

## Recent changes to the Portuguese social tariffs model – carrying water in a sieve?

### Abstract

In Portugal, social tariffs have been used since 2009 to promote universal access and affordability of water services, reducing the burden of vulnerable consumers' water charges.

The situation regarding the adoption of social tariffs by the Portuguese water services providers and the recent regulatory changes to the social tariff regime are analyzed. The main conclusion is that the existing differences in terms of affordability issues across municipalities might persist and this may also jeopardize social sustainability and territorial cohesion.

**Keywords:** Water industry; social tariffs; affordability.

**JEL Classification:** L95; Q25; D18

### 1. Introduction

The Sustainable Development Goal (SDG) number 6 - "Ensure Access to Water and Sanitation for All", set in 2015, establishes as a target ensuring universal and equitable access to safe and affordable drinking water for all by 2030. Previously, in 2000, the Millennium Development Goals (MDGs) had already shown concern for the need to grant access to a larger share of the world population to safe drinking water and basic sanitation, under the framework of goal 7 - "Ensure Environmental Sustainability". While for developing countries it is critical to guarantee the physical access to water, for developed ones, access is generally understood in terms of economic accessibility, i.e., affordability of water services.

The involvement of international organizations in the debate on the relevance of ensuring access to water services has positively evolved over the years. A clear example is the acknowledgment, in 2003, on the part of the European Union (EU) (COM 2003), of water supply and wastewater collection and treatment as services of general economic interest. For that reason, they are subject to several public service obligations, among which ensuring universal access and affordability.

Social tariffs are one of the financial measures available to ensure these public service obligations, as a short-term protection for vulnerable consumers consisting in the reduction of the burden of water charges on the income of vulnerable consumers. Other financial interventions consist of subsidies or other financial measures to support the payment of bills. In most European Union member states, the social

welfare system is used to identify the beneficiaries of aid and to allocate payments. In some member states there are also other measures available such as disconnection protection. The implementation of social tariffs gained significance in Europe due to the consequences of the most recent economic and financial crisis, which resulted in a significant proportion of households who had to struggle to pay for essential services.

In Portugal, social tariffs in the water sector have been in force since 2009, as recommended by the regulator. In 2017 and 2018, legislative and regulatory changes related to the social tariff regime were introduced, whose effects are important to understand.

The aim of this paper is two-fold. Firstly, we seek to analyze the situation regarding the adoption of social tariffs by the Portuguese water services providers. Secondly, we discuss the adequacy of the more recent social tariff regime to promote the objectives for which social tariffs are set.

To fulfill these aims we compare the groups of municipalities with and without social tariffs to determine each group's main characteristics. Concerning the second objective, the expected effects of the comprehensive adoption of social tariffs will be discussed to assess whether the existing differences between groups of municipalities will eventually be faded or enhanced and thus what can be expected in terms of social and territorial cohesion.

The remainder of the paper is structured as follows. Section 2 provides a brief review of the motives for the adoption of social tariffs. Section 3 presents the Portuguese regulatory framework of social tariffs for water. In Section 4 the adoption or not of social tariffs is analyzed and the adequacy of the recent changes in the social tariff regime is discussed. Section 5 provides the conclusions.

## 2. Why are social tariffs so needed?

Consumer protection is a critical responsibility of water regulators, regardless of the regulatory framework. The tariffs system thereunder is a relevant part of a comprehensive and regulatory framework.

Water tariffs are set to meet several goals, which are usually grouped into four categories: economic efficiency, financial sustainability, ecological sustainability and social sustainability (Martins et al, 2013; Marques and Pinto, 2015). The social sustainability goal comes from the acknowledgment that water

services should be affordable for everyone, including the more vulnerable groups. For that to be feasible, the aim is to keep the burden of water charges below the threshold that turns water services inaccessible.

Water affordability is considered to be problematic if water charges (for both water and sanitation services) exceed 3% - 5% of household income (Martins et al, 2013; Fankhauser and Tepic, 2007, Komives et al, 2005). However, it is generally not considered to be an issue in developed countries, mainly when affordability is assessed using average data (see, e.g. Fankhauser and Tepic, 2007; Garcia-Valiñas et al., 2010; Martins et al., 2016). According to Smets (2009), the burden of water charges over households' median disposable income in industrialized countries is around 1.1%, while for the poor households this figure is approximately 2.6%. Martins et al (2016, 2019a) claim that there are affordability issues behind the aggregated figures which can only be unveiled when microeconomic data is used.

What is crucial, even under the framework of developed countries, is to identify those households that need help to afford water services, at least regarding the consumption of essential quantities of water (Martínez-Espiñeira and Nauges, 2004; Garcia-Valiñas et al, 2010; Martins et al 2013). Only by targeting the vulnerable consumers is it possible to design effective policies to promote social sustainability.

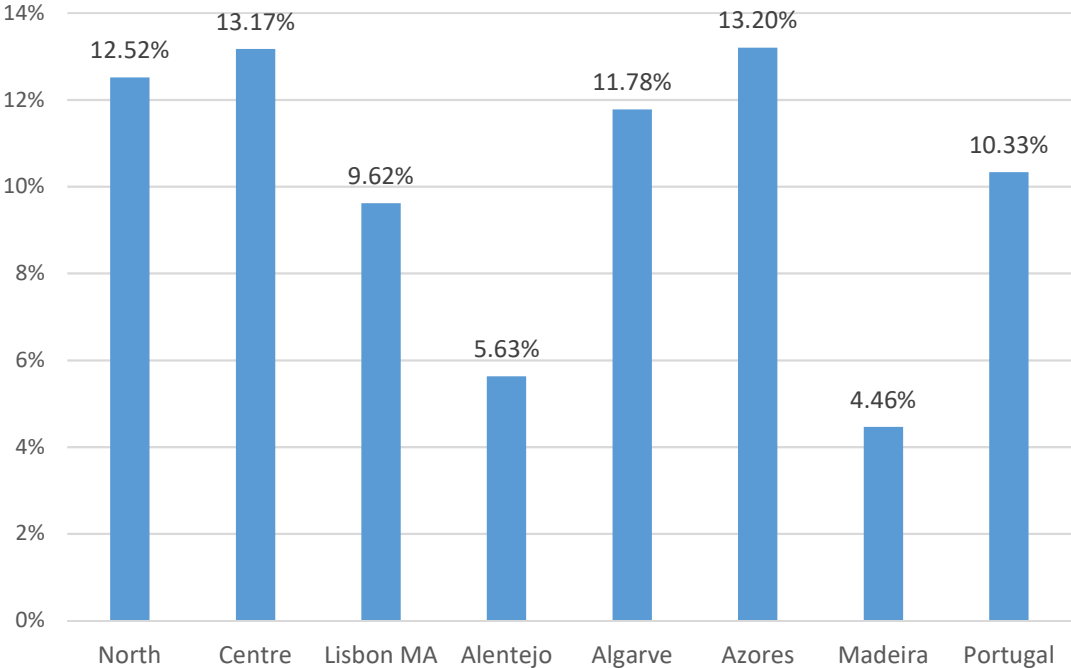
In order to guarantee the universality and affordability of water services, both increasing block tariffs (IBT) and social tariffs (ST) is used. IBT are sometimes justified in the light of social concerns, namely to promote equity among income groups, by allowing cross-subsidization between poorer and wealthier households, under the assumption that wealthier households are expected to use more water and, consequently, to pay higher volumetric charges under the IBT scheme. However, this is not as straightforward as it might seem since, as pointed out by Komives et al. (2005), Nauges and Whittington (2017) or Havranek et al (2018) income elasticity is very low for residential customers, which means that the assumption that IBT will subsidize mostly the poorer households is questionable. Besides, the combination of IBT schemes with fixed charges might actually turn out to be regressive overall, given that the fixed part is diluted over higher consumption.

Some authors have also been questioning whether IBT are able to accomplish social targets such as the universal access to water services, affordability and equity, particularly under scarcity constraints (Prevedello, 2010) and for larger households (Whittington et al., 2015). Barberán and Arbués (2009) claim that the effective potential of IBT schemes in promoting affordability and equity depends on the first block definition, which should, according to these authors, be equivalent to households' essential water needs.

In Portugal, as in other developed countries, it is considered that there are no major water affordability problems (ERSAR, 2018). However, the picture is quite different when affordability is analyzed at the microeconomic level. Thus, to tackle affordability issues more successfully, special tariff schemes that account for household income, size (large families) and composition (children in poorer households) should be considered, since macro affordability ratios significantly below the accepted thresholds might coexist with a significant prevalence of households facing affordability issues, particularly for low income groups (Martins et al, 2016).

Figure 1 shows that there are affordability issues for a significant proportion of households across Portuguese regions, although on average the burden of water charges over income is not considered to be excessive, ERSAR (2018).

Figure 1 - Percentage of households whose water affordability ratio exceeds the 3% threshold



Source of data: IDEF 2015/16.

More than 10% of Portuguese households have to spend over 3% of their income on water services. At the regional level, Azores, Centre and the North regions display the highest proportion of households with affordability issues (more than 12.5% of households).

3. The Portuguese regulatory framework of social tariffs for water

In 2009 the Portuguese Water and Waste Services Regulation Authority (ERSAR) issued a Tariff Recommendation (R1/2009), intended to harmonize the tariff schemes and to be applied by service providers. According to this recommendation, water tariffs should be reduced for households whose gross income does not exceed a certain amount determined by the operator.

The recommended regular scheme consists of a multi-part tariff structure, with a fixed charge (FC) and an increasing block tariff (IBT) concerning the volumetric component. Both this standard tariff and the social tariff schemes are illustrated in figure 2, which highlights the differences between them.

Figure 2 – Recommend tariff schemes for water supply services

Regular tariff scheme		Social tariff scheme	
Fixed charge		--	
+			
Volumetric charges	1 <sup>st</sup> block [0-5 m <sup>3</sup> ]	1 <sup>st</sup> block [0-15 m <sup>3</sup> ]	
	2 <sup>nd</sup> block ]5-15 m <sup>3</sup> ]		
	3 <sup>rd</sup> block ]15-25 m <sup>3</sup> ]		
	4 <sup>th</sup> block > 25 m <sup>3</sup>	2 <sup>nd</sup> block ]15-25] m <sup>3</sup>	3 <sup>rd</sup> block > 25 m <sup>3</sup>

As is shown in figure 2, the social tariff scheme consists of an adaptation of the standard FC+IBT regular tariff scheme. In short, there is an exemption from paying the fixed charge and the first (lowest) block price is extended to consumption up to a monthly limit of 15m<sup>3</sup>.

The discharge from paying the fixed tariff is applied regardless of the household composition. Given that water consumption depends essentially on the number of household members (being positively correlated with the number of adults and children in the household - Grafton et al, 2011) rather than on the household income profiles, this exclusion from payment of fixed charges benefits relatively smaller households more. The weight of the fixed charges on the total amount to pay is higher for smaller households, since they are expected to consume less water and thus to pay a smaller value for the variable part, when compared to larger households.

Recently, Decree Law 147/2017 (DL 147/2017) established a new regime for the application of the social tariff to water supply services, by introducing some changes relatively to previous legislation. However, municipalities are free to adopt the social tariff regime, as proposed by the city council and decided by the municipal assembly.

Following DL 147/2017, the Portuguese Water Regulation Authority issued a Recommendation in 2018, (R2/2018) which updates and replaces R1/2009 regarding the application of social tariffs to domestic users.

Whereas according to Recommendation R1/2009, only households that do not exceed a set ceiling are eligible to benefit from the water social tariff, the Recommendation R2/2018 extends access to social transfers recipients, as long as they fulfill the following requirements: i) the beneficiaries of one of the following social transfers: solidarity supplement for the elderly, social integration income, social unemployment benefit, family allowance, social pension for the disabled and the elderly, ii) belonging to a household with an annual income of € 5.808 or less, plus 50% for each household member who does not receive any income, up to a maximum of 10 members. Each municipality may define other specific situations that entitle households to benefit from social tariffs, in addition to those mentioned in i) and ii).

Moreover, Recommendation R2/2018 introduces another important change: the adoption of an automatic procedure to grant vulnerable households the water social tariff without the need to apply for it, as is the case of the Portuguese energy services (since 2016). It should be stressed, however, that this recommendation for the automatic implementation is addressed only at those municipalities/service providers that are already committed to the water social tariff. Thus, where the social tariff is already applied it should be made automatic, whereas the entities that opted to stay out of such social tariff scheme are neither forced to step in, nor to adhere to this automatic mechanism.

Regarding the design of the social tariff scheme, ERSAR recommends the exemption of the fixed charge, the reduction of the variable part, as in R1/2009, or a combination of both, depending on the choice of the municipality. It is also recommended that a consumption cap be set in order to induce environmentally sustainable behavior and discourage wasting of water, as it is a scarce and essential commodity.

Municipalities are responsible for laying down the terms of the discount to be applied. To guarantee the affordability of water services, it is recommended that such discount take into account the weight of water services charges in vulnerable households' budget. In this regard, ERSAR establishes that the average

water bill for an annual consumption of 120m<sup>3</sup> (10m<sup>3</sup> per month) should not be higher than 1.5% of the household income (equally divided between water supply, wastewater and solid waste services), thus hinting that affordability issues may be arising at lower ratios than what is commonly considered.

With regard to existing social tariffs, municipalities must adapt to the new rules if existing social tariffs do not allow access to all eligible beneficiaries under the terms and conditions set out. Cross-subsidization is not recommended, i.e. financing of social tariffs should be granted by the municipality, without charging users who do not benefit from social tariffs more.

Even if the service is not directly provided by the municipality (see the different management models in the Portuguese water industry in Table 1), financing of the social tariff is a responsibility of the municipality. When services are provided under delegation or concession, the signing of a protocol between the municipality and the entity responsible for the provision of water services is recommended, in view of setting the terms and conditions of the transfer of the subsidized amount.

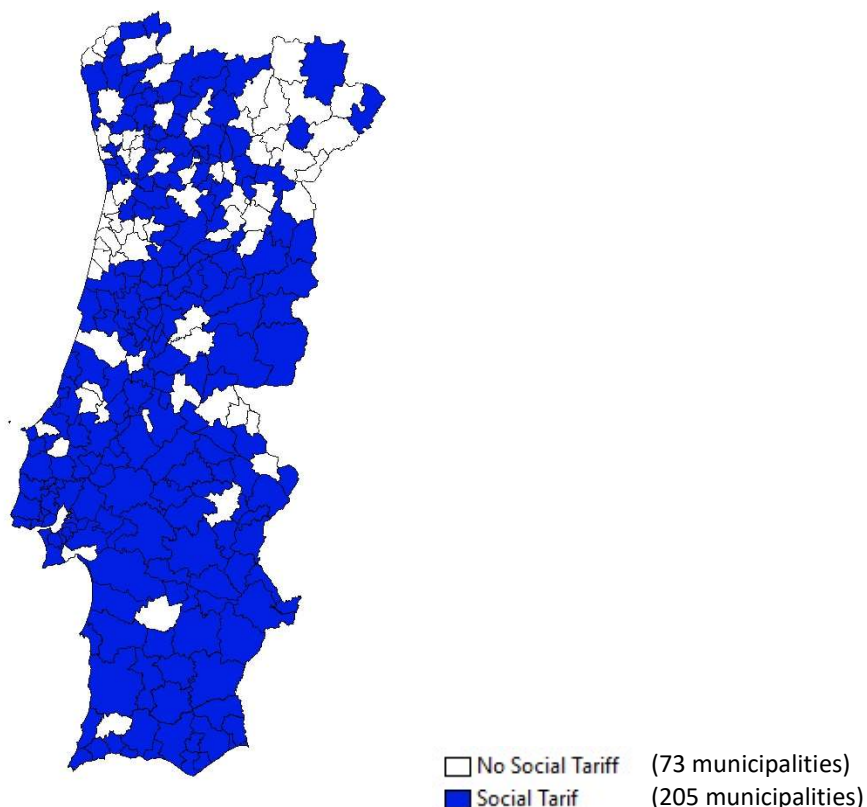
It is also important to highlight that the regulator's recommendations are "soft law" mechanisms, meaning that they do not have the required binding power to ensure compliance.

#### 4. Social tariffs in Portugal - Current situation and likely developments

Although the adoption of social tariffs was recommended in 2009 by the Portuguese regulatory authority, it has not been applied evenly in all Portuguese municipalities by the different water services providers.

Considering the 278 Portuguese mainland municipalities, and based on the information provided by ERSAR for 2016, it is possible to depict the geographical distribution of municipalities according to the dichotomy "displays/does not display the option for social tariff for water supply" (Figure 3).

Figure 3 - Social tariffs by municipality - 2016



Own elaboration using ArcGIS, data from ERSAR on <http://www.ersar.pt/pt/consumidor/tarifas-dos-servicos/tarifarios-sociais> (downloaded on march 3<sup>rd</sup>, 2019).

About 74% of Portuguese municipalities on the mainland had social tariffs in the water supply system in 2016. Those that are out of the social tariff scheme are mainly municipalities located in the Centre and Northern coastal regions and in the interior of northern Portugal.

We grouped the water service providers in the 278 Portuguese mainland municipalities according to the different organizational arrangements. The findings are as in table 1.

Table 1 – Distribution of municipalities according to organizational arrangements

Service provider	# Municipalities	With Social Tariffs	
Municipal service	180	134	74.4%
Autonomous Municipal Service	22	22	100.0%
Municipal delegation	27	26	96.3%
State delegation	22	12	54.6%
Concession	27	11	40.7%
<b>Total</b>	<b>278</b>	<b>205</b>	<b>73.7%</b>



Own elaboration, using data from ERSAR on <http://www.ersar.pt/pt/consumidor/tarifas-dos-servicos/tarifarios-sociais> (downloaded on March 3<sup>rd</sup>, 2019).

Table 1 makes it possible to compare the weight of each management model in terms of the municipalities served and of the municipalities offering water supply social tariffs to domestic users. The service is managed by municipal services in 65% of the municipalities, whereas municipal delegations and concessions are the second most relevant providers, with 27 municipalities each. However, when we focus on the group of municipalities with social tariffs, the municipal delegation is the second most relevant management model, whereas concessions offer social tariffs to only 11 of their 27 municipalities. Another interesting remark has to do with the fact that all municipalities whose water service is run by an autonomous municipal service offer social tariffs. In the case of the municipal delegation, only one of the 27 municipalities does not have social tariffs.

To understand these outcomes it is relevant to mention that there is a relationship between the size of operators and the organizational arrangement of the service provider. The largest operators (in terms of the number of domestic customers served) are Autonomous Municipal Services (mainly from the Lisbon Metropolitan Area) and secondly the Municipal Delegations, while the smallest service providers are mainly Municipal Services (being the dominant type of organizational arrangement, they supply the smallest municipalities). Finally, concession is the only organizational arrangement where private capital is present. The fact that the Autonomous Municipal Services offer social tariffs to all municipalities served might thus be explained by the scale effect, i.e., the biggest operators have more resources/possibilities to finance social tariffs and are thus more willing to offer them.

Another possible interpretation for the lowest shares of state delegations and concessions offering social tariffs may be linked to the fact that in such cases municipal authorities may not have the incentives to promote the adoption of social tariffs, which they finance, because inhabitants might perceive that it is the service provider that is offering the benefit.

In order to characterize further both municipal groups— with and without social tariffs, Table 2 displays descriptive statistics for social-demographic and economic indicators, physical access, affordability and type of management models at the municipal level. In each case, the data was collected for the most recent period available.

*Per capita purchasing power index* is a proxy for measuring income/wealth at the municipal level. The *ageing index* compares the number of persons 65 years old and more with under-15 year olds and it gives

an idea about the municipal demographic structure. The ratio of population with no more than six years of school was drawn from the results on the last *General Population Census* in 2011, and it raises the discussion of whether the automatic procedure recently suggested by the Water Regulatory Authority in 2018, could in theory foster the access to the water social tariff by people who have not applied for such benefit, either because they do not know about it or they do not know how to apply (illiteracy issues).

Table 2. Descriptive statistics for municipalities with and without social tariff for water supply service—different domains

Variable	Mean	Std. Dev.	Min	Max
<b>Municipalities with social tariff for water supply (205)</b>				
<i>Per capita</i> Purchasing Power Index 2015 (%) <sup>§</sup>	82.57	19.48	56.10	214.50
Ageing Index 2017 (%) <sup>§</sup>	218.58	102.65	87.20	733.30
Ratio of population - 6th grade at max 2011 (%) <sup>§</sup>	57.41	9.16	28.87	75.39
Physical accessibility 2017 (%) <sup>°</sup>	94.32	7.77	64.00	100.00
Affordability 2017 (%) <sup>°</sup>	0.43	0.15	0.14	0.88
Municipal Service <sup>°</sup>	0.654	0.477	0	1
Autonomous Municipal Service (SMAS) <sup>°</sup>	0.107	0.310	0	1
Municipal delegation <sup>°</sup>	0.127	0.334	0	1
State delegation <sup>°</sup>	0.059	0.235	0	1
Concession <sup>°</sup>	0.053	0.226	0	1
<b>Municipalities without social tariff for water supply (73)</b>				
<i>Per capita</i> Purchasing Power Index 2015 (%) <sup>§</sup>	75.98	15.66	55.90	136.10
Ageing Index 2017 (%) <sup>§</sup>	248.63	116.00	90.60	626.40
Ratio of population - 6th grade at max 2011 (%) <sup>§</sup>	62.20	7.63	41.83	77.28
Physical accessibility 2017 (%) <sup>°</sup>	94.22	9.64	43.00	100.00
Affordability 2017(%) <sup>°</sup>	0.46	0.14	0.07	0.76
Municipal service <sup>°</sup>	0.630	0.486	0	1
Autonomous Municipal Service (SMAS) <sup>°</sup>	0	0	0	0
Municipal delegation <sup>°</sup>	0.014	0.117	0	1
State delegation <sup>°</sup>	0.137	0.346	0	1

Concession <sup>o</sup>	0.219	0.417	0	1
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Own elaboration, using data from:

- <sup>s</sup> PORDATA, <https://www.pordata.pt> (downloaded on November 23<sup>rd</sup>, 2018)
- <sup>o</sup> ERSAR on <http://www.ersar.pt/pt/consumidor/tarifas-dos-servicos/tarifarios-sociais> (downloaded on March 3<sup>rd</sup>, 2019)

Generally speaking, after comparing both groups, it is possible to infer that in the municipalities that offer water social tariffs inhabitants are, on average, richer, younger and more educated. In fact, the correlation coefficient outcomes between the existence of social tariffs and the *per capita purchasing power index*, the *ageing index* and the *ratio of population - 6th grade at max* are 0.155, -0.124 and -0.234, respectively, being statistically significant at the 1% level. This is somehow counterintuitive from the point of view of the inhabitants' existing needs, since in principle municipalities that, on average, perform worse in these domains would expectedly be more prone to offer social tariffs to their domestic water consumers.

However, the contradiction is only apparent since globally the 73 municipalities that do not offer social tariffs also may lack the adequate resources to finance it, because usually they are poorer, smaller, older and mostly located in interior regions, as shown in Figure 3 and Table 2. Given that the social tariffs' financing is a municipal obligation and that cross-subsidization is not allowed, these municipalities face higher constraints to offer social tariffs. Simultaneously, the population of these municipalities also experience low levels of social dynamism and bargaining capacity, characteristics that typically define the more urbanized and socially differentiated regions. All these aspects contribute to the existence of a kind of a vicious cycle with a certain rigidity, thus preventing the generalization of the social tariff model across the country.

It is not possible to unveil whether the (in)existence of social tariffs comes from the demand side pressure (the information on the number of domestic consumers requiring such a tariff is not publicly available). However, the potential number of beneficiaries of social tariffs (equivalent to the number of vulnerable domestic consumers) is higher than the actual number of beneficiaries. In the municipalities already offering social tariffs, this difference comes from the fact that social tariffs are not automatic. The sharp increase observed in the number of beneficiaries of electricity social tariffs after the introduction of the automatic procedure in the Portuguese electricity industry in 2016, reveals that illiteracy issues prevent that a significant proportion of vulnerable consumers benefit from it. In municipalities that do not offer social tariffs, it is not expected that a social pressure for the implementation of social tariffs exist, since in general terms inhabitants from these municipalities have in principle lower bargaining power.

Regarding physical connection to the supply system (physical accessibility), there are no major differences between groups, the lowest value in the first group being 64% and in the second group it is 43%. In fact, the coverage rate is high, with the network of water supply covering almost the whole mainland territory, which explains the 94% average in both cases. In terms of affordability, there are also no distinct differences between groups, with the lowest figure in the first group of 0.14% and in the second group of 0.07%. For both groups, the average affordability ratio is less than what ERSAR considers to be the threshold of the burden of water supply charges on households, 0.5%.

To assess whether the two groups of municipalities are statistically different, two-sample t-tests were performed and the results are displayed in Table 3.

Table 3 – Two-sample *t*-tests for the groups of municipalities with and without social tariffs

Variable	t-statistic
Per capita Purchasing Power Index 2015 (%) <sup>§</sup>	t <sub>276</sub> = -2.6042 ***
Ageing Index 2017 (%) <sup>§</sup>	t <sub>276</sub> = 2.0737 **
Ratio of population - 6th grade at max 2011 (%) <sup>§</sup>	t <sub>276</sub> = 3.9976 ***
Physical accessibility 2017 (%) <sup>°</sup>	t <sub>272</sub> = -0.0830
Affordability 2017(%) <sup>°</sup>	t <sub>276</sub> = 1.6840
Municipal service	t <sub>276</sub> = -0.3600
Autonomous Municipal Service	t <sub>276</sub> = -2.9517***
Municipal delegation	t <sub>276</sub> = -2.8332***
State delegation	t <sub>276</sub> = 2.1421**
Concession	t <sub>276</sub> = 4.2157***

Own elaboration, using Stata 15.1.

Note: \*\* Statistically significant at the 5% significance level; \*\*\* Statistically significant at the 1% significance level.

- <sup>§</sup> PORDATA, <https://www.pordata.pt> (downloaded on November 23<sup>rd</sup>, 2018)
- <sup>°</sup> ERSAR on <http://www.ersar.pt/pt/consumidor/tarifas-dos-servicos/tarifarios-sociais> (downloaded on March 3<sup>rd</sup>, 2019).

The results confirm that the averages for the *per capita purchasing power index*, the *ageing index*, the ratio of population with low education and for the management models (except for the municipal service) are statistically different from each other, i.e. between the two municipality groups (with and without

social tariffs for water). Moreover, they are not significantly different from each other in what concerns physical and economic access to water supply services.

To analyze the factors that might influence the decision of providing social tariffs, we ran a logistic regression with clustered standard errors. The existence of water supply social tariff is the binary dependent variable. As explanatory variables, we include three binary variables, one for each management model and the socioeconomic and demographic characteristics that differ across groups.

Our results are reported as odds ratios (OR) in Table 4, computed from the logistic regression outputs. The OR compares the odds of an event (in this case, providing social tariff) in one group to the odds of that event in another group.

Table 4 – Association between the explanatory variables and social tariffs

Variable	OR	95% CI	p-value
Per capita Purchasing Power Index 2015	0.986	[0.956;1.017]	0.377
Ageing Index 2017	1.000	[0.997;1.004]	0.989
Ratio of population - 6th grade at max 2011	0.897***	[0.829;0.970]	0.007
Municipal Delegation	4.263	[0.537; 33.880]	0.170
State Delegation	0.283**	[0.107; 0.752]	0.011
Concession	0.116***	[0.044; 0.303]	0.000

Own development, using Stata 15.1.

Notes: \*\* Statistically significant at the 5% significance level; \*\*\* Statistically significant at the 1% significance level. Reference category: Municipal service. Autonomous municipal services provide social tariffs in all municipalities and are thus excluded from the analysis.

It is clear from the previous table that only some odd ratios are statistically significant. More specifically, when the water supply is provided by a state delegation (or a concession) the odds of having social tariff is 72% (or 88%) lower, respectively, when compared to that of the municipal service. Moreover, each percentage point increase in the ratio of population with low education levels is associated with a 10% decrease in the odds of providing social tariff. Both the proxy for the municipal wealth and the demographic indicator have no significant effect over the odds of providing social tariff. The same conclusion can be inferred for the municipal delegation operators.

Taking into account the current situation regarding the adoption of social tariffs and the recent legislative and regulatory changes on this subject, it is relevant to understand what can be expected in terms of the

adoption of social tariffs by municipalities where they do not exist yet, as well as the impact of the mentioned changes for those municipalities where they are already effective.

The R2/2018 changes include the introduction of new eligibility criteria and the automatic allocation of social tariffs to consumers who meet the criteria. To understand the impact of these changes, it must not be forgotten that the option to offer social tariffs is voluntary; thus, municipalities that do not offer them can maintain that option.

Regarding the introduction of a new criterion related to social transfers, the number of beneficiaries is expected to increase. However, the most significant effect should be due to the implementation of the automatic procedure. Immediately after the introduction of the same automatic procedure in the Portuguese electricity industry in 2016, the number of beneficiaries of the electricity social tariff more than quadrupled (Martins et al. 2019b). The potential effects of this change might be explained either by illiteracy issues (unawareness of the existence of social tariffs or how to proceed to apply for the tariff) or reluctance to ask for aid.

In addition to the social impact associated with the expected increase of beneficiaries and the reduction of their respective bills, another potential impact is the increase in the financing costs. This, and the fact that the regulatory recommendations are soft law - social tariffs are not mandatory and cross-subsidization between customers to finance social tariffs is not allowed - might not actually be contributing to the implementation of social tariffs throughout the Portuguese territory. In other words, one can hardly expect the municipalities that still do not have social tariffs to feel encouraged to adopt them. The recent changes to the social tariff regime possibly do not contribute to territorial cohesion and equity. It is considered, therefore, that the dualism created mainly by the fact that social tariffs are not mandatory will maintain the social differences between the two groups of municipalities (with and without social tariffs). For these reasons, the new regime will probably not solve affordability issues, one of the main reasons for the implementation of social tariffs.

## 5. Conclusion

Social tariffs have been put in place in the Portuguese water industry since 2009, after a recommendation from the economic regulator. Recently, some changes concerning the broadening of the eligibility criteria and the automatic application of social tariffs when eligibility criteria are met were introduced. However, the implementation of social tariffs is not mandatory.

The purpose of this paper was to analyze the current situation regarding the adoption of social tariffs by the Portuguese water services providers and to assess the adequacy of the recent changes to the social tariff regime to promote the objectives of affordability of water services and of social cohesion across Portuguese municipalities.

The empirical analyses revealed that there is one group of municipalities, accounting for 74% of the total number of municipalities that apply the social tariffs, which complies with the regulator's recommendations on that matter. In this group of municipalities on average inhabitants are richer, younger and more educated than that of the non-social tariff group. In about two thirds of the municipalities the water supply system is run by municipal services, municipal delegations and concessions coming in second. Despite this, when the focus is on the group of municipalities offering social tariffs, it is clear that concessions provide social tariffs for about only 40% of the municipalities served, corresponding to just 5% of the total number of municipalities with social tariffs. Additionally, all autonomous municipal services offer social tariffs. In the case of municipal delegations, only one of the 27 municipalities does not offer social tariffs.

In 2017 and 2018 legislative and regulatory changes to the social tariff regime were made, enlarging the potential number of social tariff beneficiaries and calling for the adoption of an automatic procedure that grants vulnerable households access to the social tariff for water without needing to request it. This recommendation for automatic application is addressed only at those service providers that are already committed to the social tariff. Consequently, those which already apply the social tariff should make it automatic, whereas those that opted to stay out of such scheme are not forced to adopt it.

Similarly to the developments in the Portuguese energy sector following the adoption of the automatic procedure in 2016, an increase in the number of beneficiaries and the reduction in their water bills are to be expected. The implicit financial effort required to support the social tariff model is, however, not negligible.

The recent regulatory recommendations are soft law, i.e. social tariffs are not compulsory. Additionally, cross-subsidization between customers to finance social tariffs is not allowed. Apparently, there are structural conditions contributing to the maintenance of the existing differences across Portuguese municipalities regarding the availability of social tariffs.

The trend seems to be that considerable differences in the possibility of domestic consumers benefiting from social tariffs persist, depending on the municipality where they live. Thus, one can ask whether the

affordability obligation of public service, inherent to water services, is at stake. The existing differences in terms of affordability across municipalities might persist and this may also jeopardize the obligation of public service to guarantee universal access to services of general economic interest. Recent changes to the social tariff regulatory regime are not enough to promote equity, social sustainability and territorial cohesion.

Based on the outcomes from this work, our recommendation is that social tariffs should be mandatory throughout the territory, whose implementation should depend on domestic consumers' proven vulnerability instead of being a political decision of municipalities. The fact that the decision to offer social tariffs or not is left up to the operators and municipalities leads to the existence and persistence of inequity and lack of territorial cohesion; similar situations in terms of household vulnerability are unequally treated in what comes from benefiting from social tariff, depending on the municipality of residence.

Another recommendation goes for the need to implement an automatic procedure for offering social tariffs, to ensure that the support reaches those more in need. The necessity to apply for social tariffs may inhibit some families who meet the eligibility criteria from actually benefiting from social tariffs due to illiteracy issues, a very common situation given the complexity of tariff schemes and invoices in the water sector.

A final reflection relates to the fact that universality and affordability come at a cost, and thus should not endanger the economic sustainability of service providers. Besides, since cross-subsidization is not allowed, it is up to the regulators to define rules for the financing model of the social tariff and/or other measures to support the consumption of water services. In this domain, the OECD 3T's cost recovery approach provides a useful guidance to guarantee that financial costs of social tariffs are covered. Once more, since cross-subsidization is not allowed, costs cannot be completely recovered by tariffs. Thus, we consider that the funding for social tariffs should come from the other two T sources: (i) municipal taxes and/or (ii) transfers from the State Budget.

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