

研 究 主 論 文 抄 録

論文題目

Stated choice valuation of non-market environmental goods: Considering complex decisions and heterogeneity (意志決定のプロセスと選好異質性を考慮した非市場環境財の選好意識データによる価値評価法)

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主論文要旨

This thesis is about non-market environmental valuation choices that do not follow conventional rationality assumption. We present here a collection of essays on issues surrounding the environmental valuation allowing for complexity and heterogeneity in decision-making of individuals. Implications of these decisions are important in task of ensuring sustainable global and local environment policies. Stated choices have been important basis of these environmental values. Stated choices are responses in hypothetical choice questions. Unlike revealed preference data, or actual choices from actual options, stated choices are more complex as actual experience of the situation posed is not present. This is commonly analyzed though utility maximization discrete choice method which assumes a 'rational' man maximizing his utility over a set of alternatives. In this thesis, we show that an individual, when stating preferences about environment state alternatives, is far from 'rational'. Aspects out of the conventional utility function influence his decisions. External factors such as questionnaire design and resource characterization and internal factors related to psychological status of an individual or preference heterogeneity of samples are some factors that adds complexity to analysis.

Stated-choice valuation can be worked in discrete elicitation format like in referendum contingent valuation (CV) or choice from a set of alternatives with varying environmental attributes. The analytical foundation for these valuation formats is generally based on neoclassic welfare analysis. As ecological behaviour is widely acknowledged to be influenced by beliefs, attitudes, perceptions and motivations, it is unlikely that a homogeneous group of rational choice makers can be achieved. This thesis is concerned with summarising and proposing extensions on models used to analyze discrete environmental valuation data to account for irrationalities and uncertainties in choices.

The research focus on two stated-choice valuation methods: CVM and attribute-base stated-choice method (ABSCM). Many researchers have raised questions on the reliability of willingness to pay (WTP) estimates from these models as affected by context design, psychometric bias, and tastes variations. This thesis initially presents a general framework for discrete choice analysis involving stated-choice experiment on environmental premiums. It then present behavioural construct, formulate analytical framework and empirically demonstrate the proposed model extensions. Multinomial probit and logit models assimilating bounded and unbounded distributions are conventionally used in discrete stated choice valuation methods. The sources of irrationalities and uncertainties, and the model improvements we propose are

discussed below.

*Response effects*- These models are based on referendum CV format. The inconsistencies of individual responses are affected by the survey design, bid cues, and the inherent strategic behaviour of respondents. These can be addressed by assuming flexible error structure, latent variables, and strategic scaling in utility maximization.

*Tasks complexity in perceiving goods dimension* - Environmental and natural resources can be measured in terms of quality, quantity, or a measure of both. However, the perceiving the difference may be difficult in stated preference experiments due to goods nature and the individual's lack of experience of the good in real market. Here, we present two methodological framework and empirical demonstration to address them. One considering correlation in residuals of different scenario context and the other presenting attribute base representation of goods component where attribute level prices can be directly measured. We present here a model considering the limited information-processing capacity of individuals.

*Difference in perceptions of environmental level and attitudes* - Perceptions and attitudes are investigated be factor that contributes to variance of willingness-to-pay for environmental improvements. The latent indicators of these factors are investigated and integrated in the modeling though incorporation of covariate in the variables related to good or its attribute level.

*Heterogeneity* - Taste heterogeneity is brought about by inherent differences in individuals brought about by a combination of different factors. Computational advances can now accommodate random coefficient models with different correlation structure. Different specification these models were investigated to investigate which model specification is best for environmental valuation.

The data used in the empirical demonstrations are: 1) CVM data on the valuation of damage to cultural heritage site by a road project in Cebu City, Philippines; 2) CVM data on the valuation of Aso National Park, Kumamoto, Japan; and 3) ABSCM data on measuring traffic externalities value of private and public work trips in Metro Manila, Philippines.