

Information sharing and collusion in government debt auctions

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Introduction

Governments all over the world sell around 4 trillion USD worth of securities every year. For example, in 2014 Denmark sold government bonds and T-bills for approximately DKK 170.000 million.¹ Given its size, the efficiency of treasury bond auctions has been studied for decades. Nevertheless, to date there is no consensus on what is the optimal auction mechanism.

Research on the efficiency of auctions has focused on the underpricing relative to secondary markets. Both theoretical and empirical studies have arrived at conflicting results as to which of the two main securities sales mechanisms, discriminatory or uniform auctions, is best. In both auction mechanisms, bidders face quantity uncertainty. This encourages aggressive bidding, and more so for uniform auctions. But, as long as bidders' valuation of auctioned securities reflects common values (e.g. their resale price in secondary markets), a winner's curse leads to less aggressive bidding, particular in discriminatory auctions.

We believe that a first-order issue regarding the efficiency of treasury auctions is whether bidders collude or not. There is no theoretical or empirical work that addresses this question, and we intend to fill this gap.

Project description

Governments that sell debt through financial markets face a potential challenge in that bidders may collude, thus reducing the revenue accruing to the government. Bidder collusion has already been shown empirically in many other settings, for instance in Klemperer (2002) for auctions for mobile phone licenses, or in Pesendorfer (2000) for school milk contracts. We will investigate in our study how information sharing between banks may have aided collusive behavior, and consider possible countermeasures.

Lessons from the literature on collusion in industrial organization tell us that asymmetries between firms make collusion more difficult, and indeed this is also the case in auctions. In particular, asymmetric information may make side payments between bidders costlier, thus impeding collusion.² Therefore, it seems that bidders have a strong incentive to share information to eliminate asymmetries and facilitate collusion. Our project aims to estimate the extent of the incentives to collude in existing auction formats and analyze optimal 'collusion-proof' auction mechanisms.

To this end we will extend existing state of the art theoretical models and then estimate our model's implications using a unique data set on Argentinian Treasury auctions.

¹Danmarks Nationalbank website.

²See Laffont and Martimort (1997) and Che and Kim (2006).

Policy relevance

As mentioned in the introduction, in 2014 the Danish government sold government bonds and T-bills for approximately DKK 170.000 million. There are two markets for Danish Treasury bonds: *T-bills* with a duration of less than a year (“skatkammerbeviser”), and *government bonds* with a duration of more than a year (“statsobligationer”). Government bonds are offered at auctions approximately every second week throughout the year, except over the summer and the end of the year; T-bills are offered every month.

Bids can only be submitted through state-appointed primary dealers. These primary dealers comprise major Danish banks, as well as large foreign investment banks. There are eleven primary dealers on the market for long term bonds and six on the market for short term bonds. Primary dealers have a market-making obligation, which requires them to quote bid-ask prices for Danish Treasury bonds on selected exchanges. The auction has a uniform price format, where bids exactly at the final market price are traded pro rata, such that investors with such a bid are assigned an equal proportion of their bid.

In the empirical part of the paper we will use data on Argentinian Treasury auctions. Since these have used a uniform price format, the implications derived will be directly applicable to Danish Treasury auctions. In particular the Danish Central Bank will be able to test for collusion among a subset of primary dealers.

Theoretical background

Our approach builds on the structural methods for extracting private bidder information recently developed in Hortacsu and McAdams (2010) and Hortacsu and Kastl (2012). In both papers, the authors develop, and estimate, methods that are appropriate for investigating bidders whose bond valuations are not correlated. Hortacsu and McAdams (2010) use a structural model of strategic bidding to derive bounds on private marginal values, which are then computed using observed bid schedules in Turkish Treasury auctions. Hortacsu and Kastl (2012) estimate private marginal values from the observation that dealers in Canadian Treasury auctions adjust their bids in response to the arrival of new customer bids

We are interested in a setting where there is correlation in valuations, such that collusion to reduce the uncertainty of the auctioned securities’ true value might be desirable. Therefore, we will first extend the theoretical model of Hortacsu and McAdams (2010) to estimate bidder information in situations in which valuations are correlated. Then we will estimate the value of information sharing. We expect that this is a non-monotone function of the size of the colluding coalition since reduced uncertainty will make coalition members bid more aggressively. Finally, we will study the optimal design of auctions in the presence of incentives to collude.

Data description

Our dataset comprises data on bidding in primary auctions for Argentinian government bonds between 1996 and 2001.³ The market makers were the twelve largest banks of the

³Vargas (2003) describes the Argentinian Treasury auctions’ characteristics.

Argentinian financial system (which includes both domestic and foreign banks). Most auctions were of short-term bonds, conducted every two weeks. Long-term bonds were sold in auctions only three times per year.

What makes our data unique is that we can observe the identity of bidders. This allows us to merge two sources of information: first, the actual bids made by each bank; and second, balance sheet information for each bank. The availability of balance sheet data will allow us to control for liquidity motives in bidding, something that is impossible to do with existing publicly available datasets that lack the identity of bidders. In our empirical strategy this will allow us to eliminate the part of the submitted bids that corresponds to private valuation and find if among the residual bid schedules the participants, or a subset of them, colluded by sharing their private information.

The data are already available to us, so there is no risk related to obtaining them.

Expected output, publication potential and time plan

The output of the project is expected to be one or two academic papers. The relevant existing papers on Treasury auctions have been published in top-5 journals and the best field journals. Given the uniqueness of our dataset, we expect to be able to make contributions at the same level, if we obtain strong empirical results. We expect to have a first draft of our research to present to Danish policy makers in approximately one year. And to prepare at least one paper for journal submission by the end of 2017.

Budget

We apply for funding to invite for a short stay a leading researcher in the field, Ali Hortacsu, to present his work in the EPRU seminar series in the Fall next year. We would profit from the occasion to interact with him and get feedback on our research. We also apply for funding to teaching buy-out for both researchers for two months each. The budget is attached.

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