

# Contingent Valuation and Lost Passive Use: Damages from the Exxon Valdez Oil Spill



# 1) Introduction

- Prior to the Exxon Valdez oil spill, the estimation of passive use value, was an area of economic research not well known.
- However, based on a belief that the State of Alaska and the Federal Government intended to litigate a natural resource damage claim for lost passive use values, the attention paid to the conceptual underpinnings and estimation techniques for the passive use value changed rather abruptly.

## Passive Use

- Also known as the nonuse or existence value.
- Passive use entails no direct involvement with natural resources.

## Contingent Valuation

Is a survey approach designed to create the missing market for public goods by determining what people would be willing to pay (WTP) for specified changes in the quantity or quality of such goods, or, more rarely what they would be willing to accept (WTA) in compensation for well-specified degradations in the provision of these goods.

## 2) Survey Design and Development

The research goal was to develop a valid survey instrument to measure lost passive uses due to the natural resource injuries caused by the Exxon Valdez oil spill.

### Objectives of the Survey:

- 1) To measure only a defined set of injuries.
- 2) To ensure consistency with the economic theory.
- 3) Comprehensible (Respondents should be able to comprehend the language, concepts and questions used in the survey).
- 4) Plausible (scenario and the payment vehicle should be believable).
- 5) Neutral (wording and information should not promote the interest of any party).
- 6) Conservative in estimating WTP (e.g., don't know = \$0; no photos of oiled birds)

# Key Design Issues

- The choice of the elicitation method – Binary discrete choice
- The nature of the payment vehicle – higher taxes, higher oil prices, and higher prices over a wide range of goods. Higher taxes was chosen
- The years over which the payment will be collected – longer payment periods, periodic payments, multiple year plan payments, lump-sum payments. Lump sum payment

### 3) Structure of the Final Questionnaire

The questionnaire was used as one of the main tools in the Contingent Valuation survey.

- Initial Questions - used to measure respondents' attitudes about various types of public goods and their prior awareness of the spill
- Prince William Sound Description – gave respondents a clear picture of where the spill occurred
- Description of Wildlife – addressed the effect of the spill on the wildlife
- Explanation of the Escort Ship Plan – introduced the concept of a possible second spill
- Valuation Questions – willingness to pay

# 4) Survey Execution

- 61 counties sampled.
- 334 Census blocks.
- 1,600 dwelling units.
- 75.25 response rate



# 5) Results

## Willingness to Pay Questions:

- The percentage responding with a “for” vote declined as the amount the respondents was asked to pay increased, dropping from 67% in favor at \$10 to 34% at \$120.

## The Turnbull's distribution yields these results:

- 29% of the respondents fall into the interval \$0 to \$5, and less than 9% are willing to pay over \$250, and the median falls into the interval \$30 - \$60.
- The mean WTP is equal to or greater than \$53.60.

## The Weibull distribution yields these results:

- Estimated a \$30 dollar median and a \$97 dollar mean.
- Allowing for spike at zero, the model improves the fit by placing 20.6% of the respondents at 0 and reduces the estimated mean to \$79.20 with a 95% confidence interval of [\$67.93 - \$90.47]

# Valuation Function

A valuation function is a statistical way to relate respondents' WTP to their characteristics. The respondent's WTP or an indicator of that WTP is regressed on the respondents characteristics such as income and on preferences relevant to the good being valued.

A valuation is estimated in several steps:

- 1) Observations with missing values in predictor variables must be either imputed or dropped from any estimation using that variable, a generally undesirable option.
- 2) The variables to include in the valuation function must be determined
- 3) The valuation function maybe used to make adjustments to WTP estimates.

# Adjustment and sensitivity analysis

The valuation function estimated above allows for the examination of the effect that various adjustments have on the median WTP.

## Adjustment 1

Corrects for respondents assumptions inconsistent with 3 important features of the scenario.

- ❑ Reduces the estimate of the median household WTP from \$30 to \$42

## Adjustment 2

Is for the perceived effectiveness of the escort ship plan.

- ❑ Changes the estimate of the median WTP from \$30 to \$42.

## Adjustment 3

Is for protest responses.

(how to exactly define a protest response).

- ❑ Changes the estimate of the median WTP from \$30 to \$37

**\*Making all 3 adjustments at the same time yields an estimate of \$48.**

# Sensitivity Analysis

The examination of the sensitivity estimates were as follows:

- Using only A-15 response (rather than using the response of the other questions) since the other responses may introduce a bias.
- To drop the respondents from the sample who may not have clearly understood the CV scenario posed to them.
- To look at the sponsor question
- Consideration of how stable the estimates of the WTP distribution are over time.

# Aggregate Lost Passive Use Value

- The original study reported an estimate of \$2.8 billion dollars as the lower bound on the estimate lost passive values.
- If one employs the Turnbull density parameters to estimate the mean WTP aggregate lost passive use is 4.87 billion dollars.
- Weibull distribution yield on estimate of 7.19 billion dollars.

# Conclusion

The Exxon Valdez case represented a quintessential case in which to ignore passive use values effectively said that resources the public had chosen to set aside and not develop could be harmed at little or no cost.

The State of Alaska and the U.S. Government settled their lawsuit against Exxon for 1 billion dollars in natural resources damage and restitution for injuries. In addition Exxon spent over 2 billion dollars on oil spill response and restoration.

The debate over the CV measures or passive use and their role in assessment of natural resource damages and public decision making has become a major topic removed by the passage of the U.S. Oil pollution Control Act of 1990 removed any ambiguity and came down clearly on the side of including the passive use in assessing damages.