Assignment 3

## Part 1. Analyzing costs and benefits of a VSR program

### 1. Linear Probability Model

Interpreting the coefficients:

1. Age to 30 are 0.0204401 are less likely to vote YES than age over 60.
2. Age to 40 individuals are 0.0201190 more likely to vote YES than age over 60.
3. Age to 50 individuals are 0.0099816 more likely to vote YES than age over 60.
4. Age to 60 are 0.0162261 are less likely to vote YES than age over 60.
5. Individuals in the top one percent income category are 0.0088282 more likely to vote YES than individuals in the middle income class.
6. Individuals in the poor income category are 0.0027386 more likely to vote YES than inidividuals in the middle income category.
7. Individuals in the rich income category are 0.0074891 more likely to vote YES than inidividuals in the middle income category.
8. Individuals in the very rich income category are 0.0467922 more likely to vote YES than inidividuals in the middle income category.
9. For every additional point increase for NEP score, there is an increase in probability of voting YES by 0.0158639.
10. For every $1 increase in annual payment for a household (bid), there is a decrease in probability of voting YES by 0.0010699.
11. For every 1% increase in risk reduction, there is an increase in probablility of voting YES by 0.0007445.

### 2. Value of a single prevented whale death

**The Bid when reduction is 0%. The average vote between 0 (no) and 1 (yes) is 0.5.**

**The Bid when reduction is 4%.**

**The value of a single whale is the difference between the willingness to pay (i.e.Bid) for a vessel speed reduction program at 4% and at 0%.**

### 3. Estimated Willingness to Pay for three arbitrary respondents for 60% risk reduction VSR program.

**Three arbitrary respondents:**

* 8 NEP: 29 Income: Very Rich Age: To Thirty Vote: 1
* 63 NEP: 37 Income: Rich Age: Over Sixty Vote: 1
* 7 NEP: 22 Income: One Percent Age: To Forty Vote: 0

**Willingness to Pay for 60% risk reduction program:**

Individual 8:

Individual 63:

Individual 7:

### 4. Willingness to Pay for 60% risk reduction VSR program among average Santa Barbara households.

The probability of voting yes with the average of a yes vote (). We will use the mode income (one percent), the mode age (to 30), and average NEP (38.366) to calculate willingness to pay using:

### 5. Total Benefit of a VSR program for 150,000 households in Santa Barbara County

Calculate the Total Benefits using the following equation:

### 6. Do the benefits of the VSR program outweigh the costs?

* Costs of VSR program = $7 million
* Total benefits to Santa Barbara households = $42378337

## Part 2. Evaluating the costs and benefits of carbon trading markets to mitigate fatal whale strikes

### 7. At what price will the shipping industry decide to adopt the VSR for purely self-interested reasons?

The shipping industry wants the price per ton of carbon credits to equal the cost of 60% risk reduction at $1000. The amount of fewer emitted tons multiplied by the price per ton should equal $1000.

### 8a. Approximately how many whales would be saved if all ships voluntarily adopted the VSR?

If 5 whales are saved with a 20% risk reduction program, then a 60% risk reduction program would save aproximately 3 times that amount of whales, equaling 15 whales saved.

### 8b. What would be the social value of allowing ships to enter the carbon trading market?

The social value of the carbon trading market would be the total benefits minus the costs of the program. If the ships are voluntarily reducing speed, then the $7 million costs are avoided. Therefore, the social value of allowing ships to enter the carbon trading market will be the Total Benefit calculated from problem 5.

Social value = 42378337