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A Latent Class Model for Basic Water Services in the Middle Olifants Sub-basin of South Africa

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Abstract

Using household survey data, this study investigates preferences for domestic water services and estimates willingness-to-pay for different groups of households in the Middle Olifants sub-basin of South Africa. In order to detect households' preferences, a choice experiment (CE) was conducted. Respondents are asked to choose one among several alternatives proposed to them. An important part in the choice construction process is the identification of the relevant alternatives and their respective characteristics (“attributes”) from which the respondent is supposed to choose the most preferred alternative. When respondents compare alternatives with different attribute levels, they are forced to make trade offs and marginal rates of substitution between attributes and thus willingness-to-pay-estimates can be isolated. CEs are analysed using discrete choice models based on random utility theory. Data analysis suggests the presence of preference heterogeneity and violation of the typical assumption of independent and identically distributed (IID) error terms and therefore, a latent class discrete choice model was applied.

Latent Class (LC) models allow classifying respondents according to their characteristics (“covariates”) and their choice behaviour simultaneously into homogeneous groups (“classes”). For policy recommendations this classification is helpful, since policies can be designed to address different classes of people. Especially when socio-economic variables are important factors influencing class membership, knowing a person's socio-demographic variables helps understand his or her preferences and likelihood to choose certain services over others.

This information is helpful for policy-makers to enable the design of water services in the Middle Olifants according to preferences of local households and it can provide a basis for setting water tariffs.

Keywords: Choice experiment, latent class model, South Africa, water services