Chicken or Salmon? Roles of Beliefs, Perceived Qualities and Preferences in Formulating Product Choices

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└ Background

Why do people value products differently?

- WTP for products/product attributes are heterogeneous
- Economics models attributes heterogeneity to "different preferences"
- In economics, often use socioeconomic controls as preference shifter
  - Income, education, gender, etc.
  - Does not explain much

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Background

Explain Heterogeneity in Preferences

▶ How do we build models that explain the **mechanisms** behind people's choices?

▶ **Beliefs** play a major role (Lusk et al., 2013; Costanigro et al., 2015; Manski, 2004)

    ▶ Expectation on the delivery of certain qualities from consuming a product

    ▶ More relevant when qualities are unobservable (experience and credence qualities)

    ▶ "Objective" measures may be misleading, e.g., individual can adjust their behavior(Teisl and Roe, 2010)

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Background

Objectives

1. Explicitly incorporating subjective beliefs in modeling product choices
2. Gaining insights on how consumer's subjective beliefs about products are affected by market cues
3. Investigating the roles of beliefs and perceptions in the context of choices between chicken and salmon

Conceptual Framework

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└ Model
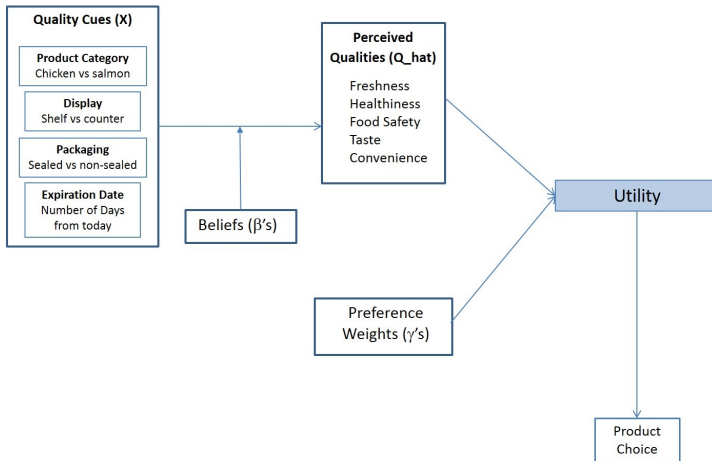
Utility

- Consumers derive utilities from consuming *J qualities* $Q_1, Q_2, \cdots, Q_J$:

$$U_i = U_i(Q_1, Q_2, \cdots Q_J, P; \gamma) \qquad (1)$$

- Quality weights: γ

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└ Model

Perceived Qualities

- True qualities are not observable
- Consumers use their *subjective beliefs* about the true qualities of a product
- *Perceived qualities* are then used to formulate utility:

$$U_i = U_i(\hat{Q}_1, \hat{Q}_2, \cdots \hat{Q}_J, P; \gamma) \qquad (2)$$

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└─ Model

Quality Cues

- Perceived qualities are formulated using observable market cues X_1, X_2, $\cdots X_K$ (Steenkamp, 1990)
- $\boldsymbol{\beta}$ is a vector of belief parameters that map cues into quality

$$\hat{\mathbf{Q}}' = (\mathbf{X}; \boldsymbol{\beta}) \tag{3}$$

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└─ Model

Back to Utility

- The estimated perceived qualities can be obtained as $\hat{\hat{\mathbf{Q}}}' = (\mathbf{X}; \hat{\beta})$ where $\hat{\beta}=$ estimated belief parameters
- Then the utility for a product s is obtained by plugging in the estimated perceived qualities:

$$U_s = ([\hat{\hat{\mathbf{Q}}}_s{}' P_s]; \gamma) \tag{4}$$

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└─Data

Survey

- Web-based survey (administered during May 2015)
- Sample of US adults (N≈2,000)
- Conjoint choice experiment setting (only with those who eat both chicken and salmon)

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└─Data

Design

- Each respondent receive **six** choice tasks
- Each set contains chicken breasts and salmon fillets with varying cues (attributes)

Table: Attributes

Product	Chicken	Salmon	Condition
Display	Shelf/Counter	Shelf/Counter	
Eat Before Date	3, 5, 14 days	3, 5, 14 days	Only with shelf display
MAP[1]	MAP if 14 days	MAP if 14 days	Implicit
Price ($/lb)	3.75, 5, 6.25	7.5, 10. 12.5	From average retail prices

[1]Modified Atmosphere Packaging

- Two-step elicitation (belief and preference)

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└ Data

Belief Elicitation

Table: Belief Elicitation Example

Please tick one product that you think is superior in:

	Chicken	Salmon	They are the same
Freshness	☐	☐	☐
Good Taste	☐	☐	☐
Food safety	☐	☐	☐
Convenience	☐	☐	☐
Healthiness	☐	☐	☐

Product Choice Elicitation

Table: Preference Elicitation Example

If you have to choose one between these products, which would you buy?

Chicken	Salmon	Neither
☐	☐	☐

Panel Mixed Logit Perceived Quality Estimation

	Freshness	Taste	Food Safety	Convenience	Healthiness
Chicken	0.397***	-0.173	-0.786***	-1.422***	-0.862***
	(0.084)	(0.141)	(0.116)	(0.148)	(0.151)
Salmon	0.335***	-0.148	-1.022***	-2.191***	-0.210
	(0.074)	(0.146)	(0.121)	(0.172)	(0.157)
Shelf	-0.716***	-0.367***	-0.430***	0.602***	-0.515***
	(0.084)	(0.105)	(0.114)	(0.128)	(0.121)
5 Days	-0.244**	-0.432***	-0.072	0.277**	-0.348**
	(0.108)	(0.139)	(0.150)	(0.137)	(0.171)
14 Days	-0.200*	-0.290**	-0.126	0.151	-0.054
	(0.117)	(0.131)	(0.154)	(0.128)	(0.149)
Observations	12195	12153	12153	12072	12075

Estimated Average Perceived Qualities (example)

Product: **BONELESS SKINLESS CHICKEN BREASTS** | **BONELESS SKINLESS SALMON FILLETS**

Sold at: Counter | Shelf

Eat before date: **Fresh from the Counter** | **3 days**

Price: **$5.00/lb** | **$12.50/lb**
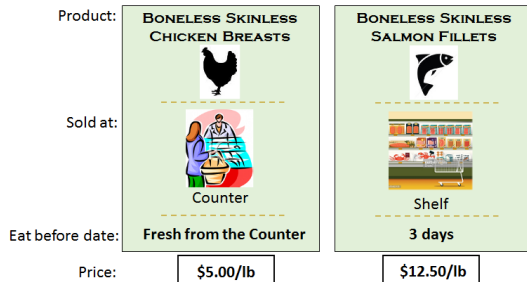
	Fresh	Taste	Safe	Conv	Health	Observed Choice
Chicken	1.97	2.63	1.44	1.35	1.86	0.86
Salmon	1.19	2.29	0.77	1.19	2.00	0.14

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└─ Analysis

Product Choice Model with Perceived Qualities

	Mean	Std.Dev.
Price	-0.084***	–
	(0.013)	–
Freshness	0.123	-0.002
	(0.090)	(0.121)
Good Taste	-0.209	0.000
	(0.190)	(0.055)
Food Safety	0.097*	0.000
	(0.058)	(0.176)
Convenience	0.312***	0.247***
	(0.068)	(0.047)
Healthiness	-0.132	0.124***
	(0.095)	(0.056)
Observations	6406	

Standard errors in parentheses

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└─ Conclusion

Conclusion

1. Our two-step elicitation provides insights on the mechanisms of product choices through implicitly considering subjective beliefs

2. Market environment does influence the formation of perceived qualities

3. Effects seem product specific

4. Some cues shifts quality perceptions but may not significantly affect the purchase decisions

    ▶ Depends on the preference parameters and trade-off with prices

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Next Steps

1. Parameter distribution assumptions
   - ▸ Other than normal distribution

2. "Properly" re-introducing the linkage between beliefs and preferences
   - ▸ Latent class approach

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└ Conclusion

Literature

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