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# Water affordability issues in developed countries – The relevance of micro approaches

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ABSTRACT

In developed countries, water affordability issues are regarded as a non-significant problem. This paper analyses the prevalence of affordability problems at household level and the determinants that might affect their occurrence. From a questionnaire-based survey, Portuguese household level data are used to show that average measures can mask affordability issues for substantial proportions of the low income groups. Findings also indicate that to tackle affordability problems more successfully, special tariff schemes should consider household income, size (large families) and composition (children in poorer households).



## 1. Introduction

Water is at the core of sustainable development goals and it is critical for human well-being, economic prosperity and the preservation of environmental capital. Significantly, for the UN in 2014 this discussion on the role of water for the achievement of all three dimensions of sustainable development - social, economic and environmental – indicates affordability as a key challenge that needs to be addressed, especially in non-developed and developing countries. This paper questions the implicit assumption that affordability issues can be considered as a solved or a non-significant problem in developed countries. This study assesses micro water affordability (using primary disaggregated household level data) to show that macro (average) measures can mask serious affordability issues for substantial proportions of the more vulnerable households. In fact, average ratios do not fully reflect differences between households in terms of their consumption needs (related to household size) and income.

The paper begins with a brief summary of the most recent developments towards a worldwide commitment to water affordability, taking into account both the contributions to the human rights dimension and the role of regulation and public policies (Section 2). This review further considers the multiple approaches to define the critical threshold for water to be affordable, by comparing the benchmarks recommended by major international organisations with the relevant scientific literature on the empirical assessment of water affordability (Section 3).

This research has three main empirical purposes. First, to analyse the prevalence of affordability problems, using micro data. Second, to implement a sensitivity analysis to re-examine the prevalence of affordability problems, using the minimum and maximum thresholds adopted by major international organisations. Third, to determine the main characteristics associated with the occurrence of affordability issues, using multiple logistic regression analysis. Ultimately, we aim to empirically illustrate the importance of using micro data to assess whether water affordability concerns should be reinforced/redirected by taking the case of Portuguese households as an example. The remainder of the paper is structured as follows. Section 2 presents a short chronology of the main milestones regarding the recognition of water affordability as a crucial goal. Section 3 provides a brief review of

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the thresholds usually considered by national and international organisations. Section 4 presents the data and methodology. The main results are presented and discussed in Section 5. Section 6 concludes.

## 2. Pathways for a worldwide commitment to water affordability

Water and sanitation services are essential for human life, for health, for dignity and for economic prosperity. Water affordability is now being recognised as an official target, or even a legal requirement, in an increasing number of countries (Smets, 2009). However, despite the consensus on the principles at stake, an effective worldwide commitment towards water affordability is still in its early stages. Significantly, the progress already achieved illustrates both the contribution of a human rights dimension and the role of regulation and public policy.

The human 'right to water' as the right to have access to the water required to satisfy basic human needs was first established in Argentina at the 1977 *United Nations (UN) Water Conference*. But water affordability emerged as a general principle only in 1992. In the *Dublin Statement on Water and Sustainable Development* (Agenda 21), later approved at the *UN Conference on Environment and Development*, the term 'access' was finally explicitly recognised as also involving economic accessibility, i.e., the right to have access to water at an affordable price. In 2002, the UN Committee on Economic, Social and Cultural Rights adopted General Comment No. 15. This confirms the right to water in international law and defines it as the right of everyone "to sufficient, safe, acceptable, physically accessible and affordable water for personal and domestic uses". At the European Union (EU) level, Protocol (No. 9) to the *Treaty of Lisbon* (2007) on services of general interest formally introduced the concept of affordability in EU law as: "The shared values of the Union in respect of services of general economic interest include in particular: (…) a high level of (…) affordability, equal treatment and the promotion of universal access and of user rights". In 2014, the UN General Assembly unanimously adopted a Resolution agreeing on a set of Sustainable Development Goals, including one dedicated to water, with targets for universal access to drinking water, sanitation and hygiene for individual households and for healthcare centres and schools, and for the safe management of wastewater, including its treatment, re-use and recycling. The discussion on the role of water, sanitation and hygiene in achieving sustainable development in the World Water Development Report 2015 (UNESCO, 2015) specifies affordability as one of the key challenges that needs to be addressed.

Meanwhile, the Lisbon Charter for Good Practices in Public Policy and Regulation of Water Supply Services and Wastewater Sanitation (IWA, 2015: 8), recently adopted by the International Water Association, and recognised in the Ministerial Declaration resulting from the 7th World Water Forum, explicitly emphasises the principle of "maintaining a fair balance between the affordability of the service provided and the level of cost recovery that ensures sustainability" as one of the principles for good public policy and effective regulation. Indeed, consumer protection, in particular the promotion of affordable prices, is a critical duty of water regulators, regardless the regulatory regime.

To sum up, water affordability is a central element to access to water and to guaranteeing the human right to water and wastewater services.

## 3. Water affordability benchmarks and empirical assessment

Water affordability has commonly been measured as the share of household income spent on water charges (e.g. Fitch and Price, 2002; Sawkins and Dickie, 2005; Reynaud, 2010). In general, in industrialized countries, water charges represent around 1.1% of the income of households with median disposable income, while for poor households it represents approximately 2.6% (Smets, 2009).

Households paying an amount for water that exceeds an affordability threshold are often deemed to be facing affordability problems. But there is no consensus on establishing a limit for a water affordability that could be identified as: the *affordability benchmark* (Fankhauser and Tepic, 2007), the *threshold of affordability* (OECD, 2003) or the *target ratio* (Gawel et al., 2011). Further, it has been argued that only those uses corresponding to the satisfaction of domestic essential needs – i.e. the water consumption needed to maintain acceptable or minimum living standards – should be considered in affordability assessments (Reed, 2005; Martins et al., 2013a). Nevertheless, international guidelines have not been suggested by the relevant institutions (Howard and Bartram, 2003; Martins et al., 2013b) and thus its operationalization is so far rather general (e.g., the water consumption quantity that is price-inelastic).

Table 1 summarises the benchmarks considered by the most relevant water governance organisations for measuring the threshold for the water services affordability ratio (AR).

Despite the differences in the thresholds, Table 2 shows that a 3% AR is often considered in the literature for water services.

Table 2 shows that the significance of water affordability challenges has different degrees and intensities in different parts of the world. Although some studies acknowledge affordability of water services as a continuing concern (Stern and Mirrlees-black, 2012), affordability issues have consistently been seen as a solved or a non-significant problem in developed countries. Indeed, a large majority of water affordability studies based on macro assessments indicate no affordability problems, on average (see, e.g., ERSAR, 2010; Fankhauser and Tepic, 2007; García-Valiñas et al., 2010; Martins et al., 2013a; Miniaci et al., 2008).

However, some of these studies do reveal potential problems for specific groups of the population, particularly poorer households and single parent families. In this regard, evidence for Portugal based on the AR for different water consumption scenarios of representative average household size and income by municipality shows that, if we take the mean income of the poorest households nationwide, the water charges raise affordability concerns in an important number of municipalities, even for low water consumption levels (Martins et al., 2013a).

The previous findings support the argument that macro affordability analysis provides only a general and often misleading picture of the issue. Therefore the assessment of water services affordability should be supplemented with an analysis of micro affordability figures (Barraqué, 2011), particularly in the case of the most vulnerable households. These concerns are reinforced in the present context of economic and financial constraints.

## 4. Data and methodology

This section introduces the data and the main methodological options used to attain our research goals. As disaggregated household level data is not available from national official statistics, primary data was collected from a household sample of residential users in mainland Portugal by means of a questionnaire-based survey performed in 2012. The random sampling framework made use of a complete telephone list of customers of 13 water utilities, with different management models and located in different Portuguese hydrographical regions. A total of 2386 valid questionnaires were obtained which yielded detailed information on the characteristics of households and dwellings.

To calculate the observed micro AR, self-reported data on

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