Designing the Competitive Tendering Process: Competition with Sealed Bids and Electronic Auctions

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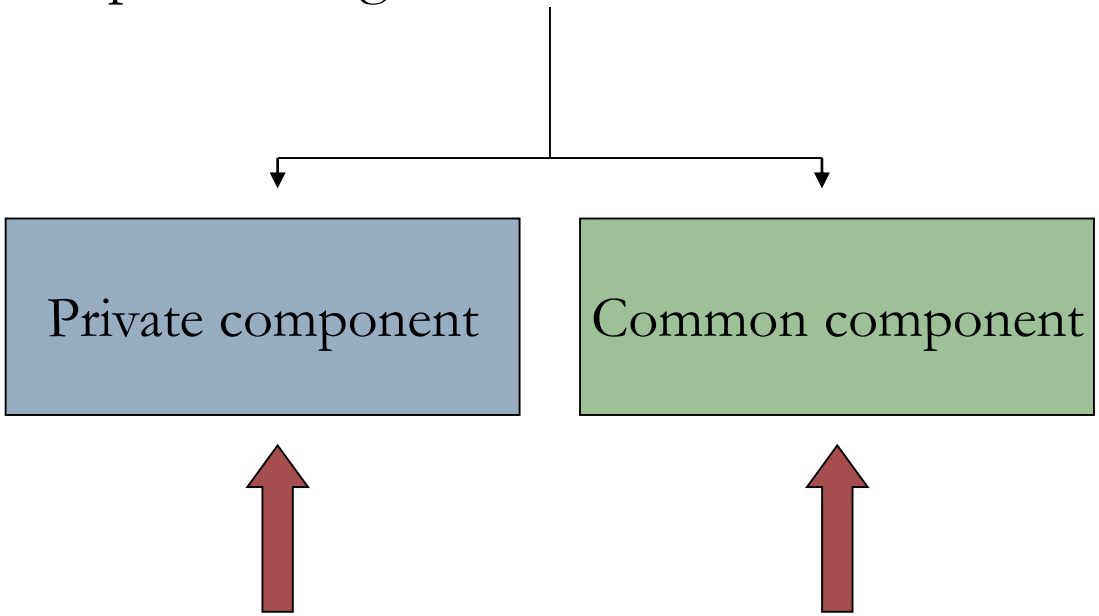
The Nature of Uncertainty

Factors affecting the cost of performing a contract are divided into



What if the Private Component Prevails?

- **In most cases, both private and common components are present**
  - However, the impact of the *common component* can be ignored when suppliers share the same information about the common component
  - The prevalence of the *private component* implies that each single supplier's estimate of the cost for performing the contract would not change if it were to learn another firm's private component

Lessons for the Design of a Tendering Process

- When the *private component prevails*, the sealed bid competitive process is appropriate (or the single-round auction)
- But which sealed bid format? (Vickery 1961)
  - Each tender's profit depends on its private piece of information

Advantages of this approach

Low management costs

Speed

Favours participation of smaller tenderers

Reduces risk of collusion

Lessons for the Design of a Tendering Process

- *Why are dynamic auctions more prone to collusion than sealed bid* ? Example:
- Consider 3 companies, A,B,C which agree to coordinate on a cartel in procurement competition for 1.000 lap tops, assigned to the lowest price in a dynamic auction. Maximum price 200€ set by the Contracting Authority.
- Suppose they agree for A to win with price 190€, B should bid up to 192€ and C until 195€. So they agree to offer 5% discount only.

	A	**B**	**C**
t=1	198€		
t=2			195€
t=3		192€	
t=4	190€		
t=5		180€??	

- A and C realise that B is violating the cartel and could react immediately by offering prices below 180€ to *punish the deviation* and prevent B from getting the contract. So B may decide not to deviate from the cartel agreement.

Lowest price vs Vickrey Auction Sealed Bid Auctions

- **Lowest price**

Company	Price
A	100
B	80
C	60

- **C wins** and receives **60**
- From CA

Second Lowest Price (Vickrey)

Company	Price
A	90
B	65
C	40

C wins and receives **65**

From CA

Lowest price vs Vickrey Auction Sealed Bid Auctions

- **Lowest price**
- Company Price
- A 100
- B 80
- C 60

Second Lowest Price (Vickrey)

Company	Price
A	90
B	65
C	40

- **Costs for executing the contract** c(A)=90, c(B)=65, c(C)=40
- **Profit Margin Lowest Price**
- PM(A)=0
- PM(B)=0
- PM(C)=60-40=20
- At least one firm regrets the
- offered price upon

Profit Margin Vickrey

PM(A)=0

PM(B)=0

PM(C)=65-40=25

No firm regrets having offered costs

Lowest price vs Vickrey Auction Sealed Bid Auctions

- Vickrey truth telling mechanism; price offered=costs
- Goethe, stamp collectors

How to Cope with the Common Value Component – Case 1

- Consider the following simple contract for **cleaning services**

Table 1

	A	B
Reserve price (€/square metre)	70	
Private value component Estimated cleaning costs: (€/square metre)	40	80
Common value component with no uncertainty Surface to be cleaned: (square metres)	30000	10000

Since Unit cost = (EUR 40 x 30 000 + EUR 80 x 10 000) / 40 000 = EUR 50 /m2 then, any bid between EUR 50 and EUR 70 would yield non-negative profit

- The contract comprises two main space categories: ***A.*** *Offices and corridors* and ***B.*** *Laboratories*. Table 1 summarises one of the tenderer's estimated costs per square metre.
- Each tenderer <u>knows perfectly the exact size of surfaces</u> to be cleaned for both categories A and B
- Each tenderer's bid will ***only depend on its (private) efficiency component*** and, arguably, upon its conjectures on other competitors' efficiency levels

How to Cope with the Common Value Component – Case 1

- Consider a more sophisticated version of the same contract for **cleaning services**

Table 2

	A	B
Reserve price (€/square metre)	70	
Private value component Estimated cleaning costs: (€/square metre)	40	80
***True* demand for cleaning services** Surface to be cleaned: (square metres)	30000	10000
Estimated common value component Surface to be cleaned: (square metres)	32000	2000

Estimated unit cost = (EUR 40 x 32 000 + EUR 80 x 2 000) / 34 000 = EUR 43.52 /(square metre) the tenderer is overestimating the task requiring the lower unit cost, but is underestimating the task with the higher unit cost. As a result, submitting unit prices between EUR 43.52 and EUR 50 will make the same tenderer lose money

- The contract comprises again two main space categories: ***A***. *Offices and corridors* and ***B.*** *Laboratories*. Table 1 summarises one of the tenderer's estimated costs per square metre.
- Each tenderer does not know the exact size of surfaces to be cleaned for the two classes A and B

- Each tenderer's bid will ***now depend also upon its estimate of the common value component***

Learning Through Bidding

- When suppliers have different information about the common component and those pieces of information show some degree of (statistical) dependence (i.e. correlation)
- A dynamic bidding procedure (electronic auction with a number of rounds) makes learning possible
- Bids reveal part of a supplier's information to its competitors, which in turn helps them form a more precise estimate of the actual cost – thus reducing the risk of suffering from the winner's curse (actual production costs higher than estimated ones)

Policy Guidelines on the tendering Format

When opting for a dynamic format, avoid:

- Fixing exogenously the number of rounds, unless mechanisms for forcing bid downwards are put in place leaving tenderers in a position to determine price dynamics

Conclusions

- Single round sealed-bid formats are generally quite appropriate in procurement
- Dynamic auctions can be used only if there is no suspect of collusion for cost-discovery