A Two-Stage Choice Experiment Approach to Elicit Consumer Preferences

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Introduction

Choice experiments (CE) have been widely used in estimating consumer preferences and willingness to pay (WTP) for product attributes because its advantage in identifying the trade-off among multiple attributes. Researchers in both marketing and economics have work hard to improve the method to obtain a better understanding of consumer preferences of products. For instance, the impact of cheap talk has been proved to improve the estimates of consumer willingness to pay (WTP). Non hypothetical CE which involves real cash exchange has been recommended because it is more incentive compatible. Large amount of choice sets in CE is not recommended because consumer limited ability to process a lot of information in short time. In addition, various econometric models have been developed to more suitably fit the assumption on consumer choice behavior. Most recently, the impact of impact of the information loads, such as the dimensionality of CE and the number of attributes in CE on the estimates of consumer WTP have been studies more extensively. Results from those studies suggest that the impact of attribute information may result from consumer limited ability to process large amount of attribute information. Some researchers also demonstrate that consumer only use a limited amount of attributes that they can recall to make choice decision. Therefore, it is reasonable to assume that consumers have limited cognitive ability to process large amount of attribute information, and they only make the choice decision using a subset of selective attributes. Base on this assumption, the CE that can incorporate the attribute selection in consumer choice decision making will be more appropriate and more efficient. This paper presents a "two-stage" choice experiment approach to estimate consumer stated preferences which allows a respondent to select most important attributes for herself/himself from a set of attributes before choice decision-making. In this approach, the CE presented to a respondent varies based on her/his selection of attributes that determine their choice decision. Using this approach, consumer groups that have homogeneous preference for a set of attributes can also be easily identified.

Methodology

Assuming that when making choice decision, consumers can only process limited information on the products, then consumers will select subsets of a full set of attribute information, and the purchase behavior is determined by the selected attributes. Consumer choice decision can be separated into two stages.

In the first stage, a consumer will select a_i, where a_i is a subset of product attributes that a consumer chooses to make her/his decision, and $a_i \in A$, where A is a set of all product attributes presented to the consumer. The selection of the subset of attributes may depend on a consumer's demographics, personal believe, experience, lifestyle etc.

In the second stage, a consumer will make choice decision based on the selected attributes, such that $P(Z_i=j)=P(U_{ij}=max(U_{ik}, k=1...m)|a_i)$, where U_{ij} is a consumer's utility depending on the consumer selected attributes, and k represents the alternatives that the consumer make choice

from. Following the random utility theory which assumes that $U_{ij}=V_{ij}+e_{ij}$, and with the assumption that e_{ij} is identically independently distributed with Gumbel distribution, the parameters in consumer utility function can be estimated using conditional logit model or more flexible mixed logit model that assumes heterogeneous preference among consumers. In fact the second stage of the approach is a traditional choice experiment, and any econometric method suitable for CE data could be used. The key difference between the presented approach and the traditional CE is that the utility function of a consumer depend on her/his selection of the attributes. If we present 10 product attributes to consumers, and ask them to selected, for instance, seven most important attributes that impact their choice decision, theoretically, we will have 120 possible CE at the second stage. However, in most cases we won't do this because most times we have a well defined research question and are particularly interested in several product attributes, and thus only leave a few attributes for consumers to select from. In addition, even we ask consumers make the selection of seven from 10 attributes at the first stage, the number of CE at the second stage may still be much smaller than 120 because some consumers may choose the same combination of seven attributes.

The Data

From November to December, 2010, a survey containing a dynamic choice experiment was delivered to 7,500 undergraduate students living in university housing of University of Florida, Gainesville, FL. About 970 students took the survey and 634 students finished the survey. The product used in the choice experiment is milk, and we were particularly interested in consumer preferences for raw milk (raw vs. pasteurized). Based on previous studies, the attributes such as price, production method (organic vs. conventional) and location (milk producing state) are predetermined attributes in the CE. In the first stage, consumers were asked to choose two most important attributes among the following five attributes: (1) whether milk is from grass fed cows, (2) whether milk is from small farms, (3) whether milk cows are treated with higher animal welfare standard, (4) whether milk is from a family farm and (5) whether milk production meets higher environment protection standard. There were 10 possible attribute combinations. In the second stage, the two most important attributes selected by a respondent and the 4 predetermined attributes were used to design the CE, and the respondent was asked to answer the CE questions. All the 10 CE used the same design -- maximum D-efficiency design with six attributes (4 predetermined and 2 selected attributes by consumers) to generate the product profiles and then cyclical design was used to generate the CE.

Preliminary Results

Based on the 970 responses of the students who answered the question asking them to select two most important milk attributes from five attributes, *higher animal welfare* standard is the most important attribute, followed by *higher environmental standard* and *from grass fed cows*. *Family farm* and *small farm* are the least important attributes. More than 30% of respondents select both *higher animal welfare* and *higher environmental standard* as two most important factors, about

13% selected both *higher animal welfare* and *from grass fed cows* and about 11% selected both *higher environmental standard* and *from grass fed cows*. These results demonstrate the advantage of the two-stage CE as the tradition CE approach only present the same CE to all respondents in which some attributes might be not important at all for some of the respondents in their choice decision.

Full paper with results will be updated soon.