

# Strategic Tools for Procurement Procedures

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# Motivation

- In 2000 the Italian Government enacted a law establishing that Consip [www.consip.it](http://www.consip.it), a stock company fully owned by the Ministry of Treasury, funded in 1997 to manage the Treasury information system, would become the “National Procurement Agency”, entitled to purchase on behalf of the whole public sector.

# Motivation

- This was a big innovation for Italy (a country of “thousand tower-bells”) though somewhat “forced” by the need to “*rationalize*” public expenditure, because of the necessity to cut and/or mitigate, where possible, the very high Italian Sovereign Debt (mostly cumulated between the 1980 and 1990) presently almost 120% of the Italian GDP, main source of recent financial turbulence.

# Motivation

- In 2003 I began collaborating with the Research Unit of Consip, to participate to a main project (“The Handbook of Procurement” CUP), and other projects.
- This gave me the opportunity to investigate the fascinating area of Procurement, where many areas of modern economics meet to serve daily.
- I’m indebted to Consip for this opportunity but of course I will speak for myself here.
- It may be interesting for you to know that Consip became a case study for HBS programme.
- Despite highly skilled computer scientists, lawyers etc. top management thought that the economic culture of procurement was weak, and the Handbook was conceived to support building up such culture.

# Motivation

- Despite highly skilled computer scientists, lawyers etc. Consip top management thought that the economic culture of procurement was weak, and the Handbook was conceived to support building up such culture
- Indeed, each chapter of the Handbook was stimulated by internal discussion on how to organize *effective* procurements, which means focusing on desirable auction design, but also on the impact on markets, public opinion etc.

# Motivation

- But, why care about procurement? Because figures are remarkable.
- For instance, in the EU, about 16% of European GDP ( approx 2.200 €bln) has been transacted via public procurement.
- Therefore, effective vs ineffective public procurement can make a big difference on a country's performance.

# Introduction

**Six( at least) main lessons I learned:**

(1) *Economists and practitioners can learn from each other; learning is bidirectional.*

*Simple Examples (out of many)*

In an early, pilot, descending multi-round auction for electronic devices Consip operators introduced, at each round, a lower bound (as well as an upper bound) to price offers. Without having heard of the “Winner’s Curse”, they inserted a lower bound to provide the “*right pace*” (as they said) to the auction, to mitigate the likelihood of “highly mistaken-wild” price offers (ALT) and bankruptcies

I was not aware of such simple, though effective and thoughtful, idea from the economic literature.

From my own perspective, I could not get satisfactory answers when asking to practitioners what would be advantages and limitations of sealed-bid (secret offer) vs dynamic (open) procurement auctions.

# Introduction

*(2) Theory and specialized literature are fundamental can not do everything.*

*Simple Example* (one out of many)

A concern for “numerous” participants to procurement auctions, even if a number of such firms would be inefficient.

In general, not considered as a main goal by the specialized literature

This concerns typically leads to division of large procurement contracts into multiple lots



# Introduction

*(3) Effective procurement requires more than appropriate auction design*

*Simple Example (out of many)*

Monitoring the quality delivered by the contractor and, where needed, implementing an appropriate system of penalties or incentives is crucial for procurement success.

If penalty systems are badly designed, or poorly implemented, firms will incorporate this in their bids.

*(4) Price is not everything*

Very low prices offered can be undesirable as delivery of promised quantity and/or quality may be endangered.

# Introduction

*(5) Distinguishing feature of procurement is repetition.*

Public, but also private, procurers tend to deal with the same suppliers repeatedly. This has pros and cons.

For example, a main advantage is that “Folk Theorems” (Relational Contracts) type-of-contexts may “enforce” appropriate quality delivery

However, repetition could make it easier for firms in the market to orchestrate cartels, rotating contract awards over time, and by so doing reduce procurement effectiveness.

# Introduction

6) *Effective public procurement procedures have common traits across countries (goods-services-works) but they may also be country (goods-services) sensitive. In general, “one size does not fit all”*

*Simple Example* (one out of many)

The UK Public Procurement Agency (a unit of the OGC called “Buying Solutions”)

<http://online.ogcbuyingsolutions.gov.uk/news/>)

runs electronic procurement auctions after which the outcome could still be negotiated. In Italy, so far, this was not possible.

# Some Main Procurement Themes

- The Handbook contents provides an overview of the main issues a buyer faces for effective procurement. Again each chapter has concerned Consip activity, either directly or indirectly

# Some Main Procurement Themes

- **Centralization**

A first fundamental decision to take for a procurement system is which goods and services centralize or decentralize to peripheral units

Initially, for Consip, this was not a major concern as it was “born central” (what could or could not do was determined by Law). However, in recent years new Regional Purchasing Agencies were set up (“Tuscany” in Florence, “Lombardy” in Milan, “Emilia Romagna” in Bologna) and there was a need to think how to coordinate these agencies actions, in order to avoid duplications and money waste. Consip was given the flexibility to choose how to coordinate with these new procurement entities, and this stimulated an internal debate on procurement centralization.

What are the main issues to consider when deciding the degree of centralization of a procurement system?

Economic literature provides little or no help; yet, the problem is crucial.

# Some Main Procurement Themes

- **Centralization**
- In what follows we list some elements supporting centralization

Efficiency, savings and costs control

Product standardization

Concern for favouritism and Corruption (World Bank)

Strategic procurement

Bargaining power

Innovation, networks and standards

In general, effective centralized procurement could only be made electronically.

Evidence shows that mixed type central-local of systems are recently prevailing, both in public as well as in private procurement.

# Some Main Procurement Themes

- **Procurement Contracting Strategies**
- The most common types of (explicit) contracts used in procurement transactions are:
  - (1) cost reimbursement (cost-plus fee)
  - (2) fixed-price contracts
  - (3) incentive contracts

In what circumstances should a buyer prefer to use one rather than the other? The economic theory of Moral Hazard provides indications.

# Some Main Procurement Themes

- **Procurement Contracting Strategies**
- (1) cost-plus: *when the costs paid by the firm to execute a contract are “easy” to ascertain. Risk of cost increase borne by the procurer. Often an upper “cap” to costs is also inserted to stimulate the contractor’s effort for cost control.*
- (2) fixed-price contracts: *when the firm costs for the contract are not easy to ascertain or when quality is predetermined and performance verifiable. Penalties are however important to deter ex-post contractor’s opportunism while executing the contract.*
- (3) incentive contracts: *for example,  $P+bC$ , mixed (1)-(2), to stimulate quality provision in complex procurements (for example in the construction industry and US defense industry).*



# Some Main Procurement Themes

- **Auctions vs negotiations ? Which contracts?**
- Which contracts should be used with auctions and which (when possible) with negotiations?
- If projects are simple and well specified, favour fixed-price contracts awarded by auctions (competitive tendering) to stimulate competition in cost reduction.

# Some Main Procurement Themes

- **Auctions vs negotiations ? Which contracts?**
- If projects are complex, and not well specified before hand, then a cost-plus contract negotiated (with reputable firms) should be favoured.

Indeed, a competitive tendering in this case might select the less skilled managers, competing aggressively on the “plus” component of the payment, as they are willing to accept lower compensation. But, in complex projects, poor coordination may be disastrous.

In general, very complex projects, where expert input on design is needed, negotiations and cost-plus contracts with reputable suppliers are preferable, while auctions, with fixed-price contracts, could be chosen for less complex projects. The 2004-14 Directives capture this point (Competitive Dialogue)

# Some Main Procurement Themes

- **If auctions, which format ?**
- So auctions (competitive tenderings) are to be preferred for simple procurement projects. But which auctions format should be selected?
- Here auction theory is very helpful (Klemperer, 2004; Milgrom, 2004)
- In general, *sealed-bid* (*secret offer*) auctions should induce a more numerous participation.
- In procurement they are much more common also because simpler to implement, and understand, than dynamic auctions

# Some Main Procurement Themes

- **If auctions, which format ?**
- Secret offer may also be less prone to collusion than dynamic auctions.
- If collusion is not a main concern, dynamic auctions however could be preferable for contracts characterized by a meaningful “*common value*” component, as it would better enhance learning and “cost discovery” for executing the contract.
- But small medium firms may be reluctant to enter dynamic auctions unless appropriate measures (like set-aside objects, bidding credits etc.) to induce them to enter, would be introduced. If they do not enter, incumbent firms might consolidate their positions, up to market dominance.

# Some Main Procurement Themes

- **If auctions, which format ?**
- Moreover, the transparency of dynamic auctions may induce bidders to behave strategically, weakening the advantages of open tenders. For example, bidding behaviour defined as “*snake in the grass*” would prevent learning from taking place, while “*jump bidding*” would try to discourage opponents at the start of the auction.
- In case a dynamic auction would be chosen, multi-rounds, rather than continuous time, auctions may be preferable
- The Anglo-Dutch auction (Klemperer 2004), is a design to capture the virtues of both sealed-bid and dynamic auctions.
- They would allow bidders more time to pause and think, between rounds, what could be a best offer for the next round.

# Some Main Procurement Themes

- **If auctions, which format ?**
- Generally, in (public) procurement, dynamic auctions may not last for too long, as they could be too costly for the buyer and the suppliers. This is unlike “isolated” auctions where teams of experts are hired just for that, as in the sales “Spectrum” auctions
- When auction length is a concern, a minimal, yet effective, dynamic auction could be some kind of a two-stage (Perry-Wolfstetter-Zamir, 2000) competition (for example, used in Italy to privatize part of ENI)
- The EU 2004 directive implicitly suggests two-stage procedures (“Framework Agreement”, “Electronic Auctions”) as effective procedure for procurement

# Some Main Procurement Themes

- **How many lots?**
- Procurement contracts are often divided into lots but how many, and which ones, should they be?
- Criteria are often geographical, or defined by the type of goods-service-work being procured.
- There is a fundamental trade-off to solve when deciding the number of lots.
- The higher the number of lots, the greater the expected number of participants in the competitive tendering, but the more difficult would be for some of the firms to express their economies of scale.
- Moreover, increasing the number of lots could make it easier for firms to coordinate on how to split the contracts.

# Some Main Procurement Themes

- **How many lots?**
- The following two broad indications seem to emerge from practice and literature (Klemperer, 2004)
  - (1) *The number of lots should be smaller than the expected number of participants* (also Italian Competition Authority)
  - (2) *The number of incumbents should be lower than the number of procured lots, and one of the lots ought to be reserved to new entrants* (UK, G3 Auction)
- However, to prevent firms colluding often is not enough to focus on the design of a single auction but also on possible future auctions and, moreover, on auctions for similar items taking place elsewhere at the same time.



# Some Main Procurement Themes

- **How many lots?**
- Having multiple lots could also “insure” the procurer against lock-in effects and dis-functionalities.
- With a single lot a contractor’s bankruptcy could generate problems in completing services/works, delivering goods
- With two lots (“Split Award”, “Multi-Sourcing”), the buyer could always ask another contractor to extend the supply also to the other lot.
- <http://www.scdigest.com/assets/newsViews/07-08-15-1.php?cid=1178>. Recent Nokia Multisourcing procurement announcement

# Some Main Procurement Themes

- **Which Multi-Contract tendering Procedures?**
- A main (economic) problem with multi-contract procurement auctions is the so called “*exposure problem*”
- This happens when lots are auctioned separately, and economies of scale can be expressed only if a certain package of procurement contracts is awarded to the same supplier.
- So, having larger lots could be a solution. But while they could help expressing economies of scale at the same time they would also tend to exclude small, though possibly efficient, firms unless they “jointly bid”.

# Some Main Procurement Themes

- **Which multi-Contract tendering procedures?**
- How to solve this trade-off ?
- A possibility is “package”, (“combinatorial”, “conditional”), bidding. (Cramton-Steinberg-Shoham, 2006)
- The table shows an example of the exposure problem with two lots, A and B.
- For Firm 1 lots A and B exhibit “positive” complementarities
- For Firm 2 lots A and B exhibit “negative” complementarities

|        | A   | B   | (A,B) |
|--------|-----|-----|-------|
| Firm 1 | 300 | 300 | 350   |
| Firm 2 | 100 | 100 | 500   |

# Some Main Procurement Themes

- **Which Multi-Contract tendering procedures?**

- Optimal to give both (A,B) to Firm 1 for 350.

- However, with complete info. the buyer is likely to pay more than 350

|               | <b>A</b> | <b>B</b> | <b>(A,B)</b> |
|---------------|----------|----------|--------------|
| <b>Firm 1</b> | 300      | 300      | 350          |
| <b>Firm 2</b> | 100      | 100      | 500          |

# Some Main Procurement Themes

- **Which multi-Contract tendering procedures?**
- “Package, combinatorial, bidding” has been applied to private procurement (Mars) but to public (“London Bus Routes”, Cantillon-Pesendorfer 2006) ? Moreover, does package bidding necessarily produce what is expected ?
- **Example:** Consip (Framework Contract for Land and Satellite, Telephone and IP, connection 2005)  
*4 lots; 1 Incumbent, Italian “Telecom”.*  
(1)  $A_1$  = Central. Adm. Land;  $A_2$  = Local. Adm. Land;  $A_3$  = Other Adm. Land  
(2) B = Satellite connection
- Firms could submit combinatorial bids for  $A_i$  lots; lot B was kept separated. A new entrant firm won all lots A, thanks to a package offer. The incumbent contested how the winner calculated costs for package but it lost the case in court. A new firm began to serve the public sector.

# Some Main Procurement Themes

- **Further Issues**
- Fostering Participation
- Best value for money and Scoring Rules
- Procuring Innovations (Pre-Commercial Procurement)
- The Law and Economics of EU Directives