The theory of planned behavior and environmental quality for estimating wildlife-watching demand in Banderas Bay, Mexico

Avila-Foucat V.S.,*[1] Sánchez-Vargas A.,* and Alonso A. Ibarra*

*Instituto de Investigaciones Económicas
Universidad Nacional Autónoma de México
Circuito Mario de la Cueva
Ciudad de la Investigación en Humanidades
Ciudad Universitaria
C.P. 04510, México, D.F.

[1]Corresponding author:
savila @iiec.unam.mx
savila_1@yahoo.com.mx
Instituto de Investigaciones Económicas
Universidad Nacional Autónoma de México
Circuito Mario de la Cueva
Ciudad de la Investigación en Humanidades
Ciudad Universitaria
C.P. 04510, México, D.F.
Tel: 52 55 56 23 01 31 or 52 55 56 23 01 00, Ext. 42453
Fax: 52 55 56 23 01 31

Abstract

The main objective of this article is to show that wildlife-watching demand depends not only on economic variables such as prices and income, but also on attitudes and on the quality of environmental assets. The Theory of Planned Behavior is used to incorporate attitudes, subjective norms and perceived behavioral control in the demand model. We show empirical evidence in this direction by looking for the determinants of the demand for birdwatching trips to Banderas Bay in Mexico, and by making use of an on-site survey and count data econometric techniques. Our empirical results indicate that the demand for trips is more sensitive to variables associated with attitudes toward a conservation action and to deforestation effects on bird populations. We also provide an estimate of the expected demand and consumer surplus. Our findings have important implications for the design of policies for improving ecotourism demand in the area.

Key words: Theory of planned behavior, environmental quality, birdwatching, count data, Mexico.

1. Introduction

Wildlife tourism is increasing all around the world, and is becoming an important activity for many rural economies (UNEP and CMS, 2006). It is a catalyst for economic growth, improving employment and in some countries generating significant tax revenues (USFWS, 2007). Therefore, wildlife-watching demand is a point of interest for many countries, and depends not only on the ecological attributes of the site, but also on the quality of those attributes (Loomis, 1995; Guyer and Pollard, 1997; Deng et al., 2002; Huybers and Bennett, 2003). Furthermore, it is important to more accurately assess individual preferences, and the Theory of Planned Behavior has proven useful in this regard.

The Theory of Planned Behavior (TPB) has been used in environmental studies for analyzing an individual's intention to behave, in order to improve the prediction of future behavior (Han and Kim, 2010; Han, 2010). According to the TPB, the chief incentive to carry out any behavior is the intention

to perform it, which depends on attitudes, subjective norms and perceived behavioral control (Ajzen, 1991).

Understanding human intention to behave has been used to estimate environmental economic valuation and green preferences, which are useful for supporting environmental policies (Pouta, 2004; Vermeir and Verbeke, 2008). However, TPB has not been used to estimate either behavior or intention to behave in wildlife observation demand. Nor has it been linked to environment quality analyses.

Both air quality (Wardman and Bristow, 2004; Wang and Mullahy, 2006; Wang and Zhang, 2009) and water quality (Barton, 2002; Jones, 2008) have been valued in many studies, likely because they are directly related to human health. Habitat quality has been valued for hunting (Hee-Chan and Chun, 1999) and for other recreational activities (Scarpa, 2000). For example, wildlife-watching has been assessed at the Lake Nakuru National Park in Kenya (Navrud and Mungatana, 1994). Demand for environmental quality has also been estimated for houses located near polluted areas (Brasingtona and Hiteb, 2005, ;Khannaa and Plassmannb, 2004), for waste collection (Basili, 2006), and for urban parks (Gelsoa and Peterson, 2005). Loomis (1995) estimated the frequency of deer-hunting trips as an indirect form of measuring environmental quality. He explores four models assuming that if the habitat is conserved, more deer will be available for hunting, thereby increasing the frequency of trips for deer hunting (Loomis, 1995). However, environmental quality, as a variable determining wildlife observation demand, has not been explored (Lawton, 2007). Thus, in this study, we used TPB and environmental quality to estimate wildlife-watching demand, more specifically bird-watching demand. Bird-watching demand is assessed in this paper, since it represents one of the main wildlife-watching activities around the world. In Mexico, whales and birds are the main species in demand for observation. Birdwatchers come mainly from Canada and the United States (US). In Canada, 30% of adults are wildlife observers, of which 7.5% are birdwatchers, and 13% had traveled to Mexico for

wildlife observation (Canadian Tourism Commission, 2006). In the US, 47% of wildlife observers are birdwatchers and almost 40% had traveled away from their homes to watch birds.

The aim and hypothesis of this research is to show that bird observation demand and consumer surplus depend not only on economic variables such as prices and income, but also on attitudes, subjective norms and perceived behavioral control, as well as on the quality of environmental assets. In other words, this paper explores a theoretical and methodological approach for demonstrating that wildlife watchers' welfare is positively associated with the quality of environmental assets and TPB variables. We present empirical evidence in this direction by looking for the determinants of bird-watching demand in Banderas Bay, Mexico and by making use of an on-site survey and a count data econometric model.

2. Theory of Planned Behavior (TPB)

TPB is an extension of the Theory of Reasoned Action, adding perceived behavioral control along with attitudes and subjective norms. Attitudes toward the behavior is "the degree to which a person has a favorable or unfavorable evaluation or appraisal of the behavior in question"(Ajzen, 1991). Perceived behavioral control "refers to people's perception of the ease or difficulty of performing the behavior of interest" and the subjective norm refers to "the perceived social pressure to perform or not to perform the behavior" (Ajzen, 1991).

2.1 TPB in contingent valuation studies

TPB has been used widely in contingent valuation methods in order to obtain more accurate results when comparing willingness to pay and the actual behavior of paying. In this respect, Harris et al. (1989) show that socio-psychological variables are useful for improving the accuracy of contingent valuation methods. Following this argument, Ajzen and Driver (1992) demonstrated that attitudes toward paying, perceived behavioral control toward being engaged in an activity, and ethical and moral issues all influence willingness to pay for recreational activities (Ajzen and Driver, 1992). Other studies

have also considered the relevance of TPB in forestry, for example in forest regeneration abatement (Pouta and Rekola, 2001; Pouta, 2004), showing that attitudes that depend on beliefs and perceived behavioral control increase willingness to pay significance. In addition, forest entrance fees have also been estimated with TPB variables (Bernat and Roschewitz, 2008). Pouta and Rekola (2001) studied willingness to pay for forest regeneration (as a behavioral intention) and demonstrated that attitudes and perceived behavioral control significantly predicted contingent valuation results. Another interesting finding is highlighted by Pouta (2004), who demonstrated that including attitude and belief variables in demand estimations improves the probability for choosing an environmental alternative, and that willingness to pay loses importance in relation to other variables.

2.2 TPB in environmental preference and behavior

Conservationism and ecological activism have also been analyzed using the TPB, and diverse results have been obtained regarding the significance of attitudes, perceived behavioral control, and subjective norms in predicting the intention to behave. Karppinen (2005) used TPB to more accurately measure the forest owner's choice of reforestation, discovering that attitude was the most significant variable with respect to both planned behavior control and subjective norms (Karpinnen, 2005). Similarly, Chan (1998) studied pro-environmental behavior toward the intention to recycle, reaching a similar conclusion: attitude was the most significant variable, followed by subjective norms, meaning that individual intention is more important than social pressure (Chan, 1998). In the same way, Fielding et al. (2008) established that attitudes toward being engaged in environmental activism and toward general aspects of the environment, are more significant than perceived behavioral control in relation to participation in environmental activism. In that study, general attitudes toward the environment, based on Ajzen and Fishbein (1977), were measured using the new ecological paradigm proposed by Dunlap et al. (2000) and Jones (2000). Ajzen and Fishbein (1977) propose that TPB is significant to the specific intention to behave and not to general behavior. However, Kaiser (2006) assessed the

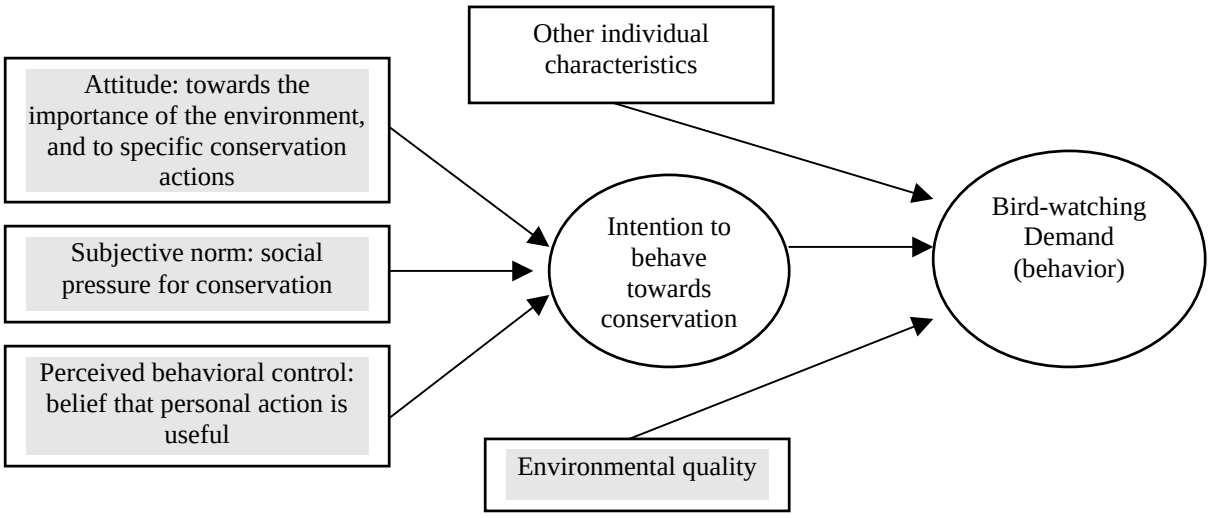
relevance of moral norms that affect people's attitudes before their intention, and found out that attitude, subjective norms and perceived behavioral control substantially explain general conservationism behavior (Kaiser, 2006). In that paper, planned behavior is used to assess general pro-environmental behavior in opposition to Ajzen and Fishbein (1977) and Fielding et al. (2008). Other studies used TPB in addition to other important factors influencing intention, such as confidence, values and beliefs. For example, we can mention articles on assessing sustainable food consumption (Vermeir and Verbeke, 2008), and farmer conservation behavior (Beedell and Rehman, 1999; Fielding, 2005).

Finally, TPB has been scarcely used in estimating either green tourism preferences or wildlife-watching demand. The application of this theory is helpful for predicting tourist intention to choose green hotels (Han, 2010), as well as to explain a customer intention to revisit a green hotel (Han and Kim, 2010).

A review of the literature shows different opinions regarding the importance of perceived behavioral control and subjective norms, but most authors generally agree on the importance of modeling attitudes. Moreover, the literature shows that TPB has not been linked to environmental quality, nor has it been applied to estimating wildlife-watching demand. Thus, in this article, both TPB and environmental quality variables are applied in estimating wildlife watching demand. Hence, this work measures the intention to behave toward general environmental issues as a determinant of bird-watching demand, in conjunction with environmental quality features. It is important to note that this paper does not measure attitudes toward birdwatching, since the latter is a behavior that interviewees have already revealed. Instead, we are interested in measuring the importance of planned behavior variables toward general conservation items, in order to know whether or not birdwatchers with intention to behave toward conservation return for another wildlife observation visit. In this sense, the study is innovative since it analyzes the relevance of the intention to behave toward general environmental aspects for actual behavior (i.e. bird-watching demand) (Fig. 1). Our empirical setting is

located in Banderas Bay, Mexico, which is an important bird-watching site for both US and Canadian tourists.

Figure 1. Conceptual approach for estimating bird-watching demand under the Theory of Planned Behavior. Variables determining bird-watching demand are indicated, where the shadowed boxes show the variables of interest in this paper.



3. Methods

3.1 Area of study

Banderas Bay is located on the Pacific coast of Mexico in the states of Jalisco and Nayarit. The total terrestrial area of the bay is about 3,000 km² and the southern part of the bay is bordered by the Sierra Madre del Sur. Thus, topography varies along the Bay, generating high diversity in terms of both vegetation types and birds in a relatively small area. Vegetation is dominated by dry forest, but both mangroves and pine trees forests can also be observed (Márquez-González and Sánchez- Crispín, 2007). There are about 321 species of birds, of which 173 are stationary and 148 migrate during the winter. According to the definitions established in Mexican legislation, five bird species are endangered and 12 species are endemic to Mexico (Gobierno del Estado de Nayarit, 2008). A tropical

climate dominates with an average temperature of 26° C and an annual precipitation between 1,100 and 1,600 mm.

Tourism has been growing in the Bay, increasing from 35% to 61%, from 1999 through 2000, while in contrast, the primary sector, including agriculture and fisheries, has decreased from 44% to 17% for the same period (Gobierno del Estado de Nayarit, 2008). Particularly, international tourism demand has grown by 15% from 1980 to 2000 (Márquez-González and Sánchez-Crispín, 2007). In 2006, the local airport recorded almost one and a half million passengers of whom 77% were foreigners and 23% Mexicans (economic benefits generated by international visitors are about two-fold in comparison to domestic visitors) (Gobierno del Estado de Jalisco, 2007). Tourism growth has brought not only economic benefits but also significant demographic growth, along with environmental degradation (Márquez-González and Sánchez- Crispín, 2007) (Gobierno del Estado de Nayarit, 2008). Proof of the latter is the deforestation of 558 hectares during the 1980-2000 period, signifying a deforestation rate of 27.9 hectares/year due to agriculture expansion, urbanization and tourism infrastructure (Márquez-González, 2008).

In spite of the environmental impacts in the region, both federal and state governments are interested in promoting ecotourism as a strategy to diversify the tourism sector, and eventually alleviate some of the impacts of traditional tourism. According to a local survey, nature is the third attribute that tourists enjoyed the most in Banderas Bay, after the beach and the village (Gobierno del Estado de Jalisco, 2007). Nevertheless, there are only seven adventure tourism and ecotourism companies in the Bay. The main ecotouristic activity is wildlife observation (birds and whales), but it is also possible to visit captive turtles and crocodiles. Adventure tourism is also important in the region along with scuba diving, kayaking, mountain bicycling, canopy tours, and rafting.

3.2 Sampling survey and bird-watching demand variables

An on-site structured survey was carried out for interviewing birdwatchers in the Bay after their bird observation experience. The sample size was 87 surveys (*30% of birdwatchers in one year)*. The survey was applied during the birdwatcher season in November 2007 through March 2008. The survey included different sections: general information, previous experience, environmental quality scenarios and TPB variables. Demand was assessed in terms of the number of times they had repeated a visit to Banderas Bay.

It is important to mention that the model was tested with an on-site survey with wildlife watchers, thus the survey needed to be short, realistic and concise in order to avoid no answers to questions.

Environmental quality variables

Environmental quality can be measured using physical, chemical and biological indicators, as well as by studying ecosystem dynamics through energy fluxes (Xu et al., 2004). In this, paper we used deforestation rates and birds as biological indicators of habitat quality. Birds are environmental quality indicators (Meire, and Dereu, 1990; Walker et al., 2009) because their ecology is well known, their links with both plant associations and territories are well understood, and because they cover different levels in the food web (Padoa-Schioppa et al., 2006). In this paper, the effect of deforestation on bird populations is used as another variable of bird-watching demand. Deforestation effects on bird populations, such as clearing, fragmentation, and change of vegetation structure, influence bird diversity, species richness and community structure (Christiansen and Pitter, 1997; Padoa-Schioppa et al., 2006; Castelletta et al., 2005; Scott et al., 2006; Watson et al., 2004; Martínez-Morales, 2005; Peh et al., 2005).

Thus, environmental quality variables comprised two scenarios: one showing only deforestation data and another showing the deforestation effect on bird populations. The latter was used to test the hypothesis that bird species loss was more significant than habitat deforestation in birdwatchers' demand to repeat a visit. The former was the control treatment. Scenarios were estimated using local

and national information in order to provide the most realistic and accurate information, based on published data. Since no information on deforestation rates were available for the entire Bay, we assumed the one recorded for the northern region of the Bay (27.9 ha/y) to be the same as for the rest of the bay (Marquez-Gonzalez, 2008). Bird diversity was estimated using the relationship described by Martinez-Morales (2005), as follows:

Species richness = 0.175 Log_{10} (forest fragment size)

$p = 0.95$

Using the previous relationship we obtained an estimate of about four species lost due to a deforestation rate of 27.9 ha/y. Hence, we constructed environmental quality scenarios with these figures in two questions with dichotomous responses on our questionnaire (Table 1).

Table 1. Environmental quality scenarios included in the survey

Environmental quality questions
Deforestation rate in the north of Banderas Bay is 27 ha/year, which is equivalent to 80% of the mangrove coverage in the Quelele lagoon, or approximately 27 professional football fields. If the deforestation rate continues (27 ha/y), will this affect your choice to return to Banderas Bay?
If the deforestation rate is 27 ha/y, the bird population will be affected and about four species a year will disappear. Will you be willing to return under such a scenario?

TPB variables

The aim of integrating TPB variables is to know whether birdwatchers with intention to behave toward conservation will return to engage in birdwatching again in Banderas Bay. In accordance with Kaiser (2006), general conservation intention to behave can be used. Thus, attitudes were measured in three different ways. First, by asking if conservation should be a priority for the society with a question such as “Do you think environment conservation should be a priority for humanity?” because it reflects a general environmental consciousness. Secondly, attitude toward specific conservation actions was assessed with the question "Will you be interested in participating in natural resource conservation in

Banderas Bay?" since it is a specific and tangible intention to behave toward conservation, in comparison to the previous question on environmental consciousness.

Subjective norms were measured by asking "Is society worried about the environment in your country?" in order to know if the interviewer lives in a society with social pressure toward conserving the environment, since the subjective norm is "the perceived social pressure to perform or not to perform the behavior" (Ajzen, 1991). Lastly, perceived behavioral control was analyzed, to know if the respondent thinks he/she has an important role in conserving the environment, by asking "Do you consider that you have an important role in environment conservation?" since this variable "refers to people's perception of the ease or difficulty of performing the behavior of interest" (Ajzen, 1991).

3.3 Demand model

In this section, we briefly describe the count data approach (Shaw, 1988; Grogger and Carson 1991; Cameron and Trivedi, 1998), which was used to provide reliable econometric evidence on the willingness to return as an indirect function of demand for trips to Banderas Bay in Mexico. The objective of count models, in the context of recreational demand, is to determine not only the demand for visits, but also to estimate a welfare measure such as consumer surplus. The count data approach constitutes a good alternative to deal with the truncation problem often associated with samples drawn from on-site recreational surveys. On-site samples are often truncated and endogenously stratified, because they do not include non-users and because the likelihood of certain persons being sampled depends on the frequency of their site visits, respectively. In this context, count data models, such as the Poisson model, allow us to estimate the demand for trips and, at the same time, to account for truncation and endogenous stratification. Moreover, it has been demonstrated that for recreational demand models it is important to add not only the recreation price activity but also travel costs (Loomis, 1995). The specification of our model is then as follows:

$$y_i^* = E(y_i^* \mid P_{i,j}, x_i, w_j, z_j) + e_i \quad (1)$$

Where y_i^* refers to the i^{th} person's returning that is equivalent to a quantity demanded of the j^{th} site, $P_{i,j}$ is the travel cost to the j^{th} site[1], x_i and w_j are general individual and site characteristics, respectively, and z_j are TPB variables and environmental quality scenarios. Travel costs were included since it is expected that a tourist will return depending not only on bird-watching tour prices but also on prices to reach the site. Since y^* is the latent quantity demanded we can get a consumer surplus estimate integrating y^* over the relevant price change and environmental quality improvement (*dp*).

$$\int y^* dp \quad (2)$$

A more specific representation of the demand function (1) results from the following assumptions. First, given that on-site surveys only collect data from a portion of the population (people with non-zero demand) we only observe y_i as follows:

$$y_i = y_i^* \quad if \quad y_i^* > 0 \quad (3)$$

Besides, if we assume that the conditional density $f(y_i^* \mid x_i)$ is Poisson with location parameter λ_i then the on-site sample's density function is given by:

$$h(y_i / X_I) = \frac{e^{-\lambda_i} \lambda^{y_i - 1}}{(y_i - 1)!} \quad (3)$$

With the following conditional mean and variance:

$$E(y \mid x_i) = \lambda_i + 1$$

$$Var(y \mid x_i) = \lambda_i$$

[1] Travel cost was estimated using local tourism statistics, flight prices, average expenses and tour prices.

Where the expected latent demand is estimated as a semi-logarithmic function of price, income and other variables.

$$\ln \lambda_i = \beta_0 + \beta_p P + \beta_1 X_1 + ... + \beta_i X_i \quad (4)$$

Second, Hellerstein and Mendelsohn (1993) show that we can estimate the expected value of consumer surplus, *E(CS)*, derived from a count model as follows:

$$E(CS) = \frac{E(y_i / x_i)}{-\beta_P} = \frac{\hat{\lambda}_i}{-\beta_P} \quad (5)$$

Where $\hat{\lambda}_i$ is the expected number of trips, and β_P is the sensitivity of the response variable (i.e. *demand*) to price changes. Thus, the per-trip consumer surplus is equal to $\frac{1}{-\beta_P}$. Finally, in order to estimate the demand and the associated consumer surplus, we make use of maximum likelihood methods, based on equation (3). A criticism of the Poisson model is that mean-variance equality, conditional on explanatory variables, is often violated with over-dispersion of the dependent variable, and a model with negative binomial distribution would provide a better fit if that is the case. Therefore, a test of the validity of the mean and variance must be reported to ensure that the Poisson model is an appropriate specification for the data at hand. Thus, for the econometric analysis, we specify the demand (λ_i) for trips to Banderas Bay as:

$$\ln \lambda_i = \beta_0 + \beta_p P + \beta_1 X_1 + \beta_2 X_2$$

Where λ_i is the number of trips taken by individual *i* , *P* denotes travel costs, X_1 is the individual's household income and X_2 is a vector that includes variables such as individual, TPB and place characteristics, including environmental quality.

4. Results

The survey shows that 69% of birdwatchers were women and 31% were men, averaging 56 years of age. International tourists come chiefly from Canada (46%) and from the US (50%). Most of respondents have postgraduate studies (43%) and have employment (60%). Income ranges between US$4,000 and US$6,000 per month. Interviewees are lodged in hotels in Puerto Vallarta (67%) or rent a condominium. Bird-watching frequency is high (more than five times a year) for 59% of them; 70% are visiting Banderas Bay for the first time and 30% repeat a visit once a year. Moreover, birdwatching was an objective before leaving their origin for all respondents. From the data shown above, it is possible to conclude that the sample is composed of mature people interested in birdwatching, with economic remuneration that allows for doing this activity frequently.

This survey gathered information as described in the previous section on the number of times individuals have visited Banderas Bay to perform bird-watching activities ("demand for trips"), on characteristics of the visitors, on ecological attributes, on environmental quality willingness to accept changes, and on TPB variables. The estimated parameters for the Poisson count model are presented in Table 2.

Table 2. Demand for bird-watching trips to Banderas Bay

Variable	**Poisson**	**Truncated Poisson**
Deforestation increases and bird species decrease	-0.2927 (0.1474)	-0.6267 (0.3666)
Price	-0.00006 (0.00004)	-0.0002 (0.0001)
Age	0.0229 (0.0069)	0.0538 (0.0157)
Bird watching as the main objective	0.3635 (0.1488)	1.0347 (0.4310)

Income	-0.0001	-0.0002
	(0.00005)	(0.0001)
Number of birds	0.1276	0.2619
	(0.0521)	(0.0972)
Participating in conservation	0.1475	0.3520
	(0.0889)	(0.1978)
Over-dispersion test	0.9605	
Log pseudolikelihood	-68.2044	-48.5454

Before analyzing the results, it is worth mentioning that a regression-based test for over-dispersion, in Table 2, shows that the Poisson model is a better alternative to value environmental quality and model tourism demand than the negative binomial model for the data at hand, given that the mean and variance of the model are not different, statistically speaking,[2] and there is no over-dispersion.

The model shows that from the TPB variables, only the attitude toward participating in conservation activities was significant to bird-watching demand. Attitude toward conservation as a priority for humanity, subjective norms and perceived behavioral control were not significant. Results also demonstrate that attitude is significant for predicting not only the intention toward general conservation actions, but also toward behavior to repeat a visit. This is an interesting finding since TPB has been proven to be significant for the intention to behave but not always for the behavior (see discussion below).

Other individual characteristics relevant for repeating a visit is age, and having birdwatching as an objective before leaving home. Age generally points to mature people who might have more economic possibilities to travel. Moreover, birdwatchers decide upon their destinations depending on bird

[2] The null hypothesis is that the mean and variance are equal, which indicates there is no over-dispersion.

populations, thus repeating a visit depends on the features of bird populations that tourists are looking for. The negative coefficient of the price variable ("Price") implies that, as travel costs to Banderas Bay increase, fewer trips are taken. The negative coefficient of the income parameter ("Income") suggests that the trip is an inferior good or that other tourist destinations might be substitutes. Substitute activities were included as a variable in the survey, but they were not significant, thus if people's income increases, since they are looking for birdwatching, they will be interested in other tourist destinations rather than other activities in Banderas Bay.

It is worth mentioning that the price and income parameters are very limited compared to the impacts of other variables on the demand. In fact, it seems that the demand for trips is more sensitive to variables associated with ecological attributes, deforestation rates and individual characteristics. For instance, the response of the demand to changes in the number of birds is positive and higher than the response to prices and income. This result might suggest that visitors are more sensitive to ecological attributes, such as the number of birds, than to economic variables. Moreover, it is interesting to note that the number of birds was more relevant than other ecological attributes such as habitat, plant diversity, bird species, or the number of endemic species. Another result of interest is the significance of deforestation and bird species' decreasing scenario (-0.29 and –0.62), which implies that under this scenario the number of visitors decreases, confirming our hypothesis that the deterioration of environmental assets plays a very important role in the demand for wildlife observation. As expected, since the survey was directed toward birdwatchers, only the scenario considering deforestation and bird population effects was significant.

Both the quantity of trips demanded and the welfare associated with both the Poisson and truncated Poisson models are shown in Table 3.

Table 3. Estimated quantity demanded of trips and consumer surplus

	Poisson	Truncated Poisson
User's quantity demanded		1.747
(numbers of trips per person a year)	1.821	
Consumer surplus (USD)	$1,266.0	$341.6

As Table 3 shows, the quantity of trips demanded by users is almost two trips per year, indicating that birdwatchers do repeat visits to Banderas Bay. This number is estimated by using the sample means of the variables. Besides, the expected consumer surplus estimates (US$1,266 according to the Poisson model and US$342 according to the truncated Poisson model) indicate that tourists actually pay less than they would be willing to, for birdwatching in Banderas Bay. Such amounts justify (other things equal), therefore, the intentionality of repeating visits, almost once a year, as shown by the model results.

5. Discussion

TPB has been applied to more accurately predict the behavior of returning to birdwatch. This study assesses whether attitudes, subjective norms and perceived behavioral control toward conservation in general influence bird-watching demand. Results show that only attitude toward a specific conservation action is significant for repeated visits. According to other studies, attitude is the most significant variable with respect to subjective norms and perceived behavioral control (Karpinnen, 2005; Chan 1998; Fielding 2008; Pouta and Rekola, 2001). The difference is that in this case the intention to behave is toward general conservation aspects, as also studied by Kaiser (2006). Furthermore, Chan (1998) points out that the intention to behave does not always lead to the corresponding behavior, thus

it is important to assess the role of TPB variables in relation to behavior. We demonstrate, therefore, that attitude is significant for the behavior of returning to birdwatch in Banderas Bay. Results in that respect are consistent with Chan (1998), who showed the significance of attitude toward the behavior of recycling in Hong Kong, and argues that internal changes (attitude) are more important than social pressure (subjective norm). Social pressure (subjective norm) is probably not significant due to the fact that birdwatchers are generally concerned a priori about the environment. Similarly, perceived behavioral control is not significant because birdwatchers are likely convinced that they have an important role in conservation. To the contrary, attitude toward a specific action for conservation in Banderas Bay is significant for repeated visits. Moreover, the intention to participate in conservation was in relation to Banderas Bay, which might be more interesting for birdwatchers than an alternative activity in their home country. In summary, personal confidence and social pressure are not significant for birdwatchers in comparison to attitudes toward specific actions for conservation.

Repeating visits will not change dramatically in relation to income, and if it increases, those interviewed might prefer to explore other destinations. This is consistent with Pouta (2004), who demonstrates that when attitude variables are included, the household income variable has less weight in contingent valuation studies. On the other hand, the negative sign of price suggests again that if prices increase, tourists might travel to another destination. Age as an individual characteristic was relevant for repeated visits, as shown by Navrud and Mungatana (1994), probably because age is related to income.

Environmental quality variables show that if deforestation increases and species richness decreases, demand is affected negatively. The latter confirms our hypothesis that the deterioration of environmental assets plays a very important role in the demand for trips. Only the scenario indicating deforestation effects on bird populations was significant, which is due to the specific respondent interest in birds. Environmental quality scenarios were simple and as realistic as possible. As Spash

(2002) mentions, “ideally, a contingent valuation method entity for valuation is meant to be described in ways designed to bring individual perceptions of environmental change into line with those which would actually occur”(Spash, 2002). Other studies have valued different attribute scenarios (Scarpa, 2010), or indirectly, environmental quality (Loomis, 1995) (Hee-Chan and Chun, 1999), but in this paper deforestation effects on bird populations was the environmental scenario limiting bird-watching demand and consumer surplus. Furthermore, it is interesting to note that the number of birds was the most central attribute, instead of bird species, or endemism. A possible explanation lies in the fact that there are only 12 endemic species in the region, compared to 173 resident species.

Finally, environmental quality consumer surplus in the truncated model was US$341.60, which is an amount, by the way, that is close to the price of an airplane ticket from Canada to Banderas Bay (Puerto Vallarta airport).

So far, TPB and environmental quality variables are positive for bird-watching demand and consumer surplus. However, further research is needed in order to include other TPB variables such as values, beliefs, and confidentiality. In the same way, other environmental quality scenarios could be assessed including more attributes of the location. However, this study was a first attempt to link repeated bird-watching visits (actual behavior) to TPB variables and environmental quality.

The policy implications of this study are related to the fact that wildlife-watching and ecotourism are being promoted by the local and federal governments as sustainable tourism strategies. A consumer surplus that motivates visitors to birdwatch in Banderas Bay is an opportunity to foster local economic development. Instead, however, tourism infrastructure has been expanding in a disorderly manner along Banderas Bay, causing habitat degradation and pollution (Marquez-Gonzalez, 2008). Therefore, any public policy oriented toward promoting ecotourism or wildlife outdoor activities in Banderas Bay must take into account that demand is sensitive to environmental quality assets and to attitudes toward the environment.

6. Conclusion

The Theory of Planned Behavior is used to measure the relevance of attitudes, subjective norms and perceived behavioral control in a context of wildlife observation demand. This article has outlined that attitudes toward general conservation action is determinant for wildlife observation demand, in contrast to subjective norms and perceived behavioral control. Moreover, environmental quality is also significant to that respect. Therefore, the hypothesis that bird observation demand depends not only on economic variables but also on attitudes and environmental quality assets is proven. On the other hand, consumer surplus was measured, highlighting the welfare benefits obtained by birdwatchers from visiting Banderas Bay. The TPB and environmental quality are then important for wildlife-watching policy and demand.

Acknowledgments

References:

Ajzen, I, 1991. The theory of planned behavior. Organizational behavior and human decision process. 50, 179-211.

Ajzen, I., Driver B. L., 1992. Contingent Value Measurement: on the nature and meaning of willingness to pay. Journal of Consumer Psychology. 1(4), 297-316.

Ajzen, I., Fishbein M., 1977. Attitude-behavior relations: a theoretical analysis and review of empirical research. Psychological Bulletin. 84(5), 888-918.

Barton, D. N, 2002. The transferability of benefit transfer: contingent valuation of water quality improvements in Costa Rica. Ecological Economics. 42, 147-164.

Basili, M., Matteo, D. M., Ferrini, S., 2006. Analyzing demand for environmental quality: A willingness to pay/accept study in the province of Siena (Italy). Waste Management. 26, 209-219.

Beedell, J. D. C., Rehman, T., 1999. Explaining farmers' conservation behaviour: Why do farmers behave the way they do? Journal of Environmental Management. 57, 165-176.

Bernath, K., Roschewitz, A., 2008. Recreational benefits of urban forests: explaining visitors' willingness to pay in the context of the theory of planned behavior. Journal of Environmental Management. 89, 155-166.

Brasingtona, D. M., Hiteb, D., 2005. Demand for environmental quality: a spatial hedonic analysis. Regional Science and Urban Economics. 35, 57- 82.

Cameron, A. C., Trivedi, P. K., 1998. Regression Analysis of Count Data. Econometric Society Monograph. 30, 432.

Canadian Tourism Commission, 2006. Travel Activities and Motivation Survey: Canadian activity profile: wildlife viewing while on trips.

Castelletta, M, Thiollay, J-M, Sodhi, N.S., 2005. The effects of extreme forest fragmentation on the bird community of Singapore Island. Biological Conservation. 121, 135-155.

Chan, K., 1998. Mass communication and proenvironmental behaviour: waste recycling in Hong Kong. Journal of Environmental Management. 52, 317-325.
Christiansen M. B., Pitter E., 1997. Species loss in a forest bird community near Lagoa Santa in Southeastern Brazil. Biological Conservation. 89, 23-32.

Deng, J.Y., King, B., Bauer, T., 2002. Evaluating natural attractions for tourism. Annals of Tourism Research. 29(2), 422-438.

Dunlap, R.E., Van Lier, K. D., Mertig, A.G., Jones, R.E., 2000. Measuring endorsement of the new ecological paradigm: a revised NEP scale. Journal of Social Issues. 56, 425-442.

Fielding, K.S., Terry, D. J., Masser, B.M., Bordia, P., Hogg, M.A., 2005.Explaining landholders' decisions about riparian zone management: the role of behavioural, normative, and control beliefs. Journal of Environmental Management. 77, 12-21.

Fielding, K.S., McDonald, R., Louis, W. R., 2008. Theory of planned behavior, identity and intentions to engage in environment activism. Journal of Environmental Psychology. 28, 318-326.

Gelsoa, B. R., Peterson, J. M., 2005. The influence of ethical attitudes on the demand for environmental recreation: incorporating lexicographic preferences. Ecological Economics. 53, 35-45.

Gobierno del Estado de Jalisco, 2007. Anuario Estadístico del Estado de Jalisco.

Gobierno del Estado de Nayarit. 2008. Plan municipal de desarrollo de bahía de banderas 2005-2008.

Grogger, J. T., Carson, R.T., 1991. Models for truncated counts. Journal of Applied Econometrics. 6(3), 225-238.

Guyer, C., Pollard, J., 1997. Cruise visitor impressions of the environment of the Shannon-Erne waterways system. Journal of Environmental Management. 51(2), 199-215.

Harris, C. C., Driver B. L., McLaughlin W.J., 1989. Improving the Contingent Valuation Method: A Psychological Perspective. Journal of Environmental Economics and Management.17, 213-229.

Han, H., Kim, Y. 2010. An investigation of green hotel customers' decision formation: Developing an extended model of the theory of planned behavior. International Journal of Hospitality Management. 29, 659-668.

Han, H., Hsu, L-T., Sheu, C., 2010. Application of the Theory of Planned Behavior to green hotel choice: Testing the effect of environmental friendly activities. Tourism Management. 31, 325-334.

Hee-Chan L, Hyun-Sun C.1999. Valuing environmental quality change on recreational hunting in Korea: A contingent valuation analysis. Journal of Environmental Management. 57, 11–20.

Huybers, T., Bennett, J. 2003. Environmental management and the competitiveness of nature-based tourism destinations. Environmental and Resources Economics. 24, 213-233.

Jones, N., Sophoulis, C.M., Malesios, M., 2008. Economic valuation of coastal water quality and protest responses: A case study in Mitilini, Greece. The Journal of Socio-Economics. 37, 2478-2491.

Kaiser, F.G., 2006. A moral extension of the theory of planned behavior: norms and anticipated feelings of regret in conservationism. Personality and Individual Differences. 41, 71-81.

Karpinnen, H., 2005. Forest owners' choice of reforestation method: an application of the theory of planned behavior. Forest Policy and Economics. 7, 393-409.

Khannaa, N., Plassmannb, F. 2004. The demand for environmental quality and the environmental Kuznets Curve hypothesis. Ecological Economics. 51, 225-236.

Weaver, D. B., Lawton, L.J., 2007. Twenty years on: The state of contemporary ecotourism research. Tourism Management. 28, 1168-1179.

Loomis, J.B., 1995. Four models for determining environmental quality effects on recreational demand and regional economics. Ecological Economics. 12, 55-65.

Marquez- Gonzalez, A., 2008. Cambio de uso del suelo y desarrollo turístico en Bahía de Banderas Nayarit. Ciencia UANL. XI(2), 161-168.

Márquez-González, A. R., Sánchez-Crispín, A., 2007. Turismo y ambiente: la percepción de los turistas nacionales en Bahía de Banderas, Nayarit, México. Investigaciones Geográficas, Boletín del Instituto de Geografía, UNAM. 134-152.

Martínez-Morales, M. A., 2005. Landscape patterns influencing bird assemblages in a fragmented neotropical cloud forest. Biological Conservation. 121, 117-126.

Meire, P.M., Dereu, J., 1990. Use of the abundance/biomass comparison method for detecting environmental stress: some considerations based on intertidal macrozoobenthos and bird communities. Journal of Applied Ecology. 27, 210-223.

Navrud, S., Mungatana, E.D., 1994. Environmental valuation in developing countries: The recreational value of wildlife viewing. Ecological Economics. 11, 135-151.

Padoa-Schioppa, E., Baietto, M., Massa, R., Bottoni, L., 2006. Bird communities as bioindicators: the focal species concept in agricultural landscape. Ecological Indicators. 6, 83-93.

Peh, K.S.H., de Jong, J., Sodhi, N.S., Lim S. L-H., Yap C. A-M., 2005. Lowland rainforest avifauna and human disturbance: persistence of primary forest birds in selectively logged forests and mixed-rural habitats of southern Peninsular Malaysia. Biological Conservation. 123, 489-505.

Pouta, E., Rekola, M., 2001. The theory of planned behavior in predicting willingness to pay for abatement of forest regeneration. Society and Natural Resources. 14 (2), 93-106.

Pouta, E., 2004. Attitude and belief questions as a source of context effect in a contingent valuation survey. Journal of Economic Psychology. 25, 229-242.

Scarpa, R., Hutchinson, W.G., Chiltond, S. M., Buongiornoe, J., 2000. Importance of forest attributes in the willingness to pay for recreation: a contingent valuation study of Irish forests. Forest Policy and Economics. 1, 315-329.

Scott, D. M., Brown, D., Mahood, S., Denton, D., Silburn, A., Rakotondraparany, F., 2006. The impacts of forest clearance on lizard, small mammals and bird communities in the arid spiny forest, southern Madagascar. Biological Conservation. 127, 72-87.

Shaw, D., 1988. On-site sample regression: Problems of non-negative integers, truncation, and endogenous stratification. Journal of Econometrics. 37, 211-223.

Spash, C. L., 2002. Informing and forming preferences in environmental valuation: coral reef biodiversity. Journal of Economic Psychology. 23, 665-687.

United Nations Environment Programme (UNEP), Convention on Migratory Species (CMS), 2006. Wildlife Watching and Tourism: A study on the benefits and risks of a fast growing tourism activity and its impacts on species. Bonn.

United States Fish and Wildlife Service, 2007. 2006 National Survey of Fishing, Hunting, and Wildlife-Associated Recreation. National Overview. United States Fish and Wildlife Service.

Vermeir, I., Verbeke, W. 2008. Sustainable food consumption among young adults in Belgium: Theory of planned behavior and the role of confidence and values. Ecological Economics. 64, 542-553.

Walker, T.R, Crittenden, P.D., Dauvalter, V.A, Jones, V., Kuhry, P., Loskutova, O., Mikkola, K., Nikula, A., Patova, E., Ponomarev, V. I., Pystina, T., Rätti, O., Solovieva, N., Stenina, A., Virtanen, T., Young, S. D., 2009. Multiple indicators of human impacts on the environment in the Pechora Basin, north-eastern European Russia. Ecological Indicators. 9, 765-779.

Wang, H., Mullahy, J., 2006. Willingness to pay for reducing fatal risk by improving air quality: A contingent valuation study in Chongqing, China. Science of the Total Environment. 367, 50-57.

Wang, Y., Zhang, Y-S., 2009. Air quality assessment by contingent valuation in Ji'nan, China. Journal of Environmental Management. 90, 1022-1029.

Wardman, M., Bristow, A. L., 2004. Traffic related noise and air quality valuations: evidence from stated preference residential choice models. Transportation Research. Part D. 9, 1-27.

Watson, J. E.M, R. J. Whittaker, R.J., Dawson, T. P., 2004. Habitat structure and proximity to forest edge affect the abundance and distribution of forest-dependent birds in tropical coastal forests of southeastern Madagascar. Biological Conservation. 120, 311-327.

Xu, F.L., Lamb, K.C., Zhaoa, Z.Y., Zhana W., Chenb D., Tao, S., 2004. Marine coastal ecosystem health assessment: a case study of the Tolo Harbour, Hong Kong, China. Ecological Modelling. 173, 355-370.