

Ecolabels for Commercial Fish Products

Rita Curtis, NMFS

Sonia Jarvis and K. E. McConnell,
University of Maryland

Overview:

- National seafood consumption data
- Restraint on support for ecolabels
- Econometric evidence on willingness to pay for ecolabels
 - Ecolabels by type of product
 - For fresh fish, by species
 - Ecolabel by type of ecolabel (dropped in this presentation)

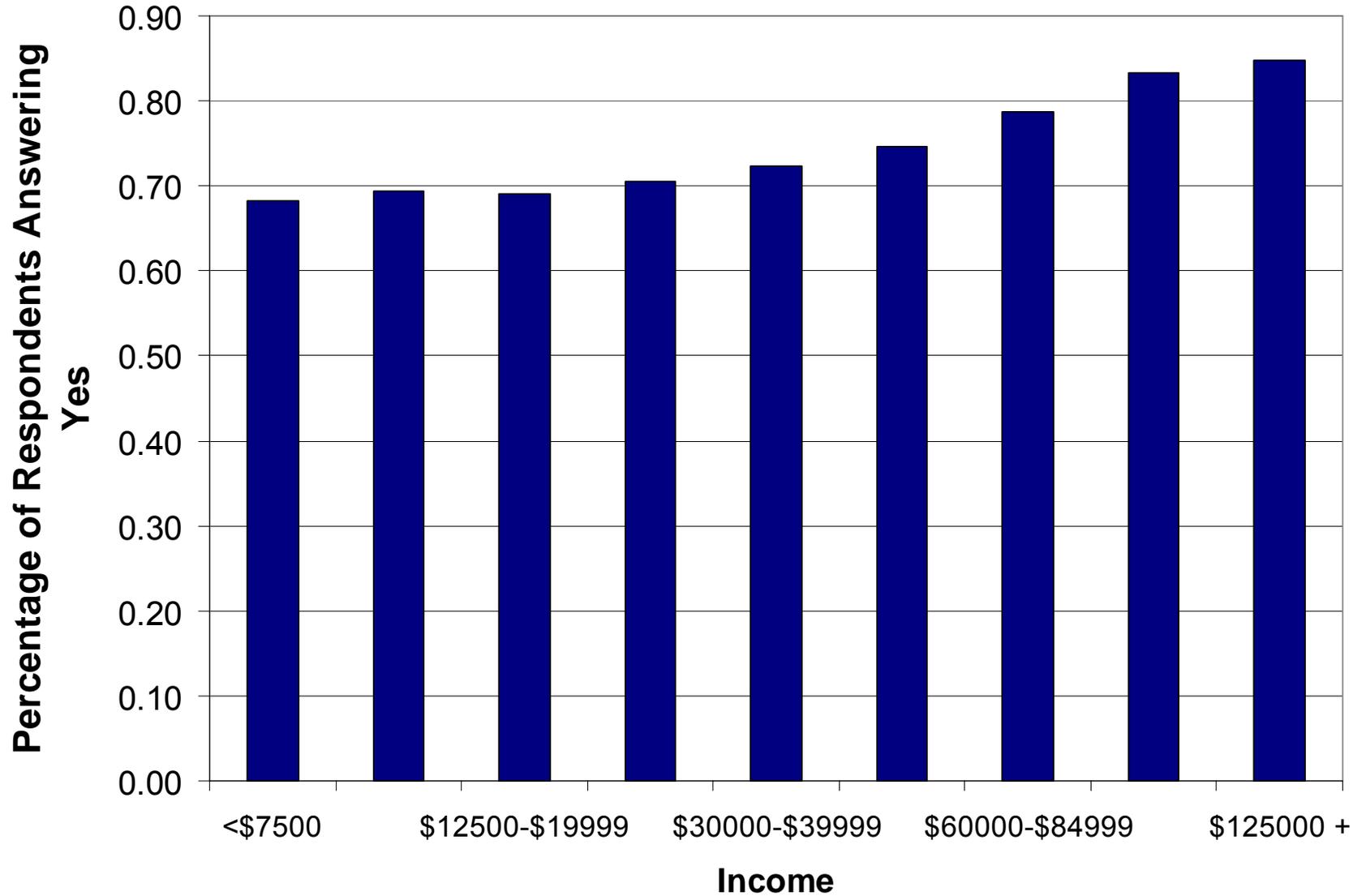
Overview:

- National seafood consumption data
- Restraint on support for ecolabels
- Econometric evidence on willingness to pay for ecolabels
 - Ecolabels by type of product
 - For fresh fish, by species
 - Ecolabel by type of ecolabel (dropped in this presentation)

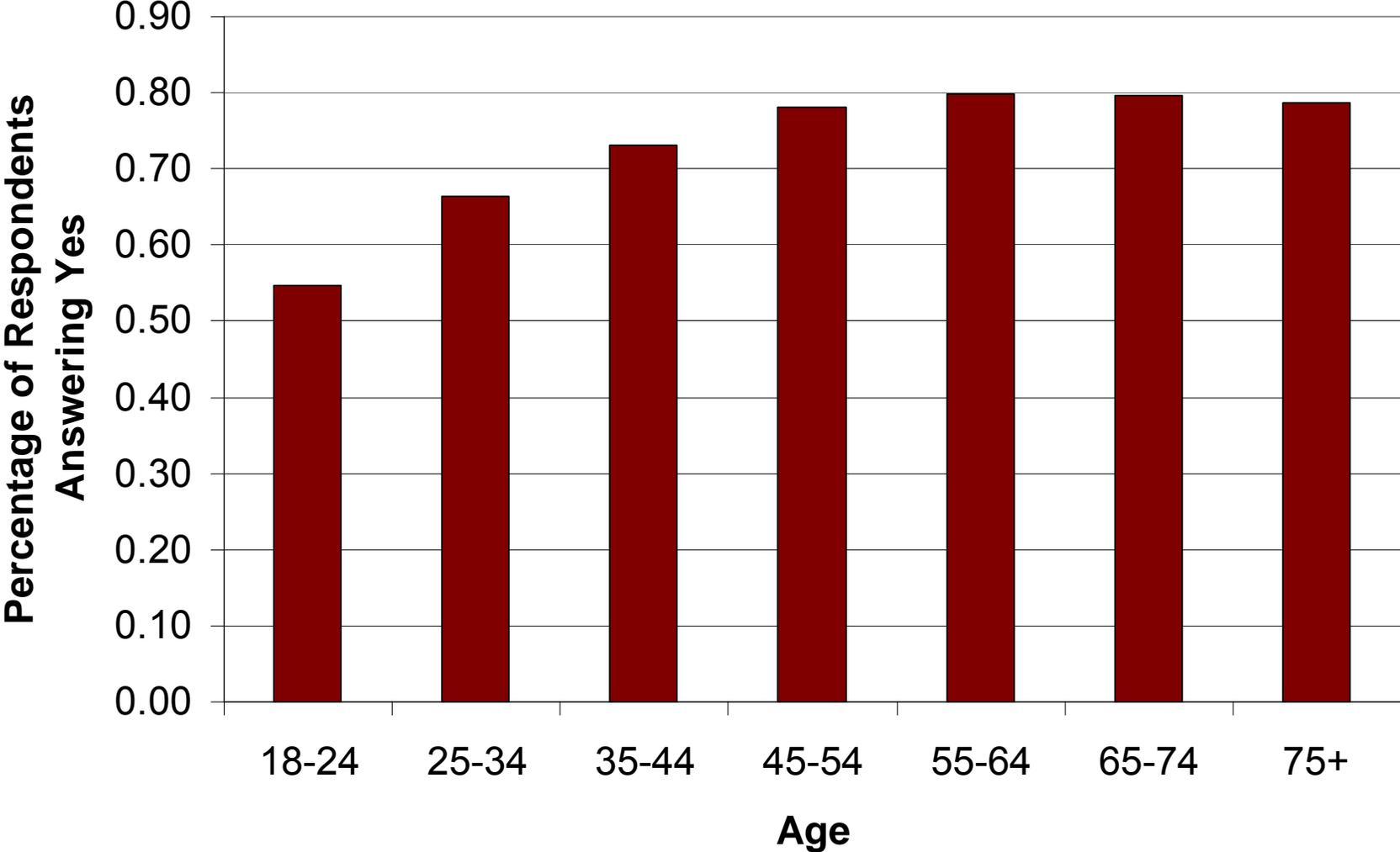
Data source:

- Knowledge Networks: a 'crafted' Web panel of households who complete questionnaires
 - Representative sample, randomly selected
 - Not necessary to be an Internet user
- Screening survey: locate households who consume seafood
- 2744 households from the screening survey form the sample
- Also source of national seafood consumption
- survey

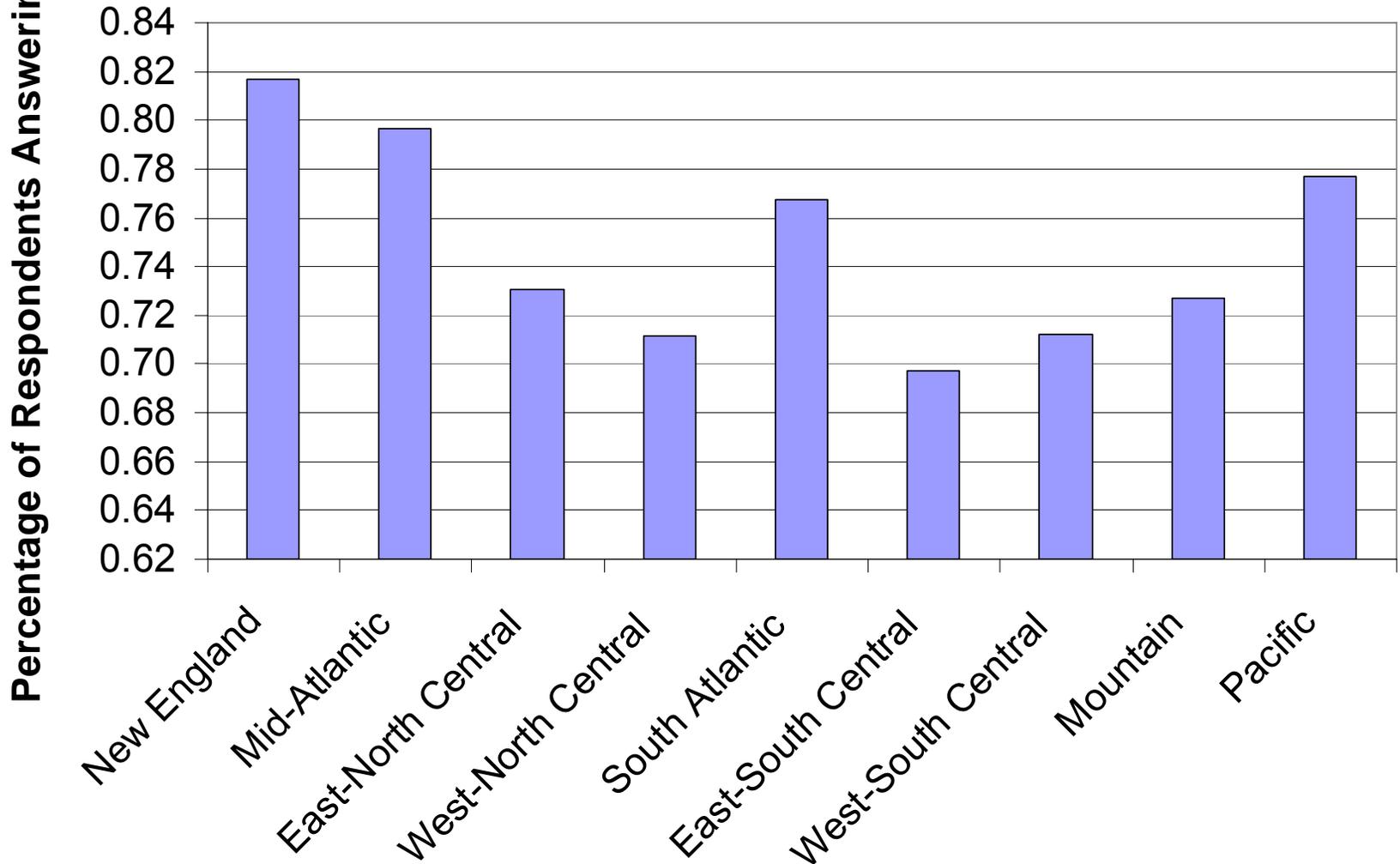
Propensity to Eat Fish, by Income



Propensity to Eat Fish, by Age



Propensity to Eat Fish, By Region



Are ecolabels welfare improving?

Room for doubt:

Mattoo and Singh

Gudmundsson and Wessels

Sedjo and Swallow

The Internet ecolabel survey

Four kinds of choice experiments:

1. Fish sandwich
2. Frozen fish filets (package)
3. Fresh fish
 - a. Comparison within a species
 - b. Comparison across species

Species: salmon, tuna, flounder

The Choice Experiments

- Fish product with ecolabel
- Fish product without label
- No purchase at this time

Survey Protocol

- Screened households recruited for six waves
 - May-October 2005
 - 75% overlap between National survey and ecolabel sample
- Internet message to respond
- Households screened for product type
 - Fish sandwich, fish filet package, fresh fish

In this survey, we'd like to find out your opinions on labeling seafood to provide information on the way fish were harvested. We first would like to give you some background on the issues involved.

Continue

Understanding fishery issues:

In some US and foreign fisheries, harvesting activities have been cited as a factor in:

- the decline of the harvested fish stocks (overfishing)
- the decline of marine protected species (e.g., sea turtles, marine mammals and/or seabirds) due to increased deaths caused by fishing gear
- the degradation of marine ecosystems (e.g., the degradation of essential fish habitat due to gear destruction)

Continue

What would a seafood ecolabel certify?

Seafood ecolabels have been used to certify the ecological friendliness of the fishery and the harvesting of the fish. For example, the "dolphin-safe" tuna label certifies that on the trip the tuna being purchased was harvested, there were no fishing gear interactions with dolphins. Ecolabels are being considered to give consumers a choice of paying a higher price for fish products bearing a label that ensures that they were harvested in an environmentally friendly manner.

Continue

In this survey, we would like you to consider purchasing scenarios under which a seafood product may have one of two proposed ecolabels or no ecolabel at all. The presence of an ecolabel does not give any information on the quality (freshness or preparation) of fish you would consume. These three categories are described on the following three screens.

Continue

Current Seafood Labeling Practices

Currently, most seafood is marketed without any kind of ecolabel. The absence of an ecolabel means that when consumers are purchasing seafood, they are provided no information on the status of the stock of species they are purchasing; whether any protected species were harmed or killed by fishing gear; or whether the fishing gear deployed by the fisherman in harvesting his catch resulted in the degradation of essential fish habitat.

Continue

Observer-based ecolabel

An independent observer onboard the fishing vessel ecolabel would certify that the seafood being purchased was harvested without interactions with any protected species in a fishery with protected species issues. Currently, there are over a dozen observer programs nationwide.

Pro: Tells consumers that in the harvest of the seafood they are purchasing, no harm was caused to any marine protected species.

Con: Does not provide consumers with any information on the long-term sustainability of the fishery.

Continue

Fish with no ecolabel.

When fish or fish products have no ecolabel, there is no guarantee that fish are harvested in a sustainable manner or that there were no interactions or interactions with seabirds, sea mammals, sea turtles or other protected, threatened or endangered species.

Pro: Providing an ecolabel will add to the cost of seafood.

Con: Consumer is not provided any information on whether the fishery the seafood came from is sustainable or whether any protected species or marine habitat were harmed in the production of seafood being sold.

The presence or absence of an ecolabel does **not** affect the quality, taste or any other characteristic of the fish you consume.

Continue

The following questions will ask you about your willingness to purchase seafood products at given price levels, some with ecolabels and some without. Of course, you will not actually purchase these goods in the survey. Before you make these choices, we want to talk to you about a problem that we have discovered in studies like this.

Recent studies have found that people often overstated their actual willingness to purchase these goods when filling out surveys in which the choice scenarios are hypothetical. We can understand partly why this is so: people might feel good about indicating that they will buy something that will support environmental conservation or, people might not be considering their actual budget when they make a hypothetical purchase decision. This so-called hypothetical bias causes survey results to be less reliable and precise. Answers based on how you would actually choose in a store or market can provide much more valuable information. Please decide on your choices as if you were actually going to make these choices and pay for them.

Continue

Randomization:

1. Product type randomized: sandwich, fish filet, fresh within, fresh cross
2. For fresh, species randomized
3. Price of ecolabeled product randomized
4. Base (no label) prices:

Sandwich	\$1.99
Package	4.59
Fresh fish	
flounder	8.99
salmon	6.99
tuna	14.99

5. Potentially 8 choice experiments per respondent:
2 per product type

Which of the following fresh fish do you buy?

A pound of wild salmon (not farm or aquacultured) costs about \$6.99 on average.

A pound of flounder costs about \$8.99 on average.

A pound of Tuna costs about \$14.99 on average.

Select one answer from each row in the grid

	Yes	No
Wild (not aquacultured) Salmon	<input type="radio"/>	<input type="radio"/>
Flounder	<input type="radio"/>	<input type="radio"/>
Tuna	<input type="radio"/>	<input type="radio"/>
	Yes	No

Next Question

We want you to consider a situation where you have the opportunity to buy a package of breaded fish filets. The package includes six filets, about one pound. In each case the fish would be the same for the consumer. They look and taste identically.

Which would you purchase:

Packaged Fish Filets

	The package of fish filets without any ecolabel	The package of fish filets with the observer ecolabel	
Means of Harvest	The fish in the package of filets are harvested with no ecolabel.	The fish in the package of filets are harvested with protection certified by an observer ecolabel on the outside of the package	
Price	\$4.59	\$5.39	
Which would you purchase?	The package of fish filets without any ecolabel <input type="radio"/>	The package of fish filets with the observer ecolabel <input type="radio"/>	Neither: I would not choose either of these options <input type="radio"/>

[Click here to see the definitions](#)

Next Question

Sandwich and fish filet models

The sandwich with ecolabel:

$$u = \alpha + \lambda(Y - P_{\text{Sand,E}}) + \beta_{\text{Sand,E}}$$

The sandwich with no label:

$$u = \alpha + \lambda(Y - P_{\text{Sand,N}}) + \beta_{\text{Sand,N}}$$

Not purchasing a sandwich

$$u = \alpha + \lambda(Y)$$

Coefficients to be estimated:

λ , $\beta_{\text{Sand,E}}$, $\beta_{\text{Sand,N}}$

Willingness to pay for ecolabel on sandwich:

$$\text{WTP} = (\beta_{\text{Sand,E}} - \beta_{\text{Sand,N}}) / \lambda$$

Econometric structure:

$v = u + \varepsilon$; ε is extreme value;

$$f(\varepsilon) = \gamma \exp(-\varepsilon\gamma) \exp(-\exp(-\varepsilon\gamma))$$

scale parameter $\gamma = \gamma_{\text{Sand}}$;

γ inversely proportional to variance of error;

Vary γ by product type

—sandwich, processed, fresh

Estimating models become:

$$u = \gamma_{\text{Sand}} \alpha + \gamma_{\text{Sand}} \lambda(Y - P_{\text{Sand,E}}) + \gamma_{\text{Sand}} \beta_{\text{Sand,E}}$$

$$u = \gamma_{\text{Sand}} \alpha + \gamma_{\text{Sand}} \lambda(Y - P_{\text{Sand,N}}) + \gamma_{\text{Sand}} \beta_{\text{Sand,N}}$$

$$u = \gamma_{\text{Sand}} \alpha + \gamma_{\text{Sand}} \lambda(Y)$$

1. Set $\gamma_{\text{Sand}} = 1$

or

2. Identify across product type

Sandwich Model, unweighted

Price ($-\gamma_{\text{Sand}}\lambda$)	-1.22
	[13.29]**
Ecolabel ($\gamma_{\text{Sand}}\beta_{\text{Sand}}$)	4.54
	[18.24]**
No label ($\gamma_{\text{Sand}}\beta_{\text{Sand},N}$)	4.34
	[22.11]**

Observations 9191

Absolute value of z statistics in parentheses

* significant at 5%; ** significant at 1%

Willingness to pay for ecolabel on fish sandwich:

$$\begin{aligned} \text{WTP} &= (\beta_{\text{Sand,E}} - \beta_{\text{Sand,N}}) / \lambda \\ &= (Y_{\text{Sand}} \beta_{\text{Sand}} - Y_{\text{Sand}} \beta_{\text{Sand}}) / \lambda Y_{\text{Sand}} \end{aligned}$$

$$= (4.543 - 4.342) / 1.221 = \$0.16$$

$$(.094 - .210)$$

90% C.I.

ECOLABEL PREMIUM : \$0.15 per sandwich

Processed (unweighted)

Price ($-Y_{Proc}\lambda$)	-0.950 [13.47]**
Ecolabel ($Y_{Proc}\beta_{Proc}$)	6.23 [16.22]**
No label ($Y_{Proc}\beta_{Proc,N}$)	5.86 [17.81]**

Observations 11261

* significant at 5%; ** significant at 1%

Willingness to pay for ecolabel on package of fish filets:

$$\begin{aligned} \text{WTP} &= (\beta_{\text{Proc,E}} - \beta_{\text{Proc,N}}) / \lambda \\ &= (Y_{\text{Sand}} \beta_{\text{Sand,E}} - Y_{\text{Sand}} \beta_{\text{Sand,N}}) / Y_{\text{Sand}} \lambda \\ &= (6.23 - 5.86) / 0.95 = \$0.39 \end{aligned}$$

ECOLABEL PREMIUM : \$0.40 per package

Processed and Sandwich, joint estimation

sandprice	-1.22
	[13.29]**
sandlab	4.54
	[18.24]**
sandno	4.34
	[22.11]**
procprice	-0.950
	[13.47]**
proclab	6.23
	[16.22]**
procno	5.86
	[17.81]**

Observations 20449

Coefficient on sandwich price

$$= -\gamma_{\text{Proc}}\lambda = -1.22$$

Coefficient on price of packaged filets

$$= -\gamma_{\text{Proc}}\lambda = -0.95$$

Conditional on λ the same across models, significant difference in $\gamma_{\text{Proc}}\lambda$ implies greater variance of unobserved preferences for packaged filets.

Fresh fish model

$$u = \gamma_{F,W} \alpha + \gamma_{F,W} \lambda (Y - P_{F,W,E}) + \gamma_{F,W} \beta_{F,W,S,E}$$

$$u = \gamma_{F,W} \alpha + \gamma_{F,W} \lambda (Y - P_{F,W,N}) + \gamma_{F,W} \beta_{F,W,S,N}$$

$$u = \gamma_{F,W} \alpha + \gamma_{F,W} \lambda (Y)$$

F=fresh

W=within

S=salmon, tuna, flounder

S=Salmon

Price ($-\gamma_{F,W}\lambda$)	-0.46
	[6.67]**
Ecolabel ($\gamma_{F,W}\beta_{F,W,S,E}$)	5.46
	[9.29]**
Noeco ($\gamma_{F,W}\beta_{F,W,S,N}$)	5.33
	[10.19]**

Observations 4074

* significant at 5%; ** significant at 1%

Willingness to pay for ecolabel on salmon:

$$\begin{aligned} \text{WTP} &= (\beta_{F,W,S,E} - \beta_{F,W,S,N}) / \lambda \\ &= (5.46 - 5.33) / 0.46 = \$0.28 \end{aligned}$$

ECOLABEL PREMIUM : \$0.28 per pound

Estimates of WTP from full model

Sandwich \$0.16

Processed 0.40

Fresh fish (per lb.) 0.45

Within

Salmon \$1.24

Tuna 2.54

Flounder 1.16

Some comparisons:

Johnston, Wessels et al. implicit WTP for ecolabels

Loureiro, McCluskey, Mittelhammer \$0.05 for organic apples

Bjorner Hansen and Russell WTP for ecolabeled toilet paper
13-18% higher

Some issues:

1. Would real willingness to pay be the same as hypothetical?
2. Would repeated purchases be the same as a one shot purchase?
3. What kind of a program for ecolabels would be welfare-improving, if this approximates consumer behavior in the market?

Sandwich

	(1)	(2)
	Unweighted	Weighted
Price	-1.221 [0.092]**	-1.192 [0.114]**
Ecolabel	4.543 [0.249]**	4.310 [0.307]**
No label	4.342 [0.196]**	4.181 [0.242]**
Observations	9191	9191

Standard errors in brackets

*significant at 5%; ** significant at 1%

All models

sandprice	-1.221 [13.294]**
sandlab	4.543 [18.242]**
sandno	4.342 [22.107]**
procprice	-0.950 [13.475]**
Proclab	6.228 [16.221]**
procno	5.855 [17.812]**
withinprice	-0.398 [7.114]**
withlab	4.967 [8.413]**
Withno	4.787 [8.863]**
withflou	0.295 [1.786]
withsalm	0.030 [0.115]
withtuna	2.258 [5.434]**
crossprice	-0.419 [3.249]**
csalm lab	5.726 [5.452]**
csalmno	5.197 [5.635]**
ctunalab	7.493 [3.600]**
ctunano	6.428 [3.302]*
cfoulab	5.220 [4.015]**
cfouno	4.733 [4.036]**

Observations 30607

Absolute value of z statistics in brackets

* significant at 5%; ** significant at 1%

	Cohort	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Jan	Feb	Number interviews completed	Fresh Cross-section
National Seafood & Ecolabel Overlap	1					346								346	346
	2						321							321	321
	3			458				377						835	458
	4				415				336					751	415
	5					127								127	127
	6						119							119	119
	7							117						117	117
	8								133					133	133
		0	0	458	415	473	440	494	469	0	0	0	0	2749	2036
Ecolabel Only	A			136										136	136
	B				132									132	132
	C					120								120	120
	D						117							117	117
	E							110						110	110
	F								93					93	93
		0	0	136	132	120	117	110	93	0	0	0	0	708	708
Ecolabel Total			594	547	593	557	604	562					3457	2744	

For estimation:

$$\text{Prob(choose ecolabel)} = \frac{\exp(u(\text{label}))}{\exp(u(\text{label})) + \exp(u(\text{no label})) + \exp(u(\text{no purchase}))}$$

$$u(\text{label}) = \gamma_{\text{Sand}} \alpha + \gamma_{\text{Sand}} \lambda(Y - P_{\text{Sand,E}}) + \gamma_{\text{Sand}} \beta_{\text{Sand,E}}$$

$$u(\text{no label}) = \gamma_{\text{Sand}} \alpha + \gamma_{\text{Sand}} \lambda(Y - P_{\text{Sand,N}}) + \gamma_{\text{Sand}} \beta_{\text{Sand,N}}$$

$$u(\text{no purchase}) = \gamma_{\text{Sand}} \alpha + \gamma_{\text{Sand}} \lambda(Y)$$