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# Mixed Public-Private Enterprises in Europe: Economic Theory and an Empirical Analysis of Italian Water Utilities

## Alessandro Marra[∗]

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[∗] Luiss Guido Carli, Dipartimento di Scienze Economiche ed Aziendali, Rome, Italy and College of Europe, Department of European Economic Studies, Bruges, Belgium. Email: amarra@luiss.it; amarra@coleurop.be.

# Abstract

Mixed enterprises, which are entities jointly owned by the public and private sector, are spreading all over Europe in local utilities. Well aware that in the vast majority of cases the preference of local authorities towards such governance structure is determined by practical reasons rather than by the ambition to implement new regulatory designs (an alternative to the typical "external" regulation), our purpose is to confer some scientific value to this phenomenon which has not been sufficiently investigated in the economic literature. This paper aims at proposing an economic analysis of mixed enterprises, especially of the specific configuration in which the public partner acts as controller and the private one (or "industrial" partner) as service provider. We suggest that the public service concession to mixed enterprises could embody, under certain conditions, a noteworthy substitute to the traditional public provision and the concession to totally private enterprises, as it can push regulated operators to outperform and limit the risk of private opportunism. The starting point of the entire analysis is that ownership allows the (public) owner to gather more information about the actual management of the firm, according to property rights theory. Following this stream of research, we conclude that under certain conditions mixed enterprises could significantly reduce asymmetric information between regulators and regulated firms by implementing a sort of "internal" regulation. With more information, in effect, the public authority (as owner/controller of the regulated firm, but also as member of the regulatory agency) can stimulate the private operator to be more efficient and can monitor it more effectively with respect to the fulfilment of contractual obligations (i.e., public service obligations, quality standards, etc.). Moreover, concerning the latter function, the board of directors of the mixed enterprise can be the suitable place where public and private representatives (respectively, welfare and profit maximisers) can meet to solve all disputes arising from incomplete contracts, without recourse to third parties. Finally, taking into account that a disproportionate public intervention in the "private" administration (or an ineffective protection of the general interest) would imply too many drawbacks, we draw some policy implications that make an equitable debate on the board of the firm feasible. Some empirical evidence is taken from the Italian water sector.

**JEL classification**: L22, L33, L95

**Key words**: public-private partnership; economic regulation, water utilities

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## Introduction

The attention that EU institutions, national governments and local public authorities pay to new forms of cooperation with the private sector, which we call Public Private Partnerships (PPPs), is growing. For instance, the European Commission (EC) published two reports dealing with PPPs (*Guidelines on public-private partnerships* and *Resource Book on PPP case studies*, respectively in 2003 and 2004) and a Green Paper in 2004 by which a public consultation was opened. In 2005, the EC adopted a Communication presenting policy-options with a view to ensuring effective competition for PPPs and currently is carrying out an Impact Assessment to evaluate the effects of future public procurement legislations.

PPP is an umbrella notion covering a wide range of economic activities in constant transformation; in a very general way, it can be defined as the partial transfer to the private sector of projects and services traditionally executed and/or financed by the public sector (EC, 2003a, 96)[1].

We limit the scope of our analysis to PPPs created at the local level to provide public services, such as water distribution and waste water treatment, urban waste collection, local public transport, and so on.

In the European Union (EU), although many governments of Member States have a long-lasting tradition of providing these services in-house, we observe a significant shift towards an increasing involvement of the private sector. In the last 30 years, many local public enterprises have been replaced by entirely private ones operating under concession or have been transformed into mixed entities (see COX, 1999).

We focus on these mixed entities, also called mixed enterprises. In local utilities, mixed enterprises are companies jointly owned by municipalities and private firms that assume

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[1] This is a flexible definition that embraces the wide variety of PPP forms implemented in EU and all over the world. For an overview of PPP practices, see EC, 2003b, 16.

co-responsibility for investments in infrastructure and service delivery[2].

The purpose of this paper is to present an economic analysis of mixed enterprises and distinctively of the specific configuration in which the public partner acts as controller, while the private one (or "industrial" partner) as service provider.

Our discussion will be frankly speculative in at least two respects. Firstly, mixed enterprises will be addressed from several perspectives. In this regard, we will understand a mixed enterprise as a governance structure (compared to in-house management and concession to totally private enterprise), as a productive organisation (compared to totally private and public firms), and finally as a regulatory scheme (an alternative to the well-known external regulatory devices). Given the large amount of implications raised, our objective is to provide the reader with an analytical framework and some clear propositions.

Secondly, the Italian water sector does not yet constitute a good empirical benchmark to test our conclusions: the recent reform implementation does not offer solid evidence in terms of sample size and above all series length. Moreover, the reorganisation of the sector was slow and still remains partial despite the marked acceleration in 2002: at the end of 2004, water services were assigned in only 47 basins (out of 91). As soon as more consolidated data becomes available, we will be able to examine our theses more accurately.

Missing best practices in the Italian water sector can not restrain us from drawing some constructive conclusions. We suggest that the concession to mixed enterprises could embody, under certain conditions, a valuable alternative to the traditional public provision and the concession to totally private enterprise as it can push regulated operators to outperform and limit the risk of opportunistic conducts. To carry out such a study, we use the framework provided by property rights theory. In particular, we adopt the insight by which ownership allows the (public) owner to gather more information about the actual management of the firm.

Following such a stream of research, we conclude that under certain conditions mixed enterprises could significantly reduce asymmetric information between regulators and regulated firms by implementing a sort of "internal" regulation. With more information, the public authority (as owner/controller of the regulated firm, but also as member of the regulatory body) can stimulate the service provider to lower operating costs and monitor it more effectively with respect to the fulfilment of contractual obligations (i.e., public service obligations, quality standards, etc.). Moreover, concerning the latter function, the

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[2] In the EU this special form of PPP is extraordinary widespread and has an established tradition in many Member States (i.e., the Société d'économie mixte (SEM) in France and the Stadtwerke in Germany). DEXIA (2004) identified some emerging trends in Europe: rapid increases were recorded in Germany, Hungary and Italy; regular increases in Austria, Greece, Portugal, Sweden, and France. On the other hand, mixed entities were decreasing in Belgium. Even if figures differ from country to country, the overall trend was towards a significant increase. DEXIA (2002, 3) calculated its number has grown from 10% in 1999 to 20% in 2002, and in the new enlarged EU, mixed enterprises are around 3.500 units.

mixed enterprise board of directors can represent a suitable place where public and private sector representatives (respectively, welfare[3] and profit maximisers) can meet to solve all disputes usually deriving from incomplete contracts, without having recourse to third parties.

The paper is organised as follows. We first examine the common rationales behind the creation of mixed enterprises, in general. Secondly, we address the relationship between ownership and information. We turn next to stress the relevance of identifying a specific configuration of mixed enterprises to build on our analysis, and we present our model. Then, we ask: 1) how is the performance of regulated firms affected by regulation rather than by other factors, such as ownership; 2) thus, whether in our mixed enterprise model the public authority (as owner/controller of the regulated firm but also as member of the regulatory agency) is able to reduce the burden of asymmetric information and regulate more effectively (that is, providing more incentives for productive efficiency); 3) finally, whether our model allows lower transaction costs necessary to let concessions work properly by solving internally (on the board of directors) all the disputes between the public authority and the private operator usually arising from incomplete contracts. In the last section, taking into account that a disproportionate public intervention into the "private" administration or an ineffective protection of the general interest would imply many drawbacks, we draw some policy implications to make feasible an equitable debate on the board of the firm.

## 1.  Mixed enterprises, three rationales behind

In this section, we shall consider why municipalities choose mixed enterprises to deliver local public services.

We well know the rationales behind public intervention in the economy and, more specifically, in local utilities. Local utilities are intrinsically characterised by market failures: many of them, for example, are natural monopoly. This is not the only economic justification, although the most important one, adopted by municipalities to enter service delivery. Further market failures, such as public or semi-public goods, asymmetric information and externalities, need to be addressed by direct public sector intervention. Finally, sustainability is also an important factor in services having a strong impact on the environment (MASSARUTTO, 2001).
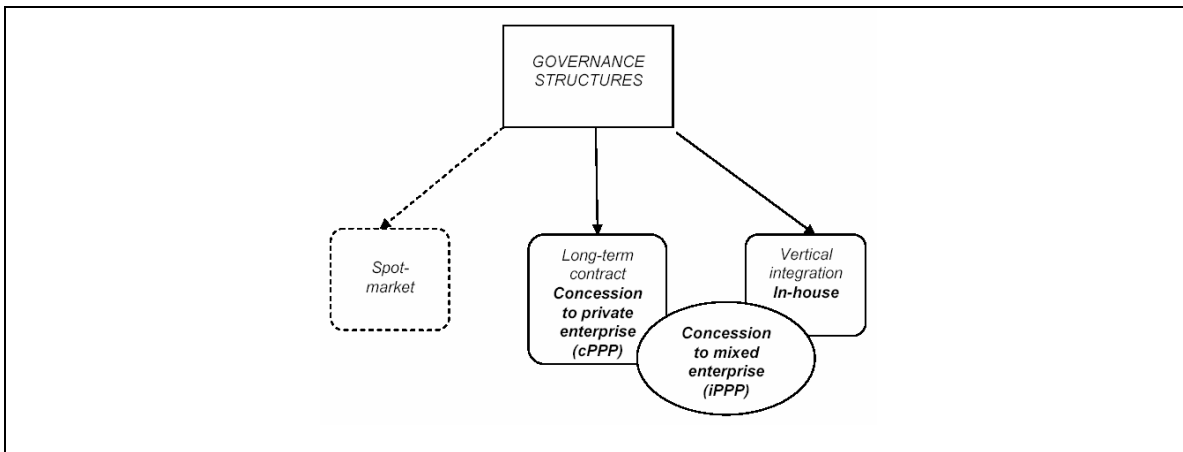
These considerations weaken the case for privatisation of local utilities and support those in favour of enterprises totally owned (and run) by the public. However, although there is sufficient room to justify municipalities entering utilities, we have to recognise that the public sector more often than not needs to involve private operators because of their superior know-how, experience and financial capabilities.

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[3] We use a welfare measure, $W = S(p) + \Pi$ (respectively, consumer surplus and producer surplus), that weights benefits and losses to consumers and producers equally.

Understanding the standpoint from which we study mixed enterprises is crucial. In local utilities, the choice of a governance structure (to deliver services) over another is under the responsibility of municipalities. Roughly, every local authority has three options. It can opt for traditional in-house provision (by public enterprises), or choose PPP, and this in two alternative forms: contractual PPP (cPPP) or institutional PPP (iPPP). The cPPP is typically represented by the concession to an entirely private operator; the iPPP is the concession to a public-private joint-venture. In the EU, in effect, public authorities can delegate service management to these mixed enterprises that operate under usual concession schemes. However, the fact that the public authority is both inside the firm (as owner/controller) and outside (involved in the regulatory body) implies certain peculiarities that make it a special governance structure[4].

Each of these three governance structures (in-house, cPPP and iPPP) entails advantages and disadvantages for local authorities.

*Fig. 1: What governance structure in local utilities?*



We concentrate on concessions to mixed enterprises, and analyse three possible reasons behind this choice:

- greater financial resources,

- higher productive efficiency,

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[4] It is not our purpose to discuss the overall regulatory design set by Law no. 36/94. We limit to remark in this footnote that in each optimal territorial basin (ATO) local authorities on the one side embody the regulatory agency (AATO), on the other side own (partially or entirely) the water service company. Even though some paradoxical circumstances might arise from such scheme, conflicts of interest can be easily circumvented by strictly defining the notion of control and the activities that have to be fulfilled by local authorities (see COVIRI, 2004, 102).

- more effective (public) control over service management.

Firstly, the stringent financial constraints set by the Stability and Growth Pact have forced many municipalities to look to private funding to build new infrastructures and/or renew existing ones. The opening of public enterprises to capital from private shareholders is for local governments a means to circumvent financial straits (see DEXIA, 2004, 24). This is evident in the Italian water sector, where concessions to mixed enterprises represent the preferred way to address the need for urgent and significant investments. We observe that investment per kilometre of network projected in Basin Plans supplied by mixed enterprises is on average €141.000,36 against €112.000,37 for totally public enterprises[5].

Secondly, the prospect of higher productivity is unequivocally one of the major drivers moving Italian municipalities towards mixed enterprises: project operating costs (operating costs estimated at the Basin Plan level) of mixed enterprises are expected to be lower than those of totally public enterprises. From the second and third graphs in fig. 2 we observe the estimated evolution of operating costs over the next 20 years in 32 Basin Plans, among which 24 iPPP and 8 in-house: a tendency to greater efficiency enhancements is sharply distinguishable in the former.

Moreover, the last graph in fig. 2 shows the overall cost difference expected on average in basins supplied by mixed enterprises and by totally public enterprises. The contribution of the private sector is identifiable by looking at the operating costs during the first year (on average 0,82€ against 0,88€ for totally public enterprises), and over the entire concession period with an expected decrease of 12,65% (against the 8,23% decrease in totally public enterprises).

Even though these results do not demonstrate any supremacy of mixed enterprises over totally public enterprises[6], they need to be carefully considered[7].

It is largely accepted that private sector involvement, at least potentially, brings more financial capabilities and better productive performance. However, we want to go further and identify another advantage of iPPP for municipalities.
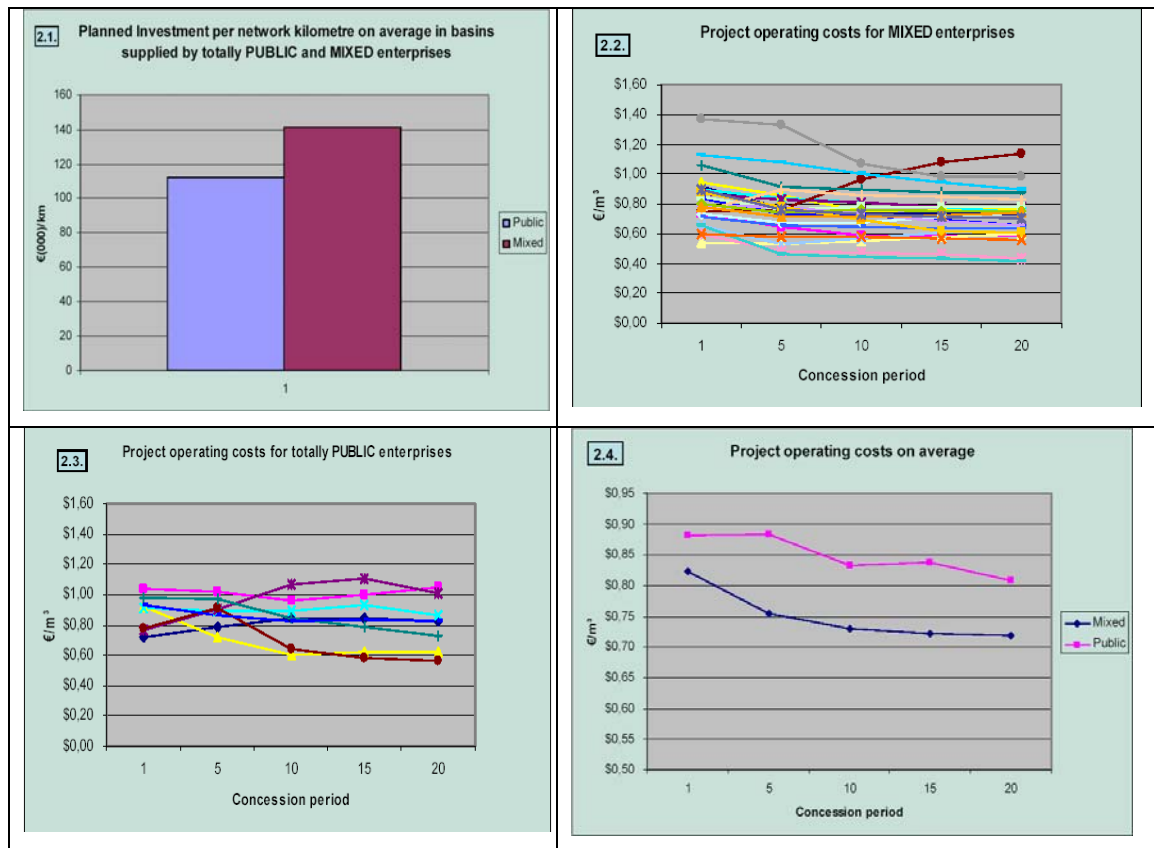
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[5] Data are from 40 Basin Plans (27 under iPPP and 13 under in-house). Notice that the difference could be larger if we exclude ATO Unico Puglia (the first aqueduct in Europe and the third in the world, with 19.635 km of network, 4.623.349 inhabitants served, 309.416.113 m³ drinking water supplied), where an enormous amount of investment (€4.670.077.000) was deliberated in its Basin Plan (2005). Without ATO Unico Puglia, the investment per Kilometre of network in basins provided by totally public enterprises would be appreciably lower, on average €99,16.

[6] Such evidence does not fit at all into the debate concerning private, mixed and public firms as discussed in section 2.3.

[7] This result matches with our assumption that PPPs (whether cPPP or iPPP) are chosen by municipalities as long as private provision outperforms the public one. Otherwise, there would be no reason to consider PPP as Pareto superior to in-house management. The Pareto criterion, as we know, ranks an allocation $x$ over an allocation $y$ if some people are better off at $x$ and no one else is harmed. If that condition is met, we say that $x$ is Pareto improving to $y$.

Thirdly, and above all, a significant public participation in the capital of mixed enterprises allows local authorities a more successful control over the service management [than in case of concessions to entirely private firms (cPPP)]. We develop this reasoning in section 2.4; at this stage, it is sufficient to make clear that municipalities by retaining a relevant proportion of the equity can properly fulfil their task of protecting the general interest underlying utilities[8].

*Fig. 2: More planned investments and lower project operating costs in iPPP*



*Own elaboration on data COVIRI (2005).*

In tab. 1, we present the public-private participation in the capital of 7 mixed enterprises, a small number but indicative of the general trend in which total public shares are never below 51%. By retaining the majority of the capital, the pubic can gather more

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[8] We share the public interest perspective and do not intend to include the private interest one in our analysis. Throughout the paper we assume that public representatives in mixed enterprises (and regulators) try to benefit society.

information about actual management and have a greater say on the board of the firm[9]. If ownership gives proprietary information, this can be used by local authorities to stimulate the service provider to lower operating costs and monitor it more effectively with respect to the fulfilment of contractual obligations.

*Tab. 1: Public-private capital sharing*

| Mixed enterprises | Public participation | Private participation |
|---|---|---|
| Acque SpA | 55% | 45% |
| Publiacqua SpA | 60% | 40% |
| Nuove Acque SpA | 54% | 46% |
| Acquedotto del Fiora SpA | 60% | 40% |
| SII SpA | 51% | 49% |
| Acqualatina SpA | 51% | 49% |
| GORI SpA | 81% | 19% |

*Source: BARDELLI, PERUZZI and SBANDATI (2002, 5).*

## 2. An economic analysis of mixed enterprises

In the following pages, we propose the mixed enterprise as a feasible way to operate the public infrastructure in delivering services. To limit the scope of our analysis, we examine the "operational" stage, leaving aside the "building and financing" phase; moreover, the role of the private sector in financing the construction of infrastructures is well known (see EC, 2003a).

When municipalities are not satisfied by in-house management, they opt for PPPs, via concessions to totally private enterprises (cPPP) or mixed enterprises (iPPP). As governments intervene in service provision in order to cope with market failures and/or distributional concerns, we infer that the private sector is mainly involved to enhance productive efficiency.

Theoretically, as we have seen above, private know-how and capabilities should translate into lower operating costs. Practically, public intervention is still necessary, firstly to make sure that lower costs mean in fact lower tariffs, and secondly to stimulate the operator to be more and more efficient. Lastly, the public authority must ensure the fulfilment of other obligations (public services obligations, quality standards, etc.). In section 2.3 to 2.4, we investigate whether mixed enterprises can support the following propositions:

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[9] However, a public majority can be held by plenty of small municipalities that, to exert effectively control, would need to be extremely united and coordinated; see LOBINA (2005) with regards to *Nuove Acque SpA*.

- the more the information available, the more effective the incentive provided by the regulator will be and the stronger the efficiency enhancement attained by the service provider;

- the dual role that public authorities hold (as owner/controller of the regulated firm and as member of the regulatory agency) can be used to strictly control the private partner/provider. Hence, the more effective the public partner monitoring activity, the less is the risk of private opportunism.

Before addressing production and information costs, we need to clarify preliminarily two crucial initial assumptions:

1) retaining some ownership allows the public authority to gather more information about actual costs and, more in general, service management;

2) to study mixed enterprises, we need to identify the specific configuration we are referring to.

To sustain the thesis that public participation in the capital of a firm serves to cope with the typical asymmetric information in the agency relationship between regulators and regulated, we rely on property rights theory. SCHMIDT (1996) argued that

"*If the government gives up control of the firm and privatizes, then it will have less information about the firm's costs (and profits) as compared to the situation where it controls the firm as a nationalized company. To justify this assumption, we have to explain why the government cannot write a contract with the private owner requiring that the government will receive all relevant information. The argument is that having access to inside information of a firm is not a specific right, which can be contracted upon easily, but rather a residual right, which is tied together with ownership. Information is not just available in a firm- it has to be produced, collected, accounted, processed, and transmitted, and it is the owner who in the end controls this process of information production. Therefore the owner is always able to manipulate the information. For example, she may manipulate transfer price, thus shifting profits from one division of her firm to another, or she may choose among different depreciation methods, thus shifting profits between periods, etc. After the information has been produced, it is impossible to verify it to an outsider even if the owner wishes to do so*" (SCHMIDT, 1996, 9)[10].

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[10] A similar aspect was discussed by WILLIAMSON (1975), who emphasised that different organisational structures imply different and concomitant changes in the information flow. Particularly, the author distinguished the information that external auditors (versus internal ones) may collect: "*An external auditor is typically constrained to review written records and documents and in other respects restricts the scope of his investigation to clearly pertinent matters. An internal auditor, by contrast, has greater freedom of action, both to include less formal evidence and to explore the byways into which his investigation leads*" (WILLIAMSON, 1975, 29). According to the interpretation offered by RIORDAN (1990), GROSSMAN and HART (1986) seemed to deny that ownership gives more information. Discussing the change in information consequent on vertical integration, they maintained that any audit an employer can have done of his subsidiary is also feasible when the subsidiary is a separate company. However, in a footnote, they

Thus, we share the view that ownership gives the public partner more proprietary information, which if correctly gathered and transferred can be used by the public regulator[11].

Another facet to be addressed is the configuration of the mixed enterprise under investigation. Mixed enterprises differ not only from totally public and totally private ones: they also differ among themselves. We identify public-private capital sharing and allocation of tasks between partners as the main factors affecting the goal orientation of mixed enterprises' and subsequently their performance. For example, it is easy to see that an enterprise will behave differently depending on whether its majority is owned by the public or private sector.

According to us, a missing identification of mixed enterprises represents one of the major obstacles in studying these entities. To support this view, we present a critical short survey of the economic literature on mixed enterprises (section 2.1). Then, in section 2.2, we describe our model, in which the private partner is in charge of service provision while the public is in charge of controlling over the former.

### 2.1. A survey of the literature

In our view, different public-private capital sharing and different allocation of tasks between partners affect the mixed enterprise's goal orientation and thus its performance.

Initially, the literature concerning mixed enterprises was largely normative (rather than positive) and descriptive (rather than analytical)[12]. As observed by MAZZOLINI (1979), "*it can generally be faulted for prescribing principles where the validity has not been clearly verified ... (moreover) it tends to lack a solid empirical base*" (MAZZOLINI, 1979, 6).

More sophisticated studies came out in the 1980s and 90s, investigating mixed enterprises along two different streams of research.

On the one side, some positive theory was developed to analyse the relationship between mixed ownership and firm conduct[13]. For us, the assumptions and propositions were sometimes overly simplistic because of the absence of a precise up-stream identification of the research subject. Some of the remarkable results achieved are summed up in the

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specified that the right to audit is sometimes a residual right rather than a contractible right, thus confirming that information depends on ownership patterns (see GROSSMAN and HART, 1986, 695).

[11] As seen above, in the Italian water sector, local authority representatives participate in the board of the regulated firm and in the assembly of the Basin Authority (the regulator).

[12] See for example MUSOLF (1972), ROBSON (1972), BOARDMAN and VINING (1985), ELFORD and STANBURY (1982), BOARDMAN, ECKEL and VINING (1986), BROOKS (1987).

[13] See VIALLET (1983), BOARDMAN, ECKEL and VINING (1986), ECKEL and VINING (1985), SCHMITZ (2000).

following quotations:

- mixed enterprises can accomplish profitability and social goals at a lower cost than public enterprise because of the effect of profit monitoring by private shareholders. In this respect, mixed enterprises can embody a cost-minimising method to achieve a combination of both goals (ECKEL and VINING, 1985, 85).

- mixed enterprises may work successfully, because they can embody a cost-minimising way for government to reconcile profit and social welfare; give inside information to the government in a simple and cheap way; avoid costly accounting procedures and other government restrictions and control which prevail in public enterprises (BOARDMAN, ECKEL and VINING (1986, 235).

Without doubt, concentrating on a sole mixed enterprise model facilitates creating a solid work surface to develop more targeted propositions.

On the other side, empirical studies investigated how mixed ownership can affect performance and the firm's value on the market[14]. Again, nowhere do we find a classification of mixed enterprises. Concerning productive efficiency, for example, BOARDMAN and VINING (1989) stated that research argues that mixed enterprises perform better than public enterprises, but not as well as private do (BOARDMAN and VINING, 1989, 4). This conclusion can be challenged in many respects: other factors, beyond mixed ownership, affect performance (see section 2.3).

Firstly, public-private capital sharing is relevant in characterising mixed enterprises. In particular, it explains to what extent public and private representatives can bring the firm's goal orientation closer to respectively social welfare and profit maximisation. In a general way, we can affirm that the larger the proportion of total shares, the more the partner will be able to determine the enterprise's conduct, and hence its performance. In this respect, BOARDMAN and VINING (1991, 223) argued that public-private capital sharing affects the firm's final objective. More precisely, different ownership settings influence the extent to which mixed enterprises engage in profit maximization, social welfare maximization (and managerial utility maximization). Different ownership conditions also affect the degree of conflict between owners.

In particular, where the public holds a large equity proportion, it has the control of the firm: through a high number of representatives on the board, it has a great say into its management. However, this straightforward proposition can be altered, for example, by a high concentration of private sector shares, or by being listed on a stock exchange. In the Italian water sector, a considerable difference exists between listed (on the Milan stock exchange) and unlisted mixed enterprises. In the former, the overall objective is closer to profit maximisation: indeed, there seems to be no room for further policies pursuing

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[14] See MINTZ (1980); MINTZ (1982); VIALLET (1982); BOARDMAN, ECKEL, LINDE and VINING (1983); ECKEL and VERMAELEN (1983); BOARDMAN, LAURIN and VINING (2000); BOARDMAN and VINING (1989); BOARDMAN, FRIEDMAN and ECKEL (1986); EHRLICH et al. (1994); SUEYOSHI (1998); MOK and CHAU (2003); LEE and HWANG (2003); GUPTA (2004), CHIU (2003).

socio-political goals, as these would have detrimental effects on the shares value. In unlisted companies, instead, the representatives of the public partner are more oriented towards social welfare maximisation[15]. In this case, the economic viability of the firm might be threatened if protection of the general interest is used by the public partner to justify excessive and unjustified interference. Then, stringent rules of corporate governance are needed to define properly the boundaries of the partners' role (see section 3).

In the next section, we analyse the second relevant factor for firm performance, which is the allocation of tasks between partners.

## 2.2. Our mixed enterprise model

Mixed enterprise is not only a public-private joint-venture owned by two partners: the extent to which these partners perceive and pursue their objectives depends on many aspects, in particular on which task they fulfil. But what are these tasks? At a practical level, partners can carry out an "operating" task (managing the service) and a "monitoring" task (controlling over the operations).

*Tab. 2: Public and private partner tasks in mixed enterprises*

|  | Scenario A | Scenario B |
|---|---|---|
| *Operating services* | *Private* | *Public* |
| *Monitoring operations* | *Public* | *--* |

In local utilities, the public partner is easily identifiable, embodied by one or more municipalities. Roughly, municipalities have to ensure that the management of the service is consistent to the principle of efficiency, efficacy and cost-effectiveness and that the service is supplied at satisfactory quality standards. The private partner is represented by industrial firms or financial institutions and their well-known goal is to make profits[16]. Depending on whether the partner is an industrial or financial partner, one arrives at divergent conclusions.

In this paper, we focus on those mixed enterprises in which the private "industrial" partner is in charge of providing services, while the public partner is assumed to exercise control (tab. 2, scenario A). This is a realistic and widespread scheme as the private

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[15] In the Italian water sector, listed companies are, for example, *ACEA SpA* and *AMGA SpA*; non-listed companies, such as *Nuove Acque SpA* or *Publiacqua SpA*, embody properly our model and will be presented in section 2.2.

[16] In water services management, we find industrial partners (such as *Lyonnaise des Eaux*, *Ondeo*, etc.) or financial partners (such as *Dexia Crediop*).

sector is usually involved in service management because of its know-how and experience[17]. It is becoming quite common in the EU and is expected to be adopted increasingly by municipalities in coming years, because of the advantages it could entail on the public partner side (in terms of less private opportunism) and on the private partner side (in terms of more productive efficiency).

Moreover, it is encompassed in the general trend perceived by the EC when it observes a change in the role of the State in the economy, moving from a role of direct operator to one of organiser, regulator and controller (see EC, 2004a, § 3).

On the side of the public partner, we are well aware that in concessions to totally private firms, opportunism is a major concern because of asymmetric information and incompleteness of contracts, and local authorities need to reduce the risk of private unfair conduct. Therefore, we propose our mixed enterprise model as a feasible solution. By retaining some ownership, the public authority is in a position to maintain an insider's view of the operations, decisions and voting rights, which can be a more effective means of control than regulatory mechanisms alone (see UNPD and PPPUE, 2000, 11).

On the side of the private partner, the private sector is represented by consortia. In these consortia the leading role is usually played by an industrial firm, which holds more than 51% of the shares (in the consortium) and is responsible for service management. In tab. 3, we show the private sector configuration in 7 mixed enterprises and identify for each the leading industrial firms.

*Tab. 3: Private consortia and leading industrial partners*

| Mixed enterprise (ATO) | Consortium | Industrial partner |
|---|---|---|
| Acque SpA (ATO 2 Basso Valdarno) | ACEA SpA, Ondeo Service SA, Monte dei Paschi di Siena, SILM SpA, Ondeo Degrement SpA, CTC | ACEA SpA, Ondeo Service SA |
| Publiacqua SpA (ATO 3 Medio Valdarno) | ACEA SpA, Ondeo Service SA, Monte dei Paschi di Siena, SILM SpA, Ondeo Degrement SpA, CTC | ACEA SpA, Ondeo Service SA |
| Nuove Acque SpA (ATO 4 Alto Vardarno) | Ondeo, AMGA SpA, Monte dei Paschi di Siena, Banca Popolare dell'Etruria e del Lazio, Consorzio IRIDE | Ondeo, AMGA SpA |
| Acquedotto del Fiora SpA (ATO 6 Ombrone) | ACEA SpA, Acque Toscane SpA, Monte dei Paschi di Siena, SILM SpA, CTC, CCC, Comit, CITS | ACEA SpA, Acque Toscane |
| S.I.I. S.c.p.A. (ATO Umbria 2) | Sewern Trent Water Service, Severn Trent Italia, Biodepuratrice, | Sewern Trent Water Service, Severn Trent |

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[17] We could also face the case in which the private partner is a "financial" partner. Then, we would refer to scenario B, with the public partner operating the service and the private providing mere financial assistance.

| | Ambiente, Omnia, SGI, RPA | Italia |
|---|---|---|
| *Acqualatina SpA (ATO 4 Meridionale Latina)* | *CGE SpA, Enel Hydro SpA, Acquedotto Pugliese SpA, SIBA SpA, Iltacogim SpA, EMAS Ambiente* | *CGE SpA, Enel Hydro SpA, Acquedotto Pugliese SpA* |
| *G.O.R.I. SpA (ATO 3 Sarnese Vesuviano)* | *ACEA SpA, Enel Hydro SpA, SGI, ICAR, Dipiudi, Ctida, Siba, Dm, Lotti, Feronia* | *ACEA SpA, Enel Hydro SpA* |

*Source: PASSARELLI and PERUZZI (2004).*

In the Italian water sector, the private partner is selected through a competitive tendering. The goal of such procedure is to identify the most efficient partner, but the outcome is often different.

According to BARDELLI, PERUZZI and SBANDATI (2001), the main criterion was that of "the most economically advantageous tender". Even though it has two relevant parameters, a technical and an economic one, most local authorities give too much emphasis to the latter, thus selecting not the most efficient partner but the one that allows maximising the recompense for the transferred equity shares. This wrongdoing could seriously alter the goal of providing efficient and high-quality services in the entire EU. For this reason, the EC envisages preparing an Interpretative Communication on this and related aspects in the course of 2006, which could help in attaining practices more consistent with the internal market goal[18].

## 2.3. Production costs

*"PPP arrangements should not be entered into merely for the sake of undertaking a PPP project. A detailed review of the costs and benefits of private sector involvement versus public alternatives must be undertaken to ensure that a PPP enhances the public benefit. The degree of private involvement needs to be carefully matched to the objectives and needs of the project and the public. Appropriateness, cost, the ability to effectively implement and manage should be the paramount considerations in selecting a PPP structure"* (EC, 2003b, 9).

The EC recommends local authorities to complete cost-benefit analyses before starting to deliver services. In order to simplify this enquiry, we propose to concentrate on two cost typologies: what we call "production" and "information" costs. While the former cost

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[18] If not well carried out, the competitive procedure "for the selection of the private partner" would not have the same impact on market liberalisation as the competitive tendering "for the attribution of the service" does. Moreover, given the steady opposition of most municipalities, not only in Italy, to delegate services of general interest to third (private) operators, the EC is to address the resistance to change of public authorities in order to find some room to introduce competition. When this aspect is solved, even the criticisms based on a wrong implementation of competitive procedures in iPPP can be dismantled.

typology does not need to be defined, the latter are meant as the costs of managing the relationship between public authorities and concessionaires.

With regard to production costs, we need to understand how efficiently our mixed enterprise can provide the service.

The inevitable starting point seems to be the debate concerning public versus private enterprises. Three distinct streams of research have compared public and private firms: agency/property rights, public choice and organisation theories (see VILLALONGA, 2000). We follow the first one, which investigates how ownership matters for productive performance. A straightforward implication of the agency/property rights theory is that, under certain conditions, private ownership enhances technical efficiency[19].

In particular, the validity of privatisation is not debatable in markets where strong competitive pressure applies (see MEGGINSON and NETTER, 2001): many studies support the proposition that private firms are more efficient (and more profitable) than comparable public firms. But such a general conclusion is disputable when we go into more detail.

Looking carefully at the *liaison* ownership-performance, many factors intervene to alter this apparently clear causal relationship. Ownership is not the only element affecting efficiency, even though it has attracted most attention. There are other reasons why two firms perform differently: apart from divergences in the degree of competition faced or in managerial skills, we cannot assimilate firms with different scale, or firms operating under non-comparable regulatory environment (see RENZETTI and DUPONT, 2003, 10). Sometimes, as we see below, with respect to the Italian water sector, the same regulatory mechanism can be applied differently, invalidating the premise for any benchmarking analysis.

Despite these difficulties, economists use to compare public and private firms' performance. RENZETTI and DUPONT (2003) made a survey of the literature that investigated the implications of ownership for performance in water utilities (as summarised in tab. 4). The results turn out to be conflicting.

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[19] Private enterprises are more efficient than public ones because of clearer corporate and managerial goals, harder budget constraints, more intense monitoring by shareholders than by politicians or civil servants, more competitive and more efficient markets for corporate and managerial control, more incentives for employees, more competitive product markets. See BOYCKO, SHLEIFER and VISHNY (1996); HANSMANN and KRAAKMAN (2000); HART, SHLEIFER and VISHNY (1997); KORNAI (1993); SHLEIFER (1998); VICKERS and YARROW (1991).

*Tab. 4: Ownership and performance in water utilities*

| Author | Country | Results |
|---|---|---|
| MORGAN (1977) | US | Private has lower costs |
| CRAIN and ZARDKOOHI (1978) | US | Private has lower costs |
| BRUGGINK (1982) | US | Public cost lower by 20% |
| FEIGENBAUM and TEEPLES (1983) | US | No difference in costs |
| FOX and HOFLER (1986) | US | Cost 'over-runs' of 46% and 43% for private and public, respectively |
| BYRNES et al. (1986) | US | No difference in efficiency |
| TEEPLES and GLYER (1987) | US | No cost difference in most general model |
| BYRNES (1991) | US | No differences in costs |
| LAMBERT et al. (1993) | US | Public more efficient |
| RAFFIEE et al. (1993) | US | Public and private exhibit 17% and 22% deviation from minimum cost, respectively |
| LYNK (1993) | US | Private and public are 11.5% and 2% above respective cost frontiers |
| BHATTACHARYYA et al. (1994) | US | No difference in overall efficiency but private are technically more inefficient |
| BHATTACHARYYA et al. (1995a) | US | Public and private exhibit 10% and 19% deviation from minimum cost, respectively |
| BHATTACHARYYA et al. (1995b) | US | Private are 91% efficient while public are 85–90% efficient |
| SHAOUL 1997 | UK | Privatisation raised profits but little else |
| CUBBIN and TZANIDAKIS 1998 | UK | Methods yield different rankings of relative efficiency |
| ASHTON 2000 | UK | Post-privatisation average efficiency is 85% and range is 77–100% |
| SAAL and PARKER 2000 | UK | Tightened price regulation lowered costs but privatisation didn't |
| MENARD and SAUSSIER 2000 | FR | No difference in compliance with water quality regulations |
| SAAL and PARKER 2001 | UK | Privatisation increased profits but not productivity |

*Source: RENZETTI and DUPONT (2003, 13).*

Mixed enterprises do not fit into this dispute and few studies were dedicated to investigate mixed ownership and performance. One of the fundamental studies was carried out by BOARDMAN and VINING (1989): looking at 489 enterprises (409 private, 23 mixed and 57 public), they found that mixed enterprises perform about the

same or slightly better than public enterprises in terms of technical efficiency.

Moreover, the scope for the comparison of firms is extremely tiny and tortuous in natural monopolies and markets for public goods, as water utilities are. Therefore, we decided to look at the relationship between regulation and performance to see whether and to what extent the former affects the latter. VICKERS and YARROW (1988, 44) argued that with no product market competition, the effectiveness of regulatory pricing will play a significant role in determining firms' performance, almost independently of ownership matters (see next section)[20].

However, one way of simulating competitive markets is to initiate some competition for the market. DEMSETZ (1968) proposed that public utilities may be efficiently managed by assuming a franchise to the firm that offered to serve the market at the lowest tariff. As long as sufficient ex-ante competition exists, competing suppliers would lower prices to competitive levels.

This intuition was confirmed by more recent economic theory: for example, RIORDAN and SAPPINGTON (1987), SAPPINGTON and STIGLITZ (1987) and LAFFONT and TIROLE (1993) supported the efficacy of franchise bidding processes. But in practice franchise bidding might fail because of many drawbacks. Notably, to have a successful competition for the market, we need a complete specification of the relevant contracts, a large number of participants for the initial right, the infeasibility of collusive agreements, and the existence of mechanisms to compensate the franchise holder for their sunk investment once they lose the contract (WILLIAMSON, 1976). Furthermore, franchise bidding does not take into account other aspects of the service that arise during the execution of the contract and need to be seriously tackled (see section 2.4).

### 2.3.1. Regulation, information asymmetry and performance

When the public intervenes as regulator, its major goal is still to maximise total economic surplus in the relevant market. This can be attained by stimulating operators to be technically efficient. But to succeed, the regulator should set optimal returns that induce firms (either private or public) to perform as efficiently as possible to raise some profit (that is, the right incentive).

However, to set these optimal returns, regulators need a deep knowledge of the firms' cost structure and their market demand curve. Only such information will allow them, at least in principle, to achieve any feasible regulatory goal by simply instructing regulated firms.

In the real world, these variables are not easily observable from the outside and thus it is difficult to determine the level of effort to be requested of the service provider.

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[20] On this issue, see also BISHOP and KAY (1988, 12).

Sometimes, even the firm itself has only a rough idea of the relationship between output and costs. In any case, regulated firms know more than regulators and have an incentive to strategically misreport information. Therefore, economists have looked for devices that, without relying on detailed knowledge, induce firms to behave in accordance with regulators' aims.

In this section, we provide the reader with a short and incomplete overview of some regulatory mechanisms. Our summary is far from being exhaustive, and aims only at stressing the fact that asymmetric information is the most important limitation on the effectiveness of regulation. Mixed enterprises can be a "structural" remedy to reduce this informational gap. Then, we look at how regulation could affect the performance of mixed enterprises in the Italian water sector.

One form of regulation is the rate of return: it sets a level of earning that just allows the firm to reimburse its costs. This entails high administrative costs, long investigations and, last but not least, significant knowledge of the firm's costs and consumers' demands. For these complexities, regulatory agencies use accounting data rather than economic costs, despite their great differences (see SPULBER, 1989, 102).

To circumvent informational requirement, several schemes have been proposed that provide the firm with sufficient incentives to enhance efficiency. We refer, for instance, to a mechanism proposed by SAPPINGTON and SIBLEY (1988)[21] that allows regulation not to be based on the knowledge of the firm's cost structure (but they need to be for the demand curve). The proposal was finally criticised by VOGELSANG (1988) because it fails to be controllable by third parties. Similarly, a proposal by VOGELSANG and FINSINGER (1979)[22] was subsequently addressed by SAPPINGTON (1980): as the firm is asked to report its costs to the regulator, concerns are raised about the incentive to inflate its account[23].

The price-cap regime seems to start at the same point as the rate of return does. The principle behind the price-cap (or *RPI – X*) regulation is that firms cut costs when they receive appropriate rewards in the form of greater profit (see LITTLECHILD, 1983). But the tariff can be figured out only after an assessment of production costs and demand level has been made (SMALL, 1999, 15). Therefore, it is not difficult to draw the conclusion that implementing a price-cap in the context of informational asymmetries can be far from simple (see CREW and FRIEDMAN, 1991).

Further efforts in this direction gave rise to new regulatory theories, by which in the presence of asymmetric information a regulator should offer incentives schemes, or a "menu of contracts" (from which the firm can choose the one most suitable to its needs)

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[21] Relying on LOEB and MAGAT (1979).

[22] An interesting scheme, developed on RAMSEY (1927), which leads the firm to minimise costs and set Ramsey-optimal prices, even in case the regulator does not know either the demand or the cost function.

[23] Possible devices to solve this problem were proposed, for example, by BARON and BESANKO (1984) with regards to auditing strategies.

to induce the firm to disclose information. This theory developed substantially in the last decades [BARON and MYERSON (1982), and LAFFONT and TIROLE (1986)], but seems to have very little impact on the way regulation is carried out because of the difficulty of setting rules that regulators can apply. CREW and KLEINDORFER (2002) severely criticise this new approach, stressing the fact that it "*is based in one way or another on assumptions like common knowledge that endow the regulator with information that he cannot have without a contested discovery process that always leaves him in a state far short of the level of information assumed in these theories. Common knowledge is the Achilles heel of mechanism design theory*" (CREW and KLEINDORFER, 2002, 11).

As a general conclusion, the less the asymmetric information between regulators and regulated firms, the more effective the price regulation will be, and finally the stronger the resulting efficiency enhancements attained by the operator.

Therefore, we propose a structural solution as a means of allowing regulators to gather more information. Since our governance structure involves a rather heavy regulatory design, we stress its worthiness at least as a "transitory" device, to gradually lead public authorities to be more informed about private firm's costs and efforts, thus accompanying them from in-house management to concession to totally private enterprise[24].

The public authorities might decide to own partially the regulated firm in order to:

1) collect more precise information (on the board of directors) about actual costs and, thus,

2) regulate more effectively, by inducing the private partner (i.e., the technological management) to make greater efforts towards cost reduction.

We present a system by which information could flow upward to more informed and effective regulators. We refer to a complex three-tier regulatory structure[25]. Two tiers are inside the firm:

- the technological management, which knows the technology of the firm;

- the board of directors, which (informed by the technological management) decides on prices, outputs and production inputs.
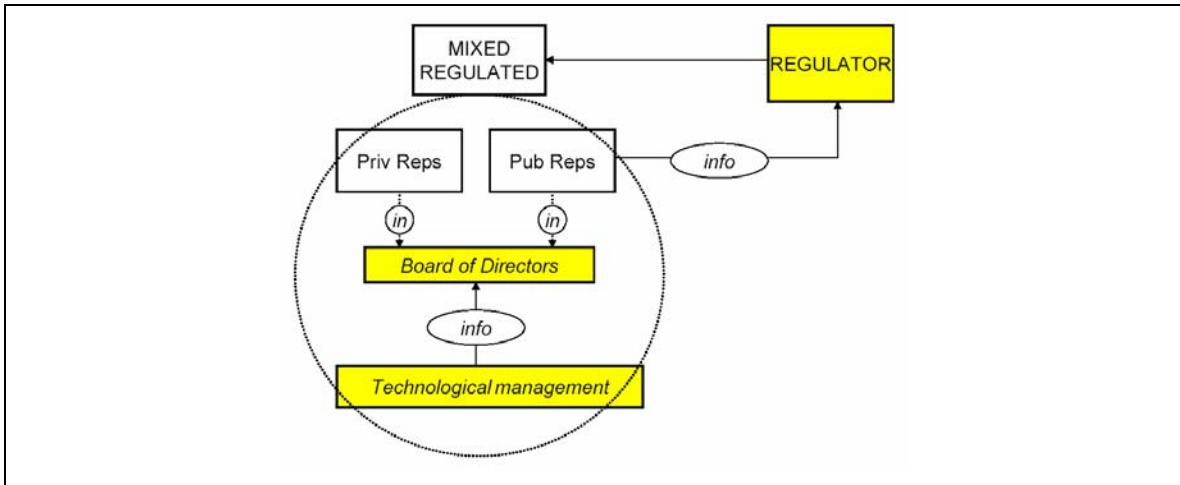
We reasonably assume that the board is imperfectly informed about what is known to the former, but at least private and public representatives on the board have the same information. The third tier, outside the firm, is embodied by:

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[24] However, when certain conditions apply, advantages can be durable, and therefore this scheme can be maintained in the long-run.

[25] Even though related to a different issue, (i.e., the extent to which public firms should be privatised), see BÖS (1991, 139) and BÖS and PETERS (1988, 236).

- the (external) regulator, in which local authorities partake and to which public sector representatives (on the board of the firm) pass all relevant information about actual costs.

*Fig. 3: Information flow in our mixed enterprise model*



We then see how this mechanism can make economic regulation more effective (and thus operators more efficient) in the Italian water sector. Art. 13 of the Galli Law[26] identifies the tariff as the instrument for ensuring the economic viability of water and wastewater management. In 1996, the Supervisory Committee on the Use of Water Resources (COVIRI)[27] proposed a method, well-known as the Standard Method, to set and revise tariffs[28].

The Standard Method establishes a benchmark tariff which serves as basis for setting and adjusting actual tariffs in each basin. The benchmark tariff is a suitable instrument to achieve adequate service levels, finance investment programmes while maintaining sound finance, containing costs, enhancing efficiency and protecting consumers' interests. The formula for the computation of the benchmark tariff for the current year (year n) is the following:

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[26] The Galli Law (Law no. 36 of January 1994) introduced the water sector reform in Italy. It offset the extensive fragmentation of the Italian water system, in order to allow operators to exploit economies of scale and scope, respectively by creating new and larger areas (so-called ATOs, optimal territorial basins) and by vertically integrating the entire water cycle.

[27] COVIRI was set up under the Galli Law and it has the following purpose: to oversee the implementation of the reform and the subsequent management of the service in order to guarantee the observance of the principles of efficiency, efficacy and cost-effectiveness, as well as the regular determination and adjustment of rates and the safeguarding of users' interests.

[28] Metodo Normalizzato (or Standard Method) for defining cost components and determining the reference tariff was approved by Decreto Ministeriale 1/8/1996.

$$T_t = (C + A + R)_{t-1} * (1 + I + K)$$

Where:

- $T_t$ = tariff of current year ($t$);
- $C$ = operating expenditure;
- $A$ = depreciation;
- $R$ = remuneration of invested capital;
- $I$ = projected inflation for current year;
- $K$ = price-cap.

To evaluate the incentives (to productive efficiency) provided by this method, we focus on operating costs ($C$). Following the identification of the governance structure (in-house, cPPP or iPPP), project operating costs ($CP_t$) are to be quantified[29]; afterwards, they have to be compared with "modelled" operating costs ($CM_t$), which represent the point of reference to measure and regulate the water service companies performance.

To determine appropriate incentives, the ATO Authority (regulatory agency at the local level with the task of regulating tariff and service quality) needs to estimate correctly $CM_t$.

Once $CM_t$ are calculated, the factor $K$ (or price-cap) can be derived from. The value of $K_t$ is according to this scale:

- when $CP_t > CM_t (1 + 0.2)$       $\rightarrow$       $K_t \geq 2\%;$

- when $CM_t < CP_t \leq CM_t (1 + 0.2)$       $\rightarrow$       $K_t \geq 1\%;$

- whereas $CP_t \leq CM_t$       $\rightarrow$       $K_t \geq 0.5\%.$

Then, efficiency enhancements have to follow this formula:

$$CP_t = CP_{t-1} (1 - K_t)$$

Where:

- $CP_t$ = project operating costs for the current year;
- $CP_{t-1}$ = project operating costs for the previous year;
- $K_t$ = price cap.

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[29] "*From a methodological point of view, the estimated project operating costs necessitate an analysis being made of the following fundamental elements: the personnel required for the management of the integrated water service; the supply of materials and water purchased by third parties, the predicted cost of electricity; the identification of the vehicles and real estate required to organize the supply activity completely (...) In the majority of the Basin Plans examined, the estimates regarding personnel and other operating costs are carried out on the basis of productivity parameters and unit costs referring to the principal quantities regarding the service in the territory of the basin*" (COVIRI, 2004, 78).

Enterprises are pushed to perform better when the value of $CM_t$ is properly set lower than $CP_t$ [for example, when $CP_t > CM_t (1 + 0.2)$, the price-cap $K$ is at least 2%].
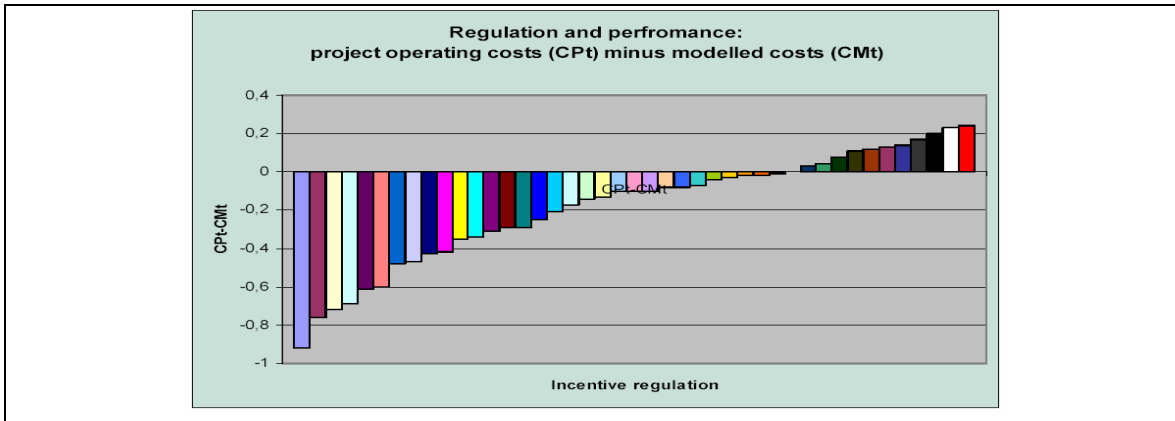
Currently, to obtain the value of $CM_t$, ATO Authorities make use of some econometric models to establish the costs of drinking water distribution, sewage and treatment (COVIRI, 2004, 79). Participation on the board of the firm facilitates the public authorities gathering of more precise information from the technological management about these costs. In particular, the information needed concerns the volumes supplied, the network length, electricity costs, water expenditures, total number of users, the difficulties in water treatment, some plants characteristics and other variables (including pollution extent). This information can be passed by public sector representatives on the board to the (external) regulator and finally used by the latter to set $CM_t$ that induce inefficient operators to outperform.

There are several ways to complete this informational transfer from the board of the firm to the ATO Authority: in the simplest case, public sector representatives in the firm could verify that the board of directors is correctly reporting to the regulator on the basis of the data originating from the management.

Nowadays, in the Italian water sector, we do not observe a significant upward flow of relevant information, neither in mixed nor in totally public enterprises. If one of the regulators' objectives is to induce service providers to increase productive efficiency, we must recognise that they were rather disappointing: in 2004, in 32 basins (out of 43), $CM_t$ were never below $CP_t$ (see fig. 4), which means that $K_t$ was at its lowest value (0.5%). However, this evidence is not telling enough if we consider that such values, taken from the Basin Plans, refer to the first year of concession when learning-by-doing still is absent.

Several reasons are hindering the correct working of the mechanism illustrated above. Some can be summed up as follows: public representatives within the firm do not have the expertise to successfully carry out their monitoring activity or are not yet aware that they represent a crucial source of information; they have been captured by private sector representatives; public sector representatives (in our model assumed to be social welfare maximisers) could pursue profit maximisation as well as the private sector (this phenomenon, can be defined as "public opportunism"); but also other distorting factors could have taken place. In conclusion, the short period of time during which the reform has been implemented still does not provide best practices. Raising consciousness of the public authorities representatives' role within the board of the firm and clearer rules disciplining the overall regulatory design (mainly to prevent regulatory capture) could help in attaining superior results.

*Fig. 4: Regulation and performance in 43 ATOs*



*Own elaboration on data CRS PROAQUA (2005, 60).*

To close, we propose mixed enterprises as a suitable instrument to reduce asymmetric information and, thus, achieve better performance (induced by regulators). Potentially, our model allows exploiting private know-how and capabilities without facing overwhelming information constraints. It is obvious that for the above mechanism to work properly, public representatives must have specific skills (i.e., expertise, high ethical standards) to monitor activities rigorously and independently.

## 2.4. Information costs

As described, the public authorities' participation in the capital of regulated firms can facilitate regulators (in which local authorities are involved) to drastically reduce its burden of asymmetric information. Through it, the public authority is in the position to maintain an insider's view of operations, giving rise to a sort of internal control rather than a mere external regulation[30].

We understand internal control in a very general way. It is not only control over the firm's technological process (as we have seen in the previous section), but also monitoring the proper fulfilment of contractual obligations. In other words, we develop beyond price regulation to stress another advantage of our mixed enterprise model.

In local utilities, tariff regulation is not the only element to be carefully taken into account, as many other aspects deserve at least equal consideration. We share the GOLDBERG (1976) intuition, according to which regulation can be seen as an implicit "administered contract". In this section, we investigate whether and how our mixed enterprise model can decrease costs necessary to make concessions work properly, that is,

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[30] A clarifying interpretation has been offered by BÖS (1991), who considers mixed enterprises as a tool by which public partner representatives and protégés could provide the regulator with inside information, like "spies" in the firm (see BÖS, 1991, 54).

meeting public service obligations, satisfactory quality standards, environmental sustainability, and so on.

In order to cover all these requirements, governments would need to prepare long-term contracts of thousands and thousands of pages to limit unfair conduct (i.e., private firm opportunism). Once signed, the service provider is expected to comply with contractual terms. However, even though precise and comprehensive clauses are set, these long-term contracts remain inevitably incomplete[31].

It has been largely recognised that when we adopt an incomplete contracting perspective, ownership becomes extremely relevant, and mixed enterprises can accomplish it.

"*One of the insights of the recent literature on the firm is that, if the only imperfections are those arising from moral hazard or asymmetric information, organizational form - including ownership and firm boundaries- does not matter: an owner has no special power or rights since everything is specified in an initial contract (at least among the things that can ever be specified). In contrast, ownership does matter when contracts are incomplete: the owner of an asset or firm can then make all decisions concerning the asset or firm that are not included in an initial contract (the owner has residual control rights). Applying this insight to the privatization context yields the conclusion that in a complete contracting world the government does not need to own a firm to control its behaviour: any goals- economic or otherwise- can be achieved via a detailed initial contract. However, if contracts are incomplete, as they are in practice, there is a case for the government to own an electricity company or prison since ownership gives the government special powers in the form of residual control rights*" (HART, 2002, 69).

We go on to discuss a peculiar feature of mixed enterprises: all disputes and controversies arising from incomplete concession contracts can be solved "internally", on the board of directors, with no recourse to third parties, such as courts or arbitrators.

Problems arising in concessions to private enterprises are well summarised by GUASCH, LAFFONT and STRAUB (2005). Looking at a considerable number of public service concessions in Latin America, they conclude that private sector involvement can imply many clashes: among them, conflicts with operators in complying with the contract, abandonment of the concession, claimed bankruptcy, poor attention to users and, above all, contract renegotiations to the detriment of consumers.

In fact, because of their incomplete nature, contracts must constantly be revised and/or renegotiated as time goes on (see GUASH, 2005). When circumstances change, for

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[31] Incomplete contracts theory is more realistic and useful than the agency theory in showing the practical difficulties in regulating local utilities. It starts from the more pragmatic assumption that a "complete" contracting of agents' future actions is impossible when no one can verify ex-post the real value of performances. On the other side, however, such a theory takes for granted agents' rationality and no asymmetric information. Uncertainty arises because each agent has to act in absence of complete information on the outcome of his behaviour since it cannot anticipate with certainty what the other will do (for an overview, see BROUSSEAU and GLACHANT, 2002, 11).

example, the private operator aims at adjusting contractual terms to its own advantage, seeking a better deal than the initial one (i.e., by asking for lower quality requirements and/or fewer universal service obligations at a given tariff level, etc.): as a partial remedy, revisions and/or renegotiations are to be settled in agreement with the regulator. The less the regulator is able to verify how the private sector partner executes the contract, the less it will be a valid counter-party.

Private opportunism is one of the main concerns public authorities need to overcome to gain public confidence. Everywhere, the conventional instrument by which local authorities control service providers is the Service Contract; in the Italian water sector, this is called Management Convention[32]. It is negotiated between the ATO Authority (AATO) and the integrated water service manager. As it was not feasible to make a survey of all management conventions adopted in 91 ATOs, we looked at the Standard Convention, which is drawn up by the Region and represents the starting point to write the Management Convention[33]. The conclusion we draw is that the adopted Standard Conventions are deficient in many respects and do not represent a useful instrument by which AATOs can draft exhaustive Management Conventions. Therefore, alternative tools are needed to cope with incompleteness of contracts.

Mixed enterprises can represent, under certain conditions, a viable solution to reduce uncertainty about private partner's future conduct and address any type of concern, above all renegotiations, internally to the firm[34]. Firstly, the perception of more stringent public monitoring potentially limits the extent to which the private sector could ask for renegotiations. Secondly, during the renegotiation process, the public authority could attenuate exaggerated requests because it has more information and, at best, solve controversies on the board of the firm without recourse to courts or arbitrators.

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[32] Generally, it could be defined as the legal instrument that local authorities use whenever they assign the service management to third parties. According to the guidelines furnished by COVIRI, through the service contract local authorities proceed to set the qualitative and quantitative objectives that they want to achieve and the conditions under which the service must be supplied to the users; lay down the obligations the provider has to fulfil in order to realize, under the agreed economic and financial conditions, such objectives; forecast and guarantee how to verify and control over the functioning of the service activities and the management outcomes;  represent what services are to be guaranteed to the users, also for the purpose of safeguarding the "consumer rights" as acknowledged and guaranteed in the Service Charter (see COVIRI, 2004, 98).

[33] To investigate Standard Convention, we refer to a Report by COVIRI (2002), entitled "The standards convention on the integrated water service in regional legislation and regulations", that is an ad-hoc survey of the Standard Conventions actually adopted as at 2001. In this Report, COVIRI pointed out the major limits found in this important regulatory instrument.

[34] Required conditions concern the level of expertise, ethical standards and independence of public representatives. In the ATO 4 Alto Valdarno experience, these conditions were missing, and in particular public representatives were incapable of protecting the public interest by dismantling the private sector requests. After each claim, the ATO started investigations appointing external experts to identify what costs were due to unforeseen external factors and what costs were due to inefficiencies. The recourse to external accountants in itself was symptomatic of their inability to exploit the participation in the capital of the firm and on the board of directors to gather information and/or to use this information for the public benefit. On the issue, see LOBINA (2005).

The EC (2004a) highlighted the main advantage that mixed enterprises imply as follows:

"*Direct cooperation between the public partner and the private partner in a forum with a legal personality allows the public partner, through its presence in the body of shareholders and in the decision-making bodies of the joint entity, to retain a relatively high degree of control over the development of the projects, which it can adapt over time in the light of circumstances*" (EC, 2004a, § 54).

From this point of view, the board of directors can represent the ideal institution where public and private representatives can settle disputes.

This idea has been developed by BÖS (1991), according to whom the board of directors can be seen as a forum in which public and private representatives advocate their respective interests (social welfare and profit maximisation) and make compromises to fine-tune the firm's objective.

A simple model and one graph (fig. 5) help in understanding how the board can work. BÖS (1991, 136) considers a board that consists of $\Theta$ percent of private shareholders' representatives, while $(1 - \Theta)$ percent of public representatives. Assuming that private shareholders maximise profit while the public authority pursues welfare maximisation, the author deduces that the two groups of representatives arrive at a compromise, which is a mixed objective function where profit and social welfare carry the percentage weight of their respective supporters on the board.

Considering a one-product monopoly which sells its output z at price p, the objective of the mixed enterprise ($\Phi$) is:

$$\Phi = \Theta * \Pi + (1 - \Theta) * [S(p) + \Pi]$$

Where welfare is measured by the sum of consumer surplus [$S(p)$] and the profit of the firm ($\Pi$).

In fig. 5, the straight line (curve *a*) represents the ultimate objective function which depends only and simply on the public-private capital shares; it assumes a linear continuous move from welfare to profit maximisation as the degree of privatisation moves from 0% to 100%. However, this function is altered by the rules and mechanisms which apply on the board, principally, the majority rule by which the group that owns the majority can dictate everything (curve *c*). More realistically, BÖS proposes to consider the mixed enterprise's objective function as a logistic form of an increase in the bargaining power (curve *b*).

Curve *b* seems to be more suitable for our purpose, as we want to highlight that our mixed enterprise and its board can represent a more "relational" institution to handle all those concerns arising from incompleteness of contracts. In our view, a continuous and smoothly interaction on the board of directors denotes a valid adaptive mechanism to cope with uncertainty and complexity.

In the next section, we suggest some corporate governance rules to guarantee a fruitful interaction on the board and prevent deadlocks; these rules should define clearly the public partner objective and limit its task to carry out control activities over the service management run by the private sector.


## 3. Policy implications

Corporate governance represents the key issue in letting the board work properly. Such rules should allow the public authority to exert some effective control over the private sector, while limiting disproportionate public interference into the private administration of the mixed enterprise.

As explained recently by the Italian Supervisory Committee:

"*A new governance of mixed companies in such a context could facilitate the task of the municipalities in performing this dual role* [in the regulated companies and in the agency with the task of regulating tariffs and service quality] *by limiting the action of the public partner of the mixed company to a role more closely linked to control over the contractual obligations rather than management tasks. At the same time, a clear definition of governance could avoid the potential conflict arising between the interests of the private partners and those of the public partners, giving rise to distorted and contradictory signals being sent to the company management, thus nullifying the objectives of the privatisation*" (COVIRI, 2004, 97).

Well aware that the study of this field asks for further theoretical streams of research and analytical tools, we set out a few guidelines to facilitate a balanced public involvement in the firm.

In the first place, public representatives on the board of the firm should be as well informed as the private ones about what is known to the technological management. This is an essential starting point. Otherwise, regulatory capture might easily occur: the regulator is captured by the regulated not only in the case of corruption, but also in case the latter has greater technical know-how (or easier access to information) than the former. Consequences can be no less serious (see MURARO, 2004, 7).

In the second place, public representatives should transfer information to the (external) regulator to reduce its intrinsic asymmetry. If information does not flow upward, private operators will end up using this gap to their exclusive advantage. As seen above, the correct upward flow of information requires expertise on the part of the representatives of the public authorities, but also independence. The risk of corruption could be even more tangible in mixed enterprises as public authorities and the private sector work side by side on the board; therefore, the necessary autonomy of the public authority must be ensured.

Then, to protect the general interest, we can rely on two complementary institutions: the
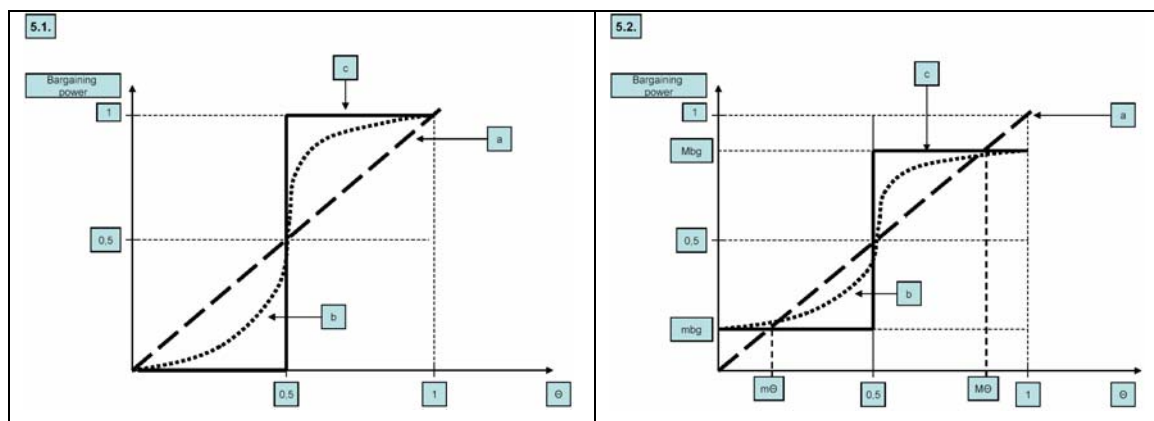
external regulator and the board of directors.

Concerning the latter, we need to enable representatives of the public authorities to fulfil their task even in case of minority participation. Whereas the private partner has a significant proportion of shares ($\Theta$), corporate rules must guarantee a minimum bargaining power (*mbg*) to the public partner. This can be done by limiting privatisation to maximum share thresholds (*M$\Theta$*) or by means of special mechanisms which limit the private partner's bargaining power to *Mbg* (see fig. 5.2).

Concerning capital shares, the private $\Theta$ can be higher than 50% but lower than *M$\Theta$* to let the public authorities have some say on the board. In case privatisation is higher than *M$\Theta$*, rules of corporate governance should ensure that private bargaining power is limited to a maximum (*Mbg*) to allow public representatives to sustain the general interest when seriously under threat.

On the other hand, a disproportionate public interference into the private management might undermine an economically viable administration of the firm[35]. Therefore, in case of public majority, privatisation should never be below *m$\Theta$* or the private sector should at least, through ad hoc corporate governance rules, have some minimum bargaining power (*mbg*) to defend its prerogative to cost-effectiveness.

*Fig. 5: Capital sharing and bargaining power in absence and presence of corporate governance*



*Source: BÖS (1991) and own elaboration.*

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[35] Public representatives, for example, could lean toward social welfare maximisation by hiring more employees than necessary.

## Conclusions

The purpose of this paper was to present an economic analysis of the specific configuration of mixed enterprise in which the public partner acts as controller, while the private one (or "industrial" partner) as service provider. We suggested that this scheme could embody, under certain conditions, a valuable alternative to traditional public provision and concession to totally private enterprises as it can push regulated operators to outperform and limit the risk of private opportunistic conducts. Missing best practices cannot restrain us from adopting a constructive approach.

To develop our analysis, we adopted the insights offered by property rights theory. In particular, we widely relied on the assumption that ownership allows the (public) owner to gather more information about the actual management of the firm.

Following such a stream of research, we concluded that mixed enterprises could significantly reduce the asymmetric information between regulators and regulated firms by implementing a sort of internal regulation. With more information, the public authority (as owner/controller of the regulated firm, but also as member of the regulatory agency) can stimulate the service provider to cut operating costs and can monitor it more effectively with respect to the fulfilment of contractual obligations (public services obligations, quality standards, etc.).

To work properly, information needs to flow upward from the technological management, through the board of directors, to the (external) regulator. This transfer can be realised only if public representatives on the board hold high expertise and ethical standards, and act in complete independence.

Moreover, concerning these contractual requirements, the mixed enterprise board of directors can represent the suitable place where public and private representatives (respectively, social welfare and profit maximisers) can meet to solve all disputes usually arising from incomplete contracts.

Data are taken from the Italian water sector. As soon as the reform implementation will provide more comprehensive evidence, we will use the analytical support presented in this paper to test our propositions more precisely.

We addressed three specific issues: 1) how is the performance of regulated firms affected by regulation rather than by other factors, such as ownership; 2) whether our mixed enterprise model can represent an effective governance structure, by means of which the public authority (as owner/controller of the firm, but also as member of the regulatory body) is able to reduce the burden of asymmetric information to regulate; 3) whether our model allows cutting transaction costs by solving on the board of directors all disputes between the public and the private, with no recourse to courts or arbitrators.

We concluded that in iPPPs production costs and information costs can be lower than in the case of in-house provision or concession to totally private enterprise.

Finally, taking into account that a disproportionate public intervention into the "private" administration of the firm (or an ineffective protection of the general interest) could imply too many drawbacks, we suggest setting corporate governance rules to make feasible an equitable debate on the board.

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