Collusion in Procurement

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Procurement bidding and collusion (1/2)

- One of the procurement target is competition to maximize buyer's profit/quality
- Contractors (bidders) may prefer instead anticompetitive scenarios to soften price competition and raise joint profit
- Collusion is a conduct adopted by a group of firms aimed at reproducing the market outcome induced by a single firm in a dominant position
- Coordination (explicit or tacit) among bidders is crucial to be awarded procurement contracts at anti-competitive conditions
- Bidding rings: increase procurement's price or reduce quality (at a given price)

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Procurement bidding and collusion (2/2)

- *Price-fixing* or *bid-rigging*: colluding firms select the winning bidder and the winning bid. The other cartel members bid high prices or less favorable condition ("phoney bids")
  - Sharing rule to redistribute rent among members
  - "Rotation" in repeated procurement

- *Market-sharing agreements*: customers are divided according to some characteristics (i.e. location) and assigned to a predetermined bidder. Other member submit a "phoney bid"

Exhibits from Guam Repair Case

Collusion: a basic overview

➢ Incentive to collude

➢ Repeated interaction and tacit collusion

➢ *Undercutting*

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Incentive to price collusion

Static model (*one-shot*) :

- **Bertrand** (price) competition $\implies$ Competitive profit lower than the industry profit

$n\ (>1)$ identical firms:

Bertrand ➔ $\quad p^B = MC = c \quad\quad q^B = 1/n\ Q(c) \quad\quad \pi^B = 0$ for all

$\quad\quad\quad Industry\ profit: \quad \Pi^B = n\ \pi^B = 0\ < \Pi^M$

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Firms prefer:

- **Increase the price to the monopolistic one**

- **Reduce production/quality**

Collusive Agreement to:

i. Avoid competition

ii. Increase the market price ➔ increase **market power**

Market power hinders the buyer

Collusion is **tacit** when arises as a "spontaneous equilibrium" (focal point)

Repeated procurement and price collusion

Profit flow if each competitor uses collusive strategies

	1	2	3	……………..
Collusion	Π^c	Π^c	Π^c	……………..
Deviation	Π^M	0	0	……………..

Profit⬜

—— Collusion

—— Deviation

Π^M

Current Benefit

Necessary discount factor!!!

Π^c

Future punishment

0

1   2   3   …

Time and competitive procedures⬜
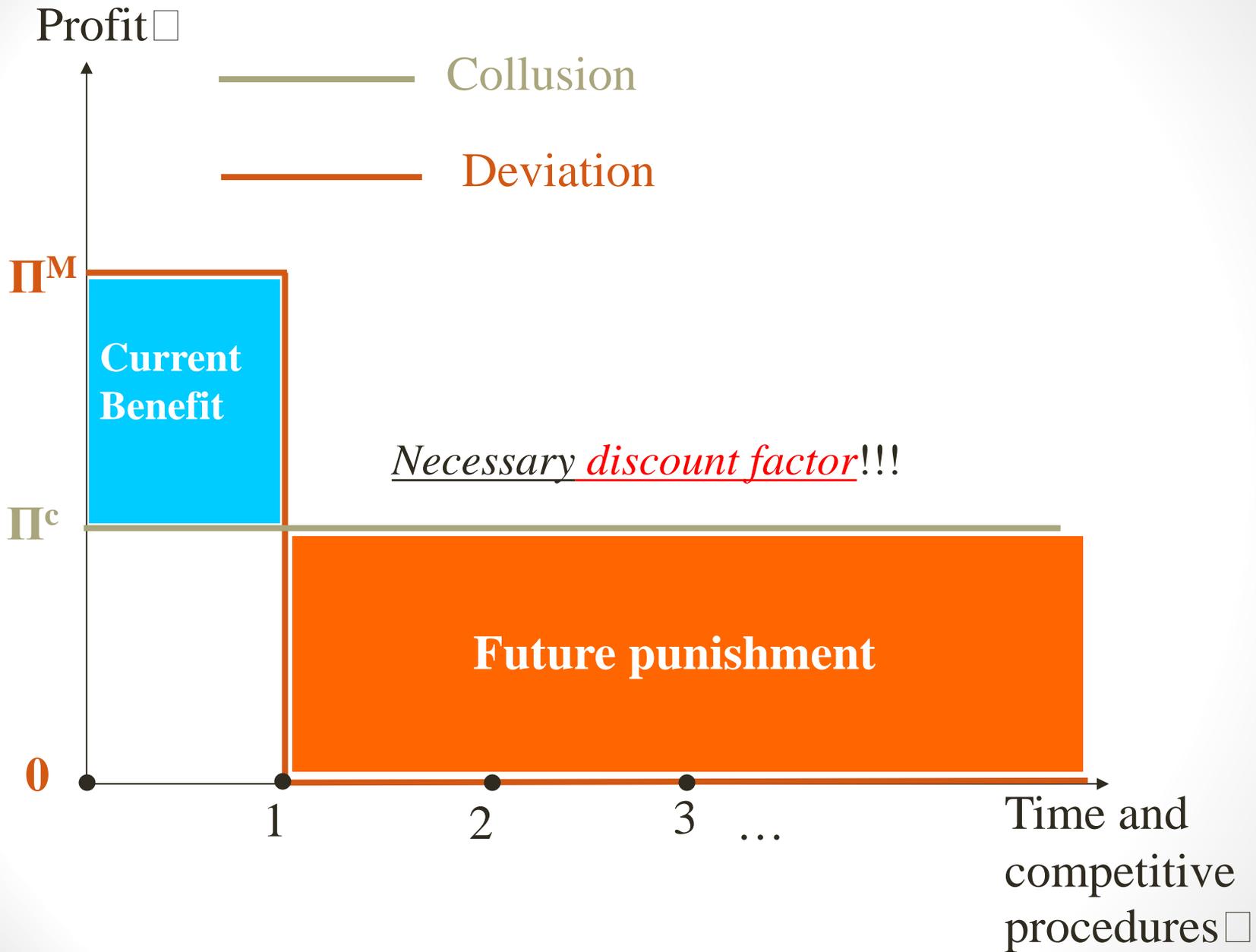
General formula:

$G^{\mathbf{C}}$: collusive profit $G^{\mathbf{D}}$: deviation profit $G^{\mathbf{P}}$: punishment profit

$$\frac{1}{1-\delta}G^{\mathbf{C}} \geq G^{\mathbf{D}} + \frac{\delta}{1-\delta}G^{\mathbf{P}} \quad \blacktriangleright \quad \boxed{\frac{G^D - G^{\mathbf{C}}}{G^D - G^{\mathbf{P}}} \equiv \widetilde{\delta} \leq \delta}$$

➔ **collusion is stable IF the discount factor is sufficiently high**

$$\frac{d(\widetilde{\delta})}{dG^C} = \frac{-1}{G^D - G^{\mathbf{P}}} < 0$$ The Higher the collusive profit the higher the incentive to collude

$$\frac{d(\widetilde{\delta})}{dG^P} = \frac{G^D - G^{\mathbf{C}}}{\left(G^D - G^{\mathbf{P}}\right)^2} > 0$$ The Lower the punishment profit the higher the incentive to collude

$$\frac{d(\widetilde{\delta})}{dG^D} = \frac{G^C - G^{\mathbf{P}}}{\left(G^D - G^{\mathbf{P}}\right)^2} > 0$$ The Higher the deviation profit The lower the incentive to collude

Discount factor (1/3)

(some) Determinants of the discount factor:

- **Frequency of the interaction**

  High frequency➜ High discount factor

- **Probability of continuation**

  high probability of continuation➜ high discount factor

- **Growth rate**

  High growth rate ➜ high discount factor

Factors hindering collusion

1. High number of competitors

2. Asymmetry (costs, market share, capacity)

3. Division into lots

4. Difficulties in detecting deviations

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1. Number of firms

The higher the number of competitors, the more profitable is the deviation

Intuition:

Net benefit from deviating $\Pi^M - \Pi^C$ **Increasing in *n***

Net loss from the punishment Π^C **Decreasing in *n***

3. Divisions into lots

- When the contract is split into small lots even small competitors may participate

- Number of lots must be lower than the number of potential participants

4. Transparency

Difficulties in detected undercutting (anti-collusive)

1. In sequential procurement an opaque disclosure of information policy hinders collusion

2. However transparency is usually obligatory because:

    - Procurement authority acts on behalf of the public buyer

    - Hinders corruption

3. Disclosing only the winning-bid is a good policy hindering collusion

4. Delaying publication of information about (and to the) non-winning bidders (Cesi and Di Natale, 2019)

Tendering formats and collusion

Lowest price vs. second-price auction

- Lowest Price Auction: collusion less stable

Reservation Price=20	Bidder 1	Bidder 2	Bidder 3 (winner for the cartel)
costs	10	10	2
Collusive bids	P>20	P>20	20
Possible deviation (2)	0	19	

- Deviating firm (2) gains 9

- Second-price auction: collusion more stable

Reservation Price =20	Bidder 1	Bidder 2	Bidder 3 (winner for the cartel)
Costs	10	10	2
Collusive bids	P>20	19	18
Possible deviation (2)		17	

- Firm 2 bids 17 wins but receives 18
- Deviation leads to a profit of 8
- Lower incentive to deviate

European Competitive tendering (Consip s.p.a.): consultancy service (financial audit) for the Italian local governments (regions) for the European co-funds (2015)-**The big four cartel**

- 30 ES   - 70 TS (Complex)
- Mean scoring rule
- 9 geographical lots
- **illegal checkerboard** scheme

Tabella 6: offerte delle *big four* nella gara AdA

	lotto 1	lotto 2	lotto 3	lotto 4	lotto 5	lotto 6	lotto 7	lotto 8	lotto 9
kpmg	30	30	10	14	11	14	10	14,999	30
EY	11,21		31,42	11,55	13,25	31,44	31,51	11,21	
PWC		13,553	13,186	11,632	32,274				12,676
Deloitte	10,064	10,905	13,207	31,342	12,098	10,064		31,342	14,048

Dynamic vs. sealed-bid (simultaneous) competitive tendering

- Dynamic tendering enforces collusion (immediate retaliation)

- In a sealed-bid collusive agreement the efficient firm bids above its value and the other members withdraw from the tendering (phoney bid)
  - Higher current incentive from deviation (no retaliation)

- Sequential Multiple contracts

  - Different but related goods (laptops, monitors) in which multi-product bidders are active

  - Collusion is stable

  - Effective retaliation (collusion enhancing)

  - Multiplicity equivalent to high frequency (collusion enhancing)

Alternative rules for dynamic auctions

Code bidding (pro-collusion)
- Signal for object of interest, identity, ongoing punishment
- Solutions:
  - Publish only a set of anonymous bids
  - Limit the number of digits

Jump bidding (pro-collusion)
- Signal of low cost
- Other bidders drop out earlier
- Upper bond may be useful

Bid withdrawals

- Collusion signaling (warning of retaliation, part of cooperative strategy under objects slitting)

    - Solution: limit the number of withdrawals or make it costly

Closing rules

- ## Simultaneous closing rule on different objects
  - Bidding open until there are no new bids on any object (FCC)
  - Enhance collusion when bidders are equally sharing the markets
  - Stronger retaliation (punishment): applied in both auctions

- ## Sequential closing rule reduces collusion (object-by-object)
  - The auction for good A closes first (without waiting for the end of new bids for good B)
  - Once auction for A is closed, any deviation occurring in B is punished only in this auction (still unclosed because of the new-deviation-bid)

Bidding consortia and subcontracting

- Firms form consortia to participate in competitive tendering

- Fosters efficiency, entry and competition

- It is better to allow BC only when bidders are unable to participate alone
  - Number of effective bidders is not reduced
  - Less risk of collusion

Ex post anti-collusive devises

- Buyer cannot apply sanctions, but…

- It may affect the expected loss from collusion:
  - Increase the probability of detection (detailed reports to antitrust authorities)
  - Increase the loss from legal complains (law-suits for damages)
  - Tough reputation against cartels
  - Distortion in the next competitive tendering (exclusion, "handicaps")

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