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The Use of Choice Experiments in Developing Countries: The Central American Experience

El Uso de los Experimentos de Selección en los Países en Vía de Desarrollo: El Caso de América Central

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Abstract. Methodologies to estimate the economic value of non-market environmental services have been developed to meet rich countries' needs. Efforts to ensure that choice experiments address the particular needs of developing countries should support the ambition to ensure balanced environmental protection and economic stability through proper economic analysis. This paper reviews a variety of studies, mainly from Central America, and presents lessons learned that could strengthen further analyses. It highlights different efforts to refine the methodology to address particular issues in developing countries.

Keywords: Choice experiments, valuation of environmental services, environmental policy.

Resumen. Las metodologías para estimar el valor económico de los servicios ambientales que no tienen mercado se han desarrollado de acuerdo a las realidades de los países desarrollados. Los esfuerzos para asegurar que los métodos de experimentos de elección reflejan las necesidades de países en desarrollo deben basarse en asegurar un balance entre la protección ambiental y la estabilidad económica a través del análisis económico adecuado. El presente artículo es una revisión de una variedad de estudios, principalmente en América Central, y discute las lecciones aprendidas que pretenden fortalecer el análisis futuro. Este artículo destaca los distintos esfuerzos para refinar la metodología y el análisis en países en vías de desarrollo.

Palabras clave: Experimentos de elección, valoración de servicios ambientales, política ambiental.

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INTRODUCTION

Methods to estimate the economic value of environmental goods and services have been developed within the context of developed countries and developed countries needs. Continued effort has been dedicated to assess the utilization of these methodologies in the context of developing countries. In the past decade choice experiments (CE) has emerged as a preferred stated preference technique for estimating the economic value of environmental goods and services. A number of studies have utilized this technique in the context of developing countries. This paper will review experiences of the use of choice experiments in Central America and assess the applicability of this methodology.

As the challenge to estimate the economic value of non-market goods and services emerged in the last twenty-five years, stated preference techniques, principally contingent valuation (CVM), have allowed economists to utilize hypothetical markets to provide information that markets cannot provide. Because of its consistency with economic choices, and the minimization of strategic biases, the dichotomous choice referendum CVM analysis became preferred, endorsed by the blue-chip Arrow et al. (1993) report, and widely popular.

The use of valuation studies in general, and contingent valuation studies in particular, have extended to developing countries. Development banks and aid agencies sponsored a number of CV investigations to estimate the willingness-to-pay for improved water supply and sanitation projects. And a number of studies utilized the travel cost model and CVM to assess recreation demand and the values of protected areas and nature conservation efforts.

Meanwhile, within the transportation and marketing literature, CE was being developed as a generalized multi-attribute stated preference technique (Ben Akiva and Lerman, 1985; Louvière

and Woodworth, 1983). The technique utilizes developments in consumer choice theory as well as limited-dependent-variable econometrics (Lancaster, 1966; McFadden, 1974). Early efforts at using CE for the valuation of environmental services focused on comparing CE results with those of CVM (Adamowicz et al., 1998; Hanley et al., 1998; Boxall et al., 1996). Later a wide variety of tests and applications assessing the methodology have been published.

This paper will assess the use of CE in Central America. A number of particular issues that may be pertinent to the Central American context, and not readily recognized by a global research community, will be stressed. A number of case studies of CE in Central America will be discussed as well as methods to address the challenges presented in Central America. The second part of this paper will review basic challenges to stated preference assessments in Central America. The third section of the paper will review a number of identified studies using CE in Central America and discuss the investigators' attempts to address issues pertinent to Central America.

ISSUES

There remain a number of issues that may be of particular concern in the use of non-market valuation studies, and particularly stated preference analysis in Central America. These include: (i) the policy and decision-making context of the study, (ii) the socio-demographic characteristics of the targeted population(s), (iii) corruption and distrust for implementing agencies, and (iv) the quality of the information transferred from the researcher to the sampled respondent and from the sampled respondent back to the researcher.

A primary concern in all applications of welfare economics, including the valuation of environmental

goods and services, is the respect that decision-makers have for the information presented. Because environmental quality is a superior good, the populaces of developed countries are well aware of the scarcity of and demand for non-market environmental goods. And the policy context that invites the use of welfare economics, via mandated benefit-cost analysis, liability and damage assessment cases, and public decisions on the allocation of non-market goods, is often established in developed countries. For example, voters in the United States are accustomed to ballot referendums that require majority consent to accept increased taxes and assessments for civic projects.

Outside of the demands of aid agencies and development banks, the policy context that provides the demand for welfare economic analysis is less readily apparent in Central American countries. As in developed countries, analysis is often driven by academic reasons such as research or post-graduate training. This is especially true of the publicly available journal articles and theses that can be reviewed and assessed. Often the academic purpose is more ambitious than addressing policy issues, such as developing a theory or methodology that can later be applied by others to policy issues. However, a long run goal of researchers should be to develop an appreciation of and confidence in the analysis applied. Ultimately peer review should help provide confidence in the analysis. It is also important to present research that is pertinent to policy and management issues in order to extend to decision makers the contribution of this type of analysis.

The dual goal of assuring quality research through peer review in scientific journals and providing outreach to decision makers is a familiar challenge to many academics. In Central America it generally implies a close relationship between local academic and research institutions and international research institutions. And it often implies working in

two languages, Spanish the common language of the isthmus and English the language of much of the international research community. For example, many of the studies listed in the next section were directly and indirectly supported by a cooperative agreement between CATIE (the Tropical Agriculture Research and Higher Education Institute), an international research and academic institution in Costa Rica, and the Environmental Economics Unit of the University of Gothenburg.

A strategy to ensure that the study is not merely an academic enterprise is the inclusion of input from local sponsoring organizations and local researchers in the initial study design. Further steps of formal consultation with local experts and focus groups are also useful in assuring that any proposed hypothetical alternatives are to some extent politically, socially, and technically feasible. Focus groups can serve to facilitate communication with the survey population. Issues of interest to the research community may not be of interest to the survey populations. Rewording concepts or presenting them in a context that is pertinent to the survey audience may facilitate the communication process. For instance Biénabe and Hearne (2006) assert that they learned from focus groups that Costa Ricans have an appreciation for nature and nature conservation, but consider biodiversity actual conservation priorities to be the concern of the scientific community.

In Central America, issues of social stratification are much more important than in developed countries. In general, poverty rates are higher and literacy rates are lower than regional rates for Latin America. This has certain implications for the target and impact populations of environmental valuation studies. Often those that are impacted hardest by environmental degradation are the poorest members of society. And because of the large informal economy, tax collection is to some degree inconsistent.

Literacy rates are important in the use of stated

preference studies because of the need to exchange quality information. Choice experiments studies do require certain cognitive abilities, and respondents without secondary education have been identified as having difficulties with intricate hypothetical choice sets (Hearne and Salinas, 2002). However the much more extensive history of the use of CVM studies to estimate poor peoples' willingness-to-pay (WTP) for improved water supply and sanitation services suggests that certain hypothetical solicitations are possible across most demographic groups.

One strategy to minimize any confusion that respondents might have with hypothetical solicitations is to utilize personal interviews in data collection. This is especially appealing in Central America where educated and eager enumerators are inexpensive and relatively easy to recruit among university students. Central Americans are generally receptive to enumerators. However, person-to-person interviews may lead to a 'yea saying' bias as has been identified as an issue in Central America (Shultz et al. 1998). This 'yea saying' bias provides a possible explanation to the counterintuitive results from Echeverría et al. (1995) of a significantly higher willingness-to-pay among Costa Rican tourists (four times) than the willingness-to-pay of foreign tourists despite lower income. However it should be noted that multiattribute CE analysis should limit any "yea saying" biases (Hanley et al., 1998).

The relatively inexpensive primary data collected from stated preference surveys is contrasted with the paucity of primary data. The scarcity of primary data is another reason why stated preference studies are popular among academic researchers in Central America. It is often quite difficult to compare the demographic characteristics of a sample with that of the target population, because data on the latter might not exist.

Another important concern in Central America is the trust that any respondent would have for any

institution that would be implementing environmental programs. Corruption and the lack of enforcement for the rule of law is a persistent issue in the region (Transparency International, 2008). This may hamper any effort to invest in environmental improvements and enforce regulations. And it could lead to distrust in any stated preference solicitation that would propose these alternatives. In nations where corruption is rampant, both corruption and any fiscal controls to attempt to eliminate corruption would provide high transactions costs upon any program that would imply the transfer of funds from one set of individuals to another. This also highlights the importance of the vehicle of payment. Multiattribute CE allows for the analysis of preferences for any particular payment vehicle within the choice sets presented (Biénabe and Hearne, 2006).

STUDIES

A number of databases, including Google Scholar, Econlit, Science direct and the Environmental Valuation Reference Inventory were used to identify case studies using choice experiments in seven Central American countries. An assortment of English and Spanish keywords was used to search for publications. The identified studies are listed in **Table 1**, and include published refereed journal articles and MS theses from the University of Michigan and CATIE. All of these theses were available on the internet. Seven of the nine studies have authors affiliated with CATIE. An additional identified application of choice experiments in Costa Rica focuses on willingness to pay for food safety attributes and is not listed because it is not an "environmental" valuation study (Hearne and Volcan, 2005).

Eight of the nine studies focused in some way on tourist preferences for ecotourism experiences, protected area management, or nature conservation. Most had target and impact populations that

were international tourists as well as Central Americans. This reflects: i) the strategy of using tourists' expenditures to help support environmental initiatives; ii) a focus on issues of local, as opposed to national and regional importance; and iii) an emphasis among research institutions, such as CATIE, in green environmental issues such as forest and protected area management. It also reflects some repetition among CATIE MS theses - although each of these studies had some individuality.

The lone exception to the focus on tourism and green environmental issues is the Alpizar and Carlsson (2003) study on urban commuter mode choice. The study is motivated by the problems of urban traffic congestion and air pollution, which is a very apparent concern to most residents of Latin American cities, and the San Jose metropolitan area. The study is designed to provide general information to urban planners and the regulators and transportation companies that might potentially regulate bus routes and provide other means to entice commuters to shift from individual cars to busses. Thus this analysis does provide a pertinent policy context that could attract decision-makers to the information presented. The authors also employed expert groups, focus groups, and trial surveys to ensure the applicability of all of the proposed alternatives and their relevance to potential respondents.

Alpizar and Carlsson (2003) avoid any large hypothetical investments attribute, such as a mass transit system, or parking garages. Thus there is little concern for any large transfers of money that could lead to the distrust of the survey. And because there was no solicitation for the willingness-to-pay for an investment, 'yea saying' is not an issue in this study. The population analyzed was the San Jose metropolitan area urban commuters with access to a car. This population is relatively wealthy and would be expected to be well educated. There would be little concern for cognitive difficulty with this population.

Only 3.8 percent of the sample expressed a negative impression of the survey or misunderstanding. A simple diagnostic test of task complexity was included in the analysis and showed no concern with neither fatigue nor task complexity.

The variety of different studies that analyze tourist preferences for nature conservation and ecotourism allow for some comparison of results. One particular commonality among these studies is an interest in international tourists. Six of these studies (Hearne and Salinas (2002), Hearne and Santos (2005), Del Cid Ramírez (2001), Otárola Guerrero (2001), Talavera Aguilar (2002), and Shoka (2006)) are expressly motivated by the hope to attract ecotourists, and their expenditures, to lesser developed areas of potential tourist development. Biénabe and Hearne (2006) considered that the Costa Rican tourism industry was an important component of the demand for environmental services, particularly amenities, and assessed tourist and Costa Rican preferences for environmental service payment options.

A further study conducted by DeShazo and Fermi (2002) is also based on the evaluation of management options at new national parks. This ambitious and generalized study of ecotourism demand addresses theoretical issues of consumer choice complexity and uses the stated choice analysis to test the impact of increasing choice complexity on responses. The empirical application uses data from 1800 and 2100 random on-site surveys in Costa Rica and Guatemala respectively. This article has been named one of the three most influential articles of the year at the 2002 World Congress of Environment and Resource Economists by Ian Bateman, editor of *Environmental and Resource Economics*. Unfortunately for this review, the case study presented in the *Journal of Environmental Economic and Management* does not present the details on sampling procedures that are found in the other listed studies.

Three of the studies deal with ecotourism options

in the Petén, Guatemala (Hearne and Santos (2005), Shoka (2006) and DeShazo and Fermi (2002)). These studies are mostly dissimilar, although there is overlap between the attributes listed in the initial DeShazo and Fermi (2002) study and the subsequent Hearne and Santos (2005) study. The Shoka (2006) study deals with archeological visits to a Petén community and does not refer to any of these previous studies.

In general these studies emphasized their intention of providing analysis to assist decision-making and support efforts to develop ecotourism and protect natural areas. Most studies emphasize connections with local sponsors responsible for tourism development, protected area management, environmental services payments, and community development. Many studies detail the efforts at soliciting information from experts groups and focus groups.

Most of the ecotourism studies used a form of on-site sampling to conduct in-person interviews. Overall surveys encompassing tourism related issues were conducted exclusively among populations of actual tourists, with the exception of Hearne and Santos (2005) and Biénabe and Hearne (2006) who also included surveys with local residents. In general popular alternative tourist sites were used as a means to encounter a target population of tourists who might visit an ecotourism destination. For example, potential ecotourists in Petén, Guatemala were interviewed at the nearby Santa Elena international airport (Hearne and Santos 2005) and at the Tikal National Park (Shoka 2006). Del Cid Ramírez (2001) used the Copan Ruins tourist area in Honduras to assess preferences for tourism development at the Celaque Mountain National Park. Hearne and Salinas (2002) were able to encounter tourists for on-site sampling at the Poas Volcano in order to assess options for the development of Barva Volcano. Airport surveying, as utilized by Hearne and Santos (2005)

and Biénabe and Hearne (2006) was a convenient mechanism to encounter international tourists with free time, but this may no longer be possible with increased airport security.

Most of these surveys were conducted over a period of a few weeks, with English and Spanish speaking enumerators. This was generally considered to be a convenient method to encounter the target population. Many of these authors discussed potential biases because of the limited sampling period. None of the econometric estimations included a correction for on-site sampling bias.

Two of the studies, Hearne and Salinas (2002) and Shoka (2006), tested the equality of the preferences of national and international tourists. Both rejected the hypothesis of equality of preferences across national and international tourists. Del Cid Ramírez (2001), Otárola Guerrero (2001), Talavera Aguilar (2002) surveyed two populations with mostly identical survey instruments and did not test for equality of preferences across populations. Hearne and Santos (2005) surveyed foreign tourists and local residents to assess preferences for ecotourism development and rejected the hypothesis of equal preferences across groups. Biénabe and Hearne (2006) surveyed three populations, international tourists, Costa Rican tourists at recreation sites, and Costa Rican residents in their homes. Because of different payment vehicles, they did not consider it feasible to test for similarity of preferences between international tourists and Costa Ricans. The authors could not reject the hypothesis of equal preferences across the two populations of Costa Ricans. DeShazo and Fermo (2002) found that the hypothesis of the equality of preferences between tourists visiting Costa Rica and Guatemala could not be rejected.

The formal comparison of values that can lead to the possibility of benefits transfer has been explored by Morrison et al. (2002). However in Morrison et al.'s study the attributes across two study areas were

mostly identical. Given that the studies under review in this paper were motivated for a variety of reasons and were designed in close relationships with local stakeholders, with the use of experts and focus groups being a shared feature, the variations in the range and nature of the attributes do not allow for formal benefits transfer analysis. However, a number of similarities in preference patterns and willingness to pay across ecotourism studies can be identified. Furthermore a number of studies assess willingness to pay in local currency and US dollars and these can be compared.

The stated preferences for improved information available to tourists were assessed in three studies. The levels of information hypothetically offered across these studies varied slightly with low levels of information implying signage and higher levels of information including participatory demonstrations and videos. Preferences and willingness to pay for improved information was positive and strongly significant across national and international tourists in the three studies, Del Cid Ramírez (2001), Otárola Guerrero (2001) and Hearne and Salinas (2002). Willingness to pay was somewhat higher for international tourists reflecting perhaps greater income.

A number of these studies assessed the preference for the option of paid tour guides. DeShazo and Fermo (2002), Hearne and Santos (2005), and Talavera Aguilar (2002) all demonstrated positive and significant preferences for park visits with guides. This was complemented by Hearne and Santos' (2005) result that local residents preferred to have tour guides available for tourists.

Transportation and site access were analyzed with two types of attributes. DeShazo and Fermo (2002) and Hearne and Santos (2005) assessed preferences for improved access roads and road pavement in the Petén respectively. DeShazo and Fermo (2002) demonstrated a positive and significant

preference for road improvements. However, Hearne and Santos (2005) reported a significant dispreference among international tourists for paved access road in the Petén while local residents had a significant positive preference toward pavement. Hearne and Santos speculated that international tourists were surveyed during the Petén's dry season when pavement is less valuable. Hearne and Salinas (2002) assessed preferences for restricted versus unrestricted access to some trails and also found a significant preference for restricted access among international tourists. Local tourists did not have a significant preference for trail restrictions. This supports the idea of different preferences between international and national tourists.

Both Del Cid Ramírez (2001) and Talavera Aguilar (2002) assessed preferences for transportation options to remote mountainous forested areas in Honduras. Results of both of these studies demonstrated no preference for horse or mule transport over hiking. Del Cid Ramírez showed that there was a significant preference for van transport but not for a four wheel drive pickup truck. It is important to note that in both of these studies the sampled population was interviewed at relatively accessible tourist areas.

DeShazo and Fermo (2002), Hearne and Salinas (2002), and Talavera Aguilar (2002) included attributes for visitor infrastructure. DeShazo and Fermo (2002) demonstrated positive and significant preferences for water and toilets. The latter two studies used identical language in their solicitation for 'modern,' 'semi-rustic,' or 'rustic' visitor infrastructure. Hearne and Salinas (2002) showed a positive and significant preference for semi-rustic infrastructure. The Talavera Aguilar (2002) thesis reported this attribute preference as a singular ordinal relationship and showed a significant preference for more rustic infrastructure.

Most of the studies were motivated by the desire

to produce analysis that would ultimately support nature conservation and the economic development of the communities and populations near the study area. Some studies addressed preferences for souvenir and handicraft sales. Del Cid Ramírez (2001) showed no significant preferences. Talavera Aguilar (2002) showed that locals but not international tourists preferred to have souvenir sales available.

Studies by Otárola Guerrero (2001) and Talavera Aguilar (2002) assessed management options within forested areas with both tourism and logging potential. These studies assessed the value of ensuring that tourism and logging occurred in separate zones. Results of the Otárola Guerrero (2001) study show a positive preference for overlapping areas of tourism and sustainably managed forest extraction among national and international tourists in Costa Rica. Respondents also expressed preferences for low impact forest management practices and for demonstrative forest management activities. Talavera Aguilar (2002) also did not demonstrate any significant preferences for zoned tourist and logging areas.

Hearne and Santos (2005) showed no significant preferences by either tourists or locals for initiatives to remove illegal settlers from the Maya Biosphere Reserve. Otárola Guerrero (2001) did show positive and significant preferences for improved quality of life among Costa Rican and international tourists.

Marginal willingness to pay (WTP) estimates, for both local and international tourists, were presented for a number of attributes in most of these studies. Often these estimates were compared statistically to assess the equality of preferences across populations (Hearne and Salinas (2002), Otárola Guerrero (2001), Shoka (2006)). Del Cid Ramírez (2001) reported higher WTP among foreign tourists, perhaps reflecting higher incomes among international tourists. Biénabe and Hearne (2006) reported estimates of marginal WTP of foreign

tourists for environmental services payments in the form of a one-time payment to be 10 and 23 times higher than a monthly contribution by Costa Ricans. Talavera Aguilar (2002) did present WTP estimates of local visitors to be higher than those of international tourists. This corresponds to CVM studies by Shultz et al. (1998) and Echeverría et al. (1995) which found higher WTP among locals and led to concerns of 'yea saying.' With the exception of the Talavera Aguilar study (2002), WTP for foreign tourists were found higher than for local tourists in the CE as was expected. Thus the overall result of these CE studies is that 'yea saying' biases might be reduced in choice experiments.

It is worth noting that the magnitude of the price attribute proposed in the context of the reviewed ecotourism studies is generally low. Most studies designed selected levels of this attributes based on observed price practices (entrance fee in national parks in many studies and accommodation costs in the case of Del Cid Ramírez (2001)) and did not include significantly high levels above actual prices. This is in line with the concern of proposing credible and realistic options, and with the participatory approaches adopted in most studies for selecting attributes. Some local institutions have been reluctant to include or propose high changes in the fees (Hearne and Salinas 2002). In support of these low prices, it should be noted that the different options proposed in the reviewed ecotourism studies do not represent radical changes from the current situation. However there appears to be a concern regarding this attribute in at least some studies. In particular, Hearne and Santos (2005) who only proposed three levels of entrance fee (0\$, 5\$ and 10\$) found a positive preference for paying a fee. Otárola Guerrero (2001) found that the price has a low influence on the preferences with regard to the other attributes. And Hearne and Salinas (2002) acknowledge that the limited range in the price attribute can be a constraint

for environmental valuation. None of the reviewed ecotourism studies propose a measure of the total WTP for a specific scenario.

CONCLUSIONS AND OBSERVATIONS

There are many important environmental issues that require proper economic analysis in Central America. As a developing region, the balance between economic growth and environmental protection is especially critical. And objective analysis to support decision-making is valuable. There are a number of factors that facilitate the use of stated preference studies in Central America. Data collection is relatively inexpensive. Central Americans are generally cooperative when being surveyed. Multi-attribute stated choice experiments may reduce the 'yea saying' bias that has been observed in some Central American dichotomous choice CVM studies and produce more reliable WTP and welfare estimates. And the context to ecotourism development is well suited to hypothetical markets.

A number of stated choice experiments studies, conducted in Central America were reviewed in this paper. Most focused on ecotourism development, with the hopes of providing information on the ecotourism experience that will increase visitorship, income from tourist expenditures, and nature conservation. And most of these concentrated on issues of a local concern, but important throughout much of Central America.

The reviewed studies demonstrated the capacity of choice experiments, designed in partnership with local stakeholders, to inform local decision making processes. Generalizing the results of specific choice experiments for informing tourism management plans in disparate sites can be questioned. However, similar patterns in preferences for similar attributes can be used to support wider planning efforts.

Many of these studies were similar. And

preferences for similar attributes were assessed across different studies. Mostly these studies showed similar preferences across foreign and local tourists for many similar attributes, except for site accessibility. Given the mixed results found in the different studies regarding the equality of preferences of different groups of tourists and residents, it is important when surveying groups of tourists with different characteristics to test for the equality before considering assessing preferences of the overall population. These studies also support the argument that 'yea saying' biases might be less of a problem in stated choice experiments than with dichotomous choice CVM studies.

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Table 1. Identified choice experiments studies in Central America on environmental topics

Author and Date	Type	Topic
DeShazo and Fermo (2002)	Journal Article	Ecotourism Preferences in Costa Rica and Guatemala
Hearne and Salinas (2002)	Journal Article	Protected Area Management and Ecotourism Preferences in Costa Rica
Alpizar and Carlsson (2003)	Journal Article	Urban Commuter Transportation Options in Costa Rica
Hearne and Santos (2005)	Journal Article	Protected Area Management and Ecotourism in Guatemala
Biénabe and Hearne (2006)	Journal Article	Environmental Services Payments
Del Cid Ramírez (2001)	MS Thesis	Ecotourism Preferences in Honduras
Otárola Guerrero (2001)	MS Thesis	Forest Management in Costa Rica
Talavera Aguilar (2002)	MS Thesis	Forest Management in Honduras
Shoka (2006)	MS Thesis	Ecotourism Preferences in Guatemala