Noisy Information Signals and Endogenous Preferences for Labeled Attributes

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Background & Motivation

Consumers are largely uninformed about production methods:

- Only 30% of Americans know that foods produced through biotechnology are available in supermarkets
- Over 80% support mandatory labels on foods containing DNA (about the same % support labeling GMOs). [All food contains DNA.]

In most economic models:

- Preferences for labeled vs. non-labeled foods are exogenous
- A label serves as an identifier,
- If consumers perceive the label itself (and not the information in the label) as a warning signal, then the assumption that consumer preferences are exogenous to labeling policy no longer holds.

"*... GM labels may well mislead and alarm consumers, especially (though not only) if the government requires them. Any such requirement would inevitably lead many consumers to suspect that public officials, including scientists, believe that something is wrong with GM foods — and perhaps that they pose a health risk.*"

▪Cass Sunstein (former Administrator of the Office of Information and Regulatory Affairs in Obama's administration)

Objectives

- Is there evidence that there is a potential **signaling effect** of labels that is separate from the preferences for the labeled credence attribute?
- Does widely documented lower WTP for products with labeled credence attributes reflect *a priori* consumer preferences, OR
- Whether it is the result of a self-fulfilling prophecy, where labeling induces concern about the attributes.

Experimental Design

Subjects were randomly assigned to one of the 3 information treatments:

1. T0: Control: No Label + No information
2. T1: Label "Contains X" + No information
3. T2: Label "Contains X" + negatively-framed information about credence attribute X

where X is a credence attribute viewed by at least some customers as negative

Theoretical Concepts

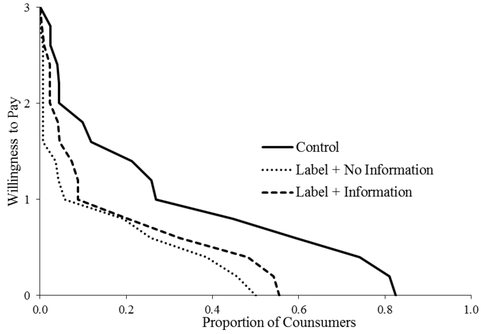
$$WTP \sim N(\mu, \rho^2);\ \textit{Information Signal} \sim N(\omega, \xi^2)$$

- ρ^2 is dispersion of valuations or **idiosyncrasy** of preferences or product attributes
- ξ^2 is an approximation of **noise in the information signal** or the level of uncertainty about the product quality

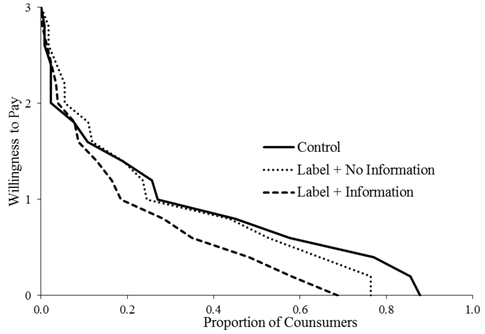
$$WTP \sim N\left(\mu - \frac{\lambda\rho^2}{2(1+\rho^2/\xi^2)}, \frac{\rho^4/\xi^2}{1+\rho^2/\xi^2}\right)$$

Realized Demands by Consumer Type

(a) Organic-Shoppers



(b) Conventional-Shoppers



Identifying Signaling Effect

- Estimate shifts and rotation effects of the demand curves as a function of different levels of information
- Show that these effects are a function of two key parameters:
  - ρ^2 (idiosuncracy)
  - ξ^2 (**noise in the information signal**).

Treatment	Action	Outcome
Control	• Do not mention existence of credence attribute	• Baseline product idiosyncrasy • Baseline information noise
	⬇ ADD MORE INFO ⬇	
Label + No information	• Reveal existence of credence attribute X via "Contains X" label	• Idiosyncrasy changes • Information noise changes
	⬇ ADD MORE INFO ⬇	
Label + Information	• Reveal existence of credence attribute X via "Contains X" label • Provide additional information	• Idiosyncrasy is the same as in "Label+Information" • Information noise changes further

Findings

- Strong evidence for **labels-as-signals** effect
- Evidence that organic-shoppers, overestimate the riskiness of consuming the labeled product. additional information reduces the noise in the signal, partially mitigating the negative signaling effect of the label.
- Conventional shoppers do not have strong priors about the possible implications of the labeled ingredients or production processes. Additional information raises uncertainty and further reduces WTP compared to the label by itself