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Framework Agreements and Repeated Purchases:

The Basic Economics and A Case Study on the Acquisition of IT Services



Ministero
dell'Economia
e delle Finanze



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Abstract

Framework Agreements are increasingly recognized as potentially effective purchasing arrangements, allowing public agencies – both at central and local level – to aggregate demand and streamline procurement processes, while keeping some degrees of contract flexibility. Yet little research is being conducted on the “economics” of Framework Agreements, let alone in-depth analyses of concrete case studies. These gaps in the literature motivate this paper.

After describing the two-stage competition process, we consider the major economic dimensions such as the degree of completeness of the “master contract”, the choice concerning the number of admitted economic operators, and the number/value of the individual purchasing contracts. We finally analyze how the Italian Public Procurement Agency, Consip SpA, tackled some of the above mentioned aspects when designing a Framework Agreement for IT services on behalf of the Italian Ministry of Economy and Finance.

1. What are Framework Agreements?

Framework Agreements (FAs) are anticipated arrangements for the delivery of goods and services over a certain period of time. According to both international practices and regulation, three broad definitions of FAs can be identified:

- The European Union (EU), in the procurement 2004 Directive¹, defines framework agreements as agreements “between one/more contracting authorities and one or more economic operators ... to establish the terms governing contracts to be awarded during a given period ... with regard to price and ... the quantity envisaged.”
- The United States of America have adopted different options such as: Government-Wide Acquisition Contracts (GWAC), Indefinite Delivery/Indefinite Quantity (IDIQ) contracts and Multiple Award Schedules (MAS) that imply multiple standing contracts with subsequent competition for task or delivery orders².
- The United Nations Commission on International Trade Law (UNCITRAL) defines a framework agreement as a transaction to secure the supply of a product or service over a period of time (periodic/recurrent purchase arrangement, periodic requirements arrangement, periodic supply vehicle).

The three families are linked by two common traits: the aggregation of demand for goods and services to be delivered/provided at different moments in time; the adoption of a two-stage procurement process. In the following two sections, we will emphasize the potential benefits and risks from aggregating (not necessarily homogeneous) public demand, possibly originating from different purchasing units – be them offices within the same Department/Ministry rather than contracting authorities scattered over a certain territory – and those arising from a two-stage procurement process.

Sections 4 and 5 will be devoted to a more detailed analysis of two common classes of FAs, that is Framework Contracts and multiple-award incomplete FAs, respectively. Section 6 will discuss a case study about the implementation of a FA for the provision of IT services for the Italian Ministry of Economy and Finance. Section 7 concludes.

¹ Directive 18/2004 CE, “On the coordination of procedures for the award of public works contracts, public supply contracts and public service contracts”, available at <http://ec.europa.eu>

² A compared analysis on the usage of framework agreements in Europe and US is outlined in (Yukins, 2008).

2. Framework Agreements and centralized public procurement strategies

Cost control is definitely a key issue in public (and private) procurement. Everywhere, Governments are increasingly urged to rein back public spending. This is very often done by rationalizing public expenditure for goods and services, which account for a considerable amount of resources. Being generally perceived as "politically less sensitive" targets for budget cuts than pension or health expenditure, public spending for goods and services becomes almost naturally the target of cost-controlling policies.

Demand aggregation or centralized public procurement, when appropriately designed, may help reduce purchasing costs considerably. This is mainly due to the interaction among several forces:

- Production economies of scale;
- Increased bargaining power of the contracting authority;
- Increased specialization;
- Knowledge/resource sharing.

2.1 Production economies of scale and bargaining power

The more standardized the product/service the more potentially advantageous to the buyer to aggregate demand, since suppliers are in a position to exploit economies of scale, thus operating at a lower unit cost. Economies of scale arise whenever production costs comprise a sizeable fraction of fixed costs, that is, of costs that are independent of the production scale. By increasing production firms are able to operate at a lower *unit* cost.

The dimension of product standardization is sometimes hard to disentangle from the degree of demand heterogeneity. To see this, consider a very simple case of procurement of gasoline. This might be considered a highly standardized commodity, but contracting authorities may have different preferences concerning delivery conditions and payment delays so that procurement contracts would end up being different "objects". Consequently, commodity standardization – or, better, contract standardization – should also be coupled with a low degree of demand heterogeneity for aggregation to deploy its full potential. When this is the case, demand aggregation generally allows firms to produce at a lower unit cost.

Economies of scale also arise when setting up procurement processes. This is simply due to the fact that when procurement contracts are fairly homogeneous, demand aggregation avoids the duplication of "transaction costs" that would arise if each purchasing unit were to conduct the procurement process on its own and competing firms were to submit distinct offers for each procurement process.

Lower production costs, however, may yield lower purchasing prices *only if* the buyer keeps intact or increases its bargaining power. The degree of competition is usually expected to increase with the value of procurement contracts. Particularly in markets where the public sector accounts for a relevant share of the total demand, centralization, standardization and aggregation can put the winner of a single competitive tendering in a position to significantly increase its market share. This strengthens the bargaining power of the public agency awarding the contract.

Yet, two conflicting forces come into play. For a *given number* of competitors, demand aggregation leads to fiercer competition. However, as the size of contracts gets larger, smaller firms may find it impossible to participate in the competitive processes – because of more demanding economic and financial requisites – thus leading to a lower number of competitors. Anyway, if the lower participation effect is not strong enough, demand aggregation usually leads to higher savings.

2.2 Specialization and knowledge/information sharing

Large organizations are usually characterized by high degree of specialization of human capital while, at the same time, producing lots of information. Knowledge-sharing is recognized to be a key (positive) externality arising within the boundaries of such organizations. In general, information sharing improves efficiency via the use of more up-to-date data/information, problem-sharing and common solutions. Moreover, seemingly different markets are often connected (e.g., printers with PC, insurance with banking, etc.), since major competitors turn out to be multi-product firms. For instance, computer producers as Siemens, HP, IBM – as well as retailers of their products - participate in procurement competitive tendering for Desktop PCs but also for Laptops. They can also bid for mainframes, data warehousing, and other IT services contracts.

Because of neighbouring markets, procurement officials would certainly benefit from information and knowledge-sharing in order to find solutions to common problems – e.g. the choice of appropriate procurement strategy, scoring rules, contractual arrangements. Consequently, the higher the level of centralization the more information, knowledge and data can be shared among procurement specialists. This also applies to legal expertise, in that gathering qualified resources dealing with sizeable procurement processes tends to improve the clearness, transparency and measurability of the formal requirements, i.e., the overall "quality" of tender documents, which in turn translates into a lower risk of legal suits.

3. Why a two-stage competitive scenario?

Centralization can normally be implemented at some cost, mainly the risk of “loose tailoring” of public contracts to purchasing units’ needs. Several reasons may explain the so-called “demand heterogeneity”: physical location (e.g., schools located on high mountains rather than in town, leading to different transportation costs); nature of the public service provided (Police will put by far a stronger importance to cars’ maintenance than Inland Revenue); different bundles of the same commodities (in a contract for food raw materials, different public agencies may need vegetables and meat in different proportions); different customizations of the same products or need for different optional services; or simply intrinsic characteristics as buying entities (timeliness of payments, managerial skills in contracts enforcement etc.). Heterogeneity may also simply stem from purchases taking place at different points in time. For instance, technological obsolescence does affect, *ceteris paribus*, the performance of a laptop. Consequently, purchase orders of laptops belonging to the same broad family turn out to concern with substantially different commodities when the speed of the processor becomes higher and higher over time due to hardware evolution.

In order to reconcile demand aggregation, contract tailoring and process streamlining, a flexible two-stage procedure can be designed whereby

- at the first stage, all or part of the terms of the contracts to be awarded are defined (framework agreement or master contract);
- at the second stage (call-off), the actual contracts are awarded (specific contracts or purchase orders).

Without the ambition of being exhaustive, a two stage process may result useful in two kind of situations: (i) repeated purchases by a single public agency; (ii) single/multiple purchases by different public agencies. In both circumstances, the presence of a procurement agency may be envisaged, acting on behalf of other public authorities to conclude the framework agreement, that is, to draft the master contract. In the remainder of the discussion, we will focus on the type-(i) two-stage process. This scenario captures in fact the main features of the case study that will be discussed in more detail in Section 6.

In Europe, the evolution of regulation on public procurement in the last few years – together with a series of interpretations³ of the same regulation issued by the European Commission itself – has led procurement officers and scholars alike to classify FAs according two major dimensions: i) the degree of completeness of the master contract; and ii) the number of economic operators with whom a FA is concluded.

This would almost naturally lead to four classes of FAs as described in the table below.

• Complete (all conditions established in the master contract)	• Incomplete (not all conditions established in the master contract)
• One economic operator	• One economic operator
• Complete (all conditions established in the master contract)	• Incomplete (not all conditions established in the master contract)
• More than one economic operator (at least 3 in Europe)	• More than one economic operator (at least 3 in Europe)

One immediate consequence of the above classification is that one is led to believe that whether a FA is complete or incomplete is hardwired in the master contract, that is, a FA is crafted either complete or incomplete. There exists, however, a more flexible approach to the design of the master contract, which is currently advocated by the Office of Government Commerce⁴ in the UK, whereby the FA may establish all the “core” conditions at the first stage – so as to make purchase orders immediately available – although some contractual clauses may be better defined at a later stage where competition is reopened.

Next Sections will discuss more in details the most common classes of FAs.

³ Explanatory Note – Framework Agreements – Classic Directive, available on http://ec.europa.eu/internal_market/publicprocurement/docs/explan-notes/classic-dir-framework_en.pdf

⁴ This approach is presented, for instance, in the “OGC Guidance on Framework Agreements in the new procurement Regulations” (2006), available at http://www.ogc.gov.uk/documents/guide_framework_agreements.pdf.

4. The benchmark case of Framework Contracts

It is worth starting our analysis with the case of a FA concluded with one economic operator and all conditions established in the master contract. This kind of FA, also known as "Framework Contract" (FC), is very close to the centralized procurement strategy implemented by the Italian Procurement Agency (Consp S.p.A.) within the program of rationalization of public spending⁵. Public agencies, both at a central and a local level, are entitled to make purchase orders from the Framework Contracts awarded by the Central Purchasing Agency.⁶

The main feature of a FC is that quality-price competition is entirely concentrated in the first stage, whereas the second stage, at which the specific contracts are awarded, is simply reduced to issuing of purchase orders. Hence, the main advantages of centralization, namely increased degree of competition and process streamlining, may deploy their full potential for the following reasons.

Firstly, bundling separate procurement strategies into a single process will avoid repeating the same tasks and allow specialized personnel to check the tender documents more carefully, thus considerably reducing the risk of litigation at any stage of the procurement cycle. There exists, however, an additional benefit that normally goes unnoticed, namely the "standardization of the procurement language", since different purchasing needs will be satisfied by relying on the same procedure. Standardization helps reduce barriers to entry into the procurement market, as firms will save on resources employed to check the differences in procurement strategies adopted by distinct contracting authorities, even if the latter end up purchasing similar commodities.

Secondly, if several purchase orders (for commodities) are squeezed into the same contract, the contractor(s) is (are) likely to operate at much lower unit costs than the level that would be attainable when the overall value is split in many separate contracts. As mentioned in Section 2.1, if the economies of scale and/or the higher bargaining power of the Central Purchasing Agency more than compensate for the potentially lower number of competing firms – due to more stringent economic/financial participation requirements – a centralized FC may trigger tighter competition and generate sizeable savings.

One noticeable exception to the above line of reasoning may arise when the master contract does not refer to commodities such as gasoline, computers, or printers; rather to services that require some specialized amount of human capital.

⁵ For further information on Consip and its public procurement strategies, see www.consip.it.

⁶ Framework Contracts awarded by Consip set both price and all the contractual clauses (but quantity and time of delivery of the single purchase orders). In addition, they never guarantee a minimum volume of purchases, rather establish an upper bound only. Thus the contractor bears all the uncertainty on the discrepancy between estimated and realized demand.

This is the case of "general purpose" FCs on IT services awarded by Consip on behalf of the Italian Ministry of Economy and Finance (MEF), including a large variety of activities, from simple maintenance to developments of new applications, from software customization to integration of complex systems. Quality proposals consist in providing effective and flexible teams of professionals and technological solutions to best fit the various needs of the MEF. The contractor is required to modify its working team to undertake a variety of tasks that will be precisely defined only after the "master" contract has been awarded. A risk then arises that the contract may resemble a sort of "Pandora's box" of heterogeneous services, generating high uncertainty when firms have to submit financial/technical proposals. The latter observation will constitute the starting point of our case study.

Nevertheless, by its very nature, any (centralized) FC also risks to become an inflexible purchasing tool that may not fit many public agencies' needs. So the higher the demand heterogeneity the more difficult to squeeze several purchase orders into the same FC. If demand aggregation is a bottom-up process, that is, if several public agencies explicitly delegate a centralized procurement agency (in fact, one of the public agencies may operate as such), then it should in principle be possible to determine in advance to what extent the same FC meets the needs of at least a fraction of final demand. Should demand aggregation be designed as a top-down process, that is, should a centralized procurement agency be entrusted with the mission of awarding FCs on behalf of public agencies, then some of the positive effects of centralization may be jeopardized if public agencies are not mandated to purchase through the same FC. In other words, if public agencies do have an "outside option" to buy by themselves, competing firms run the risk that realized demand ends up being much lower than the pre-award conjectured level. High uncertainty is likely to raise submitted prices thus hampering the positive effect on savings due to firms exploiting economies of scale.

Another major drawback of FCs originates from the risk of "adverse selection." It is well known since Akerlof's seminal contribution (Akerlof, 1970) that trade in markets may break down when buyers cannot distinguish between high and low quality goods. Since buyers' willingness to pay does not exceed the value of the "average quality" product, only sellers of low quality will be willing to trade. Anticipating this, rational buyers may refrain from purchasing altogether. A similar phenomenon may arise in centralized FCs. Since the same contractual clauses apply to all subsequent purchases, and public agencies may differ from each other with respect to one or more dimensions that ultimately affect contractor's realized profit, the latter are bound to make offers based on the "public agencies' average profile".

5. The multi-award incomplete Framework Agreements

Consequently, “bad” public agencies are more likely to issue purchase orders.

Let us see the potentially harmful consequences of adverse selection in a stylized FC for car insurance.

Suppose that public agencies differ with respect to the risk of accident of employees using cars for accomplishing their duties. Public agency “G” displays good accident records (low risk), whereas public agency “B” displays very poor records (high risk). Defining p_G and p_B the insurance premiums for low-risk and high-risk drivers respectively, an insurance company would set $p_G < p_B$ if it were able to make two separate offers. Requiring all conditions to be fixed, a FC would determine *only one* insurance premium.

How would companies set the average insurance premium p_A ? The competitive level of p_A is likely to depend, ceteris paribus, on whether the use of the FC is mandatory. If this is the case, and the competitors have sensible conjectures about the fraction of high-risk public agencies, say, 60%, then competition would drive the premium to a level of $p_A = 0.6 p_B + 0.4 p_G$. The resulting purchase orders give rise to social inefficiency since high-risk (resp. low-risk) agencies are paying too a low (resp. high) insurance premia than the ones that would emerge from insurance companies negotiating directly and separately with public agencies. If, instead, the use of the FC is on a voluntary basis, then any “average” insurance premium p_A such that $p_G < p_A < p_B$, would cause low-risk public agencies to look for a better outside option.

Rational profit-maximizing firms will anticipate that only high-risk public agencies will purchase through the FC, thereby setting $p_A = p_B$.

5.1 The main goal of incomplete Framework Agreements

Despite the formal classification into different “families” sketched in Section 3, most public procurement practitioners use to think about FAs by implicitly referring to the “incomplete” FAs concluded with more than one economic operator. It is unsurprising, then, that they are identified by the Explanatory Note⁷ of the Directive issued by the European Commission as Framework Agreements “*strictu sensu*”.

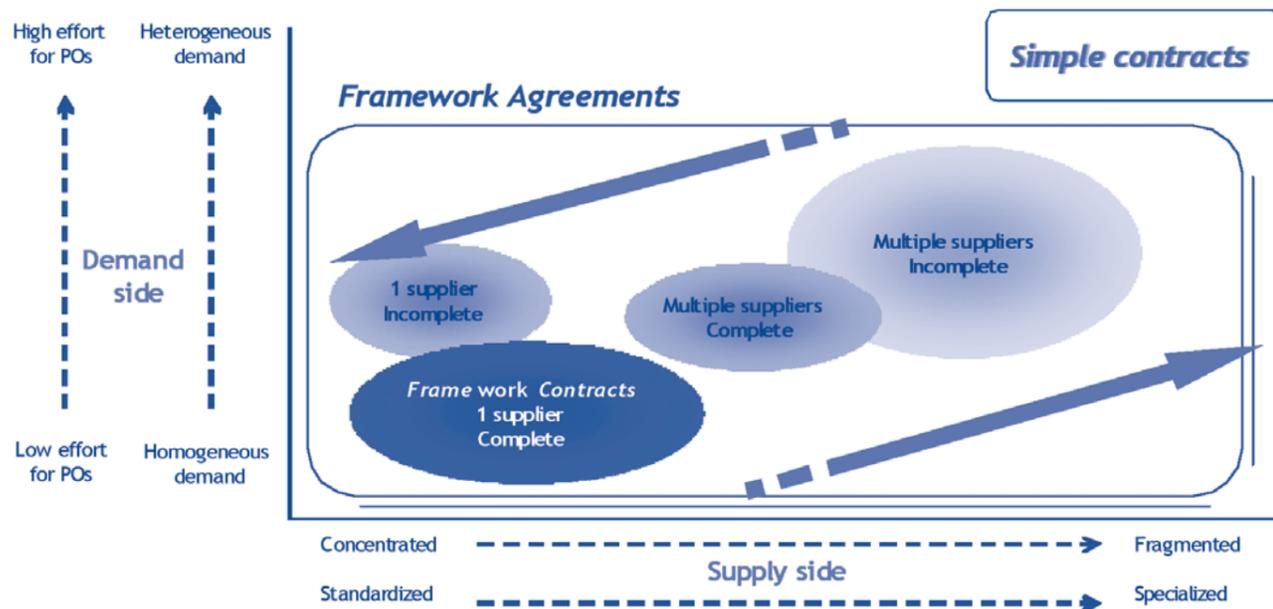
As discussed in the previous section, Framework Contracts allow public buyer(s) to reap most of the “classic” benefits of centralization, namely via tough competition, efficient use of specialization and knowledge sharing among the procurement officials, and minimization of the effort and process cost of the purchasing unit(s). On the other hand, “simple” purchasing contracts concluded through distinct and autonomous awarding procedures, while giving up such benefits, provide the contracting authorities with the maximum flexibility and possibility of customization and reduce the uncertainty faced by the competitors. Ideally, simple contracts also ensure allocative efficiency, in the sense that each contract will likely be served by the supplier who is the most efficient to do it.

In this perspective, which ranks the different procurement strategies on the basis of the degree of standardization (or centralization), multi-award “incomplete” FAs (or FAs *strictu sensu*) lay somewhere in between FCs and simple contracts (Figure 1). This suggests that their main purpose should be to address the trade-off between demand aggregation and process efficiency on the one hand and customization, flexibility and allocative efficiency on the other one⁸. In other words, the main goal of incomplete FAs is to streamline the process for repeated purchases by providing a large amount of the overall required effort in the first selection round, while leaving some space for customization and further competition at the second stage, when the actual procurement needs arise and their specific features (quantities, delivery conditions, specific tasks to be undertaken, requested customizations) become better known.

⁷ Explanatory Note – Framework Agreements – Classic Directive, available on http://ec.europa.eu/internal_market/publicprocurement/docs/explan-notes/classic-dir-framework_en.pdf.

⁸ The trade-off between competition and efficiency in incomplete FAs is analyzed more formally by (Albano and Sparro, 2008) in a stylized two-stage model with horizontal differentiation.

Figure 1



As mentioned above, such a mechanism typically turns out to be very useful in the case of a central purchasing agency concluding the agreement in order to define the basic qualitative features as well as upper-bound price conditions for contracts to be awarded by different and heterogeneous contracting authorities. This is the case, for instance, of the GSA Schedules in the US (accessible by all US Federal Government agencies), of the Framework Agreements concluded by OGC Buying Solutions in the UK, and Hansel in Finland. In what follows, however, we will focus our attention to the case where the FA is concluded and all the specific contracts are awarded by one single contracting authority.

5.2 The two-stage competition

Where the needs and/or the preferences of the contracting authority are somehow unknown or heterogeneous with respect to relevant aspects of the contracts to be awarded, it is then optimal to let these aspects to be defined through a second round of selection (the call-off stage).

When actual needs arise, so that the uncertainty about the exact object and characteristics of a single specific contract is sensibly reduced, the selection is reopened and the operators part of the agreement are asked to precise and/or complete their first-stage offer. Thus, unlike what occurs with FCs, the two-stage procurement process consists of two distinct rounds of competition.

In practice, let us consider the case of a process based on the Economically Most Advantageous Tender (EMAT) awarding criteria. In the most general case, at both stages offers are scored, ranked and selected on the basis of both price and technical sub-criteria, established in the tender documentation of the FA. Importantly, the offers submitted at the first stage can not be substantially modified at the second stage⁹. A possible practical interpretation of this principle is that "core" or "basic" technical features of the supply/service have to be evaluated when concluding the FA and may not be successively modified. Competition can instead be reopened with respect to optional items/services, customizations or further improved qualitative features. As regards the financial offers, a commonly adopted rule is that prices submitted at the first stage can only be lowered at the call-off stage.

Such a mechanism yields several strategic implications. Firstly, the suppliers may want to submit their best offers since from the first stage only with respect to the features of the contract that can not be successively changed. On the contrary, they will possibly avoid to compete too aggressively on price, so as to offer the highest price that allows them to be selected at the first stage. In fact, this could allow them to exploit possible (technical) competitive advantage at the second stage and keep their profit high. Secondly, it is possible that some competitors aim at entering the agreement in order to serve one (or a few) specific contract only. This could induce them to submit a very aggressive bid at the first stage while leaving some call-off unanswered at the second one, so distorting the first stage competition and hampering the efficiency of the whole mechanism. Both these issues can be found even in a very simple modelling of FAs, like the one, based on the lowest price criterion, in (Albano & Sparro, 2008).

⁹ In particular, the EU Directive (Art. 32) states that "When awarding contracts based on a framework agreement, the parties may under no circumstances make substantial amendments to the terms laid down in that framework agreement". A possible rationale for this prescription is that substantial changes to the tenders at the call-off stage would represent a harmful distortion of the first-stage competition.

5.3 Balancing competition

The main message of this discussion is that the degree of heterogeneity between (or the degree of uncertainty about) the specific contracts plays a crucial role in the incentives provided to the potential competitors. As a consequence, from the point of view of the public entity designing and implementing the FA, the main issue to address is how to balance the competition between the two stages. Spurring competition at the first stage, *de facto* pushes a FA to end up more similar to a FC. On the contrary, when competition for selecting the operators part of the agreement is loose, the call-offs tend to become similar to independently run competitive tenders. It is then worth to discuss the main aspects in the design of the whole process which affect the balance of competition between the two stages.

The first of such factors is *the degree of completeness of the "master contract"*, i.e. the relative fraction of the clauses of the specific contracts which are set since from the first round of competition and can not be modified at the call-off stage. The higher the number of clauses of the specific contracts defined at the first stage the lower the degree of competition at the second stage with respect to the first one.

In a FA awarded to the EMAT, when the technical award criteria concern with a large share of the relevant terms of the supply contracts, then most of the overall score will be raffled at the first stage. Thus, at the call-off stage it will be harder, for the lower-ranked competitors who have entered the FA, to fill a gap of score arising from the first stage. This provides the suppliers with the incentive to compete fiercely in order to enter the FA with a good score. On the other hand, an almost-complete master contract seems to be a suitable solution in cases where the degree of uncertainty or heterogeneity of the specific contracts is low, so limiting the risks from aggressive price bids since from the first stage.

From a normative point of view, the buyer should then focus the initial round of selection on all the aspects of the supply/service which are likely to be common to all the specific contracts. Of course, a more complete master contract will require more effort for concluding the framework agreement (e.g., in carefully estimating the future needs and in evaluating the submitted offers) while it will streamline the call-off processes. Though, this will limit flexibility.

The second key aspect affecting the balance of competition is *the number of economic operators part of the agreement*. This number can be either exogenous (i.e., predetermined in the tender documents drafted by the contracting authority managing the first stage) or endogenous (i.e., the agreement can involve all the operators whose tenders reach a predetermined quality and/or price threshold)¹⁰. The first option can be considered more useful when tight first stage competition is pursued by the contracting authority, or when limiting the number of operators part of the agreement is important in order to reduce the effort needed to evaluate the submitted tenders at the second stage.

For a given number of potential competitors in the market, an exogenously fixed small number of winners induces higher competition at the first stage. Similarly, when the number of winners is endogenous, a similar effect is reached by setting higher the score threshold the competitors have to reach in order to enter the agreement. On the contrary, where the number of winners is high or the score threshold is low, competition will be focused on the call-off stage.

For a good design, the number of competitors in the agreement should be higher when the expected number of specific contracts as well as their potential heterogeneity is high too. In fact, allowing a marginal supplier to enter the agreement should result useful to the extent that she does have concrete chances to be awarded with some contract (or, similarly, to put competitive pressure on the other operators in the agreement). Where this is not the case, an higher number of operators just lowers the competition at the first stage while making the management of the call-offs more cumbersome.

5.4 Dealing with the risk of collusion¹¹

Upon concluding a Framework Agreement, a "new market" will emerge, characterized by two salient features: i) the number of firms will be, in general, lower than the set of competing firms at the first stage; ii) firms in the FA know that they will be competing over time for a stream of purchase orders.

¹⁰ This is typically the case for "open" Framework Agreements. A FA is open when new entrants can become part of the agreement at any time. Where this is the case, one can not refer to a first round of competition, in the sense that true competition only takes place when awarding specific contracts. However, the present paper does not discuss this kind of FA. This is also because it lies outside the definition of FA provided by the EU Directive, which rather defines this mechanism Dynamic Purchasing System (adoptable for highly standardized commodities and through e-procurement platforms only).

¹¹ For more general discussion on collusion in procurement markets, see (Albano et al., 2006).

When the FA does not allow entry of new firms at a later stage¹², the resulting market will bear a straightforward resemblance with an oligopolistic market in which firms may be tempted by adopting collusive strategies, thus softening competition to raise profit. Coordination, whether explicit or tacit, is both tempting and feasible since firms interact over time. In oligopolistic markets it typically takes a rather simple form. Firms set a high price and keep it stable over time only if no-one undercuts its rivals at any point in time. Cheating is normally deterred by the threat of a possibly ever-lasting price war.

In what follows, we will emphasize how the design of the FA and the stream of call-offs may increase the risk of collusion among firms.

The sequence of call-offs could, in principle, be assimilated to a public contract split into several lots, the difference being that lots are awarded at different points in time. For a given number of firms in the FA and for a given overall value of the latter, the higher the number of call-offs the higher the risk of collusion since there will be a higher number of “pie-sharing” arrangements to sustain a collusive scheme. One countermeasure would consist, whenever compatible with final demand, in lowering the number of call-offs (that is, reducing the frequency of interaction) by increasing the value of each call-off. This would reduce the number of potentially feasible collusive allocations. However, firms would be required to have higher financial/economic capacities, which would, in principle, reduce the number of competitors in the FA, thus making collusion more likely.

When deciding whether to adhere to a collusive strategy, each firm needs to evaluate the net benefits from current deviations - namely, short-run profit minus the expected cost arising from other firms' punishing strategies - against the present value of benefits from cooperation. The latter depends crucially on firms' ability to predict the stream of call-offs. The more predictable the stream of call-offs the more confident firms will be on “how much collusion is worth”. Consequently, preventing collusion might require not announcing in advance the precise stream of purchase orders that will take place in the FA.

There exists another dimension connected with the number of call-offs, namely the degree of symmetry among suppliers. Symmetric firms might be simply interpreted as firms having similar market shares/production costs¹³.

If suppliers are asymmetric, then symmetric (i.e., of similar value) call-offs may constitute an anti-collusive device, for it makes more difficult to achieve an agreement on how to split the lots. Conversely, when suppliers are fairly symmetric, collusion deterrence might be pursued by a sequence of asymmetric call-offs.

Asymmetry among firms may be a consequence of the first stage of competition. When the FA is concluded by using the economically most advantageous tender (EMAT) criterion, firms may be allowed to “carry forward” a fraction of the awarded technical score. This case may arise¹⁴ when technical proposals refer to aspects that are common to all subsequent call-offs. Thus, upon competing for each single call-off firms may inherit the fraction of the initial technical score that was awarded at the first stage. Let us suppose that at the first stage higher-ranked firms display higher-than-average technical score and lower-than-average economic score. To make this more concrete, consider the following example in which the maximum technical and financial score is 60 and 40, respectively:

	Technical score	Financial score	Total score
Firm A	46	8	54
Firm B	40	10	50
Firm C	30	15	45

The FA is concluded with firms A, B, and C. Assume also that when bidding for the sequence of call-offs, each firm inherits 50% of the technical score awarded at the first stage, that is, firm A starts with 23 points, firm B with 20 and firm C with 15. How does such an asymmetric scenario affect the risk of collusion among firms? Observe first that firms B and C submitted higher discounts than firm A. If the design of the FA forbids firms from raising their prices at the call-off stage above those submitted at the first stage¹⁵, any symmetric “pie-sharing” collusive agreement (that is, firms rotate in winning call-offs by having firm A be awarded the first contract, firm B the second, firm C the third and so on) would leave firm A with higher collusive profit than its competitors. Thus, if firms are alike with respect to other economic dimensions such as market shares/sizes/production costs, incentive-compatibility constraints require the cartel to allocate a higher number of contracts to firm C than to firm B, and a higher number to the latter than to firm A. Thus for a given value of the FA and for a given stream of call-offs, score-heterogeneous firms are likely to find more difficult to agree on a collusive scheme than firms competing for call-offs on a “level” playing field.

¹² This is in principle only feasible in a Dynamic Purchasing System. On the similarities between Framework Agreements and Dynamic Purchasing System see, for instance, (Yukins, 2008).

¹³ The two dimensions are in fact likely to be correlated.

¹⁴ “Inherited” technical score is one of the features of the FA designed by Consip for acquiring IT services for the Italian Ministry of Economy and Finance. See the last section for more on this aspect.

¹⁵ Italian regulation of Framework Agreements goes in that direction.

6. Case study: a Framework Agreement for IT services for the Italian Ministry of Economy and Finance

6.1 Background

Consip S.p.A. (Consip hereafter) – The Italian Public Procurement Agency – is a joint-stock company owned by Italy's Ministry of Economy and Finance (MEF), operating on behalf of the State within the framework of strategic guidelines and tasks defined by its sole shareholder. The company engages in complex projects in the fields of information technology, organizational processes, emerging technologies and communications in close interaction with the MEF, with the aim of promoting technological change within the Public Administration and of sustaining the development of an information society in Italy through the dissemination of the use of ICT.

Consip manages highly sophisticated services, projects, technology and project management consultancies on behalf of the MEF and other Administrations (central and local government, health services and universities). Its activities cover two main areas:

- Management and development of IT services for the MEF, through technical and project consultancies;
- Implementation, on behalf of the MEF, of the Program for the Rationalization of Public Expenditure in Goods and Services through the use of information technologies, innovative purchasing tools and centralized procurement initiatives.

Consip's IT and organizational support covers several MEF Departments, namely:

- State General Accounting Department, whose mission consists in providing supervisory support to the MEF and, consequently, to both the Government and the Parliament, on policies, processes and public finance requirements. Its mission is to ensure proper administration and rigorous planning of the State's resources. The Department is also responsible for the consistency of the State's accounts, which entails verifying and monitoring trends in expenditure and revenue collection;
- The Treasury Department, which provides technical support in the formulation and implementation of the Government's economic and financial policy choices, at both national and international level;
- General Administration, Personnel and Services Department, which is a support unit supplying specialized services both internally and externally to the MEF's organizational structure.

Consip's intervention in IT projects can be split into three main categories:

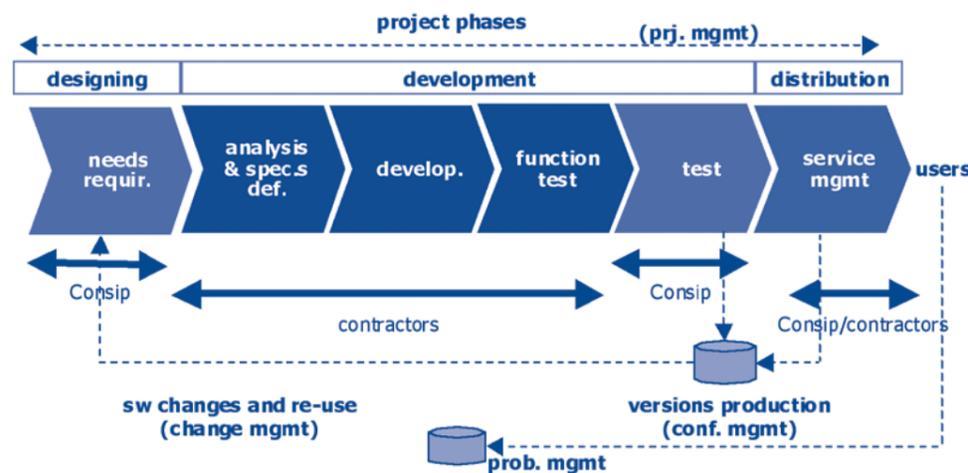
- Optimization of the organizational and functional processes of the MEF Departments. These projects deal with basic level of IT complexity such as digitalization and automation of the administrative procedures, but also concern with the enhancement of knowledge tools on the operations of the Departments and the creation of top-level decision-making support tools;
- Improvement of access to and circulation of information, both within and beyond the Ministry;
- Rationalization and coordination of the IT expenditure and management of the technical IT infrastructure of the MEF.

The overall system is one of the most complex ones available in the Italian central Public Administration. Its management involves three of Consip's Divisions (Information Systems Department, IT Infrastructures Department and Public Finance Department), accounting for 250 high level professionals who handle: 1250 servers, 4 data centers, 17000 internal users, 14000 clients fleet, 45000 external users, 270 application systems, an amount of customized software composed by 650k function points¹⁶ baseline with 100k function points developed per year, and about 100 contracts with external providers.

The span of activities ranges from process optimization and adoption of modern management technologies and methodologies to rationalization and coordination of expenditure concerning with IT items and tools. Consip also provides consultancy and project support covering all the software life cycle phases, starting from needs and requirements codification, until software delivery, maintenance and process integration with the Ministry organizational structure (see Figure 2).

¹⁶ A function point is a unit of measurement for the amount of functionality provided by a software based information system as described by a specification. The function point analysis is an ISO recognized software metric. More information is available in (Fenton, 1995).

Figure 2. A typical software life cycle



In fact, Consip does not simply procure software on the shelf. Rather, it plans, manages the realization and governs the use of *ad hoc* developed components. To give an example, the software currently used to manage the State budget comes from 30 years of development, and it is remodeled each year so as to make it comply with the financial laws approved by the Parliament.

In this wide and multi-faceted scenario, Consip is in charge of outsourcing technological projects by concluding contracts which are not limited to the simple acquisition of software or hardware licenses. Consip designs procurement processes in an extremely dynamic environment, where the ability to continuously innovate determines firms' survival chances. In this respect, Consip, acting on behalf of the MEF and the Italian Government themselves, does implement the Lisbon strategy¹⁷, which points at public procurement as a potentially effective "pull" mechanism to foster innovation in markets and to promote a knowledge-based society.

¹⁷ Kok et al.: Facing the Challenge. The Lisbon strategy for growth and employment. Report from the High Level Group; Office for Official Publications of the European Communities, Brussels, 2003.

The reference market primarily consists of system integrators which operate in the IT sector, such as IBM, Accenture, HP, etc¹⁸. Upon constantly scouting innovative solutions capable of satisfying final users' requests, Consip ultimately interrelates with the entire ICT market, both at the national and international level.

To be sure, the technological complexity managed by Consip has grown progressively over time. In order to understand how the company adapted its (project management and) procurement strategies to an evolving environment, we find it useful to recall the basic steps in a standard acquisition process. Figure 3 depicts a process consisting of ideally distinct, though in fact highly interdependent, five phases.

Figure 3. Phases of a standard procurement process



6.2 From simple contracts to Framework Contracts

In 1997, when Consip was created as in-house company of the MEF, both the dimensions and the features of the technological projects were such that awarding contracts for acquiring well-defined products and services was probably the most appropriate strategy. Indeed, this approach guaranteed focus on specific projects without limiting the possibility of adopting innovative solutions. The nature and size of such contracts were usually best suited by small or medium size companies, and the project activities themselves were typically allocated to the contractor, rather than to Consip own resources.

The main drawback of this approach was that it called for an high number of lengthy procurement processes, thus delaying the time needed for a complete solution to become operational. In addition, the activation of more than one contract with more than one contractor at the same time, usually considerably raised process and transaction costs, thus triggering complaints by the final users.

¹⁸ See, for example, <http://www.cwi.it/top100/classifica/2009/> for a ranking of Italian IT system integrators.

In recent years these problems, together with the increase in complexity of the requested solutions, have made the procurement strategy based on single-task contracts more and more cumbersome and unsatisfactory. This has induced Consip to turn on Framework Contracts. These contracts typically have larger economic value than the earlier ones, as well as longer duration.

A typical FC could be, for example, a contract for the outsourcing of a data center, or the development of a very large software project, such as a software for the management of European Community funds. Due to the broad scope of these projects, actual tasks and activities to be carried out can not be well defined at the awarding stage. This is because the tender documentation is written and the contract is awarded when the project is at the very initial stage of its life cycle. Thus, the FC can just set guidelines and general service conditions about tasks which will be pinned down at a later stage, once the contractor has been selected on the basis of a series of projects' broad requisites.

Typical benefits stemming from this type of acquisition are the following. Firstly, a large FC avoids to deal with many small call for tenders, with the clear advantage of reduced process time and costs. Secondly, the medium-long time span covered increases the continuity of the contractor's work, so both favoring its continuous learning and improving the productivity of the adapted technological solutions. As a consequence a solid, trusting, and enduring relationship is put into place between the final client and the provider. This relationship can provide the contractor with incentives to commit to tasks in areas which are simply contiguous to, even if not explicitly included in the original scope and guidelines of the FC itself. This flexibility is of great value for the contract manager, who is in charge of researching for more efficient and innovative solutions to face the continuous evolution of the Ministry's demand as well as the technological evolution.

Yet, FCs come with unavoidable drawbacks. Most notably, the overall time needed for the five phases of the procurement process (see Figure 3) is of considerable length, since from 24 to 36 months can pass by from the perception of a need to its actual solution.

This is an eternity, if one thinks that typically any web technology is considered to get obsolete within 3 or 4 months from its birth¹⁹. This means that the client is forced to acquire technology that is already out-of-date when the contract is signed.

Secondly, the high financial value of such FCs may cut out small and medium-sized businesses, which are usually unable to afford either the financial guarantees requested for participating to the tender or, in the case of winning the contract, the costs of marketing during the entire period lasting from pre-sales to the first payments. Once more, a direct consequence of doing without SMEs implies to give up the highest-content innovators, since it is well noted that technological innovation is almost always boosted by smaller rather than colossal structures.

Thirdly, uncertainty about the actual tasks to be performed shifts competition from quality to price, so hampering firms' profit margins and pushing, in turn, quality of the offered solution even more downward. Consider that profit margins in the Italian ICT market (currently estimated to be about 20% for a contractor that works with the central government) have been halved in the past ten years and further, continuous fall is foreseen in the years to come.

Too a tough price competition could also be induced by the particular role played by Consip in triggering innovative solutions from the IT world. In fact, contractors of the MEF are in a privileged position to learn how the Italian public administration users' needs evolve and provide the same users with technological hints. Reputation and experience acquired by working with Consip can improve the competitiveness of the firms in tendering for contracts awarded by other public authorities and thus increase their share in the public market. All this often makes the firms willing to afford sizeable financial efforts.

It is finally worth noticing that awarding the contract to "too a low price" tender can substantially hamper the actual quality as well as harm the relationship between the contractor and the buyer. This risk may easily overcome the expected benefit from higher savings.

¹⁹ With respect to the definition of a web-year, see, for example, Maryann Lawlor: "Virtual organizations offer technology professionals opportunity to re-serve in a new way," SIGNAL Magazine, august 2001. The article states: "...A couple of days ago I heard a new definition of time — a Web year, which is about 90 days — which is a way of measuring time in the 21st century" (<http://www.afcea.org/SIGNAL/articles/anviewer.asp?a=515&print=yes>). In effect, there does not exist a concordant definition on how long a web-year could be temporally extended. Some authors estimate its duration in 3 months, others in a time not higher than 6 months. Anyway, there exists a concordance on its definition which can be summed up as follows: "It is a new measure becoming affirmed in speeches, projects, analysis of those firms, the most innovative, who are thinking of 'contaminating' their own traditional business with technologies and business models, action and reaction speeds typical of the e-business era" (Stefano Umberto Foppa: La logica del caos, Mytech, 31 marzo 2000, <http://mytech.it/flash/2000/03/31/la-logica-del-caos/>)

6.3 Moving Forward: a Framework Agreement

In 2009, the attempt to find a third way between "simple" contracts and Framework Contracts, so as to address the drawbacks of both these outsourcing strategies, has finally suggested to resort to "incomplete" multiple-award Framework Agreements.

From the point of view of an IT project manager, a Framework Agreement probably looks, at a first sight, quite similar to a FC. The first three phases, in particular, (requirements identification, market intelligence, and tendering) might appear identical. Yet, as we will see, it presents specific design and implementation problems.

Once concluded, however, a Framework Agreement potentially yields as much flexibility, efficiency and quality as awarding single "simple" contracts does, while preserving many advantages of a FC, such as: reduced time to give start to the actual tasks, reduction of the internal costs for researching the optimal solutions, trusting relationship between the provider and the supplier, continuity of the provided services in the medium-long term.

More in detail, any manager handling an IT contract mainly seeks to achieve a good balance between quality and price of the provided services, together with designed solutions becoming operational to satisfy final users' expectations. For this goal to be achieved two set of necessary conditions have to be fulfilled:

- the supplier has to be pro-active and has not to interpret its "role" as a mere executor of a theoretical design;
- the project design has to be solid, tried and tested, accepted by all the players and functionally efficient; the technology needs to be handy and consolidated so as to satisfy the specific buyer's needs; the solution delivery needs to be rapid and accompanied by efficient assistance and support.

The Framework Agreement may be designed so as to reach the necessary balance between flexibility and timeliness of technological solutions, aggregation of the acquisition of similar albeit non-identical projects, and sound price competition for well-defined tasks. These outcomes are likely to be obtained because of the following reasons:

1. The master contract is concluded with more than one economic operator among those capable of fulfilling a broad set of specific needs, mainly defined in terms of technical/qualitative criteria and time optimization.

2. The higher number of operators (with respect to a FC) selected at the first stage of a FA is expected to soften price competition at the first stage, when specific needs and requirements are yet to be defined.
3. Price competition becomes in principles more relevant at the call-off stage when selected suppliers "learn" the details of each single project to be implemented. This reduces the risk of "winner's course", typical of competitive tenders taking place in conditions of relevant uncertainty. In addition, the reduced value of the single specific contract (compared with a FC) should limit the suppliers' willingness to compete too fiercely on price.
4. The technical evaluation of the proposals submitted at the call-off stage can be based on the analysis of concrete solutions targeting specific requirements. This is expected to enhance competition on quality.

Three potential major drawbacks arise, though. The first one may become evident after the Framework Agreement has been concluded. From a project manager's viewpoint, the time frame for implementing a specific project may appear too stretched, since the call-off stage still requires additional time and effort (for designing and running the tendering process and for proposals assessment) before a specific project gets implemented.

The second problem concerns with the risk of collusion. As pointed out in Section 5.4, in the call-off stage of a Framework Agreement collusion may be favored by frequent interactions among a reduced number of competitors, with no possibility for outsiders to intervene. Previous discussion, however, also suggests that such a risk could be, to some extent at least, reduced because of the asymmetry between the competitors (arising from the competition at the first stage).

Finally, lower-ranked competitors could find it very difficult to win any specific contract. As a consequence, despite what pointed out above about possibly softened price competition, they could be still tempted to submit too aggressive and risky price bids in order to try to recover the high participation costs.

6.4 Designing the two-stage process

We now sketch the awarding mechanism designed for concluding a Framework Agreement for the acquisition of IT services for the MEF. The awarding criteria is the economically most advantageous tender, with a quality/price ratio equal to 70/30. The maximum number of economic operators that may have become part of the Agreement is 5²⁰.

At the first stage, each tender is evaluated on the basis of the following formula:

$$\text{TotS}_{\text{FA}} = \text{FS}_{\text{FA}} + \text{TS}_{\text{FA}}$$

where:

- **TotS_{FA}** (max 100 points) is the Total Score awarded for the selection of the operators that are part of the FA;
- **FS_{FA}** (max 30 points) is the Financial Score, awarded to the submitted bids through a scoring rule²¹. The price is given by a weighted average of different cost items (e.g., fees for different professional profiles and the price of a Function Point)²²;
- **TS_{FA}** (max 70 points) is the Technical Score awarded to the qualitative aspects of the tenders. Importantly, it embeds two distinct quality components:
 - “cross” components, i.e. qualitative features relevant to *all* specific contracts to be awarded (e.g., team organization, general service level agreements);
 - “specific” components, i.e. qualitative features relevant to *some* specific tasks only (e.g., processes re-design, software development, software re-engineering, data base maintenance), which may or may not be object of each single call-off.

²⁰ Despite this number being exogenously fixed in the tender documents, an endogenous component of the mechanism is also at play: in fact, a winning firm had to be among the 5 top-ranked *and* to be awarded at least 42 out of 70 technical points.

²¹ The adopted scoring rule is a concave function of the submitted price bid: $\text{TS}_{\text{FA}} = 30 \times [1 - (\text{Price Bid} / \text{Reserve Price})^6]$. For a discussion about the rationale and the main properties of such a scoring rule, see (Dini et al.; 2006).

²² See footnote 16

As the outcome of the first stage, we have up to 5 selected tenders, ranked according to their **TotS_{FA}**. At the second stage, each specific contract is awarded to the highest-score tender, after the competition has been reopened, based on the following mechanism:

$$\text{TotS}_{\text{SC}} = \text{FS}_{\text{SC}} + \text{TS}_{\text{inh}} + \text{TS}_{\text{SC}}$$

where:

- **TotS_{SC}** is the total score at the call-off stage;
- **FS_{SC}** is the score awarded to the financial offer submitted for the specific contract at the call-off stage. The scoring rule may either belong to same family of non-linear (concave) scoring rules used at the first stage or be simply a linear scoring rule. Most importantly, prices submitted at the first stage cannot be increased at the call-off stage;
- **TS_{inh}** is the technical score “inherited” by each competitor from the first stage score, including all the cross component score plus the specific component score *relative to the object of the call-off only*. This score cannot be changed with respect to the first stage;
- **TS_{SC}** is the Technical Score relative to “new” specific aspects of the single call-off to be awarded. Such aspects have not been evaluated at the first stage.

It is worth pointing out that the overall amount of points available for the second stage is not fixed. This enables the contracting authority to re-adjust the technical score/financial score ratio on the basis of the specific call-off and on the basis of the tenders submitted at the first stage.

As call-offs unfold over time, three main questions arise:

1. Is there any evidence of enhanced efficiency from using a FA? More precisely, are economic operators in a better position to tailor both their financial and technical offers to precise projects? Does the process finally allow an earlier delivery of the operational solutions?
2. What is the impact of asymmetry among bidders – caused by a potentially different number of technical points that are carried forward to the second stage – on the degree of competition for specific projects (i.e., at the call-off stage)?
3. Is there any evidence compatible with bidders implementing coordinated strategies to “share the pie”, thus alternating themselves in getting specific contracts?

Very scattered information is available yet to be able to answer rigorously any of the above questions. This will become, almost naturally, an argument for future investigations.

7. Concluding Remarks

Despite the practical relevance for procurement strategies, little investigation about the major economic forces at play when designing Framework Agreements is being carried out by academics and other applied researchers. The variety of design solutions raising different kinds of questions may provide a reasonable justification.

This paper attempts at filling the gap by adopting a more overarching approach than the one used by Albano and Sparro (2008). There, the authors focused on a very specific economic problem - savings vs. efficiency - by using a formal two-stage competition model. In the current paper, we have qualitatively discussed additional economic dimensions that ought to be thoroughly considered by procurement officials together with country-specific regulation.

Many of the intuitions gained by carrying out such an economic analysis were in fact used to design the first Framework Agreement for IT services implemented in Italy since the European Directive 2004/18/CE had been transposed in the Italian Code for Public Contracts in 2006. While remaining one of the few case studies on practical implementations of Framework Agreements, our discussion emphasizes that a one-size-fit-all approach is entirely inappropriate. Under the umbrella of general economic guidelines lay very different procurement scenarios that require a tailored approach to produce the expected positive outcomes in terms of efficiency and flexibility.

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