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Attribute non-attendance in discrete choice experiments: A case study in a developing country

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ABSTRACT

In a discrete choice experiment (DCE), some respondents might not attend to all presented attributes when evaluating and choosing their preferred options. Utilizing data from a DCE survey in Vietnam, this paper contributes to the literature on attribute non-attendance (ANA) with an investigation of the ANA in a developing country context. Based on a review of relevant published ANA studies, we find that the extent of ANA reported by respondents in our Vietnam case study could be potentially more serious than in developed country studies. Our econometric analysis, based on a mixed logit model, shows that respondents who ignored the attributes have different preferences from respondents who attended to the attributes. An examination of ANA determinants using a multivariate probit model was undertaken to gain a better understanding of reasons for the differences in the preferences of two groups of respondents. Our results confirm that the stated ANA could be an example of a simplifying strategy of respondents, and that respondents ignored attributes which were not relevant to their situation.

1. Introduction

A discrete choice experiment (DCE) is a stated-preference (SP) technique that can be used to estimate the economic value of changes in non-market goods and services. In a DCE exercise, non-market goods and services are described to respondents by a number of attributes. A standard application of the DCE approach assumes that respondents consider all presented attributes in evaluating and choosing their preferred options. However, an increasing amount of research provides empirical evidence that when faced with a typical choice task in a DCE exercise, some respondents may actually make their choices by using only a subset of the attributes (Hensher et al., 2005; Campbell et al., 2008; Carlsson et al., 2010; Scarpa et al., 2010). This phenomenon is commonly referred to as attribute non-attendance (ANA) or attribute ignoring.

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There are several reasons why respondents ignore attributes. The first reason may be the cognitive burden for respondents in making trade-offs among several attributes with different levels in a DCE exercise. Each attribute in itself may be quite difficult to understand. To deal with the cognitive burden, respondents may use simplifying strategies when making decisions, and ANA can be an example of a simplifying strategy (Carlsson et al., 2010). In addition, the design of a choice task can lead to attribute ignoring. Selection of attributes may result in lexicographic orderings (i.e. one attribute is much more important than the others) (Carlsson et al., 2010); or attributes are immaterial to some respondents (e.g. elderly people may not use mobile phone text messaging). Hensher et al. (2012) suggest that the irrelevant range of attribute levels (e.g. improvement levels are infeasible) can cause ANA. Other reasons for respondents' ignoring attributes may be protest-like reasons (Carlsson et al., 2010; Alemu et al., 2013), e.g., they do not agree with the idea of paying for a public good. Regardless of the reason behind attribute neglect, the majority of studies dealing with ANA suggest that if ANA is taken into account, model performance is better, and potential biases in welfare estimates could be minimized (Hensher et al., 2005; Campbell et al., 2008; Carlsson et al., 2010; Alemu et al., 2013).

To account for ANA in the data analysis, there are two main approaches that have been commonly applied in the literature. The first approach, which is called stated ANA, is the use of follow-up questions asking respondents to state which attributes they attended to (or ignored) when deciding on their preferred options (Hensher et al., 2005; Campbell et al., 2008; Carlsson et al., 2010; Scarpa et al., 2010; Balcombe et al., 2011). Respondents' answers to the ANA questions are used to assign a weight to the attribute parameters, since ANA will affect the estimated attribute parameters. Typically, if a respondent i ignores an attribute j in a choice situation, the attribute parameter β_{ij} in the utility function will be restricted to zero (Hensher et al., 2005). There are grounds for questioning the restriction of zero parameters. A number of researchers have shown that respondents who indicate that they ignored a given attribute often show a non-zero sensitivity to that attribute (Campbell and Lorimer, 2009; Carlsson et al., 2010; Hess and Hensher, 2010). A possible interpretation of these results is that respondents who claim to have ignored a given attribute may simply have assigned a lower weight to the attribute (Hess and Hensher, 2013). Respondents' self-stated ANA may still contain valuable information, but such data should not be used deterministically by the restriction of zero coefficients. Stated ANA responses could be used to determine the weighted parameters via interactions between the ignored attributes and dummy variables representing the stated ANA (Carlsson et al., 2010; Balcombe et al., 2011).

Without the need for self-reported indicators, the second approach to modeling ANA is to make use of latent class modeling techniques to infer ANA from the choice data (Scarpa et al., 2009; Hensher and Greene, 2010; Campbell et al., 2011; Hensher et al., 2012). This approach is termed inferred ANA. With this approach, different latent classes represent different combinations of attendance and non-attendance across attributes; and when a given attribute is assumed to be ignored in a class, the ignored attribute's parameter is constrained to zero. All possible combinations can be covered in a 2^K class specification, with K being the number of attributes. The estimated class probabilities show the share of respondents' attendance and non-attendance across attributes.

While the DCE approach was originally developed and mostly applied in developed countries, there has been a growing interest in applying this approach to address developing country issues. However, applying the DCE method in the developing country context faces some particular challenges, such as respondents' lack of experience with surveys of public opinion and/or a lower level of literacy (Mangham et al., 2009; Bennett and Birol, 2010). To the best of the authors' knowledge, this paper presents the first study to examine the issue of ANA reported by respondents in the context of a developing country.

In the next section, we introduce our case study in Vietnam. In Section 3, we present the findings related to incidence of stated ANA in our Vietnam study and a comparison of the rate of stated ANA between our study and a number of ANA studies undertaken in developed countries. We find that the extent of ANA stated by respondents in our Vietnam case study could be potentially more serious than in the developed country studies. To assess the effects of the stated ANA, our econometric analysis in Section 4 includes two groups of models accounting and not accounting for the ANA. The results of the econometric models indicate that respondents who ignored the attributes have different preferences from respondents who attended to the attributes. Determinants of stated ANA in our study are analyzed in Section 5 to provide a better understanding of reasons for ANA. The findings will help DCE practitioners to reduce ANA in their DCE applications in developing countries.

2. Study design and implementation

Data used for this study of ANA came from a DCE exercise which aimed to elicit households' preferences for improvements in cyclone warning services in Vietnam. Each improvement alternative was described by different improvement levels of three cyclone warning service attributes—accuracy of forecast information, number of updates per day and mobile phone short message warning. A fourth (cost) attribute, defined as a one-off levy paid through the electricity bill, was also included. The willingness-to-pay (WTP) for an improvement in a single attribute of cyclone warning services can be estimated by the ratio of estimated coefficients of the attribute to the coefficient of the cost attribute. Table 1 presents the attribute levels applied in the DCE exercise. The attributes and their levels were identified following two focus group studies of public opinion about what attributes of a cyclone warning system they would be interested in, alongside a rigorous literature review and on-going discussions with Vietnamese meteorological experts. More detailed discussion of the attribute selection is provided in Nguyen et al. (2013).