Discussion of "Intermediaries as Information Aggregators: An Application to U.S. Treasury Auctions"

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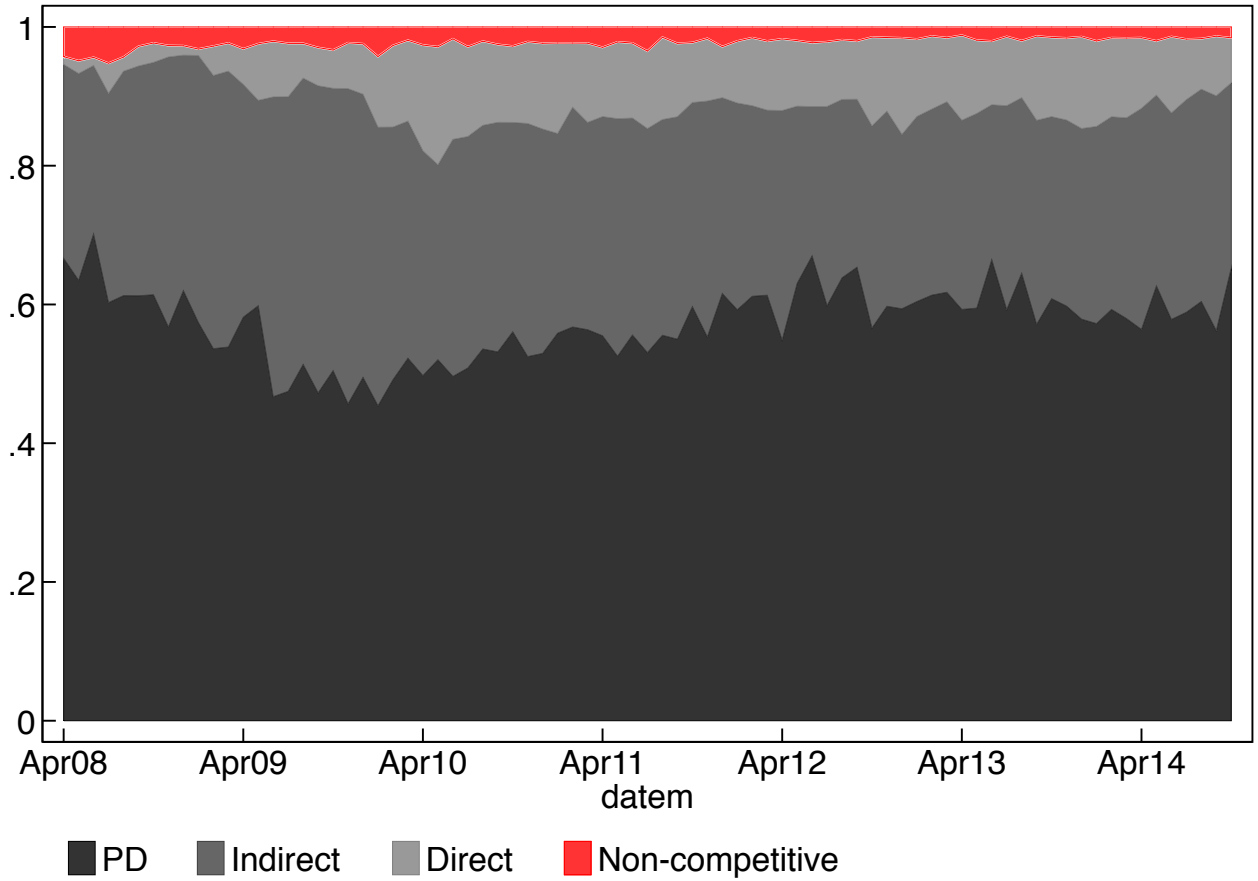
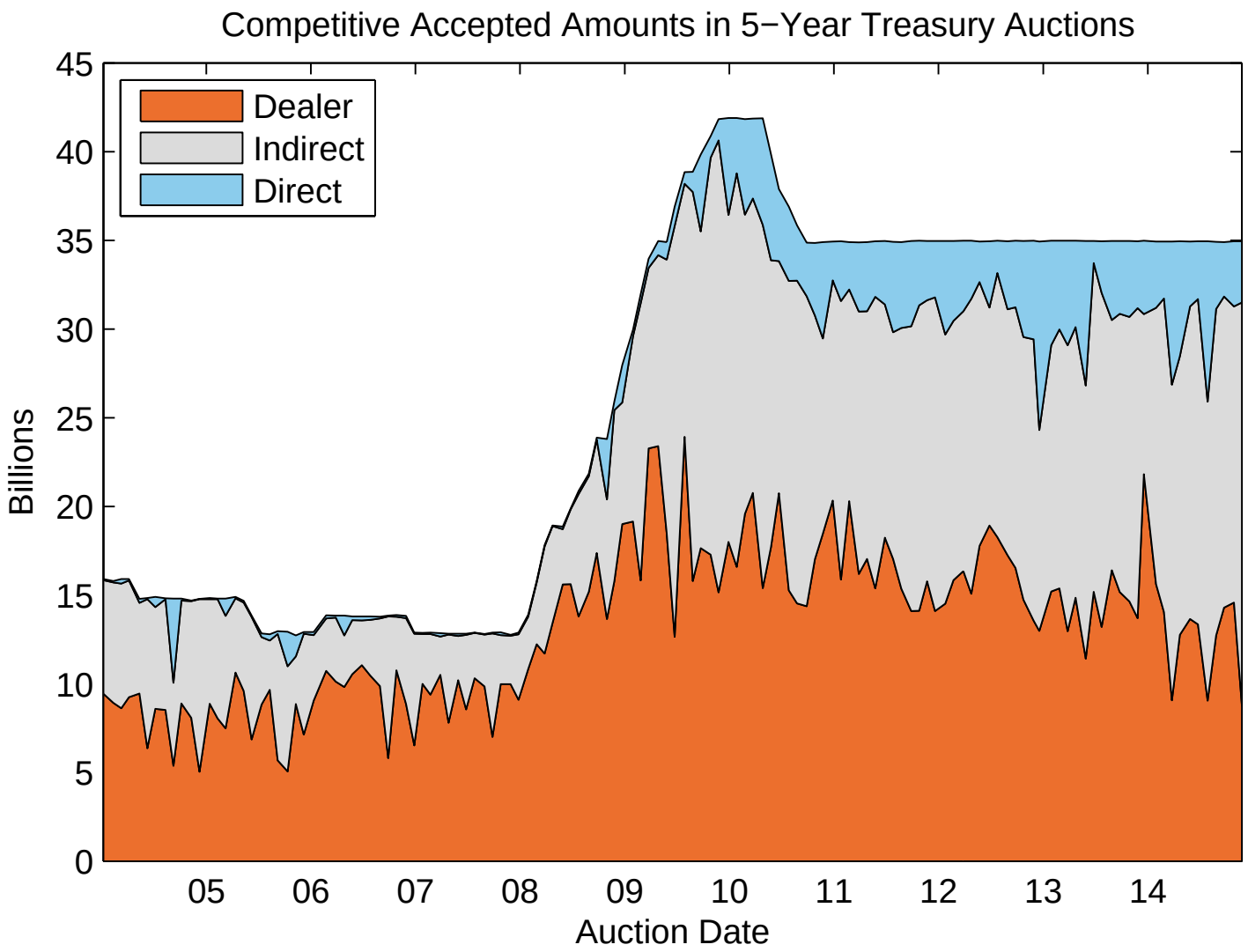
Main idea

Central idea: Why bid through dealers in Treasury auctions? Because dealers aggregate investors' information.

Figure 1: Allotted shares by bidders across all auctions



Source: Boyarchenko, Lucca and Veldkamp (2014)


Competitive Accepted Amounts in 5−Year Treasury Auctions
Dealer
Indirect
Direct
Billions
45
40
35
30
25
20
15
10
5
0
05
06
07
08
09
10
11
12
13
14
Auction Date

Main results

1. The value of having a dealer (versus having no dealer)
   - Having one dealer leads to higher expected revenue and revenue variance than having no dealer.
2. The effect of the number of dealers on expected revenue and variance
   - Numerically, increasing the number of dealers increases expected revenue and reduces revenue variance. (Effects of various channels are not clear yet.)
3. How investors choose between direct versus indirect bidding
   - Numerical illustration of when a large investor bids directly or indirectly, and the effect on revenue.
4. The effect of imposing minimum bid requirement
   - Numerically, a higher low-bid penalty increases expected revenue and revenue variance.

- A thought-provoking paper with relevant and interesting questions
- Analysis is still at early stage.
- My discussion will focus on the model and alternative approaches.

Baseline model

The model is similar to the classic noisy rational expectation equilibrium.

- The asset (Treasury bond) has unknown value $f \sim N(\mu, \tau_f^{-1})$.
- The asset supply is $1 - x$, where $x \sim N(0, \tau_x^{-1})$.
- N **nonstrategic** investors bid in a Treasury auction using demand schedules (price-quantity pairs), either directly or through a single primary dealer.
- Each investor i receives a signal $s_i = f + \epsilon_i$, where $\epsilon_i \sim N(0, \tau_\epsilon^{-1})$.
- Everyone has exponential utility.
- The primary dealer gathers investors' information $(s_1, s_2, \ldots, s_N)$ and reveals to investors the average $\bar{s} \equiv \sum_i s_i / N$.
- The dealer acts as an extra bidder, using investors' information $\bar{s}$.

Comment 1: The nature of information

- What is the nature of proprietary information $\{s_i\}$—asset fundamentals, inventories, or order flows?
- Pre-auction learning is useful if the noisy supply $1 - x$ has a large variance. But in the data noncompetitive bids are very small.
- Common versus private values. Hortacsu and Kastl (2012) find no evidence that dealers in Canadian Treasury markets learn fundamental value from customers' bids. They cannot reject the null hypothesis of private values.

Model horse race:

Model	Common value	Private value 1	Private value 2
Marginal value	Constant	Decreasing	Constant
	$\mathbb{E}[f \mid \{s_j\}]$	$s_i - \lambda q_i$	s_i
Mechanism	Divisible	Divisible	Indivisible
Bidders wish to learn	f	Nothing	$\mathbb{P}$(winning)
Noisy supply matters?	Yes	No	–
Effect of disclosing $\bar{s}$:			
Bidding strategy	Yes	No	Yes
$\mathbb{E}$[Revenue]	$\uparrow$	None	None if risk-neutral $\uparrow$ if risk-averse (?)
Var[Revenue]	$\uparrow$	None	?

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Model selection is informed by data.

Comment 2: Investors' strategic incentives

- Now back to the common-value model of the paper.
- Sharing information creates a free-riding problem. Do investors want to acquire the information at all, and under what conditions?
- Investors are not strategic traders in the model. In reality they can trade strategically by
  - Taking into account the price impact and "bid shading"
  - Partially disclosing their information to dealers, e.g. splitting the order between indirect bidding and direct bidding

    Example: Bidder 1 receives s_i, reports s_i' to dealer, bids indirectly based on $(\sum_{j\neq i} s_j, s_i')$, and bid directly based on $s_i - s_i'$.

Suggestions:

1. Consider the cost of information acquisition.
2. Let investors be strategic.
3. Solve the binary {direct bidding, indirect bidding} problem for each investor, assuming truthful reporting of s_i in indirect bidding.
   - The paper studies the direct-versus-indirect choice of a **single** strategic large investor and provides numerical illustrations.
4. If possible, allow splitting between direct and indirect bidding, with partial information sharing with the dealer.
5. Some empirical tests?

E.g., numerically, the paper finds:

Higher fundamental uncertainty $\Rightarrow$ Indirect bidding is more likely.

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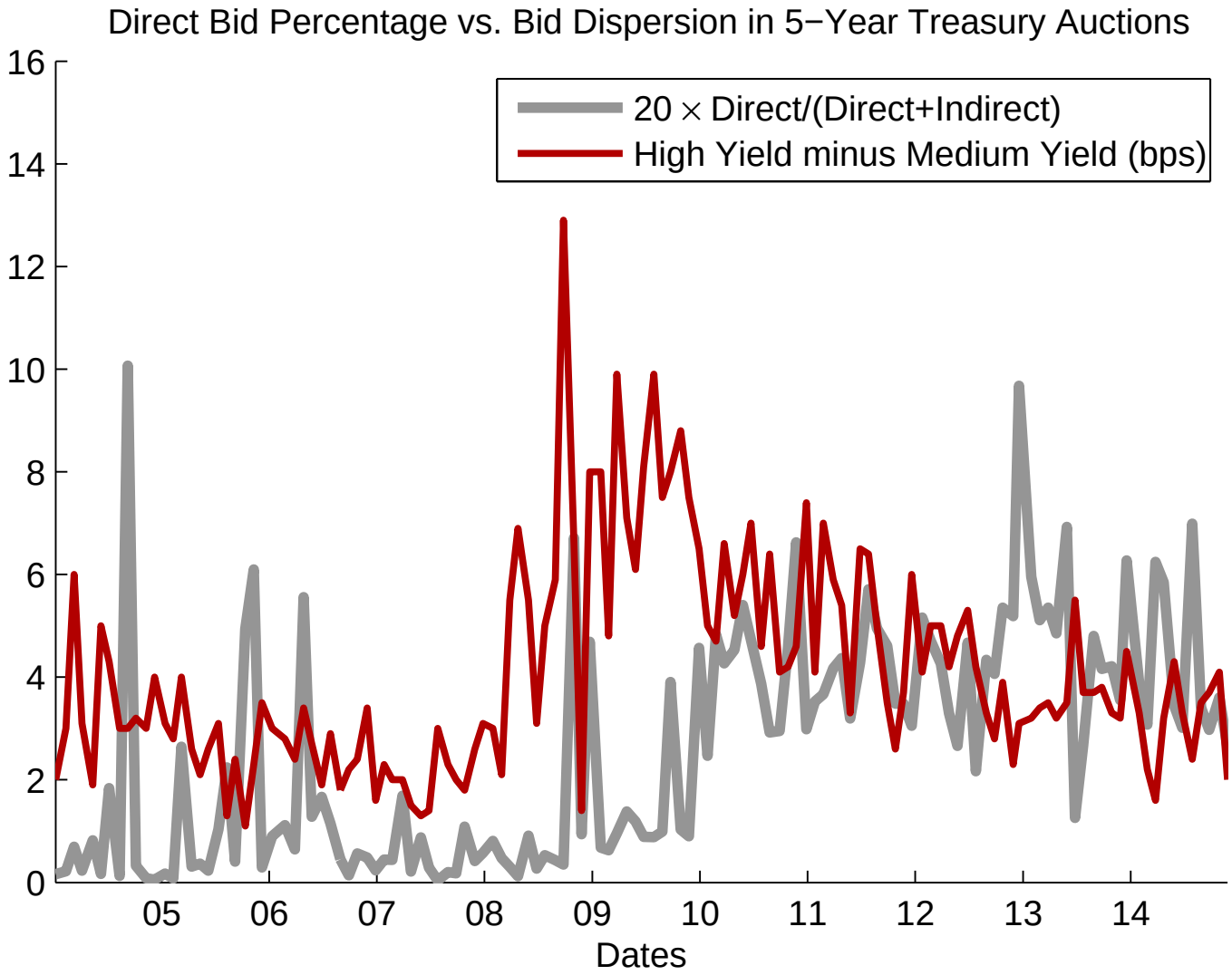

Comment 3: Strategic incentives of dealers

- Do dealers want to garble the information $\bar{s}$?
- How do investors monitor dealers for truth-telling?

Comment 4: The number of dealers

- In this paper, there are N investors and D dealers. D is changed while N is held constant.

- Two countervailing effects of increasing D while holding N fixed:
  - Competition effect: More dealers means more competition $\Rightarrow$ Higher revenue
  - Information effect: More dealers means more dispersed information and potentially higher adverse selection $\Rightarrow$ Lower revenue

- Holding N fixed is less satisfactory. It seems more reasonable to have $D + N$ fixed. Non-primary dealers can still bid as investors.

- **Suggestion**: Try fixing $N + D$ and varying N/D.
  - If free-riding and information acquisition are modeled, having a single dealer is unlikely revenue-maximizing.

Comment 5: Corner solutions with multiple dealers

- With multiple dealers and normally-distributed signals, some investors may end up shorting the bonds! But shorting is impossible in Treasury auctions. The current model implicitly allows shorting.

- If shorting is not allowed, some pessimistic information will be truncated. Intuitively, this left-tail truncation should happen more often if D is larger.

- **Conjecture**: Increasing D creates a tradeoff between price discovery and revenue:
  - More left-tail truncation $\Rightarrow$ Worse price discovery
  - More left-tail truncation $\Rightarrow$ Higher revenue?

- Downside: Banning shorting can complicate the model considerably.

Auction Design Questions

Should Treasury auctions be **double auctions** (i.e. allow shorting)?

- Pre-auction when-issued market effectively allows shorting.
- Post-auction shorting is done in OTC markets through repos.
- Price discovery should improve with shorting
- But revenue effect is unclear—it boils down to whether investors have common value or private values for Treasury securities.

Uniform-price versus discriminatory-price: Treasury issuance auctions are uniform-price, but Fed purchase auctions are discriminatory-price (Song and Zhu 2014). Why?

What is the **optimal frequency** of Treasury auctions?

What is the **optimal maturity structure** of Treasury auctions?