

Consumer Interest in Animal Welfare: The Impact on Willingness-to-Pay for Organic and Local Fluid Milk

PRESENTED BY

XUAN CHEN

PENNSYLVANIA STATE UNIVERSITY

WITH ADAM N. RABINOWITZ, UNIVERSITY OF GEORGIA

YIZAO LIU, PENNSYLVANIA STATE UNIVERSITY

AND BENJAMIN CAMPBELL, UNIVERSITY OF GEORGIA

Concerns of Animal Welfare

- Agriculture in general has been facing increasing public scrutiny of production practices.
- In particular, dairy farmers face consumers concerns about dairy cow welfare issues.
 - repeated pregnancy
 - short calving intervals
 - overproduction of milk
 - restrictive housing systems
 - physical disorders
- It is crucial to prioritize public relations and reduce the externalities to ensure a long-term industry viability.

Demand for organic and local products

- The demand has grown considerably as consumers focus on:
 - fresher
 - healthier
 - better tasting
 - environmental friendly
- Animal welfare can be used as an indicator of safety and healthiness (Harper and Makatouni, 2002).
- Animal welfare can translate into changes in purchasing behaviors of organic and local products and generate economic impacts.

Research Question

This paper is to assess the impact of **consumer interest in animal welfare** on consumers' **willingness-to-pay** for organic and locally branded milk.

Contributions

1. For animal welfare issues:

shed light on the **effectiveness of policies to deal with public concerns** by illustrating how animal welfare concerns translate into changes in purchase behaviors.

2. For promotion of organic and local products:

show the **importance of marketing strategies** of highlighting animal welfare and environmental impacts.

Survey and choice experiment

- Internet survey of milk drinking consumers
 - All six New England states (CT, MA, RI, ME, VT, NH)
 - Completed in June 2015.
 - 906 Respondents
- Each consumer presented with 8 choice sets containing 3 choices plus a “no option”
- 9 attributes chosen for this experiment
- Package size was specified as a half-gallon container

Attributes

Price	2.49	3.69	4.69	5.49
Fat content	whole	2%	1%	fat free
USDA Organic Certified	Yes	No		
Non-GMO Verified	Yes	No		
rBST/rBGH free	Yes	No		
No Artificial Growth Hormone Used	Yes	No		
Antibiotics free	Yes	No		
HACCP Certified	Yes	No		
Geographic region of production	[Respondent State]	New England	None	

Example Question for Choice Experiment

Question: Assume you are purchasing half gallon of milk, which option would you purchase?

- 1. \$2.49**
 - Whole
 - Antibiotics Free
 - No Artificial Growth Hormone Used
- 2. \$4.69**
 - Low-fat (1%)
 - Non-GMO Verified
 - HACCP Certified
 - No Artificial Growth Hormone Used
- 3. \$5.49**
 - Reduced-fat (2%)
 - Non-GMO Verified
 - rBST/rBGH Free (FDA states: no significant difference in milk from cows treated with rBST/rBGH)
 - USDA Organic Certified
 - New England Produced
- 4. No Option**

Econometric Model-Latent class model

$$U_j = \beta_0 + \beta_1 X_{j1} + \beta_2 X_{j2} + \dots + \beta_k X_{jk} + \varepsilon_j$$

$$P_{ijt|q} = \text{Prob}(y_{ij} = j | \text{class} = q) = \frac{\exp(x'_{jt}\beta_q)}{\sum_{j=0}^{J_i} \exp(x'_{jt}\beta_q)}$$

$$H_{iq} = \text{Prob}(\text{class} = q) = \frac{\exp(z'_i\theta_q)}{\sum_{q=1}^Q \exp(z'_i\theta_q)}$$

x_{jt} : Product attributes

z_i : Consumers demographic information and the attitude to animal welfare

Data

Variable	Mean	Std. Dev.
Gender	0.348	0.476
Age	53.1	15.6
High School	0.183	0.387
College	0.317	0.465
Bachelor	0.274	0.446
Graduate	0.157	0.364
Caucasian	0.848	0.359
Income	66.973	48.514
Primary	0.798	0.401
Child	0.401	0.844
CT	0.241	0.427
MA	0.358	0.479
NH	0.097	0.296
RI	0.105	0.306
ME	0.098	0.298
VT	0.102	0.302
Artificial Growth Hormones	66.8	30.0
Cow's environment	62.8	28.6
Tail docking	48.8	29.9

Results

Estimated Parameters in the Latent Class Model

Variable	Class 1 (43.6%)		Class 2 (30.3%)		Class 3 (26%)	
	Coeff.	Std. Err.	Coeff.	Std. Err.	Coeff.	Std. Err.
Price	-0.998 ***	0.040	-0.310 ***	0.032	-0.782 ***	0.065
Reduced Fat	1.390 ***	0.155	0.444 ***	0.090	-1.818 ***	0.184
Low Fat	2.507 ***	0.152	-0.215 ***	0.082	-2.513 ***	0.288
Skim Milk	2.157 ***	0.143	-1.429 ***	0.113	-3.614 ***	0.345
Organic	-0.091	0.071	0.450 ***	0.059	0.408 **	0.160
Local	0.143	0.100	0.290 ***	0.072	0.139	0.134
New England	0.176 *	0.093	0.357 ***	0.071	0.197	0.126
Antibiotics free	-0.010	0.063	0.001	0.061	0.231	0.179
rBGH/rBST free	-0.301 ***	0.081	0.487 ***	0.092	0.215	0.154
non-GMO	-0.351 ***	0.071	0.029	0.069	-0.176	0.150
HACCP	-0.114	0.077	0.148 **	0.065	-0.087	0.153
Hormone free	0.584 ***	0.091	0.242 ***	0.074	-0.190	0.192
None	-2.388 ***	0.148	-2.782 ***	0.217	-2.412 ***	0.314

Results

Estimated Parameter Values on Class Membership Variables

Variable	Class 1 (43.6%)			Class 2 (30.3%)		
	Coeff.		Std. Err.	Coeff.		Std. Err.
Artificial Growth Hormones	-0.002	*	0.001	0.000		0.001
Cow's environment	0.001		0.001	0.000		0.001
Tail docking	0.001	*	0.001	0.000		0.001
Age	-0.014	**	0.007	-0.028	***	0.008
Gender	-0.165		0.219	0.131		0.233
Caucasian	0.174		0.401	-0.464		0.375
Primary	0.085		0.247	0.330		0.272
MA	0.109		0.241	0.010		0.262
NH	-0.087		0.343	-0.034		0.387
RI	-0.210		0.341	0.059		0.355
ME	0.179		0.366	-0.145		0.408
VT	-0.419		0.333	-0.195		0.359
Income	-0.002	**	0.001	0.001		0.001
High School	-1.092	***	0.323	-0.480		0.364
College	-1.008	***	0.291	-0.032		0.333
Bachelor	-0.244		0.304	0.221		0.342
Child	0.002	**	0.001	0.227	**	0.105
Constant	1.936	***	0.595	1.929	***	0.640

Results

Willingness-to-Pay Estimates

Variable	Class 1 (43.6%)	Class 2 (30.3%)	Class 3 (26%)
Reduced Fat	1.39	1.43	-2.32
Low Fat	2.51	-0.69	-3.21
Skim Milk	2.16	-4.61	-4.62
Organic	-0.09	1.45	0.52
Local	0.14	0.94	0.18
New England	0.18	1.15	0.25
Antibiotics free	-0.01	0.00	0.30
rBGH/rBST free	-0.30	1.57	0.28
non-GMO	-0.35	0.09	-0.23
HACCP	-0.11	0.48	-0.11
Hormone free	0.59	0.78	-0.24
None	-2.39	-8.98	-3.08

Conclusion

Consumers more likely to prefer locally or regionally branded products are also to be concerned about animal welfare. These are younger and higher educated consumers who have children.

Organic buyers and non-organic buyers are caring different aspects of animal welfare.

We need to recognize that externalities exist from these issues where non-milk consumers may experience further disutility that is not captured by studies focused on milk consumers.

Thank You!

Comments and suggestions
are welcome...