IWRM2018-103
8th International Water Resources Management Conference of ICWRS


# Estimation of Industrial Water Use Demand and Price Eleasticity: Empirical Study in 30 Provinces

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China's water resources are becoming more and more scarce, and competition between the water consuming sectors is very fierce, especially the growth of industrial water consumption. In order to cope with the increasingly serious challenges of water resources and improve the water use efficiency in each water consuming sector, the central government put forward the three red lines to water demand management as the core management strategy, including how to improve the efficiency of industry water use is an important measure to realize the three red lines strategy. In improving the efficiency of industrial water use, the use of water pricing policy to improve water efficiency is an important measure. To implement this measure effectively, it is necessary to understand the price elasticity of demand for industrial water, but the empirical research is very lacking. For this reason, the objective of this study is to estimate the price elasticity of industrial water and give the policy implication. The data used are the industrial water use from 150 cities in 30 provinces in China from 2007 to 2015. Based on the data, we establish econometric models to analyze the demand for industrial water, and to estimate the price elasticity of industrial water demand. Considering the interaction between industrial water consumption and water price, simultaneous equations are adopted to estimate the price elasticity of industrial water.

The results show that the evolution of the industrial water price policy can be divided into 6 stages: the first stage (1949-1964): free charge stage; the second stage (1964-1984): low standard charge stage; third stage (1985-1991): cost price charge stage; fourth stage (1992-2003): the commercialization reform period; the fifth stage (2004-2012): the stage of deepening reform; the sixth stage (2013 - present): comprehensive water price reform stage. In 2015, the average price of industrial water use in China is 3.54 yuan per ton, the quantity of water for production and operation is 66665.1 kiloton and the industrial water reuse rate is 75.73%. The main factors that affect the demand for industrial water are water price, water reuse rate, number of employees, number of industrial enterprises and industrial electricity consumption. The estimated price elasticity of industrial water demand is -2.449. It demonstrates that industrial water prices are elastic and exists obvious effect of price lever. The policy implication of this study are industrial water use can achieve the goal of improving water use efficiency through reasonable water pricing policies.