American Journal of Business and Society
Vol. 3, No. 1, 2018, pp. 1-10
http://www.aiscience.org/journal/ajbs

Stated Preference (SP) Method in Economic Valuation

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Abstract

Tangible heritage is heritage that is "built". According to UNESCO convention in 2003, intangible cultural heritage comprises information in the dynamic form of expressions, representations, practices, knowledge and skills that are associated with instruments, objects, artifacts and cultural spaces or landscapes that communities, groups etc. These include oral traditions, performing arts, social practices, rituals, festive events, knowledge and practices about nature. In the past, heritage experts tend to regard economists as being insensitive and heavy-handed, focused too single-mindedly on financial measurement, and overlooking the true cultural significance of heritage assets [13]. When market fails, as in the case for example of public goods, it is the willingness-to-pay (WTP) or willingness-to-accept (WTA) of individual consumers that expresses the value of the goods in question. There are two methods for measuring the WTP and WTA, namely the revealed preference (RP) method and the stated preference (SP) method in measuring the value of non-market goods. This article study seeks to discuss the SP methods using past studies and the weakness of this approach and yet still one of the most commonly used approach in valuing non-market goods particularly the contingent valuation method (CVM) and choice experiment (CE). The results will be able to highlight the strengths of CVM and CE methods despite having its list of weaknesses in the field of economic value elicitation methods.

Keywords

Stated Preference Method (SP), Willingness-to-Pay (WTP), Contingent Valuation Method (CVM), Choice Experiment (CE)

Received: May 23, 2018 / Accepted: June 24, 2018 / Published online: August 20, 2018

In economic point of view, due to scarcity, decision needs to be made and when the conservation of environmental asset whether it is natural asset or a cultural asset is increased, something has to be sacrificed. This is a concept that must be accepted and in order to utilize the usage of scare resources, a mix of environmental and resource flows that provide the highest aggregate value to people must be chosen [25]. The measurement of welfare benefits is the willingness-to-pay (WTP) or the willingness-to-accept (WTA) compensation to forgo that benefit. On the other hand, the measurement of cost is the WTP to avoid suffering the loss of welfare, or the WTA to suffer that loss. These measurements of benefits and costs underlie the concept of economic efficiency, where economic efficiency increases if the sum of the benefits to the gainers (due to reallocation of resources) exceeds the sum of the costs to the losers [8]. Most of CVM studies used WTP more than WTA [39] because WTA cannot be accurately measured and Adamowicz et al. [2], did not consider WTA as a proper empirical measure of consumer surplus. Therefore, WTP is considered the better measure of consumer surplus and has been proposed to be used for CVM studies [42].

There are two methods for measuring the WTP and WTA, namely the revealed preference (RP) method and the stated preference (SP) method. The main difference between these two methods is that the RP method draws data from observations of actual choices made by people in the real world, while the SP method gathers data from people's responses to hypothetical questions instead. Therefore, the RP methods cannot be used when there is non-use values

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involved. Refer to Figure 1.

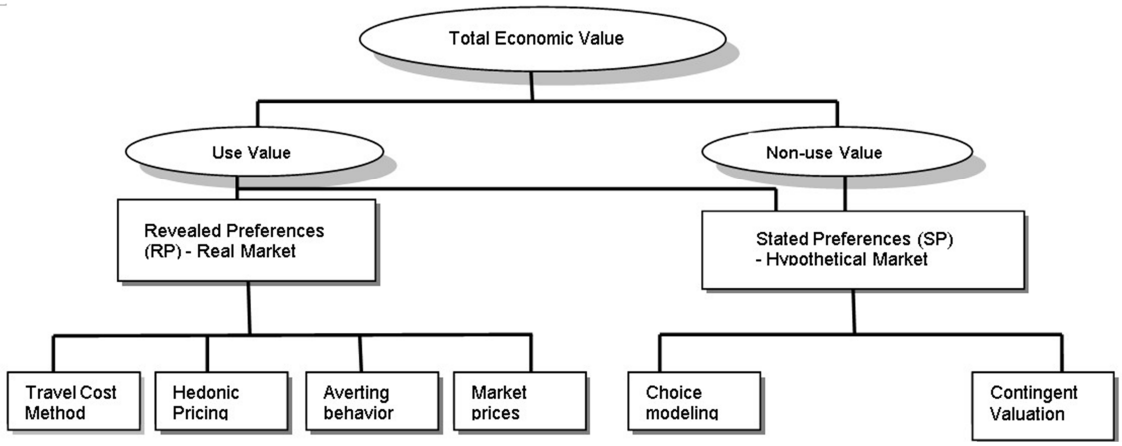

Figure 1. Economic valuation techniques.

(Source: [5] modified from [8])

These valuation techniques have been developed in the environmental economics studies. The reasons why they are readily applicable to heritage derive from the close parallels between the concepts of natural capital and cultural capital. The former comprises natural resources, natural ecosystems and biodiversity, whilst cultural capital in the economic sense is made up of cultural assets (both tangible and intangible), cultural "ecosystems" or networks, and cultural diversity. The parallel extends further into the arena of sustainable resource management: the well-known paradigm of ecologically sustainable development has an obvious counterpart in the emerging concept of culturally sustainable development [50]. Thus techniques for the economic evaluation of benefits generated from natural capital can be transferred directly to cultural capital, as can be seen in the growing number of Contingent Valuation Method (CVM), such as study by [41].

2. Literature Review

There are four ways to elicit value in CVM; namely bidding game, payment card, open-ended and dichotomous choice. Under DC elicitation method, there are single-bounded and double-bounded. Over the years, researchers modified the multiple-bounded DC to one-and-one-half bounded DC as well as triple bounded DC. Refer to Figure 2.

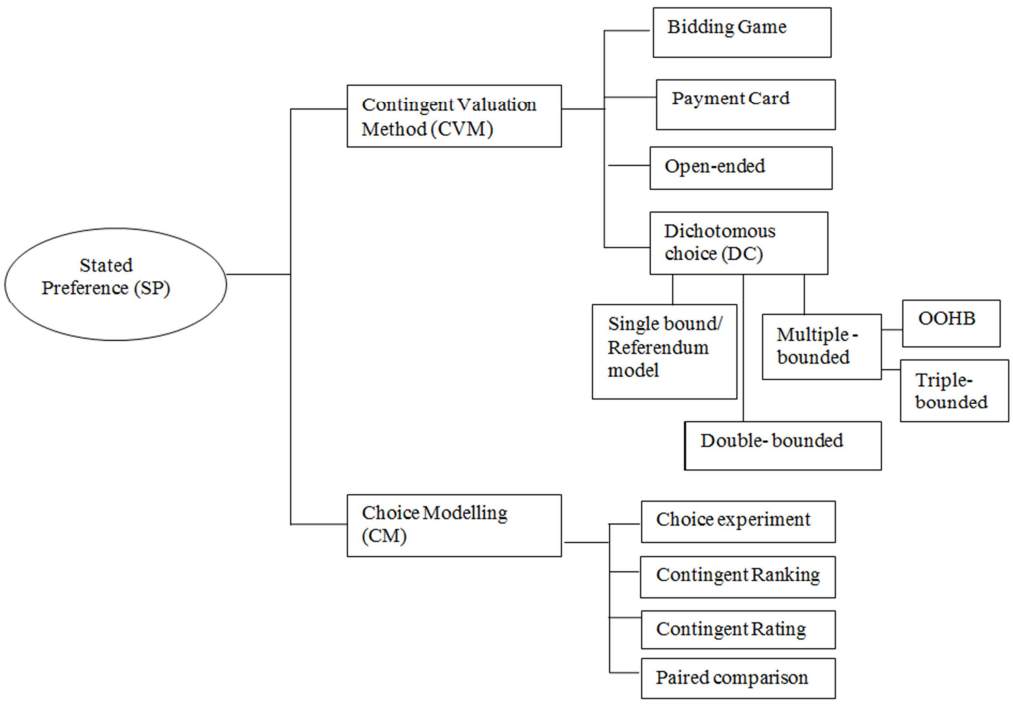

Figure 2. Stated preference elicitation methods.(Source: Modified from [27]).

Dichotomous choice under CVM and Choice Experiment under Choice Modeling (CM) are the most commonly used economic value elicitation method used. CVM is a relatively direct approach in valuing non-marketed goods. This method asks directly to its respondents to state the maximum amount of money that they are willing to pay to conserve non-marketed goods and services, or the minimum amount of payment they would accept for a reduction in an environmental service in a hypothetical market. CVM is a survey-based method which goods are traded in a constructed or hypothetical market. Therefore the designing of the questionnaire for the survey plays a very significant role in CVM. CVM is called contingent because in this method, respondents were asked to state their willingness-to-pay (WTP) contingent upon the nature of the hypothetical market. The questionnaire generally includes detailed information about the current scenario of the non-market good, the hypothetical scenario in which the change in the environmental good is presented and the market in which it is hypothetically trade. Then questions about the values of the environmental good, the attitude of respondents towards environmental issues and along with socioeconomic profile should be included as well [19, 24, 40]. Based on [27, 35], the CVM is generally divided into six stages. These stages are as follows:

Stage 1: Setting the hypothetical market

Stage 2: Obtaining bids

Stage 3: Estimating mean willingness-to-pay (WTP), or willingness-to-accept (WTA) or both.

Stage 4: Estimating bid curves

Stage 5: Aggregating the data; and

Stage 6: Evaluating the CVM exercise

A second stated preference technique that has been increasingly applied in estimating the value of improved environmental quality and valuing natural resources is choice modelling (CM). In order to reduce some of the potential biases of the contingent valuation method, some studies have used the choice modelling (CM) method, which is able to elicit relatively more information from each respondent and includes the possibility of testing for internal consistency. Choice modelling attempts to model the decision process of an individual or segment in a particular context. Choice modelling may also be used to estimate non-market environmental benefits and costs. It is another SP method available for making probabilistic predictions about human decision making behaviour. Among CM methods, CE is the most recently used approach. CE involves designing different options with different levels of attributes and characteristics. The respondents are then asked to choose their preferred options based on the given options in the surveys. A "status quo" term is always used as a baseline in the questionnaire in order to achieve welfare measure that is consistent with the economic theory. CE can provide much information and it is applicable in determining the preferred design of the environmental good. The steps of CE and the steps are as follows:

1. Identification of appropriate attributes
2. Defining the relevant measurement unit for each attribute
3. Assigning the number and magnitude of the attribute levels
4. Experimental design
5. Questionnaire designation
6. Model estimation
7. Use of parameters to simulate choice

Source: [3]

Refer to Table 1 for the summary of the past studies regarding SP methods in eliciting value of non-market goods.

Table 1. Literature Review Grid.

Author/Year	Title	Issues/Findings
Andy Choi, Brent W. Ritchie, Franco Papandrea, Jeff Bennett (2009)	Economic valuation of cultural heritage sites: A choice modeling approach	Conducted in Australia (OPH) using a mixed logit model with Choice Modeling. Questionnaires were used in this study. This study has low response rate (about 20%) may cause higher implicit price estimates. WTP is used as well.
Michael Ash, James J. Murphy & Thomas H. Stevens (2005 working paper)	Hypothetical Bias in Dichotomous Choice Contingent Valuation Studies.	This study explores the r/ship between hypothetical bias and the actual price. Data set consists of 99 observations from 15 studies of 16 distinct goods. There are 2 findings (1) There is strong evidence indicating that for public goods, which is the focus of CV studies, hypothetical bias is sensitive to the amount asked. (2) Hypothetical payments are less sensitive to changes in price for public goods, there does not appear to be a difference in the price elasticity across hypothetical and actual payments for private goods. This could suggest that there are some fundamental differences in the nature of hypothetical bias between these two types of goods that warrant further investigation The processes used by individuals responding to CV questions and the factors responsible for hypothetical bias remain unknown.
Richard T. Carson, W. Michael Hanemann, Raymond J. Kopp, Jon A. Krosnick, Robert C. Mitchell,	Referendum Design and Contingent Valuation: The NOAA Panel's No-Vote	NOAA (National Oceanic and Atmospheric Administration) recommend CV surveys should employ a referendum approach. Purpose of this paper is to consider the effects of such a "would-not-vote" option. This study followed the important elements of the NOAA Panel guidelines for the design and administration of a CV survey and use what was acknowledge by

Author/Year	Title	Issues/Findings
Stanley Presser, Paul A. Ruud, V. Kerry Smith, Michael Conaway and Kerry Martin (1995)	Recommendation	the panel and at that time, the most carefully developed questionnaire to that time, the State of Alaska's study of the Exxon Valdez oil spill. Findings: When those selecting the "would-not-vote" response are treated as having voted "against" the offered program, offering the option DOES NOT ALTER (a) the distribution of "for" and "against" responses, (b) the estimates of WTP derived from these choices, (c) the construct validity of the results.
David Throsby (2006), a text of Joseph Fisher lecture delivered at the University of Adelaide	Paying for the past: Economics, Cultural heritage and Public Policy.	Any relaxation of present controls over heritage conservation would be quite contrary to the expressed preferences of the Australian population. According to the productivity commission's Inquiry was a report from the Allen Consulting Group, who carried out a choice modeling of the demand for the public benefits of heritage in Australia at the present time, based on a random sample survey of 2000 respondents. The results: (1) People have a very strong perception of the existence, option and bequest values of heritage. (2) Cultural rather than economic motives underlay the public approval of govt support for heritage conservation.
Tran Huu Tuan, Stale Navrud (2008)	Capturing the benefits of preserving cultural heritage.	This study is on My Son (WHS), Vietnam using WTP and CBA analysis. 4 categories of respondents are studied (Foreign visitors to My Son, Vietnamese to My Son, Vietnamese around the area but not to My Son and local residents). This study was conducted in summer 2005 with a total of 967 face-to-face interviews. Results: (1) Adoption of optimal price regime would increase both revenues and reduce congestion at the site. However this price regime would not reduce the congestion problem due to Vietnamese visitors. (2) Introducing pricing structure with seasonal differentiations to reduce Vietnamese visitors during high season is feasible. (3) If investment based on entrance fees only would lead to a level of preservation would NOT be feasible. (4) CBA shows that preservation for My Son is a viable proposition.
Peter Abelson (2000), a report for a proposed study.	Valuing the public benefits of heritage listing of commercial buildings	Discussed a few case studies conducted previously in valuing heritage value and buildings. This report recommends that if govt wishes to examine public benefits of a heritage building and the public decision making, govt should commission a series of in-depth focus group to determine people attitudes towards heritage.
Yan Zhang (2010)	Rethinking cultural heritage: valuations and Dilemmas	A lecture note on cultural heritage. Chapter 1 (abundant cultural values). Chapter 2 (new conceptual framework of cultural commons). Chapter 3 (Economic valuation methodologies to capture heritage values). Chapter 4 (Governing institutions) Chapter 5 (Public-private-partnership cooperation). Melaka is in "Lijiang Model" - 4 phase project on "Cultural Heritage Management and Tourism: Models for Co-operation among stakeholders implemented from 1999-2003.
Patrizia Riganti, Peter Nijkamp (2005)	Benefit transfers of cultural heritage values: How far can we go?	This study focuses on the possibility to transfer values estimates of cultural goods from a study site to a policy site- known as benefit transfer. This paper aims to raise awareness and spur debate on the cultural value transfer which believes to be relevant in the future. Many economists feel this is rare because there is risk of data manipulation and of producing unreliable results. This paper views spatial variability and transferability of the cultural values.
Andy S. Choi (2009)	Willingness to pay: how stable are the estimates?	According to the log-likelihood (LL) and pseudo R^2 values, the last three models (Models ML01, ML02 and ML-Effect) are superior than Model MNL. Stability and reliability are examined as well using percentile intervals and advanced models (ML-02 and ML-Effect). Results: The reliability of WTP estimates and demonstrated that different choice models can result in significantly different welfare estimates. When poorly specified, ML models with better goodness-of-fit than a basic MNL model can provide lesser reliable WTP estimates than the later. However, once adequately elicited, WTP estimates from different ML models are not much different in both the mean estimates and confidence intervals.
Paul R. Portney (1994)	The contingent valuation Debate: Why Economists should care?	This paper discusses the CVM method and the guidelines set up by NOAA. To summarise there are 7 issues (1) CVM should be conducted by personal interviews rather than telephone interviews but better than mail surveys (2) CVM should elicit WTP to prevent future incident rather than min compensation for an incident that already occurred. (3) CVM should utilize referendum format (4) CVM must begin with a scenario accurately described and the effects of the program (5) CVM must contain reminders to respondents that WTP will reduce the amount they would have to spend on other things (6) CVM must include reminders to respondents of the substitutes for the commodity (7) CVM should include follow-up questions to ensure they understand the choice they were being asked and discover the reasons for their answers.
Nor'Aini Yusof, Lim Yoke Mui, Lee Lik Meng, Tan Sook Fern (2007)	Urban Conservation as a development strategy to revitalize real estate market: An analysis of property transactions in Georgetown Penang	This study is at the inner city of Georgetown. Data on policy implementation was gathered from Malaysian laws, government publications and JPPH Penang. The data was checked extensively. The findings of the study (1) Found a positive relation between conservation policy and property value (2) Even there was fluctuation in the transaction count and the price of the pre-was shophouses, the market was able to sustain its previous high price and enjoyed an upward trend. (3) There was no clear evidence that the pre-war shophouses was affected by the Rent Control Act. The overall trend of prices for the post-war and pre-war shophouses was almost the same to 10% variations in both upward and downward observed to certain years.
Tran Huu Tuan, Stale Navrud (2006)	Valuing cultural heritage in developing countries: comparing and pooling contingent valuation and choice modeling estimates.	This study applied CVM and CM to estimate the social benefits to RPPs for the MySon WHS in Vietnam (both to foreign visitors and local residents). CVM and CM method are then compared. Results for this study (1) Both CVM and CM are suited to estimating the economic benefits of preserving cultural heritage of MySon. The 2 methods produce very similar results, which can be interpreted as a test of convergence validity. (2) The pooling results give evidence to show that the CVM and CM models can be successfully used in cost-benefit analyses to assess the benefits to cultural heritage of measures including deterioration of cultural heritage sites.
Richard T. Carson, Leanne Wilks, David Imber (1994)	Valuing the preservation of Australia's Kakadu Conservation Zone.	This study is conducted in Kakadu Conservation Zone, Australia on Sept 1990. This major survey design issues (1) the accurate depiction of the good (2) the issue of determining the appropriate context the good would be provided (3) the payment structure for the good (4) the value of elicitation method used (5) the collection of attitudinal and demographic variables for

Author/Year	Title	Issues/Findings
		predicting a respondent's WTP for the good. Discussions: (1) It divides into minor and major impact to KCZ. Each scenario described 4 types of environmental impact (mine related traffic, chemicals used to extract minerals, mine process water and waste rock material, possible injury to the environmental and wildlife) (2) The differences between the two impact scenarios were of a qualitative not quantitative nature. The information contained in both scenarios was largely consistent. The major and minor impact differs primarily in their depiction of possible impacts outside the KCZ. (3) WTP is asked rather than WTA. (4) Use double bounded, discrete-choice elicitation method (5) Used survey instrument contained a number of open-ended and closed-ended questions. Results: The govt decided to preserve KCZ rather than mine stating the reason as aboriginal concerns.
Carson R., Mitchell R. C, Hanemann M., Kopp. R. J., Presser S., Rudd P. A (2003)	Contingent Valuation and Lost Passive Use: Damages from the Exxon Valdex Oil Spill	A panel was formed to assess the CVM method and the panel concluded that CVM studies convey "useful information" for damage assessment including lost passive use values. Recommendations: (1) the use of rigorous probability sampling with a high response rate (2) in-person interviews (3) a discrete choice referendum elicitation format (4) accurate description of the program (5) conservative design features (6) checks on understanding and acceptance (7) debriefing questions following the referendum questions (8) careful pretesting. The survey instrument is designed for 18mths. Results: (1) The median household WTP to pay from $30 to $27. Sensitivity of the estimates to four other factors (i) Using only A-15 response (ii) drop respondents from the sample who may not have clearly understood the CVM scenario posed to them (iii) Look at the sponsor question (iv) Consideration of how stable the estimates of the WTP distribution are over time.
Adamowicz. W., Boxall. P., Williams. M., Louviere J. (1998a)	Stated Preference approaches for measuring passive use values: Choice experiments and Contingent Valuation	This study compares between CVM and CE (Choice experiment) methods. CE at times is also called stated preference method. CE is based on random-utility theory and it is described by attributes. CE have considerable merit in measuring passive use values (i) the method provides a richer description of the attribute trade-offs that individuals are willing to make (ii) CE error variance is not significantly different from CVM error variance (iii) when combine with CVM data, the parameters on the MU of income are not significantly different (when variance heterogeneity is taken into account) (iv) the welfare values from CE generally have smaller variances (relative to their means) than the CVM estimates. This study is studies a woodland Caribou habitat enhancement program. There are three approaches used for this study (1) CVM, (2) CE and (3) CVM and CE (joint). Findings: (a) The CVM for linear and quadratic results are expected. Linear: Caribou population and wilderness area have significant positive coefficient. The intercept is positive and the bid coefficients are negative and significant. The quadratic is not significant, indicating that the MU of income is constant for this case.
Boxall. P., Adamowicz. W., Swait. J., Williams. M., Louviere. J (1996)	A comparison of stated preference methods for environmental valuation.	This paper compares CVM and CE which are used to value environmental quality changes. Significant differences were found between the values derived from the 2 methods. Detailed examination of the implied choice behavior suggested that respondents ignored substitute recreation areas in the CVM question. Restricting the CE model to consider only the one site where quality was varied, resulted in welfare estimates similar to the CVM model. CE may be more appropriate than CVM in some cases.
Throsby D. (2003)	Determining the value of cultural goods: how much (or how little) does contingent valuation tells us?	This paper argues that CVM provides an incomplete view of the nonmarket value of cultural goods, and that alternative measures need to be developed to provide a fuller account. It uses a ransom sampling in Sydney which studied the WTP with a total of 825 respondents. CVM and WTP study interchangeably. Assumptions of CVM are (1) CVM is predicted on a model of an economy comprised of rational decision makers (2) Preference system between goods are well behaved, individuals are the best judges of their own welfare (3) each individual carries equal weight in the aggregation of preferences (4) Social welfare function contains no arguments other than the welfare of the individuals of which society is composed. Weaknesses of WTP (a) CVM accepts that consumers have well-defined preferences for public goods and that this demand can be measured by the amount of other goods they are prepared to give up in order to acquire a unit of the good in question. (b) Biases affecting WTP studies such as free-riding, the embedding problem, starting-point biases, mixed-good bias etc can now be effectively controlled due to progress on WTP technique. (c) The main problem with WTP is the problem of information, more precisely ignorance. (d) WTP will not be able to provide a complete view of the nonmarket value of a cultural good if there is an existence category of value which an individual may recognize but cannot express in terms of WTP. Must distinguish between well-informed and fully-informed, where well-informed is regarded as sufficient for policy-making. This paper also distinguishes between economic value and cultural value. The characteristics of cultural goods (aesthetic properties, spiritual significance, role as purveyors of symbolic meaning, historic importance, significance in influencing artistic trends, authenticity, integrity, uniqueness etc). Although there are aspects of cultural value that cannot be expressed in monetary terms does not imply that the implicit cultural value assigned to a cultural good in an economic study is zero.
Del Saz Salazar. S., Marques J. Montagud (2004)	Valuing cultural heritage: the social benefits of restoring and old Arab tower	This is a study on the restoration of an old tower in Valencia Region of Spain with a total sample of 252. They are randomly interviewed. The sample consists of three groups (low, average and high consumers of cultural goods). The findings (1) The WTP is considerably higher for the second group. To give further credence to this observation, both parametric and non-parametric approaches were employed and yielded similar results. Two equations were estimated to ratify the results obtained from a theoretical point of view
Rocio Cascajo, Andres Garcia-Martinez & Andres Monzon (2017).	Commuters travelling by metro or urban bus in the city of Madrid, Spain	A survey combining a RP and SP survey was created studying commuters ways of travelling. The findings reveal a pure transfer penalty, independent of in-vehicle time, walking and waiting time and crowding. This pure penalty increases with the number of transfers. Crowded transfers cause a high disutility for commuters, which rises with the number of

Author/Year	Title	Issues/Findings
		transfers in the total trip
Brown L Lee TH, De Allegri M, Rao K& Bridges JF.(2017)	SP methods to improve health systems in sub-Saharan Africa	Stated-preference methods have been applied extensively to elicit health care workers' preferences and priorities for rural practice. Expert commentary: Stated-preference methods have been applied to many health systems contexts throughout sub-Saharan Africa. Studies examined established strategic areas, especially primary health care for women, prevention and treatment of infectious diseases, and workforce development. Studies have neglected the emerging areas of non-communicable diseases.
Paulo Rui Anciaes Peter Jones & Paul James Metcalfe (2018)	SP model to value reductions in community severance caused by roads in England	It uses a SP survey to estimate the value of reductions in community severance (the "barrier effect" of transport infrastructure on pedestrians). The survey was conducted in four urban areas in England. The estimated value per walking trip of reducing the number of vehicle lanes from 3 to 2 and from 2 to 1 is £1.28 and £1.00 respectively. The value of adding a central reservation (median strip) is £1.08. The value of reducing traffic levels from medium to low and from high to medium is £0.76 and £1.08 respectively The value of reducing speed limits below 30mph is £0.45. These values depend on age, gender, disability, health condition, mobility restrictions, qualifications, location, and walking behaviour.

2.1. Advantages and Disadvantages of CVM

CVM-DC as compare to other methods has several advantages. One of the advantages is realistic because CVM-DC is the simple "take-it-or-leave-it" nature of that which makes understanding of the valuation questions as simple as possible. Thus, CVM-DC gives the respondents lesser burdens than open-ended CVM question formats. [54],[46, 33] compared the discrete choice versus open-ended CVM question formats and all of them have found that the discrete choice questionnaire yielded values much larger than the open-ended format.

The other advantage of CVM-DC format is that it can be applied easily in mail, in-person or telephone interview [9]. Another important advantage of CVM-DC is that the starting point is eliminated because the offered prices are assigned randomly. Lastly, this elicitation format has the characteristics of being incentive compatible [29].

CVM-DC format had its flawless side as well. CVM-DC requires a large sample size because it needs more observation and statistical analysis to find out the WTP amount. Compared to the other elicitation formats, the CVM-DC is expensive to conduct because the effort in interviewing and collect as much data as possible from the respondents for the same level of statistical precision in WTP estimates. This is because only a discrete indicator of maximum WTP is obtained instead of the actual maximum WTP amount [40]. The analysis of the discrete choice responses requires more complicated mathematical and statistical analysis [1] [36]. Lastly, according to [32], CVM-DC can cause the "yea-saying" bias, where the stated bid differ from respondents' actual WTP.

Although CVM provides an important approach in valuing natural resources, it cannot be avoided from criticisms especially related to its reliability, validity and error biases. According to [21], the problem arises from operationalization of the utility function and hypothetical nature of revealed values from individuals and challenges of the theoretical framework for CVM. According to [16], there are five biases in CVM are as follows:

a) Strategic bias

b) Design and Information biases

c) Starting point bias

d) Vehicle bias

e) Hypothetical bias

2.1.1. Strategic Bias

Strategic bias refers to the strategic behaviour of respondents where respondents do not have truthfulness about their true WTP and it happens because respondents assume that even if they state a low WTP, others will not do it strategically and public good will be provided anyway. In a study by [17], due to the hypothetical nature of the CVM, strategic bias is not the major concern because this bias can be minimized by stressing the fact that the payment of others guaranteed, by not giving the information about other respondents' WTP and make the environmental change depend on the bid [40].

2.1.2. Design and Information Bias

Design and information bias are concerned on the structure and designation of the questionnaire, the quality and the way of presenting information and quantity of information, which is given to respondents before WTP questions. However, some researchers believed that strategic behaviour bias is closely related to the information bias. [17] suggested that the aspect of information bias could directly affect strategic bias. [17] suggested that if respondents are given the information on other individual's bids, they may revert to the free rider approach of bidding lower than the mean. This study further noted the necessity of pre-test before the main survey collection in order to balance the amount and types of information to be given by the interviewers to the respondents. This could minimise the information bias effectively. The proper format of the questionnaire, including the information related to the objective of the study, socio

[1] Analysis such as maximum likelihood and logit or probit models.

demographic and other information can minimize this bias because if the respondents are unclear on the hypothetical market or bid-designation is not proper, the final WTP value obtained will be bias

2.1.3. Starting Point Bias

Starting point bias occurs when the initial bid amount affects bid distribution [40]. In CVM, the hypothetical market scenario is used and respondents should be placed in a real market situation in a way that their value on a good in question would be as accurate as possible. Starting point bias is when the respondents believe that the starting bid is suggestive of an appropriate value [22]. [20, 17, 10]. Another weakness of this elicitation method is the possibility of "yeah-saying" bias regardless of their valuation to accept the higher offered bids. Other than that, respondents may suffer interviewer fatigue because respondents become tired or bored of the iterative bidding questions and then their answers would be less accurate [23].

Starting point bias can be minimize by giving them a starting bid price because a demand curve artefact is produce from asking individuals to respond to a hypothetical scenario with no previous experience. Therefore, the value obtained is based on what is perceived by respondents and may be different from researcher expectations[2]. The proper design, structure and phrase of questions are particularly important in minimizing this bias where explaining the process of study to gain the respondent's true WTP is another way in minimising the starting point bias [28].

Different formats of the valuation questions as an effort to reduce the starting point and hypothetical bias had been used and studies. According to [17], the use of payment card that offers a list of wide range of bids to the respondents and assists them to choose the starting point can reduce the starting point bias. Other than that, the dichotomous choice format ("Yes" or "No") would provide the respondents with a simple question, where they can feel the real market place situation. The starting point bias can be reduced by the familiarization of the respondents with the elicitation format. In addition, the aim of most valuation studies are the policy decision, presenting the results of valuation for many goods and services put the decision into a realm because the construction of the demand curve is further complicated by this format. Therefore, different set of bidding price among respondents were suggested and the factorial experimental design and using logit and probit analysis could be the solution to this bias problem because the issue of constructing ad demand curve from binary data became the challenge [17, 8].

[2] The validity of this procedure might be affected [21].

2.1.4. Vehicle Bias

According to [8], vehicle bias is related to the payments vehicle used in the CVM [3] that affects the individual's attitude. The validity of CVM results depend on the respondents' familiarity with payment vehicle, certainty about the acceptance of payment vehicle by respondents as a reliable method. [17] indicated that by determining the payment vehicle for the given environmental good based on the reality of the reality of the situation could reduce vehicle bias. The vehicle payment should be selected where all respondents - part of their socioeconomic characteristics or residential location should be equally obliged to pay for proposed change in environmental situation under the hypothetical scenario.

2.1.5. Hypothetical Bias

Hypothetical bias is related to the nature of the hypothetical market. The true WTP will be biased when individuals are not acting in the real market and one of the sources of this bias could be related to the questions wording. CVM elicitation method can be used in different CVM questions format to obtain the WTP or WTA of the respondents. Both WTP and WTA formats can be used but there are studies that showed large differences between WTP and WTA [44]. According to [21], these differences are due to the systematic error in instrument.

As mentioned earlier, respondents' familiarity with the commodity in study is also vital. According to [17], respondents with some prior knowledge about the environmental good in study will most likely answer the questions differently from those without any knowledge. Other than that, the study also included the problem of accuracy when respondents actually have not forced to state the amount. One common approach in dealing with bias is to inform the respondents about the study under hand and what CVM is going to measure actually and the importance of their responses. Other than that, the way of asking the valuation questions, their assumptions and understanding of hypothetical market, how realistic they assume this constructed market and format or concept of CVM study are equally important.

2.2. Advantages and Disadvantages of CE

CE had been used widely and there are reasons for the increased interest in the use of CE. According to [4], the advantages of CE are as follows:

a) Reduction of some potential biases of CVM

b) More information can be elicited from each respondent compared to CVM

[3] Payment vehicle such as taxes, use permits, donations, charge etc

c) The possibility of testing for internal consistency

d) Application of CE survey will be able to provide value of many alternatives of policy outcome.

e) Capability of CE in providing the value from one scenario makes this technique flexible, multipurpose and cost effective.

[31, 8] stated several advantages of CE relative to CVM-DC. CE method is able to evaluate more complex decision scenarios relative to CVM-DC as the nature of binary choice in CVM-DC cannot measure the change of different attributes. It is so as natural resources decision are based on the concern of changes in attributes of natural resources rather than measuring gains or losses in overall environmental resources. The questionnaire is more complex and more efficient in CE than the CVM scenario CE is better in estimating marginal value of attributes as part of the whole environmental good or services as well as the changes in attributes level and the value of good compared to CVM. While CVM-DC method can reveal the value of single good or service. The designation of CE has the capability of reducing multi-collinearity problem in the derived models as compared to CVM. Other than that, CE has advantages of avoiding problems in response of CVM. CE technique present respondents with different choices and ask them to trade-off between different options, hence, "yea-saying" effect can be minimized. CE would be able to gather more information from the respondents related to CVM and due to the nature of survey design of CE, it can produce as many data from a given respondent as possible as compared to CVM studies which collects single data point only.

According to [37], CE often causes stir among researchers in the optimal CE because of the differences in the set of assumptions researcher set to derive design results. Assumptions are often stated in technical terms, their implications are not clearly communicated. While experiments and models for pairs of options can be useful, many real choice problems involve larger choice sets. There are two major problems with CE method:

a) Little is known when a set of assumptions may be valid for a give application context nor how robust the claims of optimality are likely to violate the maintained assumptions.

b) Researchers prefer to calculate the quantities derived from them like WTP for a change in attribute levels.

Although the CE method has many advantages over CVM-DC, there are several problems in the application of this method in the field of environmental economics.

a) CE is associated with cognitive difficulty due to the complex choice sets. [38] found out that if choice complexity increase, the random error will increase as well. This is because respondents are asked to choose between different choice sets, the increasing in attributes and their levels may cause repeated answers and hence statistical errors in estimating the results. Therefore, correlation between answers should be considered and modelled as well and there is possibility of including large number of attributes and levels in CE design. If the number of attributes and levels increase the sample size, the number of choice sets should be increased as well. Thus, respondents may loss their interest and frustrated when they are faced with a large number of options and have to trade-off between them.

b) Another weakness of CE is related to estimating the value of environmental good. Each good is considered as different parts, it is necessary to assume that the value of a good is equal to the sum of the value of its component (attributes).

According to [8], it will cause two potential problems:

a) There may be other components of the good which assumed as constant term in the model and not included in the CE design, but does have affect on the utility measure.

b) The value of the whole good as sum of its part. Welfare measure in CE is sensitive to survey design and accordingly the selected attributes, the number of levels and how it is presented to the respondents [8].

3. Conclusion

SP approach is mostly used in research because of its ability to measure non-use values as compared to revealed preference (RP) method. CM is very similar to CVM- based questionnaires. The structure of questionnaires of CM are similar to CVM questionnaires, where they contain background information about the non-market good, elicitation question, attitude and questions on socioeconomic profile of respondents [30]. The main difference between the two methods is in the form of the elicitation question. In CM questionnaires, respondents are presented with a series of choice sets, each containing usually three or more alternatives which described the good or services. Monetary value attribute is always concluded from each choice set as respondents were asked to choose their most preferred option.

SP is an approach of survey that are conducted under a hypothetical market, hence it values both use and non-use value in the non-market goods or services. Meanwhile, in RP, it is a survey approach which is conducted under a real

market behavior[4]. Unlike SP approach, RP only measure non-use values only. While, SP method provides the capability of measuring all kind of values as SP is used to measure use and non-use values. Each of SP and RP methods has its own strengths and flaws in measuring the economic value of non-market goods.

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