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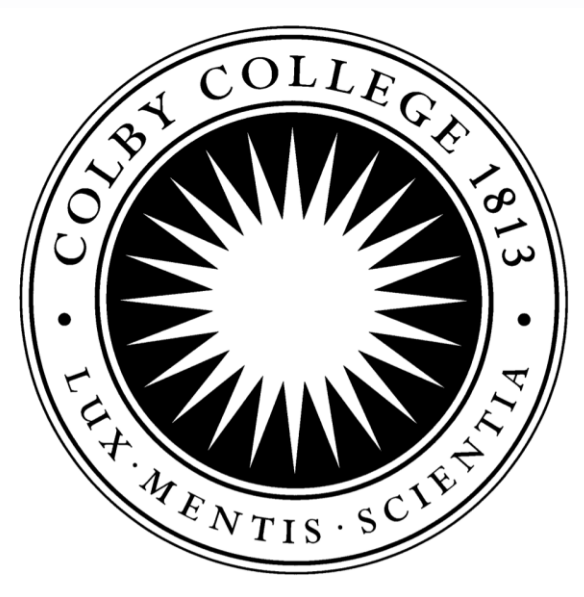
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# Preferences for Eco-labels in Seafood and Underutilized Fish



Xiaojie Chen '16, Department of Economics Colby '16

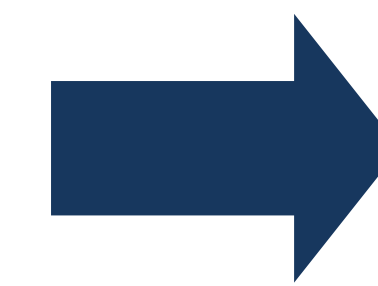
Faculty Advisors: **Sahan T. M. Dissanayake**, Department of Economics; **Loren McClenachan**, Department of Environmental Studies

Student Collaborators: Liz McCormick '15, Gaby Carpenter '16, Siena Schickler

## 1. Introduction

### Problem

The alarming decline of the global fishing economy has led to an increased recognition for the need to relieve pressure from the few commercially marketed and heavily overfished stocks, while regaining economic stability for struggling fishing communities.



### Solution

Shifting consumer demand toward seafood that is sustainably and locally harvested improves the wellbeing of fish stocks and coastal communities.

### But

Lack of transparency in the seafood supply chain is a severe impediment to consumer-driven solutions.

### A Solution

Proposed by fishery organizations is to use a variety of "eco-labels" that help describe the types of sustainability of different seafood choices.

### Types of Sustainability

| Ecological Sustainable                                   | Local                               | Social Sustainable                                   |
|--|-------------------------------------|--|
| *Able to maintain the fish population at a certain level | *Gulf of Maine                      | *Fisherman participation in decision-making          |
| *Minimal Environmental Impact                            | *100 miles from the survey location | *Economics and community development                 |
|  |                                     | *Equitable profit and benefits for fishing community |

## 2. The Research Questions

1. What is consumers' willingness to pay for sustainable seafood?
2. Are consumers more concerned with sustainability of target stocks or the livelihoods of local fishermen?
3. To what degree does official certification matter? Are consumers willing to pay more for seafood that are certified by an organization?

## 3. Methods

### Choice Experiment Survey

- Survey was distributed to visitors and residents of coastal Maine in the summer and fall of 2014
- Two set of short questions, eight choice questions, and a set of demographic questions
- Each choice question asked participants to choose between two restaurants based on sustainability labels

### Analysis

- Conditional logistic and mixed logistics models were used to estimate the log odd and calculate the willingness of the eco-labels
- Added interaction effect to examine difference in willingness to pay based on different demographic information

## 4. Results

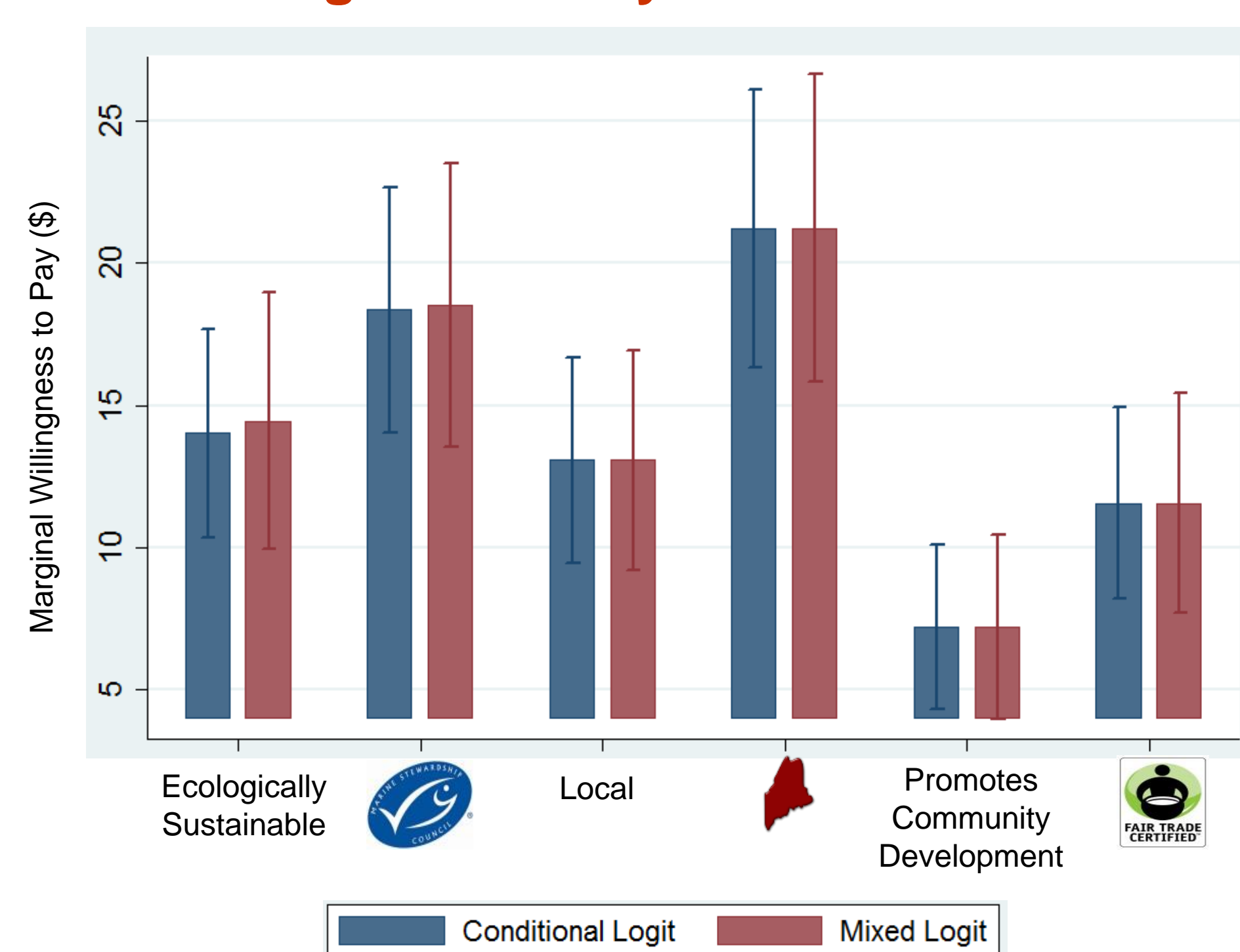
$$V_{ni} = \beta_1 X_{Ecological\ Sustainable} + \beta_2 X_{MSC} + \beta_3 X_{Local} + \beta_4 X_{Gulf\ of\ Maine} + \beta_5 X_{Promotes\ Community\ Development} + \beta_6 X_{FairTrade} + \beta_7 X_{cost} + \beta_8 ASC + \epsilon_{ni}$$

|  | Conditional Logit     | Mixed Logit           | Mixed Logit Familiarity Interaction |
|--|-----------------------|-----------------------|-------------------------------------|
| Cost   | -0.0694***<br>(-9.27) | -0.0702***<br>(-8.32) | -0.0706***<br>(-7.21)               |
| Ecological Sustainable                         | 0.972***<br>(10.26)   | 1.014***<br>(8.72)    | 0.772***<br>(5.72)                  |
| MSC Certified                                  | 1.273***<br>(12.31)   | 1.298***<br>(11.32)   | 1.327***<br>(10.97)                 |
| Local  | 0.907***<br>(9.48)    | 0.917***<br>(8.76)    | 1.075***<br>(7.35)                  |
| Gulf of Maine                                  | 1.471***<br>(13.83)   | 1.488***<br>(12.44)   | 1.682***<br>(9.95)                  |
| Promotes Community Development                 | 0.501***<br>(5.12)    | 0.505***<br>(4.71)    | 0.382***<br>(2.81)                  |
| Fairtrade Certified                            | 0.802***<br>(8.51)    | 0.811***<br>(7.60)    | 0.823***<br>(5.63)                  |
| ASC  | 1.446***<br>(6.82)    | 1.437***<br>(6.04)    | 1.452***<br>(5.68)                  |
| Restaurant Respondent X cost                   |                       |                       | -0.00160<br>(-0.19)                 |
| MSC X MSC Familiarity                          |                       |                       | -0.109<br>(-0.42)                   |
| Gulf of Maine X Maine Resident                 |                       |                       | -0.225<br>(-1.12)                   |
| Fairtrade X Fairtrade Familiarity              |                       |                       | 0.0366<br>(0.22)                    |
| Ecological Sustainable X Understand ES         |                       |                       | 0.456***<br>(2.65)                  |
| Local X Maine Resident                         |                       |                       | -0.289<br>(-1.64)                   |
| Promotes Community Development X Understand CD |                       |                       | 0.277*<br>(1.71)                    |
| N  | 4227                  | 4227                  | 4173                                |

t statistics in parentheses  
\* p<.1, \*\* p<.05, \*\*\* p<.01

|   | Mixed Logit Demographic |
|---|-------------------------|
| Cost                                    | -0.0820***<br>(-4.32)   |
| Ecological Sustainable                  | 1.036***<br>(8.74)      |
| MSC Certified                           | 1.296***<br>(10.37)     |
| Local                                   | 0.999***<br>(8.43)      |
| Gulf of Maine                           | 1.559***<br>(11.85)     |
| Promotes Community Development          | 0.484***<br>(4.09)      |
| Fairtrade Certified                     | 0.754***<br>(6.52)      |
| ASC                                     | 1.931***<br>(5.96)      |
| Restaurant Respondent X Cost            | -0.00792<br>(-0.71)     |
| Cost X Ate Within Last Hour             | -0.00863<br>(-0.71)     |
| Cost X Ate Seafood Within Last Week     | -0.0363***<br>(-2.69)   |
| Cost X Frequent Farmer's Market Visitor | 0.0327***<br>(3.03)     |
| Cost X Male                             | -0.0190*<br>(-1.74)     |
| Cost X Bachelor or Higher               | -0.00812<br>(-0.65)     |
| costXage30to40                          | -0.0233<br>(-1.29)      |
| costXage40to50                          | 0.00886<br>(0.41)       |
| costXage50to60                          | -0.0181<br>(-1.05)      |
| costXage60more                          | 0.0112<br>(0.66)        |
| costXincome25kto50k                     | 0.0219<br>(1.27)        |
| costXincome50kto100k                    | 0.0650***<br>(3.62)     |
| costXincome100kmore                     | 0.0659***<br>(3.15)     |
| N                                       | 3435                    |

### Willingness to Pay for Main Effects



### Numeric Value for Willingness to Pay

|                                | Conditional Logit  | Mixed Logit        |
|--------------------------------|--------------------|--------------------|
| Ecological Sustainable         | 14.01***<br>(7.48) | 14.45***<br>(6.30) |
| MSC Certified                  | 18.34***<br>(8.35) | 18.51***<br>(7.31) |
| Local                          | 13.07***<br>(7.07) | 13.06***<br>(6.65) |
| Gulf of Maine                  | 21.19***<br>(8.52) | 21.21***<br>(7.70) |
| Promotes Community Development | 7.215***<br>(4.89) | 7.192***<br>(4.35) |
| Fairtrade Certified            | 11.56***<br>(6.75) | 11.56***<br>(5.86) |
| N                              | 4227               | 4227               |

t statistics in parentheses  
\* p<.1, \*\* p<.05, \*\*\* p<.01

## Attribute Levels

| Attribute                 | Labels   |
|---------------------------|--|
| Ecological Sustainability | 1) Ecologically Sustainable<br>2) Marine Stewardship Council (MSC) Certified |
| Origin                    | 1) Local<br>2) From Gulf of Maine  |
| Socioeconomic Benefit     | 1) Promotes Community Development<br>2) Fair Trade Certified                 |

- Each attribute is divided into an ambiguous label and a specific label

## Choice Questions

Survey 1 Question 1

Imagine you are choosing between Restaurant A and Restaurant B for dinner. Assume these two restaurants are identical except for their eco-labels. Please read all the features of each restaurant carefully and then check the box that represents your choice. If you do not like Restaurant A or Restaurant B, please choose Restaurant C for "Neither".

|                    | Ecological Sustainability         | Origin                 | Socioeconomic Benefit          | Average Cost Per Dish | I Would Choose             |
|--------------------|-----------------------------------|------------------------|--------------------------------|-----------------------|----------------------------|
| Restaurant A       | MSC Certified                     | Local                  | Promotes Community Development | \$30                  | <input type="checkbox"/> A |
| Restaurant B       | Ecologically Sustainable          | From the Gulf of Maine | Fair Trade Certified           | \$25                  | <input type="checkbox"/> B |
| Neither Restaurant | Choose Neither of the Restaurants |                        |                                | \$0                   | <input type="checkbox"/> C |

## 5. Conclusions

- ❖ For each attribute, respondents are willing to pay more for certified label than its ambiguous counterpart
- ❖ People have a good understanding ecological sustainable and community development have a higher willingness to pay for these labels. That is, awareness of sustainability increase one's willingness to pay
- ❖ Respondents with household income higher than \$50,000 has higher willingness to pay for sustainable seafood
- ❖ Other factors increase willingness to pay: being a female or being a frequent farmer's market visitor
- ❖ **Fishing industry should issue a label for socially sustainable due to the statistical significance for this attribute**

## 6. Acknowledgments

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