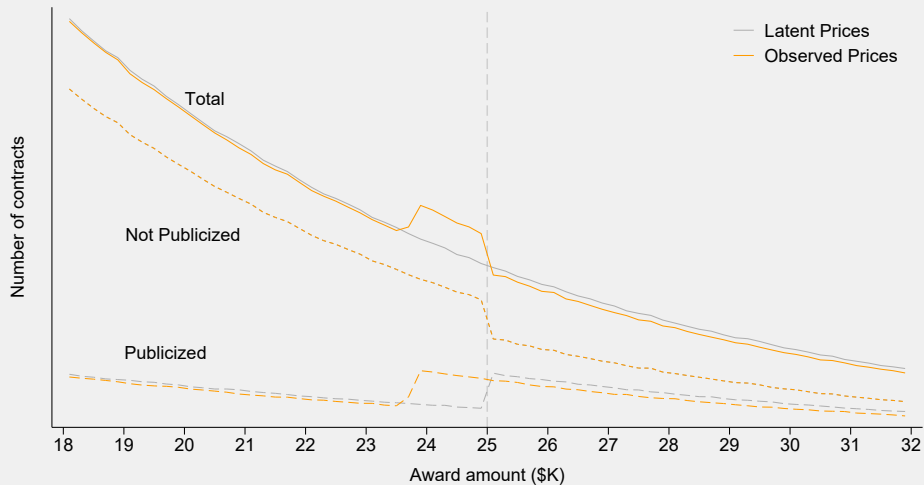# Example: Counterfactual Contract Price Distribution

Back
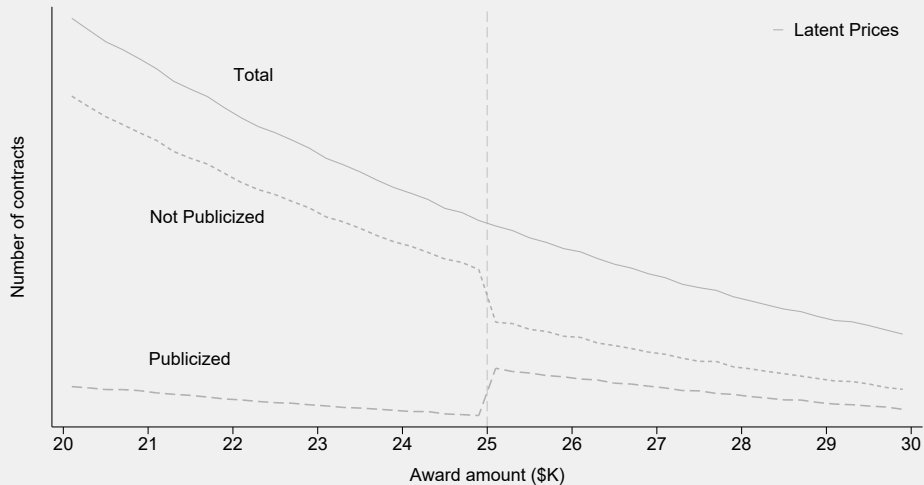
Example: Strategic Bunching
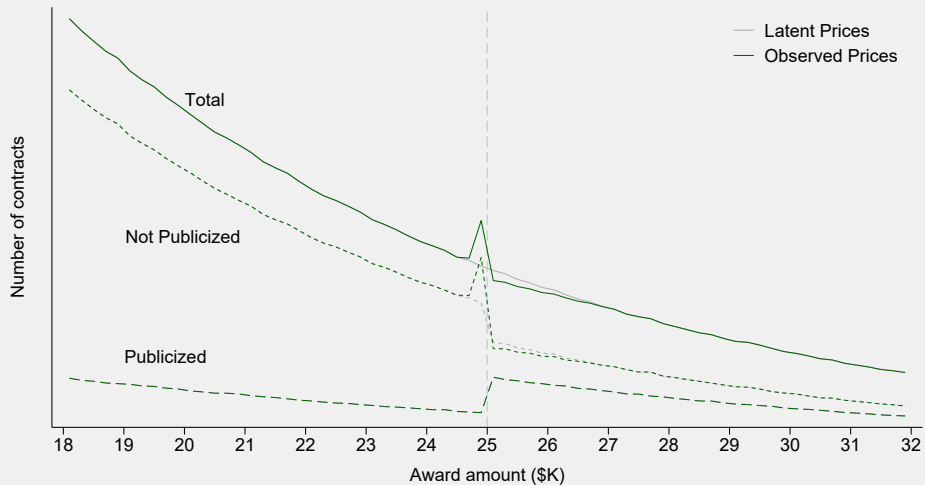
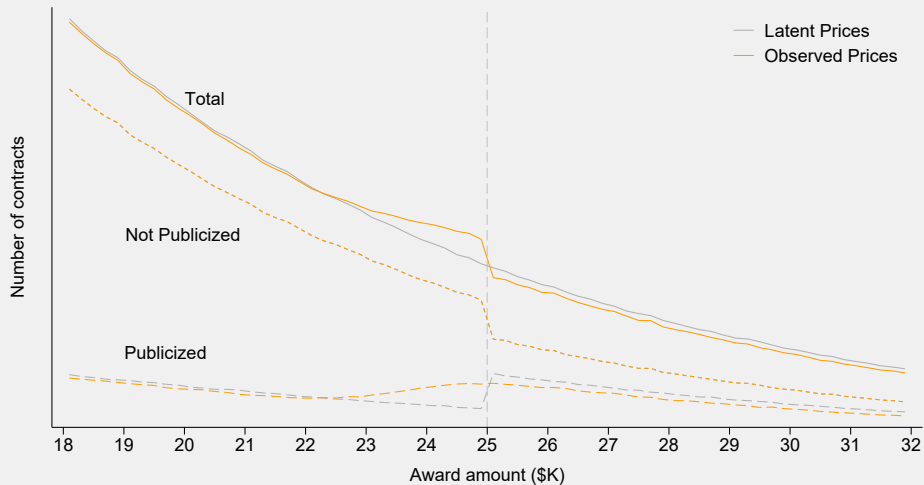# Example: Counterfactual Contract Price Distribution

Example: Fixed Price Effect = -5%

Example: Stochastic (Normal) Price Effect, $\bar{\gamma} = -5\%, \sigma_\gamma = 4\%$

Estimation Results

	Estimates		
	All Products	Goods	Services
Mean price effect ($\bar{\gamma}$)	0.019	0.016	0.022
Excess bunching ($Pr(B = 1)$)	0.026	0.028	0.021

Back

Summing up

- The empirical distribution has 25% excess mass in the award distribution right below the threshold:
    - 1/3 is explained by **price effects** (9%)
    - 2/3 is strategic **bunching** (16%)

- The mean price reduction due to publicity is \$470 ($\sim 2\%$)

- We use these results to estimate RDD:
    - Using estimate of γ_k, we can backout expected p_k^0 for publicized contracts (running variable)
    - Using estimates of bunching we can reweight observations and/or use formal partial identification results (Gerard, Rokkanen, and Rothe, 2020)
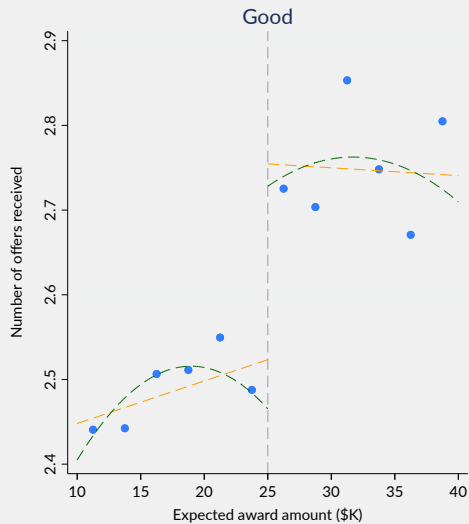
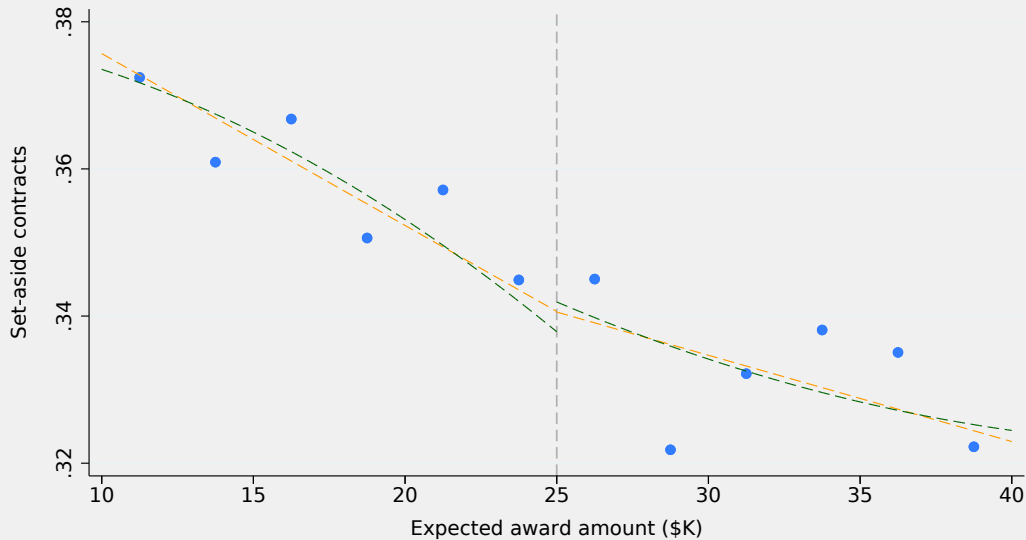# Performance: Any Delays
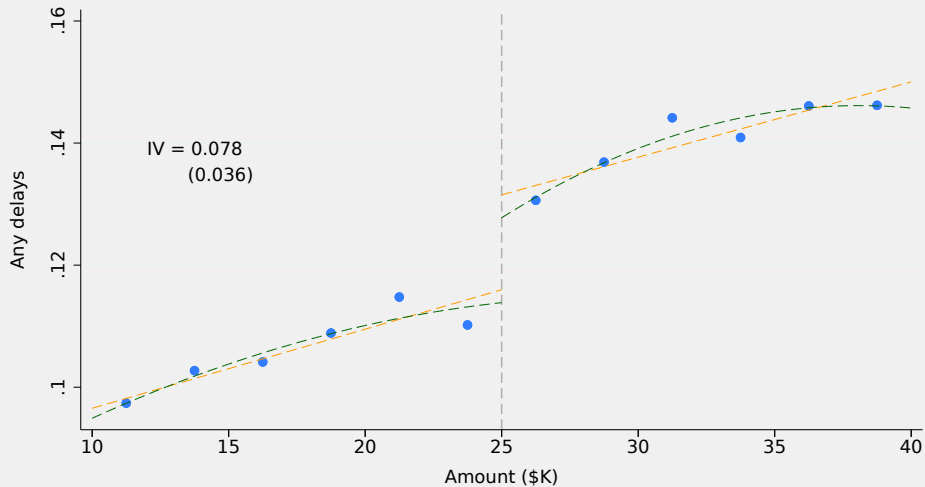
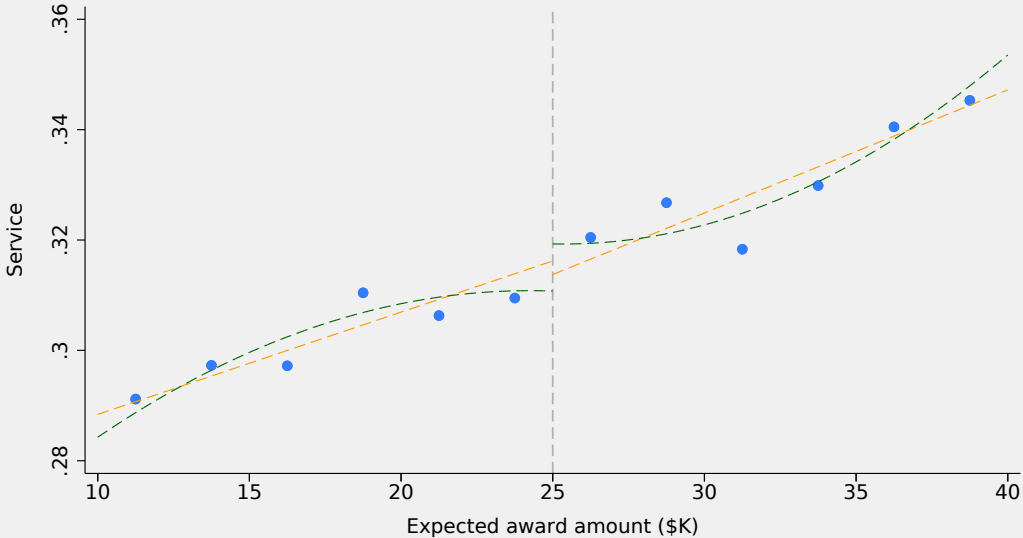# Performance: Any Cost Overruns
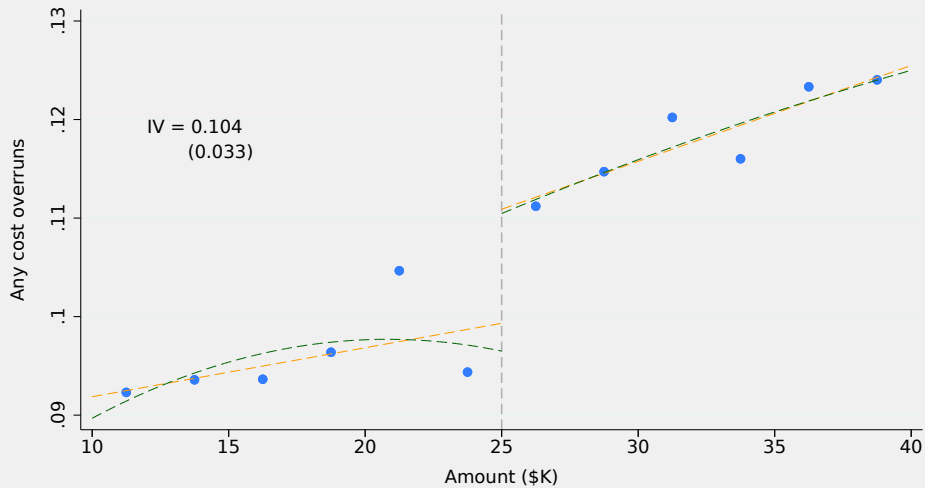
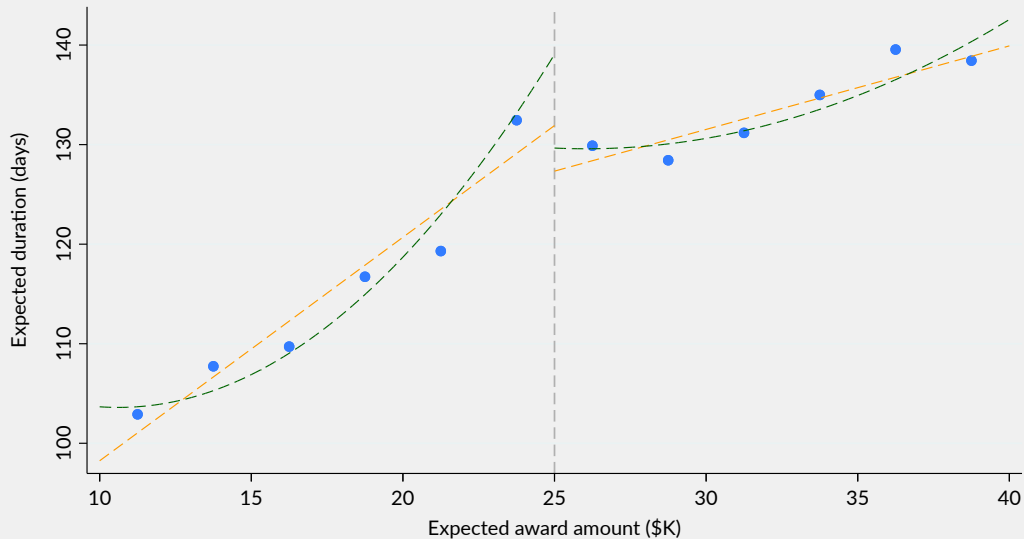# Heterogeneity by agency
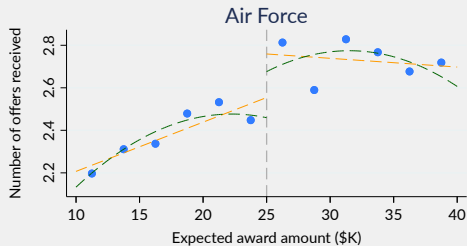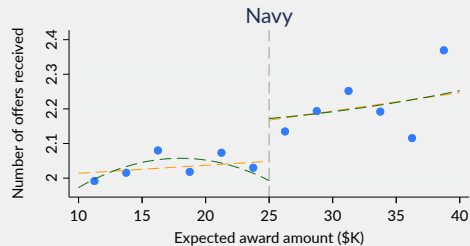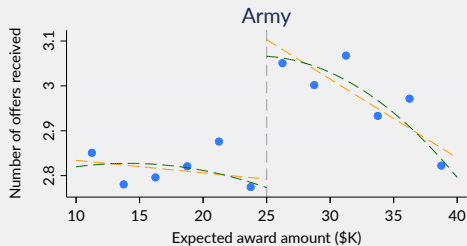
Heterogeneity: good vs services
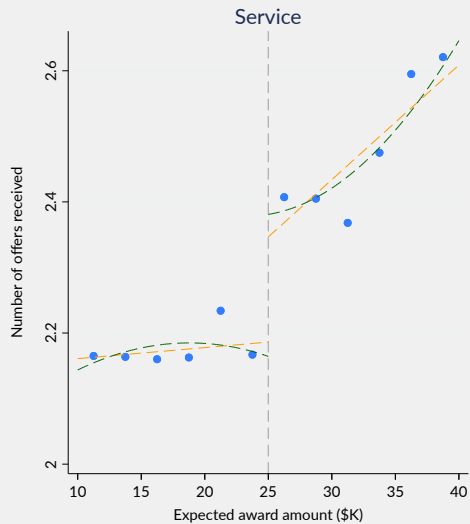
Contract characteristics: set-aside

Contract characteristics: good vs. service

Contract characteristics: expected duration

Contract characteristics: simplified procedures

Back Recap