

## **Problems of agency and technological issues in the municipalisation of water supply systems, Portugal (1850-1930)<sup>1</sup>**

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### **Abstract**

This paper starts with an overview of modern water supply systems in Portugal at the beginning of the twentieth century, trying to identify their diffusion over urban network, their performance as water providers and the institutional form governing its management. The second half of the nineteenth century was the period when modern water supply systems became either mature, either integrated with sewer systems. The superiority of private management to deal with water supply was taken for granted for most of the nineteenth century. However, problems related with private companies performance started to present public management as a possible alternative. For the period here considered public and private options were available, not only as theoretical possibilities, but also as practical options.

In a second instance, the regulatory framework of private enterprises is addressed. The main changes in regulation framework are presented, as well as the importance of foreign entrepreneurs in the introduction of contractual conditions usually set in other countries for water supply contracts.

However, it was difficult to design contracts to regulate concessions of water supply systems, due to the long-term relationship involved and to all the complexities associated with this specific industry. Conflicts between regulator and private concessionaires were recurrent, raising the possibility of municipalisation. The last part of the paper explains why public take over of waterworks became so attractive in late nineteenth century.

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<sup>1</sup> Provisional paper. English not revised.

## 1. Introduction

This paper addresses the relevance and the management problems of modern water supply systems in Portugal in the second half of the nineteenth century. Modern water supply is here defined as water provision based on a network system, which relies on centralised, piped water, substituting the water sold in containers or manually carried from a local street fountain. The introduction of modern waterworks marks a movement away from reliance on a localised and labour-intensive water-supply process to a more capital-intensive system, organised in network and automated<sup>2</sup>.

The period elected concentrates on the second half of the nineteenth century and is justified by several reasons. This is the period when modern water supply systems started and became both mature, and integrated with sewer systems. This reference to human waste disposal is important, because systems integration became crucial to solve sanitation problems in the city and pushed waterworks to develop both in technical aspects and in social coverage. In early nineteenth century, private management was considered as the ordinary way to deal with the provision of goods and services, and water supply did not differ from this assumption and practice. Limited life franchises, giving to private entrepreneurs a local monopoly on piped water supply sale, prevailed as the organisational solution to run this industry. However, private companies performance and problems related with private provision of local services started to present public management as a possible alternative. For the period here considered public and private options were available, not only as theoretical possibilities, but also as practical alternatives, actually in operation in several cities and towns.

Therefore, the first step in this paper is to map out the situation of modern water systems in early twentieth century, at the end of the period here considered. The picture given by this overview identifies modern waterworks diffusion over urban network, their performance as water providers and the institutional form governing its management.

Two institutional options were available to manage water supply in mid-nineteenth-century Portugal, when modern water systems were introduced in Portugal. Public management had been operating for a century in Lisbon, for instance, running impressive – although traditional – waterworks, developed after the 1730s and originating a rather complex engineering and organisational structure. On the contrary, private construction and operation of modern water systems became the institutional option for this early network utility. Private supply originated regulation problems in the construction and operation of the systems. The contracts designed to solve and anticipate these problems, is the second aspect addressed in this paper, trying to see how contemporary actors had dealt with the difficulties.

In a long-term relationship it is difficult to design contracts to regulate water supply. Unexpected circumstances and the very specificities of water supply as an

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<sup>2</sup> For the presentation of these characteristics of modern water systems see Tarr, 1984 and 1985; Tarr and Konvitz, 1987.

industry put contracts under stress and raised conflicts between municipalities and private companies. They were typically conflicts of power, because the franchise contracts associated with modern water supply involved two holders of property rights: the administration, which granted the franchise monopoly, and the private enterprise, which invested in modern waterworks and had the exclusive right to supply water. The third part of the paper presents several instances of these conflicts and raises the possibility of municipalisation, as a way to solve these tensions. Finally, this paper explains why municipalisation was so attractive, but had different results in Lisbon and Oporto (the second largest Portuguese city), in the first decades of the twentieth century.

Before starting with the presentation of an overview of water supply characteristics in Portugal in early twentieth century, let me remind some of the main features governing network utilities<sup>3</sup>. Modern water supply must be considered a network utility, because it requires a fixed network to deliver their services. As it was said above, it is this network feature that differentiates modern waterworks, relying on centralised and automated water distribution, from localised and labour-intensive water supply, typical from traditional provision. Therefore, this network characteristic implies that the coordination throughout all the parts of the system is essential for its efficiency. Moreover, partial investments in any point of the network only make sense and are effective, if the performance and organization of the whole system is efficient.

The second characteristic of the modern water supply infrastructure is the large amount of capital invested in waterworks (aqueducts, dams, pipes and reservoirs), being a precise example of an economic activity where sunk costs are very high.

These high sunk costs are associated with assets that are specific to water supply and that might be hardly transferable to other economic activity. Waterworks as aqueducts or pipes laid down under the streets are almost irrecoverable for any other purpose than water supply. The specificity of the investment, the high sums of capital involved and the concentration of the economic activity in the supply of one good prevent both an easy exit from industry and strategic decisions regarding the enlargement of business scope.

Finally, and still from the production side perspective, modern water supply is a classic case of a natural monopoly, that is, where a single firm can satisfy the entire market demand at lower total cost than any other combination of firms (Sharkey, 1982). The network itself is an obvious case where duplication raises the total costs of supplying a market.

Besides these four characteristics of the water supply from the production side, the water industry had also some other specific features when considered from the point of view of the consumption. The first comes from the very character of natural monopoly. A unique firm provisioning a good or a service might be tempted to abuse from its position in the market, being inclined to practice prices that are below the optimal level from the social perspective.

Another feature from the point of view of the consumption is the positive externalities associated to water consumption. From the point of view of nineteenth-century sanitary problems, continuous and abundant water consumption was essential

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<sup>3</sup> References...

to deal with urban health problems. The introduction of the water carriage system of waste disposal also created an automated, centralised and capital-intensive system in the case of sewers, whose performance depended from the efficiency of water supply (Hamlin, 1992; Melosi, 1994; Tarr, 1979 and 1984). The major technological innovation behind this system was the use of water as a draining and cleansing agent, in order to remove solid waste from the toilet flush and the sewer pipes. The basic principle behind this kind of technology was the use of water as the element of drainage. Therefore, price cannot exclude population from the access to water, considering their impact on solving the main sanitary problem in nineteenth-century city. In this sense, even if there is the possibility to exclude someone from the consumption of piped water – a situation that is different from what occurs with public goods, as public lighting and defence, for instance – positive externalities militate to provide universal consumption of water.

As a rule, markets and private enterprises are much more adapted to provide the supply of goods and services that are strictly private (which allow the exclusion of any individual). However, considering the positive externalities associated with universal consumption of water, public provision of water might become a possible institutional solution for this characteristic of water supply from the consumption point of view.

The problem facing investors and consumers was to devise an institutional device that could balance different interests and powers. The tension between the investor and consumer could be sidestepped by state ownership, which had the coercive power to finance the sunk capital without requiring the assurance of a future return from the utility. Alternatively, it could attempt to reconcile private ownership with consumers' political power through regulation from the administrative body that had granted the franchise monopoly. Either way, water supply networks operated under terms set by the state.

In mid-nineteenth-century private operation under limited franchise monopoly constituted the institutional alternative prevalent. It owes much to the contemporary experience of railroad construction and operation, as well as to the theoretical principles associated with the work of Edwin Chadwick. He differentiated traditional market competition, "competition within the field", which assumed large number of firms competing in the market, with his new concept of "competition for the field", which was based in the competition between several bidders to have the exclusive right to supply water to the entire local market<sup>4</sup>. This competitive bidding process would in some sort replicate the social efficiency of "competition within the market". However, the efficiency of these proposals depends ultimately on the design of the contracts, the power of vested interests and information on the industry.

The design of contracts is always imperfect, as well as sufficient information on all possible issues. Institutional economics stresses the importance of bounded rationality, or the costs of acquiring and processing information, and opportunism, or the use of astuteness or fraud to distort outcomes in the benefit of one agent<sup>5</sup>. The problems associated with contracts for regulating water supply involve these two features, and also asset specificity, already characterized. Regulation of modern water supply has to deal with asset specificity on the part of the utility, bounded rationality

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<sup>4</sup> Demsetz, 1968; Ekelund and Herbert, 1990.

<sup>5</sup> Reference.

on the part of the regulator and the concessionaire (incomplete and costly information about the options open to the utility and forecasts) and opportunism by both parties too. Considering opportunist behaviours, the private enterprise will attempt to deliver services that are most profitable rather than those that are most efficient, choosing either at too high or at too low quality and cost, depending on the incentives it faces. The regulator opportunism takes advantage from the costly investment in sunk and specific assets to threaten the enterprise, renegeing contractual clauses or trying to renegotiate contracts, in a sense that the utility fears to become a hostage of the regulator. Summing up, a network utility as modern water supply involves high transaction costs.

This synthesis on the characteristics of modern urban infrastructure associated with water supply point out the reasons why public regulation was needed and public supply later became a realistic solution to the problems associated with the provision of such a good. The next section will introduce the diffusion and the institutional form of modern waterworks in Portugal at the beginning of the twentieth century.

## **2. An overview of water supply in Portugal in the early 20<sup>th</sup> century**

At the beginning of the past century, the modern water supply was absent from most of the Portuguese towns with more than 5000 inhabitants<sup>6</sup>. Only 17 per cent of these towns had piped water supply<sup>7</sup> and some of them experienced water supply with deficient quality. For instance, in Setúbal and Santarém the quality was defined as bad, and even in the second largest city – Oporto –, water provisioning suffered from filthy leaking, which polluted the water. Nevertheless, in towns where water supply had not been modernised the quality was even much more appalling<sup>8</sup>.

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<sup>6</sup> This overview of water supply is based on the *Inquerito de salubridade das povoações mais importantes de Portugal* (Lisboa, Imprensa Nacional, 1903), published by Augusto Montenegro. It is a large and detailed source of information on water supply and sewage disposal across Portugal at the beginning of the twentieth century. It was based on an enquiry distributed to towns in 1901. I am finishing a study on these topics using the information provided by this enquiry. The information on cities with modern water supply presented in this source was complemented by data coming from local studies and the enquiry published in 1935: *Inquérito sobre o saneamento de águas e saneamento das sedes de concelho*, Ministério das Obras Públicas e Comunicações, 1935. Data coming from both enquiries is not entirely consistent. It was checked with information provided by local studies in order to identify the cities and towns where water supply had been modernized. Matosinhos was not considered apart from Oporto in Montenegro's enquiry, and the same criterion was followed in Table 1.

<sup>7</sup> As a reference, this number might be compared with the situation in England in 1914: of 1,130 boroughs and other urban districts outside London, there were only 2,6 per cent without piped supplies (Hassan, 1998, p. 22). The proportion of boroughs with piped water in Portugal for the same date (1914) would give a result very far away from this one: only 27 (less than 11 per cent) of the Portuguese towns, which were heads of municipal districts, had piped supplies (see Table 2).

<sup>8</sup> Considering the towns listed in the enquiry, 36 per cent described the water consumed by the population as bad, in some cases it was very polluted, constituting a serious health problem.

Table 1: Water supply at the beginning of the 20<sup>th</sup> century

<b>Modern water supply and urban network</b>	
Cities with more than 10000 inhabitants	9
Cities with more than 10000 inhabitants with modern water supply	4
Towns with more than 5,000 inhabitants	41
Towns with more than 5,000 inhabitants and modern water supply	7
Total number of towns with modern water supply	9
<b>Institutional options to manage water supply</b>	
Towns with private concession	4
Towns with municipal supply + private concession	3
Towns with municipal supply	2
<b>Water provided in the 9 towns with modern water supply (lhd)</b>	
< 30 litres	4
30-60 litres	2
100 litres	1
“Plentiful supply”	2
<b>Water quality and quantity in the towns covered by the 1901 enquiry (all the towns)</b>	
Water supply with good quality	110
Water supply with deficient quality	62
Water supply in small quantities	23

Source: see note 6.

lhd = litres per head and per day

If we look to the urban hierarchy, most of the largest Portuguese cities did not have modern water supply. At the top of the structure, Lisbon and Oporto (with respectively 356,000 and 168,000 inhabitants) had piped water provided by a private company. However, the third largest city – Braga, with 22,000 inhabitants – had traditional water supply, based on fountains and springs, without piped water to households. The fourth largest Portuguese city – Setúbal, with 19,000 inhabitants – relied once more in a private company to provide piped water to households. All the other major cities had traditional water supply, with the exception of Coimbra (16,000 inhabitants).

Table 2: Periods of installation of piped supplies in Portuguese towns, heads of municipalities (mainland, 1935)

Period of time	Number of boroughs with piped supplies	% of boroughs with piped supplies
Before 1901	12	12.5
1901-1910	7	7.3
1911-1920	10	10.4
1921-1930	38	39.6
1931-1935	29	30.2
Total	96	100.0
Total number of boroughs	252	38.1

Source: see note 6.

The quantity of water provided by fountains in the cities without modern water systems was not much lower than the few cases of cities where it had been modernised. For instance, fountains and springs provisioned Braga, the third largest Portuguese city. However, the volume of water per capita was not much smaller than Setúbal, the immediate city in the urban hierarchy, where water supply was based on a private company, carrying piped water to the households<sup>9</sup>. Other top cities in the urban hierarchy relying in traditional water supply illustrate even better this comparison: all had more than 45 litres per inhabitant each day. This was more than what was provided by the private company in Oporto, where the water daily supplied per inhabitant was around 40 litres. In the case of Évora, whose population did not grow very much after the Early Modern period, the water provided by the second longest aqueduct built in Portugal<sup>10</sup> attained a record of 196 litres per day, the double of per capita water supply in Lisbon at the time. Nevertheless, the modern waterworks in the Portuguese capital had the largest water supply per capita, taking into account the eleven cities and towns with piped water supply to the households.

There are several institutional options to manage modern water supply. The first one is public management and public property of the waterworks and the whole infrastructure. The second option is public property of the infrastructure, but with a limited life franchise monopoly granted to a private company. The third possibility remains totally on the private sector, as the owner of the waterworks and operator of the supply into the households. There is also another possible option, typically the

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<sup>9</sup> In Braga daily water supply per capita was 25 litres by day, and in Setúbal it was 28 litres.

<sup>10</sup> The *Aqueduto da Água da Prata* was built in the seventeenth century. The longest aqueduct was built in Lisbon's throughout the first half of the eighteenth century. For a description of Évora's aqueduct see Monteiro, 1995.

case of traditional water supply, based on personal and small-scale provision. The individual – or a community – is the owner of the springs and wells and organise water supply either to its own household and premises, or to a small neighbourhood.

At the beginning of the twentieth century, the Portuguese nine towns with modern water provision relied mainly in private management with or without the property of the infrastructure. Only two of them had water provision managed by local authorities (Santarém and Coimbra). The main difference between these nine towns was the place monopoly had in water supply. In three situations private operation coexisted with public supply. In these cases, pre-existent waterworks (aqueducts, pipes, reservoirs, springs and fountains) were not integrated in the infrastructure managed by the private company, but kept by the municipality. This pre-existent infrastructure continued to be publicly run in order to supply fountains where water could be caught free of charge.

The typical example of this situation was the second largest Portuguese city. Oporto. Water supply was contracted with a private company – the *Companhia das Águas do Porto*, owned by the French *Compagnie Générale des Eaux pour l'Étranger* –, but the municipality did not give up the waterworks already existing in the city and managed by the local authorities. Public pipes, aqueducts, reservoirs and fountains remained under the control of the city and the water was used both for the consumption of the municipal services and for provisioning the population in the public fountains. Only the provision of piped water to households was legally forbidden to Oporto city council<sup>11</sup>.

Only later – in the context of municipal control over water supply after the 1920s – both public and private infrastructure were consolidated under a unified management. However, this paper does not consider this process of development of water provision, focusing on the situation before the beginning of the twentieth century.

The next section will consider the regulatory framework under which these private companies operated. By now, it is possible to summarise the evidence provided by this overview pointing out the state of underdevelopment in which water supply was maintained in Portugal at the time. At the beginning of the last century modern water supply was not widespread at the top of Portuguese urban network and covered only a minor proportion of the towns with more than 5,000 inhabitants. When we look to all the towns listed in the enquiry, the number that modernised water supply is much tinier. The 1901 enquiry covered 183 Portuguese towns, thus the proportion that modernised their water supply was 5 per cent at the time. In the mid-1930s the situation improved. However, by European standards the diffusion of modern waterworks was still very rare, as it is shown in Table 2. Finally, water quantity and quality provided by modern waterworks to households was also very deficient at the beginning of the twentieth century.

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<sup>11</sup> Contract between the Portuguese government and the *Compagnie Générale des Eaux pour l'Étranger* signed in 22 April 1882.

### 3. Designing the regulatory framework: the contracts

The superiority of private management to deal with water supply was taken for granted for most of the nineteenth century. The provision of water to the cities was not considered fundamentally different from other economic activities, since several contractual conditions might be agreed in order to deal with some specificities of the business<sup>12</sup>. Public administration should provide order, fight against fires, keep up public spaces, but should not intervene in other type of initiatives. In Portugal when modern water supply became a theme of discussion and political decision, arguments in favour of private management were, nevertheless, much less insightful. The governance model is absent from the discussion on the possibilities to modernise water supply, even in Lisbon, which anticipated and modelled technical and organisational solutions for other Portuguese towns<sup>13</sup>. The first governmental proposal tendering bids to provide piped water to Lisbon states the importance of supplying water “in the same fashion used in other European cities, where private companies are responsible for the introduction of new and modern habits in personal hygiene”<sup>14</sup>. The reference to institutional arrangements used abroad is the unique justification to propose the end of waterworks public management in Lisbon, instituted with the construction of the eighteenth-century aqueduct<sup>15</sup>, which start off a specific administrative body to run it.

Further discussion of water supply to Lisbon – mainly the conflict between the municipality and the private company that gained the franchise monopoly in 1856 – added another argument for justifying private management. The financial burden on public administration was very heavy, thus the capital needed to carry out the

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<sup>12</sup> «Parliament did not regard water supply as in any way different from normal speculative ventures, and relied on the workings of market forces and the potential of competition to safeguard the public interest», writes Falkus talking about the situation in England in the first half of the nineteenth century (Falkus, 1977, p. 140). Robert Millward also emphasises that by the same period water or gas supply were treated as ordinary goods by administration and public opinion and “private enterprise was seen as the proper institutional form” (Millward, 1991, p. 99). At the beginning of the 1930s, the description on the development of municipal management in Britain after the second half of the nineteenth century has similar references to the absence of motivations to have public management in the first enterprises that started modern utilities (Robson, 1935, p. 304).

<sup>13</sup> The first detailed presentation of the solutions for improving water supply to Lisbon was made by Pedro José Pézerat, *Dados e estudos para um projecto de abastecimento de agoas e sua distribuição em Lisboa, mandados confeccionar e publicar pela Camara Municipal da mesma cidade*. Lisboa, Typographia do Jornal do Commercio, 1855. There was not any reference to the organisational form for water supply, even if the implicit solution was the public administration. The same is true in the discussion between two members of the city council published in A. de Carvalho, *Reflexões acerca do abastecimento de agoas e sua distribuição na capital*. Lisboa, Typographia Urbanense, 1853 or in the technical report made by Carlos Ribeiro, *Considerações geraes sobre a grande conserva d’aguas projectada na Ribeira de Carenque mandadas publicar pela Camara Municipal de Lisboa*. Lisboa, Typographia do Jornal do Commercio, 1854

<sup>14</sup> Preamble to the 22 December 1852 decree.

<sup>15</sup> This aqueduct, which even today is visible in Lisbon’s landscape, was started in 1731 and was built throughout a century. Its water reached the city in 1748, but the infrastructure of additional public works only ended in 1835. At the time, the municipality substituted the state administrative body that was running the construction and the operation since the beginning of the works in 1731, beginning the first experience of municipal management. See Larcher, 1937; Montenegro, 1895 and Pinto, 1973.

modernisation of water supply should be raised by private investors. The authorisation to a private company, able to raise capital by issuing shares to the public, appeared to offer the best prospect of improving water supplies, regarding the capital-intensity of the modern waterworks.

However, the production specificities associated with water supply, high sunk costs and the specificity of waterworks led potential private entrepreneurs to secure their property rights against opportunistic behaviours from the administrative body that granted the franchise. From the point of view of private investors several dangers might come up and have to be anticipated. They can be summarised in two instances. The first was the need to reward such a high and specific investment. The administrative guarantee of a minimum rate of return to the investment could be a solution for this problem. Another one might be extension in time of the limited franchise monopoly, securing property rights and giving time to long-term strategies. As the business was new and needed an extended period of maturation the concerns about capital return were inescapable. In addition, one of the main clients for water supply was the municipality, thus the company feared to become a hostage from the local administration or from decisions taken by the central government. As the specificity of assets prevented exit from business, strong incentives exist to make very detailed contracts, trying to cover any possible situation that might lead the firm to a hostage position.

From the consumer's point of view, private management of water supply had also several shortcomings, which should be circumvented through contractual regulation. A monopoly firm – even more for a long time – raised the possibility of abuse from its market position, increasing prices or lowering the standard of the service. Furthermore, the introduction of modern water supply wanted to increase the quantity and the quality of water supplied, considering the important positive externalities associated with the improvement of sanitary conditions. Therefore, private operation of water supply should consider this general target, developing the works intended to introduce larger quantities of water into the city and trying to have the service available to the entire population.

Before analysing the regulatory framework for modern water supply it is important to summarise the evolution of water supply in Lisbon from mid-nineteenth-century, when started the first projects to modernise water supply. The justification for using the Portuguese capital city as an example derives from the critical importance Lisbon had to model regulation issues in other cities, throughout the second half of the nineteenth century.

The first monopoly concession to modernise water supply<sup>16</sup> started the model that influenced all the other contracts set off throughout the second half of the nineteenth century. The process was initiated in 1852 with the conditions for a tendering bid in order to modernise water supply to Lisbon. Among the conditions of the contest was a limited life franchise for twenty years and the obligation to supply a volume of water that should be, at least, the double what was already being provided by the eighteenth-century aqueduct, the *Aqueduto das Águas Livres* (see Table 3).

This contest had no competitors. It also met with the fierce opposition in the municipal council, starting arguments against private operation in water supply. The arguments advanced by the city council against the concession of modern water

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<sup>16</sup> For a longer explanation of water supply in Lisbon see Silva, 2002.

provision to a private company were not very clear<sup>17</sup>. The petition to the government alludes to the abuses of monopolist companies, giving the example of the gas company, but without presenting any concrete facts. However, the relations between the gas company and the municipality were soured by frequent disputes. The quality of the gas provided for public lighting, damages to the road pavements made by the company's employees, or the amounts owed by the municipality – the biggest customer of the company – were frequent motives for conflicts. In the petition, it was emphasised that the water company, as proposed, would likewise be a monopolist entity. This fact would lead to a lack of consideration towards its consumers in the short term. Finally, it was added that the municipality already had two projects to increase water supply to the city, even though neither of them included home provision<sup>18</sup>.

However, the reasons for the failure of this first attempt of modernise water supply through private concession cannot be attributed to municipal opposition. The conditions set to the concession were not much attractive, explaining the absence of any bidder. The course of the events seems to sustain this interpretation.

After the 1854 cholera outbreak, another governmental initiative opened a contest for the private concession of water supply to Lisbon<sup>19</sup>. This initiative followed a proposal made by Duarte Meddicott, on 21 April 1855, representing a group of entrepreneurs involved in the water supply to Berlin and London. The proposal from this group of entrepreneurs asked for the concession of water supply, ensuring it would increase fivefold per capita, install the network of home provision, supply the water at a price about one fifth the cost paid to the *aguadeiros* (water-carriers, the men responsible for manually carrying the water from the fountains to homes) and ensure the free supply to the municipality of Lisbon, with the exception of the water needed to clean the sewer pipes. The term asked for the concession was 80 years, and the new company should manage all the work and equipment of the old aqueduct<sup>20</sup>.

The most important issue in this proposal, compared with the conditions advanced in the 1852 decree, was the term for the franchise monopoly. It was four times longer and perhaps discloses one of the reasons why the 1852 contest had no bidders: the concession for 20 years was not sufficiently attractive to such a large investment, in a business with the specificities summarised above.

The government accepted the terms formulated in this proposal as the basis for a new contest. In 13 August 1855 a contest was launched to modernise water supply, whose conditions were exactly the same proposed by the group of entrepreneurs

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<sup>17</sup> See the petition to the government, 28 January 1853, *Synopses da Camara Municipal*, 1849-1852, part II, doc. 1.

<sup>18</sup> These projects were developed by the municipal engineer, Pedro José Péserat, and were presented in *Dados e estudos para um projecto de abastecimento de agoas e sua distribuição em Lisboa, mandados confeccionar e publicar pela Camara Municipal da mesma cidade*. Lisboa, Typographia do Jornal do Commercio, 1855.

<sup>19</sup> 20 July 1855 law, giving permission to a new contest for water provision.

<sup>20</sup> A special municipal committee constituted to examine the proposal concluded that it was not advantageous for the municipality and that the public management of the water supply should be maintained. (“Relatorio da comissão nomeada para apreciar a proposta feita por Duarte Meddicott e outros”, A.C.M.L.).

represented by Thomas Rumball e Duarte Meddlcott<sup>21</sup>. This group seemed to be better positioned to win the bid, as it was formed by entrepreneurs with experience in provisioning water to London and Berlin. However, another proposal, whose first subscriber was Alberto Carlos Cerqueira de Faria, was accepted. It proposed to double the volume of water the English company offered to provide. The conditions for the contest stipulated “the government shall grant the concession to the firm which may supply the largest volume of water by head”<sup>22</sup>. Therefore, the contract had to be signed with the Portuguese group of entrepreneurs, who increased more than 60% the per capita volume of water to be supplied to the city, comparing to the English bidders. In 1857 the first joint-stock company to carry on water provision into Lisbon was created<sup>23</sup>.

The future would reveal the delusion of the proposal selected in 1856. The definitive contract was signed only in 1858, after several proposals from the company to re-negotiate some of the clauses of the 1856 contest and of its own proposal<sup>24</sup>. The government did not accept the changes proposed by the company. Such proposals to modify the contractual clauses were a premonition of the incapacity to accomplish them. On 13 October 1863, the government repealed the contract signed with the company, because it did not fulfil the conditions agreed to in 1858<sup>25</sup>. The year of 1863 – with an unusually warm and dry summer – was characterised by many complaints against the private company. Municipal management was demanded as the only way to resolve the provision difficulties. From the point of view of the city council, the *Companhia das Águas de Lisboa* had been in bad faith and the contract should be revoked<sup>26</sup>.

At no other moment was the municipalisation of water provision in Lisbon closer than in 1864. The technical committee, appointed after the contract was repealed, in order to assess the works the company had made to fulfil the 1858 contract, concluded on 11 May 1864 that the concessionaire had provided only 8 per cent of the water it had agreed to. Furthermore, the company did not seem to have the financial means to secure an investment approaching the 3,000 *contos de réis* (more than £650,000), the amount needed to modernise water provision. In contrast, handing

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<sup>21</sup> In 1855, the Minister of Public Works, Fontes Pereira de Melo, was the same that opened the 1852 contest, which supports even more the idea that there was a retreat from the previous demand for a 20 years contract.

<sup>22</sup> Law of 20 July 1855, article 5<sup>th</sup>.

<sup>23</sup> The joint-stock company to provide Lisbon with water (*Companhia das Águas de Lisboa*) was founded in 3 August 1857 with a statutory capital of 1500 contos (about £350,000), one of the most important limited liability companies in Portugal. For instance, the Bank of Portugal had £2,400,000 of capital, but it was an exceptional situation. The capital was very widely spread, as there was a statutory clause that prevented any individual from having more than 300 shares, or 2 per cent of the capital. The city council was one of the shareholders, with 300 shares.

<sup>24</sup> Montenegro (1895) and Pinto (1973) present this process in detail. For the company’s point of view see “Informação sobre o procedimento da Companhia das Águas e estado actual deste negócio”, Lisboa : Imp. União Typographica, 1858.

<sup>25</sup> The definitive contract was only signed in 1858, after several proposals from the company to negotiate again some clauses of the 1856’s contest and of its own proposal. The government did not accept the changes proposed by the company. Such proposals to modify the contractual clauses were a premonition of the incapacity to accomplish them.

<sup>26</sup> City council session of 13 June 1863, *Arquivo Municipal*, p. 721. Eventually, the contract was rescinded on 11 May 1864, and the water provision management was transferred to the municipality.

water supply over to the municipality was justified by social and sanitary imperatives: “the lack of water prevented the sewer pipes from being cleaned, and the same happened with the houses; it did not even allow people to wash, which was responsible for the diseases which systematically ravaged the city, and also for the dissoluteness, the indolence and, on the whole, the habit of the people not caring for themselves, which drove the individual away from the work and demoralised him”<sup>27</sup>. This was the reason why it was advised that “such a precious element of the people’s prosperity shall not be given to any private company”. Consequently, it was proposed that the company’s property be expropriated of and the water management be turned over to the municipality. The amount of 3,000 *contos de réis* should be raised through a municipal loan, secured by the future revenue of this service.

The *Companhia das Águas de Lisboa* did not give up. It metamorphosed into another company, isolated the 1856 proposal subscribers and prepared for a long battle in the courts against the expropriation. Carlos Zeferino Pinto Coelho, one of its shareholders, deputy, and prestigious lawyer with close connections to the Bank of Portugal and another bank (the *Companhia Geral do Crédito Predial Português*, specialised in real estate and municipal credit), assumed the support of the company’s positions<sup>28</sup>.

In 1867, four years after the contract had been repealed and the management taken over by the municipality, this crisis between administration and concessionaire ended. A new contract was signed between the *Companhia das Águas de Lisboa* and the government, against the advice of the technical committee and the requests of the city council. The latter was defeated in its attempt to secure the management of the water provision.

The analysis of the regulatory framework approved for water supply in Lisbon between 1852 and 1867 is important for two reasons. Firstly, it provides the principles that are going to be replicated in other cities. Secondly, it reveals the weaknesses of the regulatory apparatus and possible motives for recurrent conflicts between private company and public administration.

Some principles were systematically repeated in other contracts<sup>29</sup>: compulsory purchase powers similar to the railroad companies; exemption from import duties and any tax, until the capital invested would not reach a net profit of 5 per cent; the need for administrative approval for all the waterworks. The definition of the property rights was also common to other situations in the nineteenth century and adapted the traditional principles and terminology peculiar to copyhold land tenancy. Public administration was the “direct owner” (*proprietário directo*) of all the waterworks – both the old ones (the *Aqueduto das Águas Livres*, for instance) and the newly constructed by the company. The private company received for the time of the concession the “useful property” (*domínio útil*) of all the waterworks and springs. At the end of the contract the “useful property” would become consolidated with the

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<sup>27</sup> Report of the technical committee nominated by the government, p. 7.

<sup>28</sup> Pinto Coelho became the first director of the new company, in 1868, remaining in this post until his death in 1893.

<sup>29</sup> See for instance the rules for Oporto’s water supply contest (12 August 1880) and the contract signed between the government and the concessionaire for Oporto water supply in 22 Mars 1882. Both the clauses for tendering bids and the contract reproduced most of the rules of Lisbon’s contracts, mainly the one signed in 1867.

“direct property”. In some other concessions – Oporto, Cascais, Barcelos – the municipality continued to run the pre-existent infrastructure, in most of the cases only composed by some reservoirs, pipes and fountains, as well as the water sources. The private company would be responsible for providing piped water and would have the monopoly of this activity. However, at the end of the contract the waterworks constructed and managed by the company would also be incorporated in the public domain.

Table 3 presents a synthesis of the main clauses set in contracts and contests, starting with the first tendering bid in order to provide water to the city (1852)<sup>30</sup> and ending with the second franchise monopoly granted to the *Companhia das Águas de Lisboa* (1867), a contract which provided most of the regulatory framework for Lisbon until 1932 and acted as a model to water provision by private enterprises in other cities<sup>31</sup>. A small number of clauses were selected to facilitate the comparison and to illustrate the main aspects regulated by the contracts.

The main conclusion that comes from this process is the tentative approach in order to design a regulatory framework for water supply. The difference is particularly striking between the 1852 and the 1855 contests<sup>32</sup>. The first do not present almost any contractual condition to the participants in the competitive bidding. It only set the time span for the concession and the volume of water to be provided.

The provisional contract with Duarte Meddlicott, employed as the basis for the 1855 contest, constitutes a turning point in water supply regulation through concession contracts. It was not possible to trace the negotiations between the public administration and these entrepreneurs. Nevertheless, it seems that the foreign group of entrepreneurs introduced in Portugal conditions usually set in other countries for water supply contracts and which had been absent from the previous contests due to the government inexperience with this type of agreement.

For the first time, this provisional contract and, simultaneously the directive for the bidding process presents the main items of any other contract throughout the second half of the nineteenth century. It even includes a clause – not mentioned in the summary displayed on table 3 – precluding opportunistic behaviours from the franchised enterprise: during the last five years of the contract, the municipality must control attempts from the firm to lower its standard of service and should act in conformity<sup>33</sup>.

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<sup>30</sup> There was another proclamation of a contest to provide water to the city in 1849 (Montenegro, 1895). However, it did not set any condition to eventual competitors. This contest did not have any bidder.

<sup>31</sup> Other addenda to the 1867 contract were signed between 1867 and 1932. However, they changed or clarified only a few clauses of the primitive contract. A summary of the legislation concerning water supply into Lisbon was published in *Boletim da Comissão de Fiscalização das Obras de Abastecimento de Água à Cidade de Lisboa*, 1937, 11.

<sup>32</sup> The 1849 contest is absent from this analysis, but the law allowing the government to open the contest do not set any condition at all, neither the volume of water to be provided, nor the duration of the concession.

<sup>33</sup>

Table 3: Main conditions in different contracts or contest to provide water to Lisbon (1852-1867)

	1852	1855	1858	1867
Time span for the concession	20 years	80 years	80 years	99 years
Time span for public take over with indemnity		50 years	50 years	45 years
Total quantity of water, lhd	14.3 l	34.5 l	55.7 l	100 l
Water provision for free to the municipality		All the water needed with the exception of the water for cleaning the sewers	All the water needed with the exception of the water for cleaning the sewers	1/3 of the volume supplied by the company
Consumer basis		Piping into the households not obligatory	Piping into the households not obligatory	Compulsory piping into the households after 1872
Evolution of water supply		Per capita water capitation must increase at the same rate than population	Per capita water capitation must increase at the same rate than population	
Public provision to the population		The number of public fountains cannot be increased	The number of public fountains cannot be increased	The number of public fountains cannot be increased

Source – Contracts and bidding clauses for the following years:

1852: Conditions for a tendering bid in order to supply water to Lisbon (22 December).

1855: Provisional contract with Duarte Meddicott's group. The clauses in this provisional contract should base the new tendering bid (13 August).

1858: Contract with the *Companhia das Águas de Lisboa*, which gained the 1855 contest (29 September).

1867: New contract with the *Companhia das Águas de Lisboa*, after the 1864 crisis between the company and the administration (27 April).

lhd = Litres per head per day. The calculation of lhd for 1852, 1855 and 1858 used the population of Lisbon in the respective year.

Moreover, both the clauses for the 1855 contest and the 1856 contract chose the price regulation as an alternative to the other possible method of regulation – the rate of return regulation<sup>34</sup>. The latter was explicitly rejected in both documents. In alternative, it was stipulated the maximum price for water sold by the company, combined another requirement – the minimum volume of water the company had to provide to the capital city. Price regulation, combined with a predetermined standard of service, was thus the regulatory method devised.

Price regulation and standard of service maintained throughout all the period. Setting a maximum price attempted to prevent the enterprise from exploring its market position. The standard of service, defined by the minimum quantity of water that should be supplied to the city, tried to deal with the positive externalities associated with water supply as an industry. Later, municipal participation in the profits earned by the company was added to simple price regulation. Every time the company got dividends above 6%, the net profits would be shared in equal parts between the company and the city<sup>35</sup>. It was an example of the price regulation method with profit share. This new contract also changed the tariff policy of the company, introducing regressive tariffs and a fixed minimum consumption threshold.

The second turning point in the contractual regulation of the water business was the 1867 contract. It represents the attempt of the Portuguese company to secure the contract gained eleven years before and to get a sustainable demand. The minimum quantity of water per head and per day increased more than 60%. The implicit assumption was that the need to increase water supply would be very remote in time. Moreover, such an increase in the previous minimum threshold constituted a strong argument to secure the concession, after the 1864-1867 crisis. In this context, the clause requiring that water supply should rise at the same rate than population became lost between 1858 and 1867. It was an important change and left the administration without a contractual device to control the performance of the company throughout a so long period of time.

The other major change in this contract, trying to secure the concession, was the new quota for use by the administration. It increased dramatically the volume of water put at the service of local administration and overtook the previous exception in the quantity of water supplied for public uses: the water needed to sewer cleaning. As the 1858 contract was not actually applied – due to its interruption in 1864 – the volume of the water beyond municipal quota in this contract, which should be used for cleaning the sewers, was never computed. Increasing municipal quota, without any exception, was an interesting clause for the administration, because cleaning sewer pipes was one of the most important municipal purposes for the water the city council received<sup>36</sup>. All the same, it became the source of many clashes between concessionaire and administration in the next decades until 1932.

Another innovation was compulsory piping, as a means to shape and maintain a solid consumers' basis, firstly introduced in the 1867 contract. It became also a rule

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<sup>34</sup> On the different methods of regulation see Viscusi *et al.*, 1992.

<sup>35</sup> New contract between the company and the government in 18 July 1898.

<sup>36</sup> Even later water for cleaning sewer pipes was so badly needed that the 1898 contract allowed the city council to break the monopoly of the company in water provision. The municipality might get water from the Tagus River and carry it by special pipes in order to clean sewer pipes.

in the first contract with the Oporto's concessionaire in 1882. From the perspective of the company, this clause might constitute the corollary of price regulation. As the rate of return was not guaranteed by the government, enlarging the consumer basis by administrative and not by market means, was critical to the company, due to the large investments needed by the waterworks to collect water from Alviela. However, without a tariff policy that might encourage consumer's actual adherence<sup>37</sup>, this administrative measure might be of little result to enlarge the consumer basis. A new tariff policy with this partial objective – minimum level of consumption and regressive tariffs – was introduced only in the contract revision in 1898. But just after the arrival of the Alviela water into Lisbon, with excess supply of water in relative terms, the tariff policy did not adjust to respond to excess supply.

Table 4: Consumers and private consumption in Lisbon (1870-1914)

Periods	Consumers		Water consumption		Consumers' lhd
	N	Growth (%)	m <sup>3</sup>	Growth (%)	
1870-1874	7,665	-	-	-	-
1875-1879	13,097	71	-	-	-
1880-1884	23,689	81	1,391,961 <sup>a</sup>	-	35.8 <sup>a</sup>
1885-1889	33,727	42	1,619,911	16	29.2
1890-1894	40,290	19	1,723,766	6	26.0
1895-1899	42,617	6	1,788,761	4	25.6
1900-1904	47,911	12	2,178,960	22	27.7
1905-1909	56,506	18	2,940,965	35	31.7
1910-1914	65,422	16	3,341,468	14	31.1

Notes: lhd = litres per head and per day

<sup>a</sup> 1883 and 1884

Consumers' lhd only takes into account the actual consumers of the company and not the entire population of Lisbon. It only measures the water privately consumed, leaving aside public uses. Compare with Table 6, column 3, in which all the water (public and private) and the entire population of the city are considered to compute the water per capita.

The evolution of consumers and private consumption in Lisbon reflects this tariff policy practised by the company (table 4). The number of consumers increased significantly throughout the years 1870-1894, mainly after the approval of the compulsory piping regulation in 1880. In contrast, water consumption did not have similar rates of growth throughout the period<sup>38</sup>, a situation very well depicted in the evolution of consumption per head among the company customers (table 4, last column). The levels of water consumption per head and per day not only were very

<sup>37</sup> The 1867 contract stipulated compulsory piping, but the household tenant was not obliged to become customer and consume piped water. He could rely on public fountains and on water for free.

<sup>38</sup> Unfortunately, the company's accounts did not give details on private consumption before 1880, preventing comparison between consumers and consumption at the beginning of the series.

low, but also displayed a steady tendency to decrease until the end of the century. The situation changed after the approval of the new tariff (1898), suggesting that the water price policy did not follow the consumption expansion strategy based in the administrative decision to compulsory piping.

Finally, the 1867 contract also introduced a new institutional arrangement for providing current regulator control over the company's operation. The 1855 provisional contract and clauses for the contest, and the 1856 contract stipulated that the government and the municipality should have two representatives (one for each body) in the company's directive board. The large municipal assets (previous waterworks belonging to the *Aqueduto das Águas Livres*) given in tenure to the *Companhia das Águas* justified the presence of these representatives in the board. In 1867 it was created an independent body – a committee of control –, with members appointed by the government and the municipality, whose function was to survey the activities of the company. In order to deal with disputes between regulator and company, an arbitration committee had to be established.

#### **4. Conflicts of power between private concessionaire and public administration: the threats of municipalisation**

Contracts and the other regulatory devices (municipal presence on the monitoring board and the obligation to submit all the waterworks for municipal approval, as the main forms to accompany the operation of the company) did not prevent future conflicts between the concessionaire and administration, mainly with the local city council. The 1858 contract was very detailed, when compared with the governmental terms of reference for the 1852 contest. The 1867 contract is even more comprehensive. Moreover, any of these contracts was discussed for years, a situation that was repeated in the contract signed between the municipality of Oporto and the French concessionaire for water supply to the second largest Portuguese city<sup>39</sup>. However, limited rationality from economic agents prevents the anticipation of every possible situation that might appear in the relations between the company and its customers, or the company and the administration. The perfect contract, regulating the concession to the private company, and able to secure business expectations in a new industry and consumers' prospects was beyond their possibilities.

Some aspects were motives of recurrent dispute between administration and the private concessionaires for water supply in Lisbon and Oporto. One of the most important and frequent was the companies' non-observance of the works project stipulated in the contract or in further agreements. This disobedience to previous agreements affected the companies' capability to carry out the quantity of water stipulated in the contract and within the deadlines agreed. In Lisbon this was the reason for governmental abrogation of the contract with the concessionaire in 1864, as well as for the crises in 1888 and in the 1920s<sup>40</sup>. In Oporto the late contract'

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<sup>39</sup> In the case of Lisbon the decision for the 1855 bid was known in 1856, but the contract was signed in 1858. The new contract, in 1867, ended a long process of negotiation since 1865. The Oporto contest was decided in 1880, but the contract was only signed in 1882.

<sup>40</sup> Even before signing the contract, in 1858, the company attempted to drop some of the waterworks predicted in the conditions for the 1856 contest, trying to delay some of them. This was the main reason for the delay in the signature of the 1858 contract.

signature, in 1882, was due to the renegotiation of some of the clauses which had based the 1880 contest. Later, the 1882 contract was renegotiated to accommodate some demands from the company. The volume of water supplied was far below the threshold of 100 litres per head and per day, proposed as the basis for bidding. Furthermore, the steam engines necessary to elevate the water to the company's reservoirs, in order to be distributed by the network, were not installed in its totality<sup>41</sup>.

Another source of conflict was the need for companies to enlarge their consumers' basis. In Lisbon it was attempted through the compulsory piping of the households, which obliged the buildings beyond certain revenue to be connected to the water network. The dispute was fierce, with the opposition of the city council, the *Associação Comercial de Lisboa* (business association) and a large debate in the newspapers and parliament. However, the compulsory connection to the water network was a clause of the 1867 contract, which should be applied five years after the signature of the deal. Nevertheless, the dispute was so intense that the "private piping regulation" was only put into effect after 1878.

In Oporto, the 1882 contract also had the obligation of linking households to the company's main pipes. It stipulated that when modern waterworks construction ended and the water supplied by the company started to run in the pipes, a law should be approved enforcing the mandatory water piping for all houses whose revenue was higher than a certain threshold, being the construction of the installation supported by the owners. The company ended the construction of the waterworks in 1886, asking the application of the contractual clause, making water piping compulsory<sup>42</sup>. The conflict with the population, business associations and opinion makers was followed the same path as in Lisbon.

The third cause for conflict between administration and private operators was the amount of water for municipal use. In every contract there was a clause stipulating that the municipal council should receive a certain amount of water for free. Any excess would be charged at a reduced price (as a rule, half the average tariff to private consumers). The case of Lisbon is the most expressive of the difficulties, as the municipality of Oporto had access to its own water supplies<sup>43</sup>. The situation started to deteriorate in the 1880s with the accumulation of several years of municipal debts, due to disagreements about the amount of public consumption that should be paid beyond the volume of water supplied for free. The municipality contested the evaluation of this water in excess, saying that the company was trying to oblige the city council to pay its inability to enlarge private consumption and its entrepreneurial inefficiency. It also argued that in no other city the margin for leaks and the resulting water losses was so low as in Lisbon, artificially expanding public consumption<sup>44</sup>.

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<sup>41</sup> This change to the previous contract was agreed between the municipality and the company in August 1887.

<sup>42</sup> It was approved by the municipal council in May 1886 and should be applied immediately.

<sup>43</sup> However, when municipal consumption increased, the Oporto's municipality asked for the renegotiation of the amount of water provided by the company for municipal uses (new contract in 1901).

<sup>44</sup> In fact, the municipality stressed that the losses due to water leaks were only computed as 10 per cent of the water supplied to Lisbon, when in other countries the proportion would be 20-30 per cent (*Actas das Sessões da CML*, 21 July 1919, p. 131)

It is difficult to disentangle the truth from the arguments exposed by the company or by the local administration. In fact, the municipality occupied the most important place in the consumption structure of water and its position did not change very much throughout the period here considered (Table 5). Therefore, it is true that the company revealed a poor performance in enlarging private consumption, transforming the administration (local, but also the central administration) the main source of revenue to the private company. The position of the local administration as a consumer might be compared with the situation in England, at the beginning of the period displayed in Table 5: in 1882 in forty-eighty leading provincial towns only 6.3 per cent of the water was supplied for public use, against 60,3 per cent delivered to domestic households and 33,4 per cent used for industry and trade (Hassan, 1985, p. 542).

In addition, municipality did not seem to have had a water-saving perspective, mainly in the 1880s. The introduction in Lisbon of the water coming from the Alviela River (the most relevant waterworks constructed in the nineteenth century) provoked a sensation of euphoria caused by the arrival of what seemed a source of abundant water. The 1887 committee nominated to settle the dispute between public administration and private concessionaire recognised that there was waste of water in the municipal service or in social welfare establishments, which received water for free under municipal status.

This problem poisoned the relations between the company and the local administration throughout all the period here considered. We will come back to this prevailing position of the municipal council as a consumer later on in this paper.

Finally, contracts with such a time span – almost a century – had to meet population growth and increase in demand dictated by new patterns of comfort. Scientific discoveries, proposing new methods to guarantee drinking-water quality and to threats against its purity, also influenced the relations between regulator and utility were.

Gradually the credibility of bacteriological mode of water analysis increased and the former chemical methods became less important to guarantee water quality<sup>45</sup>. The methodology of bacteriological analysis started to be acknowledged as crucial to certify water purity (Hamlin, 1982; Hassan, 1998). In Lisbon, on the occasion of typhoid outbreaks in 1907, the quality of the water is presented as a possible cause for the mortality crisis. Infiltrations in water pipes coming from cesspools and old sewer pipes were responsible for the spread of water-borne outbreaks as typhoid<sup>46</sup>. Pressures on the utility to modernise its quality control methods became a new source of conflict.

In addition, urban growth constituted a threat to the levels of water supply per capita in the first phase of the waterworks modernisation. The problem was particularly important in Oporto, where the first concession only provided around 40 litres per head and per day. It was from the beginning a very small volume of water,

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<sup>45</sup> For the development of bacteriology in medicine and its effects on disease control see Biraben, 1991; Mokyr and Stein, 1997; Rosen, 1958; Winslow, 1943.

<sup>46</sup> In 1913 new typhoid outbreak led to the first time proposal for the creation of bacteriological depuration stations. In addition, a new program for waterworks was considered, in order to improve the quantity and quality of water provision. In Oporto, the 1903 typhoid outbreak raised the same concerns over the quality of the water.

when compared with international standards and with was the technical opinion of the time<sup>47</sup>. In Lisbon the volume of water followed the population increase (Table 6, column on consumption lhd). However, it did not reach the contractual level of 100 litres per head and per day, as the minimum threshold, and was also well behind other cities at the time: the average consumption was over 150 litres per capita in English, French or Deutsch cities (Hietala, 1987, pp. 101 and 201-202; Goubert, 1988). Italian cities, such as Rome, Florence, Turin and Milan had a private consumption in 1908 above 110 litres per capita and per day (Raddi, 1912). It must be noted that those ratios included all the water consumed in the city of Lisbon, including industrial and municipal uses. If private consumption were isolated, then the average consumption per head and per day would fall to less than 30 litres per day and per head, when considering the level of consumption in 1900 (Table 4)<sup>48</sup>. These were very low levels of consumption, because they only include the private customers of the company, mostly the well-off people of the city.

The quarrels with the city council were never-ending regarding the day-to-day operation of the company. The new nineteenth-century urban infrastructures (gas, sanitation and transport) shared in common the use of public resources as roads and streets. This source of conflict derives from the trend for a rising and intense pressure on the street in the city, not only as a means of circulation, but because under the pavement were placed the cables, pipes or tubes, necessary to the operation of the new urban infrastructures (Bédarida and Sutcliffe, 1981). All this caused street problems. The bad condition of the pavements in many streets was attributed to the negligence of the water company in breaking out the cobblestones to lay its pipes and then failing to replace them properly. Municipal by-laws were passed obliging the company to notify the municipality of any necessary intervention in its pipe network and giving the administration the exclusive task of repair to the streets, later invoicing the company for the labour. This was an effort to provide a swifter method of repair to the damages, but it introduced another source of conflict. In 1887, for instance, this was one of the disputed points between company and administration, aside from the other three points exposed below. The city council sent several bills to the private corporation, which were found to be exaggerated and a special committee was appointed to settle the dispute. The abuses of the company's employees or, in contrast, similar attitudes from the municipality's officials, emerge as other sources of conflict well documented in the records of the city council.

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<sup>47</sup> In 1864, Henry Gavand estimated in 40 litres per head and per day as the minimum level, not considering the water needed by local administration, which would double this estimative (Gavand, 1864). At the end of the nineteenth century Montenegro (1895) cited several estimations, proposing an average consumption per head higher than 140 litres. In 1913, and for the United States, water consumption per head per day – only at household level, leaving industrial or public uses – would be 60 litres per day, for an household with 2 taps, one water closet and one bath.

<sup>48</sup> This computation considered only the private consumers of the company, leaving aside public consumption and the inhabitants of Lisbon that did not have piped supplies, a large proportion of the population, as it is evident in Table 5. It was well bellow the levels of consumption proposed by Gavand (1864) forty years before.

Table 5: *Companhia das Águas de Lisboa*: Public consumption of water (cubic meters), 1883-1914

	Total consumption	Public consumption			
		Total	% of total consumption	Municipal	% of total consumption
1883-1884	5,948,572	4,556,611	77		
1885-1889	8,635,995	6,976,318	81		
1890-1894	8,460,427	6,558,216	78	5,209,761	62
1895-1899	8,369,300	6,466,056	77	5,028,442	60
1900-1904	9,547,789	7,261,195	76	5,750,331	60
1905-1909	11,971,270	8,966,992	75	7,186,552	60
1910-1914	13,239,006	9,836,152	74	7,703,909	58

Source: Silva, 2002

Table 6: Consumers, consumption, share prices and financial ratios of the water company (1870-1919)

	Consumers as % of city households	Consumption per capita (lhd)	Share price index (1877=100)	Financial autonomy	Solvency ratio
1870-1879	6.2	-	94	0.887	7.624
1880-1889	47.1	88.4	157	0.594	1.462
1890-1899	57.3	74.5	161	0.434	0.766
1900-1909	63.7	74.1	402	0.408	0.702
1910-1919	65.5	74.5	318	0.426	0.679

lhd = litres per head per day

Financial autonomy = Capital / Total assets

Solvency ratio = Capital / Liabilities

These issues were responsible for systematic conflicts between concessionaire and administration. The case of Lisbon is exemplary of the problems and was discussed in detail elsewhere (Silva, 2002). It is also interesting because for the first time the possibility of municipalisation of water supply was supported.

In 1866-1867 there was a large debate on the best way to manage the water supply in Lisbon. As it was said before, two years earlier the government had denounced the contract with the private company and granted the administration of waterworks to the municipality of Lisbon. However, the private company (*Companhia das Águas de Lisboa*) did not accept the solution, invoked property rights in order to preserve the franchise monopoly and proposed a new contract to the government. In contrast, the city council supported its position for municipalisation with the arguments of the technical committee, appointed by the government in 1863 to analyse the situation of water supply and propose the best solution<sup>49</sup>.

<sup>49</sup> Municipal petition to the government, 21 March 1866, *Arquivo Municipal*, 1866, pp. 2623-2626.

The position of the technical committee was favourable to municipalisation. Firstly, water provision was presented as closely related with the drainage and sewer system. Both contributed to the improvement of sanitary and health conditions and works in either system should be planned together<sup>50</sup>. Water supply could be a profitable business, enabling sewer system improvement with the revenues coming from home provision of water. Secondly, a need as fundamental as the water supply should not be managed by a private monopoly, emphasising the positive externalities associated with water supply and the common fears that private concessionaires would abuse from their market position. For the technical committee, only public management would simultaneously ensure moderation in price, quality of service and extended social coverage. It would be the only way “to promote greater consumption, indispensable to the improvement of public sanitation, to the creation of better hygienic habits and to the expansion of industries”<sup>51</sup>.

This position of the municipal administration had several weak points. The first one was technical. Even if it was undeniable that an efficient water provision would benefit urban sanitation, the principle of water-carriage for waste drainage was not included in the plan to modernise the sewer system. Only the proposals of the technical committee for the modernisation of the sewers, nominated in 1880, advanced this solution conclusively. It must be remembered that in 1871 Bernardino António Gomes, a distinguished doctor and hygienist, still professed a different solution, based in the traditional method of manual removal (Gomes, 1871). In the 1860s every proposal addressed to the municipality for solving the waste removal problem advocated manual cleaning for privies and cesspools, and proposed pipes only for the draining of rain runoff and residual home water. Therefore, the defence of the water-carriage system as a new technology to deal with sewage problems was absent from the possible solutions at that time. In other urban contexts it could support arguments for municipalisation of water. In Lisbon it did not influence government or public opinion.

From the technical and organizational point of view other difficulties existed to thwart municipal management as a long-term solution, and not only as a transient stage, during the period of crisis with the first company and before the selection of another concessionaire to the water supply. Municipal technical staff was almost non-existent in 1866. The municipality could not count on engineer Pézerat’s technical capability, because he had retired at the beginning of the year, and it remained without any engineer for more than seven years<sup>52</sup>.

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<sup>50</sup> “The aspects related with cleaning and draining, as well as with water provision are so closely linked that they cannot be considered in isolation, either because they both contribute to improve sanitary conditions, or because the works to be done in the sewage system or in the water provision should follow the same plan” (Municipal petition to the government, *Arquivo Municipal*, 1866, p. 2623).

<sup>51</sup> *Ibid.*, p. 2624. Based on this position of the technical committee, the municipal administration wrote a petition to the government supporting municipalisation. The municipal petition ended with the demand that the management of water provision in Lisbon should be definitively given to the city council, and went on to ask permission to contract a loan in order to finance the works needed to modernise the water supply.

<sup>52</sup> The modern organisation of the municipal technical services was achieved in 1874, when Ressano Garcia was hired as municipal engineer. Its growth in number of employees, and technical expertise and responsibilities was something that only happened after this date (see Silva, 1997, pp. 325 ff; and Silva, forthcoming).

The enormous investments needed to modernise the water supply imposed another serious handicap to the prospects for municipalisation. Neither the 7,000 *contos*, suggested by Pinto Coelho – the *Companhia das Águas*' board director – in order to denounce the financial fragility of the municipality, nor the 5,000 *contos* computed in the project for using the water of the Alviela river<sup>53</sup>, nor even the 3,000 *contos de réis*, estimated in the technical committee's report of 1864, were feasible. All of these sums were high enough to jeopardise the capacity of the city council to carry out the modernisation of the water supply. Between 1865 and 1870 the annual revenues of the municipality averaged 300 *contos de réis* and displayed a tendency to stabilise.

Recourse to a loan to finance the investments needed for the project was a possibility, but the recent history of the city council would demobilise the most enthusiastic optimist. In order to build the new *Picoas* slaughterhouse, the municipality had painfully obtained a loan amounting to 176.5 *contos de réis*, from the Bank of Portugal, with all municipal revenues serving as collateral. Payments to suppliers – from building materials to the gas company – were systematically delayed. Therefore, any financial institution would ask for solid guarantees for a loan of that amount, guarantees the municipality could not provide, as the several attempts to raise a loan in order to finance urban renewal projects, sewer construction or even the rebuilding of the city hall, consumed by fire in November 1865, would confirm in the next years (Silva, 1997, pp. 388 ff.). Only when the governmental aid increased from 150 to 200 *contos* a year (Law of 14 May 1872), sufficient financial guarantees were gathered to provide for a small loan, amounting to 160 *contos de réis*, from the *Banco Lusitano*.

In addition, the period 1867-1868 was not favourable for any prospects of resorting to the credit market. The 1867-70 financial crisis, with the decrease in migrant remittances from Brazil, the aggravation of the trade deficit and the difficulties felt by several banks, troubled the credit market (Justino, 1989, 2<sup>nd</sup> vol, pp. 82-87). During this period, even State bonds did not find buyers in the market: for five years beginning in early 1868 there were no operations concerning the Portuguese public debt (Mata, 1993). At the same time, the financial health of the municipality became even more difficult with the defeat of the financial reform approved by the central administration in 1867, after the early 1868 popular uprisings.

The financial debility of the city council was, thus, one important reason for the impossibility to achieve the municipalisation of the water supply. The peculiar structure of the municipal receipts implied that patrimonial or domainial revenues<sup>54</sup> (rents from real estate and revenues from the slaughter-house, for instance), added to the governmental aid provided for around 75 per cent of the municipal revenues until the 1885 administrative reform (Silva, 1997, p. 372). In contrast, fiscal revenues were insignificant in the 1860s (always less than 7 per cent) and decreased in the next years, in such a way that throughout the 1870s they never exceeded 2 per cent. This was explained by the extreme competition for the same fiscal space between local and

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<sup>53</sup> Project from Joaquim Pires de Sousa Gomes, an engineer employed in the Public Works Ministry.

<sup>54</sup> See the distinction between domainial revenues and fiscal revenues proposed by Schumpeter, 1954.

central administration, with evident advantage to the latter in the capacity to drain fiscal resources<sup>55</sup>.

This situation was doubly grievous to Lisbon's city council. Firstly, it made it dependent on funds transferred by the central administration into the municipal treasury and on the political pressure over the government. At a time of financial difficulties, resorting to governmental help provided a temporary solution to the problems: "knocking at the State's door", as it was acknowledged in 1892 by the city councillor, Martinho Guimarães. Secondly, municipal revenues had a very low potential for growth. The resort to debt in order to finance the investments in new urban infrastructure, in the sewer network, the markets or new roads, would mean serious problems to the local treasury, as occurred in the 1880s.

Summing up, the reasons which, in other urban contexts, called for municipalisation – the extreme sanitary problems or the refusal of private monopolies to run the service of water supply – were present in the Portuguese capital too. In contrast, the new sewer technology, based on the water carriage system, was not adopted. Thus, it did not constitute an additional and compelling reason for municipalisation. Furthermore, the financial resources of the municipality did not cope with the large investment needed to promote the modernization of the water supply.

There remains the possible influence that the political and ideological factors might have had in municipalisation. Motivations explicitly related with the extension of suffrage and the need to gain popular vote through a program of increased intervention in the urban environment seem to have been absent. In the 1860s there was not any change towards an enlarged suffrage. On the contrary, the electoral reform of 8 May 1878 was responsible for increasing the electorate twofold at a national level, from 40 per cent to 70 per cent of the male population more than 21 years of age<sup>56</sup>. However, in Lisbon the increase in the relative number of voters was almost null. It grew from 28 per cent to 31 per cent of the men more than 21 years old, as a result of this electoral reform, and it maintained almost this same level until the rise of the republican regime, in 1910<sup>57</sup>. Even after this date the increase in the proportion of the electors in Lisbon was not very large, and it was accompanied by a fall in electoral participation (Lopes, 1993). The extended suffrage does not seem to be a motivation for greater and continuous political pressure in order to adopt social policies in the provision of urban infrastructures. The republican party had councillors at the city council since the 1860s, but they did not request the takeover of the company as part of an ideological programme. In 1887-1888, when the concession contract with the water company was discussed, the most vehement critics of the company were the republican councillors. However, this does not mean that there was a position of principle favourable to the municipalisation of urban infrastructures, as was the case of socialists or social-catholic groups in Italian local politics (Franco, 1982; Ruge, 1990).

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<sup>55</sup> This aspect is discussed in Silva, 1997, ch. 4, when municipal finance is analysed. As the state revenues were dependent on taxes collected in Lisbon, the possibility to municipalise the consumption tax – which in other towns supported the need to enlarge the fiscal basis of the municipalities – was jeopardised in Lisbon.

<sup>56</sup> Almeida, 1991, pp. 35-37, namely Figure 2 on p. 36 and Table A.2 on p. 216. Also Almeida, 1985.

<sup>57</sup> Almeida, 1991, Table 10, p. 145 and A.3 in p. 217. Almeida, 1985, Table 2, p. 142.

After the definitive concession of water supply to the *Companhia das Águas de Lisboa*, in 1867, on two other occasions until the end of the nineteenth century, the municipalisation could have been a solution to improving water provision.

The first occasion occurred in 1872, when the company presented its project of “private piping regulation”, which obliged all new buildings to be connected to the water network. As the compulsory connection to the water network was stipulated in the 1867 contract, non-compliance by the government would entail substantial reparations to the company. In addition, the reasons which prevented the municipalisation in 1866-1867 – either the municipal financial debility or the absence of the water-carriage principle in the proposals for the modernization of the sewer system – persisted in 1872.

The second occasion occurred in 1887, following the report of a committee nominated to settle the dispute between public administration and private concessionaire around three points: the late approval of the “private piping regulation”, which caused a shortfall in the company’s expected revenues; disagreements about the amount of public consumption that should be paid to the company; conflicts about the responsibility of the concessionaire in the failure to improve water provision in order to reach the 100 litres per head and per day. The final report of the committee suggested the revocation of the contract and the subsequent municipalisation. In spite of the opposition from the majority of the city council and the republican propaganda against the private concession, the government backed down when faced with the amount of compensation to the shareholders<sup>58</sup> and the lawsuit with the company. Once more, the price tag of the municipalisation was responsible for a compromise. Throughout the 1880s the company had consolidated its economic position, enlarged the number of consumers (due to the steady support given by the compulsory connection to the water network), become profitable and witnessed a strong rise in its share value<sup>59</sup>. In addition, any attack against a company with a large number of shareholders would be very prejudicial to the reputation of the State in the financial markets. The resort to debt was the only means for finance the public budget deficit, constituting a structural characteristic of the Portuguese financial system in the second half of the nineteenth century (Macedo et al, 2002). Therefore, the position of the State in this subject was tenuous. Furthermore, the late 1880s were particularly difficult for the Portuguese State, as well as for the municipal council, due to the deterioration of their financial situation, leading to the 1891-1892 bankruptcy and the abandonment of the gold standard.

Summing up, it is exaggerated to say that municipalisation was omnipresent in the relations between local city council and the water company. However, it haunted the periods when conflicts were harsher and became a menace then mentioned. The fundamental reasons for municipalisation as an alternative to private management through franchise monopolies is presented in the next section. The preceding presentation of the most important conflicts between administration and the water company emphasises the limitation of contracts and the existing regulatory

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<sup>58</sup> As the company’s shares almost doubled between 1882 and 1883, increasing the company’s value, the municipalisation became more expensive. See Table 6 above and Figure 1 (Silva, 2002) on the evolution of share prices.

<sup>59</sup> See Table 6 above. Silva, 2002 and Silva, 1998 present a more detailed analysis of the firm’s performance in the 1880s.

framework. The actual revision of contracts from time to time adjusts the regulatory agreements to changing circumstances or unexpected outcomes.

Furthermore, the relations between company and regulator also reveal opportunistic behaviour from both sides. The situation related with municipal consumption is a clear example of this issue, well identified in regulation theory. It was amplified by the peculiar characteristic of the municipality of Lisbon: its importance as a customer, which intensified opportunistic behaviours from the regulator side.

## **5. Private management and public regulation – concluding remarks**

To recapitulate the argument to this point, the state of economic knowledge in the nineteenth century, as well as public opinion, emphasised the superiority of private enterprise for modernising waterworks and supplying water to the cities. It was assumed that the private enterprise was the most appropriate institutional form to deal with the supply of goods and services private per definition (where it is possible to prevent some individual to use or consume certain good or service). Private agents better solve the inevitable agency problems associated with the management of hierarchal relationships within the firm.

In order to deal with positive externalities, natural monopoly issues and to give guarantees to private entrepreneurs with high volumes of sunk capital invested, and simultaneously maintaining the social benefits of competition, a new institutional form expanded at the time – competition for the field, to win the franchise monopoly for provision of some good or service. This solution, largely practiced in urban infrastructures, relies very much on the efficiency of contracts, as regulatory devices to deal with the peculiarities of this kind of industries. Modern water supply systems and the Portuguese experience in the second half of the nineteenth century were a good example of this situation.

However, problems of agency did not depend solely from relations within the firm. As the franchised firm had a situation of monopoly granted by public authorities and contractual clauses governing its operation, another problem of agency came out from the relation between the utility and the administration. The franchised firm and the regulator had different goals and the solution for problems of agency between them involved high transaction costs, namely dealing with bounded rationality, opportunist behaviour and specificity of assets.

The analysis of the contracts and of the conflicts of power between regulator and franchised firm in the case of water supply in Lisbon can be seen from this perspective. The main contractual documents regulating the franchise monopoly reveal a tentative approach, by trial and error, and the influence of foreign models. They also disclose the concerns of regulator and utility. Price regulation, without any administrative means to reward sunk costs faced the difficulties to give incentives to the enterprise, besides the very long-term franchise contract. Compulsory piping (1867 contract) was the answer to this dilemma, using this administrative constraint to amplify the consumers' base, and thus not relying entirely on the market mechanisms to return the expected compensations to investment in large waterworks in the 1870s. However, until 1898 the price policy of the *Companhia das Águas de Lisboa* did not promote costumers' adherence to higher levels of consumption.

The issues responsible for conflicts of power between the private company supplying and the public administration may be summarised in four main issues: the quantity and quality of the water provided; the day to day operation of the company; positive externalities arising from an efficient water supply; and the importance of the municipality as a customer.

The positive externalities deriving from an efficient water supply were exceptionally important in nineteenth-century cities. The significance of water for proper urban sanitary conditions was recognised as a crucial issue at the time. The decisive element that revolutionised sanitation throughout the second half of the nineteenth century was the inter-relation between a modern water supply and the solution of waste disposal through a modern sewer system.

Water played a critical role in the solution of nineteenth century sanitation question. In order to introduce new technology in sewerage, based on the water carriage system of waste disposal, abundant and, in tendency, universal provision of water was needed. If water were not provisioned in quantity, filth would accumulate in the sewer pipes, frustrating the benefits caused by the automated process of waste disposal. If most of the households did not have piped water, a sanitation technology based on a centralised system would be inefficient, presenting a strong case of market failure and externalities related with water provision.

The impact of the modern sewer system in the rise of water consumption can be understood from an even more concrete perspective, looking to the distribution of water consumption by domestic use (Table 7). The introduction of water-closets would increase domestic water consumption by one third, meaning that the shortcomings of water supply limited the spread of modern waste carriage system (Wohl, 1983). But if this system might proliferate without an adequate water supply, “the result was a public health crisis and the circumstances which contributed to the growth of those two classic water-borne disease, cholera and typhoid” (Hassan, 1998, p. 16).

Table 7: Distribution of household water consumption by different fittings (1913)

	lhd	%
One kitchen tap	20.9	35.0
Additional tap	4.2	7.0
One water-closet	19.0	31.8
One bath	15.6	26.2
Total consumption	59.7	100.0

Source: Adapted from Hassan, 1998, Table 2.1  
lhd = litres per head per day

In addition, even without an integrated modern sewer system in operation (Silva, forthcoming), the municipal sewers existing in Lisbon needed larger and larger water supplies, as the rapid increase of municipal consumption demonstrates (Table 5). This was one of the main reasons why the municipality was the main customer of the company throughout all the period here considered.

Therefore, with extended social coverage and improved water supply, the city would become healthier, as was recognised in the report written in 1864 by the technical committee appointed to assess the service provided by the water company in Lisbon. Private water supply was judged to be inefficient in addressing the social and health aspects related with the strict relationship between water and the sanitary conditions of the city.

All the preceding reasons pushed the municipality to municipalisation of water supplies. The positive externalities reason, from the consumption side, is the motive mostly stressed for other contexts (Silva, 2002; Millward, 1998; Hassan, 1985). When there are positive externalities at the consumption level and transaction costs are extraordinary, incentives to municipalise water supply in order to internalise these externalities are high. In Lisbon, regulatory devices seem to be very imperfect in the second half of the nineteenth century and conflicts between regulator and utility were recurrent. The positive externalities which would arise from improved water supply were clearly emphasised by contemporary observers and displayed in the appalling conditions of urban sanitation and very low water consumption levels.

Moreover, as systems integration between water supply and the sewer system was critical to nineteenth-century sanitation revolution, there was another incentive to municipalisation. Vertical integration between both systems, consolidated under municipal management, was what occurs when municipalisation of water supply exists. Theoretically, vertical integration is an alternative when transactions demand specific investments and exist high costs associated to the celebration of contracts. As a result, technical interdependency between sewerage and water supply, coupled with high transaction costs associated with the regulatory solution, was a strong incentive to the consolidation of management in only one entity – public administration.

In the case of Lisbon another reason still emerges. The recurrence of the disputes between the water company and the municipality, their bitterness, even their virulence, at times, was the result of the peculiar relationship between the water company and the local administration. The latter was by far the largest customer of the company, as well as its main debtor, which poisoned the relations between them forever. The computation of the water actually consumed by the administration, above the quantity freely attributed, was a matter of permanent quarrel and controversy. Therefore, this peculiar relationship between client/regulator and utility was an additional motivation, permanently supporting the desire for taking over the private company. Aside from any public health reason, which might arise from better, cheaper and extended water provision, the efforts to control water supply at several times can be explained by the intention to centralise, in the same body, the administration of a service whose main consumer was the city council.

However, municipalisation of water supply did not happen in Lisbon. The reasons for its absence in the second half of the nineteenth century were presented above. Let me reiterate the main issues at this point. Financial problems, associated with the very low level of municipal revenues, and technical issues, related with the underdevelopment of the modern sewer system, were the main reasons why municipalisation did not occur.

The economic impact of the First World War – together with quantity and quality complains on water supply – launched another wave of municipalisation. At the end of the 1910s private water companies in Lisbon and Oporto, which still survived from the franchise companies for water supply created in the nineteenth

century, faced mounting energy costs<sup>60</sup> and wage demands from employees<sup>61</sup>, in a situation of political and social unrest. The rise of the tariffs was banned by contract, unless authorized by the government. The administrative decisions on the revision of water tariffs demanded hard and long negotiations, with short-lived governments. Therefore, in a situation of escalating prices<sup>62</sup>, the financial position of the companies weakened and investment on waterworks vanished.

The *Companhia das Águas do Porto* was municipalised in 1927, after a long process, which started in 1920, with the creation of a committee to analyse the conditions of water supply in Oporto. The municipality paid an indemnity of 3,500 *contos de réis* to the company, and the waterworks became municipal.

In Lisbon, the process was very similar, but in the end municipalisation did not occur. The reasons for this different outcome are developed in another text. The high cost of the indemnity to consolidate the franchise monopoly before the end of the contract was one of the reasons<sup>63</sup>. The other one was the different situation in Oporto and Lisbon, considering water supply. The situation in the second largest Portuguese city was worst either in the quantity or in the quality of the water provided. The French company invested very little in waterworks and its response to the difficulties generated by the war was lowering the quality of the service provided. In addition, the *Companhia das Águas de Lisboa* had a large numbers of stakeholders (almost all Portuguese).

The solution for the problem of water supply in Lisbon, which was not only technical (to increase the volume of water provided and prevent bacteriological contamination), but also financial (to secure the capital needed to large investments, when the private company had been financially weakened), was original. Private property rights were maintained, but a tight regulatory framework emerged, which took away from the *Companhia das Águas de Lisboa* any strategic or even current decision concerning share dividends, new works and financial organisation<sup>64</sup>. In this sense, this attitude from the new regime<sup>65</sup> was characteristic of its common position to private enterprise: it tries to make a frontier between the past and the future, honouring property rights, but introducing changes that transformed the actual operation of the institutions (in this case the Lisbon's water company) which

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<sup>60</sup> As a result of the war crisis in the provisioning of strategic goods, the price of coal increased and became scarce too. In the end of the 1910s Portugal suffered a strong currency devaluation, which aggravated the cost of imported goods. At the time, the water companies tried to find substitutes for coal in the steam engines used to elevate water, using gas or firewood. Some Lisbon's reservoirs also substitute electric power for steam power.

<sup>61</sup> In 1917 and 1919 two strikes paralysed the company in Lisbon. The first one had the intervention of military forces to protect premises and equipment. In 1920, the Oporto's water company had also to face wage demands from workers.

<sup>62</sup> Price index in 1924 increased 24 times since the beginning of the First World War, with annual inflation rates of two digits. For instance, in 1920 the inflation rate had been 73% and in 1921, 57%.

<sup>63</sup> The arbitration committee fixed the indemnity in almost 21,000 *contos de réis*. (*Actas das Sessões da CML*, 14 February 1926) Considering the high cost of the municipalisation, the city council decided to give up the contractual possibility to take over the company before the end of the contract.

<sup>64</sup> The 1932 contract, which introduced major changes in the regulatory framework, will be not analysed here.

<sup>65</sup> After 1926 there was a military coup, ending the democratic Republic. A non-parliamentary regime (the *Estado Novo*) emerged, which lasted for 48 years.

experienced intervention. However, as an illustration of the new regime's nature and disposition, the project for a new contract was presented by the Public Works Minister in the following terms: the company should accept, completely and unconditionally, its clauses and it would continue as concessionaire. Failing to accept them, the State would carry out its right to rescind the franchise.

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