

Feedback and Competition in Procurement e-Auctions

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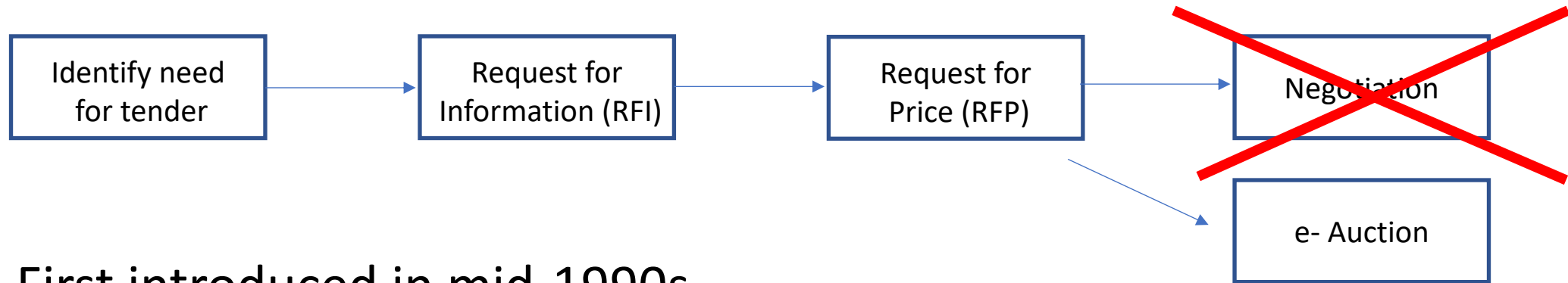
UCY - Brown Bag Seminar

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E-Auctions in procurement



E-Auctions in procurement



- First introduced in mid-1990s
- Pros: savings, efficiency, transparency
- Not yet *the rule* for procurement. Why?
 - Resistance from suppliers & buyers within organization
 - Still more of an *art* than a *science*...

Academics vs. Practitioners

The (economic) science of it...

For simple auctions (winner-takes-all, price only):

- Focus on **competition** (Bulow & Klemperer 1996)
- Revenue equivalence, i.e. **design** is secondary (Vickrey 1961, Myerson 1981)

...and the art (practitioners' view):

Even simple auctions are not so simple

- Small changes in the design can have substantial effect on savings
- These effects are not always in the direction predicted by theory

What we do...

Collaboration between academics and practitioners in framing the question

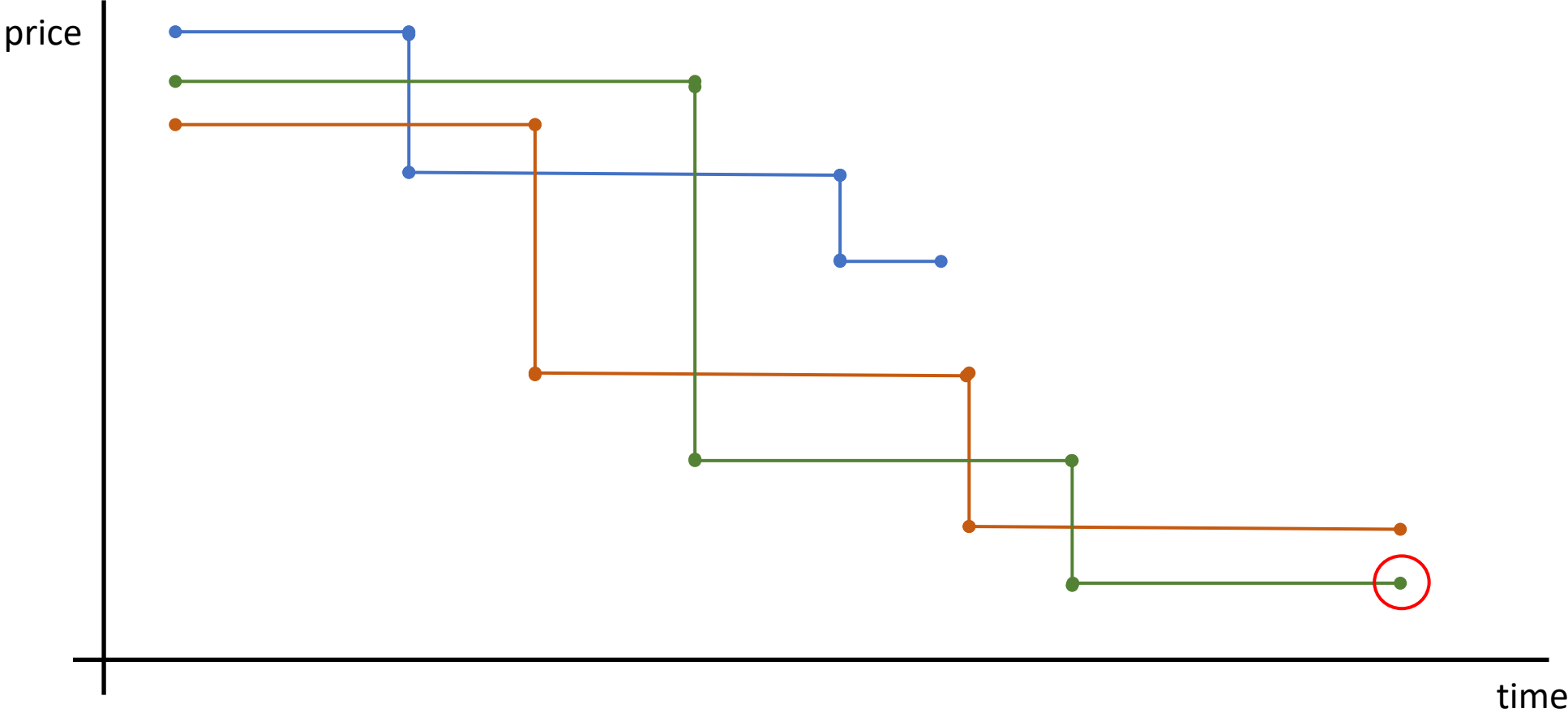
Focus:

- Feedback during English Reverse Auction
- How does it affect actual competition

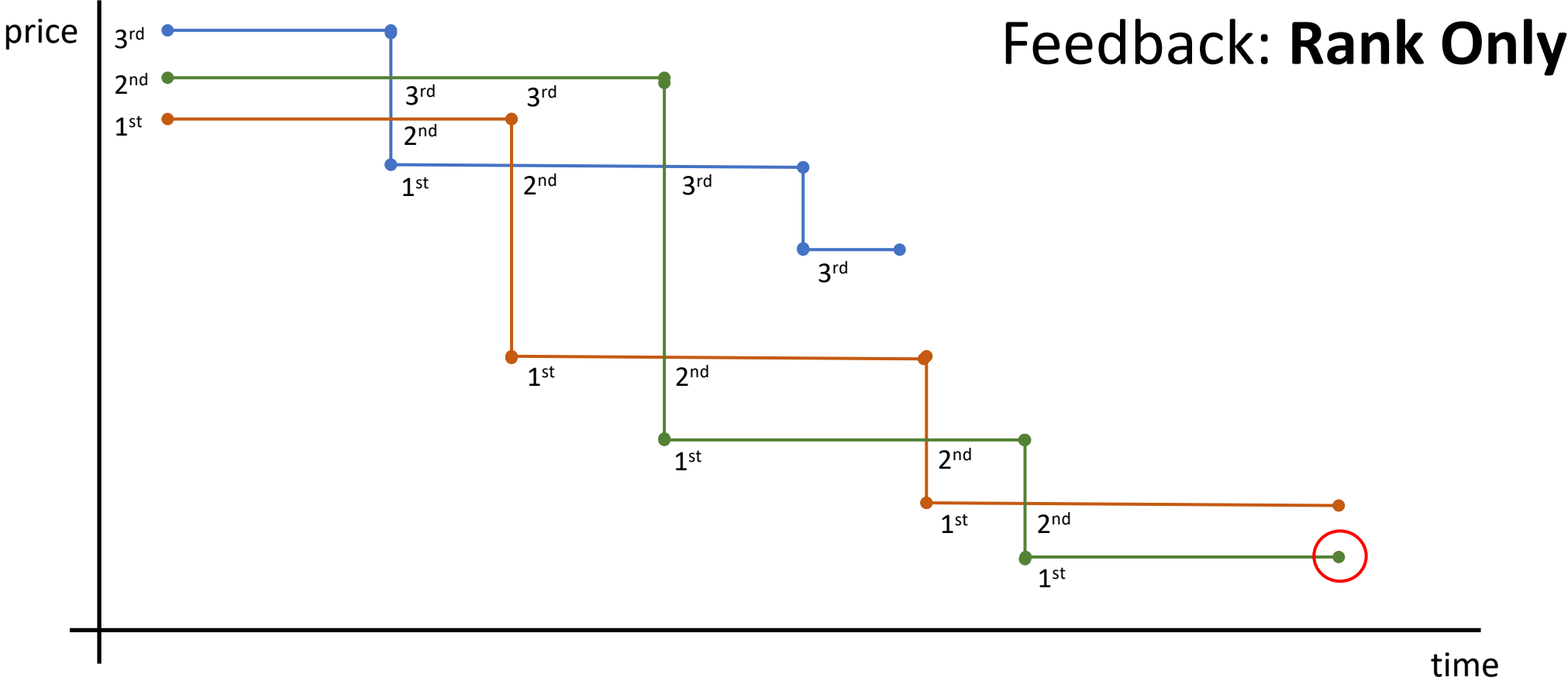
Methods:

- Some theory
- Mainly experimental

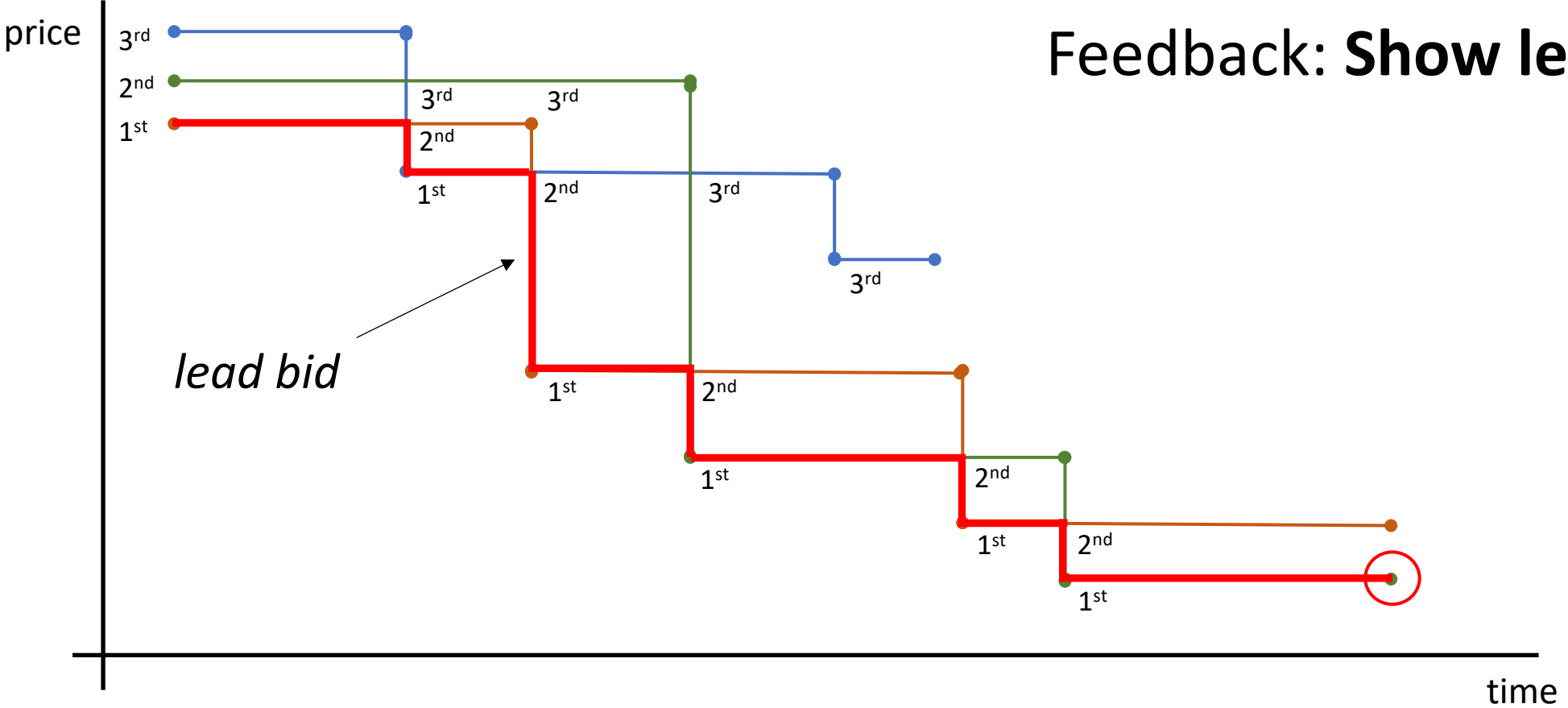
The English Reverse Auction



The English Reverse Auction



The English Reverse Auction



Feedback: **Show lead bid**

What we (think) we know

Standard Theory

- Equivalent to 2nd-price sealed-bid.
- Efficient allocation
- Feedback plays no role

Practitioners beg to differ.

Experimental evidence

- Less feedback -> behaviour closer to 1st-price sealed-bid.
- Efficient allocation
- 'Rank only' -> lower prices

Practitioners concur, but also look at initial conditions for competition.

"Bid compression" and competition

"Be aware of the distance between suppliers before the e-auction begins. If initial RFQ bids differ by more than 10 per cent between the lead bidder and the one in second place (especially if it is a winner-takes-all award strategy), a different format should be considered."

A Practical Guide to e-Auctions for Procurement, Larsen (2021)

Why care about this?

Opportunity cost and actual competition

- Actual suppliers face an opportunity cost of staying in an auction
- More information can encourage/discourage bidders

Related Literature

- Auction theory & experiments:

Vickrey (1961), Myerson (1981), Bulow & Klemperer (1996), Krishna (2002), Kagel & Levin (2011)...

- (Behavioral) operations research:

Jap (2002, 2007), Beall et al. (2003), Tassabehji et al. (2006), Carter & Stevens (2007), Elmaghraby (2007), Mithas & Jones (2009), Elmaghraby et al. (2012), Haruvy & Katok (2013)...

- Practitioners

Larsen (2021)

The experiment

- UCY LExEcon – Online
- N = 5, fixed groups
- **Cost:** random 1000 number interval in [2000,8000]->pick 5 numbers
- **Initial offer:** for each bidder pick a number in [1500,3000] and add to cost.
- Duration: 60+x seconds (random termination)
- **Exit value:** start at 30 and drop 1 point every 2 sec

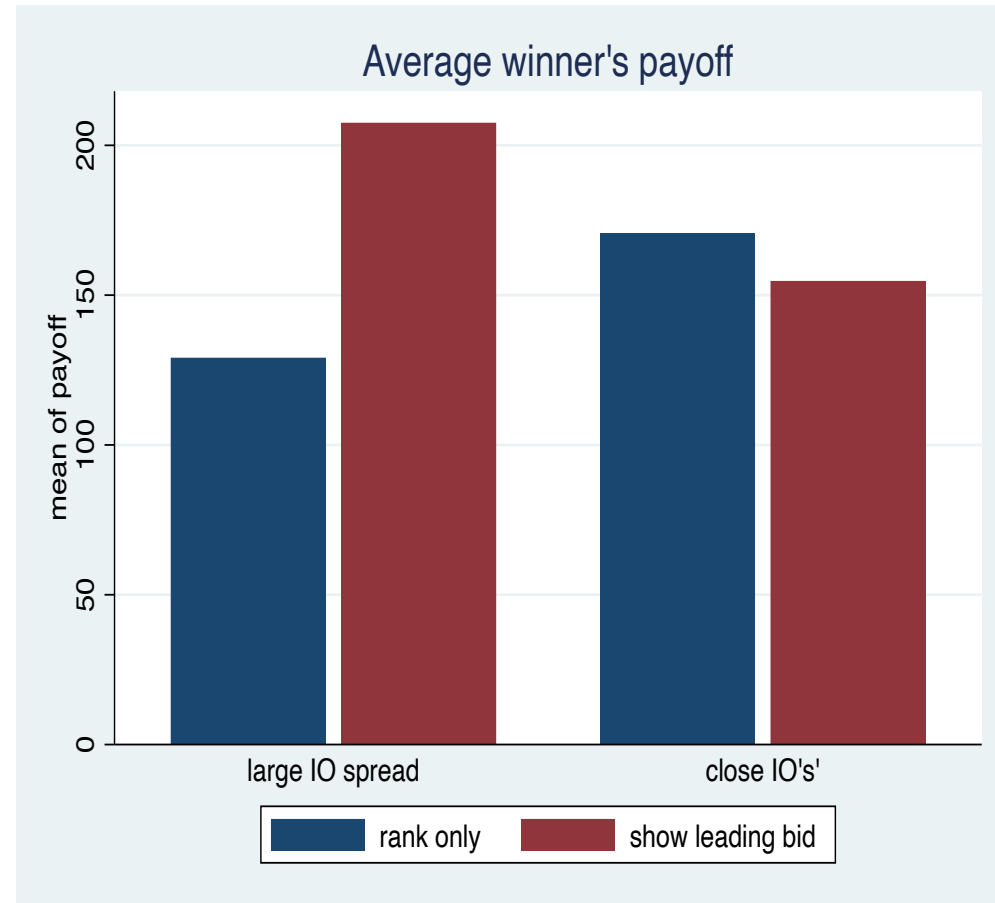
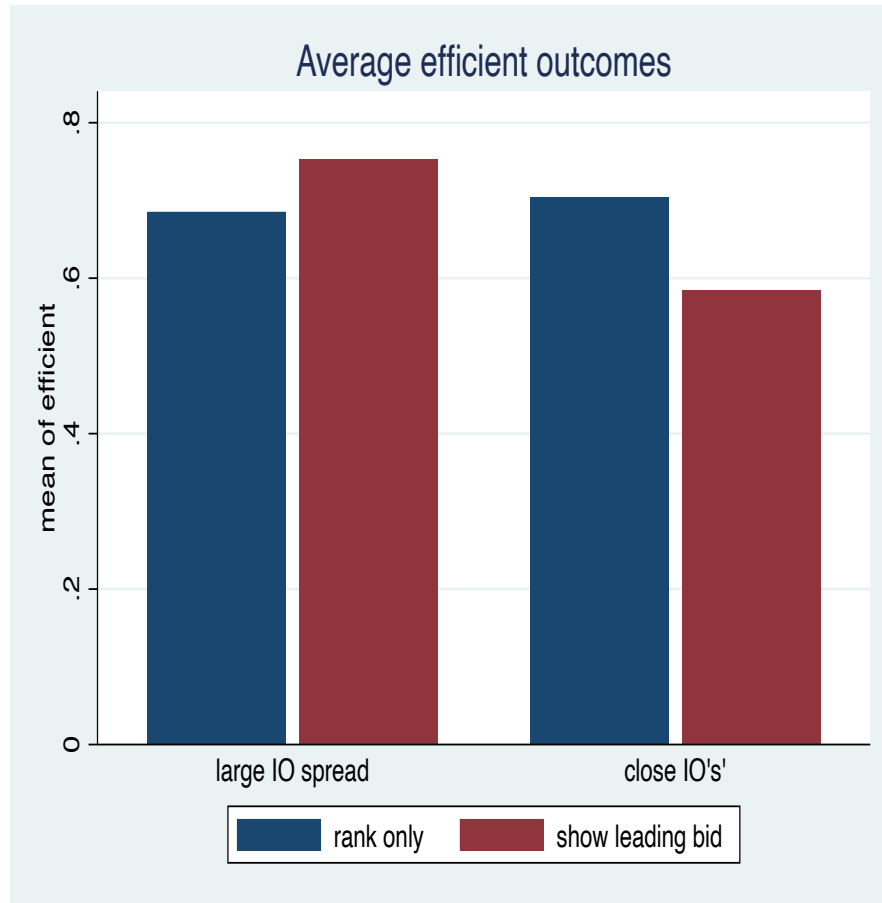
Treatment	Feedback	# of bidders per auction	# of auctions per round	# of rounds per session	# of sessions
SLB	Rank and lead bid	5	2	40	4
RO	Rank only	5	2	40	4

What did we expect to find

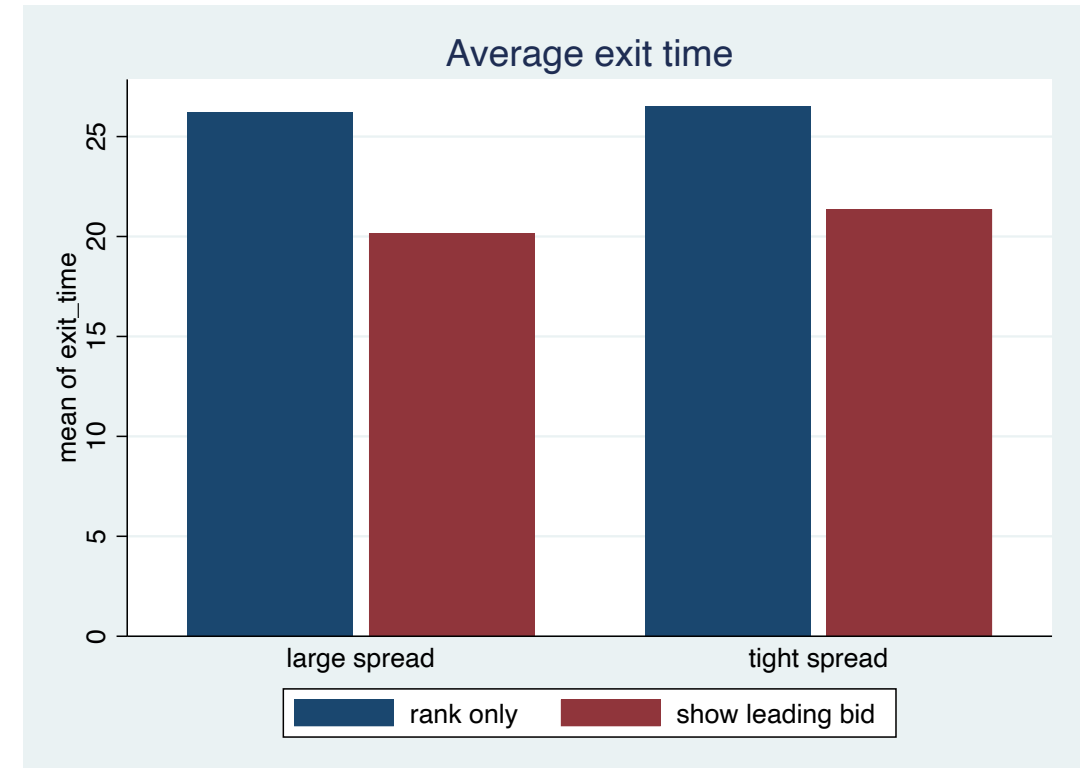
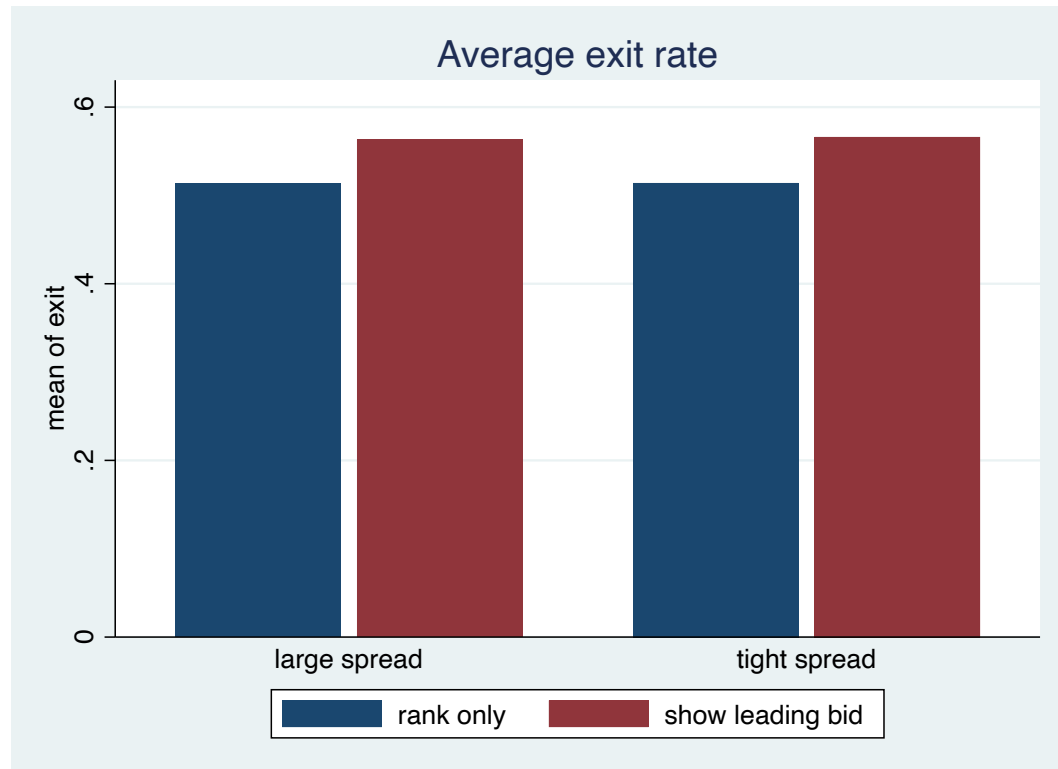
- **Efficiency loss:** when low cost bidders drop out
- **High prices:** when not enough competition to drive down prices
- (rank of) initial offers -> a noisy signal about rank of cost
- Our main assumption: ***feedback only changes information availability.***

When initial offers are close, but bidders do not see that, it is more likely to have “mistaken exits”=> low allocative efficiency, high prices.

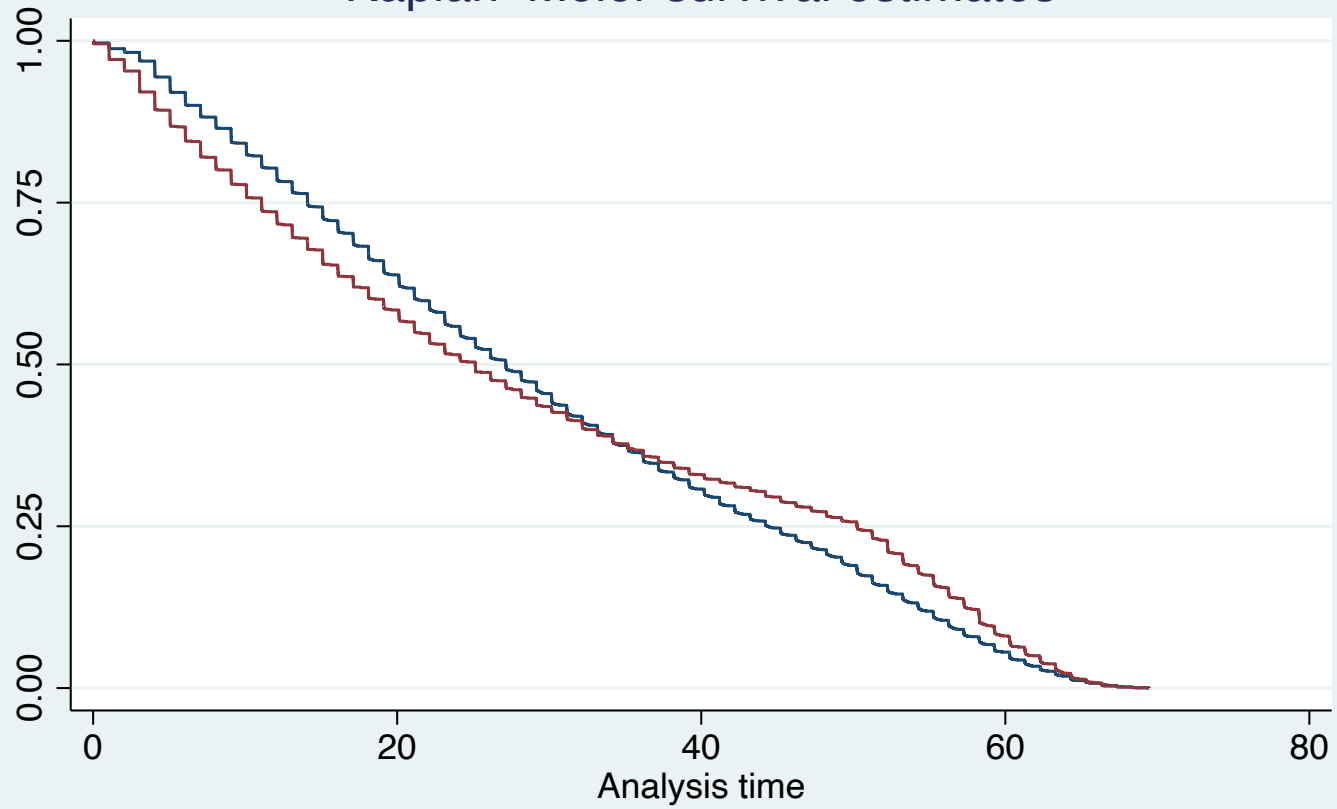
Results



Exit behavior



Kaplan–Meier survival estimates



— rank only — show leading bid

Possible explanation

We see:

- Feedback affects outcomes & effect depends on initial conditions
- Feedback affects behavior BUT effect does not depend on initial conditions

Feedback does more than just change the available information:

- Showing the lead bid expands the strategy space
- Given the possibility to exit, some bidders try to “force out” competition.
- We should observe higher heterogeneity in behaviour/individual outcomes in SLB.

Discussion

Increased “transparency” may come with a cost.

If bidders “trust the system”, less information makes them less vulnerable to others’ strategizing

Of course, exiting when you have no chance, is efficient...

We need to better understand bidding behavior before coming up with design recommendations.

Thank you!