

Valuing Information: The Case of Country of Origin Labeling

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Motivation

- **Information and labeling are at the forefront of federal food regulatory policies**
- **Existing approaches to measuring VOI have a number of weaknesses**
 - hypothetical
 - rely on numerous assumptions and specification issues
 - in general, “task of actually measuring benefits may involve difficult methodological and philosophical problems” (Golan et al. 2000, p. 16)

Motivation

- **Is there a better way to measure the value of information present in food labels?**
- **We propose a “direct” approach to valuing information that, while more contingent on the experimental context, is relatively free of the assumptions required to implement the standard approach**

Mandatory Country of Origin Labeling (MCOOL)

- USDA provision to 2008 Farm Bill
- Final rule effective March 16th, 2009
- Applicable to all fresh meats, fish and several types of nuts



MCOOL

- **Opponents**

- Feedlot and Packing Industry
 - Costs estimated between \$2.6 to \$5.6 billion
- Mexican and Canadian Government
 - Claimed MCOOL violated terms with World Trade Organization
 - In Nov, 2011, WTO panel determined that MCOOL violated the TBT agreements
- American Meat Institute
 - AMI President called MCOOL a “thinly veiled non-tariff trade barrier”

- **Supporters**

- R-CALF USA (lobbyist group)
- Consumers???

MCOOL

- **Many previous studies on consumer WTP for US vs. foreign meat**
 - But, this is not the value needed in cost-benefit analysis
 - Loureiro and Umberger (2007) is the only study providing an estimate of VOI, but it suffers from several weaknesses (their estimate was \$2.57/lb)
- **The USDA basically ignored all benefit measures in its final rule:**

“The expected benefits . . . are difficult to quantify. The Agency’s conclusion remains unchanged, which is that the economic benefits will be small and will accrue mainly to those consumers who desire country of origin information.”

Purpose and Objectives

- **Determine Value of Information (VOI)**
 - Discover consumers value of information provided by the implementation of MCOOL
 - How consumers value “knowing” versus “not knowing” the origin of their meat products
- **Compare Two Experimental Approaches**
 - Conventional indirect approach
 - New direct approach

Data Collection

- ☐ Field experiment in major grocery store chain
- ☐ Non-hypothetical
- ☐ Recruitment:
 - Free 12 ounce steak or pork chop
 - Either \$2 or \$4 cash to use in field experiment

Direct VOI



Direct Approach

You have been given a free 12 oz. steak and \$2 cash. The money is yours to keep as compensation for your time. You do not have to use it in our study.

Beside me are two coolers containing 12oz steaks that have all been USDA inspected and are of the same size, weight, and quality grade. Both coolers contain the same steak, however one contains labels and the other does not.

- Option RED is a steak from the *Red* cooler. Your free steak is from this cooler.
 - Steaks in the *Red* cooler do not have any information about country of origin. The steak could be from the U.S., Canada, Mexico, Australia, or a combination of these origins but you will not know exactly which country the steak is from.
 - In the *Red* cooler, likelihood of a steak being from U.S., Canada, Mexico, Australia, or a combination of these origins is similar to the likelihood of finding steaks from one of these locations in a typical grocery store in the U.S.
- Option BLUE is a steak from the *Blue* cooler. You can pay a price to exchange your free steak for one from this cooler.
 - In the *Blue* cooler, each steak has a label indicating its origin. Each steak will have a label indicating whether it is from the U.S., Canada, Mexico, Australia, or a combination of these origins.

Please answer the following six questions. Note: these questions are not hypothetical. We will roll a die and pick one of the six choices, and you will receive the option you chose. If you choose option BLUE, you can choose a steak from the *Blue* cooler and you will be expected to pay the price.

No Labels

Labels

Direct Experiment

1. Do you prefer option RED or BLUE? (Choose one)

Option RED	Option BLUE
keep steak from <i>Red</i> cooler and pay \$0	choose steak from <i>Blue</i> cooler and pay \$0
☐	☒

2. Do you prefer option RED or BLUE? (Choose one)

Option RED	Option BLUE
keep steak from <i>Red</i> cooler and pay \$0	choose steak from <i>Blue</i> cooler and pay \$0.50
☐	☒

3. Do you prefer option RED or BLUE? (Choose one)

Option RED	Option BLUE
keep steak from <i>Red</i> cooler and pay \$0	choose steak from <i>Blue</i> cooler and pay \$1.00
☐	☒

4. Do you prefer option RED or BLUE? (Choose one)

Option RED	Option BLUE
keep steak from <i>Red</i> cooler and pay \$0	choose steak from <i>Blue</i> cooler and pay \$1.50
☒	☐

5. Do you prefer option RED or BLUE? (Choose one)

Option RED	Option BLUE
keep steak from <i>Red</i> cooler and pay \$0	choose steak from <i>Blue</i> cooler and pay \$2.00
☒	☐

6. Do you prefer option RED or BLUE? (Choose one)

Option RED	Option BLUE
keep steak from <i>Red</i> cooler and pay \$0	choose steak from <i>Blue</i> cooler and pay \$2.50
☒	☐

Direct Choice Experiment

- **Six Treatment Combinations**
 - Product (Beef or Pork)
 - Cash Endowment (\$2 or \$4)
 - Price Range
 - Low Range (\$0 to \$2.50) where price increased by \$0.50
 - High Range (\$0 to \$5.00) where price increased by \$1.00

Econometric Framework

- **Interval Censored Model**

$$WTP^*_i = VOI_i^{Direct} = \beta_0 + X_i \rho + \varepsilon_i$$

- WTP^*_i depicts individual i's WTP
- β_0 is a constant
- X_i is a vector of explanatory variables
- ρ is a vector of coefficients
- ε_i is a stochastic error term

$$Price_{i, low} < WTP^*_i < Price_{i, high}$$

- $Price_{i, low}$ lowest price individual (i) is willing to pay for COOL
- $Price_{i, high}$ highest price individual (i) is willing to pay for COOL

Direct VOI Results



VOI

- Mean VOI across all treatment combinations = \$1.37 per choice
- This is about half the Loureiro and Umberger (2007) estimate of \$2.57
- We find a very similar mean (\$1.15) in a nationwide internet survey we recently conducted that was designed to mimic or direct experiment

Insignificant Variables

- Product (beef or pork)
- Location (Dallas or San Antonio)
- Cash (\$2 or \$4)
- Price Range (Low or High Range)
- Income
- Gender
- Age

Significant Variables

- Frequency of eating beef/pork
 - Less frequent consumers had higher VOI
- Consumer Ethnocentrism

Consumer Ethnocentrism

- The term “consumer ethnocentrism” is adapted from the classical concept of ethnocentrism
- Ethnocentrism represents an attitude where people view their own group as being superior to those who are culturally dissimilar
- “Consumer ethnocentrism” reflects the belief held by Americans that they are morally obligated to purchase American-made products, therefore some products may be purchased solely because it’s American disregarding other quality indicators

Consumer Ethnocentrism

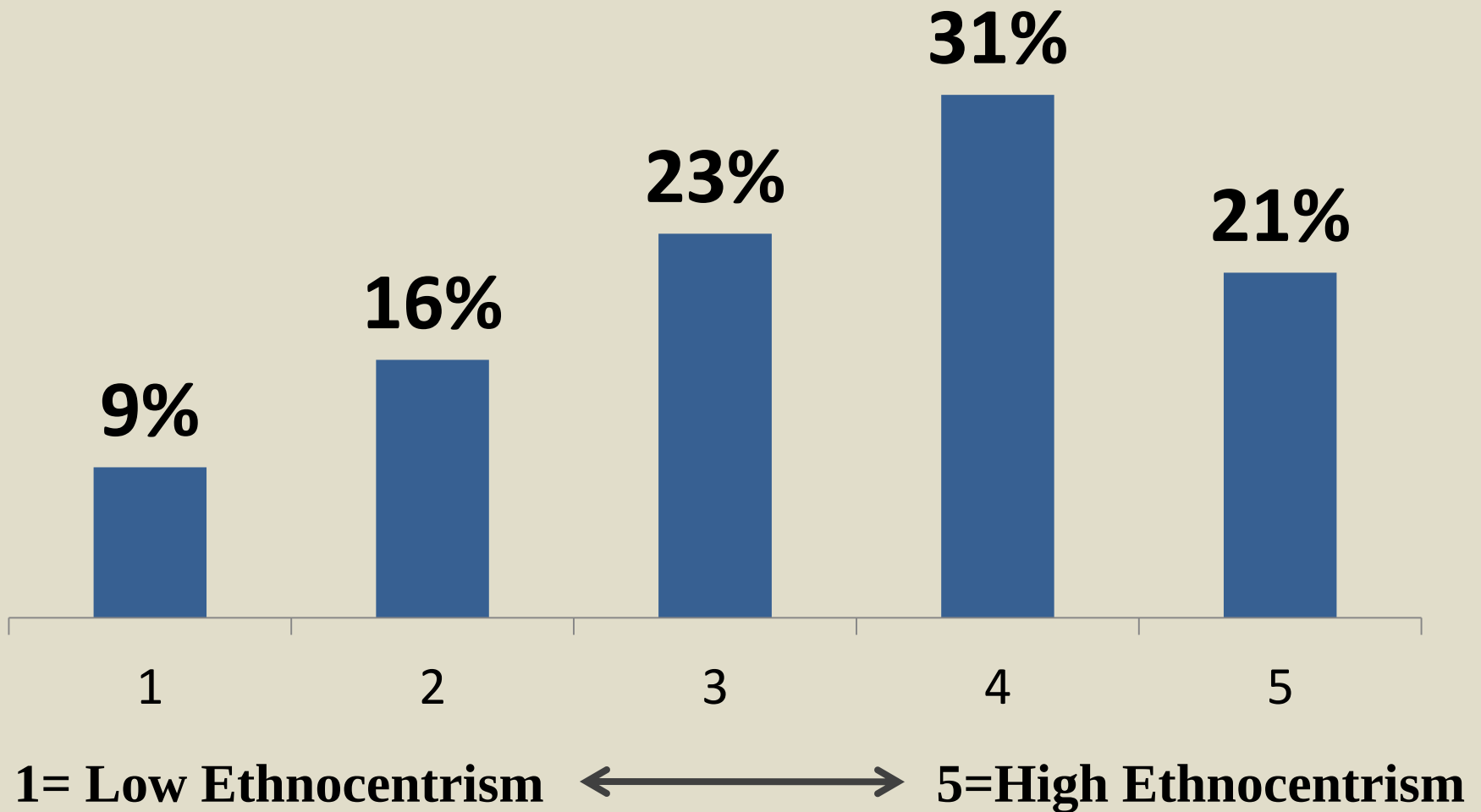
Question Example:

11. Do you agree or disagree that: A real American should always buy American-made products?

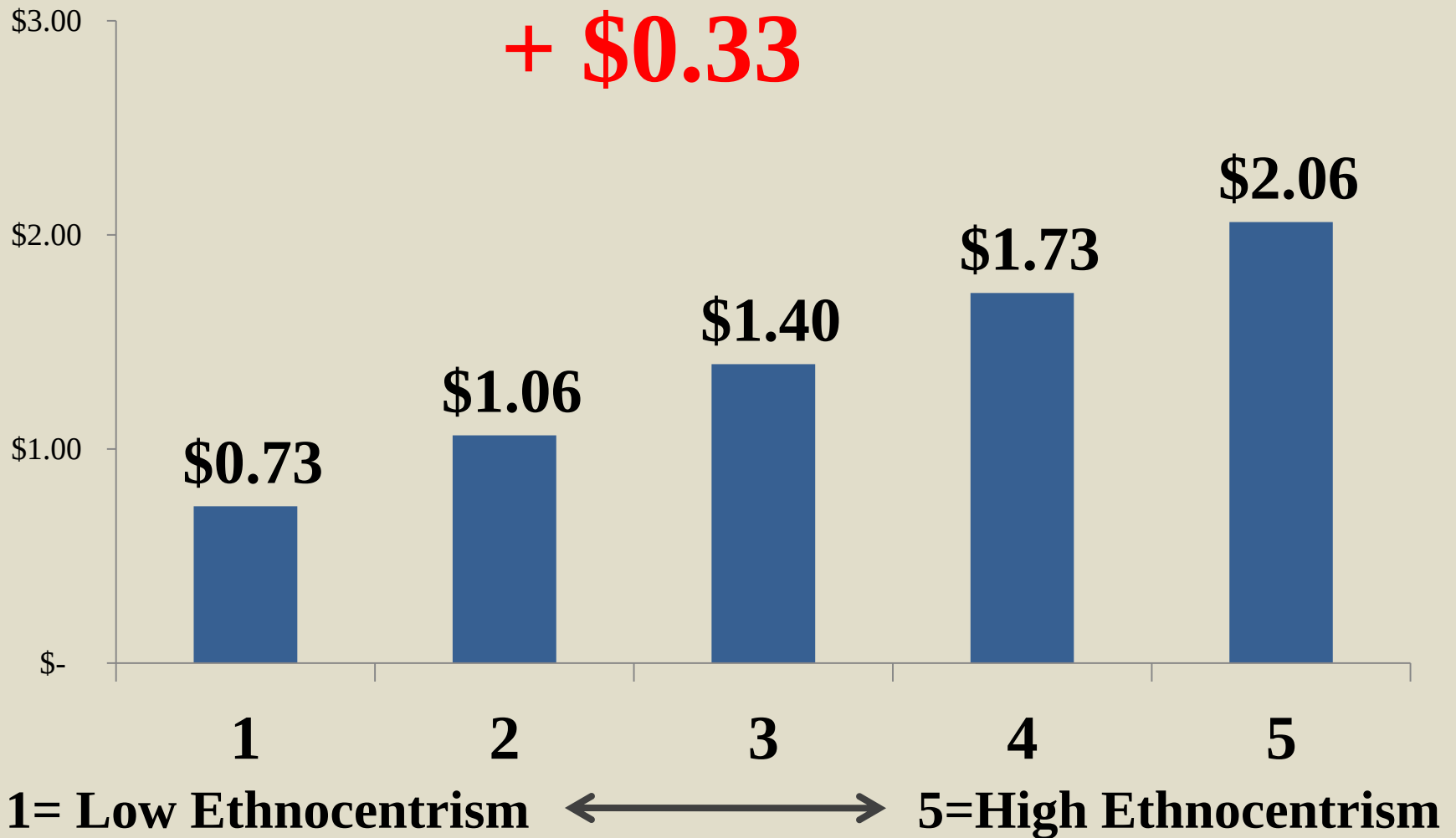
- ☐ Strongly agree
- ☐ Somewhat agree
- ☐ Neither agree nor disagree
- ☐ Somewhat disagree
- ☐ Strongly disagree

Shimp, T., and S. Sharma. 1987. "Consumer ethnocentrism: construction and validation of the CETSCALE." *Journal of Marketing Research*:280-289.

Ethnocentrism Response Frequency



Ethnocentrism Levels



Indirect VOI



Indirect Choice Experiment

Scenario 1: Which option do you prefer? (Choose one)

Keep unlabeled pork chop	Product of <u>U.S.</u>	Product of <u>Canada</u>	Product of <u>Mexico</u>	Product of <u>Denmark</u>	Product of <u>Canada and U.S.</u>	Product of <u>Mexico and U.S.</u>	Product of <u>Canada, Mexico, and U.S.</u>
\$0 ☐	\$0 ☒	\$0 ☐	\$0 ☐	\$0 ☐	\$0 ☐	\$0 ☐	\$0 ☐

Scenario 2: Which option do you prefer? (Choose one)

Keep unlabeled pork chop	Product of <u>U.S.</u>	Product of <u>Canada</u>	Product of <u>Mexico</u>	Product of <u>Denmark</u>	Product of <u>Canada and U.S.</u>	Product of <u>Mexico and U.S.</u>	Product of <u>Canada, Mexico, and U.S.</u>
\$0 ☐	\$0 ☒	\$2 ☐	\$2 ☐	\$2 ☐	\$2 ☐	\$2 ☐	\$0 ☐

Scenario 3: Which option do you prefer? (Choose one)

Keep unlabeled pork chop	Product of <u>U.S.</u>	Product of <u>Canada</u>	Product of <u>Mexico</u>	Product of <u>Denmark</u>	Product of <u>Canada and U.S.</u>	Product of <u>Mexico and U.S.</u>	Product of <u>Canada, Mexico, and U.S.</u>
\$0 ☐	\$0 ☒	\$4 ☐	\$4 ☐	\$4 ☐	\$4 ☐	\$4 ☐	\$0 ☐

Scenario 4: Which option do you prefer? (Choose one)

Keep unlabeled pork chop	Product of <u>U.S.</u>	Product of <u>Canada</u>	Product of <u>Mexico</u>	Product of <u>Denmark</u>	Product of <u>Canada and U.S.</u>	Product of <u>Mexico and U.S.</u>	Product of <u>Canada, Mexico, and U.S.</u>
\$0 ☐	\$2 ☐	\$0 ☒	\$0 ☐	\$4 ☐	\$2 ☐	\$0 ☐	\$4 ☐

Indirect Choice Experiment

- **Treatment Combinations**
 - Product (Beef or Pork)
 - Cash Endowment (\$2 or \$4)
 - Prices in CE
 - Varied between \$0, \$2, or \$4
 - Orthogonal fractional factorial experimental design
 - 27 total choice scenarios
 - blocked into 3 sets of 9 choice scenarios

Econometric Framework

□ Multinomial Logistic Model

Considering consumer utility function:

$$U_{ij} = V_{ij} + \varepsilon_{ij}$$

○ i=individual

○ j=choice option

$$V_{ij} = \alpha(\text{Price})_{ij} + \beta_1(\text{US})_{ij} + \beta_2(\text{Canada})_{ij} + \beta_3(\text{Mexico})_{ij} \\ + \beta_4(\text{Australia/Denmark})_{ij} + \beta_5(\text{USCanada})_{ij} + \\ \beta_6(\text{USMexico})_{ij} + \beta_7(\text{USCanadaMexico})_{ij}$$

Econometric Framework

□ Probability of choosing option j:

$$V_{ij} + \varepsilon_{ij} \geq V_{ik} + \varepsilon_{ik} \text{ for all } k \text{ in choice set}$$

○ k = all alternative choices other than choice j

π_{ij} = probability of choosing j before having the labeling information = $\exp^{V_{ij}} / \sum_{k=8} \exp^{V_{ij}}$

Indirect VOI Calculation

$$\square VOI = 1/\alpha [\ln \sum_{j \in C} \exp(V_j^{1*}) - \ln \sum_{j \in C} \exp(V_j^{0*}) - \sum_{j \in C} \pi_j^{0*} (V_j^0 - V_j^{0*})]$$

- V_j^{1*} = consumer's perception of quality after MCOOL
- V_j^{0*} = consumer's perception of quality before MCOOL
- V_j^0 = true quality before labeling (thus equal to V_j^{1*})
- π_j^{0*} = probability of choosing option j before MCOOL

Indirect VOI Results



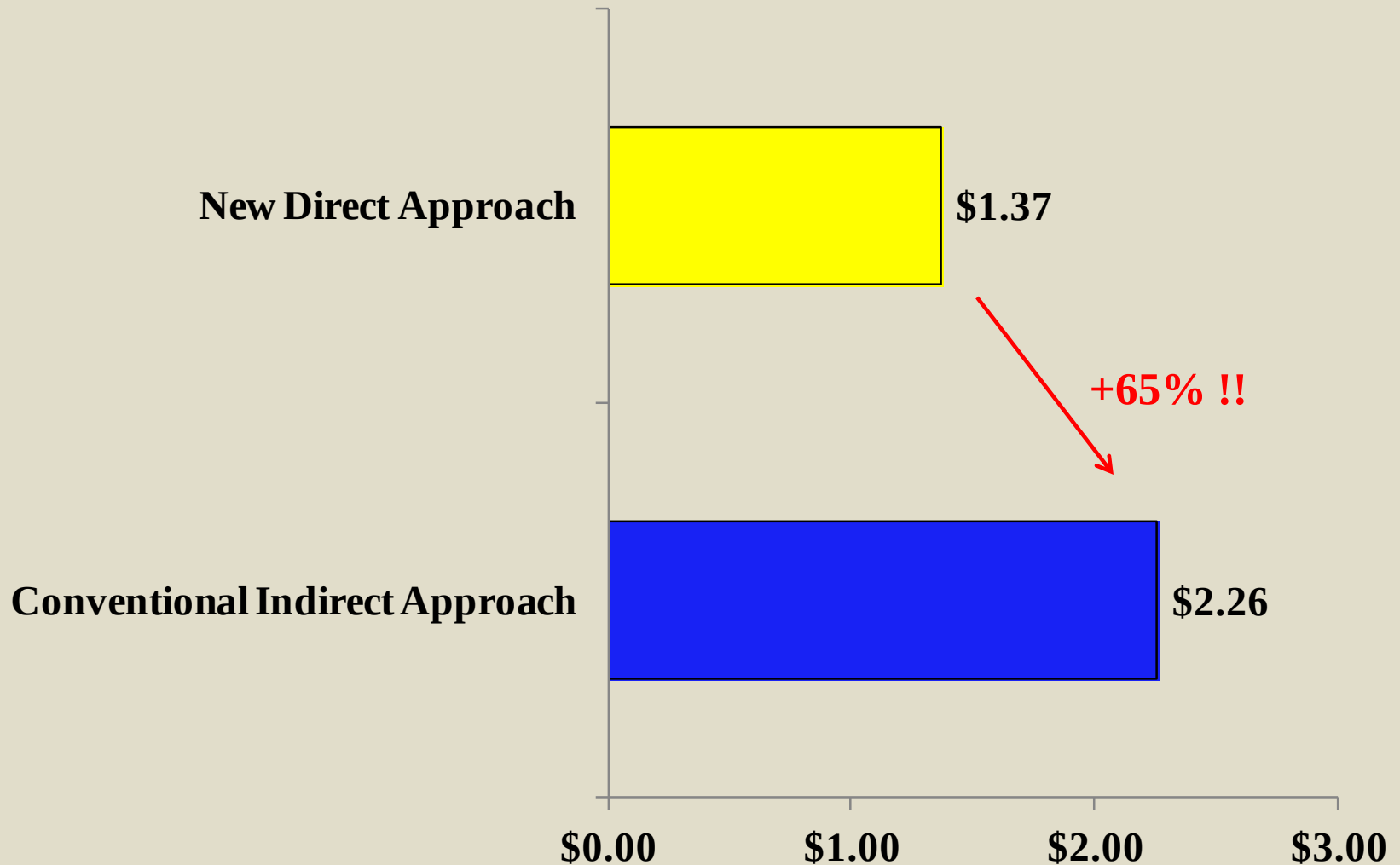
MNL Estimates

Parameter	Estimate
Price (α)	-0.464**
Product of US (β_1)	2.006**
Product of Canada (β_2)	-0.752**
Product of Mexico (β_3)	-2.701**
Product of Australia or Denmark (β_4)	-0.799**
Product of US and Canada (β_5)	0.018
Product of US and Mexico(β_6)	-1.541**
Product of US, Canada and Mexico (β_7)	-1.073**
** denotes statistical significance level of 1% or lower	

MNL estimates

- Implied mean indirect VOI
 - \$2.26 [2.04, 2.51]
- Insignificant Variables
 - Product (beef or pork)
 - Location (Dallas or San Antonio)
 - Cash Endowment (\$2 or \$4)
- Significant Variables
 - a 1 unit increase in ethnocentrism increases WTP for US vs. unlabeled by \$0.86

Direct vs. Indirect VOI



Conclusions

- Method for eliciting VOI matters a great deal
- Why the divergence?
 - procedural invariance
 - differences in complexity of the tasks
 - assumptions of the Foster/Just and Leggett models may not reflect how these consumers value information
- Which approach is better?



Conclusions

- Do the results justify the MCOOL law from a cost-benefit standpoint?
- The values \$1.37-\$2.26 per choice seem very large!
- But, how do we aggregate?
 - The values are lower for heavier meat consumers
 - People typically buy about 2lbs per choice
 - Do the values extend to other lower-value cuts?
 - These factors lower the benefit estimate to \$0.09/lb
- Other philosophical issues remain
 - does the fact that VOI is driven mainly by ethnocentrism have anything to do with Canada and Mexico's arguments?
 - How's the current law even working?

Knowledge of MCOOL

Question:

Are grocery stores in the U.S. required by law to indicate the country of origin for all fresh beef or pork products?

Yes



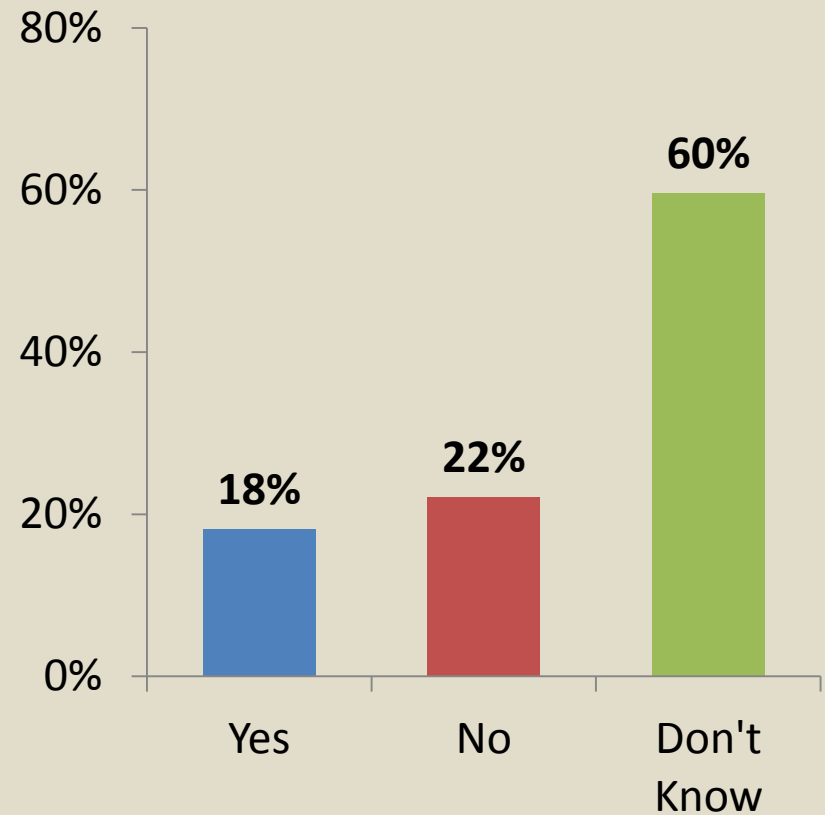
No



Don't Know



Percentage (%) Participants



What does this mean?

Look for Labels?

Question:

When you purchase fresh beef at the grocery store, do you look for a country of origin label?

Every time



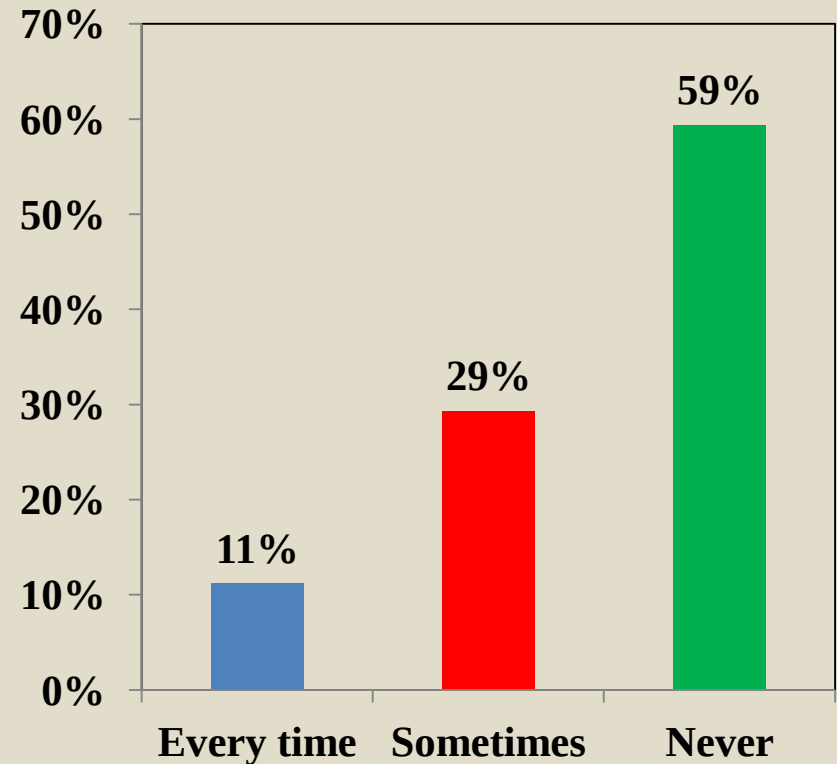
Some times



Never



% of Respondents



What does this mean?

Conclusions

- Where is the evidence that the current policy is actually benefitting consumers?
 - we are currently working with scanner data to see if we can observe any changes in meat purchases after the MCOOL came into effect
- Where is the market failure?
 - just because consumers value origin information doesn't mean we need a law