Willingness to Pay for Irrigation Water from Groundwater in Spot Water Market by Self Selectivity: An Example from Iran

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Abstract

Understanding the economic value of water can inform decision makers of the full social benefits and costs of water use, which is of particular importance in agriculture with its huge and often heavily subsidised water use. In the few available irrigation water markets, the price that is paid for an extra unit of irrigation water reflects the willingness to pay (WTP) of farmers but is blurred by the impact of other factors. Analysing this WTP and its determinants hence gives us the chance to find the 'right' value of water. One specific methodological challenge, however, arises from the observation that participation in water markets is usually not randomly distributed across the population of all water users. In consequence, self-selectivity issues arise for the analysis of WTP for irrigation water, which are often ignored in the existing water valuation literature. This study attempts to show that self-selectivity is indeed an issue in our case study of the spot water market in the Rafsanjan aquifer in south-eastern Iran. The main source of irrigation water is groundwater. A two-stage random sampling was carried out in a field study from November 2008 - February 2009. In this survey, information was collected on different aspects of groundwater, irrigation, production and cost of the pistachio production, and socioeconomic characteristics of the farmers. The factors affecting the WTP have been analysed by the Heckman sample selection model with emphasis on the effects of the farmers' decisions to participate in the spot water market. The price which is paid by the farmers is used as the dependent variable. Results show that the self-selectivity parameter in the Heckman model is significant at an estimate of -0.73. This indicates that the average WTP of all farmers in the Rafsanjan aquifer is actually much less than the WTP of those who participated in the spot water market. The significant and effective variables in the Heckman model are mainly related to technical characteristics. The study suggests that the promotion of the groundwater market could be a way to get a clear picture of the groundwater scarcity in depleting aquifers such as Rafsanjan.

Keywords: Groundwater, Heckman sample selection model, irrigation water, pistachio, Rafsanjan, self selectivity

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