SURVEY DESIGNING FOR CONTINGENT VALUATION STUDIES

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ABSTRACT

The development of survey is one of the important aspects of contingent valuation (CV) study. A CV survey should have what is known as face validity. The environmental good and the circumstances under which it would be provided should be described clearly and accurately, and the trade-off that the respondent is asked to make should be a plausible one. Thus it is important to the survey team to design a survey that brings the interested parties to endorse the delineation of the goods described on CV scenario. The survey should clearly describe what the proposed policy will actually do and what the current baseline status quo is. Thus this study serves to discuss about the methods of designing CV survey that can be used to value the environmental services, including non-market value. An in-depth discussion about how to prepare a step by step CV survey is also provided.

Keywords: *Economic evaluation method, contingent valuation, survey design*

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1. Introduction

The inconsistent importance attached to the environment by governments also reflects the inherent problem facing the public sector, namely quantifying and comparing benefits arising from spending in a diversity of areas and thus maximising the welfare of society. Where a policy affects goods and services that are traded in normal markets, changes in prices and income can be connected to consumer behaviour. But in the absence of an observable market how the benefits of higher standard of living, health care, education or protection of the environment can be associated? A solution to this problem involves

defining the benefits arising from differing sectors in terms of monetary value. In the context of public benefits arising from natural resources, this approach was first suggested in the 1940's (King, 1995). This development stems from a belief that unless the value of natural resources is expressed in monetary units, it will continue to be assigned a zero value, and will not therefore be incorporated into the decision making process. Money may not be ideal but, as it has been argued by Mitchell and Carson (1989) monetary valuation is a means of systemising and rationalising behaviour.

The contingent valuation (CV) is one of a number of valuation techniques which come under stated preferences in measuring individuals' value for environmental goods (Mitchell & Carson 1989). CV methods seek to measure individuals' value for the environmental goods directly, by asking them to state their preferences for the environment. In other words, the economic value is revealed through a hypothetical market based on questionnaires. Unlike revealed preference methods, CV was used mainly to determine non-use values of the environment such as existence value, altruistic value and bequest value since these values do not turn up in any related markets. Contingent Valuation Method was first used by Davis (1963) in a study of deer hunters in Maine. The CV method to determine non-use values first came into the public focus in a significant way with the Exxon Valdez disaster of 1989. The National Oceanic and Atmospheric Administration (NOAA) of the US constituted a panel with Nobel laureates Kenneth Arrow and Robert Solow to determine whether CV was a reliable way to ascertain lost existence values in the accident. Using the recommendations of the panel and several others, the NOAA conditionally accepted CV as reliable, subject to elaborate guidelines for its use. Thus this study serves to discuss about the methods of designing CV survey that can be used to value the environmental services, including non-market value. An in-depth discussion about how to prepare a step by step CV survey is also provided. Hopefully this article will benefit to the knowledge in environmental valuation method and contributed specifically for the understanding on designing a good survey for contingent valuation studies.

2. Survey Designing

The information provided in CV survey should be adequate for the decision of the respondent is asked to perform but should not overwhelm them with unimportant technical details. It is sometimes the case that a decision maker who has not been substantially involved earlier in the process of evaluating the policy at hand can learn more about the actual decision by reading the CV survey instruments than the various technical reports on the proposed project or research. Previous studies (Abdullah 1994; Levinson 2009; Awad & Hollander 2010; Rousseau & Vranken 2011) suggested that most of a good CV surveys in general contain: (a) an introductory section that helps set the general context for the decision to be made; (b) a detailed description of the goods to be offered or evaluated to the respondent; (c) the institutional setting in which the goods will be provided; (d) the manner in which the goods will be paid for; (e) a method by which the survey elicits the respondent's preferences with respect to the goods; (f) debriefing questions about why respondents answered certain questions the way that they did; and (g) a set of questions regarding respondent characteristics including attitudes and demographics information.

Based on the past literatures (Bhattacharjee & Herndon 2008; Liu 2012; Owusu & Anifori 2013) the introduction part should be highlight about the knowledge of the individual or public's perception of the goods and services to be valued (Green & Tunstall 1991). At the same time the survey may ask the questions to explore the knowledge of individual preference for the goods (Rodriguez 2008). Wertenbroch and Skiera (2002) suggested that the main idea in the first section in CV survey is to construct a scenario which corresponds as closely as possible to real-world situation. It is usually hypothetical for the persons being interviewed. For example, study on the issue of the effect of inland development on corals by Siti Aznor (2009) can give illustration on how the CV survey should be constructing in the introduction part to gain individual understanding with the issue or topic being study by the researcher.

> *Paragraph 1:*
> *Coral reefs are not only beautiful but also important for many reasons. Most importantly, they provide protection and shelter for many different species of fish. They also control how much carbon dioxide is in the ocean water; protect coasts from strong currents and waves by slowing down the water before it gets to the shore; and hold promise for scientists seeking new drugs to combat disease such as cancer. Furthermore, they also generate income to one's country from tourism industry; second largest to Malaysia.*
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> *Paragraph 2:*
> *Nearly 80% of the reefs of Southeast Asia, the most species-rich on earth, are at risk, and more than half at high risk. Soil erosion, from deforestation or cultivation on steep slopes, when transported by rivers into coastal waters can smothers corals, preventing oxygen and nutrients from reaching coral polyps and preventing coral larvae from settling and forming new colonies. Sewage discharge from coastal communities promotes growth of algae that blocks sunlight, which corals need to survive.*
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> *Paragraph 3:*
> *One way to protect corals from these kinds of damage is by establishing marine parks, to protect and conserve the marine eco-system, especially coral reefs. Right now, the authority is charging RM5.00 (equal to USD 1.30 or less than GBP 1.00) to every visitor to this marine park, but they only take care of the water areas, NOT the inland activity.*
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> (Siti Aznor, 2009; pp. 125 – 126).

Based on the above study shown that, in the introduction part the survey needs to explore on the attitudes to environmental goods in general and preferences for the particular good under investigation (paragraph 1). Next, on the second paragraph the survey explains the details of the goods to be offered or evaluated to the respondent. The third comes with the institutional settings in which the goods will be provided and a method by which the goods and services will be paid for. Other example of the first step to devise a hypothetical market is a study by Quah and Chong (1999) set a scenario as follows:

> *"Suppose the government wants to make the East Coast Park smaller in size so that more houses can be built. In exchange, the government will develop a park exactly similar to the east Coast Park but located in an urban, built-up area."*

The next step is to define the elicitation method. In this section, individuals are asked to state their maximum willingness to pay (WTP) for the environmental goods and services (either to increase the quantity of the goods, or to prevent a decrease in the quantity of the goods); or their minimum willingness to accept (WTA) compensation for the environmental goods and services (either to forgo an increase in the quantity of the good, or to accept less of the good). The choice of elicitation method is one of the major exercises in CV studies. Presently there are four types of elicitation method which are known as single-bound, dichotomous choice, double-bounded dichotomous choice and bidding game (Ahmed & Gotoh 2006; Siti Aznor 2009). For CV survey with an open-ended format, the question asks which no value is specified and individuals are asked a simple question on their maximum WTP for the good, for example;

> *"Suppose the National Park authority charged a fee to enter this recreation site. What is the most you would be willing to pay to use it per person per day?"*

Different with a close-ended question in which a range of values are specified and the respondent chooses one of the values, for example:

> *"Suppose the National Park authority charged a fee to enter this recreation site. What is the most you would be willing to pay to use it per person per day? (Please circle one value)"*
> *1 2 3 4 5 6*

Such a format anchors the respondent's answer to the range of values presented, although they can be offered another category in which they specify the value. This type of format might be applicable to non-priced open access recreational areas, where values in the range presented have already been determined for other comparable sites. For study that use a dichotomous choice or referendum type of survey, the question designed in which a single payment amount is presented to the respondent who either agrees or disagrees with the amount, for instant

> *"Suppose the National Park authority charged a fee of $5 per person per day to enter this recreation site. Would you be willing to pay this fee?*
> *YES/NO"*

The payment amount varies across the sample questionnaire survey across a pre-determined range. This is the elicitation method which is advocated by the NOAA. But the price range must be determined, which is normally done by doing a pilot test. This method is also rather inefficient in a sampling sense where it needs a larger number of observations. Ahmed and Gotoh (2006) said that among the four method, an iterative bidding format or multiple-bounded dichotomous choice questions is the most widely used

in various CV studies. The iterative bidding approach begins as a dichotomous choice question. Depending upon the response, the respondent is then asked if she would be willing to pay a higher or lower amount than the first. Many studies found that the big advantage with bids is that it is very close to how the market works with other products and services. For example, the iterative bidding was used in the survey on consumer WTP for pen in the laboratory that shown in Figure 1 (Wertenbroch & Skiera, 2002). Based on Figure 1, respondent was asked whether they would buy the pen for $5.00. If the response was "no" ("yes"), a follow-up price of $2.50 ($7.50) would be presented. Contingent on a subject's response to that price, one of four lists of nine or ten additional prices was then presented in steps of $.25. This narrowed down the price range to a small enough interval so that the researcher asked subjects directly how much exactly they were willing to pay.

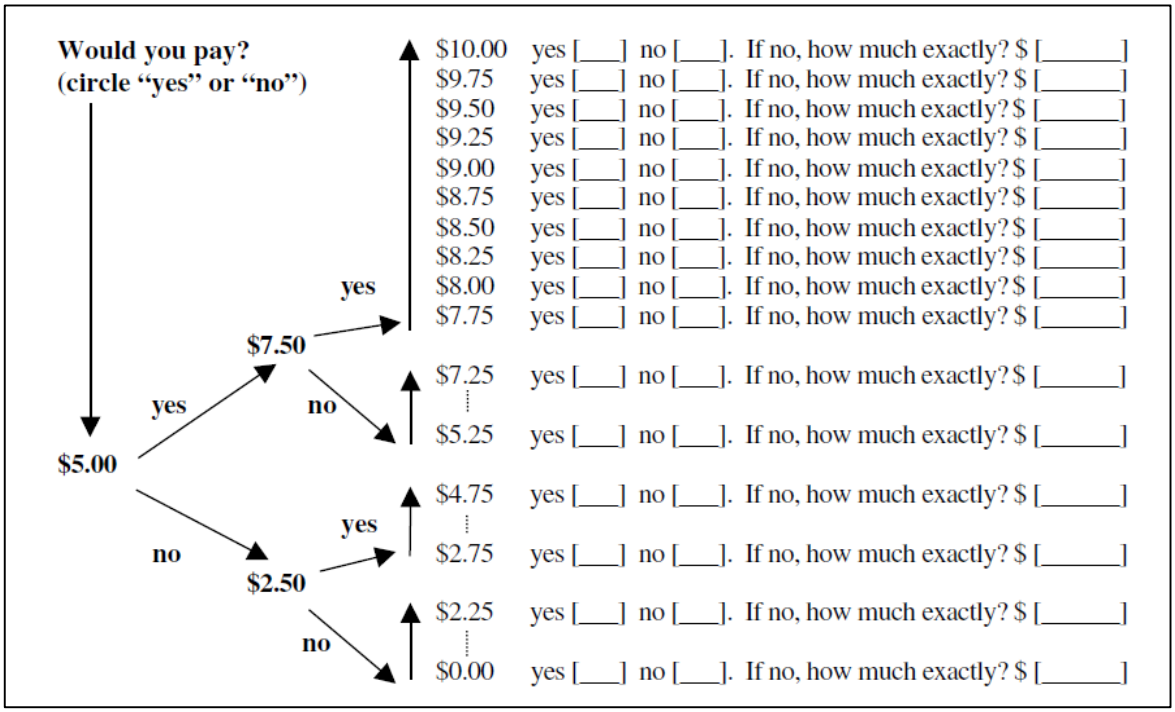

Figure 1. Iterative bidding (adapted from Wertenbroch and Skiera, 2002).

The last part of CV method will include the socio-economic information on the respondent and his or her household. This data is gathered to assess: (i) whether the sample is representative of the general population, and representative of visitors if profiles of visitors are available; (ii) the theoretical validity of the WTA or WTP bids, using a regression model relating bids to price, quantity demanded, income, preferences, and other variables which theory suggests should explain the inverse demand curve.

3. Conclusion

Conducting a successful CV study will require considerably more development work. Development work typically includes focus groups and in-depth interviews to help determine the plausibility and understandability of the description of good to be provided

and the context in which it is being provided. The task of translating technical material into a form understood by the general public is often a difficult one. Developing a useful CV survey instrument requires the research team to clearly define what the proposed project will produce in terms of outputs that people care about and in language they understand. Pre-tests and pilot studies will usually need to be conducted to assess how well the survey works as a whole. Some elements of the survey will usually be needed redesign to improve respondent understanding and the overall flow of the survey. There are some important issues that will almost always need to be addressed during the development phase of a CV survey. For example, the issues that has much attention regarding on how much information to provide to respondents because respondents need to be given enough information to make an informed decision. The most difficult cases are where respondents are misinformed about key elements of the scenario and hold their views strongly. Another difficult situation is where the information set held varies considerably across respondents with a substantial fraction of the population being very well informed and a substantial fraction of the population having little prior knowledge. Other issue is related to the payment for the good. Here the payment vehicle has to be plausible and it has to be coercive in nature if incentive compatibility is desired. It is often hard to meet both criteria for every respondent. Another aspect of payment is whether it is a one-time lump sum or recurrent payment. As a general rule, something which looks like a capital investment, such as setting aside a wilderness area, should use a lump sum payment mechanism while something like a water quality improvement that would disappear if there were not continued payments should use a recurring payment (Green & Tunstall, 1991). There are many issues when comes to the field work setting which researcher needs to really understand and must be confronted. CV surveys are among the most challenging surveys to design. They can be thought of as a structured conversation with a respondent; whereby, a large amount of information is conveyed and where the respondent is engaged in the task of providing preference information about a proposed policy change.

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