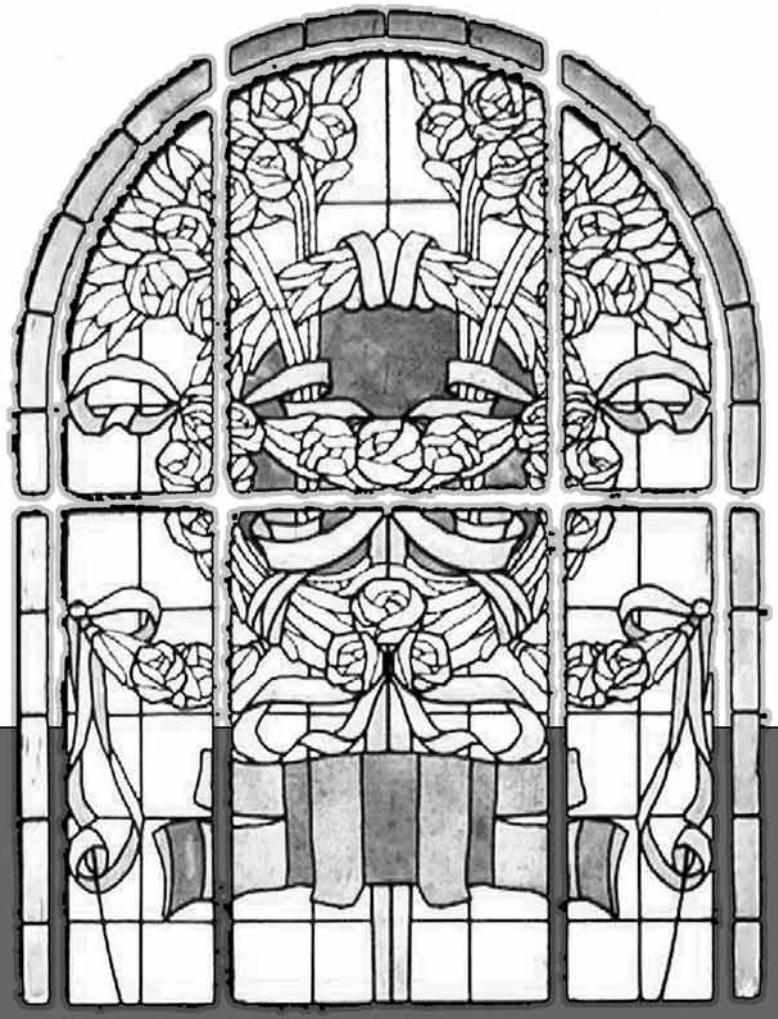

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THE MARKET FOR EVALUATIONS: OPPORTUNITY OR CONSTRAINT FOR PUBLIC DECISION-MAKERS?

R. Cervigni, O. Cuccu, R. Miniaci

Ministero dell'Economia e delle Finanze
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The *Public Investment Evaluation Unit* (UVAL) provides technical support to public administrations, by developing, testing and disseminating ex-ante, ongoing and ex- post evaluation methods for public investment projects and programmes. One of the aims is to improve effective spending and better performance of European structural funds. The Unit is part of the network of national and regional evaluation units.

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The Market for Evaluations: Opportunity or Constraint for Public Decision-makers?

Abstract

The effectiveness of public investments depends, *inter alia*, on the quality of consulting services that inform program and project decisions. This paper purports to evaluate the ability of the consulting market to provide adequate information and knowledge services to government agencies in Italy, by looking at some key market characteristics such as size, degree of competition, and level of skills and competencies. At the aggregate level we observe that the total value of public demand for consulting services relevant to the investment cycle, albeit growing, is small compared to the revenues of firms potentially supplying those services; and that for some services, demand is highly variable over time. At the micro level, we analyze the interaction between demand and supply by looking at procurement data for some 300 Feasibility Studies co-financed between 1999 and 2002 by Italy's Interministerial Committee for Economic Planning (CIPE). The evidence indicates that the market for those studies has been reasonably open and competitive, and that has attracted a sizeable portion of qualified firms (over 70 per cent in revenue terms), which however represent a small fraction of the broader service sector. Since the quality of the studies has not always been satisfactory, we conclude that an open and competitive consulting market is a necessary, but non always sufficient condition for service quality. Policy action appears to be warranted: a) to strengthen the technical and administrative capacity of public tendering entities; and b) to increase – particularly among medium and large operators – the share of firms potentially capable of supplying the requested consulting services. This in turn requires a steady increase, over time, in the size of public demand, so as to provide sufficient incentive for larger firms to focus their business strategies on the provision of quality consulting services to the public sector.

Il mercato delle consulenze per gli investimenti pubblici: opportunità o vincolo?

Sommario

La qualità degli investimenti pubblici dipende, tra gli altri fattori, dalla qualità dei servizi di consulenza che sostengono le scelte con analisi e valutazioni. Il proposito di questo lavoro è di valutare se, in relazione alla domanda di tali servizi espressa dalla Pubblica Amministrazione, il mercato ha le caratteristiche adeguate a fornire servizi di qualità, ed in particolare, grado di accumulazione di conoscenze, numerosità degli operatori, concorrenza. A livello aggregato, si osserva che la domanda di servizi espressa dalla Pubblica Amministrazione, per quanto in crescita, ha un peso limitato in relazione al fatturato delle imprese potenzialmente interessate, e che tale domanda, soprattutto per alcuni specifici servizi, è molto variabile nel tempo. L'analisi micro di circa 300 Studi di Fattibilità (SdF) cofinanziati dal Comitato Interministeriale per la Programmazione Economica (CIPE) nel periodo 1999-2002 indica come il mercato che ha offerto servizi di consulenza tecnico scientifica e valutazione è stato ragionevolmente aperto e competitivo, attirando la gran parte delle imprese con le necessarie qualifiche (circa il 70 per cento in termini di fatturato). Queste ultime, tuttavia, rappresentano una quota ridotta del totale delle imprese nei settori di attività rilevanti. Dal momento che la qualità degli studi non sempre è stata elevata, se ne può dedurre che un mercato delle consulenze attivo e concorrenziale, ancorché necessario, può non essere sufficiente a garantire la qualità dei servizi resi. Sembrano necessari interventi di *policy* per: a) rafforzare la capacità della committenza pubblica relativamente all'impostazione, al monitoraggio e alla valutazione dei servizi richiesti; b) indurre un aumento, non tanto dei tassi di partecipazione delle imprese già attive, quanto del numero di operatori potenzialmente in grado di offrire i servizi esaminati, specie tra le imprese di maggiori dimensioni. A tal fine appare necessario ampliare e rendere più stabile nel tempo il volume di domanda pubblica, in modo da indurre gli operatori più consolidati a sviluppare strategie di impresa dedicate al segmento pubblico della domanda di servizi di consulenza.

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CONTENTS

I. Introduction

The modernization of government agencies has been at the forefront of development and cohesion policies in Italy over the past few years, since it is considered a key condition for more effective public investment choices. The development programs financed with national and European Union funds have been increasingly aimed at improving the ability of local and central authorities to better evaluate the needs of firms and individuals and to plan, design, implement and operate the infrastructures necessary to meet those needs.

Given the complexity and the high degree of specialized knowledge required to carry out these activities, it would not be realistic or efficient to expect government agencies to have the full range of technical skills and competencies available in-house. On the contrary, effective project design and implementation can only come about through fruitful interaction between informed government agencies and a competent market of external experts. This interaction in turn lays the foundation upon which policy-makers can make sound public investment decisions.

When the production of the technical knowledge for selecting and managing public infrastructures becomes pivotal for development policies, it is reasonable to ask whether the firms to which government usually turns to are up to the task, in terms of skills, organizational structure and incentives required to devote adequate resources to the provision of the services required by government agencies.

This paper will focus on a specific set of consulting services of special importance for the program and project cycles of public investment. In particular, we will consider the research services to evaluate the impacts of public-investment plans and programs, and the technical assistance (TA) for preparing them. In terms of the individual projects, the analysis will concentrate on the cycle encompassing the Feasibility Studies (FS) for the ex-ante evaluation of the projects and on project design services.

Given that the main goal of this inquiry is to determine whether the market is properly equipped to provide quality services to meet the demand of government agencies, this paper will address the following questions:

On the demand side:

a) What is the government agencies' total demand for relevant external consulting services?

b) To what extent have the different component of the government demand for consulting services changed over the past few years?

On the supply side:

c) What are the firms that fulfill the demand for services by government agencies? What is their size?
d) How important is public demand vis-à-vis the total market for consulting services?

In terms of interaction between demand and supply:

e) What are the operators' participation rates in tenders launched by government agencies for consulting contracts?
f) What is the degree of competition among operators actively engaged in the market for consulting services? Is there any empirical evidence of dominant positions?
g) Should policy actions be taken to improve the functioning of the market? Specifically, is there a role for the following types of public action?
    - increasing the public sector's demand;
    - encouraging entry of new operators into the market;
    - introduction of incentives to encourage operators to specialize in the provision of certain services-including by means of consolidation processes and growth of average firm size.

All things being equal, it is reasonable to expect that the quality of consulting services will be higher: the broader and more competitive the market, the more the market structure fosters the accumulation of technical knowledge, the greater and more stable public demand as a share of total demand, the higher the ability of government agencies to define clearly their knowledge needs, and to monitor the services rendered to fulfill such needs.

Conceivably, the issues raised herein are part of a broader set of questions, which exceed the scope of this paper but which might be worthwhile to mention. Specifically, these questions relate to the role of the public sector's demand in the process of growth, diversification and specialization of the tertiary sector, and in particular of the services for production that have characterized advanced economies over the last few decades.[1] Given the growing importance of the "service economy" in terms of income and employment, the nature of the services required by government agencies is unique, in that they are intended to achieve "collective well-being". The question is whether the

[1] On the development of the service sector in Italy and Europe, see Martinelli e Gadrey (1996)

public sector's demand is capable of encouraging firms to allocate sufficient human and technological resources to generate the kind of knowledge necessary to design and implement sound public investments.

The paper is organized as follows. Section 2 illustrates the working hypotheses and the conceptual framework utilized to define the scope of the inquiry. Section 3 features the main characteristics and changes in the public demand for, and market supply of, consulting services in recent years. Section 4 analyzes the interaction between public demand for, and supply of, consulting services, using a case study concerning a specific market niche: the preparation of Feasibility Studies co-financed by Italy's Interministerial Committee for Economic Planning (CIPE) between 1999 and 2002. A micro data set on individual calls for tender, bidders and awardees of study contracts, managed by the Evaluation Unit (UVAL) of the Ministry of the Economy, makes it possible to analyze in detail the functioning of the market for consulting services in Italy. Section 5 develops estimates of the potential supply of consulting services for Feasibility Studies, as a way to measure the effect of CIPE studies on the degree of participation in tenders by private operators. Moreover, a statistical model is developed to determine the probability of bidding as a function of demand and the characteristics of the firms concerned. This is used to identify policy actions that can encourage greater participation, and hence better chances of obtaining quality services from private firms. In Section 6 findings are summarized, and policy implications are discussed.

II. The market for consulting services: conceptual framework

Government agencies resort to the consulting market because they need skills and knowledge relevant to their institutional mandate, which are not readily available in the public sector. Our interest here is to determine whether the interaction between the public and the private sectors is likely to produce quality results for the planning and project design cycles of public investments. To this end, we need first to develop a general conceptual framework to define some key variables that are likely to affect the quality of the consulting services rendered. Next, we need to adapt the framework to the specifics of the consulting services required to carry out public investments.

In light of certain standard notions of the information economics literature[2], consulting services have two key features: a) the nature of the service required is highly variable and

[2] For a recent review on this subject, see Laffont and Martimort (2001)

cannot be easily standardized; seldom does a single operator have all the skills and expertise to provide it; b) for a given skill level, the quality of the service depends on the effort of the consultant. However, this effort cannot be easily defined *ex ante* and, in some cases, cannot be readily assessed *ex post*.[3]

Therefore, a government agency looking for consulting services is confronted with two problems: a) finding the "right consultant" (a firm, or most likely a grouping of firms), i.e. the one that has the proper mix of skills and capabilities for dealing with the task at hand; b) providing adequate incentives (of financial or reputational nature) to prompt the consultant to put sufficient effort into the execution of the contract and into the delivery of high quality services. Schematically, quality q is a function of the abilities and skills of the consultant hired, (α), and of the abilities of the awarding agency, (β), to define clearly the nature and scope of the analysis needed, to monitor directly the quantity and quality of the effort made, and to introduce into the contract effective incentive mechanisms.

$$q = f(\alpha, \beta) \qquad \textbf{(Eq. 1)}$$

The first problem (finding consultants with high enough α), is normally tackled by establishing ex-ante minimum requirements in terms of experience, qualifications, etc. that consultants have to meet in order to be shortlisted for the tenders. This strategy might keep quality from falling below a minimum threshold, even though it may not attract the most qualified operators in the market. Specifically, the best operators might focus on market segments where demand is more stable or the average contract amount is higher, thus neglecting service types where demand is lower on average or more unpredictable.

The second problem (encourage adequate effort) may be harder to deal with. Possible solutions might include the specification in the contract of quality indicators to be met as a condition for payment of the consultants' fees. This may not be viable when it is

[3] A case in point is when government agencies request an opinion on the merit of going ahead with a decision, , e.g. whether to carry out a public investment; changing the strategy of a development program; selecting between two or more design alternatives to implement a public-funded project, etc.. In such instances the government agency obtains a final product (e.g. the report containing the opinion on the feasibility of a project, the effectiveness of a program etc.) but it is not necessarily capable of determining whether the consultant has utilized all available information, the most advanced analytical methods, etc.. In other words, the agency is unable to assess the amount of effort expended on the opinion. Furthermore, if the initial idea is not clearly spelled out, on which the agency wants the consultant to provide an opinion, it will be quite difficult to ascertain whether the opinion is based on sound technical bases. Lastly, the earlier in the cycle the opinion is requested, the longer the time that has to lapse for the effects of a specific economic planning choice to materialize, as these usually occur after months or even years from the time the report is provided.

difficult to spell out ex ante verifiable indicators of quality. The problem might be mitigated by having a "certification" procedure whereby, upon completion of the contract, experts from within or without the awarding agency would attest to the achievement of a minimum quality level. Such certification might be used as one of the criteria to evaluate the firms in subsequent tenders, particularly as part of the eligibility requirements in case the minimum level has been reached, and as a preferential qualification, in case such minimum level is exceeded.

Other things being equal, it is plausible to surmise that both the "adverse selection problem" (hiring the "wrong" consultants) and the "moral hazard" problem (inability to provide the consultant with the "right" incentives to deliver a quality service) can be mitigated if:

a) the median market level of qualified human capital and technical knowledge stock is high;

b) the market is competitive, that is, there are many players, each controlling a relatively small market share.

The first condition should increase, for any given tender, the likelihood of finding the proper combination of technical knowledge, even setting high (minimum) skill requirements. The second condition (competitiveness) can leverage to maximum effect reputation mechanisms, given that, in order to be awarded a contract, a firm has to submit high-quality technical bids followed by equally high-quality deliverables, allowing it to gain and/or maintain its reputation in the market.

These considerations can be summarized formally by expressing – for a given "capacity" level β_0 of the government agency - the probability of finding quality services at least equal to a given minimum threshold as a direct function of the number[4] of potential bidders in a tender (n) and the median accumulation level of human capital. In light of the difficulties to construct a suitable measure of the the latter variable, median revenues, $\hat{y}$, are used here as a reasonable proxy, assuming a direct correlation between the profitability of a firm and the total stock of knowledge capital used by it:[5]

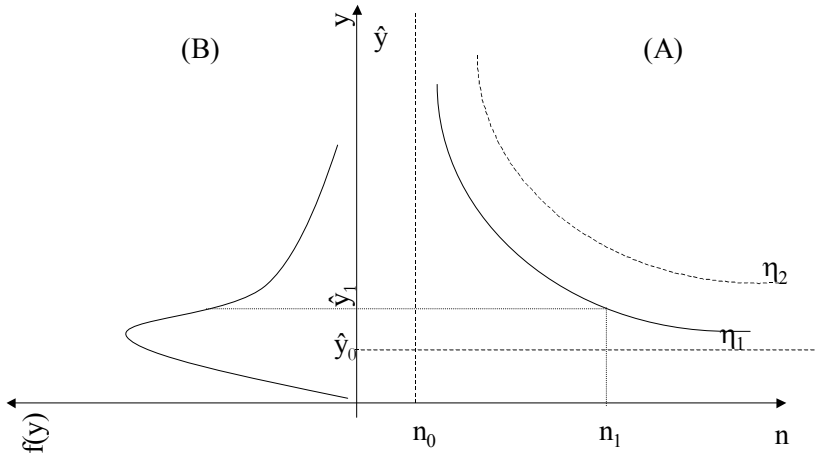
[4] To be sure, besides the large number of operators engaging in the market, consideration should be given separately also to the degree of market concentration, γ (as measured for instance by the Gini coefficient of firm revenues), since, given the same number of firms, the distribution of market shares among these may be more or less concentrated, depending on the circumstances. For simplicity's sake the degree of concentration was not expressly included in this part of the paper but will be analyzed in the section on Feasibility Studies (see section 4).

[5] The knowledge capital required is not necessarily held by a single firm. Often syndicates are set up among different firms to make available the skills necessary to perform the service required by the government agency.

$$\eta = \Pr(q \geq \hat{q} \mid \beta_0) = g(\underset{(+)}{n}, \underset{(+)}{\hat{y}}) \qquad \textbf{(Eq. 2)}$$

The hypotheses summarized in equation 2 can be discussed more thoroughly with the help of a chart. Figure II.2 part (A) shows the relationship between the probability to obtain services that meet minimum quality requirements, number of operators and average revenues through iso-probability curves: a given probability level η_1 to obtain quality services can be achieved either by high median revenue levels -in the presence of a limited number of operators, or via the combination of lower median revenue levels and a greater number of active operators.

Figure II.1 Quality of consulting services, number of operators and revenue distribution



Source: DPS-UVAL

The iso-probability curves are not defined to the left of n_0 and below $\hat{y}_0$: n_0 is a critical threshold of the number of operators, a floor below which there would be oligopoly effects with the possible deterioration of service quality, while $\hat{y}_0$ is a minimum revenue threshold, below which a firm may not have the required skill levels.

In order to improve quality, for instance shifting from the iso-probability curve η_1 to η_2, it is necessary for median revenues to rise, given the same number of operators, or for the number of operators to increase, given the same median revenues, or a combination thereof.

Part B of the figure shows the frequency distribution of market operators by revenue. If the median of the distribution is $\hat{y}_1$, n_1 is the minimum level of operators to be activated to reach probability η_1. If the number of operators that government can attract for a

tender is lower than n_1, all things being equal, the probability to achieve the desired quality level will be lower.

In the near term, the distribution of operators by revenue class (thus the level of skill accumulation, according to the original assumption) is given. Government agencies will then be able to affect the probability of finding suitable skills by encouraging a sufficiently high number of operators to bid in tenders. This can be done, for instance, via the amount of the contracts put out to tender. Suppose that the decision to submit a bid will be adopted only if the expected amount of the contract is at least equal to a certain percentage of the firm's total revenues (e.g. 5 percent or 10 percent). In this case, for that particular contract amount, the agency will only be able to attract operators for which such condition is fulfilled: small operators for small contracts, small and big operators for bigger contracts.

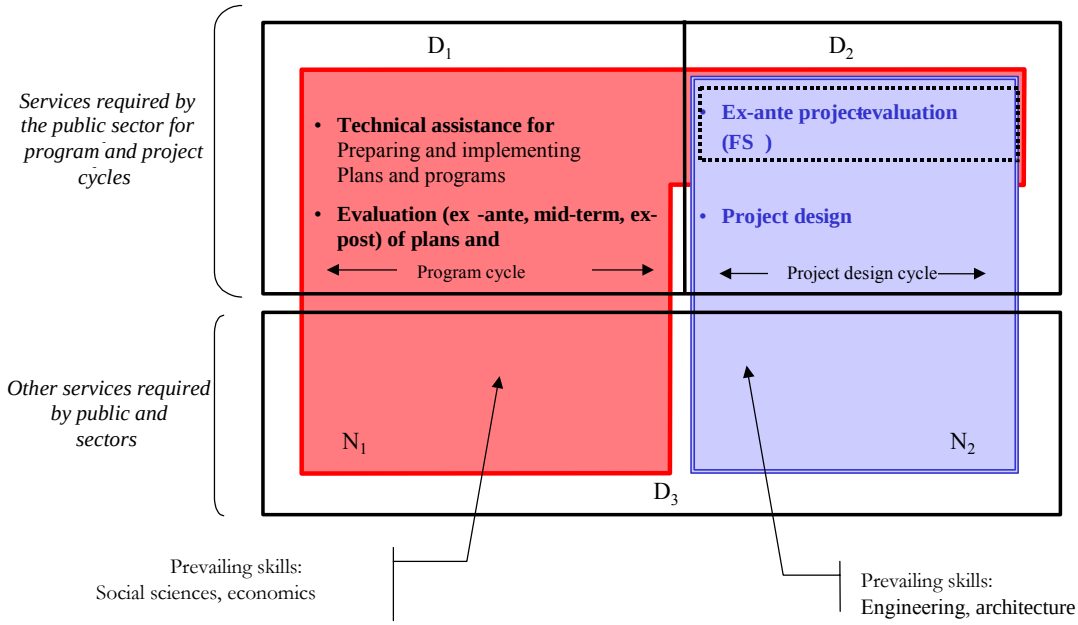
However, in the medium-to-long run the market's productive structure may change: the goal to improve service quality may be pursued by encouraging operators not only to be active bidders but also to consolidate their skill accumulation levels. This can be achieved via mergers among market operators or by having larger service providers shift their focus from the private sector to the public sector. For this to happen, it is arguably necessary to have the public sector account for a larger share of the total demand for consulting services: in the absence of such condition, operators are unlikely to be sufficiently motivated to move from a market segment to another or to grow in size.

Having discussed the general aspects of the relationship between service quality and market characteristics, to complete the conceptual framework it is necessary to define the scope of the analysis to be conducted. To that effect, this paper will not explore the whole range of consulting services required by government agencies, but only that sub-set of services that government agencies need to manage the program- and project cycle of public investments. In the program cycle, services needed include technical assistance for preparing and implementing plans and programs, and for undertaking their external evaluation (ex ante, mid-term, ex post). In the project design cycle, the main services are the preparation of Feasibility Studies to evaluate the merit of individual projects and, once the investment decision has been taken, the preparation of the engineering and technical documents required by law for the execution of public works.

Once the services of interest have been identified, the interaction between government agencies and the consulting market can be represented as in Figure II.2. Consulting

services required by the public sector include services related to both the program cycle (D1) and the project design cycle (D2). This demand is met with services supplied by firms and professionals specializing in social sciences (N1) and in engineering and architecture (N2). Suppliers of the N1 type tend to provide D1 services and the Feasibility Studies (FS) component of the D2 services. Suppliers of the N2 type focus on D2 services.

Figure II.2 Conceptual framework



Source: DPS-UVAL

In addition to fulfilling the demand by the public sector (D1+D2), suppliers of the N1 and N2 types provide to the private sector, as well as to the public sector, services different from those that are of interest here. These residual services are lumped in the D3 component of total demand.

III. Demand and supply of consulting services: macro-level estimates

III.1 Demand for consulting services

The demand for consulting services related to the design and implementation cycle of public investment programs, and to the selection and design cycle of the individual projects, was estimated by using several national and EU databases in accordance with the methodology described in the Annex.

Table III.1 summarizes the results of the exercise. As was to be expected, the most important component is the demand for project design services, with an annual average of more than 5,000 contracts put out to tender, for an annual average of over 540 million euros.

Table III.1 Estimates of the public demand for selected consulting services: summary

	Period	Total		Annual Average		Average tender amount (millions of euros)	Rate of increase of tender value	Years of positive growth (%)
		Number	Total ammount(*) (millions of euros)	Number	Total ammount(*) (millions of euros)			
D1: Planning cycle								
Technical assistance	2000-2004	218	316	44	64	1.45	233	50
Evaluation	2000-2004	80	56.6	16	10.7	0.67	113	50
D2: Project cycle								
Feasibility Studies :								
Tenders for stand-alone studies	1998-2004 (***)	651	150	102	24	0.23	191	50
Tenders for FS and other services	1998-2004 (***)	399	300	63	47	0.74	115	33
Project design	1996-2003	40,211	4,345	5,026	543	0.11	27	86

NB: (*) Only base amount of the tenders are considered; (**) Average annual rate; (***) January - April 2004

Source: UVAL own calculations based on OICE, TELEMAT and TED data

The other market segments have more or less the same size, with the number of tenders ranging, on average, from 16 to 100 per year, for an amount of 10 to 60 million euros per annum. The demand for project design services seems to increase, on average, at the

lowest annual rate (27 percent), but it is the least variable: growth was positive in 5 out of the 6 years considered. The average growth rates for the other demand components appear to be significantly higher (between 100 percent and 200 percent) but also much more variable, featuring positive growth in one-half or one-third of the years analyzed. Overall, the available evidence seems to indicate that, while there are substantial incentives for firms to focus their business strategy on project design services (high volumes and steady demand growth), other demand components appear, on the face of it, less attractive: the total annual amount of the tenders is, on average, relatively low and widely varying.

The demand for consulting services by Italian government agencies might be assessed also by way of comparison with the public demand for consulting services in some of the main European countries. Unfortunately, the available databases do not make it possible to determine the value of this demand but just the number of published tenders. Useful information can be derived considering the number of tenders above community threshold published, between 2000 and 2004, in four of the main European countries: published tenders were more than 3,600 in France, twice as much as in Italy, 2,600 in Great Britain and approximately 950 each in Spain and Germany. Assuming, perhaps rather simplistically, that the base amount of each tender is equal to the average amount of the Italian tenders, it would appear that in some European countries (France and Great Britain) public demand for consulting services is much higher than in Italy.[6]

III.2 Supply of consulting services

This section complements the analysis of the demand side by describing the supply of consulting services relevant intended for the program and project cycles of public investments. This description can provide further insight into the role that public demand can play in the market, especially concerning the introduction of incentives to direct firms to operate in certain market segments and to specialize in the provision of specific services.

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[6] These figures, which were calculated on the basis of TED data (http://ted.publications.eu.int/official/), refers to the total tenders associated with the following CPV codes (Common Procurement Vocabulary): 7220*: Software programming and consulting services.; 7230*: Data services; 7310*: Research and experimental development services; 7413*: Market research, public-opinion polling and related similar services; 7414100: Business and management consultancy services; 7420*: Architectural, engineering, construction and related technical consultancy services.

A preliminary issue concerns scoping: what are the firms and the professionals capable of providing the consulting services required by government agencies? Drawing in part on material that will be subsequently presented in greater detail (see Section 5 and the related Annex), information on the market of Feasibility Studies can be used to identify certain components of the service sector that are likely to be relevant for the whole public investment cycle.

Table III.2 provides an overview of the changes, during the 1998-2001 period, of the number and revenues of firms operating in seven sectors which, based on the participation in tenders for Feasibility Studies, might be reasonably expected to play a key role in the provision of the consulting services of interest in the present context.

Though at a varying rate, the firms operating in the selected sectors have been growing relatively fast, in terms of both number (with average growth rates ranging from 4 percent to 23 percent per year) and revenues (from 3 percent to 31 percent per annum).

Table III.2 Number and revenues of firms active in selected sectors (main ATECO codes) (1998-2001)

Sectors (ATECO codes)	Number of firms		Revenues		
	Amount in 2001	Average yearly rate of change 1998-2001	2001 Revenues (billions of euros)	Average yearly rate of change 1998-2001	Average 2001 revenues (millions of euros)
7220: Software consultancy and supply	33,297	13	20.3	21	0.61
7230: Data processing	27,404	5	6.02	12	0.22
7310: Research and experimental development (natural sciences and engineering)	7,618	12	1.64	12	0.22
7413: Market research and public opinion polling	6,749	23	2.46	31	0.36
7414: Business and management consultancy activities	50,033	7	8.27	18	0.17
7420: Architectural and engineering activities and related technical consultancy	210,086	10	16.41	6	0.08
7484: Miscellaneous business activities n.e.c.	68,382	4	9.56	3	0.14

Source: ISTAT

Generally, firms operating in the selected sectors are mainly small, and very small: in 2001, firms with revenues lower than 250,000 euros accounted (Table III.3) for over 90

percent of the total. Firms with revenues in excess of 2.5 million euros represented less than 1 percent of the whole.

Table III.3 Number and percentage share of the firms operating in the selected sectors by revenue class (2001)

Revenue class	Number	Percentage share of the total
Very small (less than 100,000 euros)	332,977	82.5
Small (100,000 - 250,000 euros)	42,816	10.6
Medium-small (250,000 – 750,000)	21,277	5.3
Medium-large (750,000 – 2.5 MM euros)	3,906	1.0
Large (over 2.5 MM euros)	2,593	0.6
Total	403,569	100.0

Source: authors' calculations based on data from ISTAT

III.3 Comparison between demand and supply

In order to come up with a rough estimate of the public sector's demand as a share of the total revenues of the firms concerned, the ratio of the average tender value to the average annual revenues was calculated for each type of service and for each group of firms (Table III.4). Since not all types of firm are qualified to provide all the types of service required, the shaded cells indicate the most likely "matches" between skills required and services offered.

Generally, based on the limited information available in the existing databases on tenders for service contracts, the public demand tracked by databases represents a small share of the total revenues of the firms concerned: between 0.1 percent and 5 percent of the total demand for each type of service; between 0.5 percent and 10.3 percent considering the demand for services characterized by a high match between skills and nature of the services required; and between 1.4 percent and 13 percent, if low-match cases are also included in the analysis.

Table III.4 Public demand for consulting services as a share of total revenues of firms in selected sectors

		Technical assistance	Program evaluation	Feasibility studies	Project design	Total (a)	Total (b)
Average tender value (1996-2003, billions of euros)		*0.06*	*0.01*	*0.07*	*0.54*		
Sectors (ATECO codes)	**Average revenues(*)**	**As a share of total revenues**					
7220: Software consultancy and supply	15.29	**0.4**	*0.1*	**0.5**	*3.6*	4.6	0.9
7230: Data processing	5.3	*1.2*	*0.2*	**1.3**	*10.2*	12.9	1.3
7310: Research and experimental development (natural sciences and engineering)	1.41	**4.5**	**0.8**	**5.0**	NA	10.3	10.3
7413: Market research and public opinion polling	2.01	**3.2**	**0.5**	**3.5**	NA	7.2	7.2
7414: Business and management consultancy activities	7.26	**0.9**	**0.1**	**1.0**	NA	2.0	2.0
7420:Architectural and engineering activities and related technical consultancy	15.59	*0.4*	*0.1*	**0.5**	**3.5**	4.5	4.0
7484: Miscellaneous business activities n.e.c.	10.41	*0.6*	*0.1*	**0.7**	NA	1.4	0.7

Legend: shaded, bolded cells: high likelihood of suppliers' skills matching demand needs; non-shaded, italicised cells: low likelihood; NA: no match. The total (a) is calculated for the cells on the row; the total (b) for shaded cells alone. (*) 1998-2001, billions of euros

Source: authors' calculations based on ISTAT, OICE, TED, TELEMAT data

However, if one considers – again ensuring an adequate match between skills required and supplied – the ratio of the average value of the individual tender to the revenues of the individual firm, public sector's demand becomes much more attractive, since the average tender value is nearly ten times average firm revenues (Table III.5).

To be sure, this ratio is heavily affected by the large share of very small enterprises that in fact cannot bid individually when the tender requires (as it is typically the case) that firms bidding for the contract have total revenues equal to a given share of the tender value. Using, as in Table III.5, the conservative assumption that tenders require total revenues for the past three years to be not lower than the tender value – or that the average revenues for the three-year period be at least equal to the tender value – it follows that, in order to participate in the average tender process, very small firms have

to join in groupings of nearly 4 operators and small firms in groupings of 1.2 operators. Based on the same assumptions, firms sized from medium-small and up can bid alone.

Table III.5 Ratio of average tender value to average firm revenues by revenue class

Revenue class	Number	Average tender value/average firm revenues	Minimum grouping size (number of operators)
Very small (less than 100,000 euros)	332,977	11.2	3.7
Small (100,000 - 250,000 euros)	42,816	3.4	1.2
Medium-small (250,000 – 750,000)	21,277	2.5	1.0
Medium-large (750,000 – 2.5 MM euros)	3,906	0.8	1.0
Large (over 2.5 MM euros)	2,593	0.1	1.0
Total	403,569	9.7	3.3

Source: authors' calculations based on ISTAT, OICE, TED, TELEMAT data

In short, empirical evidence seems to suggest that, in the aggregate, the demand for consulting services associated with public investments is fairly small when compared to the revenues of potential suppliers, and that other (public or private) components of the total demand for the services offered can affect to a more significant extent the strategies of the firms involved. At the same time, at the individual tender level, the public sector's demand seems potentially attractive for consulting firms. This attractiveness is higher, the smaller the firm's size, though this is probably mitigated, for small and very small firms, by the high transaction and management costs involved in setting up the groupings that meet the minimum financial and operating requirements typically set forth by tenders.

IV. Demand and supply of services for Feasibility Studies co-financed by the CIPE

IV.1 Case study: Feasibility Studies in the project cycle

To analyze in greater detail the interaction between demand for, and supply of, consulting services, and to evaluate if the market is competitive and capable of delivering quality results, this section explores a particular type of service, i.e. the preparation of Feasibility Studies. The decision to focus on this specific segment within the broader market for consulting services was due to several reasons.

First, in Italian laws regulating public investments Feasibility Studies play a key role. Law 144/1999 requires government agencies to commission Feasibility Studies for investment decisions in excess of 10.3 million euros. Moreover, the law regards Feasibility Studies endorsed by government agencies as a "certification" of the usefulness of the project, for purposes of preferential access to funds available for project design activities, and, subsequently, to funds for implementation.

Second, when the CIPE co-financed more than 300 Feasibility Studies between 2000 and 2002, the demand for private services jumped in a short period of time. This made it possible to observe the behavior of operators in a situation where the opportunity to increase their revenues was closely dependent on their ability to rapidly rise to the challenge. To better analyze the relationship between government agencies and private service providers, a database[7] was set up with information on the individual tenders and individual market operators that participated in the bidding process, such as procedures and the timing of the contracts awarded, number and characteristics of operators bidding.

Finally, despite the specificities of the market analyzed for this paper, the issues explored and the approach utilized may provide some clues on the overall functioning of the market for consulting services provided to government agencies.

[7] UVAL established the database also to carry out the monitoring tasks assigned to it by the CIPE.

IV.2 Demand for services and market response

In 1999 the CIPE (pursuant to resolutions 106 and 135 of 1999) provided 50 percent co-financing for the preparation of over 390 Feasibility Studies, drawing on funds appropriated for underutilized areas in Italy.[8]

The goal of the initiative was to generate a project pipeline to expedite and put to better use domestic and community funds under the EU-sponsored 2000-2006 Community Support Framework (CSF). More generally, the studies co-financed by the CIPE were meant to disseminate technical tools and methodologies suited to support better investment decisions.[9]

Ultimately, the effectiveness of the interaction between government agencies and the market for consulting services should be gauged on the basis of the quality of the service rendered. A preliminary assessment of quality can be obtained through the results of an evaluation exercise conducted on a set of 20 CIPE studies, selected among those for which the documentation was complete. The exercise was carried out on the basis of an evaluation form consisting of eleven questions,[10] closely related to the guidelines of the minimum requirements outlined by the CIPE at the time of program inception (see Annex 2). For each questions in the form, one of three qualitative answers could be selected (No, Yes, Yes in part).

To allow for simple aggregation and comparability of the answers provided, an overall evaluation coefficient was calculated for each of the studies examined. This coefficient is the total score attributed to the study (obtained by assigning 2 points to a "Yes" answer, 1 point to a "Yes in part" answer and zero to a "No" answer) as a percentage of the maximum possible score. The maximum possible score is calculated by multiplying the highest score (2) for each question times the number of answered questions. The

[8] A description of the current operations of the Fund for underutilized Areas is provided in "Il fondo per le Aree Sottoutilizzate. Elementi informativi sull'attuazione 2003", May 2004, available on the web site www.dps.mef.gov.it.

[9] As at December 2003 (when UVAL completed the monitoring of the CIPE FS), out of the original 393 accepted studies 288 had been delivered. This represented 84 percent of the total, net of studies withdrawn. Of those delivered, 222 were "certified", 13 were undergoing certification, 53 delivered studies were being approved by the awarding entities. Of the remaining 105 studies, which had not been delivered, 52 were definanced, 25 were still being prepared by the professionals retained while 28 had not been assigned (an indication in many cases of the intention of the government agencies, which had not been notified yet to the CIPE, not to have the study carried out). As at the same date, the awarding agencies had reported follow-up activities for 85 of the studies completed. Specifically, there were 110 public projects implemented in 13 Regions. For 70 of these projects, related to 53 studies, the technical or administrative procedure for the design phase was started: in 30 cases the design phase was under way, while for the remaining 40 the review of the documentation submitted to obtain financing for the preliminary design phase was either under way or nearing completion.

[10] The form utilized to collect the results reported is the final summary of a more extended version designed to evaluate the different components of the studies. For briefness' sake, this paper does not report the full version.

coefficient is then equal to 100 percent when all the analyses are scored as satisfactory and zero when all the analyses are considered unsatisfactory. The results of the exercise are shown in Table IV.1.

Table IV.1 Quality evaluation by sector (20 Feasibility Studies)

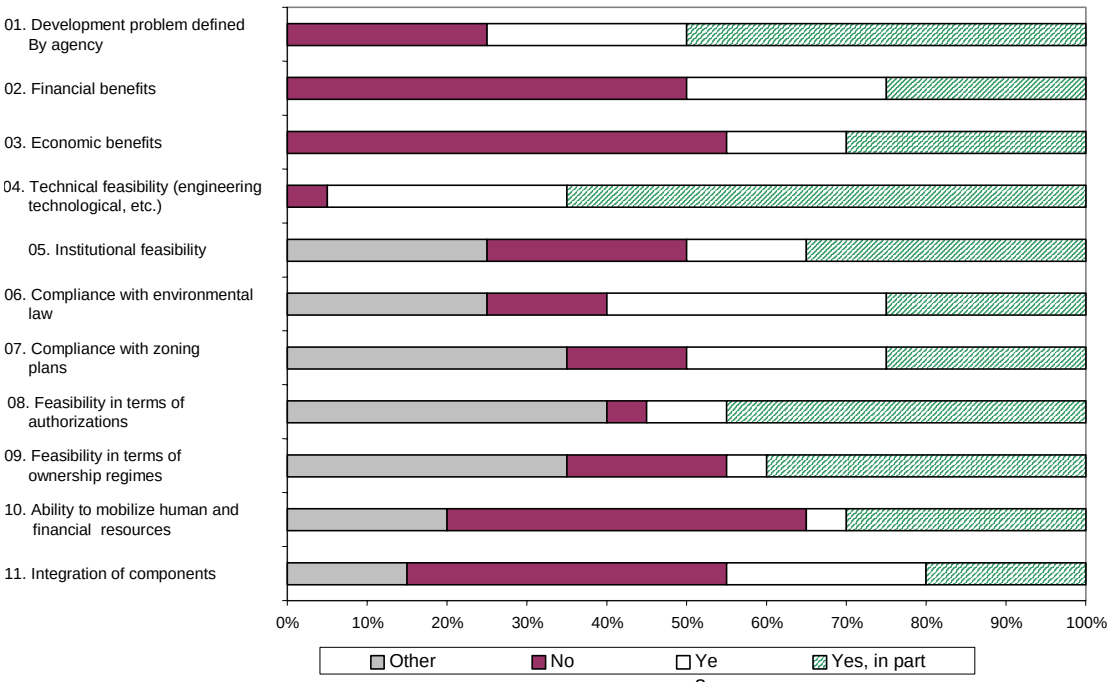
Sectors	Number of studies	Average score percent
Transports	5	60
Environment	5	44
Culture resources	5	43
Tourism	2	38
Local Development	3	16
Total	**20**	**43**

Source: authors' calculations based on data contained in the DPS-UVAL database

The average coefficient value was 43 percent. This indicates that, on average, more than half the aspects that characterize the quality of the studies had not been dealt with satisfactorily. The transport studies were the most satisfactory, local development studies the least. Arguably, in the transport sector the evaluation demand was mostly formulated on the basis of reasonably well-defined project ideas, whereas the tender specifications for studies relating to local development frequently lacked actual project ideas to be evaluated, and often consisted in requests to develop one.

Looking at the performance of the different components (Figure IV.1), the evaluation exercise suggests significant quality problems in the economic and financial analyses (considered unsatisfactory half the times or more), and, to a lesser extent, in the analyses of the availability of human and financial resources. Technical feasibility analysis appeared to be partially satisfactory in over half the cases while environmental impact analysis was satisfactory in more than half the cases in which there was sufficient information to evaluate it.

Figure IV.1 Evaluation of 20 Feasibility Studies in terms of quality



NB: The item "Other" includes answers for which the information available in the study is not sufficient to render an opinion or the questions are not applicable

Source: authors' calculations based on data contained in the DPS-UVAL database

Given the limited number of FS considered, care should be exercised in interpreting the results. Such results should also be used as an indication of highly variable quality among different components in individual studies and among studies in different sectors.

These quality problems can be explained both on the demand side (in terms of limited ability of government agencies to formulate clearly the questions to be answered by the studies) and on the supply side (incentives to participate in FS tenders, and ability and/or motivation to provide pertinent answers based on solid methods[11]).

[11] Possible shortcoming on the demand side should be put in a historical perspective. Specifically, the only significant experience Italy has ever had, in terms of a large number of ex ante studies, was that of the Investment Employment Fund (FIO - Fondo Investimenti Occupazione), which came to an end in 1989. After that year, and until the CIPE studies, the demand for this type of research was much more occasional and uneven.

The following section will look at the demand side (value, sectors, timing and awarding procedures of the FS tendered by government agencies). The bulk of the analysis in this paper, however, will focus on the behavior and characteristics of the supply side.[12]

IV.3 Analysis of the demand by Government Agencies

IV.3.1 Value, timing and sectors of tenders

The government agencies that participated actively in the FS initiative co-financed by the CIPE resorted extensively to private operators for their research requirements, through published tenders.[13]

Overall, the size of the demand (sum of tender values) for consulting services was approximately 56 million euros over a three-year period. The tenders for the Feasibility Studies had values ranging from 17,000 euros to 1.2 million euros, with a mean of 180,000 euros and a median of 130,000 euros.

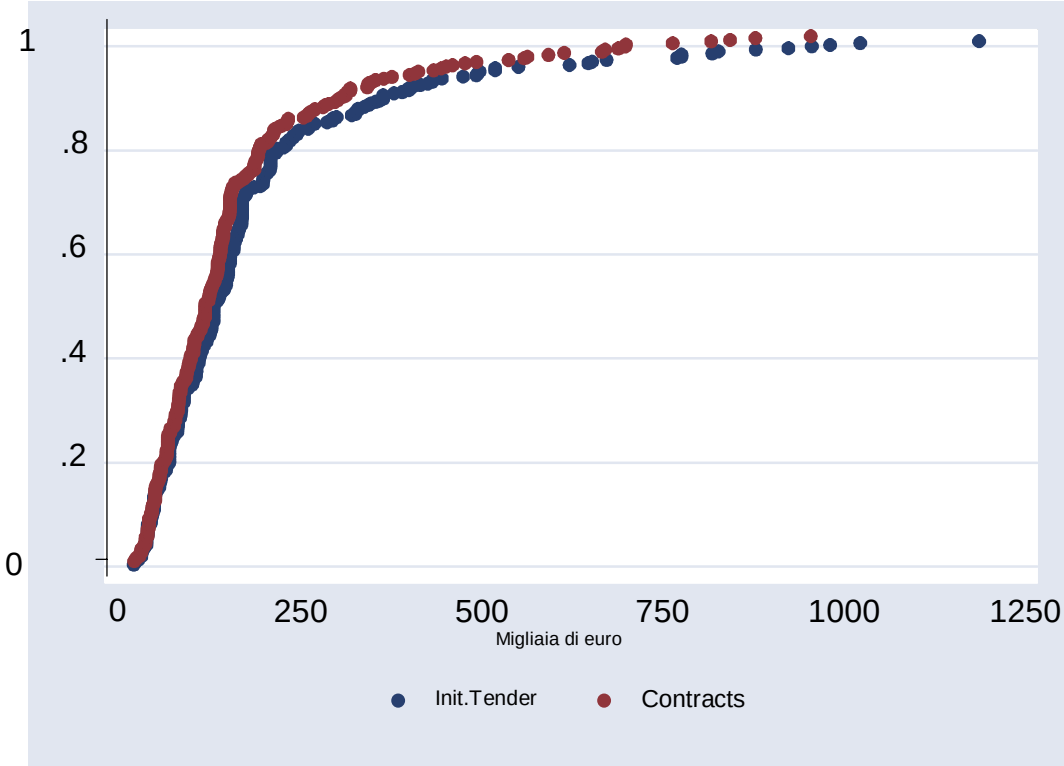
The cumulative distribution of the tender values, estimated on the basis of a sample of 127 studies,[14] is depicted in Figure IV.2. Relatively smaller tenders appear to prevail, with 60 percent of them below 150,000 euros and 35 percent below 100,000 euros. Only 12 percent of the tenders (37 studies) had a value in excess of 350,000 euros while in two cases the tender value was over one million euros. The distribution of contract amounts tracked closely that of the tender values, showing a limited level of price competition by market operators (see IV.4.3). Tender values were significantly variable over time: tenders published in 2000 (year in which the largest number of tenders was published) had a low average value while larger-value tenders were few and were published in 2001.

12 The analysis of the rest of this section refers to the subset of 313 CIPE co-financed studies that, as of December 2003, had been commissioned (excluding the 80 studies not tendered or de-financed). When reference is made to a smaller group of studies, this will be indicated.

13 While it is not mandatory under current regulations (Directive 92/50 cit.), this type of procedure was utilized in 94 percent of the studies worth less than 200,000 euros.

14 Tender value information is available for 127 out of 313 FS. For the remaining cases, the imputed value was determined on the basis of the CIPE financing allocated, since the correlation between the (log of) tender value and the (log of) CIPE financing is over 95 percent. A similar procedure was adopted to impute the contract value where not available, as the correlation between the tender value and the contract value is about 99 percent (R^2= 0,99).

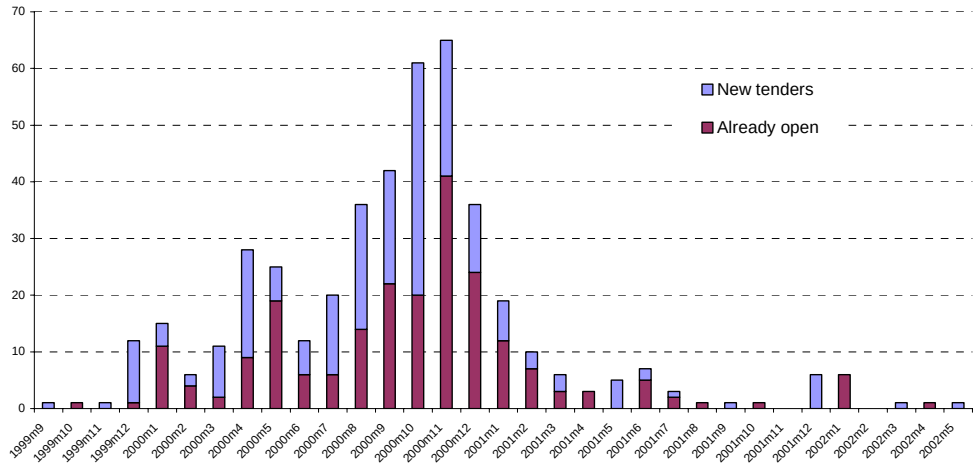
Figure IV.2 Cumulative distribution of tender values and contract amounts for FS (thousands of euros)



Source: authors' calculations based on data contained in the DPS-UVAL database

The distribution of the number of tenders over time is illustrated in Figure IV.3. After a slow start, between September 2000 and January 2001 the number of simultaneously open tenders grew significantly: in November 2000 a peak of 60 open tenders was recorded. In terms of value, a peak of 11.5 million of euros worth of open tenders was recorded in the last quarter of 2001 when, as mentioned, published tenders were few but featured a very high value, compared to the average.

Figure IV.3 Number of tenders simultaneously open, September 1999 – July 2002



Source: authors' calculations based on data contained in the DPS-UVAL database

Resources assigned to CIPE studies varied considerably by sector (see Table A2.2 in the Annex): studies for transport, telecommunication and water infrastructure obtained, on average, CIPE financing in excess of 300,000 euros, compared with an overall average of 237,000 euros for all the studies, reflecting an average tender value of 180,000 euros.[15] Three sectors (energy, agriculture, industry/services) had an average tender value lower than the overall mean.

IV.3.2 Efficiency of awarding entities

The efficiency of the awarding entities plays a key role on the demand side. Efficiency can be gauged through:

- the time required to award tenders;
- the time required to sign the contract between the awarding entity and the awardee.

On the first aspect (Table IV.2), the average awarding time was 93.6 days (about 3 months). Overall, 50 percent of the contracts was awarded in 76 days, 75 percent within 132 days. In 10 percent of the cases, awarding procedures lasted more than 190 days.

[15] CIPE's financing for Feasibility Studies is usually higher than the tender value as the awarding agencies incur such costs to implement and complete a tender procedure as preparation of project designs and/or basic assumptions to be tested before the publication of the tender, drafting of the tender and specifications, publication on domestic and European Official Journals and dissemination of the invitation to bid through the press, the internet etc.. Lastly, there are the costs for the Commission responsible for evaluating the technical bids and for the now-operational Commissions for monitoring the studies.

Table IV.2 Time required for tender award and signing of contract

Number of days	Average	Percentage of Feasibility Studies				
		10%	25%	50%	75%	90%
Days for tender awarding (*)	93.6	14	25	76	132	190
Days elapsed between awarding and contract signing (**)	79.7	8	21	50	98	176
Day elapsed between bidding deadline and contract signing (***)	176.0	55	100	155	211	281

NB: tenders with available information: (*) 166; (**) 162; (***) 145

Source: authors' calculations based on data contained in the DPS-UVAL database

While the majority of the tenders was awarded within reasonable periods of time, there were significant pockets of inefficiency. It should be noted that in these cases there was no meaningful relationship between the days elapsed to complete the tender procedure, after all the bids had been submitted, number of bids and size of the tender value. This means that delays did not appear to be attributable so much to technical problems (such as the high number of bids to review or the greater complexity of the tender as reflected by its higher value), but rather to the organizational and administrative capabilities, or lack thereof, of the awarding entities.

Inefficiency was still more evident in the case of the time required to sign the contracts. On average, it took 79.7 days to sign the contract after the award. Only for one-quarter of the tenders the contract was signed within 21 days from the award. For a substantial number of tenders it took more than 98 days (25 percent of the tenders), with a peak of 176 days or more in 10 percent of the cases.

With few exceptions, these periods are too long compared to the actual time necessary to carry out the administrative steps to sign a contract. On the other hand, it should be pointed out that the CIPE initiative represented for many awarding entities the first significant experience of interaction with the consulting market for Feasibility Studies, and this may have weighed on the length of the selection and decision process. The analysis of the awarding procedures by awarding entity (see Annex 2) seems to bear out significant differences in terms of administrative efficiency.

Some firms, given the length of time required to sign a contract, deem it appropriate to start the research and study activities even before the contract is signed, often also upon request by the awarding entity. This tends to pass on to private operators the inefficiencies of the awarding entities and, as such, cannot be considered a "best

practice" because it generates uncertainty and discourages a mutually rewarding relationship between public and private operators. These considerations are given added meaning if account is taken that, overall, in over 50 percent of the cases it takes more than 155 days, with peaks of more than 200/300 days, from the time an invitation to bid for the provision of services is published, to the time the contract is signed. Such lengthy periods of time are not consistent with the planning horizons of market operators.

Ultimately, it is necessary to streamline the administrative processes in such a way as to improve efficiency and foster a climate of certainty in the market for consulting services, especially in terms of the ability of firm to plan their operations. In addition to procedural and organizational problems, the time lags observed were due also to the alleged inability of government agencies, before launching the tender (i.e. at the time the specifications were prepared), to outline clearly the questions that needed to be answered by the study. Too broad and undefined a question can only entail greater complexity in evaluating the "best technical bid". This is borne out by the qualitative elements derived from the analysis of the tender specifications which, not infrequently, provided little information on the subject matter of the study and asked "generic" questions. At any rate, this is further testimony to the need to strengthen government agencies.[16]

IV.4 Supply side analysis

IV.4.1 Participants in tenders

The DPS-UVAL database has information available on the operators that participated in the tenders for 110 of the 313 FS co-financed by the CIPE. Bids for these studies were submitted by 946 operators while the estimated[17] (Table IV.4) number of bidders for all of the CIPE studies amounted to approximately 2,200.

Half the participants were individual consultants while firms, regardless of their legal form (joint-stock companies, limited liability companies etc.), accounted for 40 percent of the total. The number of universities was marginal (1 percent) while the other types

[16] Arguably, unless government agencies' capacity is increased, sluggish awarding procedures will probably continue to prevail, possibly inducing operators, as a way to cope with uncertainty, to bid in excess of their capacity. In some situations, these can lead to spreading firms' resources too thin, with negative consequences on service quality. It is reasonable to infer that a more stable demand for these services would make the situation a lot easier for awarding entities on one side and firms and professionals on the other.

[17] The estimate is built on the basis of the value, sector and regional location of the awarding entity for each tender. See Annex 2 for details of the estimation procedure.

of operator (including foundations and research centers other than Universities) represented the remaining 10 percent.

Most participants (85 percent) bid for tenders as part of a temporary grouping. Universities were an exception, as they joined groupings in 43 percent of the cases, i.e. nearly half the overall average.

The average value of the tender for which operators bid was approximately 244,000 euros. As was to be expected, individual consultants bid for smaller contracts while corporate entities (hereinafter corporations, together with cooperatives, will also be referred to as "firms required to file their financial statements with the Chamber of Commerce") and larger universities bid for larger contracts (277,000 and 361,000 euros on average, respectively).

Table IV.4 CIPE Feasibility Studies: number and type of participants, participation in tenders, propensity to join groupings, tender value

Type of firms	Number of participants observed (*)	Number of estimated participants (**)	Participants in at least one grouping (%)	Number of groupings submitting a bid (if at least one)	Average number of bids	Average tender value (000's of euros)
A1. Firms required to file financial statements	337	763	84	2.25	2.88	275.85
A2. Other firms	42	92	83.3	1.49	1.93	217.97
B. Individual consultants	463	1.206	85.5	1.19	1.26	196.82
C. Universities	7	21	42.9	1	1.29	421.5
D. Other operators	97	154	88.7	1.26	1.43	361.6
Total	**946**	**2.236**	**84.9**	**1.58**	**1.89**	**244.47**

NB: Relevant tenders: (*)110; (**)313.

Source: authors' calculations based on data contained in the DPS-UVAL database

On average there were 6.3 bids for each tender,[18] of which 3.2 were submitted by groupings consisting, on average, of 3.2 firms, for a total of 14.1 participants.

The large number of operators involved, compared with the average number of bids submitted, was due to a peculiarity of the Feasibility Studies under review. The minimum research and evaluation requirements set by the CIPE, as spelled out in the tender specifications, were such that projects could be successfully evaluated ex ante

[18] These comprised two Feasibility Studies assigned to external consultants without resorting to published tenders and one study assigned to a mixed group made up of specialists from the awarding entity and external consultants.

only by drawing on a solid base of interdisciplinary expertise. Rarely do individual firms – and inevitably individual consultants – have all the competencies necessary to carry out the requested study (involving environmental, territorial, legal, management, financial and economic analyses, among others). This certainly led market operators to join forces and skills, thus boosting the average size of groupings[19] (see IV.4.3).

The average revenues of the individual participants could not be properly estimated because financial data were not available for all the operators.[20] While caution should be exercised in commenting these data because of the partial information available, the average revenues of the firms that participated in the tenders amounted to 15 million euros. Certain study sectors (for details see Annex 2) attracted bids from firms with high revenue levels, viz.: energy (134 million euros), telecommunications (46 million euros) and, as a distant third, transport (16 million euros). In other words these sectors drew the largest firms. Aside from these cases, bidders had average yearly revenues ranging from 3.1 million euros to 6.4 million euros.

Table IV.5 Bidders by number of employees, revenues and year of inception

Type of firm	Number	Year of inception (average)	Revenues (thousands of euros)	Number of employees	Awarded at least one contract (percentage)	Average number of contracts awarded (if at least one)
A1. Firms required to file financial statements	337	1990	15,571	58.6	41.80	2.1
A2. Other firms	42	1994	1,257	4.9	45.20	1.6
B. Individual consultants	463				28.50	1.2
C. Universities	7				0.00	
D. Other operators	97	1992	9,400	40	9.30	1.6
Total	**946**	**1991**	**15,000**	**54.5**	**31.80**	**1.7**

Source: authors' calculations based on data contained in the DPS-UVAL database

IV.4.2 Awardees

The information available on the awardees relates to 313 CIPE studies. Overall, 613 operators were awarded at least one of the Feasibility Study contracts for which they

[19] Teaming up of consultants was particularly apparent in studies on environment, cultural resources and tourism. This is probably because the feasibility studies commissioned in these areas involve complex programs more than individual projects, with the result that several sets of skills are necessary to complete them.

[20] The financial information utilized in this paper came from the Chamber of Commerce administrative database. It follows that 2001 revenue figures are available only for corporations and cooperatives. The average revenues shown in the table reflect the average revenues of bidders that filed their financial statements with the Chamber of Commerce administrative database.

submitted a bid. Comparing this figure with the estimated 2,200 bidders (Table IV.4), it appears that slightly less than one bidder out of three was awarded at least one contract. The composition of the awardee group reflects the make-up of the universe of bidders, with individual consultants having the largest share, followed by the companies required to file their financial statements (Table IV.6).

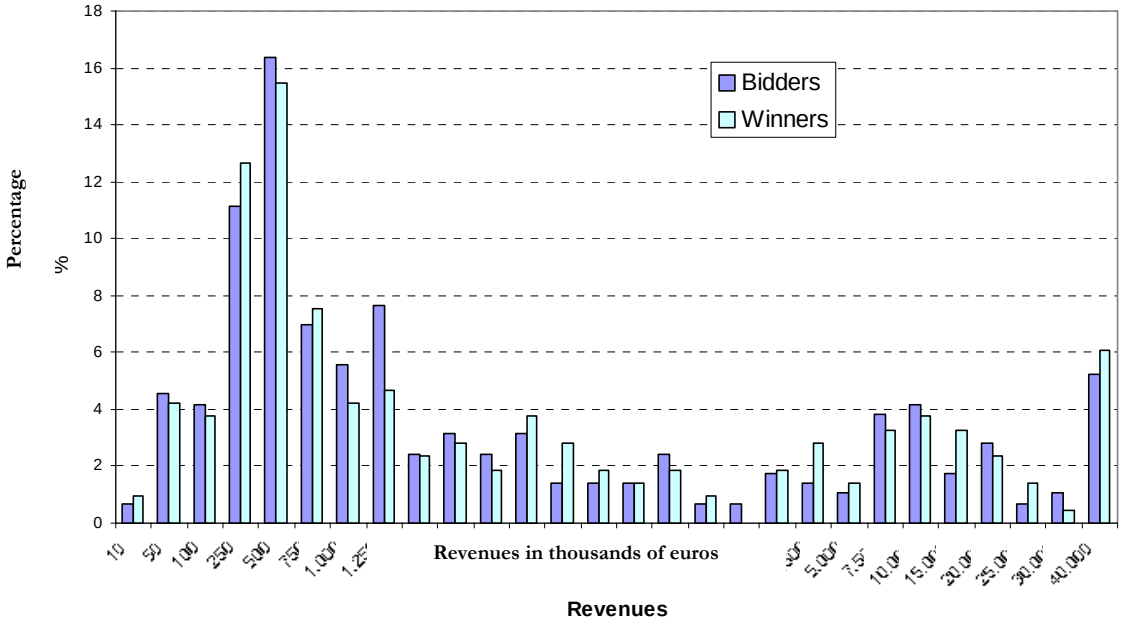
Table IV.6 Awardees of at least one contract by number of employees, revenues and year of inception

Type of firm	Number	Year of inception (average)	Revenues (thousands of euros)	Number of employees	Average tender value (thousands of euros)	Average number of contracts awarded
A1. Firms required to file financial statements	218	1990	13,594	77.2	254.1	1.8
A2. Other firms	32	1995	1,097	6.44	186	1.5
B. Individual consultants	323				166.8	1.2
C. Universities	9				90.3	1.3
D. Other operators	31	1991			214.9	1.2
Total	**613**	**1990**	**12,773**	**73.4**	**200.91**	**1.4**

Source: authors' calculations based on data contained in the DPS-UVAL and Infocamere databases

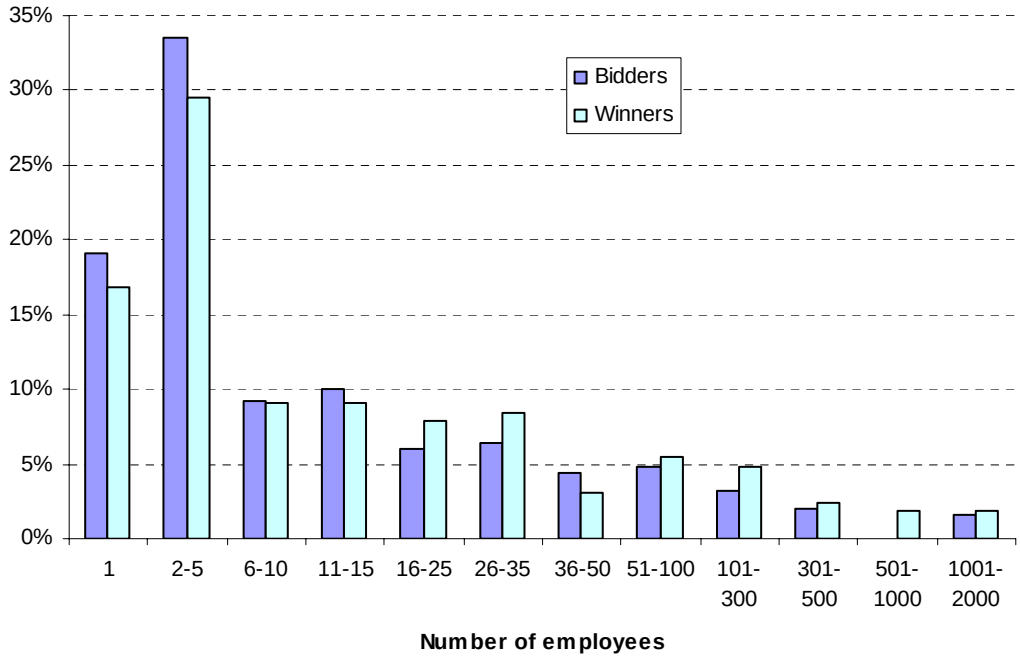
A comparison between the bidder set and the awardee subset, in terms of distribution of the firms by revenues (Figure IV.4) and number of employees (Figure IV.5) shows that, despite differences between the respective averages, the two groups are shaped in an essentially similar manner.

Figure IV.4 Bidders and awardees – distribution by revenues



Source: authors' calculations based on data contained in the DPS-UVAL database

Figure IV.5 Bidders and awardees – distribution by number of employees



Source: authors' calculations based on data contained in the DPS-UVAL database

Shifting the focus on the relatively high number of awardees, it is important to note that the large majority was awarded only one contract (Table IV.7). Firms required to file their financial statements (Type A.1) accounted for 33 percent of the operators that were awarded more than one contract. The operators with the largest number of contracts awarded (up to 20 contracts) were part of this group of firms.

Table IV.7 Awardees by type and number of contracts awarded

Type of operators	Number of contracts awarded						
	1	2	3	4	5-9	10+	Total
A1. Firms required to file financial statements	147	35	17	9	8	2	218
A2. Other firms	22	5	4	1			32
B. Individual consultants	278	35	6	3	1		323
C. Universities	6	3					9
D. Other operators	28	2		1			31
Total	**481**	**80**	**27**	**14**	**9**	**2**	**613**

Source: authors' calculations based on data contained in the DPS-UVAL database

The distribution of the value of the contracts awarded among awardees carries important implications for the competition among operators and the quality of consulting services.

To analyze such distribution, it was necessary to make certain assumptions on the agreements among operators that submitted their bids as a grouping. In general, these agreements vary according to the relative allocation of tasks and the skills to be made available. In the absence direct, detailed information,[21] a simple but plausible assumption was made: that the Lead firm in an awardee grouping receives 25 percent of the contract value, individual consultants (if participating in a grouping) 10 percent, and that the remaining amount is equally distributed among the remaining operators, including the Lead firm.[22]

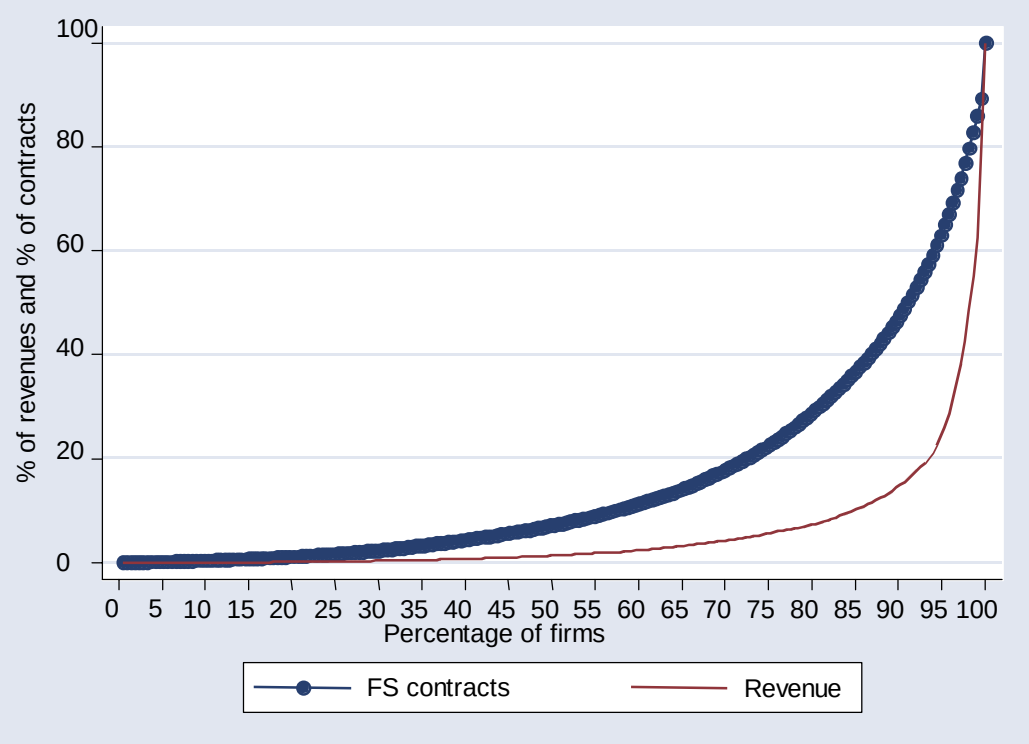
Based on these assumptions on the distribution of the individual contracts' value, the market shares of the individual awardees were calculated, to determine the Herfindal-

[21] In theory, an accurate reconstruction of the contract distribution among the different operators bidding as a grouping might be possible, through a review of all the bid documents, which specify the role and costs of each participant in case the contract is awarded. However, the quantity of material that should have been obtained from the awarding entities was so vast as to make entry into the DPS-UVAL database not feasible within a reasonable time frame.

[22] On average, since each grouping consisted of three operators, the Lead firm was allocated 50 percent of the contract value while the other two operators received 25 percent each.

Hirschman concentration index which, at 0.011, was so far removed from 100 percent as to suggest a competitive marketplace. Further confirmation of the competitive nature of the CIPE FS tenders can be obtained by comparing, through the Lorenz Curve, the distribution of the CIPE tenders with the distribution of the firms' overall revenues. Figure IV.6 shows that the concentration of the contracts is much lower than the revenue concentration: the top 5 percent of the firms in the contract distribution received 40 percent of the total put to tender, while the top 5 percent of the firms in terms of revenues accounted for 80 percent of total revenues.[23]

Figure IV.6 Concentration of FS contracts awarded and revenues of awardee firms



Source: authors' calculations based on data contained in the DPS-UVAL database

The seeming ability of the market to spread the value of contracts among a large number of operators is mostly due to the fact that, for many firms, the FS market represents a very small fraction of their revenues. While this is not enough to reach a conclusion on the effective degree of competition in the market, on the other hand it

[23] To make information consistent for meaningful comparison, the two Lorenz curves (revenues and contracts) were built using information on 110 tenders (see Table A2.3 in the Annex) for which all the bidders are known. The revenue concentration curve reflects information on the firms that bid for those tenders, and for which revenue information is available. The contract concentration curve was calculated with reference to the firms in the previous group that were awarded at least one contract.

shows that, in case of the CIPE studies, the concentration of contracts has certainly been lower than that observed in the broader market.

IV.4.3 Cooperation and competition

In addition to the number and types of operator, it is of interest to investigate the response of private entities to the demand for Feasibility Studies by government agencies.

This section will explore the following issues:

- cooperation among operators, which took shape in a strong tendency to join in temporary groupings to bid for tenders;
- price competition;
- the likelihood of being awarded a contract.

Most of participating entities (firms and individuals consultants) chose to set up a temporary grouping: 60 percent of the 110 studies for which information is available on the number of awardees and on all the bidders in general, and 75 percent of the awardees for the entire lot of 313 CIPE Feasibility Studies.

There were mainly three types of grouping:

- temporary grouping among firms;
- temporary grouping among firms and individual consultants;
- temporary grouping among individual consultants.

The first two types of grouping were the most widespread. In most cases groupings were formed for just one tender: 90 percent of them participated, with the same line-up, in a single tender (i.e. only 10 percent of the groupings participated with the same line-up in more than one tender). Therefore, these were occasional alliances and not agreements designed to restrain competition.

Setting up a temporary grouping appears to be a successful strategy: the likelihood of a favorable outcome for bids submitted by groupings and individual operators is 24 percent and 14 percent, respectively.

Table IV.8 Forms of participation in tenders and probability of contract award: individual operators and temporary groupings

Type of temporary grouping	Number of temporary groupings	Average number of members in a grouping	Bidders for one tender (%)	Average number of tenders for which a bid was submitted (if more than one)	Tender value (euro)	Awardees of at least one contract (%)	Average number of awarded contracts (if at least one)
Single operators (firms, individual consultants, other)	228	1.0	71.0	3.3	223,609	14.0	1.6
Temporary grouping among firms	185	2.6	88.0	2.3	325,090	24.0	1.1
Temporary groupings among firms and individual consultants	102	4.1	89.0	2.3	241,656	26.0	1.0
Temporary groupings among individual consultants	52	4.5	98.0	2.0	176,331	15.0	1.0
Other (*)	4	3.8	75.0	8.0	380,150	75.0	1.7
Total groupings	**343**	**3.3**	**90.0**	**2.5**	**278,368**	**24.0**	**1.1**
Total groupings and individual operators	**571**	**2.4**	**82.0**	**3.0**	**256,503**	**20.0**	**1.2**

NB: (*) This item includes groupings among public, private and/or mixed consortia

Source: authors' calculations based on data contained in the DPS-UVAL database

In addition to the already mentioned need to form multidisciplinary teams in response to the requirement of most tenders, the formation of temporary groupings may have been a way for many forms to add to their productive capacity without increasing their headcount. At the same time, however, it cannot be ruled out that in some cases firms might have teamed up to "limit" competition.

The average markdown from the initial tender value was 9.7 percent. Mean and median tender values were 180,000 euros and 130,000 euros, respectively. Average markdowns from initial tender values varied, from a minimum of 5.4 percent for studies on the manufacturing and service sectors to a maximum of 12 percent for cultural resources and recreational services (see details in the Annex). On the other hand, the low tender values, the complexity of the ex ante evaluations of many Feasibility Studies put to tender and the limited time to complete such studies were certainly not conducive to substantial markdowns.

There is no statistical evidence [24] to support the notion that an increase in the number of bidders (and bids) might lead to greater markdowns. Actually, the limited price competition is due also to the rules governing the awarding of government contracts. In most cases, among the different evaluation criteria, the bid price had only a 20 percent weight (the remaining 80 percent being assigned to methodology, organization and proposed deliverables).

Another important element to evaluate competition is the likelihood of a successful outcome for any given bid. Table IV.9 shows – for the subset of 110 studies with full information on both awardee and non-awardees – that as the number of bids submitted by individual operators increases, so does the *number* of contracts awarded in absolute terms. However, the *likelihood* of a successful outcome for a bid (ratio of contracts awarded to number of bids) does not change significantly.

Table IV.9 Multiple bids and probability of success

Bids submitted	Bidders with Available information	Percentage of awardees of at least one contract	Average number of contracts awarded	Average contracts awarded as a percentage of bids
1	667	20.5	0.2	20.5
2	130	46.9	0.6	30.0
3-5	100	63.0	1.2	33.8
6-10	37	78.4	2.5	32.6
More than 10	12	91.7	6.2	31.0
Total	**946**	**31.8**	**0.5**	**23.9**

Source: authors' calculations based on data contained in the DPS-UVAL database

A probability function was estimated to verify whether the operators' characteristics (activity sector, revenues, etc.) and their inclination to join in groupings (nature of grouping and number of operators joining) might have affected their chances to be awarded a contract.

The main conclusions that can be drawn are as follows (for details of the estimate see Annex 2):

1) bids submitted by individual consultants have the same probabilities to result in a successful outcome as the bids of individual corporate entities;

[24] A simple multivariate regression exercise shows that, given the same tender value, there is no meaningful correlation between the number of participants and the markdown with which the FS is awarded.

2) bids submitted by temporary groupings of firms or groupings among firms and individual consultants are much more likely to be successful: for corporate entities the probability of a successful outcome is 10 percent for bids on a stand-alone basis, 20 percent for bids submitted by a temporary grouping among firms and 15 percent for bids submitted by a temporary grouping among firms and individual consultants. For individual consultants this probability ranges from 10 percent for bids on a stand-alone basis to 15 percent for bids by temporary groupings with other individual consultants. Given participation in a temporary grouping, the larger the number of participants in the grouping the greater the likelihood of success;

3) the estimates confirm that the larger the number of bids submitted the lower the probability of the single firm to be awarded the study, thus attesting to a high degree of competitiveness;

4) focusing the attention on corporate entities, there is no clear evidence that the chances of being awarded a contract increase with the firm's revenues: the rank correlation between revenues and share of total tender value (computed for 208 firms) was 0.49 while the elasticity of the contracts awarded with respect to changes in revenues was 0.32 (i.e. a change of 1 percent in revenues is associated with a change of 0.32 percent of the value of the contracts awarded). On the other hand, the larger firms (with revenues in excess of 20 million euros) are certainly more likely to submit a successful bid; but the hypothesis that firms with revenues between 250,000 euros and 750,000 euros and firms with revenues between 1.25 million euros and 5 million euros or between 10 million euros and 20 million euros enjoy the same chances of success (other things being equal), is accepted at every standard significance level. Likewise, the bids of firms with revenues between 100,000 and 250,000 are as likely to be successful as those of firms with revenues between 750,000 euros and 1.25 million euros.

Overall, the data show that larger firms tend to be awarded larger-value contracts. On the other hand, they also show that, while it is positive and statistically significant, the correlation between the revenues of a firm and the size of the contracts awarded is less than proportional.

V. Market participation and role of economic policies

V.1 Potential supply of FS-related consulting services

This section attempts to estimate the size of the potential supply of consulting services for the preparation of Feasibility Studies, in terms of number of entities and volume of activity. The estimates that follow should clearly not be interpreted as precise measures, but as orders of magnitude. These may be useful to provide broad indications on the market segment that the CIPE initiative has been able to mobilize, as well as to underpin some considerations on the likely market response of a rise in demand for FS.

The analysis of the potential suppliers of the services is conducted utilizing the same classification of market operators which was used in the review of the bids: firms required (A1) or not required (A2) to file their financial statements, individual consultants (B), Universities (C) and other operators (D).

Considering the nature of available databases, and the relative importance of the different typologies of bidders in the CIPE tenders, estimates of the number of entities for typologies A1, A2, B and C (see Table V.1) were developed. Estimates of revenues or other measure of business volume were developed only for types A1 and C while entities in type D have not been included in the estimation exercise.

Table V.1 Service suppliers for FS: presence in CIPE studies and included in the estimate of potential supply

Operators	Presence in CIPE Studies			Inclusion in estimate of potential supply		
	Number of operators	Percentage of total	Relative frequency in acting as Lead firm	Estimates of number of operators	Estimates of revenues or volume of activity	Source of data used for estimation
A1. Firms required to file financial statements	416	34.1	67.7	Yes	Yes	Infocamere
A2. Other firms	55	4.5	5.2	Yes	No	Infocamere
B. Individual consultants	654	53.7	20.5	Yes	No	Agenzia delle Entrate, ISTAT, Infocamere
C. Universities	16	1.3	1.7	Yes	Yes	MIUR, CRUI ISTAT
D. Other operators	78	6.4	4.9	No	No	
Total	**1,219**	**100.0**	**100.0**	**-**	**-**	**-**

Source: authors' calculations based on data contained in DPS-UVAL database

The types of supplier selected to determine the quantity of services accounted for over 93 percent of the bidders for the CIPE studies. As to the estimation of the revenues or the business volumes, the selected firms (types A1 and C) represented approximately 35 percent of the bidders in the CIPE tenders, but nearly 70 percent of those that acted as Lead firms in groupings.

While details are available in Annex 3, the methodologies adopted to estimate potential supply are summarized below:

For firms:

- the ATECO activity codes of the firms that bid more frequently for the CIPE studies were identified;
- a random sample was built of firms contained in the Infocamere database, which was representative the universe of operators engaged in the selected ATECO classes, stratified by activity code and reported revenues for 2001. The large size of the sample (approximately 2,500 firms) was determined in such a way as to ensure an estimate error to within 10 percent at a 90 percent confidence level;
- the ability of firms included in the sample to qualify as potential bidders was evaluated on the basis of the description of the firm's activity contained in the Infocamere database. Potential bidders were classified in accordance with the roles they might be able to fill in connection with a study (Lead firms, Specialists and Non-specialists; see Annex 3 for the definitions).

For individual consultants, the number of potential bidders was estimated on the basis of different statistical sources, particularly the sector studies ("studi di settore") prepared by the Italian Tax Revenue Agency ("Agenzia delle Entrate"), by selecting the fields of activity pertinent to the preparation of the Feasibility Studies, and the associated information on revenues, capitalization and number of employees.

Finally, for Universities, the research centers active in Italy were accurately screened (based on MIUR data) according to the activities performed in connection with the Feasibility Studies. Moreover, based on the average inflows from private sources, an average revenue level was determined for each center.

Results

Overall, the CIPE tenders mobilized private operators to a fairly significant extent (Table V.2): for firms the ratio of actual, to potential bidders varied from 10 percent to

20 percent, in terms of number of entities, but was equivalent to 70 percent, in terms of revenues. For individual consultants, the ratio in terms of numbers was 11 percent, while the share of Universities attracted was rather low (4.2 percent).

For firms, participation increased with revenues (Table V.3). Specifically, considering the companies capable of acting as Lead firms in a temporary grouping of several operators, the participation rate in tenders by the top two revenue classes was 41 percent (the average was 16 percent). Participation varied also in relation to the firms' business fields (Table V.4): data processing operators (activity 7230) had the highest participation rate compared with other sectors (30 percent).

Table V.2 Actual and potential bidders in the CIPE tenders for the Feasibility Studies

Type of operators	**CIPE tenders** (Estimates for the entire set of 313 tenders)				**Potential bidders**		**Bidders in the CIPE studies as a share of potential bidders (%)**		
	Number of operators	Revenues or activity volume (millions of euros)	Total tenders value (millions of euros)	Tender value in relation to revenues (%)	Estimated number	Estimated revenues (millions of euros)	Number of bidders out of total potential bidders	Bidders' revenues vis-à-vis potential bidders' revenues	Tender value vis-à-vis potential bidders' revenues
(A)	(B)	(C)	(D)	(E) = (D)/(C)	(F)	(G)	(H) = (B)/(F)	(I) = (C)/(G)	(J) = (D)/(G)
A1. Firms required to file their financial statements	763	10,827	56.37	0.6					
Of which in the ATECO classes selected	432	3,319	56.37	1.7	3,922(*)	6.279(*)	11.0	52.9	0.9
Of which a Lead firm at least once	253	1,328	56.37	4.7	1,349(**)	1.785(**)	19.0	74.4	3.2
A2. Other firms	92	n.a.	56.37	n.a	1,517	n.a	6.1	n.a	n.a
B. Individual consultants	1,206	n.a.	56.37	n.a	11,000	n.a	11.0	n.a	n.a
C. Universities	21	n.a.	56.37	n.a	500	27	4.2	n.a	209.0
D. Other operators	154	n.a.	56.37	n.a	n.a	n.a	N.a	n.a	n.a
Total	**2,236**								

NB: (*)Operators *Lead firms* and *Specialists* + *Non-Specialists*: for definitions of, and clarifications on, these terms, see Annex 3; (**) Only *Leaders* and *Specialists*

Source: authors' calculations based on data contained in DPS-UVAL database, and on data provided by ISTAT, Infocamere, Agenzia delle Entrate, Conferenza dei Rettori delle Università Italiane

Table V.3 Participation rates of operators by revenue class

Revenue class (thousands of euros)	General bidders	Lead firms for groupings	Awardees
Revenues unavailable	5.0	6.0	1.0
< 100	5.0	3.0	1.0
100 - 250	5.0	8.0	2.0
250 - 750	14.0	22.0	3.0
750 – 2,500	20.0	41.0	5.0
> 2,500	30.0	84.0	10.0
Total	**10.0**	**16.0**	**3.0**

Source: authors' calculations based on data contained in Infocamere and DPS-UVAL databases

Table V.4 Participation rates by activity sector

ATECO activity code	Bidders in general	Lead firms in groupings	Awardees
7220: Software consultancy and supply	6.0	11.0	2.0
7230: Data processing	16.0	39.0	3.0
7310: Research and experimental development (natural sciences and engineering)	9.0	17.0	4.0
7413: Market research and public opinion polling	4.0	13.0	1.0
7414: Business and management consultancy activities	11.0	14.0	4.0
7420:Architectural and engineering activities and related technical consultancy	12.0	16.0	3.0
7484: Miscellaneous business activities n.e.c.	11.0	19.0	1.0
Total	**10.0**	**16.0**	**3.0**

Source: authors' calculations based on data contained in Infocamere and DPS-UVAL databases

V.2 Participation of private operators and policy role: a statistical analysis

The assumption underlying this paper is that, other things being equal, greater participation by operators enhances competition and affects the quality of the services provided. To this end, the next step is to identify the factors that prompt operators to take part in bids. This section purports to use the CIPE experience to empirically identify the characteristics of the tenders that exercise the greatest influence on the bidding decision of operators with the required skills. This information, in turn, can be useful to evaluate the policy tools aimed at encouraging participation. The approach followed is to compare the attitude of the bidders (see section IV) with that of the potential bidders, based on the available information.

The analysis focused on firms required to file their financial statements (Type A1) with the Chambers of Commerce which, reportedly, carry out their main business in the sectors identified by the seven ATECO codes utilized to classify potential bidders for FS contracts. For these firms, we drew a random sample (stratified by activity code and revenue class) of nearly 4,400 potential bidders, corresponding to about 5 percent of the total population. (see Annex 3).

With reference to actually observed bidders, the analysis was restricted to a subset of 100 tenders for which full information was available on both awardees and non-awardees and on the tender publication date. There were 209 firms classified as A1, and assigned to one of the seven ATECO codes considered, which bid for at least one contract. Calculations were performed to assign to each of these firms a probability of bidding for at least one contract in one of the four consecutive time intervals during which bids could be submitted for the CIPE contracts (Table V.5).

Table V.5 Number and average value of CIPE tenders by time interval

Time intervals	Average value of tender published in the period (thousands of euros)	Number of tenders published during the period
Up to June 2000	150.40	29
July – September 2000	236.15	33
October – December 2000	161.77	22
From January 2001 onwards	264.35	14
Total	**198.11**	**98**

Source: authors' calculations based on data contained in the DPS-UVAL database

Firms' characteristics, X_i, are assumed to be time-invariant, whereas tenders' characteristics at any given interval t, are known to all operators, Z_t, and vary from one time interval to another.

If a binary variable Y_{it} is introduced, which takes on the value of 1 if firm i decides to bid for at least one contract in period t, then $\Pr(Y_{it}=1 \mid X_i, Z_t, PBidder)$ is the probability that firm i bids in period t for at least one contract, given its characteristics, including its being a potential bidder, i.e. its being able to carry out the FS (see Annex 3). The other characteristics for each firm include the activity code, revenue size and the region where the firms is headquartered.

Estimating $\Pr(Y_{it} = 1 | X_i, Z_t, PBidder)$ enables us to examine how bidding probabilities change with Z_t, the characteristics of published tenders[25]. In particular, the effect of a 50 percent increase (about 10 million euros in absolute terms) of the overall tender value was simulated via two possible alternatives: a) increase by 50 percent the average tender value or b) increase by 50 percent the total number of FS financed.

The results of the simulations suggest that, if policy objectives include broadening the range of actual bidders, then the second instrument appears to be more effective. Table V.6 shows that the initial actual-to-potential bidders ratio is on the whole equal to 5.6 percent. If the first alternative is selected, the 98 studies would attract 48 additional bids (a 15.7 percent increase). In the event the second option is adopted, 49 new tenders would generate 95 additional bidders (a 31 percent increase).

It is important to note that more bids do not translate into a commensurate increase in the number of bidders. In fact, it was shown that firms tend to bid for more than one contract (1.46 on average). This means that, under a best-case scenario, a 50 percent surge in the number of studies would attracts approximately 65 new firms while a 50 percent rise in the average tender value would invite bids from 33 new firms.

These changes reflect elasticities (ratio of the percentage change in bids to the percentage change in the tender value and number of tenders) of 0.32 and 0.62, respectively.

[25] The detailed estimation procedure is explained in Annex 3. It is important to note here that, to select the sample, techniques were used to take into account potential biases in favor of bidders and the inability to make a qualitative assessment as to the capacity of the firms in the sample to be potential bidders. On the first aspect, see Manski e McFadden (1981), and on the second, see Bover and Arellano (2002). Regarding the actual model specification adopted, this is the result of a number of tests that showed consistently that more detailed specifications which would take into account, for instance, the FS sectors, the type of awarding entity or greater specifications of the firms' requirements on the basis of the relevant ATECO sector, do not add significant explanatory power. More specifically, there is no noticeable difference with respect to the tender value.

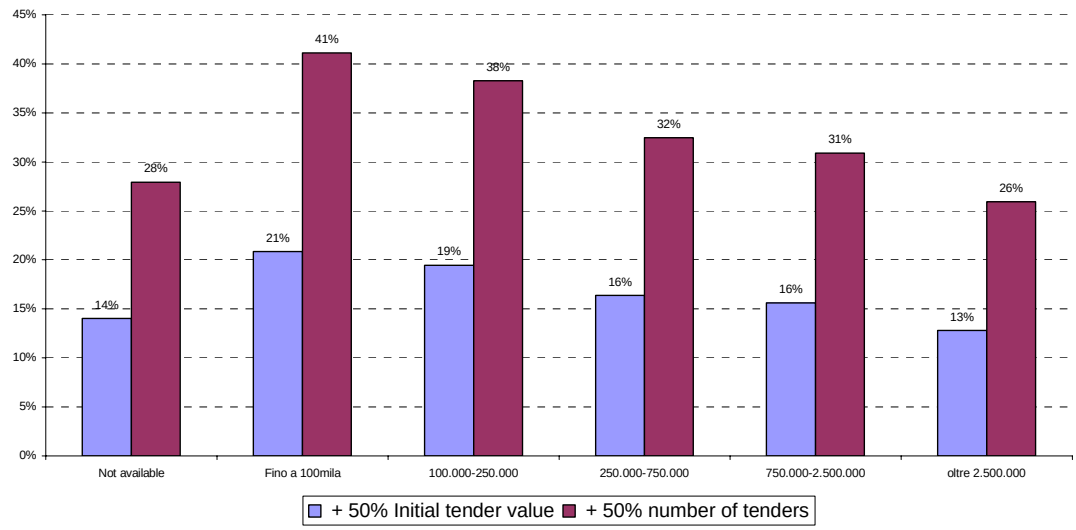
Table V.6 Simulated effects of an increase in the average tender value or the number of tenders on the number of bidders

Item	Value
Estimated number of potential bidding firms	5,439
Number of actual bidders	209
Total number of actual bids for the CIPE tenders included in the simulation	305
50% increase of average tender value:	
Change in the number of bids	48 (+15,7%)
Change in the number of bidders	33 (+ 15,8%)
50% increase of FS tenders:	
Change in the number of bids	95 (+31,1%)
Change in the number of bidders	65 (+31,1%)

Source: authors' calculations based on data contained in Infocamere and DPS-UVAL databases

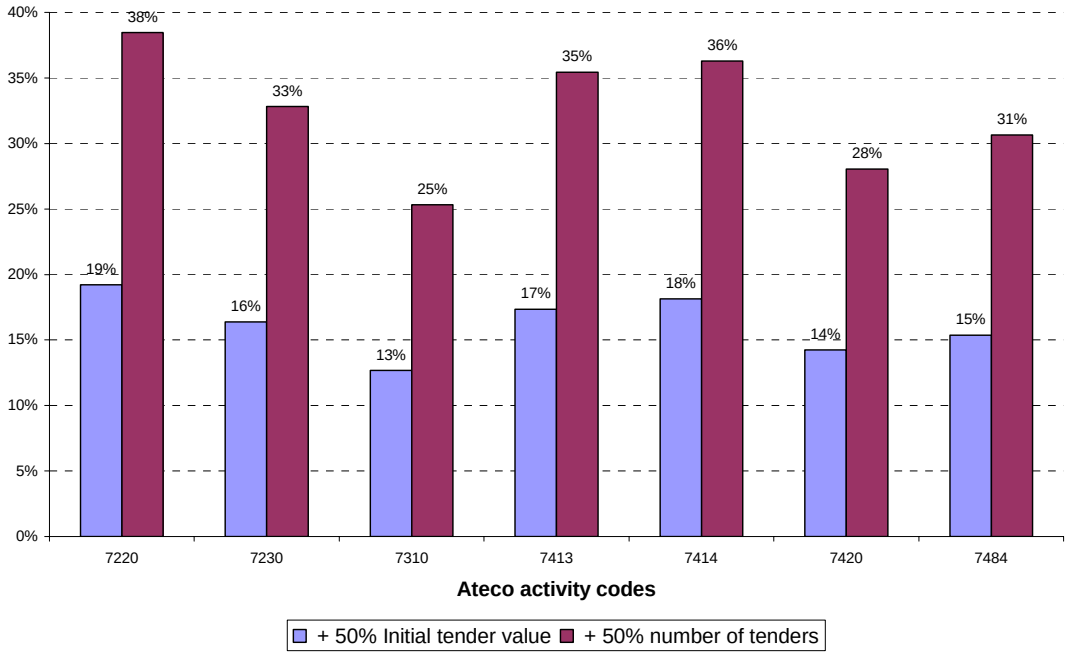
The responsiveness of firms to the demand for FS varies according to revenues (Figure V.1) and activity (Figure V.2). However, an increase in the number of tenders seems more effective than a rise in the average tender value, regardless of the characteristics of the potential bidders.

Figure V.1 Change in bids by revenue class



Source: authors' calculations based on data contained in Infocamere and DPS-UVAL databases

Figure V.2 Change in bids by activity code



Source: authors' calculations based on data contained in Infocamere and DPS-UVAL databases

Shifting the focus on Lead firms alone, it appears that bids submitted by these operators are not so much affected to a significant extent by the higher average value of the contracts as by their number. In this case, an increase in the funds designed to increase by 50 percent the average value of FS contracts does not give rise to a number of potential Lead firms that decide to submit at least one bid. On the other hand, a 50 percent surge in the number of FS, given the same average tender value, translates into a 38 percent increase in the number of Lead firms. For some group of firms that might take a lead role in a grouping, the elasticity of the number of bidders to a change in the number of tender contracts is even greater than 1.

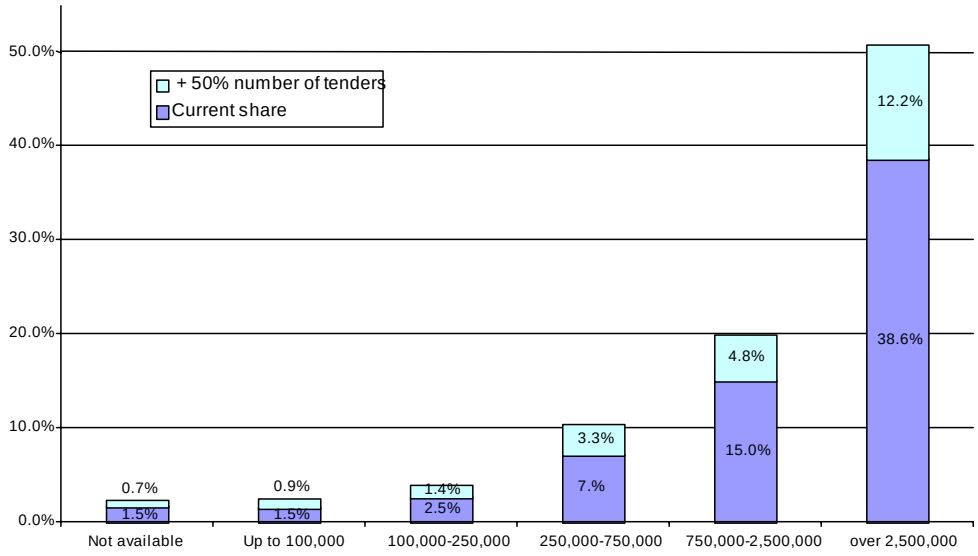
Table V.7 Simulated effects of an increase in the average tender value or the number of tenders on the number of Lead firms

Variable	Value
Estimated number of bidders that might take a lead role in a grouping	1,949
Number of actual bidders	110
Total number of actual bids for the CIPE tenders included in the simulation	156
50% increase of FS tenders:	
Change in the number of bids	61 (+39,1%)
Change in the number of bidders	42 (+38,1%)

Source: authors' calculations based on data contained in the DPS-UVAL databases

It is important to note that, even though Lead firms account for only 5.6 percent of total bids, the estimated share of the larger firms (over 2.5 million euros in revenues) is 38.6 percent. A 50 percent increase in the number of tenders might determine a rise in excess of 50 percent of these potential Lead firms (Figure V.3).

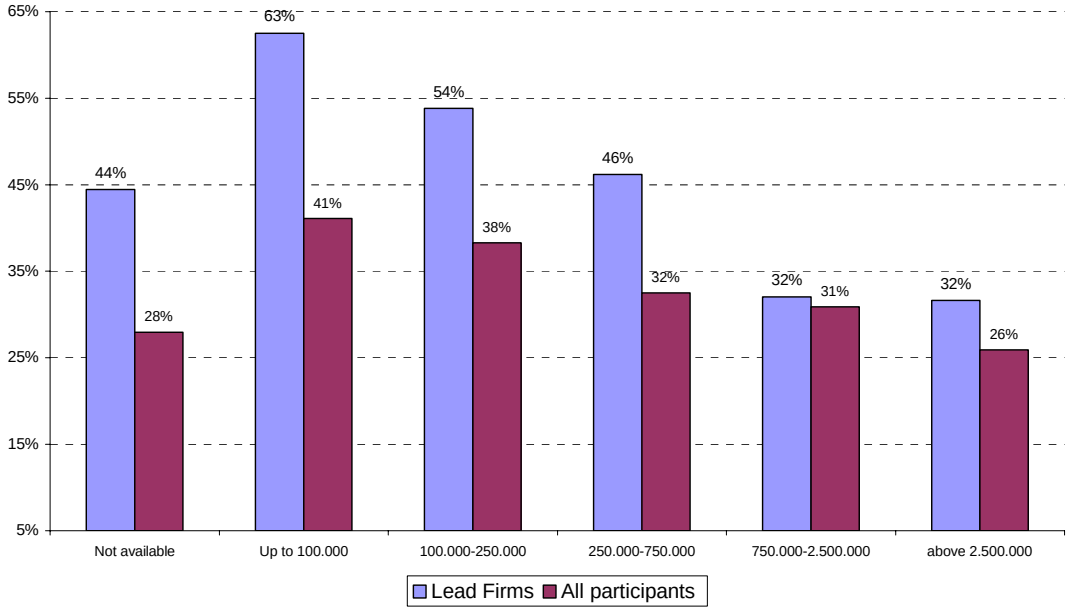
Figure V.3 Effects of an increase in the number of tenders on bidders that might take a lead role in a grouping, by revenue class



Source: authors' calculations based on data contained in Infocamere and DPS-UVAL databases

Figure V.4 shows that potential Lead firms are more reactive to a rise in the demand for Feasibility Studies compared with potential bidders in general. Very small potential Lead firms (with revenues lower then 250,000 euros), in particular, seem to be most interested in a market expansion.

Figure V.4 Percentage increase of bidders by revenue class



Source: authors' calculations based on data contained in Infocamere and DPS-UVAL databases

VI. Conclusions

This paper has analyzed certain segments of the market for consulting services that play an important role in the public investment cycle. These include technical assistance (TA) for the preparation of public investment plans and programs, and applied research for their evaluation. In terms of the project cycle, this paper focused on Feasibility Studies (FS) and project design activities.

Scope of the inquiry

The analysis addressed the following questions:

- in the current situation, is the consulting industry sufficiently broad and competitive? And is it sophisticated enough to ensure high-quality services? Do Government agencies provide sufficient incentives for consulting firms to perform to the best of their abilities?
- in the medium-to-long run, what are the possible tools to encourage firms to specialize in the services of interest here, possibly trough consolidation of existing operators and increase of the average firm's size?

These questions were addressed by using both macro-data, in relation to the market as a whole, and micro-data, in relation to a specific market niche (Feasibility Studies).

The results of the analysis and the possible implications for a more effective interaction between government agencies and private operators in the purchase/supply of services are summarized below.

Findings

In the 1996-2004 period, Government demand for consulting services was estimated to amount, on average, to approximately 690 million euros per year, slightly less than 80 percent for project design services and the remaining 20 percent for Feasibility Studies, technical assistance and program evaluation. Project design services rose in nominal terms at a slow but steady rate.

The higher fluctuation of the demand for Feasibility Studies, technical assistance and project and/or policy evaluation services may have discouraged firms from specializing in these areas.

As far as supply is concerned, the empirical evidence seems to suggest that, in the aggregate, the demand for consulting services in connection with public investments

accounts for a small share of the total revenues of potential service suppliers. Moreover, it appears that there are other components (both public and private) of the overall demand for services that influence the strategies of these firms. At the same time, at the level of individual tender, Government demand appears potentially attractive for consulting firms. Such attractiveness is higher for smaller firms, though it might be somewhat mitigated by the transaction and management costs associated with the formation of groups of operators big enough to meet the minimum capital and financial requirements typically set by tenders.

In order to gain a deeper understanding of the interaction between demand and supply, the study explored 313 published tenders for Feasibility Studies contracts co-financed by the CIPE in the 2000-2002 period, for a total of 56 million euros.

The study estimated that a total of over 2,200 operators (including firms, individual consultants, universities and other operators) bid for the CIPE contracts and that 613 were awarded at least one (80 percent of the awardees obtained one contract). Based on the characteristics of the bidders (revenues, number of employees, activity sector), it was estimated that the broader set of operators potentially qualified to bid for FS tenders may consist of some 5,800 firms, 11,000 individual consultants, and 500 university research centers. Excluding firms that do not engage primarily in Feasibility Studies, there were approximately 1,900 potential bidders.

Considering the actual bidders, the potential ones, and the structure of the contract awardees' groupings, the market for Feasibility Studies appears to be fairly competitive.

First of all, the number of bidders was relatively high: for firms, the ratio of actual to potential bidders varied between 10 percent and 20 percent in terms of number of operators, but reached 70 percent in terms of revenues. For individual consultants, the ratio in terms of numbers was 11 percent, while the share of Universities attracted was much lower (4.2 percent).

Secondly, little evidence of market concentration or dominant positions was found. Based on a plausible assumption about the distribution of contract's amount among awardees participating to a given grouping, it was estimated that the top 5 percent of the firms in the award distribution obtained 40 percent of the total value of the contracts put to tender, while in terms of turnover, the top 5 percent of firms revenues accounted for 80 percent of the total. The concentration of market shares also appears limited,

with a Herfindal – Hirschman index of 0,011, far removed from those levels (close to one) which indicate the presence of an oligopoly.

Third, awardees of more than one contract were not necessarily the largest operators: the coefficient of rank correlation between revenues and share of total contract value (calculated for 208 firms) was 0.49, while the revenue elasticity of contracts awarded was 0.32 (that is, a 1 percent change in revenues causes the value of the contracts awarded to vary by 0.32 percent). On balance, the evidence suggests that larger firms tend to secure larger contracts, but that the relationship between tender value and revenues, although positive and statistically significant, is less than proportional.

Fourth, more active operators do not have an advantage: the probability of success does not change with the number of bids submitted, even though as the number of bids increases, so does the number of contracts awarded. What really seems to make the difference is the ability to set-up temporary groupings: the probability of success of a bid by a grouping is 24 percent, versus 14 percent for a bid submitted by and individual operator.

Despite the large number of bidders, price competition was limited, as markdowns averaged less than 10 percent, and were not related to the number of bids submitted. This was partly due to the evaluation criteria selected to award the contracts, which placed greater emphasis on the technical and methodological quality of the bids than their price. Another possible explanation of the limited weight of price in the awarding decisions may be the fact that, during the period under review, the demand for Feasibility Studies jumped, prompting operators to consider price reductions for the service a secondary factor in their bids for contracts.

Notwithstanding the overall competitive nature of the market, a subset of operators played a leading role: firms with revenues ranging from 1.5 million euros to 4.6 million euros had a "success" rate of 60 percent (award of at least one contract) compared to an overall average of 46 percent. The relative success of these firms may be explained with their high degree of specialization, low costs, and ability to team up effectively with other operators.

Policy implications

Even though the data on the tenders for the CIPE studies showed that basic market forces were at work, the technical evaluation of the studies available (see section V.2)

suggests that quality was not always satisfactory. While caution is in order, due to the limited number of studies analyzed, in general it might be inferred that the existence of an active and competitive market, although necessary, is not a sufficient condition to ensure high-quality services. This raises the question of the role of economic policy in increasing quality.

Strengthening government demand. The analysis shows that there is much scope for improvement in the way government agencies manage the demand for services. Awarding entities appear generally slow in carrying out the contract award and signing procedures. This may have negative consequences on quality, by inducing firms to bid in excess of their capacity as a way to cope with uncertainty on the timing of contract inception and completion, and in particular to reduce the risk of keeping human resources idle.

Another set of issues relate to the technical skills of the awarding entities. While no consistent statistical information is available, the CIPE experience makes it possible to highlight at least three problem areas: 1) the preparation of the tender specifications, where in most cases the precise nature of the evaluation services requested is not spelled out clearly; 2) the ability to monitor the quality of the work-in-progress and to assess the robustness of the data and methods utilized for the analyses; 3) the ability to assess the completion of the work not only from an administrative standpoint, but also in terms of the quality of the end products.

These considerations go back to the more general problem of establishing quality standards for consulting services as a way to improve the interaction between public and private sectors. As things stand now, it is unrealistic to expect that government agencies have in all cases the know-how required to evaluate the quality of the services contracted to the market. In fact, one of the key reasons they resort to outside consultant in the first place is that they do not have technical expertise in-house.

The institution of technical evaluation units in all central and regional government agencies, required by Law 144 of 1999, may be part of the solution. However, many of the evaluation units activated so far are under-staffed and overworked, and therefore unable to provide adequate technical support to awarding entities. A complementary solution might be the preparation and dissemination of guidelines, methodologies and other tools that would make quality assessment faster and easier, and foster the establishment and adoption of common quality standards.

Strengthening Supply. The analysis of policy options on the supply side may be conducted with reference to the conceptual framework set at the beginning of this paper (see section II.1) and the empirical evidence summarized in Table VI.1. If quality depends not only on the number of active operators, but also on the existing stock of knowledge, it then becomes key to analyze market behavior by revenue class (assuming that this factor is somehow correlated to the accumulation of expertise and knowledge). As noted before, the market features mostly small and very small firms, which account for 85 percent of the whole. In terms of skills, only a small proportion of firms is potentially capable of providing the consulting services required by government agencies (in the case of the FS, this portion is estimated at around 2 percent). The number of potential bidders among very small enterprises is extremely limited, but it is no more than 5 percent-6 percent of the total for medium and large firms. The CIPE FS tenders were highly effective in attracting the larger revenue-generating firms, while they were less so for firms in the first two revenue classes.

Table VI.1 CIPE FS: participation rates in CIPE FS tenders; potential bidders and distribution of firms by revenue class

Revenue class	Participation rates [a]	Share of potential bidders [b] (%)	Total firms[c] (%)
Very small [d] (less than 100,000 euros)	13.3	1.3	79.0
Small (100,000 – 250,000 euros)	14.4	6.7	6.7
Medium-Small (250,000 – 750,000 euros)	44.7	4.6	7.5
Medium-Large (750,000 – 2.5 mm. euros)	55.9	5.2	4.5
Large (over 2.5 mm. euros)	109.5[e]	4.2	2.3
Total	27.5	2.1	100.0

NB: Data relate to firms engaging in the sectors listed in Table V.4
[a] Ratio of actual bidders to potential bidders; [b] Potential bidders as a percentage share of total firms in the same revenue class; [c] As a share of total firms; [d] Includes firms for which revenues were not reported; [e] An amount in excess of 100 indicates estimate errors due to the limited number of firms in the top revenue class.

Source: authors' calculations based on data contained in Infocamere and DPS-UVAL databases

In the near term, there seems to be significant room to encourage more small and very small firms to bid. These were the firms with the lowest participation rate. In fact, the econometric analysis (see Section V) of the probability of bidding for contracts, given the characteristics of the tenders and potential bidders, suggests in fact that small firms are the most reactive and that the most effective way to attract more bidders is to

increase the number of tenders as opposed to raising the average tender value. While the average elasticity of the number of bidders with respect to the number of tenders is 0.62 (a 1 percent change in the number of tenders causes a 0.62 percent change in the number of bidders), the elasticity of the number of Lead firms with revenues lower than 250,000 euros is significantly greater than 1.

However, it cannot be ruled out that, while they are more sensitive to a change in demand in the short run, small operators have less experience and thus are less capable of bringing additional expertise to the market, compared with their more established competitors.

Therefore, in the medium-to-long run it might be a good idea not to increase participation rates *per se* but to encourage bids by more qualified operators. To this end, considering the very high participation rates of firms in the top revenue classes, it might be necessary to enlarge the pool of potential bidders. In terms of Table VI.1, this would mean increasing the share of total firms capable of providing consulting services pertinent to public investments, particularly in the higher revenue classes.

To achieve such an objective, it might be necessary a steady expansion of government demand for consulting services. In fact, this might encourage larger operators to shift their focus from the private to the public sector and to invest for the development of the skills required to evaluate public-investment programs and plans.

In short, initiatives such as that of the CIPE FS co-financing program have elicited active short-term responses by consulting service providers. However, only strong and stable motivating factors appear to be able to steadily increase service quality. At the same time, the role of government agencies to bring about rising quality standards, by improving their technical and organizational capabilities, should not be underestimated.

Annex

1. Annex to Section III

1.1 Estimate of the demand for consulting services

Services for the programming cycle

The demand for evaluation and technical assistance services related to public-investment plans and programs was estimated by using data available in the European Union's TED database (Tenders Electronic Daily), given that awarding entities are required by national and community laws to transmit to this database information on all published tenders for service contracts of 200,000 euros or more. Even though the use of this database does not make it possible to gather information on tenders for amounts below the mentioned threshold, past experience suggests that a significant portion of contracts for technical assistance and evaluation services is for more than 200,000 euros.

A number of simple keyword searches in the TED database (Table A1.1) made it possible to estimate that, in the 2000-2004 period, there were on average 44 tenders for technical assistance services and 16 tenders for evaluation services a year for more than 200,000 euros. Using the information on tender values (available for about 75 percent of the tenders), and considering that both types of service are usually provided on a multi-year basis, the average amount for evaluation and technical assistance contracts can be set at 670,000 euros and 1.45 million euros, respectively. Projecting these amounts for all the tenders published, the estimated yearly average value of total tenders is 10.7 million euros for evaluation services and approximately 64 million euros for technical assistance services.

Table A1.1 Tenders for evaluation and technical assistance contracts above community threshold (2000-2004)

	Evaluation				Technical assistance			
	Total tenders	Tenders with known value			Total tenders	Tenders with known value		
		Number of tenders	Total amount (millions of euros)	Average value (millions of euros)		Number of tenders	Total amount (millions of euros)	Average value (millions of euros)
2000	7	6	2.24	0.37	17	9	5.70	0.63
2001	21	16	14.41	0.90	33	31	49.30	1.59
2002	21	19	15.03	0.79	30	27	33.46	1.23
2003	23	22	13.92	0.63	67	61	105.58	1.73
2004	8	7	1.60	0.23	71	67	89.22	1.33
Total	**80**	**70**	**47.21**		**218**	**195**	**283.28**	
Average 2000-2004	16	14	9.44	0.67	44	39	56.65	1.45

NB: data were obtained by querying the TED database utilizing the following key words: "technical assistance" and "program*" and not "evaluation"; "plan" and "development" and not "feasibil*"; "evaluation" and "program*" and not "DOCUP"; "project" and "development" and not "feasibil*" and not "plan"

Source: authors' calculations based on data in the TED database: http://ted.publications.eu.int/official/

Services for the project cycle

Key consulting services for the project cycle include the preparation of Feasibility Studies, and all the services related to project design activities.

Feasibility Studies

Besides the community database TED, two national databases were used. These are capable of providing additional information[26] to perform an exercise that might not yield accurate results, but can certainly provide a clear idea of the magnitude of the demand for Feasibility Studies. In this area, a significant portion of demand gives rise to contracts for amounts lower than the community threshold. Therefore, in order not to underestimate the total demand, information from the other two databases was included, eliminating any duplication.

Between 1998 and April 2004, 1,050 tenders were published to invite bids for consulting services related to Feasibility Studies (Table A1.2). Using the information on contract

[26] These are the OICE database (http://www.oice.it/osservatori/index.html), on tenders for engineering services, and the TELEMAT database (www.telemat.it) on tenders for public works and services. It is interesting to note that the three sources, for all their differences, complement one another: with respect to the total number of tenders found consolidating the three databases, and net of any duplication, TELEMAT covers about 73 percent while OICE covers approximately 50 percent of the total. TED 21 covers percent, due to the fact that this database collects only information on tenders for service contracts amounting to more than 200,000 euros.

amounts, available for about two-third of the tenders, an average value per tender of 430,000 euros was calculated. Applying this average to on all published tenders (including those for which the tender value was not known), the total estimated amount of the tenders published during the period was around 450 million euros, or an average of 71 million euros a year.

Table A1.2 Tenders for consulting and engineering services with FS (1998-2004)

Year published	Total tenders	Tenders with known value		
		Number of tenders	Total amount	Average value
			(millions of euros)	
1998	71	33	21.71	0.66
1999	71	48	11.36	0.24
2000	300	229	62.16	0.27
2001	207	144	34.65	0.24
2002	200	122	97.02	0.80
2003	171	107	50.88	0.48
2004(*)	30	18	23.33	1.30
Total	**1,050**	**701**	**3,011.11**	
Average 1998-2004	150	100..1	43.01	0.43

NB: (*) January – April

Source: authors' calculations based on data in the OICE, TELEMAT and TED databases

The tenders analyzed included both requests for Feasibility Studies alone and requests for broader planning and consulting services which comprise, among others, Feasibility Studies (for the whole project or, in some cases, in terms of environmental impact). As can be seen in Table A1.3, tenders for Feasibility Studies are the majority (over 60 percent of the total) but have a lower value overall, thus a lower amount per tender. Again, projecting the information derived from the subset on the entire population of tenders of known value, the total estimated amount for "mixed" service tenders was around 300 million euros (i.e. FS plus other activities) and for FS alone was 150 million euros. This represented an average yearly amount of 47 million euros and 24 million euros, respectively.

Table A1.3 Feasibility Studies: tenders by type of service (1998-2004)

Year published	Mixed tenders (Feasibility Studies and other services)				Tenders for Feasibility Studies			
		Tenders of known value				Tenders of known value		
	Total	Number	Total amount (millions of euros)	Average yearly change in tender value (%)	Total	Number	Total amount (millions of euros)	Average yearly change in tender value (%)
1998	38	18	19.24		33	15	2.47	
1999	30	18	6.85	-64	41	30	4.51	83
2000	53	25	14.43	111	247	204	47.73	958
2001	55	34	12.47	-14	152	110	22.17	-54
2002	115	72	87.03	598	85	50	9.99	-55
2003	98	55	38.72	-56	73	52	12.16	22
2004(*)	10	8	20.89	-46	20	10	2.44	-80
Total	**399**	**230**	**199.63**	**115**	**651**	**471**	**101.48**	**191**

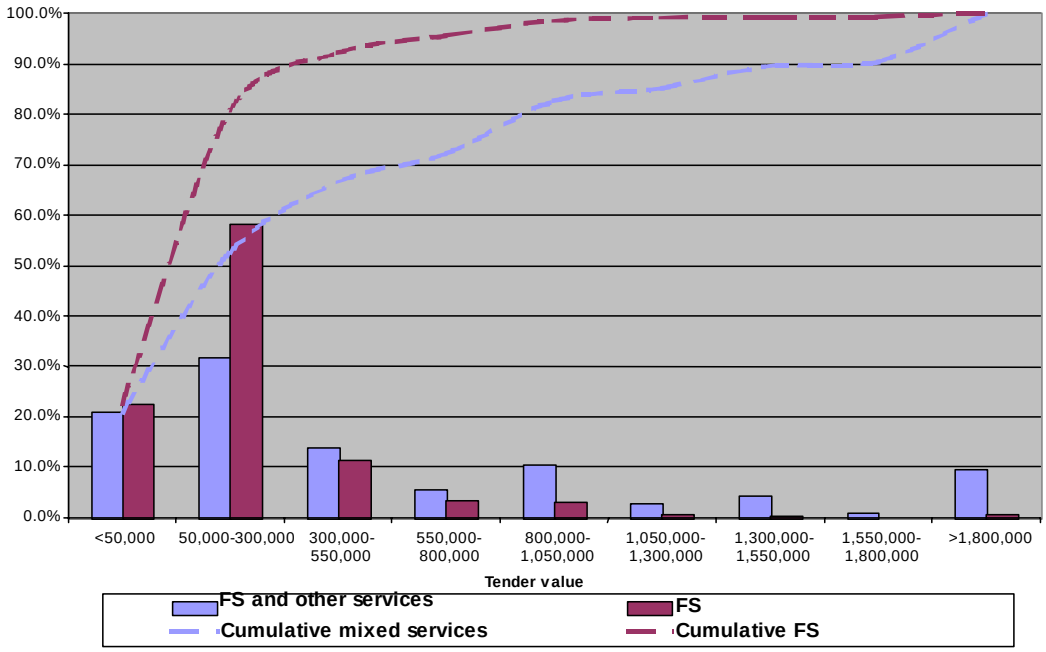
NB: (*) January - April

Source: authors' calculations based on data in the OICE, TELEMAT and TED databases

In addition to a lower average amount, FS tenders have a distribution concentrated on amounts relatively lower than those of tenders for mixed services. As can be seen in Figure A1.1, the amount of 90 percent of the FS tenders is equal to or lower than 300,000 euros. On the other hand, mixed service tenders with contract amounts in the same range accounted for less than 60 percent of the whole (nearly 20 percent of the tenders has a value in excess of 1 million euros).

Furthermore, Table A1.3 shows that the number and total value of tenders do not tend to change over time, making it possible to infer that demand has been affected to a significant extent by events unrelated to the regular programming cycle. Specifically, the relatively large number of tenders recorded in 2000 and in part of 2001 was largely due to the CIPE FS tenders described in Section IV which, in 2000 alone, were at least 180 and accounted for over 70 percent of the 247 tenders for stand-alone studies indicated in Table A1.3. On the other side, the peak achieved by tender values in 2002 was due to the planning activities associated with the "Turin 2006" Winter Games, as 34 out of the 115 tenders for studies and other services were launched in connection with this event, for an amount of 50 million euros out of a total of 87 million euros, or 60 percent of the whole.

Figure A1.1 Distribution of tenders for engineering services comprising FS by value (1998-2004)



Source: authors' calculations based on data in the OICE, TELEMAT and TED databases

Engineering and design services

Useful information on the level of government agencies' demand for services related to the project cycle (other than Feasibility Studies) are provided by the OICE-Informatel database. In the 1996-2003 period, an average of 5.026 tenders a year for engineering services were published, for an average yearly amount of over 543 million euros overall and an average tender value of 114,000 euros.

Table A1.4 Tenders for engineering services (1996-2003)

Year	Number of tenders	Total tender value (millions of euros)	Average tender value (thousands of euros)
1996	4,113	221.91	53.95
1997	6,798	474.80	69.84
1998	6,553	480.48	73.32
1999	2,860	516.41	180.56
2000	3,120	475.29	152.34
2001	5,221	538.19	103.08
2002	5,536	722.96	130.59
2003	6,010	914.71	152.20
Total	**40,211**	**4.345**	
Media 1996-2003	5,026	543.09	114.49

Source: Oice/Informatel database, http://www.oice.it/osservatori/index.html

2. Annex to Section IV

2.1 Quality evaluation methodologies

The following is the evaluation form utilized to evaluate the quality of the Feasibility Studies referred to in sub-section VI.2.

Table A2.1 Summary of the evaluation form utilized to evaluate the quality of the Feasibility Studies co-financed by CIPE

Question	Contents
1	Does the study provide adequate answers to the development needs expressed by the agency?
2	Does the study provide adequate elements to evaluate the financial merits of the proposed actions?
3	Does the study provide adequate elements to evaluate the economic merits of the proposed actions?
4	Does the study provide adequate indications on the technical feasibility of the proposed actions (e.g. engineering and technological aspects, etc.)?
5	Dose the study provide adequate indications on the institutional feasibility of the proposed actions?
6	Does the study provide adequate indications on the compliance of the environmental impact of the proposed actions with environmental laws?
7	Does the study provide adequate indications on the compliance of the proposed actions with urban development legislation?
8	Does the study provide clear indications on the type of authorizations required to carry out the proposed actions? (e.g. cultural resources superintendence, Basin authority, etc.)
9	Does the study provide adequate indications on the implications of the proposed actions in terms of ownership rights of land and buildings, and on the need to purchase them?
10	Does the study provide adequate indications on the feasibility of the proposed actions in terms of the availability of the human and financial resources required to start and manage the project?
11	Are the different components of the study well integrated and useful for informed decision-making on the type of action and investment?

Source: authors' analysis calculations based on of CIPE Resolutions

2.2 Estimate of the initial tender value and contract amount

The DPS-UVAL database has information on the value of initial tender and the contract eventually signed value for 127 out of 313 tenders. In the remaining cases, the tender value was estimated by simple linear regression of the log of the tender value over the log of the CIPE financing (the corresponding R^2 exceeds 92 percent). For 98 studies,

reliable information is available on both the tender value and the amount of the contract: in this case R^2 in the simple regression between the two variables is greater than 98 percent and this correlation was utilized to estimate the contract amount whenever this information was missing.

2.3 Feasibility Studies by sector: characteristics of bids

The tables below show the main information on the bids submitted by sector, namely: the average financing, the tender value, the number of bids submitted, the number of bidders, the amount of the contracts and the markdown from the tender value.

Table A2.2 FS by sector: number, CIPE financing and tender value

	Number of studies	Average financing (000's of euros)	Average tender value (000's of euros)
Basic Infrastructure			
Transports	73	310.64	234.8
Telecommunications	8	307.94	353.43
Energy	6	117.06	95.77
Water	28	324.45	212.34
Environment	61	260.40	198.08
Construction	22	188.7	139.58
Human resources			
Education	16	181.02	143.53
Research and Development	6	168.71	147.81
Cultural resources and recreational services	31	164.27	131.29
Production			
Agriculture	3	121.2	98.77
Industry and services	14	128.23	101.81
Tourism	41	181.09	133.81
Other Sectors	4	159.33	116.24
Total	**313**	**237.31**	**180.67**

NB: Average financing includes CIPE's 50% contribution. For certain studies of the telecommunications sector, the average financing amount does not include the portion in excess of 50 percent made available by the sponsoring agency, which explains why the tender value is greater than financing.

Source: authors' calculations based on data contained in DPS-UVAL database

Table A2.3 FS by sector: bids submitted and bidders

Sector	Studies with information	Average number of bids per tender		Average size of groupings (number of operators)	Average number of bidders	Percentage of bidders mandated to file financial statements	Average revenues(*) (millions of euros)
		Total	From groupings				
Basic Infrastructure							
Transports	31	5.8	3.4	3.3	13.4	59.7	16.47
Telecommunications	3	6.0	3.7	2.7	12.3	67.3	46.42
Energy	1	9.0	1.0	2.0	10.0	40.0	134.18
Water	11	6.1	3.2	3.7	14.1	44.3	6.32
Environment	20	8.0	4.4	3.1	17.3	49.0	4.60
Construction	6	5.2	2.5	3.1	10.5	50.6	4.91
Human resources							
Education	10	5.2	3.6	3.4	14.0	36.2	5.30
Research and Development	2	1.5	0.5	3.0	2.5	83.3	6.91
Cultural resources	16	6.7	3.7	3.4	16.1	32.3	3.13
Production							
Industry and services	4	4.8	2.0	2.6	8.0	72.3	5.01
Tourism	6	7.5	4.0	2.7	15.2	68.7	5.89
Total	**110**	**6.3**	**3.5**	**3.2**	**14.1**	**51.0**	**10.38**

NB: (*) Average revenues were computed with reference to the number of bids. Since one operator may have bid for more than one contract, the total average is not the same as that calculated with reference to the individual bidders (see Table IV.5).

Source: authors' calculations based on data contained in DPS-UVAL Infocamere databases

Table A2.4 FS by sector: tender value, contract amounts and markdown percentage

Sector	Number of studies	Initial tender value (euros)	Contract amount (euros)	Percentage markdown	Average number of bids(*)
Basic Infrastructure					
Transports	73	234,800	206,633	10.2	5.8
Telecommunications	8	353,431	314,362	9.4	6
Energy	6	95,765	84,351	9	9
Water	28	212,342	187,028	11.2	6.1
Environment	61	196,779	171,927	9.5	8
Construction	22	139,582	122,031	7.8	5.2
Human resources					
Education	16	143,530	128,321	9.3	5.2
Research and Development	6	147,809	128,261	10.8	1.5
Cultural resources	31	131,294	105,687	12.1	6.7
Production					
Agriculture	3	98,774	90,437	6.8	-
Industry and services	14	101,813	92,130	5.4	4.8
Tourism	41	133,808	119,751	9.3	14
Others	4	116,236	105,886	6.7	-
Overall average	313	180,475	158,172	9.7	6.7
Overall median	**313**	**129,114**	**118,269**	**9.8**	**6.0**

NB: (*) The number of bids is calculated on the basis of the 110 tenders for which information is available on both the awardees and all the other bidders.

Source: authors' calculations based on data contained in DPS-UVAL database

2.4 Efficiency of the different awarding entities

The different awarding entities involved in the CIPE experience exhibit a widely varying degree of organizational skills and efficiency in awarding contracts (Table A.2.5): Universities (20 days) seem to be the most efficient, followed by Mountain Communities (around 38 days), Municipal consortia and other local authorities (52 days), reclamation and agricultural development agencies (58 days).

The situation is critical for regional governments (107 days) and consortia managing transport and water infrastructures (106 days), and even more so for port authorities, park authorities, municipal associations, which award contracts after 138 days.

Considering the average time required to complete the process between the award and the signing of the contract, there seem to be problems for all awarding entities: for the most efficient, in this case the Mountain Communities and central agencies, it takes an average of around two months but there are several instances where the average exceeds 100 days (for instance the infrastructure concessionaires and provincial authorities).

Table A.2.5 Time necessary to complete the tender process: award and signing of contract for services by type of awarding agency (average day)

	Number of tenders with known information	Days elapsed		
		Bidding deadline - contract award	Contract award - signing	Bidding deadline - contract signing
Central agencies	9	71.2	61.7	125.2
Regional agencies	70	107.3	77.3	195.8
Provincial agencies	18	81.6	109.0	179.1
Municipal authorities	32	103.9	70.6	163.0
Mountain Communities	3	37.7	57.3	75.5
Transport and water infrastructure concessionaries	4	106.0	100.5	232.3
Municipal consortia	3	52.0	70.2	110.0
Agricultural development consortia	11	58.1	69.8	150.0
Universities and other education entities	8	19.9	82.4	102.3
Other public agencies	8	138.3	112.0	219.6
Total	**166**	**93.6**	**79.7**	**176.0**

Source: authors' calculations based on data contained in DPS-UVAL database

2.5 Estimating the total number of bidders when only awardees are known

Based on the information available on the 110 tenders for which the bidders are known, the overall number of bidders for tenders can be calculated as a function of the tender value, the geographic location and the sector of the study. The procedure outlined below was adopted:

1) based on the tenders that provide all useful information, the average number of participating groupings was calculated conditional on the tender sector, awarding entity and ranking above or below the median of the tender value computed for the sector to be studied. A distinction was made between groupings (i.e. composed of more than one member) and individual bidders;

2) the amounts calculated under 1) are imputed to the tenders for which no information is available on the number of participants, paying attention to the combinations of regions and/or sectors for which no tenders with complete information are available. In this case the amounts are calculated given the awarding region and sector, respectively;

3) steps 1) and 2) are repeated also for the number of operators bidding in the tenders (total and corporate entities);

4) the total number of groupings bidding in the tenders is the sum of the bidders observed and imputed under 1) and 2) for each tender, since the probability that one grouping bids in more than one tender is negligible. However, a correction is necessary for the individual operators: the total number of bidders in the tenders is divided by the average number of tenders in which individual operators bid (2 for all consultants, 3 for corporate entities).

From a theoretical point of view, more sophisticated imputation techniques could have been used in alternative to the approach utilized for the estimate (following for examples Rubin's multiple imputation procedure). However, in this case the goal was simply to obtain a consistent estimate of the total number of bidders in the tenders, given a set of tender characteristics. What was of interest here was the conditional mean and, consequently, the use of imputation methods not based on regressions would have provided little benefits compared with the chosen technique.

2.6 Estimate of the probability of submitting a successful bid

For about one hundred studies in the UVAL database, in addition to the characteristics of the operators that were part of the grouping that was awarded the contract, information is available also on the characteristics of the unsuccessful bidders. In these cases, we can study which features of the operators and the tenders influence the probability of an operator to submit a successful bid. Operator i (characterized by X_i reflecting type, business sector and size in terms of revenues) can bid for more than one of the N tenders considered ($n=1,\ldots,N$) - each characterized by Z_n (Feasibility Study sector, type of awarding entity, tender value, number of bids submitted) – either alone or in a grouping characterized by R_{in} (nature of grouping and number of bidders). Therefore, studying how the characteristics of the operators, tenders and groupings of which the operator is part influence its probability of success means studying the conditional probability function $\Pr(Y_{in}=1 \mid X_i, Z_n, R_{in})$, where Y_{in} is equal to 1, if the operator i is one of the awardees of the tender n, and zero otherwise. In the following analysis it was assumed that the shape of the conditional probability function is that of a logistic function. Since the nature of the problem is such as to induce a covariance structure among the observations (the same operators appear repeatedly in the samples), the possibility was explored to use panel data estimation techniques. However, any fixed effects estimator would have ruled out the possibility to analyze how X_i affects the probability of success while the use of random effects estimators showed that the within

group correlation is not highly significant. Thus, it was deemed appropriate to resort to a pseudo-maximum likelihood by using robust estimates of standard errors.

The tables below show the estimates of the parameters of $\Pr(Y_{in}=1 \mid X_i, Z_n, R_{in})$ obtained on the set of all bidders and on the set of all corporate entities alone. For the latter, in particular, possible effects of the size in terms of revenues, and the extent thereof, on the successful outcome can be investigated.

Table A2.6 Pseudo-maximum likelihood estimates for the parameters of $\Pr(Y_{in}=1 \mid X_i, Z_n, R_{in})$. Analysis by sectors and revenue class

	Corporate entities Number of observations: 709			All bidders Number of observations: 1,601		
	Coefficient	Std. Err.	t	Coefficient	Std. Err.	t
ATECO activity codes						
45: Construction	0.2102	0.3372	0.62	0.5126	0.2974	1.72
72: Data processing and related activities	0.3393	0.4898	0.69	-0.0240	0.4956	-0.05
73: Research and development	0.0187	0.4041	0.05	0.2125	0.3116	0.68
74: other professional and business activities	-0.2084	0.3095	-0.67	0.0091	0.2542	0.04
Other						
Type of bidder						
A1: Firms required to file financial statements						
A2: Other firms				0.3331	0.3395	0.98
Individual consultants				-0.1147	0.2842	-0.40
Universities				-0.1840	0.5671	-0.32
Other				-0.8789	0.3697	-2.38
Revenues (euros)						
Less than 100,000						
100,000 - 250,000	1.6249	1.0748	1.51			
250,000 - 750,000	2.5502	1.0462	2.44			
750,000 - 1,250,000	1.5167	1.0891	1.39			
1,250,000 - 2,500,000	2.5388	1.0306	2.46			
2,500,000 - 5,000,000	2.4302	1.0445	2.33			
5,000,000 - 10,000,000	2.9587	1.0662	2.77			
10,000,000 - 20,000,000	2.2833	1.0409	2.19			
over 20,000,000	3.3246	1.0235	3.25			
Tender value (thousands of euros)	0.0003	0.0007	0.49	-0.00004	0.0005	-0.08
Number of bids submitted	-0.1940	0.0353	-5.5	-0.1785	0.0357	-5.00
Constant	-2.5804	1.2021	-2.15	0.1385	0.5982	0.23
Pseudo R^2: 0.16						

Source: authors' calculations based on data contained in DPS-UVAL and Infocamere databases

Table A2.7 Pseudo-maximum likelihood estimates for the parameters of $\Pr(Y_{in}=1 \mid X_i, Z_n, R_{in})$. Analysis by grouping and study sector

	Corporate entities Number of observations: 709			All bidders Number of observations: 1,601		
Type of grouping						
Temporary firm grouping	0.7535	0.3569	2.11	0.8002	0.2891	2.77
Temporary grouping of firms and individual consultants	0.6046	0.4807	1.26	0.4604	0.3255	1.41
Temporary grouping of individual consultants				-0.1569	0.4204	-0.37
Other types of grouping and individual bids						
Total operators participating in grouping	0.2395	0.0954	2.51	0.2917	0.0421	6.93
FS sector						
Environment	-0.5097	0.5932	-0.86	-1.0636	0.4487	-2.37
Culture and recreational services	-0.3275	0.6934	-0.47	-0.9716	0.4541	-2.14
Construction	-0.6292	0.6800	-0.93	-0.7683	0.5287	-1.45
Energy	1.4070	0.9196	1.53	0.3713	0.7673	0.48
Manufacturing and services	-0.6559	0.8628	-0.76	-1.1245	0.6908	-1.63
Education	-0.5890	0.8035	-0.73	-1.4029	0.5797	-2.42
Research and development	1.1581	1.3376	0.87	0.7461	1.1660	0.64
Telecommunications	-2.0075	0.8353	-2.4	-1.6752	0.6646	-2.52
Transportation	-0.6981	0.5428	-1.29	-1.0069	0.4286	-2.35
Tourism	0.2740	0.6263	0.44	0.1114	0.4645	0.24
Water, agriculture and other						
Type of awarding entity						
Municipal authorities	0.1708	0.4206	0.41	-0.5076	0.3387	-1.50
Provincial authorities	-0.1376	0.5656	-0.24	-0.6324	0.4095	-1.54
Regional authorities	-0.3922	0.4867	-0.81	-0.8377	0.3929	-2.13
Mountain communities	-0.9173	1.3042	-0.7	0.4862	0.5974	0.81
Infrastructure concessionaires and firms	-1.1782	0.7077	-1.66	-1.4626	0.6091	-2.40
Reclamation and agricultural development entities	-0.9831	1.0442	-0.94	-2.5085	0.7243	-3.46
Ministries	-0.8428	0.4779	-1.76	-0.4032	0.3570	-1.13
Universities and other educational institutions	-0.6524	1.0484	-0.62	0.0591	0.6257	0.09
Tender value (thousands of euros)	0.0003	0.0007	0.49	-0.00004	0.0005	-0.08
Number of bids submitted	-0.1940	0.0353	-5.5	-0.1785	0.0357	-5.00
Constant	-2.5804	1.2021	-2.15	0.1385	0.5982	0.23
Pseudo R^2: 0.16						

Source: authors' calculations based on data contained in DPS-UVAL and Infocamere databases

Table A2.8 Effects of increase of operator's size

Operator's size	$\Pr(Y_{in} \mid F_i = F) - \Pr(Y_{in} \mid F_i =< 100{,}000)$	Std. Err.	t
Less than 100,000			
100,000 – 250,000	0.0659	0.0355	1.86
250,000 – 750,000	0.1693	0.0419	4.04
750,000 - 1,250,000	0.0579	0.0351	1.65
1,250,000 - 2,500,000	0.1676	0.0459	3.64
2,500,000 - 5,000,000	0.1518	0.0384	3.95
5,000,000 - 10,000,000	0.2394	0.0598	4.00
10,000,000 – 20,000,000	0.1321	0.0427	3.09
Over 20,000,000	0.3152	0.0491	6.42

NB: the *benchmark* is the operator with less than 100,000 euros in revenues ($\Pr(Y_{in} \mid F_i =< 100.000) = 0.0176$); all the other variables (X_i, Z_n, R_{in}) are set at the average value observed in the sample for the estimate. Only corporate entities are considered for the estimate of ($\Pr(Y_{in} \mid F_i =< 100.000) = 0.0176$).

Source: authors' calculations based on data contained in DPS-UVAL and Infocamere databases

Table A2.9 Effect of participation in groupings

Type of grouping	Corporate entities	Individual consultants
Individual bids	-	-0.01 *(0.024)*
Temporary firm grouping	0.098 *(0.031)*	-
Grouping of firms and individual consultants	0.049 *(0.033)*	0.045 *(0.029)*

NB: corporate entities that bid without taking part in any grouping are the benchmark ($\Pr(Y_{in} \mid Al, Singola) = 0{,}0998$). All the other variables (X_i, Z_n, R_{in}) are set at the average value observed in the sample for the estimate. The cell indicated the different between the probability of success attributed to the benchmark and that attributed to the bidder shown in the caption. The corresponding standard errors are in italics and in parentheses.

Source: authors' calculations based on data contained in DPS-UVAL database

3. Annex to Section V

3.1 Estimate of the potential supply on the basis of Infocamere data

Types of operator bidding for FS contracts

The operators that bid for the study contracts have been analyzed[27] considering the following variables: business sectors (ATECO activity codes) in which bidders engage, information available on 358 firms, number of employees known for 253 firms, revenues known for 312 firms, year of inception known for 288 firms.

The analysis of the ATECO activity sectors in which the bidders in the tenders considered in the DPS-UVAL database engage resulted in the identification of the seven most significant four-digit ATECO codes for the purposes at hand.

Bidders engage mainly (Table A3.1) in ATECO class 74 (Other professional activities, particularly legal, accounting and business services and architectural and engineering services), in class 72 (Data processing and related activities), in class 73 (Research and Development) and in class 45 (Constructions).

Particularly significant is the presence of operators in "Architectural and engineering activities and related technical consultancy" (ATECO code 7420) and "Legal, accounting and business services" (ATECO code 741).

Table A3.2 illustrates the composition of the awardees by ATECO activity code, casting light on the features of the operators that were awarded most FS contracts and the sectors in which they engage: relatively few operators, engaging in market research and public opinion polling (code 7413) and accounting for a mere 1 percent of total revenues, obtained 11 percent of all contracts; the largest group of operators (24 percent of the total), engaging in the architectural and engineering sector (code 7420) and accounting for 6 percent of total revenues, was awarded 22 percent of the contracts.

[27] In order to retrieve the necessary information, it is necessary that operators be members of the Chamber of Commerce. This, however, excludes all individual consultants.

Table A3.1 Bidders by activity sector

Activity sector ATECO codes	Number of operators	Percent Of the total
7220: Software consultancy and supply	15	4.2
7230: Data processing	11	3.1
7310: Research and experimental development (natural sciences and engineering)	17	4.7
7413: Market research and public opinion polling	19	5.3
7414: Business and management consultancy activities	39	10.9
7420: Architectural and engineering activities and related technical consultancy	105	29.3
7484: Miscellaneous business activities n.e.c.	18	5.0
Other activities related to the previous ones (two- and three-digit ATECO codes)	55	15.4
Total selected activities	279	77.9
Other ATECO codes (64 different codes)	79	22.1
Grand total	**358**	**100.0**

Source: authors' calculations based on data contained in DPS-UVAL database

Table A3.2 Awardees by activity sector: number, revenues as a percentage share of the total and tender values as a percentage share of the total

ATECO activity code	Number of operators	As a share of total firms (%)	Revenues as a share of the total (%)	Tender value as a share of the total (%)
7230: Data processing	5	2.0	0.0	1
7484: Miscellaneous business activities n.e.c.	5	2.0	0.0	1
7413: Market research and public opinion polling	9	4.0	1.0	11
7220: Software consultancy and supply	10	5.0	4.0	5
7310: Research and experimental development (natural sciences and engineering)	13	6.0	1.0	4
45 Constructions	21	10.0	13.0	10
7414: Business and management consultancy activities	29	14.0	11.0	11
7420: Architectural and engineering activities and related technical consultancy	49	24.0	6.0	22
Other 72, 73, 74	34	16.0	9.0	22
Other codes	33	16.0	55.0	12
Total	**208**	**100.0**	**100.0**	**100**

Source: authors' calculations based on data contained in DPS-UVAL database

Estimate of potential bidders: firms

After the main activity sectors of bidding firms were identified, the number of potential bidders was estimated in the manner illustrated below. Information on A1 and A2 firms, indicated in the main text, or organizations that are required to register with the Chamber of Commerce, can be retrieved from the Infocamere database. This database includes not only administrative and accounting information about these firms but also a sufficiently detailed description of their business, making it possible to determine whether they might be interested in the Feasibility Studies. As the number of firms included in the database was too large (only for the seven codes of interest there were over 88,000), a sample was drawn. For each of the seven codes concerned, the universe of firms that were established prior to 1999 and wound up after 2002 were stratified on the basis of the revenues reported in 2001. The following strata were considered:

Table A3.3 Stratification of sample of firms

Stratum	Lower limit (euros)	Upper limit (euros)
1	Unreported	Unreported
2	1	99.999
3	100.000	249.999
4	250.000	749.999
5	750.000	2.499.999
6	2.500.000	-

Source: authors' calculations based on data contained in the Infocamere database

Within each stratum a pre-established number of firms was drawn at random. Since the main objective was to estimate the fraction of firms potentially interested in conducting a feasibility study, the size of these random samples was determined so that the estimated ex-ante probability of incurring in an estimate error greater than 0.1 would be lower than 10 percent (see, for instance Cochran, 1977). These thresholds were selected to keep the size of the sample within manageable proportions, that is making it possible to survey the individual records in a reasonable period of time. This led to the selection of a sample of nearly 2,500 firms (2.8 percent of the population), stratified by ATECO activity code and revenue class. Since the reference population was available in its entirety, the sampling weights– so that the sample-based estimates might be applied to the population as a whole – were simply the fractions of the population selected for every stratum considered.

As to the estimate of the corresponding revenues, it should be noted that Infocamere provides revenue data grouped in 25 classes. Thus, every firm included in the

Infocamere database was assigned the mid-point of the class to which it belonged (for the upper class, which is not bound, the value utilized was the mid-point of the last-but-one class times 3, viz. 1,125 million euros). The revenues of the potential bidders for FS tenders is the sum of the revenues of the firms considered as potential bidders, weighted by the sampling weights to be projected onto the universe.

The evaluation of the share of potential bidders was conducted through the review of such information as the detailed description of the activity performed (that is the description in addition to that codified by the ATECO codes) and the secondary activity code.

Considering the different roles that firms with diverse skills and strategies can play within groupings bidding for FS contracts, the potential of the firms in the sample was evaluated by assigning each such firm to one of the following groups:

i) *Lead firms:* entities capable of bidding for FS contracts as a lead firm, or on an individual basis;

ii) *Specialists:* firms that can bid for FS, but not as lead firms;

iii) *Non-specialists:* firms which might consider the possibility to bid occasionally for FS, though this is not part of their core business;

iv) *Outliers:* the remaining firms which, even though they are classified under the ATECO codes reviewed, engage in activities that are not pertinent to the preparation of Feasibility Studies.

While it is important to draw a distinction, on the basis of the respective roles, operators in i) and ii) account for the great majority of potential providers of FS services. For this reason they are lumped in together in the estimate below.

Based on the analysis of the sample selected in the universe of the firms registered with the Chambers of Commerce, there appears to be an estimated total of 1,950 potential bidders (between lead firms and specialists) capable of providing consulting services for preparing FS. Details of the estimate by activity code are provided in Table A3.4 (in absolute terms) and table A3.5 (in percentage terms).

Table A3.4 Estimate of number of potential bidders by sector and role in groupings

Activity sector by ATECO code	Outliers	Non-specialists	Specialists	Lead firms	Total
7220: Software consultancy and supply	11,521	389	13	133	12,057
7230: Data processing	20,708	201	5	29	20,943
7310: Research and experimental development (natural sciences and engineering)	638	261	69	40	1,007
7413: Market research and public opinion polling	4,386	800	54	155	5,395
7414: Business and management consultancy activities	13,968	512	98	259	14,838
7420: Architectural and engineering activities and related technical consultancy	10,230	1,042	246	698	12,216
7484: Miscellaneous business activities n.e.c.	21,350	285	42	107	21,784
Total	**82,801**	**3,490**	**527**	**1,421**	**88,240**

Source: authors' calculations based on data contained in the Infocamere database

Table A3.5 Estimate of share of potential bidders by sector and role in groupings

Activity sector by ATECO code	Non-specialists		Specialists		Lead firms		Specialists and lead firms as a share of the total (%)
7220: Software consultancy and supply	3.2	(0.7)	0.1	(0.1)	1.1	(0.9)	1.2
7230: Data processing	1.0	(0.3)	0.0	(0.0)	0.1	(0.1)	0.2
7310: Research and experimental development (natural sciences and engineering)	25.9	(3.0)	6.9	(1.5)	4.0	(1.3)	10.8
7413: Market research and public opinion polling	14.8	(2.8)	1.0	(0.4)	2.9	(1.1)	3.9
7414: Business and management consultancy activities	3.5	(0.7)	0.7	(0.3)	1.8	(1.1)	2.4
7420: Architectural and engineering activities and related technical consultancy	8.5	(1.9)	2.0	(0.5)	5.7	(1.6)	7.7
7484: Miscellaneous business activities n.e.c.	1.3	(0.3)	0.2	(0.1)	0.5	(0.2)	0.7
Total	**4.0**	**(0.4)**	**0.6**	**(0.1)**	**1.6**	**(0.3)**	**2.2**

NB: the standard errors of the estimate is shown in parentheses

Source: authors' calculations based on data contained in the Infocamere database

Most potential bidders engage in Research and Development (code 7310, 10.8 percent of the total) and in Architecture and Engineering (code 7420, 7.7 percent of the total). Analyzing the standard errors, the estimated numbers of lead firms and specialists under codes 7220 and 7230 are not significantly different from zero.

Revenues can be estimated only for A1 firms, as they are the only ones that are required to file their financial statements with the Chambers of Commerce. Based on the sample of A1 firms with available financial statement information (2,095 firms, equivalent to 2.4 percent of the total firms registered with the Infocamere and 8.4 percent of those required to file their financial statements), potential bidders (lead firms and specialists) have revenues of approximately 1.7 billion euros (Table A3.6), representing 4 percent of the total revenues of the firms in the sectors considered.

Table A3.6 Estimate of revenues of potential bidders and role in groupings

	Estimated revenues (millions of euros)	Standard error
Outliers	40,195	2,000.73
Non-specialists	4,495	631.51
Specialists	535	144.34
Lead firms	1,249	319.05
Total (*Lead firms and specialists*)	**1,785**	

Source: authors' calculations based on data contained in the Infocamere database

Table A3.7 Estimate of revenues of potential bidders by activity sector

ATECO activity codes	Specialists		Lead firms	
	Estimate revenues (millions of euros)	Revenues of potential bidders as a share of total revenues	Estimate revenues (millions of euros)	Revenues of potential bidders as a share of total revenues
7220: Software consultancy and supply	2.22	0.02	197.55	1.55
7230: Data processing	52.11	1.19	53.40	1.21
7310: Research and experimental development (natural sciences and engineering)	114.35	8.35	69.67	5.09
7413: Market research and public opinion polling	138.87	5.00	85.76	3.09
7414: Business and management consultancy activities	15.66	0.21	119.25	1.58
7420: Architectural and engineering activities and related technical consultancy	190.69	2.96	665.00	10.33
7484: Miscellaneous business activities n.e.c.	21.59	0.19	58.99	0.53
Total	**535.49**	**1.15**	**1,249.62**	**2.69**

Source: authors' calculations based on data contained in the Infocamere database

In keeping with the estimate of the number of firms, Table A3.7 shows that potential bidders in Research and Development and in Architecture and Engineering show the highest level of revenues as a share of the total.

Estimate of potential supply: individual consultants

In order to provide an estimate of the number of individual consultants that might bid for a Feasibility Study contract, different sources of data were used: the sector studies prepared by the Tax Revenue Agency for the estimate of the tax revenues, ISTAT's and ASIA's archives and the Infocamere database.

Among the sector studies published on the web site of the Tax Revenue Agency, five concern professional activities related to consulting services for Feasibility Studies. Specifically, these studies cover certain ATECO-classified activities that were prominent among those carried out by the firms that bid for the CIPE studies, such as 7220, 7414 and 7420. Even though these sectors do not run the full gamut of the areas in which individual consultants engage, they might be considered to account for a significant portion, based on the CIPE experience.

Sector studies are based on representative samples of the operators that engage in a given sector. The units included in the samples are assigned to homogeneous clusters in terms of revenues, type of activity, capitalization and employees. Sector studies can provide useful information to estimate the share of operators that can be reasonably considered qualified to bid for FS contracts within a specific field of activity.

Briefly, the information on sector studies have been utilized considering the weight of each cluster on the total for the ATECO activity sector, the number of individual consultants as a share of total operators included in the sample and the weight of the Feasibility Studies relative to the range of services offered by the operators in the cluster (Table A3.8, columns F, G and H). Combining this information with an estimate, based on ISTAT and Infocamere data, of the total number of individual operators in each sector (columns J, K, L and M in Table A3.8), the estimated number of individual consultants that might bid for a Feasibility Study contract is approximately 11,000.

Table A3.8 Estimate of the number of individual consultants that might provide services for the preparation of Feasibility Studies

Sector study	ATECO 1991	Significant cluster	Q in sample attributed to clusters	Total Q analyzed in sector studies	Q per cluster as a percentage share of sample questionnaires	Percentage share of individual consultants estimated in cluster	Estimated percentage of operators actively engaged in FS market	Estimated percentage of potential bidders among individual consultants	Number of operators in ISTAT-ASIA as at 2001	Number of operators active in 2001 according to Infocamere	Estimated individual consultants in ATECO class	Allocation factor four-to-five-digit ATECO code	Estimated number of potential bidders among individual consultants
(A)	(B)	(C)	(D)	(E)	(F) = (D)/(E)	(G)	(H)	(I) = (F)*(G)*(H)	(J)	(K)	(L) = (J)-(K)	(M)	(N) = (I)*(L)*(M)
SG66U	7220	Consulting services (cluster 9)	3,214	30,227	10.6	45	39	1.9	34,644	21,079	13,565	34	87
SG87U	7414	Large consulting firms (cluster 1)	271	6,727	4.0	12	43	0.2	51,276	22,260	29,016	1	60
SG87U	7414	Operators specialized in operations control (cluster 3)	736	6,727	11	100	42	5	51,276	22,260	29,016	1	1,333
SG87U	7414	Medium-to-small non-specialized suppliers (cluster 6)	2,146	6,727	32	53	100	17	51,276	22,260	29,016	1	4,906
SG87U	7414	Suppliers of training services (cluster 8)	492	6,727	7	42	64	2	51,276	22,260	29,016	1	570
SK18U	7420.1	Specialists in FS, planning and survey (cluster 9)	741	22,852	3.2	93	100	3.0	213,520	18,790	194,730	6	352
SK02U	7420.2	Medium civil engineering firms (cluster 4)	3,186	29,519	10.8	90	100	9.7	213,520	18,790	194,730	6	1,135
SK02U	7420.2	Small engineering firms serving mainly government (cluster 5)	4,601	29,519	15.6	100	100	15.6	213,520	18,790	194,730	6	1,821
SK23U	7420.3	Consulting firms (cluster 2)	141	1,161	12.1	77	100	9.4	213,520	18,790	194,730	1.3	237
SK23U	7420.3	Civil engineering firms (cluster 6)	232	1,161	20.0	37	100	7,4	213,520	18,790	194,730	1.3	187
Total													**10,689**

N.B. Q= questionnaires

Source: Italian Tax revenue Agency, ISTAT and Infocamere

Estimate of potential supply: universities

According to data published by the Ministry of Education, University and Research (MIUR - Ministero dell'Istruzione, dell'Università e della Ricerca), in Italy there are 2,500 research centers, including Departments and inter-departmental centers. To identify such of these structures as engage in areas related to the preparation of Feasibility Studies, a simple classification of probabilities (null, low and high) was set for research centers that might participate in a tender. This classification was applied to every center, on the basis of the description of the activities performed, as reported in the MIUR database. Table A3.9 shows the results of this exercise, indicating that approximately 20 percent of the research centers operates in disciplines[28] pertaining to the preparation of Feasibility Studies.

Table A3.9 Classification of research structures in Italian universities and potential ability to operate in the market for Feasibility Studies

Potential qualification	Number of structures	Percentage share of total
0 – Null	1,430	56.3
1 – Low	606	23.9
2 – High	480	18.9
3 - Undefinable	24	0.9
Total	**2,540**	**100.0**

Source: authors' calculations based on data contained in the MIUR database, www.miur.it/ustat/stru2000_c.htm

According to the estimates of the Conference of Rectors of Italian Universities (CRIU - Conferenza dei Rettori delle Università Italiane) and on the basis of ISTAT data, in the 1995-2000 period Italian universities had average revenues from private sources of approximately 134 million euros (Table A3.10). It was assumed that most of these transfers were payments for research contracts between universities and third parties and that, on the face of it and in the absence of more detailed information, this amount can be used as a reference point to determine the weight of tenders for Feasibility Studies on the total revenues generated by universities for consulting/research services rendered. Assuming further, in a somewhat simplifying fashion, that revenues are allocated equally among research structures, research centers capable of providing Feasibility Study services would take in, on average, 27 million euros a year. This estimate was obtained by multiplying the yearly average revenues for all research structures that have been classified as highly qualified for participating in FS tenders.

[28] The selection was conducted on the basis of data published online by the MIUR, considering research centers involved in social sciences, economics and engineering for public works.

Table A3.10 University revenues for transfers from private sources

Year	Revenues (millions of current euros)
1995	99.4
1996	111.2
1997	186.1
1998	157.2
2000 (a)	115.4
Average	**133.9**

NB: the data refer to University revenues from private sources (research or consulting contracts, provision of services, donations, etc.). The 2000 figure relates to "Revenues from services rendered"

Source: authors' calculations based on data from Conferenza Rettori Università Italiane. The 2000 (a) figures originated from ISTAT (2003)

3.2 Estimate of the probability of participating in a CIPE FS tender

Given the information available on the characteristics of the tenders for the FS co-financed by the CIPE and that available in the Infocamere database, the objective is to determine how the characteristics of the CIPE tenders may have encouraged potential bidders to participate in the tenders. The analysis focused on operators engaging in one of the areas under the four-digit ATECO codes considered above and the 100 tenders for which information on bidders, awardees and the time of publication of the tender is available. Formally, it can be said that our main object of interest is $\Pr(Y_{it} = 1 \mid X_i, Z_t, PBidder_i)$, where

- Y_{it} is a dichotomous variable that takes the value 1, in case operator i bids in at least one tender in the reference period t, and zero otherwise;
- X_i captures the characteristics of the operator – which are assumed to be constant across periods, such as activity sector, revenue class as at 2001, location of registered office, years in business;
- Z_t represents the characteristics of the tenders carried out in period t – which are assumed to be known for all the potential bidders, such as average tender value, number of tenders, field of application for the FS, type and region of the awarding entities.

Not every operator has the know-how necessary to complete an FS. Thus, it is reasonable to assume that only potential bidders, as defined above, are likely to participate in the tenders. In other words, it is assumed that the probability that a firm

participates in a tender for an FS is null if it is not included among the potential bidders, viz. $\Pr(Y_{it}=1 \mid X_i, Z_t, PBidder_i=0)=0$. It should be kept in mind, however, that the distinction between potential and non-potential bidders cannot be observed directly. On the other hand, the estimate of the fraction of potential bidders obtained previously can be utilized to solve this problem of lack of direct observability by using an estimate approach similar to that suggested by Bover and Arellano (2002). In fact:

$$\begin{aligned}\Pr(Y_{it}=1 \mid X_i, Z_t, PBidder_i=1) &= \frac{\Pr(X_i, Z_t, PBidder_i=1 \mid Y_{it}=1)\Pr(Y_{it}=1)}{\Pr(X_i, Z_t, PBidder_i=1)} \\ &= \frac{\Pr(X_i, Z_t \mid Y_{it}=1)\Pr(Y_{it}=1)}{\Pr(X_i, Z_t, PBidder_i=1)} \\ &= \frac{\Pr(Y_{it}=1 \mid X_i, Z_t)\Pr(X_i, Z_t)}{\Pr(PBidder_i=1 \mid X_i, Z_t)\Pr(X_i, Z_t)} = \frac{\Pr(Y_{it}=1 \mid X_i, Z_t)}{\Pr(PBidder_i=1 \mid X_i, Z_t)}\end{aligned}$$

It follows that the problem of the estimation of $\Pr(Y_{it}=1 \mid X_i, Z_t, PBidder_i=1)$ can be broken down in two parts:

- the estimation of $\Pr(Y_{it}=1 \mid X_i, Z_t)$, that is the probability that an operator bids for an FS contract regardless of its being qualified as a potential bidders. In theory, an estimate of this quantity can be obtained directly by applying an appropriate probability model to the entire universe of active operators during the period considered. As a matter of fact, this approach cannot be implemented directly, thus steps were taken to retrieve from the Infocamere database a random sample, stratified by ATECO code and revenue class, equivalent to 5 percent of the population of operators active between 1999 and 2002 (for a total of approximately 4,400 operators) and to add it to the 210 participants in the tenders in question. In this way, an sample suitable for estimation was created where bidding firms were consistently overrepresented. This in order to facilitate the estimate of the parameters of $\Pr(Y_{it}=1 \mid X_i, Z_t)$ via the maximization of the likelihood function. However, the individual contribution to the likelihood should be adjusted for the overrepresentation of bidders. Thus, every observation was weighted according to suggestions by Manski and McFadden (1981) for choice-based sampling cases. Lastly, the function form adopted for $\Pr(Y_{it}=1 \mid X_i, Z_t)$ was that of an extreme value function, to account for the degree of skeweness in the data:

- the estimation of $\Pr(PBidder_i = 1 | X_i, Z_t) = \Pr(PBidder_i = 1 | X_i)$, that is the probability that an operator characterized by X_i is a potential bidder. This probability is that which has been in fact estimated in the previous section.

The estimated parameters of $\Pr(Y_{it} = 1 | X_i, Z_t)$ have been utilized to simulate the effects of a change in the number of studies and in the average tender value on the probability that every firm included in the sample participates in a tender. The data in the tables were derived by weighting such simulated values by the probability that the operators are indeed potential bidders $\Pr(PBidder_i = 1 | X_i)$, so as to consider the probability of potential bidders to participate $\Pr(Y_{it} = 1 | X_i, Z_t, PBidder_i = 1)$.

The estimate and simulation exercise is repeated with the same rationale, considering both the participation of operators regardless of their role in the bid for an FS contract and their participation as lead firms. In this case the potential bidders considered are only those that can act as lead firms in groupings. The final estimate adopted for the parameters of $\Pr(Y_{it} = 1 | X_i, Z_t)$ is displayed in Table A3.11, which shows that the (unconditional) probability of participating in a tender for the FS increases hand in hand with the size of the firm in terms of revenues and that, all other things being equal, firms located in Southern Italy (excluding the islands) are most likely to bid. While the number of studies conducted is important to determine the probability of participating in a tender, in both cases the average size of the studies does not appear to play a key role (the estimated parameter is not statistically different from zero). This remark is reflected in the results of the simulations described in the main part of the paper.

Table A3.11 Estimate of maximum likelihood for the parameters of $\Pr(Y_{it}=1 \mid X_i, Z_t)$. *Standard error*s corrected for firm *clustering*

	Participation in any role			Participation as a lead firm		
Number of observations		18,072			18,072	
Number of positive outcomes		305			162	
Sensitivity		87.9			77.9	
Specificity		83.9			86.5	
	Coeff.	Std.Err.	t	Coeff.	Std.Err.	t
Firm's revenues (euros)						
Unreported						
< 100,000	2.1393	0.3310	6.46	2.0337	0.5919	3.44
100,000-250,000	2.4675	0.3335	7.4	2.6563	0.4740	5.6
250,000-750,000	2.8582	0.2759	10.36	2.9600	0.3877	7.63
750,000-2,500,000	3.5210	0.2888	12.19	3.9742	0.3807	10.44
Over 2,500,000	4.1483	0.2998	13.84	4.5621	0.3833	11.9
Firm's activity sector						
7220						
7230	-0.7349	0.4476	-1.64	-1.9953	1.0696	-1.87
7310	1.8327	0.4199	4.36	1.8022	0.6734	2.68
7413	1.2826	0.4064	3.16	1.6940	0.5582	3.03
7414	1.0373	0.3559	2.91	1.3332	0.4542	2.94
7420	1.9896	0.3134	6.35	2.3773	0.4021	5.91
7484	0.1770	0.3817	0.46	0.5930	0.4909	1.21
Area where firm is located						
North	-1.3498	0.1904	-7.09	-0.8435	0.2644	-3.19
Central Italy	-0.3236	0.2256	-1.43	0.3091	0.2990	1.03
South						
Islands	-1.8295	0.6076	-3.01	-1.3334	1.0639	-1.25
Average tender value of studied conducted in the period	0.0016	0.0012	1.3	-0.0013	0.0016	-0.84
Number of studies in the period	0.0237	0.0082	2.9	0.0292	0.0111	2.62
Constant	-9.9935	0.5813	-17.19	-11.2580	0.7276	-15.47

Source: authors' calculations based on data contained in DPS-UVAL and Infocamere databases

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