Consumer Demand and Preference for Eco-friendly Labeled Commercial Fish Commodities: Application to Tuna Steak

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Introduction

- Global catches of tuna species have been continuously increasing for decades
- In US, Tuna demands counted a third of all fish and seafood sales and stock depletion have threatened long term outlook of tuna supply
- Eco-Labels and Traceability have been taken to mitigate the problem
- US companies committed to allow to trace the source from "catch to can"

Objectives

- Investigate household level tuna steak (sashimi grade) consumption and purchase preference especially within land-locked state –Kentucky
- Examine perceptions and attitudes toward farm raised and wild caught
- Quantitate willing-to-pay for eco-friendly labels and attributes

Survey and Data

- An online survey conducted for Kentuckians in July 2010 via zoomerang.com
- 421 usable questionnaire returned:
  - 71.5% Female (State Average: 51.6%)
  - 49.9% Occupied (State Average: 55.3%)
  - Mean age over 18 is 52.2 years old (State Average: 48.5)

Conjoint Experiment: Attributes and Levels

Tuna (steak form and sashimi grade)				
Origin	Wild Caught	Farm-raised		
Storage Mode	Previously Frozen	Fresh and Never Frozen		
Eco-Labeled	Certified Turtle Safe*	None		
Price	$8.99/lb	$14.49/lb	$19.99/lb	$25.49/lb

*: "Certified Turtle Safe by definition is fish harvested by fisheries under stringent controls to avoid sea turtle by-catch"

Theoretical Model

Random Utility Model and Mixed Logit Regression are applied

$$U_{ni} = V_{ni}(x_{ni}, s_n) + \varepsilon_{ni}$$

x_{ni} : Observable Alternative Attributes; s_n: Demographics
V_{ni} : Observable Utility Component;
ε_{ni} : Unobservable Utility Component/Random Utility

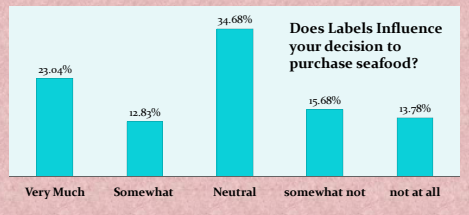
The probability of choosing alternative **j** is written as:

$$P_i(j) = \frac{\exp(X_{ij}\beta)}{\sum_{i=1}^{J} \exp(X_{ii}\beta)}$$

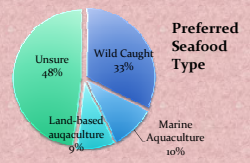
Willingness to Pay: $WTP = MU_{attribute} / MU_{price}$

Descriptive Summary

- **30%** of respondents could differentiate fish between wild-caught and farm-raised aside from labeling
- Over **40%** had notice labeling whether seafood is wild-caught or farm-raised
- About **36%** admitted that the label information will affect their purchase decisions (see below chart)



- However, almost half (48%) of the respondents are unsure about source of their seafood consumption



Econometric Results

Mixed Logit Regression Results and Willingness-to-Pay

Variable	Coefficient	SE	p-value	WTP
Buy Nothing	-1.45	0.19 ***	<.0001	
Wild Caught	-1.96	0.34 ***	<.0001	-$9.69
Pre-Frozen	0.97	0.31 ***	0.002	$4.78
Turtle Safe	1.43	0.49 ***	0.0034	$7.04
Price	-0.20	0.02 ***	<.0001	-
Whether Has Differentiate Ability of Wild Caught or Farm Raised				
Wild Caught*Differ	0.21	0.21	0.3254	
Pre-Frozen*Differ	0.08	0.16	0.6218	
Turtle Safe*Differ	-0.30	0.21	0.145	
Price*Differ	0.05	0.01 ***	<.0001	$0.24
Whether Label will Influence Purchase Decision				
Wild Caught*Label Influence	0.30	0.08 ***	0.0002	$1.46
Pre-Frozen*Label Influence	-0.21	0.06 ***	0.0006	-$1.03
Turtle Safe*Label Influence	-0.21	0.08 **	0.0124	-$1.03
Price*Label Influence	0.02	0.00 ***	<.0001	$0.10
Pre-Frozen*Urban	-0.25	0.14 *	0.0831	-$1.21
Pre-Frozen*Female	-0.59	0.16 ***	0.0003	-$2.89
Turtle Safe*Female	-0.36	0.18 *	0.0534	-$1.76
Turtle Safe*Age	-0.01	0.01 **	0.0381	-$0.06
Turtle Safe*Education	0.03	0.05	0.4512	
Turtle Safe*Occupied	-0.14	0.14	0.3256	
Turtle Safe*Income	0.10	0.06	0.1048	$0.51
Environmental Priority				
Wild Caught*Env Friendly	-0.31	0.22	0.152	
Pre-Frozen*Env Friendly	0.21	0.18	0.2409	
Turtle Safe*Env Friendly	0.58	0.22 ***	0.0096	$2.87
Price*Env Friendly	0.01	0.01	0.2623	

⇗ Kentucky Consumers might not preferred wild caught tuna and negative WTP is reported.

⇘ Significant Price Premium for "Turtle Safe".

⟹ Respondents whoever admitted they are affected a lot while purchasing seafood by Label Information, did pay higher for wild caught tuna, however, lower for certified turtle safe tuna surprisingly.

For individual *who has a priority for choosing environmental friendly* seafood product, they did pay higher price for turtle safe certified tuna.

Conclusions

- This study provide perspectives upon consumer demand for commercial tuna fish.
  - Comparison between wild caught and farm raised tuna species via conjoint experiment choice setting, Mixed Logit Regression results reported lower price for wild caught in Kentucky area;
  - Regarding environmental concerns, significant price premium displayed, especially for "Turtle Safe".

- Interesting results regarding heterogeneous consumers revealed different attitude afterwards: individuals who admitted labels information would affect they seafood purchase decision turn out to paying less for certified turtle safe tuna steak.
- One of the contributes of this study, is to inform tuna producers and marketers about future product marketing strategies and promotions.
- Additionally, the premium on Eco-Friendly label -- "Certified Turtle Safe" -- suggests consumers' blooming desires for ecological wellbeing and sustainability.

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Poster prepared for presentation at Agricultural & Applied Economics Association's 2012 Annual Meeting, Seattle, Washington, August 12-14, 2012.