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Research article

Levers supporting tariff growth for water services: evidence from a contingent valuation analysis

Andrea Guerrini [a, *], Vania Vigolo [a], Giulia Romano [b], Federico Testa [a]

[a] Department of Business Administration, University of Verona, Via Cantarane 24, Italy
[b] Department of Economics and Management, University of Pisa, Via C. Ridolfi 10, Pisa, Italy

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ABSTRACT

The backwardness of the water utilities sector necessitates urgent investment in infrastructure to improve water quality and efficiency in water supply networks. A policy of tariff growth represents the main source to sustain such investments. Therefore, customer engagement in the form of willingness to pay (WTP) is highly desirable by water utilities to obtain social legitimization and support. This study examines the determinants of consumers' WTP for improvement programs for three drinking water issues: quality of water sources, renewal of water mains, and building of new wastewater treatment plants. The study is based on a survey conducted among a sample of 587 customers of a water utility located in the province of Verona in the north of Italy. The contingence valuation method is used to measure WTP. Specifically, an ordinal logistic regression model yields the following significant determinants of WTP: quality of water and services provided, preference for privatization of the water utility, sustainable consumption of water, and some socio-demographic variables. The findings provide interesting insights into the drivers of WTP as well as managerial recommendations for water utilities. In particular, the findings show that water utilities need to improve service and water quality to increase customers' acceptance of tariff growth. In addition, utilities should invest in customer education and communication activities focusing on specific age groups (e.g., older customers) to enhance their WTP. Finally, communication strategies should reinforce the possible role of liberalization and privatization in supporting infrastructure investments.

1. Introduction

Firms providing public services are often affected by poor technical efficiency, low economic profitability, and weak financial sustainability, and this also applies to water utilities (Da Cruz et al., 2012; Romano and Guerrini, 2011; Romano et al., 2013), which face the additional risks of water scarcity and inefficient water use, since water losses are approximately 36% of water fed into the water grid (OECD, 2011), with a maximum average of 43% in the south of Italy (Cittadinanzattiva, 2013). In Italy, investment required in the water sector to meet infrastructure needs is around € 65 billion in the next 30 years, according to a plan of the national authority for energy, gas, and water services (AEEGSI). According to financial data for 126 water utilities, the total amount of planned investment per inhabitant per year realized from 2014 to 2017 was € 35 in the northern regions, € 48 in the central regions, and € 18 in the southern regions (REF, 2015), while the average value of investment in other European countries ranged from € 80 in Germany to more than € 120 in Denmark. The OECD estimated the required investments for Italy at € 80 (OECD, 2011). However, this requirement does not match the scarce funds available to national and local governments, along with the effects of the EU Stability and Growth Pact, which limits the expenditure capacity of municipalities. For this reason, a policy based on tariff growth is the main source of finances to realize new investment (Massarutto and Ermano, 2013; Massarutto et al., 2013). The total revenues collected through tariffs increased annually between 6% and 7% from 2012 to 2015 (REF, 2015, when utilities applied the method developed by the national regulator, the AEEGSI, based on the full-cost recovery rule. According to a recent report of the national authority (AEEGSI, 2016), the highest price variations for 2014 were recorded in the central regions (6.19%), while the lowest growth was recorded for the southern regions and islands (0.36%

* Corresponding author.
E-mail addresses: andrea.guerrini@univr.it (A. Guerrini), vania.vigolo@univr.it (V. Vigolo), giulia.romano@unipi.it (G. Romano), federico.testa@univr.it (F. Testa).

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and −0.05%, respectively); a similar picture is provided for investments per capita realized in the period 2014–2017, with € 192 per inhabitant in the central regions, and € 63.9 per inhabitant for the islands. From 2000 to 2011, when the so called "tariff normalized method" was applied, tariffs increased by more than 70%, with an annual average of 5.83% (CGIA, 2012), while the consumer price index grew 27.1%.

Starting from this backwardness of the sector, this study applies the contingent valuation method (Venkatachalam, 2004) to explore the factors affecting the willingness to pay (WTP) for water services of Italian citizens. Besides socio-demographic variables, the factors considered include customers' perceptions of water quality and service quality, customers' "green" use of the resource, and customers' attitude toward privatization. The study contributes to the literature about WTP by describing how resource-related factors (e.g., water quality), service-related factors (e.g., courtesy of front-office personnel), and behavioral elements (e.g., green consumption of water) influence customers' WTP. In addition, this is one of the first studies to adopt a stakeholder engagement approach to understand customers' support of tariff growth policies in the Italian context. Therefore, our study provides added value by providing new empirical evidence on the acceptance of tariff growth policy by citizens. Some interesting practical implications arise from the study concerning the policies a water utility should deploy in terms of communication with stakeholders, and quality of services delivered in order to lighten the impact of tariff growth.

The rest of this article is organized as follows. After this introduction, a literature review on WTP is presented, with a focus on studies conducted in developed countries. The subsequent section presents the context of the study and methodology adopted. The results section describes the evidence from the statistical analysis. Finally, the discussion and conclusion sections provide interpretations of the results and their practical implications for water utilities, respectively.

2. Willingness to pay for water services

2.1. Willingness to pay: a stakeholder engagement approach

The influence of stakeholders on business activities has increased significantly in recent years (Provasnek et al., 2016). Several studies have argued that companies need to review their stakeholder engagement approaches in order to avoid potential conflicts, animosity, or legal challenges and to enhance their legitimacy (e.g. Desai, 2017; Du and Vieira, 2012). In addition, companies can engage with stakeholders, such as local communities, to identify new opportunities for collaboration and develop reciprocal trust (Greenwood, 2007; Provasnek et al., 2016). With regard to public utilities in particular, more inclusive and bottom–up processes are gradually replacing traditional top–down approaches to policy design and implementation (Akhmouch and Clavreul, 2016). This trend also applies to the water utilities context, in which multi-level, polycentric governance models are used to increase suppliers' political and social legitimacy (Bresciani et al., 2017). In this scenario, stakeholder engagement by water suppliers contributes to "effective, efficient, and inclusive water management" (Akhmouch and Clavreul, 2016, p. 2).

Since water supply presents the characteristics of a natural monopoly and water utilities operate in a regime of competition for the market, in which the customers cannot choose their service provider, customer engagement seems to be particularity important for water utilities to obtain social legitimizing and support (Demsetz, 1968; Rienzner and Testa, 2003). The literature offers different theoretical models to explore the link between stakeholder engagement strategies and companies' financial performance (Li et al., 2008). Some models suggest that stakeholder engagement leads to higher stakeholder support, which in turn leads to higher levels of customers' WTP (McWilliams and Siegel, 2001). In particular, customers might be willing to pay more for a product or service perceived as socially responsible (D'Amico et al., 2016). In this regard, Dean et al. (2016) argue that an engaged citizenry (i.e., citizens who understand and actively support investments to develop sustainable water management initiatives) is crucial to implement sustainable water management policies.

Within this framework, the contingent valuation method and WTP can be considered a form of stakeholder engagement for improving water services, for example, by supporting investments to enhance the quality of tap water, reduce leakages, and expand wastewater treatment plants. Therefore, WTP can be interpreted as the value customers attribute to water services (Kwak et al., 2013). Specifically, Stanchev and Ribarova (2016, p. 229) described WTP as the "monetary metric of the economic value to water customers."

The literature about WTP for water services has addressed both developing and developed countries. Studies conducted in developing or emerging countries have focused mainly on WTP for water safety (e.g., Burt et al., 2017; Khan et al., 2014), WTP for regularity of water supply (Tussupova et al., 2015; Vásquez et al., 2009), WTP for improving surface water quality and reliability (e.g., Bell et al., 2014; Wang et al., 2013), and WTP for supporting environmental services (e.g., Ojeda et al., 2008; Xu et al., 2003). In this regard, Ojeda et al. (2008) explored WTP to restore and preserve the ecosystem of the Yaqui River Delta, Mexico, and found that 95% of households were willing to pay about $ 4.70 per month.

With regard to developed countries, which are the context for this study, research has investigated WTP for tap water quality (e.g., Polyzou et al., 2011) and infrastructure (e.g., del Saz-Salazar et al., 2016; Tanellari et al., 2015). Concerning water quality, Polyzou et al. (2011) explored WTP for the improvement of tap water among citizens in Greece. Only 40% of respondents expressed the intention to contribute to the improvement of water quality. While the average amount of WTP for the total sample was $ 4.65 every 2 months in the water bill, for the group of respondents willing to support water improvement, the average amount was much higher ($ 10.38). Similarly, Kwak et al. (2013) examined the WTP for tap water quality improvement in South Korea, where the water supply system is run exclusively by local governments supplying water at lower prices than production costs in order to stabilize prices and guarantee basic citizens' rights. The study revealed a mean WTP of $ 2.2 per household per month. The amount corresponds to 36.6% of the monthly water bill and 20.2% of the production costs of water.

Some scholars have investigated WTP to improve old infrastructure and reduce leaks. For example, in their study conducted in northern Virginia and the Maryland suburbs of Washington DC, Tanellari et al. (2015) explored customers' WTP for three programs: water quality improvement, water quality infrastructure, and pinhole leak damage insurance. Their findings revealed that 44% of respondents would not support the program, in line with the findings of Polyzou et al. (2011). The quality infrastructure program obtained the largest share of votes compared to the other programs (29%), followed by water quality improvement (17%), and pinhole leak damage insurance (9%). On average, customers were willing to pay 87.64 $ for the water infrastructure upgrade, 85.07 $ for the water quality improvement program, and 80.69 $ for the pinhole leak damage insurance program (per quarterly billing cycle). In addition, del Saz-Salazar et al. (2016) focused on the Guadalquivir River basin, in Spain, which suffers from high water stress and leakage problems. The authors investigated customers' WTP to improve urban water supply infrastructure and reduce leakages. On