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THE PUBLIC-PRIVATE PARTNERSHIPS: A THEORETICAL APPROACH AND THE CASE OF THE WATER SECTOR

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1. INTRODUCTION

In the last years, Governments have developed new forms of organization, different from the traditional procurement, for the provision of public services: the Public-Private Partnerships (henceforth PPPs). They have been used to finance the building of tool-roads, airports, sportive infrastructures, to provide sanitation services and to supply drinking water, and there is an increasing interest around the world in this new type of coordination between public and private sector.

This work analyses the phenomenon of the PPPs from a theoretical point of view, adopting the perspective of the contract theory. Then, the evolution of the PPPs in the water sector is analysed, in order to understand the role of these new type of organizational forms for the developing of water services.

The charter 2 clarifies definitions and key features of all forms of PPPs. This is necessary because of the lack of an unambiguous definition of the term Public-Private Partnership. Moreover, the PPPs may be arranged in a number of different ways. Nevertheless, all types of PPPs are characterized in involving public and private parties in a long-term relationship, in order to realize a project with a general degree of complexity, with respect both to the technical aspects and to the provision of financial resources. While the public party is involved in defining general objectives in terms of public interest, the private party concentrates on the operative aspects in order to realize the project. Moreover, both public and private parties bore part of the risk, considering the ability of each party to bear it.

Though every form of PPP is characterized by the previous common features, some deep differences arise with respect to the traditional form of procurement. With a PPP, the different stages of design, building and operation are generally bundled to one only operator, while they are separately contracted out in the case of procurement. Moreover, in a PPP the public party specify only the general aims he desire to achieve, delegating

the organizational stage to the PPP, while in the traditional procurement the public party describes precisely the design, the project and the input to be provided by the private party. Finally, a PPP necessary involves a long-term risk sharing between public and private parties. The consequence is that, if only one part bears the entire risk of the project, this is not a case of PPP.

The PPPs may be arranged in many different ways, so they may be classified in two broad classes. The contractual PPPs, which are regulated exclusively through contractual arrangements, and the institutional PPPs, where a third distinct entity, created and owned by both public and private parties, is the tool used to manage the long term relationship.

Finally, the chapter provides the European legislative framework that regulates the PPPs. It is worth notice that these new organizational forms are in some cases not regulated by the community law. So, the PPPs were initially seen with a certain suspicion by the European institutions, because in some cases they were used to bypass the Community law on procurement and public contracts. In some cases, the PPPs were also used to bypass the budget constraints imposed by the Stability and Growth Pact. In fact, it may be possible that costs and investment are recorded off balance in the national and local governmental accountancy, so they do not influence deficit and debt. Nevertheless, European Commission is oriented to better regulating the phenomenon of PPPs, in order to stimulate the involvement of private parties especially through the form of the institutional PPP.

The chapter three provides a survey of the economic literature on the phenomenon of the PPPs. Because PPPs are long-term contracts, which regulate the relationship between public and private parties, it is a natural consequence that they are analysed within the microeconomic branch of the contract theory. The contract theory studies the incentives of parties in investing in a contractual relationship or in deviating towards opportunistic behaviours. The understanding of such incentives is determinant in the

assessment of the endogenous risk, which affects the performance in terms of efficiency of every organizational form.

A recent literature is developed in the last years about the PPPs, in the framework of two strands of the economic contract theory, well known as *New Economics of Regulation* and *Incomplete Contracting Theory*.

The New Economics of Regulation refers to the Principal-Agent Theory, and through the introduction of participation and incentive constraints is able to reduce inefficiencies deriving from imperfect information. The strand of the Incomplete Contracting Theory deals with the problems deriving from the impossibility of describing all future contingencies of a contractual relationship, which make impossible to write a complete contract. The consequence is that the initial contract will be revised and renegotiate every time. In this case, inefficiencies are reduced through the correct allocation of residual control rights, which attribute contractual power in the stage of renegotiation and reduce the case of hold-up.

In the chapter, we analyse the consequence of asymmetric information and of contractual incompleteness.

With respect to the asymmetric information, an interesting case is the "inverted" asymmetric information. In fact, in a principal-agent context, in general the agent owns private information, used to extract an informative rent to the principal. Nevertheless, it may be that a local government (principal) is privately informed about the quality of the infrastructure that a potential service provider (agent) will use. In this case, a local government with a low quality infrastructure is most probable to involve private partners in the provision of the public service. On the other hand, a local government with a high quality infrastructure more likely chooses to keep ownership of the productive assets and manage them directly.

The presence of contractual incompleteness implies many consequences. First, if there is a positive externality between the building stage of a facility and the following managing stage, it is preferable to bundle these activities under only one party. In this case, a role for a PPP arises. In the case of

bundling, the party is able to internalize the positive effects of the building stage on the managing stage, while in case of separated agents no investment in the building stage would have been made. Second, in presence of contractual incompleteness a lack of commitment of public parties arises. In this case, a public party in the ex post stage always extracts all surplus deriving from investment of public managers. The consequence is that public managers have no incentives to invest, and this is a source of inefficiency of the public sector. Finally, the presence of contractual incompleteness makes important the ex post parties' contractual power, because it determines the division of the ex post surplus deriving from the renegotiation stages.

Due to the particular feature of the PPPs, where a public party is not able to describe, at the date the contract is signed, the exact way to provide what he wants, we argue that the economic nature of a PPP is that of an incomplete contract. It is a general claim that, in a PPP, the public party specifies the output, and not the input, the final result, and not the means necessary to realize it. Nevertheless, this is the same feature of an incomplete contract, characterized by the fact that it's impossible to describe all future contingencies, so the contract is revised every time during the relationship. The economic nature of a PPP is that of an incomplete contract, where the public party is not able to describe ex ante the input and the means necessary to realize his aims.

The chapter 4 provides the analyses of the PPPs in the water sector. The water sector exhibits a number of industrial characteristics that create the need for the public intervention in the sector in order to achieve allocative and productive efficiency aims. In the first part of the chapter we analyses the special features of this sector, beginning from the infrastructure, which are very specific and capital intensive, and from the condition of natural monopoly. Then, the informational constraints are analysed, which a public authority has to face in choosing its policy. In particular, the quality of the

existing water assets may generate an informational constraint. In fact, these assets may have been built and operated in the past by the municipalities. In this case, municipalities have acquired private knowledge about the quality of water infrastructure. For example, a municipality may know which of the existing assets should be renewed and when. The consequence is that, in the water sector, the public party (principal) benefits of an informational advantage on the service provider (agent). Then, a survey of the various regulation frameworks is provided, in particular of the tariff regulation. Finally, the features of the demand and the issue of affordability are analysed.

After a survey of the empirical literature on the water sector, that does not provide any result that is able to suggests the most efficient organizational form for the provision of water services, the chapter provides an analyses of the water systems of the four largest European countries: England and Wales, France, Germany and Italy. Moreover, the analyses of the private multinational present in the sector is provided, of their contractual power, and a research, especially for the Italian case, of the more or less hidden links and agreements between various private operators.

The national water systems are then compared, in order to understand the peculiarity of each organizational model with respect to the regulation framework, the ownership structure, the government levels involved and their contractual power, the tariff setting and the way investment are financed.

Two opposite models arise. The English model of *regulation by independent authority* is based on a unique national authority, independent from national and local governments, which promotes a homogeneous regulation of the national water sector, where entirely private companies owns the water infrastructure. The French model of *regulation by contract* does not include any national regulator, because every duty and obligation is regulated by the contract signed between municipalities and water providers. A local dimension of regulation characterizes this model, where

private sector serve more than 80% of population. Germany and Italy adopt hybrid models. The German model is similar to the French one in the strong decentralization towards municipalities; on the other hand, the public party is the prevalent operator of the sector, leaving little room to the private sector. A hybrid form is present also in Italy. In this case, more room is left to the public-private partnership in the form of mixed capital firms.

In the last part of the chapter, an incomplete contracting approach is used in analysing the role of the PPP in the development of the water sector. The basic assumption is that the sector is characterized by the presence of contractual in completeness, especially in failing a comprehensive description of the long-term investment plans. The problems deriving form the contractual incompleteness are worsened by the presence of asymmetric information about the quality of water infrastructure. Under this conditions, an comparison between the traditional fully public firms, the private regulated firm and the PPP in the form of the mixed capital firm is provided.

In each case, the firm is conducted by a manager, which may exert two types of efforts. The first type is an effort in *cost reducing activity*, which we assume that leads to a reduction in operative costs but is accompanied by a reduction in the quality of the service provided. A second effort is directed towards a *quality enhancing activity*, which increases the quality of the water assets in the building stage of planned investment. The important assumption is that manager's efforts are non-contractible, because they are not verifiable by a third party.

We argue that the institutional PPPs, in the form of a mixed capital firm, may be able to achieve more satisfactory results than a fully public firm and a fully private regulated firm. In fact, a mixed capital firm devotes more effort than a fully public firm in the *quality enhancing activity*. This is because the presence of the private party is able to reduce or to eliminate the problem of expropriation of managerial effort made by the public party. On the other hand, in order to achieve productive efficiency, an effort in the *cost reducing activity* is made higher than a fully public firm. Nevertheless,

differing form a fully private firms, this activity of cost reduction is not exacerbated, so the activity of maintenance of assets is not cut, and the value of water infrastructure is not depreciated.

2. WHAT IS A PUBLIC-PRIVATE PARTNERSHIP?

Despite its large diffusion, there is not an unambiguous definition of the term Public-Private Partnership. According to the European Parliament, a PPP can be described as a "long-term, contractually regulated cooperation between public authorities and the private sector to carry out public assignments, in which the requisite resources are placed under joint management and project risks are apportioned appropriately on the basis of the risk management skills of the project partners".[1]

In the economic literature, Maskin and Tirole (2006) argue that, "[a]lthough the variety of risk-sharing arrangements and governance structures makes a precise characterization difficult, a PPP is usually defined as a *long-term development and service contract* between government and a private partner. The government engages its partner both to develop the project and to operate and service it. The partner may bear substantial risk and even raise private finance. Its revenue derives from some combination of government payments and user fees".

We argue that, despite the various forms that can assume, the following features characterise all types of PPPs and differ them with respect to the traditional procurement:

1. the relatively long duration of the relationship, involving cooperation between public and private partners on different aspects of a planned project;

2. a general complexity in funding the project, involving one ore more private players and in some cases public funds too;

3. the important role of the private party, who can participate at different stages of the project, while the public partner concentrates primarily on defining the objectives to be attained in terms of public interest, quality of services provided and pricing policy;

[1] European Parliament, Resolution n. 2006/2043.

4. the distribution of risks between the public and the private player, that is determined case by case, according to the respective ability of the parties concerned to assess, control and bear this risk.

In this framework, the cooperation between public and private parties may be realised through a continuum of organizational forms, with a more or less involvement of the private sector, and depending on the different allocation of contractual risk, as we will see in the following paragraph.

2.1 PPPS, PROCUREMENT AND REGULATION

Traditionally, the Government operates through the tools of the procurement and of the regulation in order to achieve its aims. Taking the definitions of Laffont-Tirole (1993), we refer to procurement when a private firm supplies a good or a service to the Government, while we refer to regulation when a firm supplies goods or services to consumers on behalf of the Government. In the terminology of contractual theory, in the case of procurement principal and consumer coincide, while, in the case of regulation, principal (Government) and consumers (buyers) do not coincide.[2]

More precisely, with *procurement* the Government decides to build infrastructure or to buy goods and services through the purchasing by private firms. Different is the case of regulation. In many important industries, direct competition among firms is unfitted, often because of technological considerations.[3] This is the case, for example, of public utilities, such as gas, electricity, sanitation, telecommunication, transport

[2] During the last decades, the economic theory of procurement and regulation has been heavily based on the theoretical framework or the principal-agent theory and on the mechanism design techniques. As we will see in the next chapter, this led to the emergence of a New Economics of Regulation, that criticizes the traditional paradigm of regulation in not considering the questions arising from imperfect information between public regulator and private regulated firms. The best review of these earlier contributions to the procurement and regulation theory is Laffont-Tirole (1993) and Armstrong-Sappington (2007).

[3] According to the economic theory, in presence of natural monopolies, public goods, externalities or imperfect information a market failure arises. In all these cases there is some room for public intervention in order to overcome market inefficiencies.

and water industries. In these cases, the Government may decide to directly produce these public services throughout an own public firm. Alternatively, with *regulation*, he may introduce specific rules in order to retain an external control over private firms operating in such industries. In these case, we call of "private regulated firms", in accordance to Laffont-Tirole (1993).

The authors distinguish between external and internal control of a firm. External control is the control of all variables that link the firm with external parties, such as consumers (control of prices, of quality …), competitors (regulation of entry, access pricing) and taxpayers (cost auditing). Internal control is the control of the firm's inputs, of the productive process, of the managerial incentive schemes, of decisions concerning employment, level, location and type of investment and borrowing.

	Internal Control	**External Control**
Public firm	Pubblic	Pubblic
Private regulated firm	Private	Pubblic
Private unregulated firm	Private	Private

In this way, a *public firm* is a firm whose capital is owned by the Government, who retains both internal and external control. A *private regulated firm* private sector owns the capital, and retains internal control, while external control is in the hand of the Government. A *private unregulated firm* is subject no neither external nor internal control by the government.[4]

In this framework, the PPPs arise as new organizational forms, which are often used to replace the traditional procurement in order to build infrastructure or to purchase goods and services. The PPPs are also used to replace the usual policies of intervention in the sector of public utilities,

[4] One can argue that a private unregulated firm does not exist. In fact, all private firms are subject to antitrust law, to sector rules and other government decisions. Nevertheless, a *private unregulated firm* may be seen as a firm that is not subject to a personalized regulation, but it is subject only to the general law.

traditionally based on the creation of public firms or in the introduction of regulation of private firms.

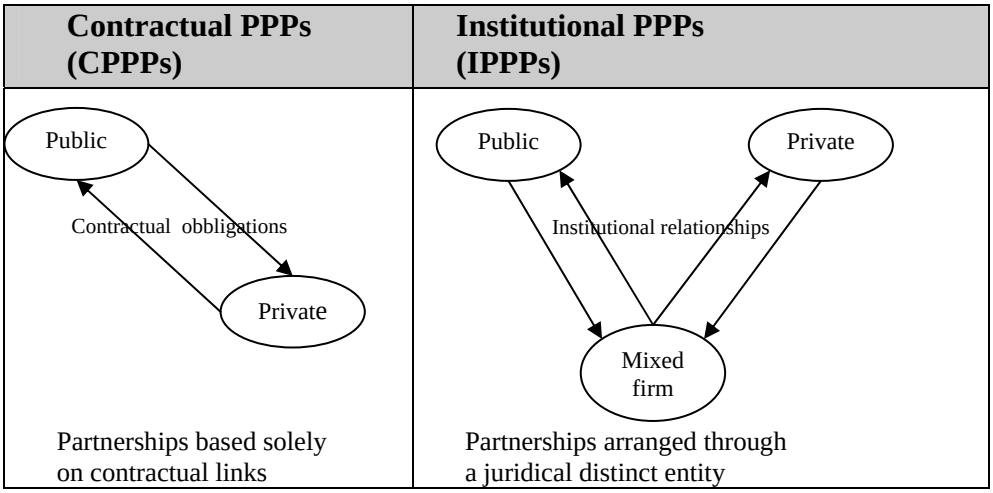
The PPPs may be arranged in many different ways, and they may be classified in two broad classes.

2.2 CONTRACTUAL AND INSTITUTIONAL PPPS

The various forms of PPPs may be classified into two broad classes, corresponding to two distinct juridical forms, which regulate the relationship between public and private parties.

The first class includes the partnerships between the public and the private sector based solely on contractual links, which are therefore characterised by a purely contractual nature: the Contractual Public-Private Partnerships (henceforth CPPPs).

The second class includes the partnerships involving cooperation between the public and the private sector arranged through a juridical distinct entity, which are therefore characterised by an institutional nature: the Institutional Public-Private Partnerships (henceforth IPPPs). The following figure depicts the different kind of links between public and private parties in the two cases.



Different types of PPPs

In the CPPPs, the links between private and public sector are of contractual nature only, the parties remaining distinct entities. In the traditional procurement, public goods or services are provided with the public sector financing and designing the project itself, contracting with a private firm to build the facility, and then either operating the facility in-house or contracting out the operation to another firm. The CPPPs are different in that the private party may be more involved it the design, funding and execution, of a good or service. The CPPPs cover a variety of forms, the most important of which are the service contracts, the concession contracts and the PFI, as we will see in the next section.

The IPPPs involve the creation of a new entity, generally in the form of a mixed capital firm, whose capital is held jointly by the public and the private partner, which is delegated for the provision of a public service or for the building of a facility. An IPPP can start either by creating a new entity held jointly by the public sector and the private sector, or by the private sector taking control of an existing public firm. In the European Union, public authorities often recur to IPPP, in particular for the provision of public services at local level (for example, for water supply services or waste collection services). The public party exercises the external control of the firm. Moreover, the public party retains the internal control of the firm together to the private partner, through the presence in the body of shareholders and in the decision-making bodies of the company, in order to monitoring the development of the project over time. In this case, we can define a *mixed regulated firm*, which we can adds to the cases identified by Laffont-Tirole. The following is the new table updated with this new case.

	Internal Control	**External Control**
Public firm	Pubblic	Pubblic
Mixed regulated firm	Public/Private	Pubblic
Private regulated firm	Private	Pubblic
Private unregulated firm	Private	Private

2.3 THE DIFFERENT FORMS OF PPPS

The PPPs may be arranged in many different ways, which give rise to a continuum of organizational forms. All these forms differ in the way they involve private sector in ownership, finance, operation and accountability, as we can see in the following table.[5]

	Setting Performance Standards	Asset Ownership	Capital Investment	Design & Build	Operation	User fee Collection	Oversight of Performance and Fees
Fully Public Provision	Public	Public	Public	Public	Public	Public	Public
Design and Construct Contracts	Public	Public	Public	Private	Public	Public	Public
Service Contract	Public	Public	Public	Public	Private	Public	Public
Build, Operate, Transfer	Public	Public	Private	Private	Private	Public	Public
Concession Contracts	Public	Public	Private	Private	Private	Private	Public
Private Finance Initiative	Public	Private	Private	Private	Private	Private	Public
Mixed capital Firms	Public	Public/ Private	Public/ Private	Public/ Private	Public/ Private	Public/ Private	Public

Allocation of public/private responsibilities across different forms of organization.
Source: OECD, 2000, modified by our elaboration.

At the first level of the fully public provision, the public party manages all aspects of the provision, being the owner of the assets, providing funding, choosing design, building and operating the facility, and setting performance standards and prices.

[5] A particular form of PPP not reported in the table is the he competitive dialogue. It may be useful for particularly complex contracts, when it is difficult to define the technical means and objectives able to supply a public service or in cases where public authority is objectively unable to define the legal and/or financial form of a project. In this case public authority may open a dialogue with the candidates in order to identify solutions able to meet its needs. At the end of this dialogue, the candidates submit their final tender based on the solutions identified in the course of the dialogue. The contracting authorities assess the tenders on the basis of the pre-stated award criteria. The tender who has submitted the most economically advantageous tender may be asked to clarify aspects of it or confirm commitments featuring therein, provided this will not have the effect of altering fundamental elements in the tender or invitation to tender, of falsifying competition or of leading to discrimination.

In the lower levels, public party reduces its involvement in favour of the private sector, as we can see with the white area in the table. Nevertheless, the public party always in each case retains the activities of setting and controlling performance standard and pricing policies, while private parties may be more or less involved in the other stages of the provision.

In a Design and Construct Contract, private party is delegated to design and to build a facility. The difference with a procurement contract is that public authority specifies its needs and aims, but design and construction are left to the private firm.

With a Service Contract, a public authority delegates operations and maintenance of a facility for a certain period. The public authority pays a predetermined fee for the service and set a performance standard to be met. There is no implied financial risk for the private party, which is only responsible for the activities of maintenance of the facility.

In the Build/Operate/Transfer form (B.O.T.), the private partner builds a facility on the base of the specifications provided to by the public authority, operates the facility for a specified period, and then transfers the facility to the authority at the end of the contract. In most cases, the private party also provides some, or all, of the financing for the facility, so the length of the contract or franchise must be sufficient to enable the private partner to realize a reasonable return on its investment.

In a concession contract, which usually has a long duration, the private party provides a service to the public, “in place of”, though under the control of, the public party. The private party has full responsibility for all capital and operational costs. In return, he receives all revenues, in so being residual claimant. Prices are generally set in the signed concession contract, together with all performance targets. Initial assets are public owned, and returned to the public party at the end of the contract, while the private party is compensated for its investment whose monetary costs have not been fully amortized. Nevertheless, it may be the case that contract specifies

supplemented subsides from the public party to the private one in addition the revenues deriving from the consumers.

Under natural monopoly conditions, a concession contract of a offers several advantages. If allows private participation in a sector generally managed by public parties. A concession contract may be able to create a competition for the market, ensuring the most efficient operator and, in principle, facilitating regulatory oversights. Moreover, a concession contract may encourage cost efficiency, in particular when it is jointed to a price cup regulation or to a rate of return regulation. On the other hand, a concession contract includes the following disadvantages. It needs a complex contact design, and an adequate monitoring system, whose cost may offset the benefits of this organizational form. Moreover, it may be difficult that contract cover every future contingency, or it may be difficult to enforce the contract in case of contingencies unverifiable by third parties. In these cases, a phase of renegotiation is possible to occur during the relationship, with the ex post surplus shared by the parties according to their contractual power. Moreover, a concession contract faces the lack of incentives to invest toward the end of the concession period, because of the fixed term nature of the contracts. Finally, Government's ability to be credible in its commitment to not renegotiating creates opportunities to use and abuse of renegotiation, raising doubts about the initial prices on which a concession is awarded.

One of the most used forms of PPP is the Private Finance Initiative[6] (P.F.I.). It typically involves the bundling of design, building, finance and operation of the facility with a long period contract. The difference with a concession contract is that the private contractor is the owner of the facility, and, generally, there is a specific clause of what happens to the facility at the end of the contract.

[6] The term Private Finance Initiative has been introduced by a programme of the British Government permitting the modernisation of the public infrastructure through recourse to private funding.

Last, but not least, a particular form of PPP arises when public and private parties agree in order to create a new entity, in the form of a corporation, owned by the two parties. This form of mixed capital firms permits to delegate to this third vehicle the provision of a public service, as we will see in the next paragraph.

It is worth noting that in all cases, the public sector remains responsible for regulation and monitoring the PPP.

Given the features characterizing the PPPs, they differ from the traditional procurement in that, for an infrastructure project, the different stages of design, building and operation are contracted out separately in the case of procurement, while they are generally all contracted out to the same entity in the case of PPPs.

Moreover, differing from the traditional procurement, the role of the public party in a PPP is to specify the output, not the input, delegating to the private party the organisation of the provision. In other words, in a PPP the public party specify only the general aims he desire to achieve, delegating the organizational stage to the PPP, while in the traditional procurement the public party describes precisely the design, the project and the input to be provided by the private firm.

With respect to the risk, it is worth notice that a PPP necessary involves a long-term risk sharing between public and private parties. In particular, the long-term risk sharing has to regard the service provision. When either the public or the private partner carries all of the risks related to the service provision, there would be no partnership in the current sense of the word. For example, contracting out the construction of an infrastructure asset to the private partner would not qualify as a PPP as long as the public sector owns the assets and carries the risks of providing the public service in question. Similarly, a concession agreement where the private partner owns and runs a facility and where the public sector carries no risk at all would also not be a PPP. Finally, even when all the previous criteria seem to be fulfilled, a long-term risk sharing may occurs if a government guarantee on

the private borrowing to finance the construction the infrastructure for the provision of the public service; after all, a guarantee implies that the public sector is the ultimate risk-carrier in the project.

2.4 CONVENTIONAL REASONS OF PPPS

Many factors explain the development of the PPPs in the last years. In general, this is a consequence of the changed role of the State in the economy, which moves from the role of a direct operator to the role of regulator and controller.[7]

The main conventional arguments of the Governments in favour of PPPs are the following:

1) the involvement of the private sector assures efficiency savings and improvements in quality standards;

2) private partners bring expertise and professional management skills;

3) PPPs allow the transfer of some risk from the public to the private sector;

4) PPPs allow raising private finance in order to invest in infrastructure.

However, an important factor of development of PPPs in the European Union is linked to the fact that the Member States face with European budget constraints. In particular, European Union imposes to the Member States the maintaining of financial requirements referred to the annual balance deficit and to the amount of public debt reported to the GDP, in respect of the Stability and Growth Pact.[8] These requirements represent a balance constraint for the Governments in application of their economic

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[7] Economic literature increasingly makes reference to a policy which moves from *government* to *governance*.

[8] According to the Maastricht Treaty, the stability of the public finance of the Member States is considered in particular with reference to the risk of an excessive deficit. Every country must respect in particular two financial conditions: the ratio between budget deficit and gross domestic product may not exceed 3%, and the ratio between public debt and gross domestic product may not exceed 60%. This is in application of the "golden rule" that current expenses have to be financed by current revenues and debt may finance only investment expenses.

policies of public spending. It is worth notice that, in order to complain with the E.U. financial requirements, every Member State imposes an Internal Stability Pact to its local authorities, such as municipalities and other territorial institutions.[9]

In this framework, private funding may be a means to overcome these budget constraints both for the central Government and for the local authorities. In fact, costs and investments of PPPs are often recorded off balance in the governmental accountancy, and do not impact on the government deficit and debt. In particular, the organizational forms of PFI and of IPPP permit to shift costs and investment from the public bookkeeping to a third entity, which may be not consolidated in the balance of the State.

On this point, in order to avoid the recourse of the Member States to PPPs only to take advantage of the benefits of the off balance accountancy, Eurostat, the Statistical Office of the European Communities, has taken the decision STAT/04/18 on the 11th of February 2004. According to Eurostat, the assets involved in a PPP should be classified as non-government assets, and therefore recorded off balance, only if both of the following conditions are met: 1) the private partner bears the construction risk, and 2) the private partner bears at least one of either availability or demand risk.

In this framework, one could observe that the various forms of PPPs may represent a way to provide infrastructure without weighting on the public balance.

Nevertheless, this is a wrong way to see the phenomenon. The recourse to PPPs cannot be presented as a simple solution to provide private funding for a public sector facing budget constraints. For each project, it is necessary

[9] In Italy, since its introduction in 1998, the Internal Stability Pact has been subject to substantial changes almost annually. However, the principles of the Internal Stability Pact are significantly different from the rules of the E.U. Stability Pact. In fact, the main obligation of local authorities is not based on an expense/GDP ratio but on a simple limitation of public expenditure. It is essentially a prohibition of expenditure exceeding certain thresholds.

to assess whether the partnership option offers real value added compared with other options, such as the conclusion of a more traditional contract. A PPP may deliver efficiency gains and service improvement, but these benefits may also involve substantial hidden costs. Moreover, PPPs involve long term relationships, and it is possible that short term benefits may be outweighed by a number of long term problems. According to Flinders (2004), due to the long term duration of a PPP, the risk is the possibility of a "Faustian bargain", referring to a deal made for a short term gain with great costs in the long terms.

In conclusion, the presence of a particular budget constraint on public spending may be a strong incentive in the creation of PPPs even when they do not yield any microeconomic efficiency gain.

2.5 THE EUROPEAN LEGISLATIVE FRAMEWORK

The large diffusion of the PPPs over the past decade in many Member States of the European Union, the lack of a juridical definition applicable throughout the Union and the lack of specific provisions in current Community law able to cover all the different forms of PPP induced the Commission of the European Communities to present the "Green Paper on Public-Private Partnerships and Community Law on Public Contracts and Concessions" (Brussels, 30.4.2004, COM 2004-327). The aim of the Green Paper was to analyze the phenomenon of PPPs with regard to Community law on public procurement and concessions.

The Green Paper does not enter in a value judgement regarding the decision to externalise public services or not, which remains a competence of national and local public authorities. The aim of the Green Paper is to analyse the extent to which Community rules apply to the phase of selection of the private partner in the different forms of PPPs. In this framework, the Green Paper offers a contribution in clarifying definitions and terms.

The European legislative framework governing the choice of private partner for any project involving the award of tasks to a third party is governed by a minimum base of principles deriving from Articles 43 to 49 of the EC Treaty, which are the principles of transparency, equality of treatment, proportionality and mutual recognition.

More detailed rules cover some forms of CPPPs in order to protect the interests of traders established in a Member State who wish to offer goods or services to contracting authorities established in another Member State. The aim is to avoid both the risk of preference towards national tenders and the possibility that public choices may be guided by considerations other than economic ones.

In the case of the concession contracts, the "Interpretative Communication on concessions under Community law" (Official Journal of the European Union, n. C121, 29 April 2000) defines the outlines of the concept of concession and the obligations incumbent on the public authorities when selecting the economic operators to whom the concessions are granted, in order to facilitate conditions of effective competition between private parties and legal clarity.

Moreover, the new Directives 2004/17/EC and 2004/18/EC introduce new rules in order to coordinate the procedures for the award of public contracts or concessions, and the new procedure called "competitive dialogue".

After the debate on the Green Paper, the "Communication from the Commission to the European Parliament, the Council, the European Economic and Social Committee and the Committee of the Regions on Public-Private Partnerships and Community Law on Public Procurement and Concessions" (COM 2005/569, 15.11.2005) confirms that the most part of PPPs, especially the CPPPs, are covered by the Community Law on public contracts and concessions. On the other hand, the Commission finds a high demand of operators for a greater legal certainty in the European rules concerning concessions and the IPPPs. In fact, the IPPPs are often

cases of the European Court of Justice (henceforth ECJ) and uncertainty is spread among operators.

According to the Commission, the private partner of such IPPPs must be selected in a transparent way and without discrimination, in order to respect the procurement directives or the EC Treaty. The question arises when a public authority assigns to a IPPP, with a mixed public/private firm, a public contract or a concession: is in this case necessary a tendering procedure in respect of the procurement directives of the European Community? Here the judgments of the ECJ in the Teckal and Stadt Halle cases (C-107/98 and C-26/03) have laid down the determining criteria.

Under the Stadt Halle case law, the ECJ states that the participation of the awarding authority in the mixed capital undertaking does not justify exemption from the principles of procurement law. An exemption from procurement law is recognised only in the case of "in house" enterprise. It is the case when the awarding authority exercises over the undertaking enterprise a control similar to that which it exercises over its own departments and when the enterprise essentially acts only for the public body. The two criteria must be cumulatively fulfilled to ensure that there is equivalence with internal departments of the contracting authority. Moreover, according to the Court, the contracting authority exercises a control as it would over its own departments only when it hold 100 % of the undertaking's capital, in other words when there is no private shareholders involvement. This judgment is based on the fact that awarding a public contract to a mixed-economy enterprise without a tendering procedure would damage the aim of undistorted competition and the principle of equality of treatment of parties. In fact, the absence of a tendering procedure would give to the private participating in the capital of the mixed-economy enterprise an advantage over its competitors.

The ECJ confirmed his judgement in the *Teckal* case (case C-107/98, *Teckal,* Judgment of 18 November 1999).

On the other hand, recently, with the ANAV case (case C-410/04), the orientation of the Court is that it is not only the actual participation of a private party in the capital of a publicly owned company that excludes the in-house status of a publicly owned company, but also a contracting entity's intent to open up the capital of its daughter company to private third parties in the future. Thus, public contracts or concessions could not be awarded "in-house" to publicly owned companies the capital of which is intended to be opened to private parties in the course of the performance of the respective public contracts or concessions.

At this point the orientation of the ECJ seemed to be diffident towards the model of IPPPs. In fact, there was no possibility for a public authority to create an IPPP without contrasting the orientation of the ECJ. It seemed that this fact signed the end of the model of IPPPs.[10]

In this framework of great legal uncertainty, at the end of 2006 the "European Parliament Resolution on public-private partnerships and Community law on public procurement and concessions" (2006/2043) supports the Commission's efforts to take action in the field of Institutionalised PPPs (IPPPs). In view of the proliferating case law, the European Parliament emphasizes the widespread legal uncertainty in the application of in-house criteria and therefore calls on the Commission to devise criteria, based on the current case law of the ECJ, that establish a stable frame of reference for local authority decision-making.

In response to the European Parliament claim of a stable frame and legal certainty, in date 05.02.2008 the European Commission issued the "Interpretative Communication on the application of Community law on Public Procurement and Concessions to Institutionalised Public-Private Partnerships (IPPP)" (C, 2007, 6661). According to European Commission, the perceived lack of legal certainty in relation to the involvement of private partners for IPPP may undermine the success of such projects, and may

[10] On this point, Chiti (2005) is a critic work on the orientation of the ECJ, and foresaw the end of the model of the IPPPs for the management of public local services.

discourage public authorities and private parties from entering into IPPP at all.

This Communication sheds light on the Commission's understanding of how the Community laws have to be applied in the case of IPPPs.

First, Commission states that simple capital injections made by private investors into publicly owned companies do not constitute an IPPP. In fact, the private participation to the IPPP consists both in the contribution of capital and in the active participation in the operation and management of the contracts awarded to the public-private entity.

An IPPP is usually set up in two ways. The first way is by founding a new company, the capital of which is held jointly by the contracting entity and the private partner and awarding a public contract or a concession to this newly founded public-private entity. The second way is the participation of a private partner in an existing publicly owned company which has obtained public contracts or concessions "in-house" in the past. In any case, the Commission does not consider a double tendering procedure — one for selecting the private partner to the IPPP and another one for awarding public contracts or concessions to the public-private entity — to be practical.

According to the Commission, one possible way of setting up an IPPP, which is compatible with the principles of Community law while at the same time avoiding a double tendering procedure, is as follows. The private partner of the IPPP is selected by means of a procedure, the subject of which is both the public contract which is to be awarded to the future public-private entity, and the private partner's operational and managerial contribution to perform the task of the public-private entity. The selection of the private partner is accompanied by the founding of the IPPP and the award of the contract the public-private entity.

The principles of equal treatment and non-discrimination imply an obligation of transparency, which consists in ensuring basic information on the following points: the public contracts to be awarded to the future public-

private entity, the statutes and articles of association, the shareholder agreement and all other elements governing the contractual relationship between the contracting entity and the private partner on the one hand, and the contracting entity and the future public-private entity on the other hand. Information should include the duration of the public contract, the optional renewals or modifications of the initial public contract.

Moreover, the contract between the public authority and the private partner should determine a detailed procedure in order to assure a new tender at the end of the contract.

Finally, after the IPPP is founded and the contract is signed, the IPPP must remain within the scope of their initial object and can as a matter of principle not obtain any further public contracts or concessions without a procedure respecting Community law on public contracts and concessions.

However, as the IPPP is usually set up to provide a service over a long period, it must be able to adjust to certain changes in the economic, legal or technical environment. Community provisions on public procurement and concessions do not rule out the possibility of taking into account these developments as long as the principles of equal treatment and transparency are respected. Thus, it is required that the tender expressly provides for this possibility, and for the relevant detailed rules, in order to define the framework within which the procedure must be carried out.

In this way, European Commission solved the legal feasibility of the model of IPPPs, opening to it for the future economic political choices by the E.U. Member States.

3. THE PUBLIC-PRIVATE PARTNERSHIPS IN THE ECONOMIC THEORY

In the previous section, we have analysed the different forms of PPPs, and their features. We have seen that they represent a new form of public sector intervention in the economy. In this respect, the analysis of PPPs fits in the more general issue of delineating the optimal division of labour between the public and the private spheres. Theoretical analyses should highlight benefits and costs of PPPs, as compared to the other traditional forms of public intervention in the economy. In particular, this analysis should outline the conditions under which contractual or institutional PPPs may be the optimal organization form compared to the traditional procurement or to the simple market regulation.

In the previous chapter, we have seen that a recurrent justification of a PPP in building and managing a public facility is the possibility of reducing public spending (and distorsive taxation[11]) throughout a supposed cheaper private funding. The implication of this claim is that the provider should finance all the initial cost of investment and that no public subside should be allowed, with private partner boring the most part of financial risk. Nevertheless, private financing do not seem to be an important justification for PPPs. In fact, according to the economic theory, the optimal risk sharing implies that it is efficient for the less risk-averse parties to take a bigger proportion of the risk. According to this view, the government should be less risk averse than private operators, because of its large diversification and because of its power to impose taxes. The consequence should be that for large size projects which imply large risks, a PPP should be less efficient

[11] The theory of public finance shows that taxation generates a loss in the net welfare, which is born by consumers or firms depending on the elasticity of demand and supply functions. The only way taxation does not create distortion is trough lump sum transfers, nevertheless this way is difficult to realize.

then the traditional public provision. In fact, one should expect the private provider to demand a higher remuneration from the government for having to bear high risks. Moreover, private contractors will face less favourable financing conditions in capital markets because they have a higher default probability than the government, which benefits from its ability to tax.[12]

According to Engel-Fischer-Galetovic (2006), the only argument of private funding is not able to justify a PPP. The authors show that, in financing a facility to provide a public service, user fees paid directly to the provider and government subsidies are perfect substitutes. In fact, the public sector may use subsidies to finance a franchise, but in this case the government has to collect taxes and increase public spending, incurring in the shadow cost of taxation. On the other hand, also if the user fees are able to cover the entire cost of the initial investment, and no subsidies are necessary, an opportunity cost arises, deriving from the renunciation of the government to these future revenues in favour of the franchise. In fact, these revenues could have been used to reduce general taxation and its distortions.

The authors state that a PPP should be preferred to a traditional public provision only under the exogenous assumption that the PPP is productively more efficient in building and managing the infrastructure whit respect to the public sector.

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[12] A further cost of risk delegation is the presence of informational problems. Classical agency theory shows the relationship between risk sharing and incentives in optimal contracting. The problem comes from the difficulty of disentangling exogenous risk from endogenous risk, that is, what the contractor can influence through his action. The theory assumes that the outcome delivered by the agent, in terms of cost and quality for example, is a random variable, but with its distribution being a function of the effort exerted by the agent itself. In this way, the theory focuses on the trade-off between risk sharing and incentive provision. At the date of the contract, the government has to trade off risk-sharing and incentive-provision considerations. Indeed, as effort is not contractible, passing on no risk to the contractor will lead to zero effort. At the other extreme, delegating to the contractor the whole risk induces him to fully internalise the benefits of his efforts since he is the residual claimant of these benefits. But, so making, the government will have to pay a high risk premium if the contractor is very risk averse. The optimum is to find a middle ground, where the degree of risk sharing is such that the marginal loss incurred by shifting risk from the government to the contractor equals the marginal gain from increased effort by the contractor.

In this case, the contract has to trade-off optimally the following variables: the opportunity cost of the user fees, the shadow cost of taxation which need to finance public subsidies, the allocation of risk demand. The last variable concerns the risk deriving from uncertain demand of the users of the infrastructure, so the question of which party bears the risk of the project is relevant for the design of the contract. In this case, according to Engel-Fischer-Galetovic, optimal contracts have to design the *duration* and the amount of public transfers (*subsidies*). Assuming a risk neutral government and a risk averse private partner, these contracts may be classified into three large groups, depending on the size of the up-front investment and on the uncertainty of the demand.

The first group includes small projects, where the small size of the initial investment is entirely covered by user fees in all states of demand. In this case, there is no demand risk, and the franchise obtains full insurance against risk. The optimal contract does not allow for subsidies because the franchise is full insured, and the duration is finite and short, in order to reduce opportunity costs deriving from a direct management of the revenues by the government.

On the opposite side, there is the group of the large projects, with a large up front investment and where user fees are not able to finance entirely the project in any state of demand. In this case, due to the risk aversion of the franchise, the government has to pay subsidies in every state of demand, and it incurs in public spending and in distortionary taxation. In order to minimize subsidies and their negative effects of tax distortion, the duration of the contract is long or indefinite. Again the franchise is fully insured, because a minimum subside and a long duration of the contract permit to cover the initial investment.

The intermediate size projects belong to the third group, where it can occur that demand of users may be high or low, and it respectively covers or not the initial investment. In this case, the terms of the contract are contingent to the state of demand. In case of low demand state, due to risk

aversion of the franchise, the government pay a subside in order to cover the initial investment, but the duration is long enough. In case of high demand state, user fees are able to cover the initial investment, and no subsidies are provided, and the duration of the contract is short.

3.1 A CONTRACTUAL APPROACH TO THE ANALYSES OF PPPS

The contribution of Engel-Fischer-Galetovic is important in clarifying the financial side of PPPs and the link with public transfers. Nevertheless, the authors are not convincing in assuming an exogenous way in the choice of a PPP, referring to its higher productivity with respect to the traditional procurement. In fact, the authors assume as given the fact that a PPP is more efficient, from a productive point of view, than a traditional procurement. Nevertheless, they do not explain the reason of this larger efficiency. It would be more satisfactory to explain the differences between the various organizational forms in an endogenous way. In so making, a difference in productive efficiency would be explained considering the different incentives that contractual parties have in achieving efficient results.

According to the traditional economic literature, the need of a public intervention in the economy arises in presence of a market failure. A market failure occurs when market competition, through the price mechanism, is not able to coordinate economic agents and to achieve the maximum social welfare. According to the economic theory, a market failure occurs in case of natural monopoly, of public goods, of externalities and of imperfect information between agents. Nevertheless, the net benefit of the public intervention depends both on the ability to alleviate inefficiencies deriving from the market failures and on the costs of this intervention.

In this framework, to make sense from an economic perspective, a PPP should have an economic justification for the involvement of both public and private sector, in order to achieve social welfare efficiency.

At this point, a definition of social welfare occurs. According to the economic literature, social welfare deals with two efficiency arguments commonly used in the economic analysis. The first argument deals with productive efficiency, which concerns with the ability in producing at minimum costs. The second argument deals with allocative efficiency, which concerns with the ability to choose a socially efficient production level, in order to maximize an aggregate utility function. In a Pareto-sense, a distribution of resources is allocative efficient when it is impossible to make some agents better off without making others worse off. Together, allocative and productive efficiency determine social welfare.

In this framework, the rational for public sector involvement in a PPP deals with the presence of a market failure and the need to increase allocative efficiency. In this respect, the reason of the public sector in a PPP is not different from the traditional public intervention. In addition, the private sector involvement deals with productive efficiency, and its role should be to add value to a PPP in order to make it more convenient than a traditional form of intervention.

According to this view, every organisational form determines a second best solution, because of a trade off between productive and allocative efficiency.

The analyses of the trade off between allocative and productive efficiency is relevant in the assessment of the more socially preferable organization form for the project. In this framework, the financing and development of a large project involves a variety of economic and political parties, and the success of this project depends on the efforts and investments of these parties. The risk assessment of the project and of the way in which it is organised may not be only based on purely exogenous considerations. An endogenous risk has to be considered in order to explain the differences between the different forms of organisation. This endogenous risk is influenced by the contractual terms, which may induce the parties to under-perform.

In this framework, a contractual approach permits to understand the endogenous risk deriving from the economic agents incentive' to deviate towards opportunistic behaviours. A contractual approach is able to analyse the optimal design and risk sharing in a PPP.

The study of this endogenous risk and the consequent trade off between productive and allocative efficiency is the objective of two strands of the economic contract theory, well known as *New Economics of Regulation* and *Incomplete Contracting Theory*.

3.1.1 The New Economics of Regulation

The New Economics of Regulation is associated in particular with the work of Laffont and Tirole (1993), *A Theory of Incentives in Procurement and Regulation*. They critique the traditional paradigms of regulation in not considering the lack of information of the regulator towards the regulated firm. According to this theory, the regulation problem is essentially a control problem under incomplete information. The framework is a principal-agent set up in which the principal is the Government or the regulatory institution and the agent is the regulated firm. Through the techniques of the Mechanism Design, the principal maximizes social welfare under incentive constraints that result from the informational advantage of the agent and its strategic (opportunistic) behaviour. This advantage has two components. The first is that the firm is better informed about itself than the regulator; the firm has thus information that is hidden from the regulator. In this case of *adverse selection*, the firm has more information than the regulator about some exogenous variables. The firm's informational advantage may be referred to the production costs or to the demand curve, in a procurement and in a regulation context, respectively. The second informational advantage is that the firm knows its actions but the regulator does not; in other words, the firm can take actions that are hidden from the regulator. This case of *moral hazard* refers to endogenous variables that are not observed by the regulators. The firm takes

discretionary actions, called *effort*, that affect its cost or the quality of the service provided. In this case, the firm may opportunistically reduce its effort in order to maximize its utility function. Effort may be the intensity or the number of hours of the manager's labour. However, it may be interpreted more broadly. Some examples of negative effort are the manager's allocation of benefits, attention to career rather than to efficiency, purchase of materials at high prices.

Most effects of adverse selection and moral hazard do not compare in accounting statements and are neither observable by the regulator nor verifiable by a third party, like as a court. This informational advantage allows the firm to extract a rent from the regulator. The New Economics of Regulation stresses the trade-off between productive efficiency and rent extraction when the regulated firm has such an informational advantage.

3.1.2 The Incomplete Contracting Theory

The other strand of literature relevant for the analysis of contract design and risk transfer in PPPs is the Incomplete Contracting Theory. The origin of the notion of contractual incompleteness dates back to the papers of Grossman-Hart (1986), Hart-Moore (1990) and Hart (1995). All these contributions share the idea that contracts are necessarily incomplete, because it is impossible to describe ex ante all aspects of the future trade due to uncertain future. In other words, contracts are incomplete because it would be too costly to write a comprehensive contract, in the sense that it will specify all parties' obligations in all future states of the world, to the fullest extent possible.

Contractual incompleteness is crucial if parties have to undertake relationship-specific investment. Due to contractual incompleteness, the parties have to leave future outcomes open to future renegotiation, and the contract is ex post renegotiated all the time during the relationship. Such renegotiation influences the incentives to undertake ex ante relationship-specific investments. The assumption of relationship-specific investment is

crucial because the ex post contracting costs become prohibitively high due to the ex post absence of competition deriving from the specific relationship.

In this context, according the New Property Rights approach (henceforth, NPR), the 'correct' allocation of property rights, in determining the bargaining parties' power in the ex post determination of the terms of trade, protects the holders of property rights against the expropriation of the benefits of their specific investment and thus increases their incentive to invest. In other words the ownership of physical or non human assets matters because ownership is a source of power when contracts are incomplete. In fact, given that a contract will not specify all aspects of asset usage in every contingency, it is the owner of the asset in question who has the right to decide all usages of the asset in any way not inconsistent with a prior contract, custom, or law. In fact, possession of residual control rights is taken virtually to be the definition of ownership.

Contractual incompleteness is strictly linked to the assumption of nonverifiability. It is possible that contractual parties cannot write ex ante a contract contingent on the state of nature, because this state is not verifiable by a third party that could enforce the contract. The presence of nonverifiability makes also relevant the allocation of residual control rights. In fact, under some conditions, the expropriation of the relationship-specific investment could be avoided regardless of the structure of ownership through both ex ante profit-sharing agreement and investment expenditure sharing agreement. However, these agreements may be insufficient to encourage ex ante relationship-specific investment because profits or investment may be unverifiable. In the first case one party could inflate costs and claim that profits are low, and in the second case may be difficult to describe or verify the investment, and it is impossible for a third party to enforce the contract. Consequently, the correct allocation of residual control rights becomes a relevant device in order to encourage relationship-specific investments.

It is worth notice that both the New Economics of Regulation and the Incomplete Contracting Theory recognise that the presence of a public authority (government, regulator agency…) as a contractual party implies some peculiar effects that are not present in a pure private relationship. In fact, with the presence of a public partner two problems arise. First, the problem of determine its utility function: is the public partner interested in maximizing social welfare or own egoistic goals? The second problem is the lack of commitment of a public partner. In fact, a government or any other public authority is not able to commit not to expropriate ex post the private parties' investment in order to maximize his utility function, due to the fact that private efforts and their benefits are non contractible.

Concluding, both the New Economics of Regulation and the Incomplete Contracting Theory provide important lessons for the analysis of contract design in the PPPs. First, when information is asymmetric, the regulator faces a trade off between rent extraction and productive efficiency. Second, as contracts are incomplete, there is a trade-off between ex post decisions rights and ex ante effort choices, implying that if economic agents have ex post decisions rights, they will exert greater efforts ex ante. Third, public owners of an asset cannot commit not to expropriate the returns of private parties' efforts (managers or shareholders). Fourth, the type of contracts modifies project returns or their distribution and, thus, impacts on endogenous project risks.

In the next paragraph a survey of the economic literature that analyses the questions arising with the PPPs is provided, referring to the New Economics of Regulation and the Incomplete Contracting Theory.

3.2 INSIGHTS FROM THE N.E.R.

Within the literature of the incentive theory, in the framework of the principal agent modelling, we have seen that the NER critics the traditional analyses of procurement and regulation. In fact, in not considering

informational problems, the traditional theory largely ignored incentive issues.

The most part of the literature of the NER deals with the optimal design of incentive contracts between government and private firms under conditions of adverse selection and moral hazard. Nevertheless, some work highlights the effects of informational problems on the organizational form of PPPs, compared with the traditional procurement.

3.2.1 Building and managing facilities: the effects of bundling under asymmetric information

One of the key features of a PPP is that the stages of building and managing of a public facility are bundled in one single provider. A recent literature analyses the conditions under which the bundling is preferable, and, as a consequence, if a PPP is desirable with respect to a traditional form of procurement.

The principal agent approach focuses on the role of asymmetric information and analyses how informational rents and incentives change if building and managing are bundled or unbundled.

In order to understand under which circumstances bundling or unbundling (and so PPP or traditional procurement) are optimal, it is relevant to investigate the role of asymmetric information in delegating some tasks to the private sector and the deriving agency problems. In particular, it is assumed that efforts in building and managing assets are non-verifiable, so delegation comes with a moral hazard problem.

The theoretical literature of mechanism design shows that, in assigning tasks in the presence of agency problems, the incentives in one task may destroy incentives in another when tasks are substitutes in the agent's cost function.[13] This result suggests that the stages of building and managing of a facility should be split when there is a negative externality between the

[13] Holmstrom and Milgrom, (1991).

task of the builder and the task of the service provider, and should be bundled in case of a positive externality.

In this framework, the work of Martimort-Pouyet (2006) analyses the effects of this moral hazard on the optimal form of delegation. Two cases are feasible. First, the case of a positive externality between stages, when a better design of the infrastructure may help to save on operating costs. Second, the case of a negative externality, when a better design may also require learning new procedures for managing assets and thus increase operating costs.

A positive externality calls for the bundling of building and managing stages. In so making, the firm is able to internalize the positive effect of the effort made in the building stage on operating costs. The reason is that, under moral hazard, there is a trade-off between providing incentives to the builder to improve the quality of the infrastructure and giving him insurance against adverse shocks. This trade-off reduces the power of incentives, so the builder exerts less than the first-best effort. This decreased quality of the assets increases the operating costs in the managing phase. The builder and the operator should thus be merged into a single entity, while the opposite is for a negative externality, when unbundling is desirable. The consequence is that a PPP is preferable to a traditional procurement in case of a positive externality between the phases of building and managing a public facility.

Nevertheless, much of the benefits of bundling in a PPP are lost in the case of non-benevolent decision-maker. In this case, asymmetric information is not related to the agent but to the principal (the decision maker), which owns information about the sign of the externality between the stages of building and managing. In this case, a problem of adverse selection arises. Under adverse selection, the public party may be induced to manipulate his private information. In this way, he can report the presence of a positive externality while a negative one is the truth, in order to withdraw private benefits from conceding favour to the private operator. Preventing such manipulation has a social cost, due to the incentive

constraints necessary to induce the decision-maker to reveal the truth, and so part of the benefits deriving from the bundling and the PPP are offset by these costs.

Another case of "inverted" asymmetric information, where the principal owns private information, is presented in the next section, with respect to information about the quality of infrastructure for the provision of a public service.

3.2.2 Asymmetric information on the quality of infrastructure

In general, in a principal-agent context, the agent owns an informational with a private knowledge about hidden information and hidden actions. Nevertheless, it is possible that the principal owns an informational advantage, and the agent is the less informed party.

Martimort-Sand-Zantman (2006) analyse the case of a local government (the principal) privately informed about the quality of the infrastructure that a potential service provider (the agent) will use. In this case, the design of concession contracts acts as a signal of the quality of infrastructure to the private parties. They analyze how this signalling issue interacts with the moral hazard problem that the local government faces when it delegates production to the private sector.

The assumption is that some facilities have been built and operated in the past by local municipalities. In this case, municipalities own private knowledge about the quality of the existing assets. For instance, in the water sector, a municipality may know which of the existing assets (pumps, water pipes, etc...) should be renovated and when.

The authors analyse the case of small and poorly diversified local governments, assumed risk averse, which delegate public services to private contractors, represented by large private companies operating on several markets. When a local government is privately informed on the quality of his assets, the contract signed with a private contractor is a trade-off between two forces. The first is that, by keeping a share of the financial risk,

the public agency reveals part of its private information about the quality of assets. The second is that, by keeping part of the financial risk, the public agency reduces the contractor's incentive to exert an effort. In this way, a trade-off between signalling and moral hazard arises.

In particular, contracting out the service for a fixed-fee would provide the private contractor with first-best incentives. However, due to the fact that private partner has no information on the quality of assets, the local government has to reduce the fixed-fee in order to convince it to participate. On the other hand, if the local government keeps part of the operational risk, this is a signal of a better technology to the agent. This strategy has nevertheless two costly drawbacks. First, the risk averse principal is no longer fully insured. Second, since the risk neutral agent no longer enjoys the full return on his effort, the incentives to work are reduced.

A local government with a low quality infrastructure finds it worth selling the assets to the private sector for a fixed-fee. Instead, a local government with a high quality infrastructure chooses to keep ownership of the productive assets and to enjoy all returns on these assets.

The authors suggest that local governments who face a harder budget constraint and thus could be assumed as being more risk averse are also the more likely to contracting out to private parties. Public ownership is more likely under high quality facilities and a less risk averse local government. As the agent becomes more risk averse, the case for public ownership becomes stronger. In fact, private involvement requires a higher risk premium to be paid in order to assure the risk deriving from the lack of information about assets.

3.2.3 Asymmetric information on operative costs

In the previous section, the public party owns a private information on the quality of assets. However, the more general case analysed by the principal-agent theory is when the agent owns private information on its operative costs. This is the base assumption of the works of Schmidt (1996a and

1996b) in comparing public firms versus private regulated firms. These works analyse the case of privatization. Nevertheless, they may highlights on the effects of adverse selection which may be present also in a PPP. Due to asymmetric information on operative costs, a private regulated firm may be able, through its opportunistic behaviour, to extract an informative rent to the public party. The public party, introducing in the design of the contract participation and incentive constraints, is able to reduce the informative rent of the private firm. Nevertheless, the private party invest more in cost reducing activities in order to increase his rent, and this implies a productive efficiency. On the other hand, a loss in allocative efficiency is the result of the fact that private party is not interested in socially efficient production levels. An entirely public owned firm implies, instead, that the public party has now access to the private information of the firm about its costs. In this case, the public party is able to extract ex post the entire rent of the firm. Nevertheless, a problem of moral hazard arises. In fact, as the public partner is not able to commit no to expropriate ex post the rent of the firm, the firm does not invest in cost reducing activities, so a productive inefficiency arises. On the other hand, the presence of the public partner permits to achieve an allocative efficiency about the production levels, being interested to social goals.

The problem of the lack of commitment of the public authorities is also analysed by Laffont-Tirole (1991 and 1993). According to the authors, the cost of a public firm is the suboptimal investment by the firm's manager in those activities that can be redeployed by the public party in order to serve social goals. The important assumption is that, under the traditional provision of a public firm, the public party is not able to commit not to expropriate managerial efforts towards its social goals. As managerial effort is non-contractible, the fear to be expropriated of his own investment

generates a suboptimal effort by the management, which implies a productive inefficiency of the public firm.[14]

The trade off between productive and allocative efficiency implies some considerations. The presence of private parties is important if it is relevant the effort in cost reducing activities, in the sense that the gains in productive efficiency are higher than the loss in allocative efficiency. On the other hand, the presence of a public partner is important if social benefits deriving from the production of the public service are relevant. In this case, allocative efficiency is more important than the gains of cost reducing activities.

In presence of market competition, social benefits deriving by the production are lower than in a monopolistic condition, because of the presence of other firms, which produce substitute goods. The consequence is that in condition of market competition, social benefits are not relevant and it may be preferable the achievement of productive efficiency. Instead, in conditions of market power and monopolistic conditions, it may be more relevant the achievement of allocative efficiency, and the presence of a public party may be preferable in order to achieve social goals, also if this implies a loss in terms of productive efficiency.

3.3 INSIGHTS FROM THE INCOMPLETE CONTRACTING THEORY

In the previous paragraphs, we have seen that the literature of incomplete contracting focuses on the impossibility to write a comprehensive contract and on the role of allocation of control and decision rights in determine parties' incentive in making relationship specific investment.

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[14] According to Polo-Scarpa (1995) the problem of the lack of commitment of the public sector and the risk of expropriation of the effort is present also towards private shareholders of a PPP. In fact, private shareholders have no incentive to invest because the public partner is unable to commit itself to no expropriate ex post their investment. For instance, the public partner as a regulator agency may be not able to constraint itself to a predetermined regulator policy. In fact, the public regulator may change ex post the terms of the regulation in order to achieve social goals, but in this way private investment may be expropriated. Private parties, preventing this behaviour, have no incentive to invest.

The New Property Rights approach may be considered as an allocative principle, in order to efficiently assign residual control rights over non human-assets. In literature, this approach has proved very useful to explain vertical integration and the boundaries of firms, the internal organization of firms and the meaning and importance of asset ownership.

Nevertheless, contractual incompleteness and the NPR approach may have something to say in delineating the boundaries between private and public parties and in the magnitude of private sector involvement in the provision of public services.

In a world of complete contracts, ownership structure and the allocation of residual control rights would be neutral with respect to the governmental goals. In a complete contracting world, the government would be able to achieve any goals, economic or otherwise, via a detailed initial contract. Hence, if something exists that makes the difference between a private firm, a public firm and any form of PPP, this is the presence of contractual incompleteness.

According to this view, it is natural to analyse public choice using the ideas of contractual incompleteness.

A recent literature, which belongs to the strand of the contractual incompleteness, analyses the new organizational forms of the PPPs in an incomplete contracting context, in order to understand how contractual parties' investment can deviate from the first best. The analysis compares the traditional organizational form with the new forms of PPPs.

Hart-Shleifer-Vishny (1997), for the first time assume the idea that contractual incompleteness is connected to the fact that the quality the governments wants for a public service provision is impossible to be fully specified in the initial contract. The authors suggest that it is often impossible to verify and to enforce the quality provided because it is possible for the provider to reduce the quality without violating the letter of the contract. Indeed, as documented by empirical evidence, critics of private provision often argue that private contractors would cut quality in the

process of cutting costs because contracts do not adequately guard against this possibility.

The basic idea is that the government and the provider are able to specify in the initial contract only some basic aspects of the service and the initial price. The assumption is that it is impossible to anticipate all the future contingencies at the time the contract is signed. Instead, the parties renegotiate the contract ex post once it is clear what kind of contingencies has occurred.

After the contract has been signed, the provider can make a relationship-specific investment, devoting effort towards two types of innovation relative to the basic service: a cost innovation and a quality innovation. In general, the assumption is that cost innovation leads to a reduction in costs but it is accompanied by a reduction in quality, while a quality innovation leads to an increase in quality but it is accompanied by an increase in costs. The assumption is that, ex ante, it is impossible to contract on innovation and on the relative effort, and that, ex post, a renegotiation between parties will occur in order to split the ex post surplus.

In this context, the ownership of residual control rights over non-human assets necessary to provide the public service is relevant because it determine who has the authority to approve innovations when non-contracted contingencies occur.

A recent literature analyses the effects of bundling the different stage of building and managing of a facility under the assumption of contractual incompleteness, in order to compare the effects of a PPP with respect to a traditional procurement.

3.3.1 Building and managing facilities: the effects of bundling under the assumption of contractual incompleteness

The perspective of incomplete contracts is assumed in Hart (2003): the builder of the asset or the provider of the public service can modify the nature of the asset or the nature of the public service without violating the

initial contract. In fact, it is impossible to write at the initial date a complete contract which specify all the aspects of the provision. The initial contract specifies only the “basic good” to be provided. Specifically, the builder can make two types of non-verifiable, and non enforceable, investments: a productive investment, that makes the asset more attractive and easy to run, due to non contractible higher quality invested in the building, and an unproductive investment, that reduces total costs and quality. The productive investment is able both to increase the provision of quality and to reduce total costs in the stage of provision of the public good. The unproductive investment is able to reduce both total costs and quality in the stage of provision of the public good. In other words, the builder’s effort affects operating costs and quality only in the successive stage of the provision of the public good. The two types of investment are unverifiable and not enforceable by a third party. Nevertheless, the initial contract is not violated if the basic good is provided. A trade off arises between unbundling and bundling.

In the case of separate contracts, or unbundling, the Government contracts with the builder in order to build the assets necessary to the provision of the good, and then he contracts with the provider in order to run the asset and to produce the good. The builder can make productive and unproductive investments, but, since these investments affect the costs and quality provided in the next stage of the provision, he does not internalise the effects of these investments, so he does not invest at all. The cost of unbundling is a low productive investment, while the benefit is a low unproductive investment.

In the case of bundling, the builder contracts with the Government both the building and the managing of the asset. In so doing, he internalises the effect of productive and unproductive investments. The benefit is that the PPP is interested in making productive investment, with an increase in the quality of the provision of the public good. On the other hand, the cost of

the PPP is that he is interested in unproductive investment too, in order to reduce total costs, with a consequent loss of quality.

In the model, no bargaining is assumed ex post, so the builder does not renegotiate the initial price. The model shows that under unbundling the builder does not internalise the social effect of innovations. In so doing, the builder does not invest in productive innovation, nevertheless he does not invest in unproductive investment too, and this is a benefit. On the other hand, under bundling, the builder again does not internalise the benefits of quality innovation, but he internalises the benefits of cost innovations.

The conclusion is that unbundling is good if the quality of the asset to be built can be well specified, whereas the quality of the service cannot. Under these conditions, the underinvestment in productive innovation is not a serious issue. In contrast, bundling, and so a PPP, is good if the quality of the service can be well specified in the initial contract, whereas the quality of the asset cannot be.

Bennett-Iossa (2006) also study the desirability of bundling the building and management of facilities used for the provision of public services and the optimal allocation of ownership between public and private parties.

They assume the perspective of contractual incompleteness, and assume that the ownership of assets assigns the residual control rights and the right to decide whether any innovative activity can be implemented. A difference with Hart (2003) is that here the renegotiation between parties is assumed. A difference with H-S-V (1997) is that Bennet-Jossa (2006) does not allow for renegotiation in the case that the asset is owned by the private sector. According to Bennet-Jossa (2006) renegotiation occurs only if the government is the owner of the asset (p. 2145).

Bennet-Jossa (2006) show that if there is a positive externality across the stages of production, bundling is always optimal since it induces the internalization of the externality. This is consistent with the motivation commonly given for the PPPs, which views the integration between the different stages of the provision of a public service as a device to promote

investment. Nevertheless, they show that the internalization of externality does not necessary work in favour of the PPPs. In particular, in the case that innovation in the building stage reduces costs at the managerial stage (positive externality) as well as increasing social benefit, bundling is always optimal, due to internalization of the positive externality. Instead, if the innovation in the building stage increases both costs and social benefits at the managerial stage, unbundling may become optimal. In fact, in this case, the promise by the government to reward the contractor for the increase in social benefit would be not credible, and an underinvestment arises from it. In this case, public ownership works as a commitment device for the government to share its benefit with the investor: the public sector is the owner of the asset and the contractor has no power to implement any innovation without the willingness of the government, unless renegotiation occurs. The advantage of public ownership is that it induces to renegotiation, and the advantage of renegotiation is the partial internalization of the effect of investment on social benefit. In this case, public ownership may become optimal.

3.3.2 Rinegotiation and contractual power

We have seen that, in an incomplete contracting context, the renegotiation of the initial contractual conditions assumes an important role in the determination of ex post surplus and of parties' incentives in making relationship specific investment. According too this view, the parties' contractual power in the ex post renegotiation stage is determinant in the division of the ex post surplus. Therefore, parties' contractual power becomes one of the most important factors in the managing of a long-term relationship. The consequence is that contractual power of public and private parties should be well balanced. Unfortunately, in many cases, public parties may be in a weaker position than the private counterpart in the renegotiation stage, because of a lower contractual power. The reason depends on the governmental levels involved in the relationship. In fact, a

small and poorly diversified municipality, which may be not able to manage complex and multimillionaire contracts with external private parties, is surely in a weak position.

On the other hand, private parties involved in a PPP are selected through a competitive auction, in order to choose the most efficient firm to provide the public service. Nevertheless, bidders often anticipate the possibility of renegotiation, and base their bids not only on their costs, but also on the cost of securing the contract. At the auction stage, bidders can take into account their potential market power once the relationship is engaged with the public partner, and they take into account their bargaining power in the renegotiation stage. In fact, the presence of relationship specific investment determines a lock-in effect, and the relationship becomes a bilateral monopoly.[15] In the period between the award of the contract and the renegotiation, the private party may increase its bargaining power. If the public party is a weak contractual position, the private party is able to extract a better deal in the renegotiation stage. Under these conditions, underbidding becomes a way to increase the probability of winning an auction, with the possibility that the renegotiation reduces ex post the losses of such ex ante behaviour.

3.3.3 The residual value of assets

In an incomplete contracting context, under conditions of specific investments in material assets necessary to provide a public service, the incentive in making such investment is a crucial factor. With respect to this, an important aspect to be considered is the residual value of assets.

The residual value of material assets used to provide a public service depends on many factors. In the initial stage, the builder's effort is important in building a high quality asset. The effort devoted by the service

[15] In this case, the "fundamental transformation" of Williamson (1985) arises, where, due to specific investment of parties, a market relationship becomes a bilateral monopoly. Parties are no longer able to refer to alternative agents on the market.

provider in maintenance activities during the contract assures the assets from the depreciation process. Finally, the possibility of a private use, alternative to the public use, of the asset at the end of the contract is determinant in assigning a market value to it. The high specificity of a specific asset for a public use reduces its private value, and so its market value.

Bennet-Iossa (2006) show that the automatic transfer of assets from a private contractor to the public party at the end of the contract is welfare reducing. The assumption is that the contractor owns residual control rights over the assets during the contractual period, and he has no incentive to invest in these assets. The reason it that, anticipating the automatic transfer of the assets, the private contractor does not benefits of his efforts, so he does not invest. According to the authors, this incentive would increase if the automatic transfer of assets were left open to a voluntary negotiated transfer. In this case, the private contractor would receive part of the benefits of his investment, and his incentive to invest would rise. On the other hand, a negotiation at the end of the contract may be length and may create uncertainties in the public service provision. It may be also the case that, because the provision of the public service needs to be continued using the assets, negotiation may give to the private contractor the possibility to exert hold-up towards to the public party.

3.3.4 The IPPPs and the public partner as a shareholder

In the case of a PPP, the provider of the public service has the residual rights of control over the way the service is provided. After the initial contact has been signed, the provider may come up with innovative ways of providing the service. In an incomplete contracting approach, it is impossible to foresee such innovations in the initial contract, so the splitting of the surplus deriving form the implementation of these innovations is subject to ex post bargaining of the contractual parties. The service provider anticipates the outcome of the bargaining over the division of the surplus

deriving from innovations, with implications on his incentive to invest in the research of possible innovations. The research of possible innovations in providing the public service is a non contractible relationship specific investment, and the allocation of residual control rights to the party that support this cost may induce it to invest.

In the case of classical procurement, the public sector may be assumed welfare maximizing, disliking monetary transfers to the provider because of the cost of raising funds to finance such transfers due to distorsive taxation. The case of an institutional PPP (IPPP) is quite different in the objective function to maximize. The IPPP is a joint venture between public and private sector, which own a participation in the capital of this entity, and this entity retains the residual control rights on decisions to be taken. According to Bennet-Iossa (2005), a IPPP maximizes an objective function that is a combination of its own profits and of the social benefit deriving from the provision of the public service. In this way, the contract is signed from an agent that does not maximize social welfare, though has some concern for social benefit.

Under a IPPP an overinvestment in cost reducing activity arises. In fact, since the IPPP has control rights, it can implement the cost reducing innovation unilaterally without bargaining with the government, and there is overinvestment because the IPPP does not take into account the negative effect of this innovation on the social benefit.

On the other hand, if the presence of a public party in the IPPP is high, the effects of underinvestment in quality-enhancing innovations are alleviated. In fact, in this case, the weight of the social benefits in the utility function of the IPPP is high, due to the larger presence of the public partner.

The conclusion is that if the participation of the public agency is not high in the PPP, delegation of contracting is never optimal for quality-enhancing innovations, while it is optimal for cost-reducing innovations.

3.4 THE ECONOMIC NATURE OF A PPP

The particular feature of the PPPs is that the public party is not able to describe, at the date the contract is signed, the exact way to provide the public service he wants. The chapter 2 shows that, due to the complex nature of the public projects involving the PPPs, it is a general claim that the public party prefers to specify in the initial contract the output, and not the input, the final result, and not the means necessary to realize it. On the other hand, in the present chapter we have seen that an incomplete contract is characterized by the fact that it's impossible to describe all future contingencies, so the contract is revised every time during the relationship. It is surprising that the basic features of a PPP and of an incomplete contract are the same! For this reason, we argue that the economic nature of a PPP is that of an incomplete contract, where the public party is not able to describe ex ante the input and the means necessary to realize his aims. And this is truth both for the class of the contractual PPP and for the institutional PPP.

The CPPP have in common the features of incomplete contracts. In particular, the competitive dialogue, where the law defines it as a complex contract, when it is difficult to define the technical means and objectives able to supply a public service. In some cases, public authority is objectively unable to define also the legal and/or financial form of a project. It is clear that a contract in this form is necessarily an incomplete contract.

In the concession contracts and in the PFI , it is often present the problem of the public transfers (subsidies), because the franchise may be not able to cover the entire cost on the public service. It may be case that it is impossible to describe ex ante the level of public transfers, because it is not known the demand function of the service. Moreover, the problem of the quality of the public provision is a serious question, because it is difficult to describe ex ante all the aspects of the provision, due to the long duration of the contract. We have also seen that, in some cases, it is difficult to describe precisely the kind and the amount of network investment. For these reasons, these contracts assume the nature of incomplete contracts.

In the case of the institutional PPP, public and private parties agree to create a separate entity that is a joint venture, in order to provide a public service. The participation of a public party to the entity may be seen as a way to avoid the problem of the contractual incompleteness. In fact, the public party, as a shareholder, holds part of the residual control rights on the assets and on the relevant decision concerning the public project. In this way, he can impose ex post his willingness when the contingencies will reveal in the future. The difficulty in describing ex ante means and aims is overcome by owing part of the property and control rights in the project. So, also in this case, the IPPP has the economic nature of an incomplete contract.[16]

In each case, the contractual power of the parties is the key factor that determine the splitting of the ex post surplus in the renegotiation stage.

Basile-Trani (2008) show that, under uncertainty conditions and in presence of relationship-specific investment, contractual parties may prefer to sign a so called *intentionally incomplete contract*. Parties leave open some aspects of the trade to be bargained ex post during the relationship, when uncertainty will become clear. The authors show that, under certain conditions, this type of *loose contract* may be preferable to the introduction of too restrictive incentive constraints.

In this framework, we argue that the PPP are incomplete contracts, where the parties has the willingness to define some aspects of the relationship, but they leave open some others, in order to decide ex post, when the contingencies will become clear.

According to this view, the approach and the methodology of the incomplete contracts are an important tool to examine the world of the PPPs.

[16] According to Laffont-Martimort (2001) "…[p]roperty rights are usually incomplete contracts. Indeed, property rights define what can be obtained by the agents in the status quo of the ex post Nash bargaining over the gains from trade" (p. 373).

In the next chapter, we analyse the development of PPPs in the water sector, and the different way it is organized in the most important European countries. Then, we use the approach of the contractual incompleteness to analyse the role of PPPs in the water sector, in order to understand the effect on endogenous risk deriving from different forms of PPPs.

4. THE PUBLIC-PRIVATE PARTNERSHIPS IN THE WATER SECTOR.

The water sector exhibits a number of industrial characteristics that embody a conflicting nature between allocative and productive efficiency. These characteristics create the need for the public intervention in the sector, in order to achieve allocative efficiency aims, impossible to achieve with only the presence of market mechanisms.

The water sector is a case where public intervention may occur through a continuum of organizational forms, with a more or less involvement of private parties in the provision of water services. As we have seen in the chapter 2, the government may choose among the fully public provision and a variety of forms of PPPs. We have seen that the rationale of private sector involvement in PPPs deals with productive efficiency arguments. Nevertheless, the presence of public party is essential in pursuing allocative efficiency aims, in particular through the tools of regulation.

Until the 1990s, national governments and international institutions, like as the World Bank, mainly based their politics on Keynesian and classical economics. Market failures were recognized to occur in case of natural monopoly, externalities, and in presence of public good aspects of many infrastructure projects. Therefore, public sector was seen as the main actor also in the infrastructure water sector. The form of the fully public provision of water services was the norm in developed and developing countries, on the basis that it would have been straightforward to control prices and behaviours of public firms.

In the early 1990s, with the increasing awareness of Governments about environmental degradation of water resources, United Nations and international community started to change their perception about public provision in the water sector. In 1992, the Conference on Water in Dublin and the UN Conference on Environment and Development in Rio imposed a new approach for water management, described in the so-called Dublin

Principles.[17] Water was recognized as an economic good, a commodity that should be priced at its true economic value, that is at its cost of provision. Nevertheless, water is a finite and vulnerable resource, essential to life, development and environment. Therefore, water management should be based on a participatory approach, involving users, planners and policy makers.

This new approach reflected also the World Bank policies. The World Bank is one of the major international actor in the water infrastructure sector of developing countries. In fact, lending for water resources investment accounted for about 16 percent of all World Bank lending over the past decade. In the 1990s, the World Bank's policy changed. Public sector was seen as lacking of innovative capacity, inefficient, unable to compete in world markets, and corrupt. The current system dominated by a fully public provision was perceived as inefficient and the private sector was seen as a way to achieve an innovative approach, an efficient management and a cut in the cost of public subsidies in water infrastructure. Market failures were replaced by state failures. This radical change in the public policy occurred worldwide and became the main reform policies of the major international organizations (World Bank, International Monetary Fund, Organisation for Economic Cooperation and Development). The 1993 World Bank's Policy Paper reflects the broad principles of the Rio Earth Summit of 1992. In particular, World Bank states that a modern water management needs a much greater attention to the environment. Water management needs that all stakeholders participate, including the State, the private sector and civil society, women need to be included and resource management should respect the principle of subsidiarity, with actions taken at the lowest

[17] The four Dublin Principles on water are the following. 1) Fresh water is a finite and vulnerable resource, essential to sustain life, development and the environment. 2) Water development and management should be based on a participatory approach, involving users, planners and policy-makers at all levels. 3) Women play a central part in the provision, management and safeguarding of water. 4) Water has an economic value in all its competing uses and should be recognized as an economic good.

appropriate level. Moreover, water is a scarce resource and a greater use needs to be made of incentives and economic principles in improving allocation and enhancing quality.

Fifteen years later, experience shows that the Dublin Principles have provided inspiration and direction for many water reforms both in developed and in developing countries. In particular, many forms of both contractual and institutional PPPs have been experienced, with a more or less involvement of the private sector. Nevertheless, experience shows that private involvement in the water sector remains a controversial issue. The model of PPP is always complex, and this is also true in the case of water supply. The question of the role of the State in the water sector is crucial, and it might be that a PPP leads to more State involvement than expected, because of the need of institutional arrangements for regulation.

In this chapter we analyses the phenomenon of the PPPs in the water sector. Initially, the analysis of the special features of the water sector is necessary to understand the particular issues arising from these features, and this is made in the section 4.1. After a survey of the empirical research of the water sector made in the section 4.2, the experiences of the most important European countries are provided in the section 4.3. The section 4.4 provides a comparison of the various water systems analysed.

4.1 SPECIAL FEATURES OF THE WATER SECTOR

We have seen that water sector exhibits a number of industrial characteristics that create the need for the public intervention in the sector in order to achieve allocative and productive aims. In this section we analyses the special features of this sector, beginning from the infrastructure and from the condition of natural monopoly. Then, the informational constraints are analysed, which a public regulator has to face in choosing its policy. A survey of the various regulation frameworks is provided, in particular of the

tariff regulation. Finally, the features of the demand and the issue of affordability are analysed.

4.1.1 Water infrastructure

Drinking water infrastructure includes treatment and storage plants, pumps and a distribution system. All these long period assets require intensive fixed capital investment. In fact, fixed costs of water suppliers are typically high relative to variable costs. The study of Armstrong-Cowan-Vickers (1994) shows that, in England and Wales, fixed costs represent 80 per cent of total costs.

The consequence is also that revenues are principally used to cover the cost of investment in infrastructure, and that the amortization period is long. Due to the long amortization period, the duration of water contract is generally long. In Italy, on average a water contract cover a period of 27 years. In England, for obtaining the end of the contract, a minimum notification period of 25 years is required. A short duration of water contracts may be observable in France, where often a service contract is signed, not including investment obligations for the water provider. Nevertheless, in this case, investment cost is bored entirely by the local municipalities.

Moreover, a large part of water infrastructure is fixed in place and has no alternative use. The presence of an intensive, fixed in place and asset specific investment is an important feature of the water sector. In fact, due to these features, the residual market value of this specific investment is low. The value of the investment in water infrastructure is linked to its public use. In general, water assets return to the public authority at the end of the contract. Every investment on these assets is so a sunk cost, and a water provider is interested to cover this cost before the contract expires. In this case, we have seen in the previous chapter that a problem of underinvestment arises. In fact, the automatic transfer of material assets to the public party at the end of the contract may be welfare reducing, because

the party's incentive to invest is weakened by the fact that he has no benefits form such investment.

4.1.2 The natural monopoly

A natural monopoly arises when, due to the technology of the supply and the level of the demand, it is optimal to organize production with only one firm. In economic terms, the notion of natural monopoly is linked to the condition of sub-additivity of the cost function.

If y is the amount of output, a cost function $c(y)$ is strictly sub-additive in y if

$$c(y) < \sum_{h=1}^{H} c(y^h)$$

$$\forall H > 1 \text{ and with } \sum_{h=1}^{H} y^h = y$$

This means that the cost of producing the amount y of output with only one firm is lower than the cost of producing the same quantity with any number H of different firms. The implicit assumption is that all firms face the same cost function. With respect to this definition, a natural monopoly arises if the cost function is sub-additive along the entire relevant range of the production level y, with respect to the level of demand. It is possible to show that, in the case of a single product firm, the presence of decreasing average costs is a sufficient, not necessary, condition to have a sub-additive cost function. This is the case of high capital-intensive sectors, with a high component of fixed costs with respect to variable costs.

We have seen that, in the water sector, the presence of intensive capital investment, in order to realize treatment and storage plants, pumps and a widespread distribution network, determines a high percentage of fixed costs with respect to variable costs. The water sector is so characterized by conditions under which a natural monopoly arises.

Because of the presence of the natural monopoly, direct competition (competition in the market) is very difficult. Economic theory elaborates

other forms of direct competition: the *cross-border competition* and the *common carriage*. In the first case, the public authority gives licence to supply large industrial consumers in the area of another water supplier. In the second case, several water suppliers use a single network to supply customers, and customers can choose their water suppliers. Some rare cases of these forms of competition are present in England. Nevertheless, according to Balance and Taylor (2005), the presence of the cross-border competition and of the common carriage is unlikely to develop in the future. In fact, in the first case it is necessary a relevant investment for building alternative network linked to industrial consumers. In the second case, a problem of monitoring the water quality arises, because it is impossible to identify the responsible for water quality incidents under common carriage. Unlike gas and electricity, experience does not show any successful model of competition in the water sector. In fact, the efficiency gains does not outweigh the costs deriving from the limited competition introduced in the sector.

Other forms used to introduce an indirect competition in the water sector are the *competition for the market* and the *yardstick competition*.

Competition for the market arises when a potential service providers bid for the right to supply a monopolistic market under a certain period.[18]

According to some economists a mechanism can be designed that will take advantage of competition for the right to serve the market so as to achieve desirable objectives – elimination of monopoly rents, efficient pricing, and productive efficiency. Nevertheless, according to Williamson (1985), this competition process cannot be designed without introducing the high transaction costs and administrative complexity of traditional

[18] In order to simplify the exposition we omit the analyses of the auctions. Beginning from the work of Demsetz (1968), auction theory is become an important strand of the economic literature. Following the development of the game theory, the auction theory quickly progressed between 1975 and 1985, and now is an applied branch of game theory which deals with how people act in auction markets and researches the game-theoretic properties of auction markets.

regulation. With auctioning, the potential suppliers bid against each other to obtain the contract. The contract is usually awarded to the bidder that offers to supply water at the lowest price. However, the contract should describe also the amount of investment over time and the quality of the service. Moreover, the price selected by the bidding process is not fixed over the partnership period and may be renegotiated due to change in circumstances, unforeseen events and numerous pressures. Therefore, regulation is necessary to ensure that a monopoly power does not arise during the relationship. In the water sector, where service provision is characterized by long-term contracts and information asymmetries, the public party has to ensure transparency of technical and financial information of the water system. Nevertheless, an open and transparent competitive process is substantially time consuming and costly for both bidders and public authorities. The work of Haarmeyer and Mody (1998) shows some examples of the entity of these transaction costs. In Buenos Aires, for example, the cost of consultants which helped the government in evaluating the bids for the concession of the water service was estimated in [US]$ 4 million. Each consortium bidding on the Buenos Aires tender reported expenses for about $2-$3 million in preparing its proposal. These high costs are a deterrent for smaller firms, and may explain why there are usually only a few bidders in tendering processes in the water sector. The work of Foster (2005) shows that in Mexico City, five on ten water contracts had only one bidder participating to the auction. Moreover, the bidders are often a small group of multinationals that dominate the international water market, as we have seen in the previous section. We have seen that, in France, between 1999 and 2001 the average number of offers received vary between 2,1 and 2,4. In Italy, the average number of bids is 1,1.

Experience shows also that competition is restricted when contracts are re-tendered because the incumbent has information that gives him an advantage in bidding to retain the contracts. Furthermore, under concession contracts, the incumbent can ask for compensation for his investment. In

France, in 99% of cases private operators are renewed in their water contracts.

Comparative or “yardstick” competition is a way for the regulator to reduce asymmetric information about the firm’s cost. The idea here is that firm’s costs should be compared with those of other firms, possibly in different geographical markets, facing a similar technology. However, despite its attractive perspectives, yardstick competition is not normally used in the water sector. Yardstick competition should, in theory, encourage efficiency and refrain monopolists from diverging from least-cost derived from the other firms. However, yardstick competition is demanding in terms of data and analysis. Costs of different regional monopolies differ due to variations in operating environment and inherited infrastructure, and regulators need to make costs comparable by using econometric methods. For these reasons, yardstick competition is normally inherently subjective and thus introduces scope for regulatory opportunism and uncertainty for water companies, which weakens their incentives to invest. Yardstick competition has been applied in England and Wales in combination with price-cap regulation, where comparisons between companies are done when setting and resetting price controls. The results of yardstick competition in the United Kingdom water sector are mixed. According to Renzetti and Dupont (2004), the efforts of OFWAT (the British water regulator) to promote competition in the English water industry seem to have been only partially successful.

4.1.3 Informational constraints

As the most part of economic relationship, also the provision of water services is characterized by informational constraints, which limit the control of the contractor operative costs and on the quality provided.

The two main types of information constraints are *moral hazard* and *adverse selection*. *Moral hazard* refers to variables that are impossible to verify by a third party, like as a court. In this way, public party is not able to

enforce the contract with respect to these variables. These variables refer to discretionary actions taken by the contractor, which may affect costs and quality of the services provided. These actions are summarised under the label of *effort*, and, in this case, a problem of unverifiable information arises. The *effort* may stand for the number of hours worked by a firm's manager, or for the intensity of his labour. *Adverse selection* is referred to the case that one party may have private information at the date of contracting. In this case of asymmetric information, public party does not know the firms' technological possibilities and its cost structure. In other words, the public party does not know the actual amount of costs that a certain firm needs to provide to service required, because he does not know its productivity level.

On the other hand, with respect to the water infrastructure, the quality of the existing water assets may generate another informational constraint. In fact, these assets may have been built and operated in the past by the municipalities. In this case, municipalities have acquired private knowledge about the quality of water infrastructure. For example, a municipality may know which of the existing assets (pumps, water pipes, metering systems and so on) should be renewed and when. In the water sector, according to Martimort-Sand-Zantman (2006), the public party (principal) benefits of an informational advantage on the service provider (agent), differing from the classical case of the principal agent theory, where the agent normally benefits of the informational advantage. On the other hand, it is extremely costly for a private party to verify the quality of assets announced by the local government. In fact, different with a hospital or an electric central, the water network is widespread in a generally great area, and consists of existing assets, in many cases hidden assets, to be valued one by one. A feature of the water sector is that the most part of water assets are underground. Hence obtaining accurate information about them can be costly and there is generally a lack of reliable information about the condition of existing infrastructure.

Moreover, it is possible that also the municipality has no perfect information on the quality of its assets. We can observe the Italian case. In Italy, the AATO is responsible to writing an investment plan for the entire duration of the concession contract. As we will see in the next paragraph, the national water authority (COVIRI, 2008) states that, by a sample of water investment plans attached to the concession contracts, the analyses of the water plants is often incomplete in the technical aspects, and the database are not always reliable. On the other hand, it is extremely costly to a third party to verify information included in a twenty-year investment plan.

The consequence of this lack of information about the quality of the water assets may be a source of conflict and renegotiations after the contract has been signed. It may also be difficult to judge the quality of the work done by a private provider in a short period.

4.1.4 The regulation framework, contractual parties and bargaining power

One of the most important factors in organizing water services is the he model of regulation adopted. The two main models are the *regulation by independent authority* and the *regulation by contract*.

The regulation by independent authority is based on a unique national authority, independent from national and local governments, which promotes a homogeneous regulation of the national water sector. The model of regulation by contract does not include any national regulator, because every duty and obligation is regulated by the contract signed between parties. A local dimension of regulation characterizes this model. In fact, in this case, water sector is in the responsibility of rather small and poorly diversified local municipalities. Moreover, due to the small entity of these local governmental bodies and their poorly diversified activity, they are often induced to contracting out water services ant the related considerable investment in order to overcome balance constraints, such as those deriving from the European Pact of Stability and Growth, as we have seen in the

section 2. In fact, in so making, costs and investment related to water services are recorded off balance in the local government accountancy, and do not affect their budget constraints.

Nevertheless, in this framework, bargaining power may be not balanced between very small local governments and the great multinationals participating to a tender. Local governments, like as municipalities, usually do not have the necessary expertise to oversee complex contracts, particularly long term contracts granting a large degree of autonomy to the contractor. Municipalities find themselves negotiating multi-million euros contract with private multinational companies. According to OECD (2006), for many of them, this is a new experience, and the results are major disparities in bargaining power, particularly when large, international water operating companies are involved.

In this framework, local governments in fact may bore more risk than the contract suggest.

Moreover, the private sector increasingly demands guarantees and public subsidies, especially when it invest in developing countries. Some of these guarantees, such as take-or-pay contracts (the public sector is bound to pay for set quantities of water irrespective of actual use) or guaranteed rates of return on investment, may dilute incentives for private sector performance. In this case, incentive in productive efficiency can decrease if, in order to attract the desired investment, it is necessary to reduce private risks by providing guarantees and onerous clauses. But this is the opposite of the aims of the involvement of the private sector.

4.1.5 The determination of water tariffs

The most important variable to be regulated by the public sector in organizing water provision services is the determination of tariffs that consumers have to pay to the contractor. Two main forms of regulation of water tariffs are possible. They are the rate of return regulation and the price-cap regulation.

The spirit of the rate of return regulation is to chose tariffs in order to equate total revenue and total cost. In a first stage, in order to determine the necessary revenue, the regulator analyses the historical operating costs over a certain period, and estimates depreciation on previous investments. Costs are adjusted by eliminating unjustified expenditures, and then by using projections on inflation and other future shocks. Then the regulator chooses a reasonable rate of return for the capital invested. The level of forecasted costs plus the chosen rate of return determines the level of revenue required. The second stage consists in choosing the tariff level and the relative tariffs in order to realize the revenue required. Once the tariffs are determined, they are fixed until the next tariffs review. Tariffs may be indexed to inflation or to the price of some inputs. A crucial matter in determining the incentive properties of the rate of return regulation is the length of time over which the tariffs are fixed. In fact, if the regulatory lag is infinite, the rate of return regulation assumes a nature of fixed price contract, with the firm as a residual claimant for its cost savings. In practice, regulatory reviews can be initiated by the regulated firm or by the regulator agency. In general, a firm facing rising costs of inputs ask to the regulator for permission to raise tariffs. Tariffs are adjusted as necessary to ensure that the realized rate of return on investment does not deviate substantially from the target rate. Prices are adjusted to reflect significant changes in costs; and the regulator is required to ensure that the firm has the opportunity to earn the contracted target rate of return.

Price-cap regulation does not make explicit use of accounting data. The regulator fixes ceilings tariffs for either all products or a basket of them (average or weighted price), and the firm is free to choose its tariffs at or below the ceilings. An indexation clause adjusts these ceilings over the regulation period. Price-cap regulation, in its pure form (infinite regulatory lag) rules out contractual use of cost data. The difficulty is that, in this case, it requires the regulator to have good knowledge of cost and demand conditions. Too high a tariff ceiling makes the firm an unregulated

monopolist, too low a cap conflicts with the financial equilibrium of the firm, and the right tariff level may be difficult to calculate.

Like rate of return regulation, price cap fixes the tariffs for a certain period. Nevertheless, the spirit is different. In fact, price cap is prospective rather than retrospective. The firm's historical cost is not the base of future tariffs, but the setting of tariffs are equivalent to impose a fixed price contract, with a high incentive power. In fact, the specified tariffs increase often is linked to the overall rate of price inflation, and typically does not reflect the firm's realized production costs or profit. In so making, the firm can have strong incentives to reduce its operating costs. Moreover, the distance between regulatory reviews is set exogenously, not endogenously (usually four or five years). Nevertheless, evidence shows that it is not so in the practice. In fact, often the regulator has difficulties in not intervening when pressured to reduce prices in the face of large profits, or to increase prices when the firm shows signs of a potential default.

According to Armstrong - Sappington (2007), rate-of-return and price cap regulation can have different effects on unobservable investment (e.g., managerial effort) designed to reduce operating costs and on observable infrastructure investment. Because it links prices directly to the realized costs, rate-of-return regulation is unlikely to induce substantial unobserved cost-reducing investment. However, rate-of-return regulation can promote observable infrastructure investment by limiting the risk that such investment will be expropriated. In contrast, price cap regulation can provide strong incentives for unobservable cost-reducing effort, especially when the regulatory commitment period (the length of time between regulatory reviews) is relatively long. Therefore, according to the authors the choice between these two forms of regulation will depend in part on the relative importance of the two forms of investment. In settings where the priority is to induce the regulated firm to employ its existing infrastructure more efficiently, a price cap regime may be preferable. In settings where it is important to reverse a history of chronic under-investment in key

infrastructure, a guaranteed rate of return on (prudently incurred) investments may be preferable.

4.1.6 The characteristics of water demand

Due to its nature of essential good for life and health, water is characterized by an inelastic demand, with respect both to the tariff and to the service quality aspects. Moreover, water market is generally mature, especially in developed countries, with low possibility of new contracts. As we will see in the next chapter, in England market analysts state that, for the water companies, opportunities for new revenue deriving from new contracts are limited, because of a mature demand. In France, the connection rate[19] of rural population, that is generally lower than that one of urban population, is equal to 98.2%. In general, developed countries have a high percentage of connection rates and there is a very limited room for new contracts.

These features of the water demand have important implication in determining incentives of private parties involved in its provision.

In fact, a recurring argument in favour of PPPs is that private parties' involvement ensures higher incentives in providing water quality and a higher standard service because of the opportunity of increasing revenue.

Unfortunately, the consequence of a mature and inelastic demand, with respect both to the price and to the service quality, is that revenues and profits will depend heavily on tariff increases, which depend on how water tariffs are determined. In this framework, incentive of private parties to invest in quality in order to achieve new contracts, and so new revenue, are diluted and very weak.

4.1.7 The issue of water affordability

Due to the fact that water is essential for life and health, access and affordability of its bills for the entire population are important for

[19] The connection rate represents the share of population served by the water network.

determining overall social welfare. In fact, the requirement of universal provision leads to a trade-off between productive and allocative efficiency.

Allocative efficiency deals with social welfare aims. In the case of the water sector, social goals are the connection to the water network and the affordability of the water bills for all classes of population.

The issue of affordability is linked to the consumers' ability to pay water bills. According to OECD, an indicator of water affordability is the share of disposable income spent in water charges. The analyses of OECD (2002) shows that the threshold value of water bills affordability is between 3 and 5% of the disposable income. A higher value may determine high social problems, especially for the poor social classes, which may be unable to pay water bills and may be subject to the break of the provision.[20] The following table, elaborated by CO.VI.RI (2008), shows the affordability of water charges in Italy.

Annual water bill (€)		Affordability	
		On average income	On low income classes
Average	250	1,07%	2,15%
Maximum	587	2,52%	5,04%
Minimum	81	0,35%	0,69%
Standard Deviation	65	0,28%	0,56%

Average annual cost, including VAT, for a consumption of 200 m3/year, and levels of affordability in Italy in 2007. Source: CO.VI.RI (2008)

The table shows that, on average, water cost is lower than 3% of disposable income. Nevertheless, if the analyses considers only the poorest classes, with a low disposable income, there are cases where water cost is

[20] According to OECD, available evidence of affordability indicators suggests that, in about half of OECD countries (15 out of 30), affordability of water charges for low-income households is either a significant issue now or might become one in the future, if appropriate policy measures are not put in place.

high than 5% of disposable income. This is a signal of a difficulty in Italy in affording such a cost for the poorest class of population.

In France, according to Reynaud (2007), water charge is 1.2% of average disposable income. Nevertheless, considering only the poorest classes of population, the percentage is 4.8%. The issue of affordability is relevant in developing countries. In South America that water charges increasing in those countries have determined unsustainable costs for householders. In some cases water bills were the 20% of disposable income, due to the low level of wages.

All these considerations imply that the public authority has to be heavily involved in regulating water services. In fact, the problem of affordability of the water bills may create a problem in the future cash flows deriving from the concession contract, and this may be a cause of disagreement between public and private parties.

The mechanism put in place by French public authorities and private firms in order to guarantee an affordable access to water corresponds to the creation of a financial aid designed to help low-income households facing difficulties for paying the water bill. In this case a fund has to be created, financed by a fee on the water bills or by the general taxation.

4.2 EMPIRICAL RESEARCH ABOUT PPP IN THE WATER SECTOR

In this paragraph we try to understand if empirical investigations are able to identify the preferable organizational form for the provision of water services. Unfortunately, in the economic literature there are few empirical studies evaluating the effects of public-private partnerships in the water sector. Since PPPs are difficult to characterize empirically, most of the studies focus on the two extremes of public and private ownership. Moreover, according to Renzetti and Dupont (2004), it is difficult to draw any robust empirical conclusion in favour of a specific ownership structure.

A first empirical approach examines the links between ownership and performance by estimating an aggregate cost function for water utilities. The results are not unanimous. Crain and Zardkoohi (1978) find that private water utilities have, on average, lower costs. Conversely, Bruggink (1982) finds no cost difference, while Feigenbaum and Teeples (1983) find that public utilities have lower costs.

Other empirical studies use a cost frontier approach. Bhattacharyya et al. (1995) define inefficiency as the difference between actual cost and its theoretical optimal value on a cost frontier. They analyze whether ownership structure may explain this inefficiency. They find that private and public firms deviate by 19 percent and 10 percent respectively from minimum cost. Hence, according to the authors, public firms are more efficient than private firms.

It is worth notice that these studies do not lead to any evidence about the relative productive efficiency of private or public ownership.

Nevertheless, according to Renzetti and Dupont (2003), these empirical approaches focus on a conceptual distortion about the cost basic assumption. In fact, one of the key assumptions of both approaches is that firms, either public or private, minimize costs, while the principal-agency literature shows that this assumption should be made with caution.

There is no much research on the effects of the ownership structure on consumers, in particular on water quality and prices. Orwin (1999) and Houstma (2003) both provide evidence that, on average, private firms charge higher prices than public ones in France and California, respectively. Ballance and Taylor (2005) report on a study of water prices in France in May 2001 by the French Ministry of Agriculture and the French Environment Institute. The study is based on a survey of 5000 municipalities and covers 68 percent of the French population. They found that, on average, water delivered by private companies is 27 percent more expensive than that delivered by public operators.

However, Buller (1996) shows that there are more private firms in areas where costs of supply are higher. This suggests that private involvement is more likely where costs are higher, giving a possible explanation of why prices to consumers charged by private firms are higher than public firms.

The last consideration highlights a distortion of the empirical studies whose results may be misleading. Such studies test the effect of ownership on performance often assuming that other factors remain constant. This assumption can bias the results. In fact, the difficulty of empirical analysis is due to the fact that the performance of different ownership structures may not be compared without separating the effects of other factors, making the data homogeneous.

Renzetti and Dupont (2004) identify three main factors that have to be neutralized in order to compare the performance of different ownership structures: the size of the firm, the physical environment, and the policy and regulatory environment.

Because of the high initial investments needed in water supply, a larger firm may be able to produce more and hence enjoy economies of scale as the cost per unit decreases. And this is an important difference with respect to a smaller firm.

The physical environment is also important, because a firm with a supply of poor quality water will likely have a higher cost than one with a supply of clean water. Moreover topography, population density and the type of customer mix also have a significant impact on performance.

Finally, water quality standards, health and safety regulations, as well as tax rules and pricing also influence performance. Differences in performance may be caused by differences in regulations across jurisdictions or by the fact that regulation and taxation are applied differently between public and private utilities.

The conclusion is that, at the present, empirical studies do not lead to any evidence about the relative efficiency, in productive or allocative terms, of

private firms with respect to public firms, or of a certain form of PPP with respect to another.

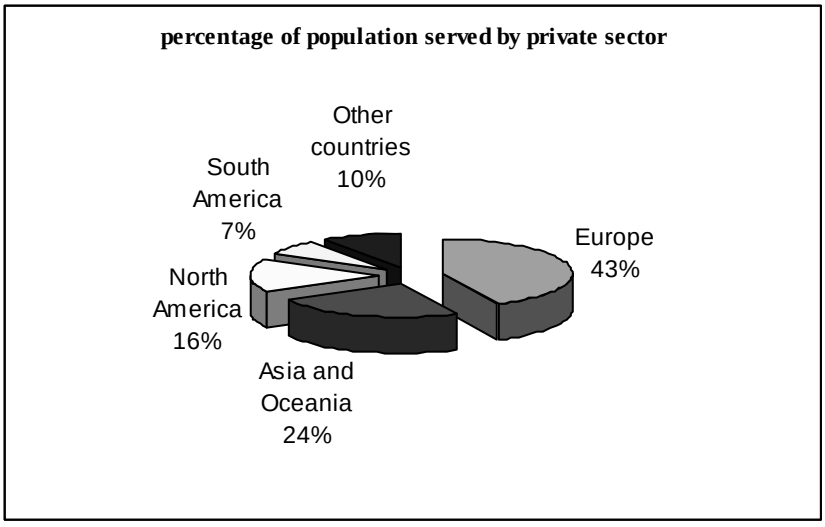
Nevertheless, empirical investigation seems to have indicated the answer to an important question: if, in the analyses of the water sector, the ownership structure has to be considered as an endogenous or exogenous variable.

According to Martimort-Sand-Zantman (2006) it is misleading to treat ownership as an exogenous variable when estimating the water demand and the cost function of water utilities. When one estimates water demand for a given community, it is quite natural to consider as explanatory variables data concerning its population (age, wealth), the city itself (size, density) and possibly the choice between direct and delegated management. According to the authors this method is potentially biased since the variable concerning ownership is certainly endogenous. The authors shows that the empirical investigation made by Reynaud and Thomas (2005) of the water industry in the South-West of France is the best available evidence of their theory. Reynaud and Thomas (2005) estimate the probability that direct or delegated management is chosen in the water supply. They use the standard explanatory variables (size, population density, industrial density), and, in addition, the quality of the network. As a parameter of a network quality they use the amount of leakage of water during the distribution stage. Since leakage occurs between the production stage and the distribution, a natural measure of network quality is the ratio of billed water to produced water. The results of Reynaud and Thomas (2005) are clear: the higher the ratio, the greater the probability that the municipally chooses direct management. According to Martimort-Sand-Zantman (2006), the empirical results of Reynaud and Thomas (2005) is consistent with their theory. The conclusion is that ownership structure is an endogenous variable, which depends, among other causes, on the quality of the network and of infrastructure. The better is this quality, the higher is the likely that the choice is the direct

management, the lower is this quality, the higher is the likely that the choice is the delegated management.

4.3 WORLDWIDE EXPERIENCES OF PPPS IN THE WATER SECTOR

Worldwide, only 5 per cent of the total world population is served by private sector in the water service supply, about 290 million people. Of these, 43 per cent are in Europe, 24 per cent in Asia and Oceania, 16 per cent in North America, 7 per cent in South America, and 10 per cent in other countries (source by Stephenson, 2005, p. 265).



During the 1990s, private sector participation in water services provision increased worldwide. On the contrary, at the end of 1990s, multinationals started to exit from some contracts in developing countries in order to reduce their exposure to projects that are not profitable enough or too risky.

Nevertheless, PPPs remain the main policy stance in many international operations.

In the following section, we analyse how water sector is organized in some important European countries, in particular in England and Wales, in France, in Germany and in Italy. Some other experiences are also analysed, especially in Latin American countries. An analyses of the private

multinationals is also provided, in order to understand industrial relationships between private parties participating in the provision of water services. Finally, a comparison of the different water systems is provided, in order to understand the main differences in the regulation framework, in the ownership structure, in the finance and in the levels of government which are delegated to negotiate and to manage water services.

4.3.1 The water sector in England and Wales

In 1945, in England and in Wales there were more than 1,000 bodies involved in the supply of water services. Most of these were local authorities, in the form of inter-municipal operators, and a little group of private companies. These subjects were regulated by a simple price-cap formula, in order to guarantee them a maximum rate of return of 5%.

In this way, planning for water resources was a highly localised activity with little co-ordination at either regional or national level.

The Water Act 1973 established 10 new regional water authorities (RWAs) that would have managed water resources and the supply of water services on a fully integrated basis. The Water Act 1973 required the regional water authorities to operate on a cost recovery basis, with capital to meet investment requirements raised by borrowing from central government and revenue from services provided. Water authorities were obliged to operate on a cost recovery basis to ensure charges met their revenue requirements. There were no other sources of government subsidy.

The tight fiscal controls applied by central government in the 1970s and 1980s, due, largely, to instability in the world economy and the high levels of debt inherited by the water authorities, led to insufficient expenditure to meet the capital maintenance and investment requirements.

In response, the government introduced some changes through the Water Act 1983. This led to some constitutional changes, reduced the role of local government in decision making and gave the authorities scope to access the private capital markets.

The reform involved a restructuring of the water system by separating the roles of regulation and provision of water services. It established three separate, independent bodies to regulate the activities of the water companies. These were:

1. the National Rivers Authority (now succeeded by the Environment Agency, EA), for monitoring river and environmental pollution;
2. the Drinking Water Inspectorate (DWI), for monitoring water quality;
3. the Office of Water Services Regulation Authority (OFWAT), to set the price regime that companies follow.

On the other hand, the reform allowed the access of the private capital in the industry. Various arguments in favour of the private sector encouraged the reform: the private sector would have been more efficient, private companies would have been better able to finance the large investments needed and private sector would have created competition. The industry was reformed in 1989.

Technically, the restructuring of the water sector involved the following stages. First of all, the creation of 10 limited companies, with shares owned by the government, and the transfer of assets and personnel of the 10 RWAs into the new created limited companies, which became owners of the entire water system and properties of the RWAs. Then the sign with the new companies of 25-year *licence* for sanitation and water supply. Finally, the entire capital of the companies was offered for sale and fully underwritten on the London Stock Exchange. The Government hold a so-called “golden share”: the 10 water companies were protected from takeover for 5 years. This prevented any individual or single company from controlling more than 15 % of voting shareholdings. The golden share ended in 1994.

In order to ensure that the shares of the new limited companies would be attractive to investors in the stock market, the government took a number of steps in order to increase the profitability of the water companies. In this way it was guaranteed the full underwriting of the shares in the Stock

Exchange and the political success of the operation. In fact, before selling the shares, the government issued a significant public bond in order to cancel all of the long-term debt owed by the water and sewerage companies at a total cost of 4.9 bn of pounds (1989 prices). In addition, the government provided for a cash injection of 1.5 bn of pounds to the companies, known as the 'green dowry'. Moreover, the companies were sold by issuing shares on the stock market, with special discounts. Finally, the initial price regime, set as a political act before OFWAT was established, was also extremely generous, and the companies were given special exemption from paying profits taxes.

Each licence was granted for a period of at least 25 years from the sign. In this way, water companies were awarded their regional activity until 2014. In 1991, OFWAT, that is responsible for ensuring that the companies were profitable, and for encouraging efficiency, inserted into company's license a clause requiring that for the end of the licence a minimum ten-year notification period was given. In 2002 the minimum notification period was extended to 25 years. According to OFWAT, this clause provides companies with greater certainty, enabling them and their investors to plan more securely. According to OFWAT, a competitive tender can create increasing uncertainty in the water companies and this uncertainty could affect the cost and availability of finance to companies, to the detriment of consumers.

The following table shows the ownership of the 23 private water companies in England and Water operating at March 2007. Only 6 of them are listed at the London Stock Exchange, while 8 companies are controlled by international Private Equity Funds and other multinationals. The two larger world water multinationals, the French Suez and Veolia, owns 4 companies.

Company	Owner	Country	Type of owner	Comments
Anglian Water	Osprey/AWG	UK	PE	Consortium of PE funds
Northumbrian Water	Controlled by PE and banks	UK	SEC	25% owned by Ontario Teachers Pensions, 15% by fund managers Amvescap, 5% by Barclays Bank
North West Water	United Utilities	UK	SEC	United Utilities is a quotated company
Severn Trent Water	Severn Trent	UK	SEC	Severn Trent is a quotated company
Southern Water	Royal Bank of Scotland	UK	PE	Owned by SWC: RBS owns 49% of SWC (PPI Investments is other main shareholder).
South West Water	Pennon Group	UK	SEC	Pennon is 30% owned by 5 financial investors
Thames Water	Macquarie	Australia	PE	
Welsh Water	Glas Cymru	UK	NPC	
Wessex Water	YTL	Malaysia	M	
Yorkshire Water	Kelda	UK	SEC	Two PE investors buy 7% stakes in April 2007
Bournemouth and West Hampshire Water	Biwater	UK	P	Private company, operates internationally, but not in EU outside UK.
Bristol Water	Agbar/Suez	ES/FR	M	
Cambridge Water	Cheung Kong Infrastructure	Hong Kong	M	
Cholderton Water	Cholderton Estate	UK	P	Private family owned
Dee Valley	-	UK	SEC	35% of shares owned by Axa SA.
Folkestone and Dover	Veolia	FR	M	
Mid Kent Water	UTA and HDF	Australia	PE	Utilities Trust of Australia (UTA); Hastings Diversified Utilities Fund (HDF).
Portsmouth Water	South Downs Capital	UK	PE	
South East Water	UTA and HDF	Australia	PE	Utilities Trust of Australia (UTA); Hastings Diversified Utilities Fund (HDF).
South Staffordshire Water	Arcapita Bank	Bahrein	PE	Formerly known as First Islamic Investment Bank
Sutton & East Surrey Water	Aqueduct Capital	DE	PE	Aqueduct Capital is part of Deutsche Bank.
Tendring Hundred	Veolia	FR	M	
Three Valleys	Veolia	FR	M	

England and Wales: Water Company ownership, March 2007 (Type of owner: SEC = stock exchange quoted (UK); M = multinational; PE=private equity; NPC=not-for-profit company; P= privately owned company)
Source: Hall D., Lobina E (2007).

A price cap system operates on the assumption that the regulator (OFWAT), gathering information about firms, can set an upper limit on price increases that allows an efficient company to finance its functions.

Price caps are calculated and set in advance by the regulator every five years in the Periodic Review process. In order to calculate the price caps, the regulator employs econometric models and detailed assessments of individual company performance to identify potential reductions in operating, capital maintenance, and capital enhancement expenditure (Ofwat, 1998).

Potential efficiency gains are determined also through the relative comparison of companies performance. In theory, the profit is constraint between the price cap regulation and the possible efficiency gains. The scope for opportunistic behaviour of firms is, in theory, diminished through the practice of comparative competition. In fact, allowed prices increases are calculated not as a function of its own actions, but rather in relation to all other firms performance. Competition, whether direct or simulated, is assumed to be a better driver of efficiency rather than regulation, legislation, or moral suasion.

In its original form, price cap regulation was intended to minimize regulatory activity, with relatively small information requirements. The companies price limits were to be set by the regulator once every ten years. In theory, the key features of the British system were the following: little regulatory interference; a relatively long period between regulatory interventions; the capping of prices, rather than dividends; and the creation of a system of indicators, or "yardsticks", which allows simulated competition amongst companies. Efficiency incentives should arise because companies are allowed to retain any profit made after price caps have been set.

Unfortunately, actual results have been different from expectations.

According to Lobina-Hall (2001), in the first 4 years, on average prices rose by over 50%. The first 9 years produced an average increase of 102%, of 46% in real terms, adjusted for inflation, with some companies having an increase of 75% in real terms.

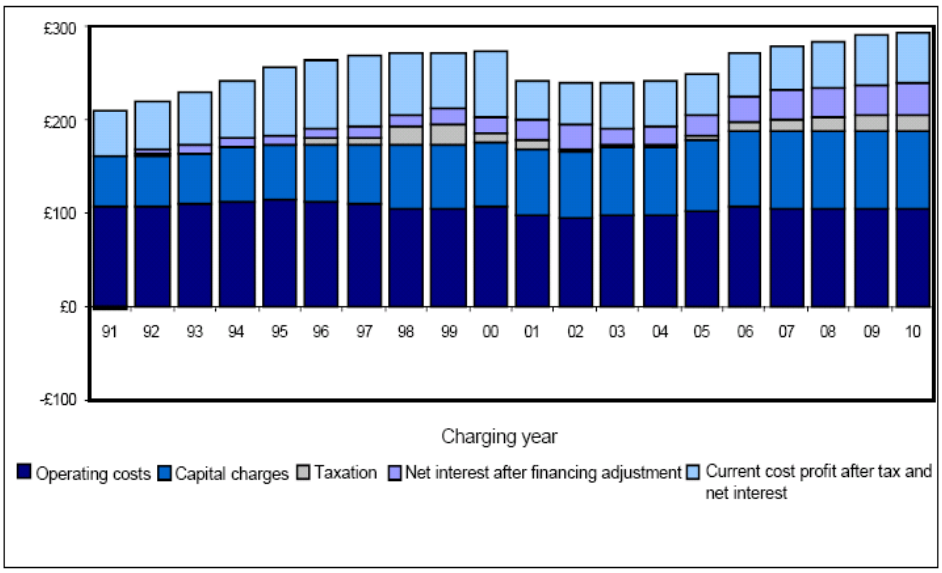
		89-90	90-91	91-92	92-93	93-94	94-95	95-96	96-97	97-98	98-99	% rise 89/90 - 98/99
Anglian	cash	157	178	205	226	244	259	272	279	282	288	84%
	Real terms	217	224	247	264	280	289	294	294	288	288	33%
DwrCymru	cash	149	169	197	218	237	255	263	272	281	294	98%
	Real terms	206	214	237	255	272	285	284	287	287	294	43%
NorthWest	cash	111	125	143	156	170	182	194	208	221	234	111%
	Real terms	153	157	172	182	195	204	210	219	226	234	53%
Northumbrian	cash	108	123	148	160	177	188	197	207	216	229	112%
	Real terms	149	155	178	186	203	210	213	218	221	229	53%
SevernTrent	cash	107	122	139	153	166	181	189	200	208	222	108%
	Real terms	148	153	168	178	190	203	205	211	213	222	50%
SouthWest	cash	147	165	194	231	268	304	318	329	339	354	142%
	Real terms	203	208	234	270	308	340	344	347	347	354	75%
Southern	cash	124	138	161	173	183	197	214	229	244	257	107%
	Real terms	172	174	194	202	210	220	231	241	249	257	49%
Thames	cash	101	114	130	141	153	163	174	182	190	201	99%
	Real terms	140	144	156	164	176	182	188	192	194	201	44%
Wessex	cash	139	155	178	193	210	223	234	243	252	265	91%
	Real terms	192	196	215	225	241	249	253	257	258	265	38%
Yorkshire	cash	123	136	155	166	179	192	204	213	216	226	84%
	Real terms	170	172	187	194	206	215	221	225	221	226	33%
England& Wales	cash	**120**	135	156	171	186	199	210	221	229	242	102%
	Real terms	**166**	170	188	199	213	223	228	233	234	242	46%

Average annual household water bills, by company.
Real terms = adjusted to 1998/99 prices using RPI deflator . E & W totals include water only companies
Source: OFWAT Memorandum 18 March 1998, in House of Commons Research paper 98/117 December 1998

Actual costs in the period 1990–1995 were significantly lower than expected, and the profits resulted higher then expected levels.

Generally, the companies tend to overestimate the forecasted capital expenditure, which is used to calculate the allowed price rises. In this way, the actual expenditure is lower than the expected, and the higher revenues insure higher profits. The same case occurs when many companies deliberately cut their investment programmes and use the savings to maintain or increase their dividends.

The following table shows how the main components of the household bill for England and Wales have changed from the beginning of the reform.



Components of the average household bill, 1991-2010 (2003-04 prices)
Source: OFWAT (2006).

Operating costs as a proportion of household bills are declining slowly, while capital charges (current cost depreciation and the infrastructure renewals charge) have risen. Business taxes were negligible until the mid-1990, but then they have risen because of the end of taxes exemption. The return on capital is split into two components; interest payments and profit attributable to shareholders. Interest payments have risen sharply as debt has become a major element of company finances. This means that investment is financed by debt or by prices increasing.

In this framework, only a few years from the water reform of 1989 the regulator decided to reduce the price review from ten to five years, in order to readjust price limits. This decision of OFWAT was a response to the difficulty of accurate forecasting over even a relatively short period of time.

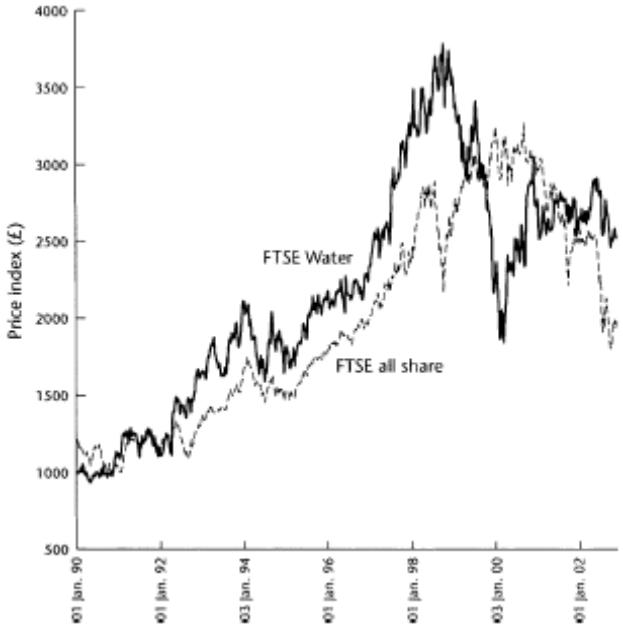
Information requirements grew substantially, with OFWAT making implicit decisions on the acceptable real rates of return on capital employed in order to arrive at price limit determinations. Rather than being an end-point of regulation, price caps have become a means to the end of regulating rates of return, via intense scrutiny of and negotiation over the “true” cost of

capital for companies. The light regulation foreseen was changed in the tighter regulation with respect to any other industry.

As a result, the regulator began to analyse more deeply the companies' investment programs. In 1998, the Competition Act provided a stronger power to the regulator in order to force water companies to cut their prices in case of an "excessive" rate of return. In this way, the price limits announced by OFWAT in 1999 for the year 2000–2001 reduced bills by an average of 12.4% in real terms (Ofwat, 2000).

Nevertheless, the impact of the price cap reduction, and earlier interventions by the regulator to prevent companies from taking up their full price cap, called into question the robustness of the efficiency incentives as originally designed. In fact, the fear of expropriation of profits undermines companies' incentive to maximize efficiency.

The cut in price caps announced in 1999 implied a drop in revenues for most water companies, and a consequent drop in profits. Following the announcement of the final Periodic Review determinations in mid-1999, share prices lost 50% of their value.



Share prices, UK water sector and FTSE all share

The paradox was that, as a result, by 2000, many water companies had greater difficulty in financing their investment programs.

According to Bakker (2003b), given the difficulty of sourcing finance and the perceived future low-growth opportunities in the domestic market, water companies decided to refocus their activity outside of the core, regulated business.

Soon after the 1999 Periodic Review, various water companies proposed for the separation between assets ownership and operations. In this way, similar to a lease contract adopted in France, the owner of water networks is responsible of the implementation of the investment program, while a long-term lease contracts can be made to private companies to operate only water provision services. According to the water companies, one motivation to reorganizing the system stems from the difficulty experienced by some companies in sourcing financing for future investment programs. Moreover, while facilities management companies typically have low profit margins, a service company is able to generate a higher rate of return on capital employed because of the presence of few assets, and is more attractive under the more stringent price caps imposed by the regulator. Finally, in the long-term the declining status of water infrastructure may be the key factor in companies' desire to exit the asset ownership side of the business.[21]

Many companies expressed an interest in restructuring asset ownership, by arguing that equity was an expensive source of finance, and that other sources of finance – in particular debt finance – were cheaper in the long-term. In this way, one of the key justification for the water reform returns to be open to discussion. The argument that equity market were the better form of finance was based on the fact that, although more expensive than government debt, equity market creates pressure on managers to make efficiency gains which offset the increased cost of capital. Instead, it seems

[21] Little of the asset stock in England and Wales is less than three decades old; much of it is older than fifty years. In London, one in three kilometers of pipes is more than 100 years old (Bakker, 2003)

that any efficiency gain under private equity ownership would not be outweighed by the increase in the cost of capital.

4.3.2 The water sector in France

In France, water supply is a responsibility of municipalities. There are 36,679 municipalities, each of which is responsible for its own water supply. Many municipalities, in particular the smaller ones, have created municipal associations in order to benefit from economies of scale. Nevertheless, in 2003 there were approximately 14900 water service providers (BIPE, 2005). The economic regulation of private service provision is undertaken purely by contract between the municipality and the provider. There is no national or regional regulatory agency in France that would approve tariffs and set contractual service standards.

Although they are required to maintain ownership of the infrastructure, the municipalities can choose whether and how to delegate the management of the water services. Local municipalities may decide a direct or a delegated management.

With the direct management, the community takes complete charge of investments and operation of water supply services, of the relations with users, invoicing and recovery. The staffs of the water authority are composed of municipal agents with a civil servant status. Today, this type of organization can be found only in small rural communities.

Local public authorities may decide the delegated management, in order to engage a Public-Private Partnership. In this case, the relationship between the local municipality and the private sector can take different forms: a service contract (*affermage*) where the municipality remains responsible to finance infrastructure, and a concession contract (*girance*), where the private operator is responsible for financing all new investments over the duration of the relationship. Typically, all these contracts specify the nature of expected services and the water pricing schemes (including price adjustment formula).

The service contract is the most common organizational form, usually awarded for a period of 7 to 12 years. As we have seen in the chapter 2, with the service contract the private provider is responsible for the current operations of the water utility; it collects tariff revenues from users and pays a special additional charge to the local community, which is included in the water rate determined by the contract. It has no obligation to invest in the infrastructure.

On the other hand, in a concession contract, the private provider builds installations, operates them at its own expense and recovers its cost by billing water price. At the end of the contract, it will hand the network and installations back to the municipality. The concession contract implies a higher degree of risk for the operator to the extent that it is responsible for all the investment. However, the level of risk depends of course on the type of price regulation implemented.

The participation of the private sector has progressively increased in France since the 20th century. For the water service, the market share (in terms of customers) of the private sector was 17% in 1938 and 44% in 1964. According to the French Ministry of Environment, it was around 80% in 2001.

Year	1938	1964	1975	1979	2001
Public	83%	56%	50%	47%	20%
Private	17%	44%	50%	57%	80%

Evolution of the private participation in the water sector

The main characteristic of the private sector is its oligopolistic form with three major companies: Véolia Group, through its subsidiary Générale des Eaux, Suez Group, through its subsidiary Lyonnaise des Eaux and SAUR (Bouygues group). They represent the quasi-totality (89%) of the private market (other private companies operate at a local level but their weight remains small).

Year	2001
VEOLIA	51,1%
SUEZ	24,3%
SAUR	13,1%
Other	11,5%

The French private water market

We have seen that local communities directly carry out economic regulation of French water services. Contrary to other countries, in the case of private operation the government regulation is replaced by a contract between the private operator and the local community. In other words, regulation is based on the contract signed between the parties. Nevertheless, local municipalities are not always in a good position to exercise an efficient control over water service providers. The process of price setting is different whether the local community has chosen to delegate the service to a private firm or not. If the local community manages directly the water service, it can set the price of water by itself. If the local community has chosen to delegate water services to a private firm, the price is determined by projecting financial accounts provided by the operator. The relationship between the local municipality and the firm is formalized by means of a contract that specifies a price structure, a formula of price revision and clauses allowing for exceptional conditions. Since the bargaining power is in most of the case favourable to firms, the price structure is likely to reflect a monopolistic behaviour rather than social welfare maximization. In fact, the three large private water companies are in a stronger negotiation position than the municipalities, and there is almost no real competition in the sector. Hall (2002) reports that about 90% of contracts are renewed with the same company. Moreover, in a report of 2003, the French Supreme Audit Agency (the *Cour des Comptes*) noted that many municipalities, including some large ones, do not have the capacity to control the private sector contracts, in particular unjustified increases of certain fees. The municipalities do not use

the numerous legal instruments at their disposal to better control the contracts they sign. According to the Audit Agency, the annual financial reports submitted by the private companies to the municipalities are often not very transparent. For example, in many cases these reports cannot be compared to the financial projections submitted during contract negotiation, because they are formulated on different bases. Also, water companies are allowed to carry out works through their own subsidiaries without selecting them according to the local government regulations for competitive bidding. Finally, large utilities can manipulate transfer prices, thus making their finances even less transparent to municipal regulators.

In order to strengthen competition, to fight corruption and to improve transparency in the water sector, in 1993 the French Parliament approved the "Sapin Law". It limits the duration of the delegation contracts and imposes a procedure of publicity and consultation preliminary to the conclusion of delegation or renewal water contracts. This procedure includes a negotiation stage where the local communities must negotiate with one or more contractors in order to obtain specifications and detailed information about the content of their bids.

The impact of the Sapin Law is reported in the table below.

	1998	1999	2000	2001
Number of delegation agreements	582	684	509	477
Number of delegation agreements in the sample	333	195	211	208
Length of contracts before / after delegation agreement	17 / 11	16.8 / 11	15.2 / 10.8	15.7/10.9
Private operators renewed (%)	92%	82%	88%	89%
Average number of offers received	n.a.	2.4	2.1	2.2
Price change (%)	-9%	-10%	-12%	-8%
Price change in % (local communities with less Than 10,000 inhabitants)	4%	-4%	-3%	-3%
Price change in % (local communities with more Than 10,000 inhabitants)	-16,5 %	-14%	-17%	-12%

Impact of Sapin Law on delegation agreement renewal on the water sector
Source: Guérin-Schneider and Lorrain (2004)

The number of agreements leading to a change in operators remains low. In fact, in 80 to 90% of the cases, the existing operator is renewed for

another term. The number of offers received by local communities is still very low, 2.2 in 2001. In 28% of the cases, the local community receives only one offer, which means that ex-ante competition for the market is very weak. To summarize, the level of competition among private companies through the delegation contract bidding process is still low in France.

4.3.3 The water sector in Germany

In Germany, the responsibility of the regulation of water supply is shared among the Federal Government and the 16 Federal States (*Laenders*), within the framework of the E.U. laws. On the other hand, the organization and implementation of the water supply belongs to the traditional duties of the municipalities, in accordance with federal and regional water laws.

Industry associations and professional associations also play an important role in self-regulating the water sector. In particular, the professional associations play an important role assisting in the development of technical norms.

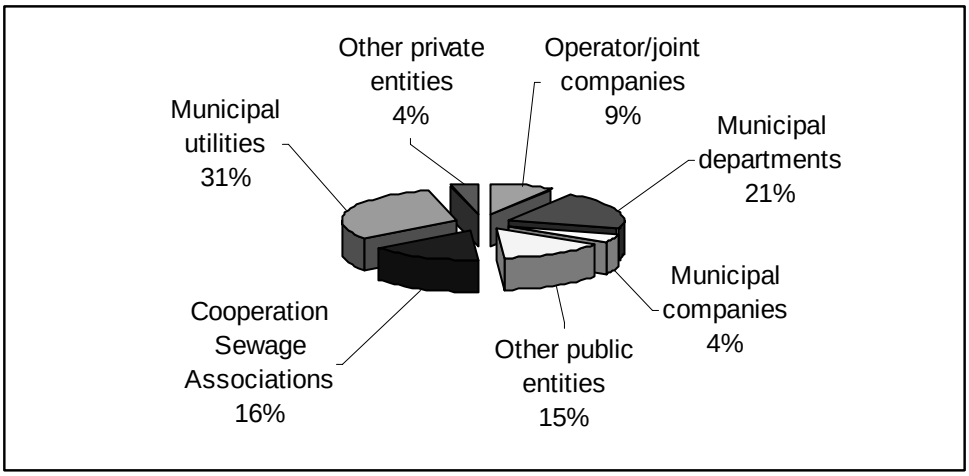
Some salient features of the sector compared to other developed countries are its very low per capita water use, the high share of advanced wastewater treatment and very low distribution losses.

In Germany, there are about 12.320 municipalities, and about 6.000 water operators, mainly publicly owned. Traditionally, municipalities organize the supply of water. Nevertheless, in the last twenty years many other organizational forms different from the traditional municipal departments have been developed and realized. The national water market is not dominated by multinationals, as is the case of France, but rather by a multitude of medium-sized enterprises and municipal companies. Municipalities are free to choose the organizational form of their water services, while the ownership of the water assets has to remain in their hands. They may decide, according to their political and economical preferences, if delegate or not water services and the degree of involvement of private parties.

In particular, a municipality may decide the direct management of the water services. In this case, we face the case of a fully public provision, as we have seen in the classification of the chapter 2, and the most common organizational forms are the following:

- the municipal department, operated by the municipality within the scope of the municipal administration and bookkeeping;
- the municipal utility, operated by the municipality in a separate entity with independent bookkeeping;
- the municipal company, with a private entity company (corporation) in the hands of the municipality.

In alternative, the municipality can choose to involve private parties in engaging a Public-Private Partnership. In this case, the organizational forms may be the mixed capital firm, or joint company, with the creation of a private entity company owned by municipal and private parties, that is an institutional form of Public-Private Partnership. In alternative a service contract or a concession contract with a private owned firm, as defined in the chapter 2.



Different forms of organisation in % of population.
Source: German Federal Ministry for the Environment, Nature Conservation, and Nuclear Safety (2001).

The figure depicts the various forms of organization of the water supply, in % of population served. It is worth notice that private participation covers only 13% of population. The voluntary cooperation between municipalities in water associations plays an important role, providing water to 16% of population. Nevertheless, public forms of organization serve more than 70% of population.

The two most important IPPPs are Gelsenwasser and Berlinwasser. Gelsenwasser is quoted, and it is owned for the most part by the municipalities of Bochum and Dortmund (92%), by other municipalities (5%) and by the market (3%). It is a multi-utility (water, sanitation and natural gas distribution) serving 3.2 million inhabitants in North Rhine-Westphalia, under concession agreements with 39 municipalities, and many other localities throughout Germany and internationally. It has expanded into Eastern Europe, in particular in Hungary, Poland and Czech Republic. Berlinwasser is a IPPP among the Lander of Berlin (50,1%), Veolia (24,95%) and RWE (24,95%). It provides water and sanitation services in Berlin, serving 3.5 million people.

The technical and economical regulation of water management is based in Germany on the following instruments.

The property of the water network is of the municipalities. The federal law imposes minimum requirement standards for the quality of drinking water and for technology and operation of plants.

By law, price mechanisms for water supply are subject to the cost recovery principle, including capital replacement and the remuneration of equities. The municipalities are not responsible for price supervision, but rather the antitrust agency (which also regulates the supply of gas and electricity).

4.3.4 Some experiences of South America

During the last decade, Bolivia introduced PPPs in the water sector. In 1999, the municipality of Cochabamba organized the auction for the concession of

the water service. The only bidder to the auction was the consortium Aquas de Tunari, which was indirectly controlled from the American multinational Bechtel and the Italian AEM (owned by the municipality of Milan), trough the public company Edison. The contract assigned the concession of the water services for the duration of thirty years, with the right of extraction of water on every springs, including private ones. The consortium increased the tariff of 300%, and the cost of water became too high compared with a medium wage of the country. In some cases, a monthly water bill was 12$, with respect to a monthly wage of 60$. Moreover the cost of connection to the water network was charge in the bill, and the concession to the consortium forbids any free private use of alternative sources of water, that were the traditional way of local communities in provisioning themselves. In april 2000 a protest of thousands people, called water war, induced the government to abolish the water reform and to rescind the contract with the consortium, with the water service transferred to a company owned by the municipality. In 2002 the multinationals Bechtel and Edison recurred to the court of the ICSID (the International Centre for Settlement of Investment Disputes of the World Bank) asking the government the payment of 25 million dollars in compensation for damages.

Also the government of Ecuador had some problems with private involvement in the water sector, too. In 2001 the Ecuadorian government, trough its owned company ECAPAG, signs with Interagua C.Ltda, indirectly controlled by the multinational Bechtel, the contract of concession of the water services in the city of Guayaquil, the most populous city of Ecuador. Interagua changes the tariffs with an increase in 2006 of 400% respect to 2000. Though the high prices paid to the contractor, population begins a protest due to the low quality of the water, the frequent interruption of the service and the diffusion of cases of hepatitis in the city. In 2003 Interagua obtains a loan of 40 million dollars from the Inter-American Development Bank, with the Ecuadorian government which guarantee the debt, in order to invest in the water infrastructure.

The case of Argentina is the following. In 1995, the government signed a thirty years concession contract with the company Aguas de Aconquija, controlled by the French Vivendi, for the water services in the northern region of Tucuman. The tariffs increased of 100 %, while people began to complain the deterioration of the water quality. In 1996 a large protest of citizens (about 80% of bills were not paid in sign of protest) due to high tariffs and bed water quality, induced the government to recur to the provincial Court for contractual breach of the Vivendi. In 1997, the government rescinded the contract and began a phase of renegotiation with Vivendi. In 1998, the French company decided to abandon the concession contract, denouncing the government of changing the initial terms of the concession contract. Vivendi recurred to the court of ICSID asking the government the payment of 105 million dollars in compensation for damages.

A similar proceeding is present at the ICSID between Argentine and Azurix Corporation (the water division of Enron Corporation), for a concession contract regarding water services in the region of Buenos Aires. In this case, too, the contractor claims a compensation of 156 million dollar for the break of the concession in 2002 due to the unilateral decision of the government.

4.3.5 The Italian water system

A structural reform of the Italian water sector has begun in 1994 with the so called *Galli Law*.[22] At that time, the sector was highly fragmented, poorly planned, and somewhere even extremely inefficient. Small public companies and municipal departments were the prevalent organisational model, with about 8000 water suppliers. Tariffs were set well below the cost recovery level, causing almost no investment and a general worsening of the public budgets. As a result of the *Galli Law*, a slow process of consolidation

[22] Law n. 36 of 5 January 1994.

and industrialisation has taken place. There have also been substantial changes in the regulatory governance. Nevertheless, after 14 years, the reform is not yet fully completed.

The new organisational model is based on some key points:

1) separation of the role of planning and regulating the sector (assigned to the public authorities of Regions) from that of operating it (delegated to a totally separated entity);

2) territorial integration of homogeneous areas into new administrative divisions at the sub-regional level, called ATOs;[23]

3) full cost recovery through tariffs and financial self-sufficiency.

The chosen model is the concession contract. The AATO has to delegate the responsibility of both operations and investment to a single operator. Nevertheless, every AATO is free to choose the property regime of the water operator: its capital may be public, private or mixed. However, in every case it has to follow European rules on procurement. In fact, when a private entity is involved, the AATO has to select the private partner through competitive auctions based on the most economically advantageous offer. Direct delegation may can only occur if the company is fully public, recurring the case of *in-house* provision, as we have seen in the chapter 2. More precisely, the water law in linked to the Public Local Services Law. According to the Law 267/2000 (article 113), the AATOs may organize the water service through the delegation to a provider in three different way:

1. procurement of the service to a private firm, through a public tender, according to the procurement laws of the European Union;

2. direct delegation to a so called in-house company, entirely publicly owned;

3. direct delegation to a mixed company, with a public selection of the private partner.

[23] AATO is the acronym for Autorità d'Ambito Territoriale Ottimale.

Substantial freedom is left to the AATO in choosing the actual details of the agreement with the water provider. The main decision variables are: the length of the concession; the nature and strength of the control on performance; the informational obligations; the allocation of risks, especially investment overruns and revenue fluctuations; the system of penalties for underperformance; the procedural aspects of contractual adjustment, dispute resolution and asset valuation at contract termination.

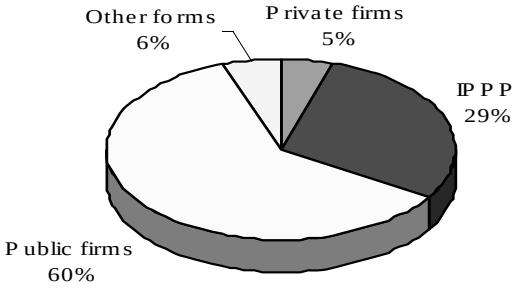
The following table shows the situation of the AATOs in the 2007.

				Organizational form			
Regions	**Number Of Existing ATOs**	**ATOs with a selected provider**	**Number of providers**	**Traditional Procurement to a private firm**	**IPPPs**	**Public Firms (in house)**	**Other forms**
Piemonte	6	6	29		7	17	5
Val D'Aosta	1						
Lombardia	12	6	11		1	10	
Veneto	8	7	12		1	11	
Friuli Venezia Giulia	4	1	1			1	
Liguria	4	2	5		1	4	
Emilia Romagna	9	9	10		9	1	
Toscana	6	6	6		5	1	
Umbria	3	3	3		2	1	
Marche	5	4	6		1	5	
Lazio	5	4	4	1	2	1	
Abruzzo	6	6	6			6	
Molise	1						
Campania	4	2	2		1	1	
Puglia	1	1	1			1	
Basilicata	1	1	1			1	
Calabria	5	3	3			2	1
Sicilia	9	5	5	4	1		
Sardegna	1	1	1			1	
Ato Lemene	1						
Total	**92**	**67**	**106**	**5**	**31**	**64**	**6**
North	***45***	***31***	***68***	***0***	***19***	***44***	***5***
Centre	***19***	***17***	***19***	***1***	***10***	***8***	***0***
South	***28***	***19***	***19***	***4***	***2***	***12***	***1***

The situation of Italian AATOs, year 2007. Source COVIRI, 2008

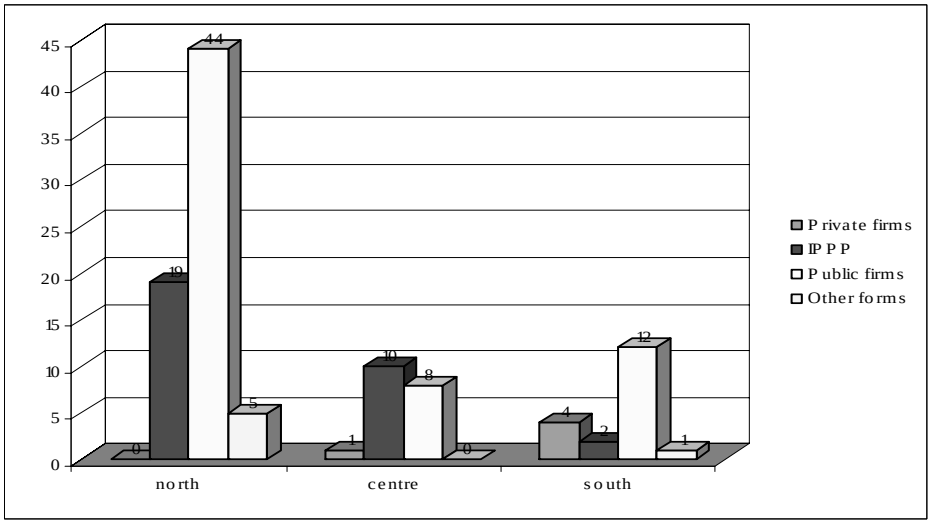
Of the existing 92 AATOs, 67 of them have delegated the water service to the provider, which represents the 73% of the total cases. It is worth notice that the Galli Law was adopted in 1994, and, at the present, it is not

yet totally completed, especially in the south of the State! Moreover, the number of water providers is 106, which means that some AATOs have chosen more than one provider. The table shows also the organizational forms chosen by the AATOs.



Organizational forms in Italy

The figure shows that the most important organizational forms chosen by the AATOs are the solution of in-house provision through a public firm (60%) and the Institutional Public-Private Partnership (29%). The traditional procurement to an entirely private firm is a residual form (5%).

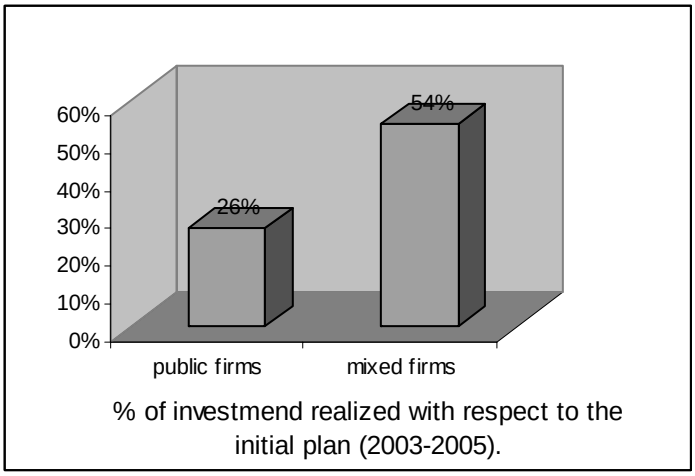


Distribution of different organizational forms

The previous figure shows that the institutional Public-Private Partnership is the preferred solution in the central regions, while in the other regions it's prevalent the model of the public firms. In the northern regions the reform has been quite completely implemented, while this is not so in the rest of the State.

During 2007, the COVIRI sent out a questionnaire to the AATOs, in order to know the entity of investment plans in water sector. The analysis is partial, because some AATOs did not answer. Nevertheless, the sample analysed gives the following results.

First, every AATO prepares a plan of investment necessary to its water network, and the provider should realize this plan. Nevertheless, in the years from 2003 to 2005 only 49 % of the planned investment has been realized by the water providers. We have analysed if there is a difference between the various forms of organization, and the better performance is achieved by the IPPP (mixed capita firms).



% of investmend realized with respect to the initial plan (2003-2005).

In fact, on average, as the previous figure depicts, the public firms and mixed firms realized, respectively, 26% and 54% of the planned investment.

A second aspect analysed by COVIRI is the structure of the planned financing of the water providers in order to realize the planned investment. The following table shows that the prevalent form of financing investment is

the self-financing. In fact, on average a water provider finance 58% of its planned investment with self financing.

structure of planned financing for investment	average
self-financing	58%
Debt	23%
transfers from E.U.	16%
capital increase	2%
transfers from municipalities	1%
Other	1%

Source: COVIRI 2008

In other words, firms plan to finance investment through the revenue deriving from the tariffs charged to consumers. The other forms of funding are the debt and the public transfers deriving from the European Community, which on average represent 23% and 16%, respectively. Capital increase and transfers from municipalities are only a marginal case.

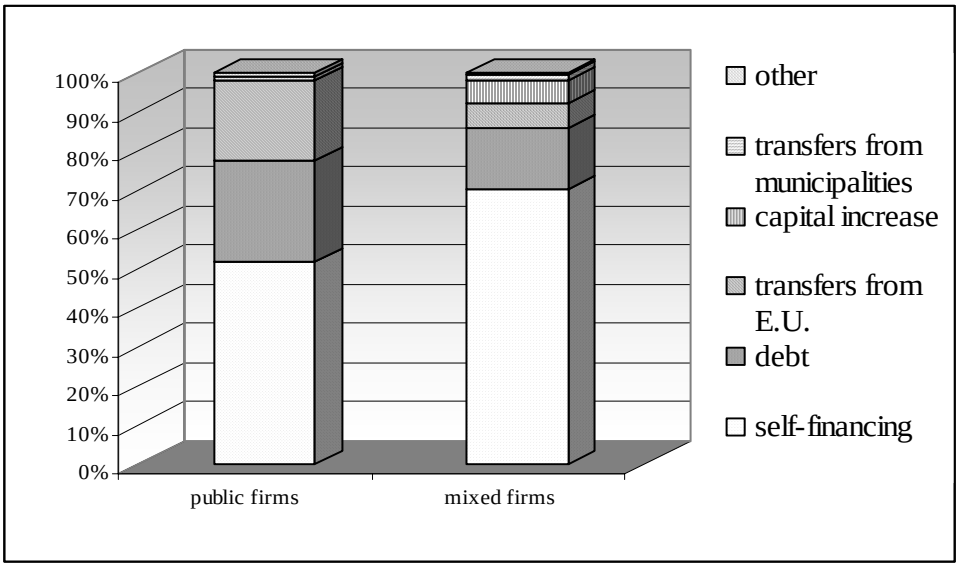
We have analysed the differences between public and mixed firm on the data of the questionnaire of COVIRI. The result is that a strong difference between public and mixed firm arises in financing investment. Self-financing is the 70% of the planned financing of mixed firms, while it is the 52% in the public firms. Moreover, mixed firms use debt and European funds only for 16% and 6%, with respect to 26% and 20% of public firms.

structure of planned financing to realize investment	average	public firms	Mixed firms
self-financing	58%	52%	70%
Debt	23%	26%	16%
transfers from E.U.	16%	20%	6%
capital increase	2%	0%	6%
transfers from municipalities	1%	1%	1%
other	1%	1%	1%

Our elaboration on COVIRI 2008

The result is that mixed firms prefer the use of self-financing more than public firms in their plans, and are not disposable to increase debt with

respect to public firms. The following figure shows how prevalent is self-financing in the mixed firms with respect to the public firms.



Structure of planned funding of public and mixed firms.

The following table shows the financial structure of public and mixed firms realized after the first three years of management, with respect to the structure planned at the beginning date.

structure of funding	**public firms**		**mixed firms**	
	planned	***realized***	***planned***	***realized***
self-financing	52%	39%	70%	60%
debt	26%	17%	16%	10%
transfers from E.U.	20%	42%	6%	8%
capital increase	0%	1%	6%	16%
transfers from municipalities	1%	1%	1%	5%
other	1%	0%	1%	1%

Structure of funding, our elaboration on COVIRI 2008

Public firms report a realized self-financing and debt value lower than planned, while the component of E.U. transfers is more than double with respect to the plans. Also mixed firms report a realized self-financing value

lower than planned. This means that public firms, while reporting high percentage of self-financing and debt, actually tend to finance investment for the most part throughout European financial resources.

The market structure of the Italian water sector has been elaborated using the data set of COVIRI (2008) and of Italian Antitrust Agency (2007).

The following table shows the most important water company in Italy.

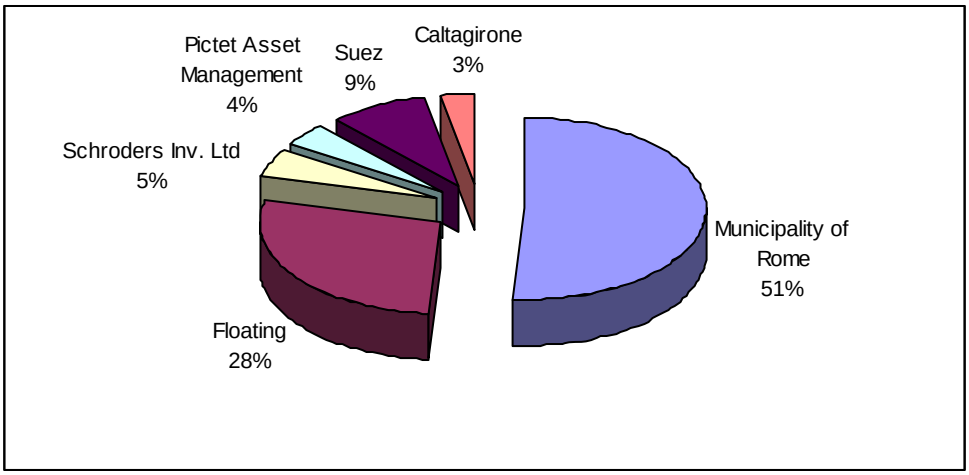
Firm	Served population	%
ACEA spa	8.200.243	14,62%
Acquedotto Pugliese spa	4.019.566	7,16%
Hera spa	2.528.283	4,51%
Smat Torino spa	2.153.258	3,84%
Metropolitana Milanese spa	2.461.534	4,39%
Iride spa	1.183.267	2,11%
Enia spa	1.110.740	1,98%
Arin Napoli	980.000	1,75%
A2A spa (ex Asm Brescia)	908.726	1,62%
Veolia	700.000	1,25%
Acegas-Aps spa	470.184	0,84%
Suez	244.519	0,44%
other operators	31.147.202	55,51%
Total	56.107.522	100,00%

Source: our elaboration using data COVIRI 2008 and AGCM (2007).

Acquedotto Pugliese spa, Smat Torino spa, Metropolitana Milanese spa and Arin spa are public firms, serving the region of Puglia and the municipality of Turin, Milan, and Naples, respectively. Suez and Veolia are the two most important water multinationals. The other firms are institutional Public-Private Partnerships. Acea spa, Hera spa, Iride spa, Enia spa, A2A spa and Acega-Aps spa are Public-Private Partnerships in the form of mixed capital firms involving the most important municipalities (Rome, Bologna, Genoa, ReggioEmilia-Parma-Piacenza, Milan and Brescia…). All these mixed capital firms are quoted at the Milan Stock Exchange, while local municipalities own the majority of the capital (>50%).

Acea spa is the most important water company in Italy, serving about 15% of population. Moreover, if we consider only the water market opened to the private partnerships, Acea serves more than 50% of this population.

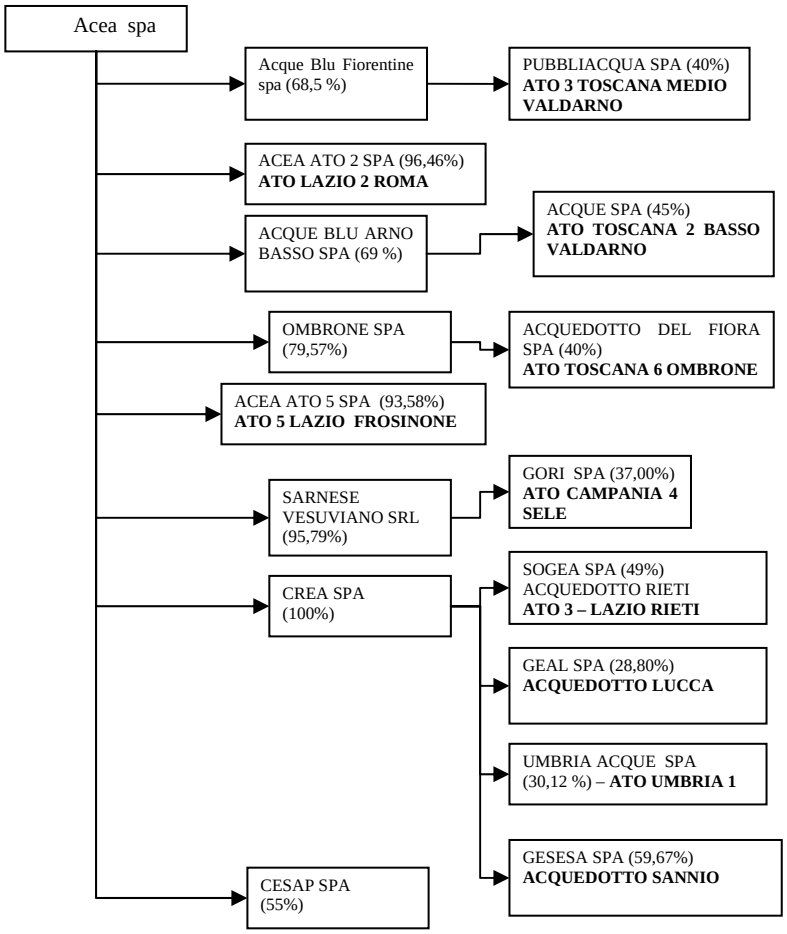
Acea is a mixed capital company, where the Municipality of Rome owns 51% of shares, while 9% is owned by Suez, its operative private partner. The remaining part is owned by Asset Management Companies and by the market.



Source: Acea spa, Group Balance Sheet, 2007.

Acea spa is the water provider not only of the city of Rome. In fact, from the beginning of the Italian reform, its strategy has been to expand in the Italian water industry, and the following figure shows the presence of the company in many parts of Italy.

We have seen that Acea spa is an IPPP between the municipality of Rome, which owns 51% of shares, and private parties, in particular SUEZ and asset management funds. The controlled company Acea Ato 2 spa, is owned by Acea spa (96,46%) and by the municipalities of the ATO 2 Rome. In this way, Acea Ato 2 spa is an IPPP between the municipalities of the ATO 2 Rome, including the city of Rome, and private partners, where the municipality of Rome indirectly owns the major part of the shares.



The nature of mixed firm of ACEA spa is because it is a multi utility operating in the municipality of Rome. Nevertheless, with its strategy of expansion, ACEA, and indirectly the municipality of Rome, is become the industrial partner of other municipalities belonging to other ATOs. For example, ACEA owns 37% of GORI SPA, which provides water services in the region of Campania (ATO 4 – Sele). The remaining 63% is owned by the municipalities of the ATO 4-Campania Sele. In this case, GORI SPA is an IPPP between public municipalities and a private party, that is Acea, which is indirectly controlled by the municipality of Rome! In other words, we can say that the municipality of Rome indirectly controls water provision of 12 % of Italian population! The question is the following: what is the

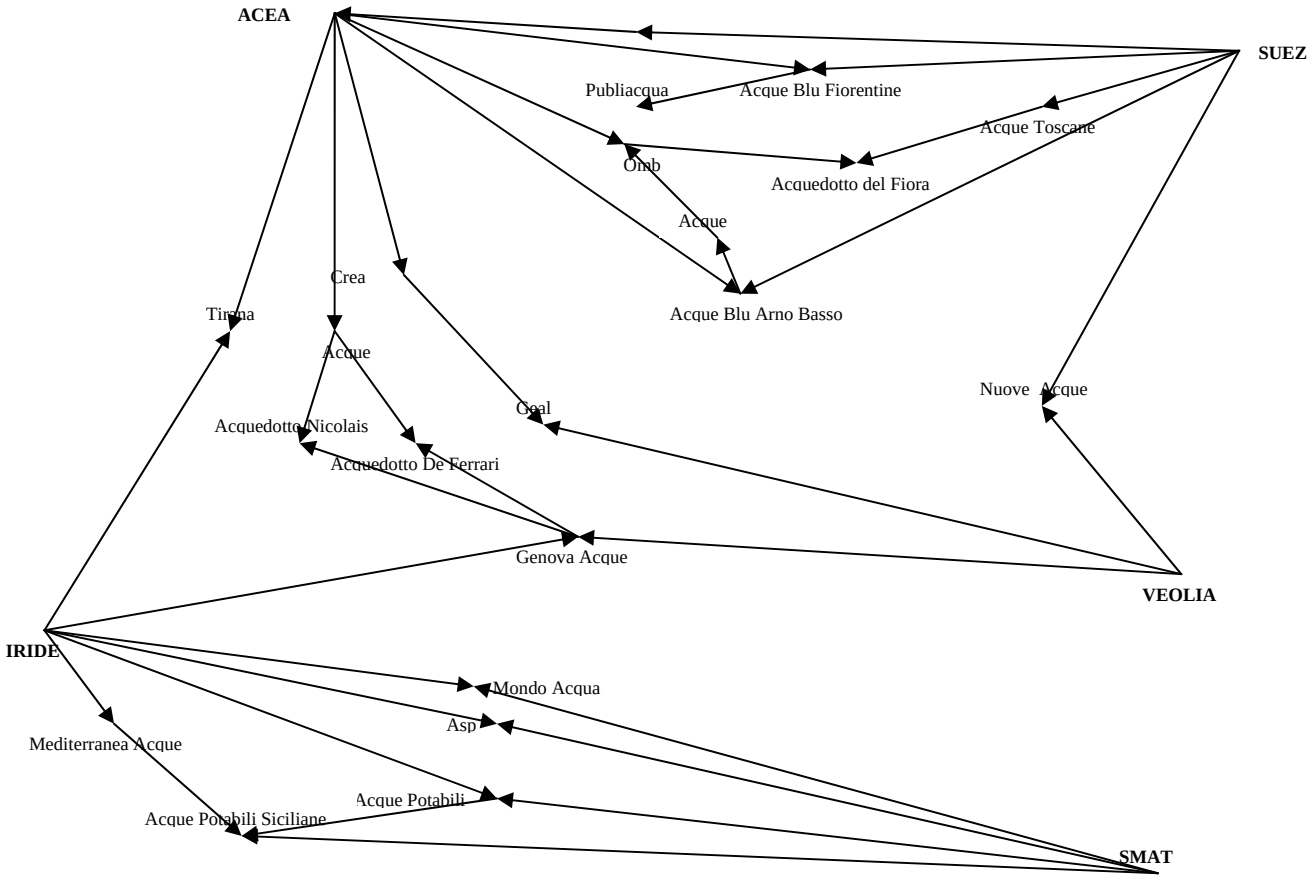
objective of the municipality of Rome in controlling water provision of municipalities that are not in its electoral boundary?

The following facts perhaps may highlights on the behaviour of the management of Acea in its expanding strategy. Acea at the present owns indirectly 40% of Publiacqua spa, an IPPP with local municipalities (including the city of Florence) for the provision of water services in the ATO 3 Toscana-Medio Valdarno. The participation is owned through its controlled company Acque Blu Fiorentine spa, where it owns 68,5% of shares while SUEZ owns 22,83%. SUEZ, the France Company, works in the Italian water sector both directly and indirectly through its controlled companies. During 2006, the AGCM[24] (the Italian Antitrust) applied a penalty to ACEA and SUEZ due to the violation of the article 81 of the EC Treaty, which forbids agreement between firms consisting into limit market competition. According to the Italian Antitrust, a hidden agreement exists between the two companies ACEA and SUEZ, which are direct competitors in the Italian water market, in order to coordinate their commercial strategies and to share the water concessions of the ATOs. According to the AGCM, this agreement has conditioned quite 25 per cent of Public-Private Partnerships created at national level. The two companies have concerted their participation to many auctions for water concessions and for the entry in PPPs with local municipalities, initiating with the region of Toscana. After all, though the agreement is hidden, the relationship between ACEA and SUEZ is formalized by the participation of SUEZ in 9 per cent of the capital of ACEA, and by the fact that SUEZ directly chooses two of the nine members of the Board. In particular, AGCM demonstrated that SUEZ offered in France its abstention in the auctions where ACEA was interested. On the othe hand, in Italy a documentation exists where SUEZ offered its abstention in the auction for the water concession of the ATO 5 – Lazio

[24] Autorità Garante della Concorrenza e del Mercato.

Frosinone, won by ACEA, while ACEA offered its abstention in the auction for the choice of a private partner of the municipality of Livorno.

However, we have analyzed the link existing among the most important Italia water providers, as we can see in the following figure.



The analyses confirm the presence of a cooperation between SUEZ and ACEA, but also many links between ACEA and Veolia.

The effect of these agreements is a limitation of competition in the Italian water sector, which was in a delicate moment of transition due to the reform of 1994. A limitation of competition is also evident by the analyses of Anwandter-Rubino (2006).

The authors show that in the last tenders of AATOs for the research of a private partner, the average number of bids has been 1.1.

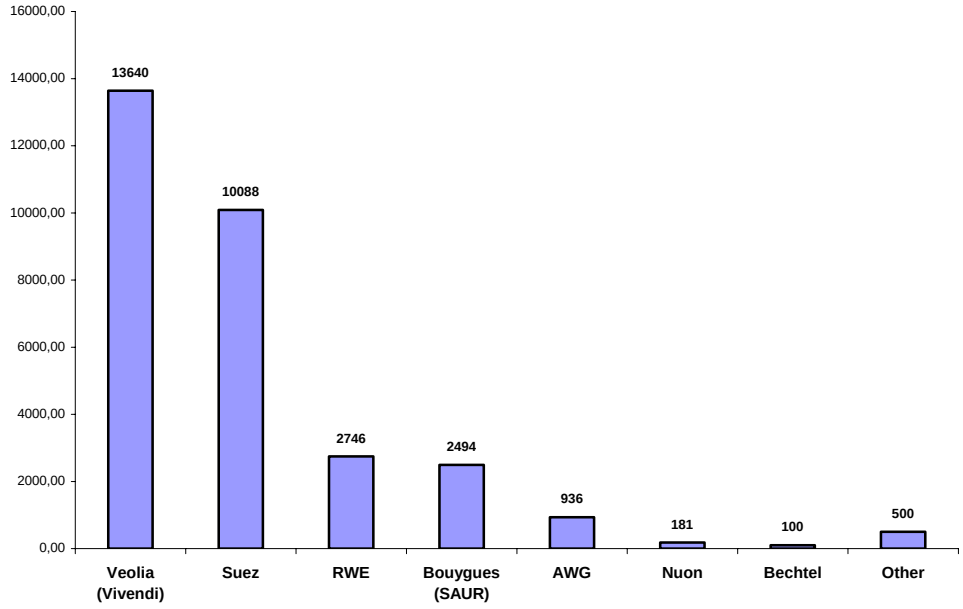
Kind of tender	*Number of tenders in the sample*	*Average duration in years of the concession*	*Average number of bids*
Research of private partner	12	26,3	1,1
Private concession	10	28,0	1,1
TOTAL	**22**	**27,1**	**1,1**

Source: Anwandter-Rubino (2006)

In the following paragraph, we will see that the case of collusion is spread at international level, too. Moreover, we will see that also some cases of corruption are present in some part of Italy involving private partners.

4.3.6 Private corporations involved in PPPs in the water sector

The water business is dominated by the two largest French multinationals, Suez and Veolia (ex Vivendi), who together hold about 70% of the international private participation in the water business. The following figure compares sales of these two and the other largest companies in the 2001.



Water sales, 2001 (€millions), Hall (2002), modified.

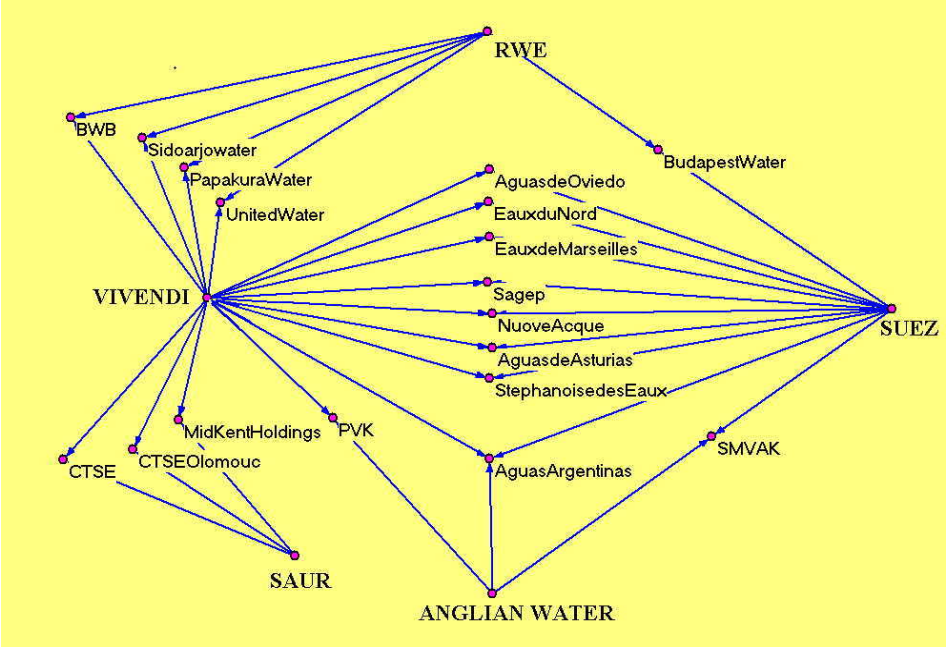
Other large international operators are the German RWE and another French multinational, the Bouygues-Saur.

In the last years, a process of concentration is in act, notably with a series of recent takeovers of US companies. Suez bought US Water, which was owned by Bechtel, and United Utilities, and a number of Azurix contracts in Mexico.

Moreover, the most important private corporations are suspected of a collaboration in order to reduce competition and to dominate the water market. In fact, as reported in Hall (2002), in 2002 the French Antitrust Authority (*Conseil de la Concurrence*) ruled that Suez, through its controlled companie Lyonnaise des Eaux, and Veolia-Vivendi, through its controlled companies Generale des Eaux, had been abusing their market dominance in France, where they control more then 70 % of the private water sector. The two companies had created joint subsidiaries in a number of towns and regions, so that they were sharing the profits of a number of water concessions instead of competing against each other: 12 joint ventures in France were listed, including cities such as Marseilles and Lille – two involving SAUR as well. The council also said that since June 1997 more than 40 tenders had been made uncompetitive by the groups' behavior. As we have seen in the previous paragraph, also Italian Antitrust charged SUEZ and ACEA for the same reasons.

These forms of trusts are not a local case, but it is an international phenomenon. The following figure shows a number of links between the major international companies.

It is worth to notice that even the nearest competitors to Suez and Veolia-Vivendi (RWE, SAUR, and Anglian) are interested in many partnerships with Suez and Veolia-Vivendi, in order to establish themselves in the market. RWE/Thames for example are partners to Vivendi on three of their major water operations – Berliner Wasserbetribe, Budapest Sewearge (FCSM), and United Water in Adelaide, Australia, and its offshoots in New Zealand (Papakura) and Indonesia (Sidoarjo).



Joint ventures between leading water multinationals
Source: PSIRU database, 2002. Generated by V.Popov using Social Network Analysis software, reported in Hall (2002).

RWE is also a partner to Suez in Budapest Water. SAUR has partnerships with Vivendi in both the UK and the Czech republic. Anglian is a partner of both Suez and Vivendi in Aguas Argentinas, and separately of Vivendi and Suez in the Czech Republic.

In Italy we have seen in the previous paragraph the link between SUEZ, Veolia and ACEA.

However, a number of convictions for bribery involving managers of subsidiaries of both SUEZ and Veolia, in order to obtain water contract, supports the suspicion of collaboration between multinational corporations. The following table lists some of the most significant recent convictions.

Some details of these convictions are the following. In France, in 1991, the mayor of Ostwald resigned after receiving paybacks from Vivendi, Saur and Suez. He claimed the payments were ‘normal’ and that other officials received similar cutbacks.

Year of conviction	Country	Location	Corporation
2008	Italy	Calabria	Veolia
2008	Italy	Latina	Veolia
2001	USA	New Orleans	Veolia
2001	USA	Bridgport	Veolia
2001	Italy	Milan	Veolia
1996	France	Grenoble	Suez
1996	France	Angouleme	Veolia
1996	France	Réunion	Veolia
1991	France	Ostwald	Veolia

In 1995, in Grenoble, a senior executive of Lyonnaise des Eaux (Suez) received prison sentences for taking and giving bribes to award the water contract to a subsidiary of Lyonnaise des Eaux. The bribes were over $2.8 million. In 1996, two senior Vivendi executives were convicted of bribing the mayor of St. Denis in order to obtain a water contract after admitting in court in October 1996 that Vivendi had financed elected officials in order to obtain a water concession. The two senor executive managers were found guilty of bribery in at least 70 cities throughout France.

In USA, Professional Services Group (PSG), purchased by Vivendi in the mid-1990s, signed the contract to operate New Orleans water service in 1992. A PSG executive and a member of the New Orleans Sewerage and Water Board were convicted in connection with bribery charges as PSG was seeking an extension to that contract.

In Italy, in 2001, a senior manager in Vivendi's water division was convicted for bribery and received a prison sentence in connection with a bribe paid to the president of the Milan city council during the bidding procedure for the contract for a wastewater treatment plant in the south of Milan. In January 2008, part of the top management of Acqualatina spa was arrested for corruption. Acqualatina spa is an institutional Public-Private

Partnership between the municipalities of Latina, which own 51%, and the multinational Veolia, which owns 49%. The charge is that, because the company is an IPPP, with public authorities involved, every operation of contracting-out is subject to a competitive tender, in respect to the European and national procurement law. The Court demonstrated that, though they had the majority, public managers did not prevent private managers from contracting-out, without public tenders, many services and construction contracts to the subsidiaries of the private partner, Veolia. The same top managers, imposed by Veolia, are charged of corruption for the same reasons in the company Sorical spa, that is an IPPP between the Regional Authority of Calabria (53,5%) and Veolia (46,5%), operating in the Calabria's water services.

These cases show the presence of a difficulty in the IPPP to stop private cross-subsidies from private partners. The cash surplus deriving from water revenues may be drained by the parent companies of the private partners, which then give generous dividends to their private shareholders. This case of "milking the cow" of water to finance other activities is used in particular by multinational corporations and by multi-utility companies.

One of the phenomenons of the last ten years is the exit of some multinationals from the water contract of some developing countries. The reason is the need to reduce their exposure to projects that are not profitable enough or too risky.

More precisely, over the period 2001-2004, water multinationals have limited their investment in developing countries. According to Izaguirre-Hunt (2005), RWE-Thames announced that it would withdraw from most regions while focusing on Central and Eastern Europe, while Veolia announced that it would concentrate on selected Asian countries, and Suez that it would pull out of Asia and Latin America.

The question of the provision of water services and infrastructure in poor developing countries is a key issue of the model of Public-Private Partnerships. The World Bank insists that private sector involvement is

possible also in developing countries, but multinationals do not share this optimism.

Hall (2002) reports the results of the World Bank Water Division of January 2002. The Water Division stated that the private sector has no incentive to invest in developing countries. Moreover, the chief executive of SAUR rejected some common beliefs about the role of the private sector as an investor in developing countries. In these countries, a problem exists of compatibility between regulation and profitability and of feasibility of the cost recovery. He concluded that subsidies and soft loans are essential in developing countries in order to sustain water investment in infrastructure. He warned that tighter contracts and regulation make things worse from a business perspective: the general increase in risk was made worse by *"*[*u*]*nreasonable contractual constraints …. Unreasonable Regulator power and involvement"*. Finally, he rejected the possibility of cost recovery from users: *"water pays for water is no longer realistic in developing countries: Even Europe and the US subsidise services….Service users can't pay for the level of investments required, not for social projects…"*[25]

The solutions to these problems, in his view, is the presence of public subsidies, soft loans and guarantees. The role of the World Bank should be to coordinate the supply of these soft loans and subsidies, tell developing countries what to do, and act as a partner to private companies.

His final statement was that, without these subsidies and soft loans coordinated by the World Bank, the multinationals would exit from the water contracts of the developing countries.

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[25] 'Is the Water Business Really a Business?' Mr J.F.Talbot, CEO Saur International World Bank Water and Sanitation Lecture Series 13th February 2002 http://www.worldbank.org/wbi/B-SPAN/docs/SAUR.pdf

4.4 A COMPARISON OF THE DIFFERENT NATIONAL WATER SYSTEMS

In this section, we make a comparison between the national water system of England and Wales, France, Germany and Italy. We are interested in particular in analyzing and comparing the following four points: the regulation framework, the ownership structure, the government levels involved and their contractual power, the tariff setting and the way investment in water infrastructure are financed.

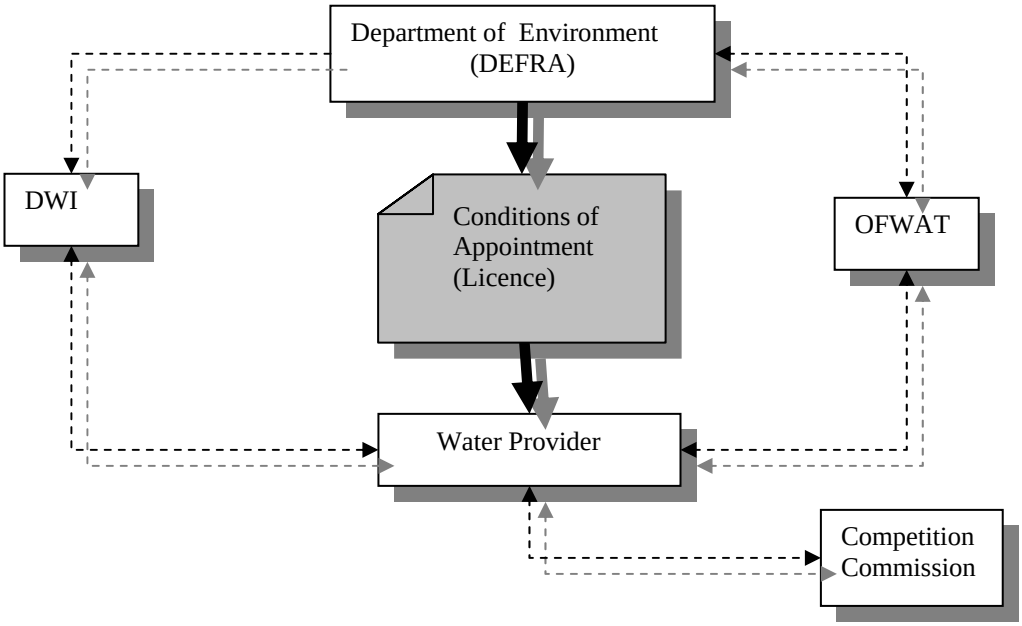
4.4.1 The regulation framework

In analysing the water system of the four countries, we can observe two main regulation models adopted by England and by France, the *regulation by independent authority* and the *regulation by contract*, respectively. In the cases of Germany and Italy, a mixed model is adopted.

The model of *regulation by independent authority* is based on a unique national authority, independent from national and local governments, which promotes a homogeneous regulation of the national water sector. The model of *regulation by contract* does not include any national regulator, because every duty and obligation is regulated by the contract signed between parties. This model is characterized by a local dimension of regulation.

In particular, the following figure depicts the English regulation structure.

A strong central framework characterizes the model, with a national regulator that is the Department of Environment, and its offices of DWI and OFWAT, which deal with the technical and economic regulation, respectively. Local Authorities have a little responsibility, and a clear separation between regulators and regulated firms is able to eliminate every conflict of interest.



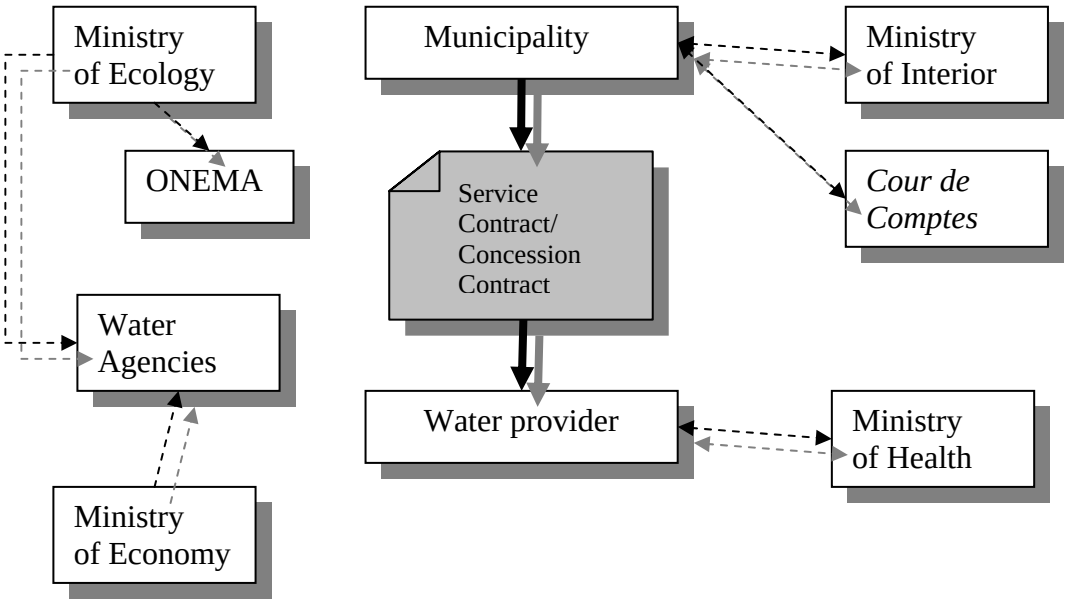
The Department of Environment, Food and Rural Affairs (DEFRA) has overall responsibility for all aspects of water supply, water resources management and the water regulatory systems. It prepares the water legislation, and sets the legal framework for drinking water quality, environmental, and customer service standards, which the undertakers must deliver and the OFWAT must enforce. The Conditions of Appointment (often referred to as the "Licence") were granted by the Department of Environment in 1989. The Licence imposes conditions on the companies, which are enforced by the economic regulator, that is the Office of Water Services Regulation Authority (OFWAT). OFWAT is the economic regulator of the water sector. Its mission is to regulate water sector in a way that provides incentive and encourages the private companies to achieve a world-class service in terms of quality for customers. Its choices are made independently of the Government. OFWAT directly enforce the licences awarded to the water companies, and set a regulation framework in order to limit price increases, to improve water services, to encourage companies to be more efficient and to guarantee standards of service. It is worth notice that water licences impose to the water companies the respect of the national

regulation of procurement of services in the public sector if they chooses to contracting out part of their services. The Drinking Water Inspectorate (DWI) is the office of DEFRA which carries out technical audits of water undertakers and initiates enforcement action in case of contraventions of the water standards.

Finally, the Competition Commission has the role of 'court of appeal' for both the water companies and the DEFRA. A company may appeal against the decision of DEFRA in case of disagreement of the five-yearly review of K factors or of interim adjustments of tariffs.

The Competition Commission also plays a role in the event of a merger or acquisition within the water industry.

The French model is quite different, and the following figure depicts it.

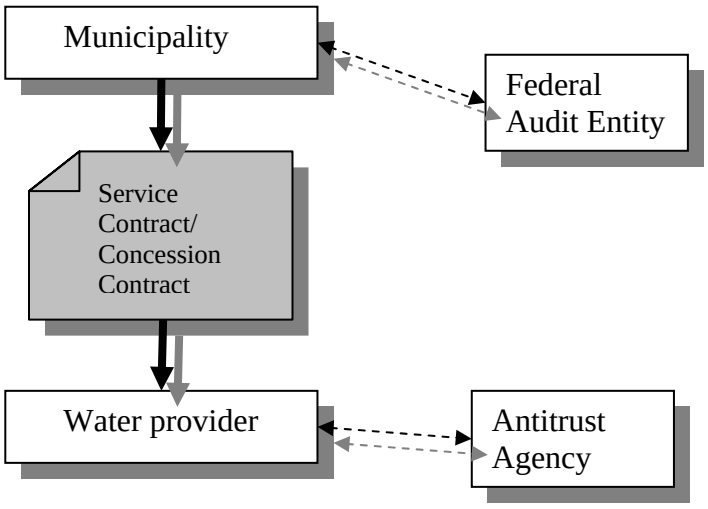


Opposite to the English model, a strong local dimension based on the municipalities characterizes the French model. Municipalities have the power and responsibility of the water provision, and the economic regulation of private service provision is determined by the contract through

the municipality and the provider. There is not any national or regional independent regulator, and municipalities are the only responsible for the design of the contract with the water provider, in order to contract tariffs, adjustments and every other contingency. The only control on municipalities is made by the Ministry of Interior and by the National Audit Entity (Cour de Comptes) within the general auditing of expenditure and of the general financial equilibrium. The model is characterized by a weak power of the National Government. This power is also spread in many departments. In fact, the competence of general environmental regulation is of the Ministry of Ecology, while its National Office for Water and the Aquatic Environment (ONEMA) has the objective of developing knowledge and information about water resources and their uses. The control of the drinking water quality is in the competence of the Ministry of Health. Moreover, Six Water Agencies, controlled by the Ministry of Economy together with the Ministry of Ecology, collect fees directly from water users (householders or economic stakeholders) for any pollution they have caused or for the water they may have drawn. These funds are then reallocated in the form of financial loans or subsidies to local communities for investment in waster infrastructure.

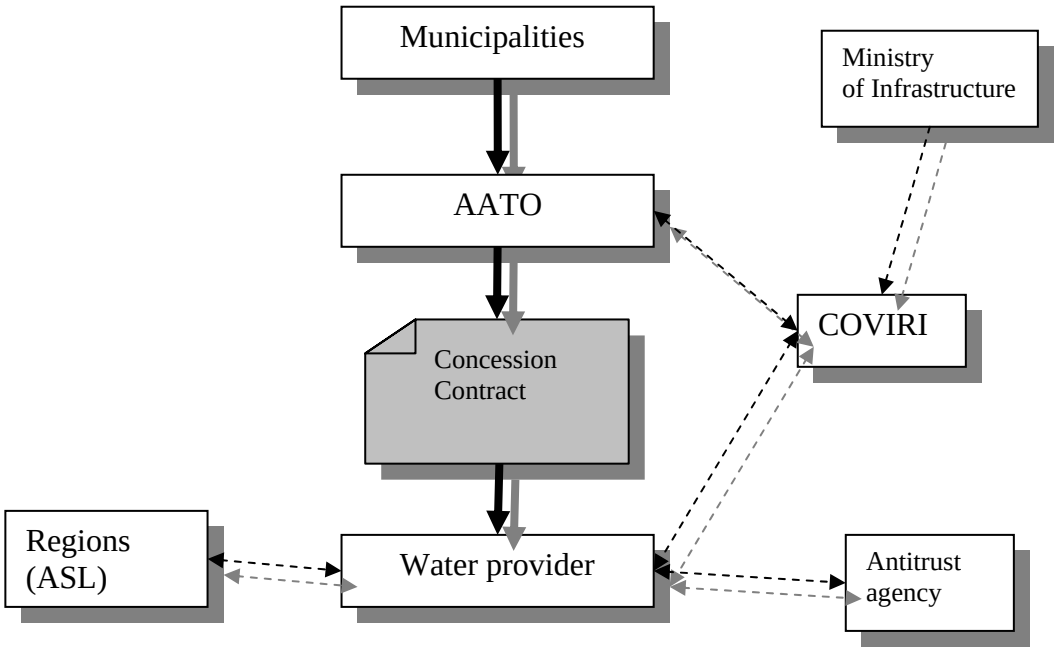
In Germany, the responsibility of the water provision is delegated to the municipalities, which design the water contract and negotiates directly with the water provider. Nevertheless, we have seen that the major part of cases the water provider is a fully public owned firm.

In Germany, the model is structured on the base of the French one. A strong decentralized framework assigns to the local municipalities the provision of the water services. The Federal Government and the Stats (Laenders) states the legal framework, usually transporting EU legislation, thus influencing general condition of water services, water tariffs (e.g. for the principle of cost recovery), water quality and so on.



Moreover the Government use the power to control the expenditure of municipalities. Nevertheless, the central institution is the municipality, which have to decide on the institutional, organizational and contractual arrangements for the provision of water services. Drinking water quality is also monitored directly by municipalities. Like in France, there is no autonomous regulatory agency. Nevertheless, the national Antitrust Agency is competent, between other, on the tariff supervision, through a cost control and a comparison with other homogeneous companies. Municipalities are free to determine water tariffs, though Antitrust Agency may order a revision of the tariffs if an abuse of monopoly power is proven. In fact, water providers must be able to demonstrate that their water prices are not higher than those of comparable companies and suppliers. If the Antitrust Agency conducts an investigation due to suspicion of “misuse of pricing”, the technical standard and cost structures are closely examined and then compared to those of similar companies.

The Italian regulatory structure, whose structure is depicted in the following figure, is a hybrid between the French and the UK model.



First of all, there is neither a strong decentralization, like as in France, nor a strong centralization, like as in England. An intermediate government level is the centre of the model. In fact, local municipality are obliged to joint in basin consortia, called AATOs, which are responsible for the water provision. The AATOs choices the organizational model and decide an investment plan to be realized. The contractual form is the concession. Like as in French, the AATOs design the concession contract, and, within the national and European legislation, negotiate the tariffs and other contractual clauses. The concession contract is the main regulatory tool, with AATOs acting as a local regulator. Unfortunately, every AATO has conflicting interests in making the regulator and the contractual party. In fact, an independent regulator is not presence in the model. The only national body is the COVIRI, an office of the Ministry of Infrastructure. Among its main duties, there is the power to enact the broad formula for tariff determination and adjustment, which has afterwards to be spelled out in more detail in each contract signed by the AATOs. Regional Environment Agency

(ASL)[26] are responsible of the pollution control. Finally, as we have seen in the previous paragraph, the national Antitrust Agency may play a role in case of abuse of dominant position of water companies.

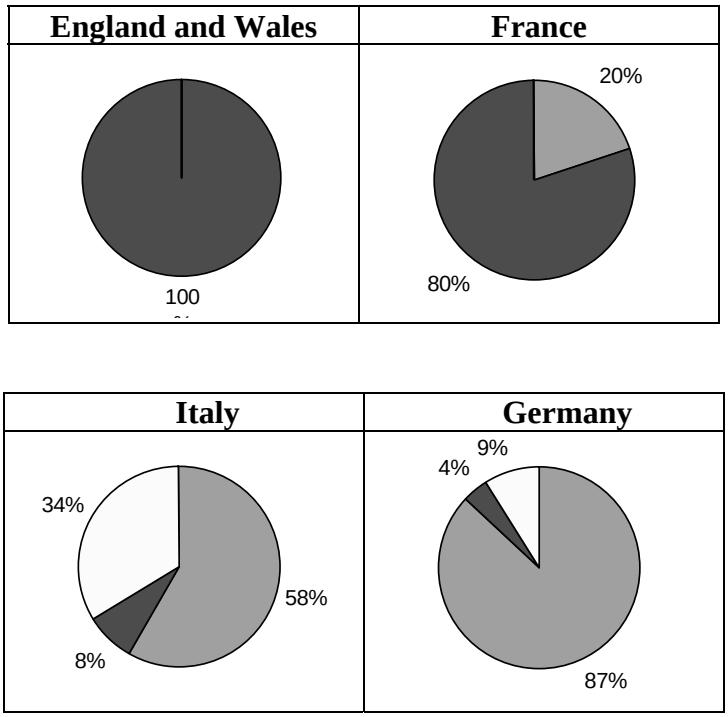
4.4.2 The ownership structure

In the chapter 2, we have seen that PPPs may be arranged in many different forms, depending on the type of involvement of the private sector in the various stages of the provision. Generally, if not organized with a fully public provision through a public firm, the recurrent forms of PPPs in the water sector are the concession or service contracts. It is often the case that the capital of the water company is mixed owned by public and private parties, creating a mixed capital firm.

In order to shows the ownership structure of the capital of the water companies, the following figure depicts the percentage of population served by private regulated firms, mixed capital firms and public firms in the four countries analysed.

England is the only country where the private sector entirely owns the water companies, and where the public sector owns no participation in the stage of provision. Also in France, private firms owns the large part of the water companies, which serve 80% of population, while public firms serve only the 20% of population. In Germany and in Italy, public firms principally provide water services, serving 87% and 58% of population respectively. However, while in Germany only a little part of population is served by some forms of PPPs, in Italy an important part of population (34%) is served by the IPPP in the form of the mixed regulated firm, and private firms serve only a marginal part (8%).

[26] ASL is the acronym of Azienda Sanitaria Locale.



Percentage of population served by public firms (grey colour), mixed firms (white colour) and private firms (black colour).

A different analysis has to be made with respect to the ownership of water assets. We have seen that water assets consist in treatment and storage plants, pumps and distributional networks. Generally, public authorities, such as municipalities or other local governments, maintain the ownership of these entire infrastructures. In the service and concession contracts public parties generally lease water assets to the water provider, which will give back them at the end of the contract. This is what happens in France, Germany and Italy.

The case of England and Wales is the only in the world where water infrastructures are privately owned. In fact, the water companies, entirely privately owned and listed at the London Stock Exchange, are the owners of all infrastructures used to provide water services. On the other hand, the Department of Environment awarded a licence to every water company in order to supply water services in a certain geographical area. This licence, whose obligations are controlled by the Water Services Regulation

Authority (OFWAT), may end. Nevertheless, in the case the Department of Environment decide to terminate a licence, a minimum 25 years' notice has to be given to the water company. In so doing, water companies have substantially a sort of indeterminate duration of their licence.

4.4.3 Governmental levels involved and their contractual power

We have seen that in the four countries different levels of government are involved in the provision of water services. The levels of government of the water organization determine also the number of institutions involved and their degree of contractual power. The following table gives an idea of the degree of centralization/decentralization of the water organization of the four countries.

Country	**Accountability for the water service**	**Number of water providers**
Germany	*Municipality*	6.000
United Kingdom	*National Government*	23
France	*Municipality*	14.900
Italy	*Consortium of municipalities (AATOs)*	235

Due to their decentralized organization, France and Germany base the service provision on the ability of their numerous municipalities, and have a high number of providers. The English model, based on a centralized national organization, is composed by only twenty three water companies. Finally, the Italian water system is an hybrid model, where an intermediate level of government is chosen, and with a relatively low number of service providers, with respect to the French and the German case.

4.4.4 Tariff setting and the financing of water investment

The general principle of the cost recovery of the water services is everywhere accepted, so no difference arises on this point between the four countries. Some differences arise on the way infrastructure are financed. In the determination of water tariffs generally a price cap regulation is used, that is some cases is an hybrid form.

In England and Wales each water company needs to collect sufficient revenue to finance its operating expenditure (C) and the capital investment programme (I). It also has to finance previous capital investment through the return of the company earns on its capital value (r). In addition, revenue has to cover also taxation costs (T). The sum of these costs is called revenue requirement (Rr).

$Rr = C + I + r + T.$

Tariffs limits are set in order to achieve a forecasted revenue (R), that ensures the revenue requirement plus a K factor:

$R = Rr + K.$

K includes price increasing due to inflation, measured by the retail price index (RPI) and an X factor that is an efficiency factor.

$K = RPI – X.$

OFWAT examines the scope for efficiency for every water company. Separate efficiency targets are set by the value X for each company for operating and capital expenditure. In this way, tariffs should normally increase slower than the rate of inflation. Tariffs are calculated by OFWAT in advance every five years in the Periodic Review process. At each price review, Ofwat considers the operating costs and capital costs (capital maintenance) necessary for companies to maintain their assets. Though OFWAT aims to minimise uncertainty, there are two major methods of dealing with uncertainty in un-contracted contingencies between the Periodic Reviews: *interim determinations* and *logging up and down mechanisms*. A company is allowed to ask an *interim determination* to OFWAT in order to re-determine its tariffs limits between the periodical reviews if it faces higher costs or lower income in respect of certain specified circumstances than assumed at the last price review. A relevant change of circumstances can occur when a new or changed legal requirement arises, or in case of an increase in the number of customer opting for a free meter, or in case of a higher percentage of non-payment by householders with respect to the hypothesis. The *logging up mechanism*

allows changes in capital costs to be taken into account at the next price review for certain specified changes experienced by a company. The mechanism ensures that the periodic review reflects the actual circumstances faced by the companies. In this way, water companies are not residual claimant with respect to uncertainty, so the formula is not a pure price cap, but a hybrid form.

Investments in water infrastructure are financed by water companies through the debt or through self-financing by revenues. No subsides are allowed from the national or the local governments.

In Italy a hybrid price-cap, similar to the England case, is applied. Water tariffs are determined by the AATOs, the regional water consortia between the basin municipalities, applying the Normalized Method. The AATO determines, for the entire duration of the concession, operative costs, amortization costs and the return of the capital value. Amortization costs and the rate of remuneration of invested capital depend on the investment plan approved by the AATOs. A difference with the English system is that in Italy every three years a tariff review is undertaken with a balance between the actual and the forecasted revenue.

Like as in England, in the three years period, tariff limits insure the forecasted revenue plus the inflation rate and a K factor that is a price limit accorded by the AATOs and depending by efficiency goals. The existing formula envisages a revenue-cap mechanism in which efficiency gains should mainly occur in the operational costs, and are retained by the company for three years, until a comprehensive tariff rebate takes place. On the contrary, *planned* investment costs must be fully reimbursed and are remunerated at a fixed rate of 7 per cent.

Apart form the periodical tariff review, the AATO may consider in every time the tariff revision in case of a significant deviation of operative costs and of revenue requirements due to non-contracted contingencies.

Also in Italy, investments are financed directly by the water provider, which can decide the recourse to debt o to self-financing. No subsides are allowed from the national or the local governments. Nevertheless, we have seen that the cost of investment is entirely reimbursed by the planned revenue. Finally, the Italian water tariff id determined with a hybrid mechanism, which refers to the revenue cap regulation for the operating stage, and to the rate of return regulation for investment to be carried out.

In France, the major in each municipality determines water tariffs. In the case of direct management, water prices are defined annually according to a vote by the local council. In the case of delegated management, the tariff is negotiated between the municipality and the water provider for the duration of the contract. As we have seen in the previous paragraph, local municipalities have a substantial flexibility in setting their tariffs, which are in the most of cases negotiated with the water provider. In addition to the basic water price, tariffs include also a surcharge to finance the activities of the River Basin Agencies and other levies for other state agencies. In a lease contract, the provider generally collects a communal surtax on behalf of the municipality, which correspond to the investment to be made in the water network. In fact, in the French model, the service provider is not always responsible of the investment in water infrastructure. This occurs only in the case of concession contracts. In the case of service contract, the service provider is only responsible for the operating the current water services, while the municipality is responsible for new investment in water network and other infrastructure. In this case, the municipality has to raise funds through surtaxes added to the water bills, or through the recourse to debt or to national subsides.

In Germany, water companies and municipalities are autonomous in their tariff calculation. A state tariff regulator or a central authority does not exist. Municipalities set water tariffs in case of public provision. In case of private

parties' involvement, the tariff is negotiated in the concession contract. Nevertheless, the financing of investment is responsibility of the service provider only in the case of a concession contract.

Water companies must be able to verify and demonstrate that their water prices are no higher than those of comparable companies are. In fact, though a national regulator is absent, the national Antitrust Agency has some power on the control of the tariffs. The antitrust agency may conduct an investigation due to suspicion of "misuse of pricing". In this case, the technical standard and cost structures are closely examined and then compared to those of similar companies (which corresponds, in part, to Cost Benchmarking). This approach is essentially not different from countries with a central price regulation. Germany's approach differs from these others, however, in that it uses no uniform formulas applied from a central agency, but instead considers each situation individually, which corresponds to Germany's federal, decentralized structure.

Water investment is predominantly financed through debt and user fees. Commercial debt is issued directly by the municipalities in the form of municipal bonds or by utilities. According to the professional associations of the sector, there is no investment backlog. In fact, water losses in the distribution network have been estimated at only 7 percent in 2001, down from 11 percent in 1991. According to a study commissioned by the BGW losses are 19 percent in England/Wales, 26 percent in France and 29 percent in Italy. These would not only be the lowest water losses in the four countries, but also in the world.

The following table shows a comparison of water tariffs between the four countries.[27]

[27] The survey is based on prices as of 1 July 2008 for a consumer with an annual usage of 10,000 cubic meters. All prices are in US cents per cubic meter and exclude VAT. Where there is more than a single supplier, an unweighted average of available prices was used. The percentage change is calculated using the local currency in order to eliminate currency movement distortion.

Country	Cost (US$)/m³	2006/2007 Change	5 Year Trend (2003/2008)
Germany	3.01	+1.6%	+4.4%
United Kingdom	2.37	+6.5%	+48.2%
France	1.99	+0.2%	+13.8%
Italy	1.57	+4.7%	+35.4%

Source: NUS Consulting Group (2008)

We have seen that the two opposite models are the English and the French model. In terms of risks bored by the service providers, the main differences are the following.

In the English model the ownership of the assets is of private water companies listed in the stock market. The private companies bore operative and investment risks, and they have to respect service standards imposed by an independent regulator (OFWAT). Demand risk is lower, because the private companies can obtain an increase of the tariffs in case of a high reduction of demand. A certain risk occurs every five years, with the price review determined by OFWAT. Nevertheless, OFWAT is constrained in guaranteeing economic and financial equilibrium of the private companies and a certain remuneration of the private investment.

In the France model, the private sector bears operative risk and part of the demand risk, while investment risk is shared with public party. In this context, private sector bears only a part of the total risk, while the municipalities bore the large part. Moreover, due to the strong decentralization towards municipalities, these local governments actually bore more risk then what seems, due to their small contractual power with respect to private multinationals.

The German model is a hybrid, similar to the French one in the strong decentralization towards municipalities; on the other hand, the risk is largely bored by the public party, which is the prevalent operator of the sector, leaving little room to the private sector. In fact, the tariff has to cover the entire cost of the service, included the investment cost.

A hybrid form is present also in Italy. In this case a more room is left to the public-private partnership in the form of mixed capital firm, where operative and investment risk are bored by private and public parties. However, a revision of tariffs is possible in case of increasing in costs or in decreasing of demand.

4.5 THE PUBBLIC-PRIVATE PARTNERSHIPS IN THE WATER SECTOR: AN INCOMPLETE CONTRACTING APPROACH.

In the previous section, we have analysed the main features of the water sector, and we have provided a comparison of the different water systems in the most important countries of the European Union.

In general, in order to provide water services, a government enter in a PPP without an economic analysis that shows the effects of this choice on social welfare. The main arguments in favour of a PPP are the following.

1) The PPP ensures water quality and achieve regulatory compliance. According to this view, private partners have a powerful incentive to increase the quality of the services provided, in order to secure new contracts and increase their revenues.

2) A second argument is the technical expertise ensured by private partners, which focus their businesses on the operation and maintenance of water facilities.

3) The third argument is the operative efficiency. The technical experience of the private partner can translate into a more productive efficiency of a PPP with respect to a pure public provision from a cost perspective, allowing municipalities mitigate increases in water tariffs.

4) The last argument is that a PPP is able to raise private finance in order to invest into the high capital-intensive infrastructure of the water system.

On the first point, the fact that private partners have a high incentive to increase the quality of the services provided, in order to secure new contracts, is not confirmed by the experiences analyzed in the previous

section. In fact, the problem is that the water sector is a particular case, with a generally saturated market, where there is a very little room for new contracts and new consumers. The consequence is that private partner may have a low incentive to improve the quality of the service provided, and this is the opposite of the government's aims.

On the fourth point, in the previous section we have seen that in the water sector the role of the private partner is not to raise funds. In fact, the cost of the service is always financed by revenue collected by final consumers, and the investment cost is also financed by debt or it is self-financed by revenue collected by final consumers and/or by public subsidies. In fact, we have seen that in Italy consumers finance investment costs through water tariffs, and no State subside is allowed. The same case occurs in England and in Germany, where investment are financed by the water tariffs charged to consumers. Only the case of France allows, in some cases, investment financed by local authorities. We have seen that in Latin American countries investment are often financed by the World Bank, with a guarantee of the local governments, which bore the entire risk of insolvency. In every case, private parties does not provide funds in order to invest in the water infrastructure. On the other hand, in particular within the European Union, the role of the PPPs may be linked to the possibility of shifting the high investment costs out of the governmental accountancy, in order to overcome balance constraints imposed by the Stability and Growth Pact, as we have seen in the chapter 2.

The argument two and three do not explain the reason why the private partner is superior to its public partner in experience and in productive efficiency. These arguments are exogenously given, while an endogenous reason should be better to clarify the difference in the relative performances. In other words, the reason of the superiority in technical expertise and in productive efficiency of a private partnership with respect to a pure public supply is not clear. Moreover, we have seen that also econometric analyses are far from give an unambiguous result.

In this framework, the differences between the PPPs and the more traditional forms of water provision have to be explained in an endogenous way. In other words, the superiority of one organizational form with respect to another is linked to the parties' incentive to invest in the relationship or to deviate towards opportunistic behaviours.

Due to the specific features of the water sector, the service provider has to face a number of risks during the long-term relationship. In fact, we have seen that the water sector is characterized by high specific and fixed in place investment. They require high specialization, the ability to finance such investment and the ability to maintain the long-term financial equilibrium between costs and revenues. Water infrastructure requires a long amortization period, so the provider has to be able to repay the long-term loans used to finance the planned investment. Moreover, the provider has to consider the risk that construction costs exceed expectations, with respect to the initial planned investment. Finally, the provider has to face also a political risk, due to the possible political instability and the change of regulation with respect to the beginning of the relationship.

On the other hand, the provider is awarded to operate under monopoly conditions, with no competitors, and this may be a source of high market power.

The principle of optimal allocation of risk states that the party best able to manage it at the least cost should handle the risk, and higher risks need to be balanced against higher returns. Unfortunately, in practice in the water sector it is very difficult to write a complete contract where all risks are clearly allocated to each contractual party. In the water contracts, it is not always clear who should manage the risk, and risk allocation may be more the result of ex post bargaining and negotiation than the result of an optimal allocation.

Contractual incompleteness is in fact one of the most important feature which characterizes contractual relationships in the water sector.

The other peculiar feature is the presence of asymmetric information about the quality of infrastructure. In the chapter 3, we have seen that economic theory suggests that a local government (the principal) may be privately informed about the quality of the infrastructure that a potential service provider (the agent) will use. According to Martimort-Sand-Zantman (2006) this is the case of the water sector. In fact, water infrastructure have been often built and operated in the past by local municipalities, which own private knowledge about the quality of the existing assets. A municipality may know the declining status of existing pumps, water pipes and distribution networks. The authors suggest that in case of high quality infrastructure, public ownership is more likely the organizational form, under the assumption of a risk neutral local government. On the other hand, in case of low quality infrastructure and risk averse local governments, it is more likely the involvement of private parties, and the engagement of a form of PPP. According to this view, the prevalence in the north of Italy of the in-house organizational form should mean a high probability of a good quality water infrastructure in that region, different from the region of south, where the involvement of private parties implies that the quality of infrastructure is probably bad. In addition, the English case shows that private involvement occurred because of the bad quality of infrastructure, caused by year and years of underinvestment by the public water authorities.

Nevertheless, the presence of the in-house organizational forms are not only the consequence of the quality of infrastructure. The choice of the in-house form may be also the consequence of rent-seeking lobbies trying to get subsides, of self-interested politicians struggling for power or for a large share of electoral vote. In this case, the in-house public firm is affected by all inefficiencies characterizing the public sector.

If the presence of public parties may be the cause of productive inefficiencies, the presence of private parties may generate a market power.

In this section, we use an incomplete contracting approach in order to understand the role of the PPPs in developing water services and the effects of different ownership structures on parties' incentive to invest in the relationship.

The experiences analysed in the previous section reveal that, of the organizational forms analysed in the chapter 2, the most used for the water provision are the following:

the *in-house* model, that is the delegation to a the fully public firm;

the contractual PPP, in the form of a concession contract to a fully private firm;

the institutional PPP, that is the creation of a mixed capital firm, with the partnership capital owned by public and private parties.

In each case, the public party engages a long-term contract with the provider, due to the need of diluting in the time the amortization of high intensive capital investment. The experience shows that the duration of a water contract varies from fifteen to twenty five/thirty years.

If the public party would be able to sign a complete contract, the organizational form would not be a matter, and the same result could be achieved in each case. The consequence is that, if a difference exists between different organizational forms, this is due to the presence of contractual incompleteness.

Therefore, in order to understand the costs and benefits of the previous three organizational forms, we assume that contracts are incomplete, and residual rights of controls in un-contracted circumstances are important in determining parties' incentives.

4.5.1 Contractual incompleteness in the water sector

In the water sector, a complete contract should describe all parties' obligations in every contingency, and it should impose high penalties in case of not respected contractual clauses. It is worth notice that in some areas, the contract may easily describe many aspects of the water provision.

In fact, the previous chapter shows that the quality of the current activities of delivering water to consumers may be easy to describe. For example, it may be easy to define the waiting time for the installation of a new water meter, the chemical parameter of the water (as analysed by an independent laboratory), the speed of the administrative activities.

Nevertheless, we consider that in two crucial areas incompleteness arises: the activities of building new infrastructure and the activities of maintenance of the existing water infrastructure.

In fact, in the activities of construction of new infrastructure, the contract should provide a detailed description of each water plant and distribution network to build from the first to the last year of the a long-term contract, specifying the location, the detailed draw of the network and the cost of building each plant. Moreover, the contract should specify the variation in the water tariff for every change in the investment plan proposed by the public party. It should specify the effects, during the relationships, of the variations of building material costs, it should specify the delivery day for every plant, and the contractual variation in every contingency. It should specify the contractual variation in every change of the environmental law, or in every case of climatic changes, or in every other possible contingency.

Moreover, it should specify in detail every maintenance activity of the water infrastructure, for every year of the contract and for every plant. Unfortunately, it is impossible to sign such a detailed contract, because it is impossible to foresee all future contingencies that could occur in a so long period of time. Some variables are too difficult to specify in advance and without ambiguity. Moreover, many variables are non-verifiable by a court, which is not able to enforce the contract. In particular, as assumed by the theorists of incomplete contracting, the increase in the value of material assets is not verifiable. In fact, for a judge it is not sufficient to observe the amount of monetary expenses bored by the provider, because it can also use money in a wrong way.

The issues of contractual incompleteness are made worse by the presence of informational problems about the quality of infrastructure. We have seen that public parties may have an informational advantage about the actual state of infrastructure. Nevertheless, this aspect may be a cause of renegotiation of the contract, because in the most cases the determination of water tariffs is linked to the amount of investment to be realized. On tha other hand, it may be the case that also the public party may be not perfectly informed about the actual quality of its water infrastructure. In fact, due to the technical features of the sector, the physical assessment of the actual state of water assets is extremely costly, so a small and poor local municipality may have no resources to finance such activity.

Moreover, according to Bajari-Tadelis (2001), the descriptive engineering suggests that either the contractor or the pubic authority has private information at the initial stage of a public project. They both, however, share uncertainty about many important design changes that occur *after* the contract is signed and construction begins, such as design failures, unanticipated site and environmental conditions, and changes in regulatory requirements. These observations suggest that in this case the problem is primarily one of *ex post adaptations* rather than *ex ante screening.*

The issues of contractual incompleteness in the areas of construction and maintenance of water assets are shown by the experiences analysed. In the case of Italy, COVIRI (2008) shows that the investment plans attached to the concession contracts signed by AATOs are often not clear and well defined. Investment plans in general report only the total annual amount of the planned investment, but it is absent a clear description of each single plant to realize and the amount of investment of each single plant. The business plans are never detailed in the specification of the current activities to realise, and they never describe the maintenance activity to realize in order to preserve the value of the existing assets. Moreover, databases are not always reliable, and a demographic and economic analysis is not always present.

Due to the fact that the contract is incomplete, it will be renegotiated every time during the long-term relationship. For this reason, according to an incomplete contracting approach, the contract may be view as a background, a starting point for a renegotiation stage rather than a tool able to specify a final output.

In fact, the experiences show that renegotiation is a frequent activity in the water service long-term relationships.

First, we have seen that each country applies a hybrid form of revenue cap regulation, due to the presence of a renegotiation step of the initial conditions in case of not-contracted contingencies. For example, in England, apart from the periodical tariff review, a so-called *interim determination* allows a private company to ask a re-determination of its tariffs limits in case of higher costs or lower income in respect of the initial circumstances. The case of Italy shows that, a part the periodical review, in every time a tariff revision is possible in case of a significant deviation of operative costs and of revenue requirements due to non-contracted contingencies. In the case of France and Germany, the municipalities are autonomous in their choice of water tariffs, with are negotiated and renegotiated every time with the service providers.

Second, the number of renegotiations in the water contract is effectively very high. Guasch-Laffont-Straub (2003) show that in Latin American countries, during the 1990s, on a sample of 89 water contracts, 63 were renegotiated (70.8%). According to the authors, one of the main determinants of renegotiations is incompleteness of contracts[28]. In the French case, private providers always renegotiate water tariffs, and, in some cases, the municipalities, which do not want to renegotiate the contract,

[28] According to Guasch-Laffont-Straub (2003), apart form contractual incompleteness, there are also other factors which explain water contract renegotiations. There are political cycle considerations (the government expropriating the contractor), and the ability of the regulator to impose the implementation of the agreed contract.

prefer to return to the direct management[29]. In Italy, though the water reform is still at its initial stage, many cases of renegotiation of water contract have just occurred. For example, the only case of Acea, which we have seen in the previous sections, shows that in some ATOs a renegotiation of water tariffs have occurred after less than three years from the beginning of the contract. In fact, from the reading of Acea's Group Balance Sheet for the year 2007, we can notice that a renegotiation of water tariffs have occurred in the ATOs of Frosinone and of Ombrone.

4.5.2 An analyses of different organizational forms

In this section, we adopt the perspective of incomplete contracts, within the spirit of the works of Hart-Shleifer-Vishny (1997), Hart (2003) and Bennet-Iossa (2006), in order to understand the performance of different organizational forms. In particular, we analyse the case of an istitutional PPP (that is a *mixed capital firm*, owned by public and private parties), with respect to the traditional form of the in-house provision (through a *fully public firms*) and to the concession to a *fully private regulated firm*. The idea is that the fundamental difference between public, mixed and private firms concerns the allocation of residual control rights.

A public entity has to organize its water sector. Due to the conditions of natural monopoly, one possibility is to create an own *fully public firm*s, which manages the entire water system. Another way is to engage in a PPP, in order to involve private partners. We assume that, considering the forms of PPP of section 2, the public entity is interested to a concession contract to a *fully private regulated firm* or to the creation of a *mixed capital firm*.

In any case, the public entity has to sign a contract in order to engage a long-term relationship with the water provider. The contract is characterized by a long duration, by an investment plan to be realized during the relationship and by the provision of the water services. Water assets will

[29] In June 2008, the major of Paris announced that when the contract with SUEZ and Veolia will expire in 2009, the water system will return to public management.

come back to the public entity at the end of the contract. The provider will collect revenue directly from the consumers, applying a water tariff as defined in the contract. The assumption is that the initial contract, called "basic contract", is able to describe only some aspects of the long-term relationship. In fact, due to the presence of contractual incompleteness analysed in the previous paragraph, it is impossible to write a complete contract that describes ex ante all contingencies. Instead, the parties revise the basic contract ex post. In this case, we refer to a "modified contract".

In each case, the firm is conducted by a manager, which may exert two types of effort. The first type is an effort in *cost reducing activity*, which we assume that leads to a reduction in operative costs but is accompanied by a reduction in the quality of the service provided. A second effort may be directed to a *quality enhancing activity*, which increases the quality of the water assets in the building stage of planned investment. The important assumption is that manager's efforts are non-contractible, because they are not verifiable by a third party, such as a court, and hence they cannot be enforced. Moreover, every effort can be made without violating the basic contract. In fact, the basic contract is an incomplete contract, so these activities do not violate it. In particular, the *cost reducing activity* lead to a reduction in operative costs, nevertheless it is accompanied by a reduction in the quality, which may regard the quality of water assets, because of a reduced effort in the maintenance activity. The *quality enhancing activity* leads to an increase in the quality of the water assets in the building stage of planned investment. Due to the contractual incompleteness about a long-term investment plan, as we have seen in the previous paragraph, this effort is devoted to enhance the quality of investment also in presence of non-contracted contingencies and of technical issues.

The assumption is that the manager bores a cost in making efforts, so he is stimulated in these activities only if he can share part of the benefits deriving form these efforts.

In the case of a fully public firm, a public manager, appointed by the local government, operates the firm. The assumption is that the public manager does not implement any effort, because he does not benefit of any surplus deriving from this activity. In this case, inefficiencies arise by the fact that any cost reducing activity and any quality enhancing activity are made. In fact, the public entity, that is the owner of residual control rights, extracts all surplus deriving from the manager's efforts, and this fact determines no incentive to the manager in making efforts. On the other hand, in this case the absence of cost reducing activities is a good news, because maintenance activities are not cut, and existing assets are not depreciated.

In the case of fully private firm, the firm is operated by a private manager, which is appointed by the private party. The assumption is that private party both owns the firm and manages it, and there is no separation between ownership and control. In this case, because the private party owns the residual control rights on assets, he exerts a strong effort towards the *cost reducing activity*, without considering the negative effects of such activity on the maintenance activities. On the other, no effort in *quality enhancing activity* is made. In fact, in this case, no surplus comes back to the private party, because this activity enhance the value of assets, which go back to the public party at the end of the contract. In case of renegotiation, the public party may offer to the private some of the surplus deriving from the *quality enhancing activity*. In this case, an effort in such activity is made within the limits of the surplus recognized by the public party in the renegotiation stage.

Because the private party ignores the deterioration of assets deriving from the cost reducing activity, there is an exaggeration on this activity. On the other hand, an effort in *quality enhancing activity* is made, even though within the limits of the surplus deriving from the renegotiation stage.

In the case of a mixed capital firm, the partnership capital is owned by public and private parties. We assume that the public entity retains the major part of the firm capital, while the firm is operated by a manager appointed by the private party, which exerts efforts. As in the private case, we assume that there is no separation between ownership and control, so private party benefits of the manager's wage and of the firm profit. In this case, the profit is shared by public and private party.

In this case, private party exerts a *cost reducing activity*. However, due to the fact that the major profit deriving from this effort has to be shared with the public partner, this activity is not exacerbated, so the maintenance activity is not cut and the value of assets is not depreciated. On the other hand, public and private parties engage a renegotiation on the surplus deriving from the *quality enhancing activity*, and the private party exerts an effort in such activity within the limits of the surplus recognized to him in the renegotiation stage.

This case shows that the institutional PPPs, in the form of a mixed capital firm, may be able to achieve more satisfactory results than a fully public firm and a fully private regulated firm. In fact, a mixed capital firm devotes more effort toward a fully public firm in the *quality enhancing activity*. In fact, the presence of private parties is able to reduce or to eliminate the problem of expropriation of managerial effort made by the public party. On the other hand, in order to achieve productive efficiency, an effort in the *cost reducing activity* is made higher than a fully public firm. Nevertheless, differing form a fully private firms, this activity is not exacerbated, so the maintenance activity is not cut, and the value of water assets is not depreciated.

The optimal choice of the organizational form is not given, because it depends on the importance that the activities of quality enhancing and of cost reducing may have in every sector. In a competitive market, where there is not the delegation of building infrastructure and with no problem of natural monopoly, the cost reducing activities perhaps would have been

most important and with no negative externalities. In this case, a fully private firm would have been the optimal organizational form, with its strong activity of cost cutting.

The water sector, instead, is very peculiar, and it is important the quality of infrastructure, which is a good that, in the long term, is owned by the public sector and must not be depreciated. In this case, the presence of a private partner makes possible higher efficiency than a public firm; nevertheless, the presence of the public party is important in avoiding the pressure on cost cutting of the private parties and in renegotiating contractual clauses in order to stimulate the quality in building infrastructure.

5. CONCLUDING REMARKS

With the development of the PPPs in the water sector in the last years, a number of slogans circulate on the water as a public good, as a fundamental right, an essential resource, and on the necessity that it must remain within the public sector. However, what means that the private sector is involved in the water sector? Initially, we have to clear the field by a misunderstanding. The private sector is not involved in the property of the *water resources*. They are surely in the public hands. Nevertheless, a different thing is the provision of *water services*, which deals with the distribution of the water through specific infrastructure. In this field, the private sector may inject its market orientation and its entrepreneurial vision, in order to achieve productive efficiency. Nevertheless, the monopolistic nature of the water sector, where no alternative forms of market competition are feasible, generates a worry of creating a private monopoly. The English case shows that private firms, due to their market power, are largely devoted to activities of cost cutting. The consequence is that this activity has negative effects of the quality of water infrastructure.

On the other hand, the public sector is no more efficient than the private sector. Experience shows that the public sector is however sensible to lobbies trying to get subsides, or to self-interested politicians struggling for power or for a large share of electoral vote.

In this context, a role for the PPPs arises. In fact, the involvement of private and public parties may be the way to achieve a solution which collects the benefits of each party. In this case, the presence of a private partner makes possible a productive efficiency higher than a public firm. Nevertheless, the presence of the public party is important in avoiding the pressure on cost cutting of the private parties in those activities important in the maintenance of the quality of water infrastructure. Moreover, public party is important also in renegotiating contractual clauses in order to

concede to the private one part of the benefits deriving from the activity of enhancing the quality in building infrastructure.

Finally, two considerations have to be made.

First, it is important the governmental levels involved in the contractual relationship, because the magnitude of the public authority influences its contractual power. The PPP has to be managed by public and private parties with a well balanced contractual power. Unfortunately, in many cases, public parties may be in a weaker position than the private counterpart in the renegotiation stage, because of a lower contractual power. In fact, small and poorly diversified municipalities are not able to manage complex and multimillionaire contracts with large private multinational companies, which have a high contractual power. This is what happens in many cases in the French model. Nevertheless, also the Italian case shows that the public authority should be organized at a regional level, because municipalities are always small and not able to manage the complexity of a water contract.

Second, the water system needs an autonomous and independent regulator agency, which can arbitrate the renegotiation of water contracts and balance the parties' contractual power. The case of Italy presents a water regulator, the COVIRI, with a very little power. In fact, the renegotiation stage occurs directly between the AATOs and the service providers. Nevertheless, the AATOs maintain the function of regulator and of contractor, with a clear conflict of interest. An independent regulator would be able to avoid such conflicts of and to arbitrate the renegotiation of the contract.

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