Utilities Policy 34 (2015) 82–93

Contents lists available at ScienceDirect

Utilities Policy

journal homepage: www.elsevier.com/locate/jup

An analysis of the price escalation of non-linear water tariffs for domestic uses in Spain

Marta Suárez-Varela [a, *], Roberto Martínez-Espiñeira [b], Francisco González-Gómez [c]

[a] Department of Applied Economics II, University of Valencia, Edificio Oriental. Avda. dels Tarongers s/n, 46022 Valencia, Spain
[b] Department of Economics, Memorial University of Newfoundland, St John's, Newfoundland and Labrador A1A 5S7, Canada
[c] Department of Applied Economics and Institute of Water Research, Faculty of Economics and Business, University of Granada, Campus de Cartuja s/n, 18071 Granada, Spain

ARTICLE INFO

Article history:
Received 10 October 2014
Received in revised form
19 January 2015
Accepted 19 January 2015
Available online 7 February 2015

Keywords:
Water tariffs
Price escalation
Progressivity
Spain
Increasing block rates

ABSTRACT

Efficient and sustainable water resource use and management is becoming increasingly important, especially in regions under water stress. The use of increasing block pricing involving an escalation or progressivity of unit prices in tariff systems is an economic instrument that contributes to achieving this objective. More progressive tariffs are expected to contribute to a better allocation of resources and avoid their wastage. This article analyses the determinants of the price escalation of water supply tariffs in Spain, a country subject to a high water stress throughout most of its territory. The main objective is to discern whether differences in the degree of progressivity in the tariffs are explained fully by climatic and scarcity factors or are, instead, disproportionately affected by political and business criteria. Data from 967 municipalities are analysed using conditional mixed process (CMP) modelling. Among the obtained results, we find that tariff escalation is influenced by factors related to the environment in which the service is supplied, as well as by factors related to the decision makers' own strategic choices.

© 2015 Elsevier Ltd. All rights reserved.

1. Introduction

Different topics of discussion surround the design and implementation of water pricing policies, both with regard to the price level itself and the design of the tariff. When it comes to the price level, one key consideration is the call for universal access to water. This issue is of particular concern in developing countries (UN Water, 2013, 2014) but it also affects disadvantaged groups in developed countries (García-Valiñas et al., 2010; Martins et al., 2013). Another concern is the requirement to charge prices capable of recovering the cost of supply of the service (Hoque and Wichelns, 2013; Massarutto, 2007). Implementing this principle of cost-recovery requires that water prices appropriately signal water resource scarcity and promote practices consistent with the objective of efficiently allocating these resources. This principle also requires avoiding electoral opportunism strategies, so that consumption levels fall closer to the users' real needs.

The design of water tariffs has also been the subject of study (García-Valiñas, 2005; Rogers et al., 2002). The practice of applying binomial tariffs (including both a fixed and a variable component) is increasingly popular (Hernández-Sancho and Molinos- Senante, 2015; OECD, 2010). The fixed part of the tariff guarantees a level of revenue per user with which to cover the associated fixed costs of supplying the service. The variable part of the tariff, most often involving increasing block rates (IBRs), aims to ensure the sustainable and efficient use of water resources. With increasing block rates, unit water prices are progressively[1] higher with increasing water consumption. In principle, this type of tariff is applied with an aim of preventing waste, mainly in high-income families, although if other measures are not applied, it penalises larger households (Arbués and Barberán, 2012).

In essence, the choices involved in the design of a nonlinear water tariff include deciding whether a non-zero fixed fee will be used; deciding about its size and also whether it will entitle the

[1] As explained in Section 4.1, it is this kind of progressivity that we refer to throughout. That is, we are concerned with the degree of price escalation within the tariff. This should not be confused with the more common use of the term, which involves the notion that richer individuals pay more for something or are taxed proportionally more. We use *progressivity* and *price escalation* indistinctly in the paper.

* Corresponding author.
E-mail addresses: marcesua@uv.es (M. Suárez-Varela), rmartinezesp@mun.ca (R. Martínez-Espiñeira), fcojose@ugr.es (F. González-Gómez).

http://dx.doi.org/10.1016/j.jup.2015.01.005
0957-1787/© 2015 Elsevier Ltd. All rights reserved.

user to any free water allowance, and if so, of what size; deciding how many blocks of consumption to use in the variable component of the tariff; deciding about the size of each block; and deciding which price to apply to each of the blocks. It is the combined effect of all these elements that results in a given degree of price escalation in the tariff and what is, thus, supposed to drive the allocation of water resources towards efficiency.

Several recent studies have analysed the determinants of price levels for residential water uses (García-Valiñas et al., 2013; Ruester and Zschille, 2010). Some of these studies found that differences in water prices among cities are due, in part, to differences in the costs of providing the service, related to the need to apply more complex water treatment techniques, to higher energy costs for resource extraction and transportation, or to other similar conditions. Sometimes, differences in costs are not attributable to environmental factors. Instead, they are due to disparities in the efficiency of the management of water utilities (Berg and Marques, 2011; Carvalho et al., 2012). Higher costs due to inefficiency will normally lead to an increase in prices. Additionally, other factors in principle unrelated to the costs of service, such as the ideology of the ruling party in the municipality, industry structure, or ownership type of the water supplier (Bel et al., 2015; Chong et al., 2006) nonetheless appear to drive price differences. In these cases, citizens and taxpayers may perceive a certain degree of unfairness affecting access to a good that is necessary for life (Martínez-Espiñeira et al., 2012).

Other studies have focused instead on the choice of fixed components of the tariff and their effects in terms of efficiency in the use of water resources and equity (Dandy et al., 1997; Martínez-Espiñeira, 2002).

We focus on the remaining element of non-linear tariffs. The objective of the present contribution is, therefore, to analyse the determinants of the degree of price escalation (progressivity) built into the variable component of water tariffs for residential uses in Spain.

The analysis of progressivity in taxation schemes has of course been a frequent topic of analysis. For example, there have been studies that addressed this issue as part of the analysis of local taxes (Bahl et al., 2002; Chernick, 2005; Foster, 2013). However, to our knowledge, there is only one previous example of this type of research in the context of water pricing, namely Boyer et al. (2012), who discuss what factors influence the choice of the type of tariff structure (increasing block, uniform rate, or decreasing block) in four Southern US States. Our focus is to learn whether more progressive tariffs are applied in areas with higher degrees of water stress, or whether differences in the progressivity of the rates are, instead, due to other reasons. The analysis is conducted using municipal data for Spain, a country where much of the land is under water stress. Our database contains information for 967 municipalities from all the Spanish regions for the year 2014.

We propose a measure of local progressivity of the tariff structure based on the escalation of the average unit prices for seven levels of consumption. Within a simple least squares framework, we use a conditional mixed process approach to jointly model for each municipality the value of this measure and two other aspects of the tariff structure, namely the number of pricing blocks used and the size of the fixed component of the tariff. The joint modelling of these three variables accounts for the likely correlation among them and makes it possible to correct for endogeneity bias. Our main findings are that the degree of tariff escalation in water supply tariffs is influenced not only by factors related to the environment in which the service is supplied, such as the level of water scarcity in the municipality but also largely by other determinants related to the decision makers' own strategic choices.

The paper is organised as follows. Section 2 describes the factors that may influence the degree of price escalation in the tariffs. Sections 3 and 4 contain a description of the data and the methodology used in the analysis. In Section 5, the results are reported and discussed, before a concluding section.

2. Determinants of price escalation in water tariffs

The use of progressive tariff systems is justified on the grounds that water, being a good that satisfies different needs, can be viewed differently from an equity perspective, depending on the amount consumed. Thus, water for drinking and cooking is considered a basic necessity. On the other hand, water for watering gardens and filling swimming pools would often be considered a type of luxury good. Other uses fall in an intermediate category, for example, those related to laundry and household cleaning. Interestingly, although one of the purposes of the use of increasing block tariffs is to subsidize lower levels of consumption, the subsidy is regressive in the sense that, in order to obtain the maximum quantity of subsidy,[2] one must consume the whole amount of water within the subsidized blocks. Thus, those who consume less end up receiving a smaller subsidy.[3]

Within the first levels of consumption, it is agreed that water prices should not be a deterrent for families with low incomes. Water is a merit good that serves economic, environmental and social goals and generates substantial positive externalities (OECD, 2003). Water accessibility should, therefore, be guaranteed, at least in amounts sufficient to cover basic needs. However, as consumption levels rise above the category of necessities, it is desirable that the unit price of water increase in consumption blocks. Higher water consumption levels are penalised, which is expected to contribute to achieving the objectives of efficiency and sustainability of water resources. Therefore, the variable part of the tariff is supposed to take into account objectives of accessibility, efficiency, and sustainability (Rogers et al., 2002).

In Spain there exists an extraordinary diversity of tariff systems (González-Gómez et al., 2012). This is because water prices are set at the municipal level, as each municipality has jurisdiction over the management of the water service in the municipality.[4] According to the Spanish Association of Water Supply and Wastewater (AEAS, 2012),[5] 95% of the municipalities in Spain apply binomial tariffs, with both a fixed quota and a variable component charged from the first cubic meter of water consumed. In the remaining 5% of municipalities, the fixed component includes a free minimum allowance. When it comes to the variable component of the tariff, most municipalities (58.2%) set three different consumption blocks; up to 29.1% of municipalities apply different prices to four or more consumption blocks; while 10.7% of them use only two blocks and 2% apply a flat rate. The fact that each municipality or water supplier sets its own fixed quota and the prices and size for each consumption block further increases the diversity of tariff systems in Spain.

This wide variety of tariff structures in a country with 8119 municipalities leads us to consider what factors may explain the differences in the degree of progressivity embedded in their tariff

[2] We thank an anonymous referee for pointing this out.

[3] See Komives et al. (2005, Ch, 5) for a more extensive analysis of this aspect of increasing block tariffs.

[4] Except in those cases in which tariff design is conducted in larger areas, when municipalities decide to form associations or *consortia* and the water service is supplied by a single management unit.

[5] These statistics were obtained from a sample in which municipalities with less than 20,000 inhabitants are underrepresented. There exists no other statistical source at a national level that addresses the structure of water supply tariffs in Spain.

Download English Version:

https://daneshyari.com/en/article/1000076

Download Persian Version:

https://daneshyari.com/article/1000076

Daneshyari.com