

Screening for Cartels at Public Procurement Auctions

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Concluding
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- *Screening* is when a competition authority actively searches markets for cartels.

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- *Screening* is when a competition authority actively searches markets for cartels.
- Purpose of screening

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- *Screening* is when a competition authority actively searches markets for cartels.
- Purpose of screening
 - identify markets worthy of investigation

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- *Screening* is when a competition authority actively searches markets for cartels.
- Purpose of screening
 - identify markets worthy of investigation
 - induce cartel members to come forward under a leniency program

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- *Screening* is when a competition authority actively searches markets for cartels.
- Purpose of screening
 - identify markets worthy of investigation
 - induce cartel members to come forward under a leniency program
 - deter cartels from forming.

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- *Screening* is when a competition authority actively searches markets for cartels.
- Purpose of screening
 - identify markets worthy of investigation
 - induce cartel members to come forward under a leniency program
 - deter cartels from forming.
- Proposal: Screening public procurement auctions for cartels.

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- 1 Public procurement auctions encompass 45-65% of government expenditure and 13-17% of GDP (International Institute of Sustainable Development, 2008)

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- 2 Bidding rings are common at procurement auctions.

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- 3 Tacit collusion is unlikely in procurement auctions.

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- 4 Data is available.

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- 4 Data is available.
- 5 Foundation of solid empirical analysis on collusion in procurement auctions

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- 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

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- ① Efficiency - the value of the cartel is maximized when the cartel member which 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.

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Implementation

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- Selection of a cartel member as the one "designated" to win the contract (or 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

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- 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.

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Issues

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- Identify collusive markers:
 - bids
 - participation
 - patterns in the identity of the winning bidder
- Determine the ease with which a cartel can avoid leaving collusive markers.

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Bids

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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.

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

- Estimate reduced form bidding equation

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

- $BID_{i,t}$ 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.
- Independence Hypothesis: Coefficient of correlation for $\varepsilon_{i,t}$ and $\varepsilon_{j,t}$ is zero.

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- 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.

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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.

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- 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.

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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)

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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 at the auction at any time.

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Bids - South Africa: Preferential Bidder Programs

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- P. Bolton, "Government Procurement as a Policy Tool in South Africa," *Journal of Public Procurement* (2006).
- Since 1994, various programs have promoted social objectives at public procurement auctions.
 - Preferential Procurement Policy (2000)
 - Black Economic Empowerment (2003)
- 10-20 points (out of 100) are given to preferred bidders in determining to whom is awarded a contract.

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Bids - South Africa: Preferential Bidder Programs

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- Determination of a bidder's score (20 point preference)
 - A non-preferential bidder with the lowest bid gets 80 points.
 - A preferential bidder receives points equal to

$$20 + 80 \times \left[1 - \left(\frac{\text{bid} - \text{minimum bid}}{\text{bid}} \right) \right].$$

- Implications
 - Empirical analysis can be done with these preference-adjusted scores.
 - Screen for cartels among eligible contractors and among non-eligible contractors.

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Participation

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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.

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- 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.

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- 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.

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Patterns in the Identity of the Winning Bidder

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- 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

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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
 - 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.

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- Public procurement auctions make up 13-17% of GDP.
- Experience shows that cartels are common at procurement auctions.
- The data and empirical methods are available to screen procurement auctions for cartels.
- Screening for cartels is a potentially important tool to shut down cartels and deter cartel formation.