Session 14

Contingent Valuation Method

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The Contingent Valuation Method (CVM)

CVM was used for the first time by Davis in 1963, in the study of hunters in Maine. Later, by Randal et. al and Brookshire et al. CVM is a valuation based on a questionnaire that offers the respondents an opportunity to make an economic decision on a good, which no market exists. That is, the valuation is contingent upon the simulated market presented to the respondents.

CV is capable of

1. Able to obtain option price estimates in presence of uncertainty.
2. Able to value goods not previously available.
3. Able to estimate all existence class benefits.
4. Relevant ordinary (or inverse demand) curve are estimable.
5. Relevant Hicks compensated demand or inverse demand is directly estimable.

Passive use: is a term that is used to encompass the jargon found frequently in economic literature: existence value, bequest value, quasi-option value and option value:

Quasi - option value: WTP for the option to defer a decision to some date in the future when more information may be available.

The application of CVM is divided in 5 steps:

A. *Stage One*: *The Hypothetical Market*

Create a hypothetical market: The information given to respondents about all aspects of the hypothetical market. Place the respondents in a market like situation to be able to purchase the targeted products.

B. *Stage Two*: *Obtaining Bids*

1. Face to face (interviewer bias, but this is the best)
2. Telephone (least favorable data short attention span)
3. Mail (Problem: potential non-response bias and often from low response rate).

For example, the WTP may be derived in several ways:

1. Iteration process is conducted until, their MWTP is reached
2. Payment chart is used to for the respondents to select the bid.
3. Initial bids were asked from respondents without helping them for the bid.

C. Stage Three: Estimating Average WTP/WTAC

It is usual in CVM to find that mean WTP exceeds median WTP since the Average is affected by few out liers. In general average WTP and WTA are straightforward to obtain.

D. Stage Four: Estimating bid curves:

A bid curve can be estimated for open-ended CVM formats. Using WTP/WTA as the dependent variable and a range of independent variables. For instance;

WTP = f (Income, education, age, environmental quality, etc.)

The Bid curve is also useful to predict the valuation of changes in Environmental Quality, other than those suggested in the survey. (Linear Expenditure system approach and it properties)

In Dichotomous frameworks, bid curves are the logit-probit functions, which predict the probability of yes response to a particular offer price.

E. Stage Five: Aggregating Data;

Aggregation means that individual bid or bids are converted to a population. Total value figures, which should include all the component values, as well. Decision over aggregation depends on:

a. The choice of relevant population.

- All those whose utility will be significantly affected by the action.
- All those within the relevant political boundary who will be affected by the action.

Therefore, decision is wide open as far as what population to consider, the choice is wide open from a country all the way to Europe.

b. Moving from sample means to mean from total population. One approach will be to multiply the mean of the sample by the number of households. However, the socioeconomic characteristics of the sample should be strong representative of the population.

c. Choice of time period over which benefits should be aggregated. If the present value of environmental benefit flow over time is being considered then the benefits are usually discounted.

Problems in CVM:

I. Biases: This means systematic over or underestimate of true WTP & WTA.

a. Starting point bias
b. Vehicle of payment bias
c. Hypothetical bias.
d. Strategic bias.
e. Mental account bias. Where individual have some mental account for environmental protection, i.e., if I want to spend $100/year on environmental issues. If 5 different surveys at five different times ask me and my total willing to pay may exceed my mental account constraint. This would lead to a problem. What to do? Why this happens?

When I answer to my first survey, I have no idea that I am going to be asked again. No actual expenditure is expected on my account.

II. Embedding.

When value placed on a good in a CVM depends on the extent to which it is embedded in other goods. i.e., The first surveyor asks me about WTP for to preserve bald eagle and my response is, $5/month. The second surveyor rearrange the questions in such a way that first I am asked about WTP to preserve 10 different birds and then ask for bald eagle.

WTP for bald eagle $5.00
WTP for 10 different birds = $5.00

Why? What people are doing in CVM is offering an amount of money that makes them feel good about their attitude to the environmental. Therefore, they dump this "warm glow" or "good cause argument" in the first commodity scenario that they are asked.

III. Difference between WTP & WTA

WTP < WTA. Due to income effect. This divergence is not restricted to CVM. However, people systematically value losses more highly than equivalent gains, and reduction in losses more highly than foregone gains.

IV. Information effects:

Change in information given implies change in the valuation. The WTP may be affected by;

a. Information about the characteristics of the good.
b. Information about substitutes and complements.
c. Information on relative expenditure.

d. Information on the behavior of others.
e. The provision rule. The more information the greater is WTP.

V. Benefit transfer:

Let's assume that the WTP for Grand Canyon is i.e., $5.00. Can this value be used for Mesa Verde? (since CVM is too expensive to conduct every where). The answer is in most cases no, since the attributes, beneficiaries and characteristics of each (park, water body, site) is different.

VI. Assessing the reliability of the CVM.

There exist two methods for assessing CVM:

a. Test - retest procedures: conduct CVM on different sample of the same population over time.

b. Convergent validity checks: compares value obtained by CVM with other methods like travel cost or hedonic.

VII. Enhancing reliability in CVM

Articles published by Morteza Rahmatian. Test the CVM, or use CVM-X, which is improvement over traditional CVM. to find out

a. How well respondents understood the questions.

b. Why the respondents gave particular answers.

CVM-X consist of four steps:

1. Conduct CVM to obtain hypothetical value for the good in question.

2. Bring sub-samples of CVM respondents into a lab and elicit real bids in an incentive - compatible auction that employs real goods, real money and repeated market experience.

3. Estimate a calibration function relating the auction market bids to their hypothetical bids.

4. Adjust the CVM of respondents who did not participate in the laboratory auction.

For example the survey on foods safety the traditional CVM > CVM -X by 9%. Therefore CVM-X can work for private goods however, more application is needed for public good application.

National Oceanic Aviation Administration (NOAA) created a panel to evaluate CVM and the result was not a simple yes or no, but a guideline of acceptable standards in which a CVM method should incorporate.

1. CVM should primarily use face to face interviews. Telephone survey however, is to be used above mail surveys.

2. CVM should use WTP to prevent future incidents from occurring rather than WTA for the incident that has already occurred.

3. CVM should use a referendum format. "….The respondents should be asked how they would vote if faced with a program that would produce some kind of environmental benefit in exchange for higher taxes or prices? (Portney, 1994).

4. Familiarity is an endogenous variable. That is, a sufficient description must proceed the valuation so that the respondent understands the effect of the program they are being asked to evaluate.

5. The respondent should be reminded throughout the survey that the expenses on the proposed item reduce the amount of income they have to spend on other goods.

6. Respondents should be informed of any substitutes.

Controversy of CVM:

The origin of the CVM debate can be traded to three critical factors that have made it such a real world controversy.

1. Creation of Comprehensive Environmental Response Compensation and Liability Act of 1980 (CERCLA), commonly known as super fund law. This law empowered the government to sue for damages to natural resources, in which they had a trusteeship.

2. 1989 Exxon oil spill is the second factor contributing to the CVM controversy. Under both the loss of passive use considerably increased total damage liability and it is recoverable.

3. Oil pollution Act of 1990, which was an attempt by Congress to deter future negligent spills. The Act empowered NOAA to write laws and regulations that outlined damage estimates.

It is now in the interest of big business to discredit the valuation of passive use, therefore, the controversy of CVM is no longer an academic question.

CVM criticisms:

I. Measurement Bias.

A. Incentive to mis-represent: This is a form of strategic behavior bias or compliance bias.

Solution: plausible payment vehicles and interview that makes the proposed item less hypothetical. Compliance bias occurs either by a sponsor or interviewer. In this case, the respondent attempts to please the sponsor or the interviewer by complying with the perceived expectations of the survey.

a. Implied value cue: This form of bias can exist in the following cases:

The starting point bias: This is regarding the opening bid. Solution: bid chart. However, bid chart may lead to range biases.

Range bias: In this case, respondents may perceive that the range presented reflects the acceptable bids and therefore, they may adjust their offered bids.

Relational bias: In this case, respondents link their valuations to another environmental amenity value, which used as benchmark. If the benchmark items are an environmental amenity it can unintentionally imply that a value to the amenity being surveyed. Therefore, the respondents would interpret it as a reference point.

Importance bias: For a successful CVM study, respondents must be reminded that a zero value is acceptable.

Sequencing effect: When WTP responses for the values of several goods are in succession, the same good elicits a higher response when placed first in the list. Sequencing effect implies the same arbitrary valuation by respondents as the embedding effect. Sequencing is a result of substitution and income effects. "As more substitutes are added to the bundle of changes, the value of the bundle will be less than the independent valuation because of successively higher levels of other public goods.

B. Scenario Misspecifications:

1. Theoretical misspefications bias; is when the researcher is incorrect in economic theory or about the amenity or policy itself.

2. Amenity misspecifications bias. This is when the respondent interprets meaning not intended by the interviewer. There are four types of this form of bias:

   a. Symbolic misspecification. When the response is to the symbolism of the amenity and not to the level of it.

   b. Part whole misspecification has three types:

      i. Geographic distribution. When respondent has difficulty in isolating the specific amenity and applies it to a global perspective.

      ii. Benefit composition. This occurs when the respondent has difficulty dividing the components of the benefit. i.e., difference between existence and option value.

      iii. The final part. The whole bias is a result of the respondent interpreting the single policy as part of a global policy.

3. Metric bias - misperception of the degree of scale.

4. The probability of provision bias. This is present when respondent perceives the probability of the amenity being provided is different from the interviewer's intention.

C. Context misspecification bias. Likewise, when the respondent interprets meaning not intended by the interviewer. In this case the respondents perception differs from the intended context.

   i. Payment vehicle
   ii. Property rights
   iii. Method of provision
   iv. Budget constraint
   v. Elicitation question
   vi. Instrument context
   vii. Question order

The above problems can be avoided through proper survey design and implementation (Carson, 1989).

C. Embedding effect:

This argument believes that CVM is arbitrary and the valuation response varies over a wide range depending on whether the good is assessed on its own or embedded as a part of a more inclusive package? No measuring instrument can be taken seriously if its permitted range of application yields drastically different measure of the same object.

Schkide and Payne (1993) elicited WTP for preventing the death of migratory birds. Three separate surveys were used indicating that, 2000; 20,000 and 200,000 out of 85 million birds die each year as a result of waste oil holding ponds that could be fixed under the proposed program. "The WTP were similar in all three questionnaires".

Kahneman & Knetsch (1992). WTP of Toronto residents, expressed with a vehicle of higher taxes, to prevent the drop in fish population. In all Ontario lakes was only slightly larger than the WTP to preserve the fish stock in a small area of a province. Smith (1992), Haneman (1994) and Carson (1996) all criticized the above studies on four grounds.

i. The use of telephone survey.
ii. Open ended survey
iii. Failure to provide adequate description of the commodity
iv. Violation of NOAA guidelines for acceptable CVM practice.

Embedding effect claims that the valuation is arbitrary and the respondents are unable to value the good in a way that is consistent with economic theory. Inadequate design of CVM can yield exaggerated embedding effects; however, the occurrence of embedding in a carefully created survey does not invalidate the results.

Proponents of the CVM claim that embedding effect also exist in market commodities as well. Randall and Hoehn (1996) evaluated the embedding effect through a sequence of price changes for private goods. They showed that embedding effect are standard economic fact induced by substitution relationships and constrained endowments. Further, significant determination of embedding effect is the size of the proposed price or quantity change, and the number of item evaluated.

D. Warm-glow hypothesis.

Moral satisfaction is a renaming of a term coined by Anderson (1990) called warm glow. Kahneman & Knetsch claimed that, occurrence of embedding can be explained by the respondents' desire to purchase moral satisfaction. Discounting moral satisfaction violates the economic doctrine of consumer sovereignty - the consumer is a better judge of what gives him utility than anyone else.

E. Divergence of WTP & WTA:

Essentially a matter of property rights where, WTP < WTA due to income and wealth effects. Now is this divergence is a result of CVM being a poor measurement tool or is it a result of human behavior that is yet to be explained?