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Non-Market Valuation Techniques

Khalid Abdul Rahim

***Faculty of Economics and Management
Universiti Putra Malaysia***

khalid@econ.upm.edu.my



Non-Market Valuation Techniques

Basic Concept of Value

- economic values are based on what people want – their preferences
- theory of economic valuation is based on individual preferences and choices
- economic value is measured by the most someone is willing to give up in other goods and services in order to obtain a good, service, or state of the world



Non-Market Valuation Techniques

Basic Concept of Value

- market price does not correctly measure the economic value of goods or services
- many people are actually willing to pay more than the market price for a good, and thus their values exceed the market price



Non-Market Valuation Techniques

Three types of procedures have been employed to measure the demands for goods and services in the absence of ownership and efficient pricing, i.e.

to place consumer preferences for natural resources and environmental goods and services on common ground with the demands for more conventional commodities



Non-Market Valuation Techniques

- **Travel cost and random utility models**
- **Hedonic methods**
 - of decomposing prices of market goods to extract embedded values for related environmental attributes
- **Experimental methods**
 - for eliciting preferences
 - by using hypothetical settings, called **contingent valuation**
 - by constructing a market where none existed



Contingent Valuation Method

- estimate economic values for all kinds of ecosystem and environmental services
 - both use and non use values
- most widely used method for estimating non-use values
- most controversial of the non-market valuation methods



Contingent Valuation Method

- referred to as a “stated preference” method
 - because it asks people to directly state their values
- values that do not involve market purchases and may not involve direct participation
 - these values are sometimes referred to as “passive use” values
 - include everything from the basic life support functions associated with ecosystem health or biodiversity, to the enjoyment of a scenic vista or a wilderness experience, to appreciating the option to fish or bird watch in the future, or the right to bequest those options to your grandchildren. It also includes the value people place on simply knowing that giant pandas or whales exist



Contingent Valuation Method

- The conceptual, empirical, and practical problems associated with developing dollar estimates of economic value on the basis of how people respond to hypothetical questions about hypothetical market situations are debated constantly in the economics literature
 - **source of controversy**



Contingent Valuation Method

Why Use the Contingent Valuation Method?

because of the importance of non-use values, and their potentially significant levels



Contingent Valuation Method

Alternative Approaches

- Since non-use values are significant, and few people actually visit the site, other methods, such as the travel cost method, will underestimate the benefits of preserving the site
- contingent choice methods might also be used, depending on the questions that must be answered, and whether contingent choice question formats are more effective than standard contingent valuation questions. This would be decided in the survey development stage of the application



Contingent Valuation Method

Application of the CVM

- **Step 1**
 - define the valuation problem
- **Step 2**
 - make preliminary decisions about the survey itself
 - whether it will be conducted by mail, phone or in person, how large the sample size will be, who will be surveyed, and other related questions
- **Step 3**
 - the actual survey design



Contingent Valuation Method

Application of the CVM

- **Step 4**
 - the actual survey implementation
- **Step 5**
 - compile, analyze and report the results



Contingent Valuation Method

How Do We Use the Results?

- estimate the average value for an individual or household in the sample
- and extrapolate this to the relevant population in order to calculate the total benefits from the site



Contingent Valuation Method

Important Points to consider

- Before designing the survey, learn as much as possible about how people think about the good or service in question
 - consider people's familiarity with the good or service, as well as the importance of such factors as quality, quantity, accessibility, the availability of substitutes, and the reversibility of the change
- Determine the extent of the affected population or markets for the good or service in question, and choose the survey sample based on the appropriate population.



Contingent Valuation Method

Important Points to consider

- The choice scenario must provide an accurate and clear description of the change in environmental services associated with the event, program, investment, or policy choice under consideration
 - if possible, convey this information using photographs, videos, or other multi-media techniques, as well as written and verbal descriptions



Contingent Valuation Method

Important Points to consider

- The nature of the good and the changes to be valued must be specified in detail

make sure that respondents do not inadvertently assume that one or more related improvements are included

for example, if people are asked to value only air visibility, it would be important to make sure that they do not include their value for health-related improvements in their stated willingness to pay amount.

if people have a tendency to think of environmental improvements in general, even when asked about water quality alone, it would be necessary to point out specifically that environmental quality, other than water quality, would remain the same.



Contingent Valuation Method

Important Points to consider

- Questions can be asked in a variety of ways, using both open-ended and closed-ended formats
 - in open-ended format, respondents are asked to state their maximum willingness to pay for the environmental improvement
 - with closed-ended format, also referred to as **discrete choice**, respondents are asked whether or not they would be willing to pay a particular amount for the environmental improvement, or whether they would vote yes or no for a specific policy at a given cost.
 - the discrete choice format is generally accepted as the preferred method



Contingent Valuation Method

Important Points to consider

- In addition to the hypothetical question that asks for willingness to pay, the survey must specify the mechanism by which the payment will be made, for example through increased taxes
 - in order for the question to be effective, the respondent must believe that if the money was paid, whoever was collecting it could effect the specified environmental change.
- Respondents should be reminded to consider their budget constraints.



Contingent Valuation Method

Important Points to consider

- Specify whether comparable services are available from other sources, when the good is going to be provided, and whether the losses or gains are temporary or permanent.
- Respondents should understand the frequency of payments required, for example monthly or annually, and whether or not the payments will be required over a long period of time in order to maintain the quantity or quality change
 - they should also understand who would have access to the good and who else will pay for it, if it is provided



Contingent Valuation Method

Important Points to consider

- In the case of collectively held goods, respondents should understand that they are currently paying for a given level of supply
 - the scenario should clearly indicate whether the levels being valued are improvements over the status quo, or potential declines in the absence of sufficient payments.
- If the household is the unit of analysis, the reference income should be the household's, rather than the respondent's income



Contingent Valuation Method

Important Points to consider

- Thoroughly pre-test the valuation questionnaire for potential biases
 - pre-testing includes testing different ways of asking the same question, testing whether the question is sensitive to changes in the description of the good or resource being valued, and conducting post-survey interviews to determine whether respondents are stating their values as expected.
- Include validation questions in the survey, to verify comprehension and acceptance of the scenario, and to elicit socioeconomic and attitudinal characteristics of respondents, in order to better interpret variation in responses across respondents



Contingent Valuation Method

Important Points to consider

- CVM can be conducted as in-person interviews, telephone interviews or mail surveys
 - the in-person interview is the most expensive survey administration format, but is generally considered to be the best approach, especially if visual materials are to be presented.
- Interview a large, clearly defined, representative sample of the affected population.
- Achieve a high response rate and a mix of respondents that represents the population



Contingent Valuation Method

Important Points to consider

- Whatever survey instruments and survey designs are used, and whatever response rate is achieved, make sure that survey results are analyzed and interpreted by professionals before making any claims about the resulting dollar values



Contingent Valuation Method

Advantages

- CVM is enormously flexible
- the most widely accepted method for estimating total economic value
 - including all types of non-use, or “passive use,” values. CVM can estimate use values , as well as existence values , option values , and bequest values
- the nature and the results of CVM studies are not difficult to analyze and describe
- CVM has been widely used, and a great deal of research is being conducted to improve the methodology, make results more valid and reliable, and better understand its strengths and limitations



Contingent Valuation Method

Limitations

- there is considerable controversy over whether it adequately measures people's willingness to pay for environmental quality
- most people are unfamiliar with placing dollar values on environmental goods and services
 - therefore, they may not have an adequate basis for stating their true value
- contingent valuation format may be biased
 - rather than expressing value for the good, the respondent might actually be expressing their feelings about the scenario or the valuation exercise itself.



Contingent Valuation Method

Limitations

- respondents may make associations among environmental goods that the researcher had not intended
- some researchers argue that there is a fundamental difference in the way that people make hypothetical decisions relative to the way they make actual decisions
- WTA very significantly exceeds WTP
- if people are first asked for their willingness to pay for one part of an environmental asset and then asked to value the whole asset the amounts stated may be similar. This is referred to as the “embedding effect.”



Contingent Valuation Method

Limitations

- people's expressed willingness to pay for something has been found to depend on where it is placed on a list of things being valued. This is referred to as the "ordering problem."
- respondents may give different willingness to pay amounts, depending on the specific payment vehicle chosen
 - for example, taxes, may lead to protest responses from people who do not want increased taxes.
 - a contribution or donation, may lead people to answer in terms of how much they think their "fair share" contribution is, rather than expressing their actual value for the good.



Contingent Valuation Method

Limitations

- many early studies attempted to prompt respondents by suggesting a starting bid and then increasing or decreasing this bid based upon whether the respondent agreed or refused to pay such a sum
 - the choice of starting bid affects respondents' final willingness to pay response.
- strategic bias arises when the respondent provides a biased answer in order to influence a particular outcome
 - if a decision to preserve a stretch of river for fishing, for example, depends on whether or not the survey produces a sufficiently large value for fishing, the respondents who enjoy fishing may be tempted to provide an answer that ensures a high value, rather than a lower value that reflects their true valuation



Contingent Valuation Method

Limitations

- information bias may arise whenever respondents are forced to value attributes with which they have little or no experience
 - in such cases, the amount and type of information presented to respondents may affect their answers
- non-response bias is a concern when sampling respondents
 - since individuals who do not respond are likely to have, on average, different values than individuals who do respond.
- estimates of nonuse values are difficult to validate externally.



Contingent Valuation Method

Limitations

- When conducted to the exacting standards of the profession, contingent valuation methods can be very expensive and time-consuming, because of the extensive pre-testing and survey work



Contingent Choice Method

- **similar to contingent valuation**
 - can be used to estimate economic values for virtually any ecosystem or environmental service
 - can be used to estimate non-use as well as use values
 - it is a hypothetical method
 - it asks people to make choices based on a hypothetical scenario
- **differs from contingent valuation**
 - because it does not directly ask people to state their values in dollars. Instead, values are inferred from the hypothetical choices or tradeoffs that people make
- **results may be used to simply rank options, without focusing on dollar values**
- **suited to policy decisions where a set of possible actions might result in different impacts on natural resources or environmental services**



Hedonic Pricing Method

- **used to estimate economic values for ecosystem or environmental services that directly affect market prices**
 - it is most commonly applied to variations in housing prices that reflect the value of local environmental attributes. It can be used to estimate economic benefits or costs associated with:
 - environmental quality, including air pollution, water pollution, or noise
 - environmental amenities, such as aesthetic views or proximity to recreational sites



Hedonic Pricing Method

- **The basic premise of the hedonic pricing method is that the price of a marketed good is related to its characteristics, or the services it provides**
 - for example, the price of a car reflects the characteristics of that car—transportation, comfort, style, luxury, fuel economy, etc. Therefore, we can value the individual characteristics of a car or other good by looking at how the price people are willing to pay for it changes when the characteristics change
- **The hedonic pricing method is most often used to value environmental amenities that affect the price of residential properties**



Hedonic Pricing Method

Application

- **Step 1:**
collect data on residential property sales in the region for a specific time period (usually one year). The required data include:
 - selling prices and locations of residential properties
 - property characteristics that affect selling prices
 - neighborhood characteristics that affect selling prices, such as property taxes, crime rates, and quality of schools
 - accessibility characteristics, such as distances to work and shopping centers, and availability of public transportation
 - environmental characteristics that affect prices



Hedonic Pricing Method

Application

- **Step 2:**
statistically estimate a function that relates property values to the property characteristics, including the distance to open space
the resulting function measures the portion of the property price that is attributable to each characteristic.
the researcher can estimate the value of preserving open space by looking at how the value of the average home changes when the amount of open space nearby changes



Hedonic Pricing Method

How Do We Use the Results?

- The results can be used to evaluate agency investments in open space preservation
 - for example, specific parcels may be under consideration for protection
- The hedonic value function can be used to determine the benefits of preserving each parcel, which can then be compared to the cost.



Hedonic Pricing Method

Advantages

- The method's main strength is that it can be used to estimate values based on actual choices
- Property markets are relatively efficient in responding to information, so can be good indications of value
- Property records are typically very reliable
- Data on property sales and characteristics are readily available through many sources, and can be related to other secondary data sources to obtain descriptive variables for the analysis



Hedonic Pricing Method

Advantages

- The method is versatile, and can be adapted to consider several possible interactions between market goods and environmental quality



Hedonic Pricing Method

Limitations

- The scope of environmental benefits that can be measured is limited to things that are related to housing prices.
- The method will only capture people's willingness to pay for perceived differences in environmental attributes, and their direct consequences
 - if people aren't aware of the linkages between the environmental attribute and benefits to them or their property, the value will not be reflected in home prices.



Hedonic Pricing Method

Limitations

- The method assumes that people have the opportunity to select the combination of features they prefer, given their income
 - however, the housing market may be affected by outside influences, like taxes, interest rates, or other factors.
- The method is relatively complex to implement and interpret, requiring a high degree of statistical expertise.
- The results depend heavily on model specification.
- Large amounts of data must be gathered and manipulated.



Benefit Transfer Method

- used to estimate economic values for ecosystem services by transferring available information from studies already completed in another location and/or context
 - for example, values for recreational fishing in a particular state may be estimated by applying measures of recreational fishing values from a study conducted in another state.



Benefit Transfer Method

- the basic goal of benefit transfer is to estimate benefits for one context by adapting an estimate of benefits from some other context
 - benefit transfer is often used when it is too expensive and/or there is too little time available to conduct an original valuation study, yet some measure of benefits is needed. It is important to note that benefit transfers can only be as accurate as the initial study



Benefit Transfer Method

Application

- **Step 1:**

identify existing studies or values that can be used for the transfer

In this case, the researcher would look for studies that value beach use, specifically for lake beaches if possible. For the purposes of this example, assume that the researcher has found two travel cost studies that estimated values for swimming at lake beaches.



Benefit Transfer Method

Application

- **Step 2:**

decide whether the existing values are transferable

the existing values or studies would be evaluated based on several criteria, including:

- Is the service being valued comparable to the service valued in the existing studie(s)? Some factors that determine comparability are similar types of sites (e.g., lake beaches in a park), similar quality of sites (e.g., water quality and facilities), and similar availability of substitutes (e.g., the number of other lake beaches nearby).
- Are characteristics of the relevant population comparable? For example, are demographics similar between the area where the existing study was conducted and the area being valued? If not, are data available to make adjustments?



Benefit Transfer Method

Application

- **Step 3:**
evaluate the quality of studies to be transferred
The better the quality of the initial study, the more accurate and useful the transferred value will be. This requires the professional judgment of the researcher



Benefit Transfer Method

Application

- **Step 4:**

adjust the existing values to better reflect the values for the site under consideration, using whatever information is available and relevant

The researcher may need to collect some supplemental data in order to do this well. For example, in this case, the sites valued in each of the existing studies differ from the site of interest. The researcher might adjust the values from the first study by applying demographic data to adjust for the differences in users. If the second study has a benefit function that includes the number of substitute sites, the function could be adjusted to reflect the different number of substitutes available at the site of interest.



Benefit Transfer Method

Advantages

- Benefit transfer is typically less costly than conducting an original valuation study
- Economic benefits can be estimated more quickly than when undertaking an original valuation study
- The method can be used as a screening technique to determine if a more detailed, original valuation study should be conducted
- The method can easily and quickly be applied for making gross estimates of recreational values
 - The more similar the sites and the recreational experiences, the fewer biases will result



Benefit Transfer Method

Limitations

- Benefit transfer may not be accurate, except for making gross estimates of recreational values, unless the sites share all of the site, location, and user specific characteristics.
- Good studies for the policy or issue in question may not be available.
- It may be difficult to track down appropriate studies, since many are not published.
- Reporting of existing studies may be inadequate to make the needed adjustments.



Benefit Transfer Method

Limitations

- Adequacy of existing studies may be difficult to assess.
- Extrapolation beyond the range of characteristics of the initial study is not recommended.
- Benefit transfers can only be as accurate as the initial value estimate.
- Unit value estimates can quickly become dated.

