Consumer Preferences for Animal Welfare Attributes: The Case of Gestation Crates

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Introduction/Problem Statement

- Animal welfare is a growing issue with U.S. consumers
  - State-specific changes: FL, AZ, OR, CO, CA???
  - Burger King and others are sourcing %X from "crate-free sources"

- Information is needed on perceptions, beliefs, and views on alternative animal rearing practices (Norwood & Lusk)

- Bans on typical production practices may not be optimal

- Are preferences associated with farm size and/or other implicit attributes?

Research Design/Data Used

- Nov. 2007, mailed 1,000 surveys in MI
  - 26% response rate; 205 completes available for CE

- Conduct choice experiments
  - 8 scenarios
  - 3 Information treatments:
    - Base Info., Consumer Group Info., and Industry Info.

Pork Attributes & Levels in CE:

Pork Chop Attribute	Option A	Option B	Option C
Price ($/lb.)	$3.49	$6.49	
Avg. Farm Size	Large	Small	
Production Practice	Labeled Gestation Crate-Free	Gestation Crate Ban	Neither A nor B is preferred
Country of Origin	US	Canada	
I choose …			

- Country:
  - U.S., Canada, Brazil
- Farm Size:
  - Small (<75%), Median (< >50%), Large (>75%)
- Prod Practice:
  - Typical, Labeled Gestation Crate-Free, Gestation Crate Ban

Random Utility Model Setup

- Systematic portion of utility:

$$V_{ijt} = \alpha' P_{ijt} + \beta_i \mathbf{x}_{jt} \qquad \forall\ j = A, B \qquad\qquad V_{ijt} = \delta \qquad \forall\ j = C$$

- 6 effects coded attribute variables

$$\mathbf{x}_{jt} = [Small_{jt}, Large_{jt}, Crate\ Ban_{jt}, Labeled\ Crate\ Free_{jt},$$
$$Canada_{jt}, Brazil_{jt}]$$

- 3 models: MNL, RPL, LCM:
  - RPL: Normally distributed & correlated X vector
  - LCM: 4 segment model w/o membership covariates

Use of Estimated RUM Models

- Estimate WTP
- Test if WTP G.C. Ban > WTP Labeled G.Crate-Free
  - Necessary to economically justify state-wide ban
  - Test if public good benefits outweigh private option loss
    - (Carlsson, Frykblom, and Lagerkvist, 2007 AJAE)

- Estimate welfare effects of gestation crate ban
  - Max exp utility: $CV = \ln(\sum e^{V_j}) + C$

  - Welfare change from state A to B is: $\frac{1}{MUI}(CV^B - CV^A)$

Results

- MNL rejected for RPL and LCM-4
- Insensitive to information treatments

- RPL model:
  - Heterogeneity of *Small* & *G.C. Ban*
  - *Small* is positively correlated with both *G.C. Ban* & *Labeled G.C.-Free*
    - Suggests farm size is a closer substitute for crate use

Results: LCM-4 WTP Estimates

ATTRIBUTE	Segment 1 (32%) "Pork Enjoyers"	Segment 2 (33%) "Attribute Conscious"	Segment 3 (14%) "Price Conscious"	Segment 4 (20%) "Ban Preferring"
Small (vs. Median)	$0.48 [$-0.07, 1.09]	$0.99 [-$0.23, 2.60]	($0.21) [-$1.70, 1.69]	($0.52) [-$1.42, 0.46]
Large (vs. Median)	($0.70) [-$1.36, -$0.15]	($0.89) [-$2.32, 0.40]	$0.98 [-$0.50, 2.73]	$0.17 [-$0.81, 1.11]
Gestation Crate Ban (vs. Typical)	($1.00) [-$1.58, -$0.45]	($3.39) [-$5.44, -$1.99]	$0.73 [-$0.97, 2.30]	$5.62 [4.18, 7.41]
Labeled G.Crate-Free (vs. Typical)	$0.84 [0.30, 1.39]	$1.86 [0.50, 3.49]	($0.08) [-$1.68, 1.75]	$3.13 [2.08, 4.39]
Canada (vs. US)	$0.33 [-$0.28, 0.99]	($2.29) [-$4.05, -$0.83]	($1.68) [-$4.03, 0.20]	$0.64 [-$0.30, 1.57]
Brazil (vs. US)	($2.90) [-$3.72, -$2.19]	($13.13) [-$20.00, -$9.00]	($0.89) [-$3.51, 1.11]	($5.35) [-$7.19, -$3.93]
Opt Out	($6.88) [-$7.54, -$6.35]	($0.72) [-$2.06, 1.49]	($0.23) [-$1.73, 3.43]	($3.62) [-$4.14, -$3.06]

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Results: Can a State-Wide Ban be Economically Justified???

- Does WTP G.C. Ban > = WTP Labeled G.Crate-Free ?

Model/Segment	Gestation Crate Ban vs. Typical [a]	Labeled Gestation Crate-Free vs. Typical [a]	p-Value [b]
1 Segment Model	($0.32)	$1.13	0.999
Random Parameters Model	$0.34	$2.11	0.972
LCM-Segment 1 *"Pork Enjoyers"*	($1.00)	$0.84	0.999
LCM-Segment 2 *"Attribute Conscious"*	($3.39)	$1.86	0.999
LCM-Segment 3 *"Price Conscious"*	$0.73	($0.08)	0.228
LCM-Segment 4 *"Ban Preferring"*	$5.62	$3.13	0.005

- 20% in LCM segment 4: only group w/ utility supporting ban
- Fail to reject equality in segment 3 (14%)
- Reject ban using MNL or RPL model and 65% in LCM segments 1 & 2

Results: Welfare Effects of Ban

	Labeled Gestation Crate-Free pork available Millions of dollars/year	Labeled Gestation Crate-Free pork NOT available Millions of dollars/year
LCM-Segment 1 (32%)	($147.71) [-$369.27, -$44.31]	($97.31) [-$255.45, -$26.07]
LCM-Segment 2 (33%)	($7,194.63) [-$12,605.41, -$3,951.75]	($3,853.95) [-$6,872.50, -$2,072.79]
LCM-Segment 3 (14%)	($308.62) [-$1,527.88, -$31.62]	($154.31) [-$706.40, -$13.72]
LCM-Segment 4 (20%)	($1,996.50) [-$3,218.73, -$1,180.95]	($731.90) [-$1,285.51, -$427.04]
WTD POP AVG:	($2,864.00)	($1,470.93)

- Assumes no production cost adjustments & hence no overall pork price changes --- so welfare effects may be understated

Implications

- Consumers are rather heterogeneous regarding g.c. use

- Free market alternatives to bans on production practices may be optimal

- Given close voting on ballot initiatives, implications of "ban preferring" segment disproportionally voting may be huge.
  - Desires/voting behavior of a select few impacts the welfare of all consumers with altered product choice sets

- Pork industry: encourage voluntary disadoption?

Extensions

- How do consumers value alternative methods of gestation crate disadoption?
  - Is indoor group sufficient or is outdoor access really preferred?

- Are animal welfare preferences coupled with food safety, quality, locally grown, or other factors implicitly associated by consumers?

- Related issues:
  - What drives ballot initiative voting behavior? Slippery slope?
  - For those reducing consumption b/c of welfare, how are other meats and non-meats gaining?
  - How do consumers value "X% crate-free sourced" by restaurants?

QUESTIONS

- Tonsor's website (includes presentation & paper):
  - http://www.msu.edu/user/gtonsor/