

Evaluating Health Care Quality Improvements through Contingent Valuation: A Review of Willingness-to-Pay Studies

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Abstract: This paper is an empirical review of contingency valuation of willingness to pay for health care quality improvements. The paper has highlighted a number of issues in relation to the use of contingent valuation method (CVM) to provide monetary values for changes in goods like the health care quality improvement. Empirical literature reviewed showed lack of empirical literature on contingency valuation on health care quality improvement particularly in Nigeria. The analysis suggests that CVM can be seen as a useful tool to monetarise environmental impacts associated with health. It is important to stress that CVM should only be used in relation to health impacts which are well-perceived by participants in such surveys. Therefore, the main role of CVM is to provide monetary values for local health impacts. CVM entails a number of advantages with respect to monetarisation of health impacts which indicate that valuation can reflect use as well as non-use values; CVM focuses on ex-ante valuation; direct estimation of willingness to pay; experimental approach allows for valuation of a variety of different environmental goods. However, the method also involves a number of problems: -Large difference between willingness to pay and willingness to avoid measures; controlling the validity and reliability of estimates; strategic behaviour in responses; hypothetical nature of survey and survey design related issues.

1. Introduction

Contingent valuation method (CVM) is a questionnaire-based valuation technique whereby willingness to pay (WTP) or willingness to avoid (WTA) are directly obtained from the respondents with respect to a specific good. As such the technique is applicable in all circumstances. CVM has mainly been used with respect to non-marketed goods and in particular for environmental goods/ resources. In this context a hypothetical market for a non-marketed good is defined and the respondent is requested to specify their WTP's (or WTA's), (O'Doherty, 1996). In the following we will focus on Contingent valuation method (CVM) in relation to eliciting monetary values for environmental goods rather than non-marketed goods in general. For example, a CVM study could examine the ex-ante value obtained from a project reducing air pollution for a specific area; the respondents in such a study would be asked how much they would be willing to pay for the reduction in air pollution.

A Contingent valuation method (CVM) study involves interviews with the participants which can be undertaken as face-to-face, mail or telephone based. The typical Contingent valuation method (CVM)

study starts with informing the participants about the environmental resource in focus (e.g. air quality) along with information about the proposed change in the environmental resource and the procedure to be used to finance the proposed change in the environmental resource. This information is provided in order to familiarize the respondents about the change to be evaluated such that the possibility for valid and reliable answers is enhanced. On the basis of this information the respondents are asked about willingness to pay. Usually, a series of follow-up questions are included in order to confirm the given WTP (or WTA) as well as provision of socio-economic background information (gender, age, employment, income). This background information can be utilized to examine their relationship to WTP, e.g. the extent to which willingness to pay depends on income could be tested. The question concerning the willingness to pay can be structured in different ways, where the main forms include (see Jensen (1995): -

1. open ended;
2. dichotomous choice;
3. bidding games;
4. payment card based forms.

Open ended based WTP would be formulated as what is the maximum you would be willing to pay for [the specified change in the environmental good]? . Dichotomous choice formats involve two questions, where the first one concerns whether or not there is a willingness to pay for a specified change in the environmental good. This question should be answered with a yes or no, if yes then a question is asked concerning whether the WTP is equal to a specified amount. For bidding games the participants are asked whether they are willing to pay a specified amount. If yes, then another question is asked about willingness to pay a specified amount higher than the previous amount. This process continues until a no answer is obtained. Participants in payment card based forms of CVM are shown a card on which a range of payments is illustrated. The participants should then identify the payment on the card which corresponds to their willingness to pay. Obviously, other methods exist which can be used to elicit WTP, e.g. as combination of the above discussed main forms.

An important issue is whether the different procedures used to elicit WTP within CVM result in different WTP-estimates. O'Doherty (1996) refers to a study where it was shown that responses given to open-ended and the dichotomous choice formats were significantly different. This difference was only found for public goods such as environmental goods. No difference for private goods markets could be found. It is likely that such differences can be related to the lack of familiarity with WTP questions concerning changes in the level of environmental goods.

An important aspect of CVM is that in addition to consideration to use values, non-use values can also be taken into account. The correct specification of non-use value is crucial in order to avoid double-counting. Diamond and Hausman (1993) discusses the concept of non-use value within CVM emphasizing that focus should be on those non-use values which are unrelated to human use of an environmental good rather than non-use values related to an individual's own use or the enjoyment of other individuals' use. This component appear as significant compared to the other forms of non-use values.

The use of CVM to obtain monetary values should be restricted to those elements which are familiar to the respondents. Otherwise, the risk is that WTP values do not reflect preferences but rather guesses given the hypothetical character of the analysis. Furthermore, it is important to clarify to the respondents what the requested WTP should refer to. Therefore, a more concrete and limited valuation task is likely to provide more reliable WTP's. On this basis Contingent valuation method (CVM) could be used to provide monetary values for local environmental impacts from transport, thereby focusing on those elements which the respondents have knowledge about. It should be noted that monetary values on emission changes would appear

to be too abstract to be elicited within Contingent valuation method (CVM). However, as noted above values concerning air quality changes could be derived from Contingent valuation method (CVM). Ideally, Contingent valuation method (CVM) values are confronted with those from other valuation techniques in order to ensure that values used are not the result of the methods used but rather reveal general properties.

2.0 Literature Review

2.1 Possibilities and Problems with Contingent Valuation Method (CVM)

Contingent valuation method entails a number of characteristics which allows for enhancing the extent to which changes to environmental goods can be assessed on a monetary basis. However, the method also involves a number of problems and short-comings. Below, the possibilities and problems of Contingent valuation method (CVM) will be outlined.

The possibilities created by Contingent valuation method (CVM) include the following:-

- ✓ valuation can reflect use as well as non-use values;
- ✓ CVM focuses on ex-ante valuation;
- ✓ direct estimation of willingness to pay;
- ✓ experimental approach allows for valuation of a variety of different environmental goods.

Contingent valuation method (CVM) values will reflect total value rather than use value only. In this way it is possible to obtain a comprehensive measure for the value associated with a specific environmental good. The focus on ex-ante valuation provides a useful input to decision making processes where concern is about a potential policy change; this should be contrasted to travel cost and hedonic pricing methods where the values in general are derived on an ex-post basis. Direct estimation of willingness to pay can provide useful information about the values for a specific environmental good within a sample of a given population being derived from the active involvement of the respondents. The experimental approach in CVM extends the valuation of environmental goods which cannot be accessed through indirect valuation methods. However, this is subject to the valuation task relating to a well-perceived situation or experience. Various studies into CVM have identified a number of problems, see e.g. Diamond, Hausman, Leonard and Denning (1993) and O'Doherty (1996). Below, these problems will be presented:-

1. large difference between willingness to pay and willingness to avoid measures;
2. controlling the validity and reliability of estimates;
3. strategic behaviour in responses;
4. hypothetical nature of survey;
5. survey design related issues.

An often cited problem in relation to CVM is large differences between willingness to pay (WTP) and willingness to avoid (WTA). In standard situations WTP is lower than WTA, although the difference should be small provided the income effects are small. Diamond and Hausman (1993) argue that the income effects in relation to CV studies can be expected to be small due to the money values involved and the fact that CV surveys have indicated that obtained WTP's do not increase in proportion to income (see Diamond, Hausman, Leonard and Denning (1993)). The response from CVM proponents have mainly approached this problem by arguing that environmental goods contain use as well as non-use values (including existence values). This could imply inflated WTA values while WTP values could, in theory, be elicited correctly (O'Doherty (1996)). Furthermore, it can be argued that the value function for losses is steeper than for gains, thereby providing for a difference between WTA and WTP. Finally, it should be noted that market prices are the result of repeated valuations while CVM often represents one off valuations; this could provide the basis for caution in the evaluation phase.

The validity of CVM values is difficult to determine given that the true WTP is often unknown. If the true WTP was known there would no reason to undertake a Contingent valuation method (CVM) study. The best approach is to examine carefully the questionnaire design in order to ensure that the questions are clear and reflect the situation to be examined. Furthermore, indications about the validity of Contingent valuation method (CVM) values can be provided through comparisons to the values obtained from other methods, e.g. revealed preference and hedonic pricing methods. The lack of information about the true WTP is also a problem in relation to controlling the reliability of the obtained CVM values. Indications about reliability can be obtained through undertaking a given CVM study at different points in time, the so-called test-retest situation. This can provide information about the extent to which similar CVM values are obtained given no change in other conditions.

The structure of Contingent valuation method (CVM) surveys can lead to strategic behaviour among the respondents. For example, if the respondents perceive that the environmental good as likely to be provided irrespective of the stated preferences then there could be incentives to free-riding implying lower WTP's. On the other hand if respondents perceive that the provision of the good is contingent on the stated preferences combined with the impression that eventual payment is a fixed amount then that could lead to overstating the true preferences. O'Doherty (1996) argues that carefully survey design can minimize the extent to which strategic behaviour occurs. For example, free riding can be eliminated by ensuring that the participants do not have the impression that the good in focus will be provided irrespective of the stated preferences. The hypothetical character of Contingent valuation method (CVM) could lead to problems if the respondents have difficulties in coping with such a survey. It could lead to irresponsible behaviour giving too high or too low values because of uncertainty concerning the good in question and because the hypothetical character could be perceived as implying that responses given have no consequences. To a large extent this problem can be limited through appropriate survey design and using Contingent valuation method (CVM) in relation to situations/ experiences which are familiar and well-perceived. It should be noticed that improving a CVM study is not done through provision of more information only, of importance is how the information is perceived by the participants. The format used to elicit preferences can induce biases in the stated values. For example, the iterative bidding games can involve a so-called starting point bias due to the choice of a specific starting value for the WTP's. On the other hand the open-ended format can result in a large number of zero values along with very large values. Therefore, the selection of the format for eliciting preferences is important in order to minimize the presence of biases.

3.0 Result and Discussion on Empirical Studies on Willingness to pay for Health Care Improvement

Jain, Dixit, Jain, & Raikwar (2013) assessed the patient perception about brand name and generic drugs and to identify clusters with different preferences, and to evaluate the willingness to pay for a brand-name drug over a generic alternative using a cross-sectional survey was conducted through self-administered, online questionnaire. The questionnaire comprised 27 items, which included several attributes of pharmaceutical products like therapeutic efficacy, brand, price and source of information. Questionnaire also included 4 hypothetical scenarios to ask about patients' preferences to purchase brand name drugs over generic drugs and vice versa. Descriptive statistics were used to examine characteristics of the participants and to summarize our results. Preference clusters were identified, individual level utility functions were estimated and the willingness to pay for a brand name drug over a generic alternative. Results revealed that the usable response rate was 68%. The mean age of the respondents was approximately 29 years (range 18-68 years). Most respondents believed that generic drugs were less expensive (91.8%) and therapeutically effective (72.2%) than brand-name drugs, but only 52.2% preferred to take generic drugs themselves. Four clusters with distinctive individual level preferences with some differences in socioeconomic background were identified. About half of the respondents were price sensitive. Approximately 62% of the respondents were willing to take brand-name drugs for chronic diseases such as cardiovascular and respiratory diseases. 74% respondents preferred to purchase over the counter generic drugs for general ailments such as headache, sore throat

and fever. Few respondents had preferences such as specific brand or to have a pharmacist or a physician as an information source for buying over the counter drugs.

Zeber, Williams, Manias, Peterson, Roberts, Hutchins & Udezi (2013) examined the frequency and effect sizes of risk factors associated with initial medication adherence utilizing multiple search terms for patient, provider or organizational factors associated with initial adherence. Following rigorous efforts limiting inclusion to studies targeting initial adherence versus broader or more ambiguous early treatment periods, we reviewed publications presenting primary data from 1966-2012. Eligible articles were abstracted documenting terminology, methodological approaches, and factors associated with adherence problems. The frequency that unique risk factors were analyzed and their relative effect sizes calculated by the study authors were noted. Results revealed that only 24 publications met eligibility criteria from 865 potentially relevant publications. The diverse papers covered an array of study designs, analytic techniques, and populations (7 countries, sample sizes 60–5.2 million), utilizing administrative datasets and self-reported surveys. Several articles modelled numerous risk factors yet others focused on single variables. The most prevalent factor ($n=16$) was specific medication or drug class (OR range 1.50–4.87), followed by 14 papers reporting comorbidities or illness severity (ORs 1.40–2.78); 11 articles noted medication cost effects (ORs 1.20–7.30). Less frequently cited were socioeconomic status, physician characteristics or medication beliefs, factors magnifying adherence problems up to six-times.

Iskedjian, Navarro, Farah, Berbari, Walker & Le Lorier (2013) carried out an examination of patient preferences: subgroup comparisons of time trade-off and standard gamble results using correlation between mean or median TTO and SG was explored by Spearman's rank correlation test, when a sufficient number of study arms were available, for the following subgroups: incremental HU, disease, gender, age, income, education level and employment status. All comparisons were undertaken by sorting the mean or median HU values according to TTO, in increasing order by increments of 0.10. Results revealed that for the incremental analysis of mean TTO versus SG, significant positive correlation was observed when HU values were greater than 0.6 ($r=0.687$), 0.7 ($r=0.478$) and 0.8 ($r=0.525$) or lower than 0.7 ($r=0.564$); no significant correlation was observed for HU values lower than 0.6 ($r=0.7$ with post-hoc analyses identifying the scarcity of studies as a plausible reason) or greater than 0.9 ($r= -0.037$). Overall mean SG was greater than overall mean TTO for all disease subgroups except HIV, with significant positive correlations observed in two diseases: cardiovascular disease ($r=0.929$) and ocular disease ($r=0.504$). Significant positive correlation was observed in both subgroups of females ($r=0.814$) and males ($r=0.738$). The series of subgroup analyses pertaining to median incremental HU values yielded findings similar to those in the analysis of means.

Potthoff, Eichmann & Guether (2013) investigated a longitudinal relationship between perceived health, functional limitations and work disability in Germany and UK following the WHO model of "disease - functional limitation - work disability". The study analyzed the longitudinal effects of perceived current health and functional limitations on future work disability using careful panel management and quota adjustment ensured the representativeness of the samples for the populations in the countries. Results revealed that in 2007, 48.1% of the sample was fulltime (GER: 57.4%; UK: 38.9%) and 12.5% part-time (GER: 10.6%; UK: 14.5%) employed. Five years later, in 2012, 19% of the previously full- or part-time employed individuals were no longer employed due to health reasons. Health related unemployment in 2012 was highly correlated with general health status ($\gamma=0.70$; $p<0.01$) and functional limitations as measured by the SF-12 subscale in 2007 ($\gamma=0.39$; $p>0.01$). Of those still employed in 2012, 16.2% were impaired in their jobs. Most frequently they had to take breaks more often (7.5%), were restricted in performing typical elements of work (6.1%) or required special tools (2.7%).

Mathias, Crosby, Klaver, Drogendijk, Hakimi & Odeyemi (2013) examined the Patient Perception of Intensity of Urgency Scale (PPIUS): its validation in men with Lower Urinary Tract Symptoms (LUTS) Associated with Benign Prostatic Hyperplasia (BPH) using measurement properties, including reliability, validity and responsiveness, were assessed. Results revealed that 1,010 males (mean age: 66) were enrolled. Intra class correlations (test-retest reliability) exceeded 0.70 for all scores. All PPIUS scores at Visit 2 and EOS were significantly ($p<0.001$) different for those above/below the median on

International Prostate Symptom Score (IPSS) storage scores, but TUF5 and number of urgency episodes had highest partial eta-squared values indicating these scores demonstrated the greatest ability to discriminate between groups differing in baseline severity (known groups validity). Three PPIUS scores (maximum, TUF5 and urgency episodes) showed notably higher values across all four responsiveness measures. Findings were similar in the subgroup of patients with high storage symptoms at baseline.

4.0 Conclusions and Recommendation

This paper has highlighted a number of issues in relation to the use of contingent valuation method (CVM) to provide monetary values for changes in goods like the health care quality improvement. The analysis suggests that CVM can be seen as a useful tool to monetarise environmental impacts associated with health. It is important to stress that CVM should only be used in relation to health impacts which are well-perceived by participants in such surveys. Therefore, the main role of CVM is to provide monetary values for local health impacts. CVM entails a number of advantages with respect to monetarisation of health impacts:-

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1. Large difference between willingness to pay and willingness to avoid measures;
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The presence of these potential problems indicates the importance of survey design along with correctly perceived information by the participants in such surveys. A number of issues remain for future research including (1) clarification of the extent to which CVM values reflect preferences from an economic theoretic point of view, (2) possibility for obtaining separate measures on use and non-use value rather than total value and (3) development of optimal procedures to elicit willingness to pay values.

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