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Analysis

Valuing marine turtle conservation: A cross-country study in Asian cities

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ABSTRACT

The prime objective of this paper is to estimate from a cross-country perspective the willingness to pay for marine turtle conservation using the contingent valuation method. A secondary objective is to investigate two methodological issues about contingent valuation study: scope effect and payment vehicle effect. Using a uniform survey instrument and protocol, a sample of 3680 respondents from Beijing (China), Davao City (Philippines), Bangkok (Thailand) and Ho Chi Minh/Hanoi (Vietnam) were interviewed. Results indicate that the respondents in all cities have a positive willingness to pay for marine turtle conservation. The type of scope effect and payment vehicle effect considered did not seem to be significant in Beijing, Davao City and Bangkok. But some evidence show that there are scope effect and payment vehicle effect in Ho Chi Minh/Hanoi sample. Our study offers practical insights into Asian household preferences for marine turtle conservation.

1. Introduction

The marine turtle is an important species, not only for their economic and intrinsic value, but because their presence is often an indicator of healthy marine ecosystem. However, despite their valuable roles, marine turtles face a wide-range of threats (Perrine, 2003). As a result, all species of marine turtles are listed by the IUCN as being endangered, and the Hawksbill (*Eretmochelys inbracat*) and Leatherback (*Dermochelys coricea*) are listed as critically endangered (IUCN, 2007). Positive human action is required to ensure the survival of most species of marine turtles.

The marine turtle is a migratory species. Their habitat is shared among a large number of countries such as China, the Philippines, Thailand, Vietnam and Indonesia. Coordinated policies to conserve marine turtles are thus more likely to be effective than those pursued by countries on their own. Some progress has already been made (Smith, 2008). However, international collaborations remain sparse in scope and in length. Lack of coordination between different governments, failure to consider fully economic aspects and evaluate public preferences for marine turtle conservation has contributed to a continuous decline of marine turtle populations.

The preservation of animals requires protection of the individual species and also conservation of the habitats in which they live. The costs of such conservation to society can generally be easily measured (Chambers and Whitehead, 2003). In order to determine the economic efficiency of specific protection programs, it is necessary to compare these costs with some estimate of the economic benefits of conservation. However, estimating the non-market benefits from endangered species conservation is not easy, given the market failure associated with the public good (Freeman, 2003).

The contingent valuation method (CVM) seeks to elicit the value that people attach to a species by asking them how much they would be willing to pay (Mitchell and Carson, 1989). Literature on using the CVM to estimate benefits of a specific endangered species is growing (e.g. Jackobsson and Dragun, 1996; Chambers and Whitehead, 2003; Bandara and Tisdell, 2004). However, to our best knowledge, there is no recent study that values the conservation of marine turtles on a cross-country scale using a single CVM survey instrument and common survey procedure.

The primary objective of this study is to estimate the economic benefits of marine turtle conservation using the CVM from a cross-country perspective. A uniform survey instrument and field protocols were used in five major cities in four Asian countries, specifically in Beijing (China), Davao City (Philippines), Bangkok (Thailand), Ho Chi Minh (HCM) City and Hanoi (Vietnam). The four countries surveyed form part of the migratory route of marine turtles where many major nesting sites and feeding grounds of marine turtles can be found.

Although CVM has become one of the most popular methods used by environmental and resource economists to value environmental goods, the technique remains controversial (e.g. Hausman, 1993;

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Cummings and Harrison, 1994). There is a significant body of evidence to suggest that CV estimates do not exhibit great sensitivity to scope (Boyle et al., 1993; Foster and Mourato, 2003). With respect to a specific endangered species, how should funds be used to support their conservation be collected? Is mandatory payment superior to voluntary contribution? A secondary objective of this study is to carry out two methodological tests, focusing on payment vehicle effect and scope effect. Such tests are absent in the existing marine turtle valuation literature.

The rest of this paper is organized as follows. The second section presents the research design. Empirical results and discussion are presented in the third section. Finally, main conclusions are summarized.

2. Research Design

2.1. The Elicitation Format

The dichotomous choice (DC) question format was used to elicit the willingness to pay (WTP) of respondents. The DC approach was first employed by Bishop and Heberlein (1979) and is generally considered to be a superior elicitation method because of its incentive compatibility (Lee and Mjelde, 2007).

The bids used for the main survey were based on several pre-test results in each country. In the pre-test, five different bids were asked using the DC format. In the main survey, five bid levels were used for each country, three of which were common to all countries, i.e., US$ 0.02, US$ 1 and US$ 5. The bids finally used in the four countries are shown in Table 1.

2.2. Questionnaire Design

The survey questionnaire used in the field was based on several focus group discussions among the agencies involved, government officials, environmental experts, and some local residents. A series of pre-testing surveys were also conducted in all cities involved to further identify and correct potential problems. Several revisions were undertaken before the survey questionnaire was finalized.

2.2.1. Scope Test

Scope test involves observing changes in the WTP estimate as the quantity or quality of the good is made larger or smaller. This study was designed to use split samples to test the scope effect. Two conservation program scenarios were presented. One was a regional collaborative conservation program to protect the marine turtle in the four countries, and the other was a national conservation program to protect the marine turtle only within each country. The questionnaire contained exactly the same questions except that the two programs differed in the scope.

2.2.2. Payment Vehicle Test

Payment vehicle design is a crucial element in application of the CVM. To allow for a payment vehicle effect test, two possible payment vehicles based on pilot studies were used. The first was a monthly mandatory surcharge on households' electricity bills and the second was a voluntary surcharge on households' electricity bills every month. The payment was limited in 5 years, which assumed that the collection in 5 years would be enough to conduct the conservation activities. The reason for choosing a surcharge on electricity bills as the payment vehicle was that almost all households in the four countries were paying electricity bills, which is most common compared to other payment vehicles. The questionnaire contained exactly the same questions except that the two programs differed in the payment schemes.

Based on our research design, we asked separate groups of respondents about their WTP for one of three marine turtle conservation scenarios: (i) a regional program financed through a mandatory surcharge, (ii) a regional program financed through voluntary contributions, and (iii) a national program financed through a mandatory surcharge. The respondents were randomly assigned to one of the packages. Each set of respondents was randomly divided into five groups, each of which was asked to give a yes-or-no response to one of the five bid levels in each country.

The final survey questionnaires mainly consisted of four interrelated sections, which were uniform in the four countries. The first section contained questions about respondents' general environmental attitudes, such as environmental awareness and perceptions of environmental issues. The second section was composed of questions about the respondent's knowledge of and attitude towards marine turtle conservation. The third section introduced a marine turtle conservation program and WTP questions as well as some debriefing questions (including reasons why respondents are or why they are not willing to pay). Cheap talks were also added to reduce potential hypothetical bias through an explicit discussion of the problem (Cummings and Taylor, 1999). Before the valuation question, we first described the hypothetical bias phenomenon and asked respondents to bear it in mind and answer as if they were in a real situation. The last section included a number of relevant questions regarding respondents and their households' socio-economic characteristics.

2.3. The Sample

The sample was selected from Beijing (China), Davao City (Philippines), Bangkok (Thailand), Ho Chi Minh (HCM) City and Hanoi (Vietnam). These cities were chosen based on the fact that residents of major cities are relatively more educated and hence more capable of responding to a CVM survey. The reason for choosing HCM and Hanoi in Vietnam is that it is believed that the preferences of people in the two cities are different and thus, they should be both included to make it representative for large cities in Vietnam.

The sample in each country was selected using the same multi-stage stratified random sampling procedure which is based on the city population statistics. The respondents randomly spread across all administrative districts in the survey cities. The respondents in each city were male or female household heads above 18 years old. The household head was identified as the person in charge of daily expenditures and other (younger) family members.

2.4. Survey Mode

In-person interviews are the method recommended by the NOAA panel for the administration of contingent valuation surveys (Arrow et al., 1993). However, for decisions involving unfamiliar and/or complex environmental policies, especially where non-use values are being sought such as marine turtle conservation in this study, personal interviews would appear to face some potentially serious limitations (Macmillan, et al., 2002). In this study, the drop-off survey method was chosen to give the respondent ample time to think (Whittington et al., 1992) on the valuation scenario and to elicit WTP response based on household decision (Harder, 2006). This involved personal delivery, personal follow-up and personal collection of the survey questionnaire (Subade, 2005).

Table 1
Bids used in the four countries.

Cities	Bids (US$)				
Beijing	**0.02**	0.5	**1**	**5**	7.5
Davao	**0.02**	0.1	**1**	2	**5**
Bangkok	**0.02**	0.25	**1**	2.5	**5**
HCM and Hanoi	**0.02**	0.5	**1**	**5**	7.5

Note: Numbers in bold are common bids.