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The impact of privatization approaches on the productivity growth of the water industry: A case study of Chile

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ABSTRACT

The water industry faces the challenge of implementing privatization reforms. This process mainly adopts the following two approaches: the privatization of public water and sewerage services (WSS) and the privatization of water companies' ownership. This paper investigates the impact of both privatization approaches on changes in productivity in the water industry. In doing so, the Luenberger productivity indicator (LPI) was computed for a sample of Chilean water and sewerage companies (WaSCs) for the period 1997–2013. Unlike the most commonly applied index (Malmquist productivity index), the LPI simultaneously takes into account output expansion and input contraction. The results evidenced that productivity in the Chilean water industry decreased after its privatization. However, in the subperiods in which the ownership of WaSCs was privatized, the productivity of the water industry increased due to technical improvements. On the other hand, the concession of WWS to private WaSCs involved a regression in productivity. From a policy perspective, regulators and managers of WaSCs at the international level can learn important lessons from the Chilean case to improve the productivity of the water industries in their countries.

1. Introduction

Access to water and sewerage services (WSS) is a human right, as has been recognized by the United Nations through the Millennium Development Goals. Hence, in recent decades, governments have undertaken significant efforts to ensure WSS to citizens. In particular, over 2.3 billion people have gained access to an improved source of drinking water since 1990, and between 1990 and 2012, almost 2 billion people obtained access to improved sanitation (UN, 2014). In this sense, public authorities should promote consumers' access to these services through efficient provision, high quality, and reasonable tariffs (Ferro et al., 2011).

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The water and sewerage sector has two main features that justify its regulation, namely, the provision of WSS through a monopoly regime and the existence of externalities (SISS, 2013). Without regulation, the risk that water operators will abuse their users is higher, as they can take advantage of their market power (Marques and Simões, 2008). In other words, in the absence of competitive markets, operators do not have incentives toward efficiency and innovation. Moreover, they will provide services of lower quality at higher prices (Marques and Simões, 2008). The second feature is that the urban water cycle involves externalities. Thus, supplying drinking water generates positive external effects on society, and the environmental and social costs of not treating wastewater are higher than private treatment costs (Molinos-Senante et al., 2010). In this context, regulation is an essential tool for State intervention in the water and sewerage sector. It promotes efficiency and innovation in WSS and protects the public interest.

Several factors have contributed to an increase in the trend toward privatization in the water industry (Craig, 2009). First, many municipalities have obsolete WSS infrastructures that will require a huge investment to upgrade or replace. Moreover, water authorities have had to comply with increasingly stringent environmental legislation about wastewater treatment and quality requirements for drinking water. Second, private water companies have identified public WSS as potentially profitable to own or operate. Third, water privatization is a subset of an ideological agenda to reduce the role of governments and increase the role of the private sector in providing public services. In addition, world institutions such as the World Bank and the International Monetary Fund are pressuring developing countries to turn to privatized water systems as a solution for inefficient, cash-poor state-run WSS (Conca, 2006; Baer, 2014). Water privatization describes a variety of models of private sector involvement in water services. Thus, water industry privatization mainly involves the following two approaches: (i) the privatization of public WSS, i.e., water authorities enter into long-term contracts with private entities to operate and maintain their water supplies and/or sewerage systems; and (ii) the privatization of the water companies' ownership, which involves the privatization of public water and/or sewerage infrastructure. Both approaches have been implemented worldwide. Thus, in 2000 alone, ninety-three countries had municipalities that underwent some form of privatization (Petrova, 2006).

Privatization and regulatory reforms in the water industry have stimulated interest in benchmarking tools to assess the effectiveness of the reforms. Evaluating the performance of water utilities provides very valuable information for the development of policies (Mbuvi et al., 2012). Moreover, evaluations of changes in the productivity of water companies are essential to mitigate information asymmetries and for tariff revisions. The cases of England and Wales are paradigmatic, and several studies have assessed changes in the productivity of English and Welsh water companies (e.g. Saal et al., 2007; Bottaso and Conti, 2009; Portela et al., 2011; Maziotis et al., 2014). Because of the advantages of benchmarking, studies on the efficiency and growth in the productivity of water utilities have also been carried out in other countries, such as Portugal (Carvalho et al., 2012), Australia (Worthington, 2014), Spain (Sala-Garrido et al., 2012), Italy (Guerrini et al., 2013), and France (Lannier and Porcher, 2014), among others.

To compute changes in the productivity of decision-making units (DMUs), several methods can be used, namely, parametric and non-parametric approaches. Non-parametric frontier methods have recently experienced an upsurge in popularity because they do not require the availability of prices, but rather, rely on physical inputs and outputs (Epure et al., 2011). In this context, the most commonly applied index to compute changes in productivity is the Malmquist productivity index (MPI) (Fethi et al., 2011). An alternative measure is the Luenberger productivity indicator (LPI), which is a generalization of the MPI (Chambers et al., 1996). The alternative approaches to compute growth in productivity need to be robust to gain acceptance by policy makers and managers of WaSCs. Otherwise, estimations of changes in productivity would be biased, and therefore, policy and managerial conclusions would not contribute toward improvements in the performance of water companies.

Although the LPI encompasses the MPI (Boussemart et al., 2006), in the framework of water utilities, to the best of our knowledge, only Molinos-Senante et al. (2014a) have evaluated growth in the productivity of water companies by computing the LPI. They assessed changes in the productivity of both English and Welsh water and sewerage companies (WaSCs) and water-only companies (WoCs), focusing on water services only. Molinos-Senante et al. (2014a) were pioneers in their application of LPI in the water industry; they focused mainly on comparing MPI and LPI scores, rather than on investigating the relation between changes in productivity and the regulatory cycle and privatization in England and Wales.

Against this background, the main objective of this paper is to investigate the impact of the two main privatization approaches – the privatization of public WSS and the privatization of the water companies' ownership – on changes in productivity in the water industry. To assess growth in the productivity of water companies, the LPI and its components, namely, efficiency changes and technical changes, are computed. Hence, the main factor that drives changes in productivity over time is identified. This information is essential for both policy makers (regulators) and managers of utilities to improve the productivity of WaSCs. An empirical application was developed focusing on 18 WaSCs in Chile[1] over the period 1997–2013. The second objective of this paper is to explore some environmental and quality of service variables that might affect changes in the productivity of WaSCs. Unlike Molinos-Senante et al. (2014a,b), our study covers WSS, and not water services alone. Chile presents an interesting case within the context of this research. The case of water industry privatization in Chile provides an example of full privatization in a monopoly sector that has achieved near universal access in urban areas (Baer, 2014). Moreover, because Latin America could be described as being situated at a medium level in terms of the coverage, quality and cost recovery of WSS (Ferro et al., 2011), water managers and authorities in other Latin American countries can learn some

[1] See Section 2 for a detailed explanation of the privatization and regulatory reforms in the Chilean water industry.