Screening for Cartels: The Next Step in Enforcement

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Introduction

- Stages of the fight against cartels

$$\textit{Discovery} \mapsto \textit{Prosecution} \mapsto \textit{Penalization}$$

- *Screening* is the activity of identifying those markets likely to have a cartel.
- Purposes of screening
  - find markets worthy of investigation
  - "scare" cartel members to come forward under a leniency program
  - deter cartel formation.

Introduction

- What do we need in order to engage in screening?
  1. What do we screen? Data
  2. What do we look for? Collusive markers
  3. How do we look for it? Empirical methods
- Objective: Develop a more active role for competition authorities and consulting firms in detecting cartels.
- Today's proposal: Screening public procurement auctions for cartels.

Why Public Procurement Auctions?

1. Public procurement encompasses 45-65% of government expenditure and 13-17% of GDP (International Institute of Sustainable Development, 2008)
2. Bidding rings are common at procurement auctions.
3. Tacit collusion is unlikely in procurement auctions.
4. Data is available.
5. Foundation of solid empirical analysis on collusion in procurement auctions
6. Potentially large reputation effect.

Collusion at a Procurement Auction

Requirements for Successful Collusion

1. Efficiency - the value of the cartel is maximized when the cartel member that most values the contract wins it.
2. Stability - it is in the best interests of each cartel member to abide by the collusive agreement.
3. Detection avoidance - cartel members do not want to create suspicions that there is a cartel.

Collusion at a Procurement Auction

Implementation

- Selection of a cartel member as the one "designated" to win the contract (and compete against non-cartel members)
  - knockout auction prior to the auction
  - bid rotation - cartel members take turns being the designated cartel member
  - market allocation - customers/regions are distributed among cartel members
- Supportive behavior by non-designated cartel members
  - cover bidding - cartel members submit bids in excess of the designated cartel member's bid
  - bid suppression - cartel members do not participate so as not to compete with the designated cartel member

Collusion at a Procurement Auction

Implementation

- Allocation of contracts or transfers to ensure compliance by all cartel members
  - bid rotation
  - market allocation
  - transfers - designated cartel member which wins a contract transfers part of it (sub-contracting) or makes monetary payments to other cartel members.

Screening for Cartels at Auctions
Issues

- Identify collusive markers:
  - bids
  - participation
  - patterns in the identity of the winning bidder
- Determine how to test for these collusive markers.
- Assess how easy it is for a cartel to avoid a "trail" of collusive markers.

Screening for Cartels at Auctions
Bids

Collusive Marker: After controlling for common factors, bidders' bids are positively correlated.

- After controlling for common factors, the competitive model predicts bids are independent.
- Cover bids are positively correlated with the designated cartel member's bid to give the appearance of competition.
- Challenges
  - Need to fully control for common cost and demand factors which would positively correlate bids.
  - A smart cartel can avoid this correlation by scaling upward all cartel members' competitive bids.

Screening for Cartels at Auctions
Bids

- Bajari and Ye (2003)
- Data: 138 auctions conducted for highway maintenance contracts over 1994-98.
- Estimate reduced form bidding equation

$$\frac{BID_{i,t}}{ENG_t} = \beta_0 + \beta_1 DISTANCE_{i,t} + \beta_2 CAPACITY_{i,t} + \cdots + \varepsilon_{i,t}$$

  - $BID_{i,t}$ is the bid of firm i on project t.
  - ENG_t is engineering cost estimate for project t.
  - Cost factors: *DISTANCE* between contractor and project, *CAPACITY* of contractor, etc.
- Competitive Hypothesis: correlation of $\varepsilon_{i,t}$ and $\varepsilon_{j,t}$ is zero.

Screening for Cartels at Auctions
Bids

- Considered the 23 pairs of 11 largest firms that have at least four bids in the same auction.
- Independence was rejected for four pairs of firms.
- Only one of those four pairs (firms 2 and 4) bid against each other regularly.
- Candidate cartel: firms 2 and 4.

Screening for Cartels at Auctions
Bids

Collusive Marker: The lowest bid behaves differently than the non-lowest bids.

- The designated cartel winner's bid is designed to maximize expected profit.
- The other cartel members' bids are designed to avoid winning and creating suspicions.

Screening for Cartels at Auctions
Bids

- Porter and Zona (1993)
- Data: 116 auctions conducted for highway construction contracts over 1979-1985.
- Empirical model measures the likelihood of the observed ranking of bids at an auction given exogenous variables.
- Estimated three models using: 1) all bids; 2) lowest bid; and 3) non-lowest bids.
- Result: Lowest bid behaved differently than non-lowest bids.

Screening for Cartels at Auctions
Bids

Collusive Marker: Bidders' bids respond to cost and demand factors in a manner contrary to the competitive model.

- This could be due to
  - some bids being cover bids
  - how the designated cartel member responds to competition from non-cartel members
- If a bid encompasses prices on multiple components, are some of the unit prices highly variable across auctions?
  - A non-designated cartel member may increase the unit price of a few component prices to deliver a cover bid.
- Example: School milk (Porter and Zona, 1999)

Screening for Cartels at Auctions
Bids

Collusive Marker: Bids are better explained by a model with fewer bidders than actually participated.

- If there is a bidding ring with cover bidding, some bidders are, effectively, inactive.
- Banerji and Meenakshi (2004)
- Data is for 421 oral ascending bid wheat auctions in India from 1999.
- Participants
  - Three large buyers (total market share of about 45%)
  - Many small buyers.
- Collusion Hypothesis: Observed bids are more consistent with a model with one large buyer than a model with three large buyers.
- Result: Observed bids are "as if" there is only one large buyer.

Screening for Cartels at Auctions
Participation

Collusive Marker: After controlling for common factors, bidders' participation decisions are not independent.

- Positive correlation tells a story of cover bidding.
- Negative correlation tells a story of bid suppression.

Screening for Cartels at Auctions
Participation

- Porter and Zona (1999)
- A contract is for the annual supply of milk in a school district.
- Data for 509 school districts in Ohio over 1980-90.
- Explaining bid submission
  - Estimated the decision of a firm to bid on a contract.
  - Under competition, the decision to submit a bid should be independent across firms.
- Result
  - Independence was rejected: If one suspected firm submitted a bid, it was more likely the others did as well.

Screening for Cartels at Auctions
Participation

- Explaining bid levels
  - Estimated the relationship between a firm's bid and cost and demand factors (distance between district and plant, district enrollment, etc.)
  - Test: Do some bidders' bids respond to cost and demand factors in a manner contrary to the competitive model?
- Results
  - Unsuspected firms' bids were found to be increasing in the distance between the processing plant and the school district.
  - Bids of the three suspected colluding firms were
    - less sensitive to distance compared to competitive firms
    - *decreasing* in distance for two of the firms.

Screening for Cartels at Auctions

Patterns in the Identity of the Winning Bidder

- Compliance requires that all cartel members adequately share in the gains from colluding
  - bid rotation - firms take turns being the designated cartel member
  - market allocation - customers or regions are allocated across cartel members
  - transfers - monetary or sub-contracts

Screening for Cartels at Auctions

Patterns in the Identity of the Winning Bidder

Collusive Marker: The probability of a bidder winning the current contract is lower if it won the preceding contract.

- Challenge: Distinguishing bid rotation from competition among bidders with capacity constraints.
- Implications for market shares (Pesendorfer, 2000)
  - With bid rotation or market allocation, market shares are stable. (Look for stable market shares.) Ex: Texas school milk cartel.
  - With transfers, market shares need not be stable. (Look for evidence of side payments.) Ex: Florida school milk cartel.

Concluding Remarks

- A more effective anti-cartel program requires
  - increasing penalties
  - increasing the probability a cartel pays penalties
    - raising the likelihood that a case leads to a conviction
    - raising the likelihood that a case is brought
- Leniency programs have provided incentives for cartel participants to report a cartel and, if one is reported, to admit guilt.
- Economic screening is a next step in promoting cartel discovery.
- Screening
  - generates cartel cases
  - enhances the effectiveness of a leniency program
  - deters cartel formation.