Mitigating Hypothetical Bias: An Application to Willingness to Pay for Beach Conditions Information

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Abstract

Hypothetical bias continues to be a challenge for practitioners of stated preference methods, and various remedies have been proposed to mitigate the problem. This paper presents the background, theory, and experimental design for testing two novel hypothetical bias mitigation treatments in the context of a contingent-valuation survey focused on a beach conditions monitoring service for Gulf Coast beachgoers. The two treatments proposed are: 1) a multiple-question budget and substitutes treatment, and 2) a cheap talk with confirmation treatment, to be tested both independently and in tandem. We present a theoretically-consistent model of budget-constrained utility maximization which accounts for the respondents" subjective probability of a good beach trip with and without the beach conditions information. Data are to be collected via an online referendum-style valuation questionnaire sent to a randomly-selected sample of Gulf Coast households. Along with referendum responses and subjective probabilities, other information elicited from the respondents will include beach visit frequency, beach activities engaged in, knowledge of existing monitoring services, and specific beach conditions of interest.

Introduction

A major challenge facing the contingent valuation method (CVM) is hypothetical bias, which is the difference between hypothetical and real-payment responses. In a CVM survey, respondents are presented a hypothetical scenario about the current state of a good and a proposed program affecting the state of the good, respondents are asked to make a decision as to whether he would be willing to pay for the program to be implemented. Hypothetical bias was first identified by Bohm (1972) in a study estimating the demand for public goods, where he identified a difference between actual and hypothetical willingness to pay (WTP) estimates. Some studies have been done to ascertain factors that influence hypothetical bias; examples include; List and Gallet (2001) who found that the degree of hypothetical bias was smaller for elicitation methods such as willingness to pay (WTP) relative to willingness to accept compensation (WTA), private relative to public goods, and first-price sealed bids relative to a second-price auction baseline. Little and Berrens (2004) and Murphy, Stevens, and Weatherhead (2005) disagreed with the conclusion that private goods had less hypothetical bias in their responses compared to public goods. Also, Ladenburg, Dahlgaard, and Bonnichsen (2011) and Mahieu (2010) found that gender and socioeconomic factors contribute significantly to the degree of hypothetical bias, whereas Mjelde et al. (2012) found that neither income nor gender affects the degree of hypothetical bias.

The objectives of this study, therefore, are 1) to test how the proposed hypothetical bias treatments affect responses in a CV survey; and 2) to determine those factors that affect consumer preferences for beach conditions information, including beach visit frequency, beach activities engaged in, knowledge of existing monitoring services and specific beach conditions of interest.

Background

Hypothetical Bias Mitigation

Various approaches have been designed to bring about convergence of hypothetical responses to real responses (Murphy, Stevens, and Weatherhead 2005). These approaches include cheap talk, budget and substitutes reminders, confirmation, certainty follow up; although none of these approaches has been identified as the most efficient (Champ, Moore, and Bishop 2009).

Cheap Talk is a non-binding statement included in a CVM survey that describes the issue of hypothetical bias to respondents before they are asked to answer the WTP question. Cummings and Taylor (1999) were the first to use cheap talk script, an *ex ante* approach to mitigate hypothetical bias in a CV survey. They found that responses from hypothetical valuation question with cheap talk were indifferent from the actual payments which implied that the cheap talk design was effective in mitigating hypothetical bias. Also, to test the strength of cheap talk in eliminating hypothetical bias Lusk (2003), used a mass mail survey and found that hypothetical WTP values decreased substantially with cheap talk script for respondents who were unknowledgeable about the good. Lusk and Hudson (2004) and List and Gallet (2001) also found that respondents who had experience with the good tend to give hypothetical estimates closer to the real estimate as compared to those with no experience with the good. Brown, Ajzen, and Hrubes (2003) and Murphy, Stevens, and Weatherhead (2005) found that cheap talk script was more effective in eliminating hypothetical bias when payment levels increases. Also, studies by Aadland and Caplan (2003) and Carlsson, Frykblom, and Lagerkvist (2005) found cheap talk script to yield hypothetical responses which are closer to the real responses. Aadland and Caplan (2006) concluded from their study that neutral cheap talk scripts results in the increase of hypothetical bias instead of reducing it. But Silva et al. (2011) argued differently that neutral cheap talk script was able to mitigate hypothetical bias. Penn and Hu (2018b) found that the cheap talk treatment is able to mitigate hypothetical bias more efficiently when used in conjunction with other mitigation approaches like budget and substitute reminder.

Budget reminder technique is also an *ex ante* approach included in the CV survey and is a statement which tells respondents to be mindful of their income and household budget before responding to the WTP question. Loomis, Gonzalez-Caba, and Gregory (1994) sought to find out if respondents consider their budget constraint and price of substitute goods in WTP surveys. They used two treatments; no budget and substitute reminder and budget and substitute reminder, to evaluate individuals WTP for western Oregon Forest fire reduction but found that both treatments gave identical average WTP values. Kotchen and Reiling (1999) included a substitute and budget constraint reminder in their CV study and also found that it did not have any effect on the average WTP estimate. Neill (1995) likewise found that budget constraint and substitute reminders were ineffective in mitigating hypothetical bias.

The confirmation approach, also known as the honesty and realism is an *ex ante* hypothetical mitigation approach that urge respondents to answer honestly by confirming that they would still pay the same stated hypothetical value for the good given a real situation. Some studies required respondents to swear to tell the truth, that is, state their true value for the good in the hypothetical scenario given them in the survey. Jacquemet et al. (2013) used three treatments which included hypothetical bidding, baseline oath and real bidding in second auction for dolphin protection and found that the oath treatment induced a more truthful response than both the hypothetical and real treatments.

Certainty follow up is an *ex post* hypothetical bias mitigation approach that is included in the survey after the WTP question, here respondents are asked to confirm how sure they are about their stated WTP value on a certainty scale. Champ et al. (1997) found that hypothetical bias can be reduced by measuring how sure respondents are about their WTP estimate on a certainty scale of 1 to 10. Studies done by Blumenschein et al. (1998), Blumenschein et al. (2001) and Johannesson et al. (1999) found that the certainty follow up question reduces the difference between the hypothetical and real responses. Penn and Hu (2018a) also found that certainty follow up approach mitigates hypothetical bias more than the cheap talk treatment.

Beach Valuation

Most valuation studies related to beaches have only concentrated on WTP for improvements in beach quality and factors affecting beach patronage but none have estimated the WTP value for access to beach conditions information for beach visit decisions. Murray, Sohngen, and Pendleton (2001) found that beachgoers who had access to beach conditions information spend less money on their beach trips since they make less bad beach trips. They also found that information on beach conditions affect beach patronage by beachgoers, but their study could not provide the WTP value of beach conditions information. Thus, this study seeks to provide monetary value of beach conditions information while mitigating hypothetical bias.

Theoretical Framework

Assume a utility-maximizing agent j subject to budget constraint that derives utility from beach trips B_j^i, at cost p_j, and a composite of all other goods and their prices, X_j^i, purchased with remaining income. Beach trips are risky goods; specifically, there is some probability that each trip will be a “good” trip, which is not resolved until after the trip has been taken. The agent holds their own subjective probability of a good trip, $0 \leq \pi_j^0 \leq 1$. Thus, the expected "quantity" of a "good" beach trip is $\pi_j^0 * B_j^0$. Additionally, the agent can purchase access to a beach monitoring service that provides information regarding conditions at the beach, at price t_j. The superscript i indexes the scenario with the purchase of the beach monitoring trip, $i=1$, and the scenario without such purchase, $i=0$. With this information from the monitoring service in hand, the agent can revise their subjective probability from π_j^0 to π_j^1, where $\pi_j^1 \geq \pi_j^0$. The number of beach trips taken can change depending on the presence or absence of the information from the monitoring service. For example, some individuals may react to the new information by taking more or fewer trips, perhaps more "good" trips and fewer "bad" trips, with the net change in number of trips specific to the individual. Alternatively, some individuals may take the same number of trips, but given the new information, change the timing, location, and/or other details of those trips.

The constrained utility maximization problem is thus:

$$\max_{B,X} \left\{ U_j = U_j \left(\pi_j^i B_j^i, X_j^i \right) \right\}$$
$$s.t.$$
$$p_j B_j^i + it_j + X_j^i = Y_j$$

This yields the optimal number of beach trips, $B_j^i * = B_i^j (\pi_j^i, p_j, it_j, Y_j)$, from which the optimal level of the composite good can be calculated as $X_j^i * = Y_j - it_j - p_j B_j^i *$, for $i = 0,1$.

Using the above and following Haab and McConnell (2002), the indirect utility, i.e., the maximum utility achievable as a function of prices and income (Varian 1992), for the two scenarios, with or without the monitoring service, is given as:

$$
\begin{aligned}
V_j^1 &= V_j^1(Y_j - t_j - p_j B_j^{1*},\ \pi_j^1, \mathbf{Z}_j,\ \varepsilon_{1j}) \\
V_j^0 &= V_j^0(Y_j - p_j B_j^{0*},\ \pi_j^0, \mathbf{Z}_j,\ \varepsilon_{0j})
\end{aligned},
$$

where $\mathbf{Z}_j$ is a vector of observable household characteristics, attributes of the choice, and variations in questionnaire; and ε_{ij} is independently and identically distributed (iid) individuals preferences unobserved by the researcher.

From the model, when utility from the scenario with the CV policy implemented with a net required payment, t_j, is greater than the utility from the status quo,

$$
V_j^1(Y_j - t_j - p_j B_i^{j*},\ \pi_j^1, \mathbf{Z}_j,\ \varepsilon_{1j}) > V_j^0(Y_j - p_j B_j^{0*},\ \pi_j^0, \mathbf{Z}_j,\ \varepsilon_{0j})
$$

then it implies that the j^{th} respondent chooses “yes” as the appropriate response to the CV referendum. The random component ε_{ij} is assigned with only probability statements about yes or no responses, since it is unknown to the researcher. Respondents probability of yes response signify that he thinks he is better off with the proposed service despite the made required payment, thus $V^1 > V^0$, which yield the following probability:

$$
\Pr[\text{Yes}_j] = \Pr\left[V_j^1(Y_j - t_j - p_j B_j^{1*},\ \pi_j^1, Z_j,\ \varepsilon_j^1) > V_j^0(Y_j - p_j B_j^{0*},\ \pi_j^0, Z_j,\ \varepsilon_j^0)\right],
$$

which is general for parametric estimation.

Assuming a reduced-form, linear utility function, the deterministic component of preferences is linear in covariates and income:

$$
V_j^i = \boldsymbol{\alpha}^i \mathbf{Z}_j + \delta^i \pi_j^i + \beta^i\left(Y_j - t_j - p_j B_j^i\right) + \varepsilon_j^i,
$$

where α, δ, and β parameters to be estimated. Thus, the deterministic utility for the contingent valuation scenario when the individual purchase the beach information service is:

$$V_j^1 = \boldsymbol{\alpha}^1 \mathbf{Z}_j + \delta^1 \pi_j^1 + \beta^1 \left(Y_j - t_j - p_j B_j^1 \right) + \varepsilon_j^1$$

The utility for the status quo, that is, when individual do not purchase the beach information service is

$$V_j^0 = \boldsymbol{\alpha}^0 \mathbf{Z}_j + \delta^0 \pi_j^0 + \beta^0 \left(Y_j - p_j B_j^0 \right) + \varepsilon_j^0$$

The change in deterministic utility is then:

$$V^1 - V^0 = (\boldsymbol{\alpha}^1 - \boldsymbol{\alpha}^0)\mathbf{Z}_j + (\delta^1 \pi_j^1 - \delta^0 \pi_j^0) + \left[\beta^1 \left(Y_j - t_j - p_j B_j^1 \right) - \beta^0 \left(Y_j - p_j B_j^0 \right) \right] + (\varepsilon_j^1 - \varepsilon_j^0)$$

Assuming that marginal utility of income is constant across the two scenarios, i.e., that price t_j is negligible relative to income, then we have $\beta^0 = \beta^1 = \beta$, the utility difference becomes

$$V^1 - V^0 = (\boldsymbol{\alpha}^1 - \boldsymbol{\alpha}^0)\mathbf{Z}_j + (\delta^1 \pi_j^1 - \delta^0 \pi_j^0) + \left[\beta p_j \left(B_j^0 - B_j^1 \right) - \beta t_j \right] + (\varepsilon_j^1 - \varepsilon_j^0)$$

Further, assuming that the marginal utility of the probability of a good trip is unchanged between the two scenarios, we have $\delta_j^1 = \delta_j^0 = \delta_j$, and the expression simplifies further to:

$$V^1 - V^0 = (\boldsymbol{\alpha}^1 - \boldsymbol{\alpha}^0)\mathbf{Z}_j + \delta_j (\pi_j^1 - \pi_j^0) + \left[\beta p_j \left(B_j^0 - B_j^1 \right) - \beta t_j \right] + (\varepsilon_j^1 - \varepsilon_j^0)$$

Defining $\boldsymbol{\alpha}^1 - \boldsymbol{\alpha}^0 \equiv \boldsymbol{\alpha}$, and $\varepsilon_j \equiv \varepsilon_j^1 - \varepsilon_j^0$, and recognizing that $\pi_j^1 - \pi_j^0$ is the difference in subjective probability between the two scenarios, and labeling the difference as $\Delta \pi_j = \pi_j^1 - \pi_j^0$, we have:

$$V^1 - V^0 = \boldsymbol{\alpha}\mathbf{Z}_j + \delta\Delta\pi_j + \beta p_j\left(B_j^0 - B_j^1\right) - \beta t + \varepsilon_j$$

Hence the probability of a „yes" response is;

$$\Pr\left(yes_j\right) = \Pr\left(\alpha\mathbf{Z}_j + \delta\Delta\pi_j + \beta p_j\left(B_j^0 - B_j^1\right) - \beta t + \varepsilon_j > 0\right)$$

We then make assumptions about the error term to estimate the difference in utility parameters. Which are ε_j is independently and identically distributed (iid) with a zero mean signifying the normal and logistic distributions which are both symmetric. Therefore, the probability that the j^{th} respondent selecting a yes response can be calculated as,

$$\begin{aligned}\Pr(\alpha\mathbf{Z}_j + \delta\Delta\pi_j + \beta p_j\left(B_j^0 - B_j^1\right) - \beta t + \varepsilon_j > 0) &= \Pr\left[-(\alpha\mathbf{Z}_j + \delta\Delta\pi_j - \beta t_j + \left[B_j^0 - B_j^1\right]\beta p_j)\right] < \varepsilon_j \\ &= 1 - \Pr\left(-(\alpha\mathbf{Z}_j + \delta\Delta\pi_j - \beta t_j + \left[B_j^0 - B_j^1\right]\beta p_j) > \varepsilon_j\right) \\ &= \Pr\left(\varepsilon_j < \alpha\mathbf{Z}_j + \delta\Delta\pi_j - \beta t_j + \left[B_j^0 - B_j^1\right]\beta p_j\right)\end{aligned}$$

Converting the error term from normal distribution $\varepsilon \sim N\left(0, \sigma^2\right)$ to a standard normal distribution $\varepsilon \sim \left[N(0,1)\right]$ where $\theta = \frac{\varepsilon}{\sigma}$ then $\theta \sim N(0,1)$ and

$$\begin{aligned}\Pr\left(\varepsilon_j < \alpha\mathbf{Z}_j + \delta\Delta\pi_j - \beta t_j + \left[B_j^0 - B_j^1\right]\beta p_j\right) &= \Pr\left[\theta < \frac{\alpha Z_j}{\sigma} + \frac{\delta\Delta\pi_j}{\sigma} - \frac{\beta}{\sigma}t_j + \frac{\left[B_j^0 - B_j^1\right]\beta p_j}{\sigma}\right] \\ &= \Phi\left[\frac{\alpha Z_j}{\sigma} + \frac{\delta\Delta\pi_j}{\sigma} - \frac{\beta}{\sigma}t_j + \frac{\left[B_j^0 - B_j^1\right]\beta p_j}{\sigma}\right]\end{aligned}$$

which implies probit model and Φ is the cumulative standard normal

The discrete choice model is used to predict the choice between two discrete alternatives such as „to pay" or „not to pay" for a commodity. When the dependent variable is dichotomous in nature (that is „yes" or „no"), the binary logit and probit regression models are used to predict the probability of a „yes" response to the WTP.

The dichotomous choice CV study will calculate the willingness to pay estimate and the effects of covariates on the WTP. The WTP is a function of the estimated parameters, the chosen covariates and random component assumed for preferences. Thus the WTP is the maximum monetary value which ensures that the individual is indifferent between the proposed CV scenario and the status quo and it is mathematically defined as:

$$\boldsymbol{\alpha}^1\mathbf{Z}_j + \delta^1\pi_j^1 + \beta^1\left(Y_j - WTP_j - p_jB_j^1\right) + \varepsilon_j^1 = \boldsymbol{\alpha}^0\mathbf{Z}_j + \delta^0\pi_j^0 + \beta^0\left(Y_j - WTP_j - p_jB_j^0\right) + \varepsilon_j^0$$

Solving the equation for WTP yields:

$$WTP_j = \frac{(\boldsymbol{\alpha}^1 - \boldsymbol{\alpha}^0)\mathbf{Z}_j + \delta^1\pi_j^1 - \delta^0\pi_j^0 + (\beta^1 - \beta^0)Y_j + (\beta^0B_j^0 - \beta^1B_j^1)p_j + \varepsilon_j^1 - \varepsilon_j^0}{\beta^1}$$

And applying the aforementioned assumptions, simplifies to:

$$WTP_j = \frac{\boldsymbol{\alpha}\mathbf{Z}_j + \delta\Delta\pi_j + \beta p_j(B_j^0 - B_j^1) + \varepsilon_j}{\beta} = \frac{\boldsymbol{\alpha}\mathbf{Z}_j + \delta\Delta\pi_j}{\beta} + p_j(B_j^0 - B_j^1) + \frac{\varepsilon_j}{\beta}$$

Thus, WTP works out to be the standard expression, $\frac{\boldsymbol{\alpha}\mathbf{Z}_j}{\beta}$, but with the term for the effect of the change in subjective probability added to the numerator, i.e., added to the list of exogenous explanatory variables (and for those for whom subjective probability is unaffected, the term drops out completely), and a new term that shifts WTP up or down by the individual"s total change in cost for the resulting change in trips. If an individual"s number of trips does not change between the two scenarios, then WTP simplifies to the usual (modified) expression.

Figure 1 shows that at the status-quo or before the project, the individual has an initial budget line x with initial utility level, U_0, where π_j^0 is the individual *j's* subjective probability of a good beach trip before introduction of the service. B_j is also the total number of beach trips. The status-quo thus yields an optimal number of good beach trips as $\pi_j^0 B_j$. With the introduction of the beach conditions information service, the individual *j's* subjective probability of good trips is expected to increase from π_j^0 to π_j^1 thus decreasing the effective price of good trips, which implies that at the same cost, p_j and income level Y the individual will be able to purchase more beach trips that is from, $\frac{Y\pi_j^0}{p_j}$ to $\frac{Y\pi_j^1}{p_j}$. Thus, budget line x rotates to a new budget line y still at a fixed income level of Y hence yielding a new and greater indifference curve U_1. Individual j does not have property right to good beach trips hence the compensating variation (CV) is used to measure his maximum WTP in order to keep him on the initial indifference curve U_0. The CV is then measured by shifting back the new budget line y until it is tangent to the old indifference curve U_0, and measuring this new height along the income level, that is point Y to Z on the y-axis.

Experimental Design

A survey questionnaire has been designed to estimate the WTP value of an online service to monitor beaches conditions in the 5 Gulf Coast states which are: Alabama, Florida, Louisiana, Mississippi, and Texas. The survey asks respondents to choose (hypothetically) whether or not they were willing to pay the specified amount in the survey for the provision of an online service which will monitor Gulf Coast beach conditions. The first part of the survey gives a brief introduction about the purpose of the survey and also identifies the target population; that is beachgoers who have visited a Gulf coast beach in the past twelve months hence respondents who had not visited a Gulf coast beach in the last twelve months will be dropped out of the study. They are also asked to select the specific beaches in the 5 Gulf states they have visited in the last twelve months. After which respondents are asked the number of trips they made to each particular beach and whether they were day or night trips. Other questions include: type of activities they engaged in at these beaches, their knowledge about existing online monitoring services, beach conditions they are interested in, whether or not they are willing to pay a specified monthly subscription fee for the online service, how certain they are about their WTP decision. Cheap talk with confirmation script and budget and substitute reminder are also included in the survey. The survey also lists all the beaches in the 5 Gulf Coast states which have been proposed for the online monitoring service; 6 new beaches in Alabama, 6 new beaches in Louisiana, 6 new beaches in Mississippi, 20 new beaches in Texas, and 10 additional beaches in Florida. We define A „Gulf Coast beach" in the survey as any beach along the Gulf of Mexico in one of the 5 Gulf Coast states, which include: Alabama, Florida, Louisiana, Mississippi, and Texas. There will be 20 different versions of the survey based on the combinations of the five different monthly subscription fees ($1, $5, $10, $15, $20) and the four different treatments (control, budget and substitute reminder, cheap talk with confirmation, budget and substitute and cheap talk).

Questions that test the different treatments as well as respondents" subjective probability of a good beach trip before and after the implementation of the beach monitoring online service and their travel cost are included in the survey as follows.

Budget and substitute treatment question:

> *We would like to know whether you would be willing to pay for this service if the subscription fee were $X per month. But before you answer, think about your budget,*

whether you could afford it, and about the other things you could spend this money on instead. Think also about other ways you might access the same or similar information without having to pay for this service. So thinking about your budget, is this really affordable for you?

Cheap talk with confirmation treatment question:

Also, when answering questions like this, some people say Yes even though they are not very sure whether they would actually pay for it. This is called "Hypothetical Bias". Even though you are not actually paying for the program today, we would like you to answer the way you would IF YOU ACTUALLY DID HAVE TO PAY FOR IT TODAY. Please confirm that you will answer the way you would if you actually did have to pay for it today.

To measure respondents WTP for the beach conditions information the question below will be asked:

So, based on what we've told you about the beach conditions monitoring service, if it were available, do you think you would pay the $ per-month fee to access it during <u>at least one month</u> out of a typical year?
Remember: you could pay for access for as much as 12 months out of the year or as few as zero months out of the year, but we'd like to know if you would pay for it <u>at least one month</u> out of a typical year.

Uncertain-voter follow-up vote question:

On a scale from 1 to 10, how sure are you about your answer? (1 is Not at all Sure and 10 is Very Sure)

To measure respondent‟s subjective probability that their beach trip will be a good one before the introduction of the beach conditions monitoring service website the question below will also be asked:

1. *Some trips to the beach we might call "good" trips: the weather is good, it is not too crowded, the water is clean and not too rough, and so on. But other trips, for one reason or another, we might call "bad" trips. Out of 10 trips to the beaches that you usually visit, how many would you typically expect to be "good" trips?*
2. *Do you think using the beach monitoring service would increase your chances for a "good" beach trip?*

Respondents who answer „Yes‟ to question 2 above will be also asked to provide their expected probability of a good beach trip assuming the beach monitoring service is implemented in the question below:

> *Out of 10 trips to the beach, how many would you typically expect to be "good" trips if you had access to the beach monitoring service?*

To also estimate the travel cost of respondents‟ beach trip, respondents‟ mode of transformation and number of people respondents made the beach trip with, will also be solicited as shown below:

1. *How did you travel from your home to the beach on your **most recent** trip?*
2. *On your **most recent** trip, how many other people in your household went on this trip? (Do not count yourself.)*

Also, some other variables of interest that will be collected from respondents with the survey instrument are shown in Table 1.

Data Collection

Data are being collected with the single dichotomous choice technique through an online survey approach. GfK Custom Research has been contacted to administer the survey to their Knowledge Panel located in the 5 Gulf Coast states. The survey has been pretested to check bad question logic, typos, wrong question wordings, formats, clarity, understanding of questions etc. The survey will be sent out to a sample of 3,698 GfK Knowledge Panel members- a nationally representative and probability based online panel in the five Gulf Coast states, with their response rate of 85% and an incidence rate of 35% representing the rate of respondents who have visited a Gulf Coast beach, a total of at least 1100 respondents are expected to send back completed surveys. The sample will be drawn according to relative population shares of the 5 Gulf Coast states and then randomly selected from each of the respective proportion, though this is not strictly stratification by state it will be sufficient for our study since the sample will be representative of our population. The sample represents beachgoers who are over 17 years old and have visited a Gulf Coast beach in the past 12 months.

Results and Conclusion

The above is a framework to carry out the research on how hypothetical bias will be mitigated in a WTP for beach conditions information among beachgoers in five Gulf Coast states. Thus with data in hand the study will also be able to address how respondents‟ age, gender, race, educational level, income level, frequency of beach trips, most visited beaches, beach activities engaged, current knowledge about existing online services and beach conditions respondents are interested in; affect their willingness to pay. The study will provide the public monetary value of beach condition information for Bureau of Ocean Energy Management, Gulf of Mexico Coastal Ocean Observing Systems.

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Table 1: Summary of supporting information to be collected in the survey instrument

Variables
Age
Gender
Race
Educational level
Income level
Beach activities engaged
Beach conditions interested in
Frequency of beach trips
Knowledge of online service
Most visited beaches
Response to WTP
Travel cost
Prior subjective probability of good beach trip
Post subjective probability of good beach trip

Figure 1: Compensating Surplus Measure