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STATE BRANDED PROGRAMS AND CONSUMER PREFERENCE FOR LOCALLY GROWN PRODUCE

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Poster prepared for presentation at the Agricultural & Applied Economics Association's 2010 AAEA, CAES & WAEA Joint Annual Meeting, Denver, Colorado, July 25-27, 2010.

BACKGROUND

- Promotion of local agriculture began in 1930s
 - Agriculture Markets Agreement Act of 1937
 - Earmarking of assessments on agricultural sales toward commodity promotion and research
 - 261 state-legislated commodity promotion program identified by 1989
 - Washington Apples, Florida Citrus, California Peaches
- Famer-to-Consumer Direct Marketing Act of 1976
 - Used by states to combat interstate competition and depressed commodity price
 - Stagflation following the 1973 oil crisis
 - Michigan, Kansas, and Massachusetts introduced first state branding programs
- Reagan era saw federal programs shifted to states via block grants
 - 17 state brand programs were established in the 1980s, followed by eight more in the 1990s
- Emergency Agricultural Act of 2001 saw a near doubling of state brand programs
 - \$160 million to promote specialty crops and \$45 million in matching funds
- 41 programs in total by 2008

PURPOSE AND HYPOTHESIS

- Growth in the popularity of locally grown
 - Expansion of Farmers' Markets (FM) and Community Supported Agriculture (CSA)
 - 150% growth in FM registry from 1994-2006 to over 4,300
 - CSAs grow from 50 in 1990 to over 1000 in 2008
 - Amendment in Farmer-to-Consumer Direct Marketing Act in 2008
 - FM promotion program provided \$15 million in grant funding for the marketing of local food
 - Growth in number of state branding programs
 - Brand managers need to identify "best practices"
 - Appropriately positioned brands will help local producers capture a larger share of consumers' food budget
 - Potential to generate higher and more stable farm incomes

- Consumer Perception and Preference
 - Identifying key attributes to help align brand value proposition
 - Identifying impact of brand awareness on purchase frequency
 - Understanding how consumers perceive locally grown in relation to food safety
 - Difference in WTP measures between a fresh produce product with recent food safety recall and one without such a recall
 - Difference in WTP for State or National certification in the local market

- Attributes of a successful state brand
 - Membership composition, funding sources, and program age
- Consumer WTP for local produce
 - If the Arizona Grown brand represents food safety then Spinach should exhibit higher WTP than Carrots
 - Traceability is a public good and should have negative WTP
- Demographic variables affect utility
 - Age, income and education
- Purchase behavior
 - Brand awareness, safety perception, and local support index will positively impact purchase frequency and WTP for locally branded produce

METHODOLOGY

- Three Methods Used
 - Simple descriptive statistics and t-tests were used to identify attributes that had an impact on the success of state brand programs
 - Conjoint analysis was conducted to identify differences in preference for local produce product that has had a recent food safety recall (spinach) and one that has not (carrots)
 - A RUM was used to determine the marginal impact of attributes and estimate WTP for traceability and local vs. national certification
- Phase I: State Brand Programs
 - Secondary data collection began in Jan. 2008
 - Five common categories found: funding sources, membership compilation, marketing assistance, promotional activities and age of program
 - Success metric was defined as membership totals
 - Thirteen attributes identified and questionnaire was created to administer to each state department of agriculture
 - Membership means were calculated for each attribute by +/- response
 - ANOVA and T-tests were conducted to test significance of mean differences
- Phase II: Consumer Choice Analysis
 - Focus group and key person interviews
 - Food safety and traceability identified as key concern
 - Conjoint analysis was chosen to capture trade-offs between attributes
 - Since no market data exists for Arizona Grown a hypothetical choice environment was created for product origin, traceability, certification, and price

- Conjoint Random Utility Model (RUM)
 - Estimates the probability that the utility gained by the individual i selecting good j is greater than all other alternatives in the choice set

$$PROB_{ij} = P[(V_{ij} + \varepsilon_{ij}) > (V_{ia} + \varepsilon_{ia}; a = 1, 2, \dots, J, a \neq j)]$$
 or
$$P[(\varepsilon_{ij} - \varepsilon_{ia}) < (V_{ij} - V_{ia})]$$
 - Describing the density function of the normally distributed error term, the above probability is given by:

$$P_i = \int Z_i (\varepsilon_i < V_S - V_{NS}) f(\varepsilon_i) d\varepsilon_i$$
 - Where Zi is an indicator variable that equals 1 when the term inside the parenthesis is true and 0 otherwise (Train 2002)
- Probability in a Multinomial Logit
 - Under the logistic distribution assumption for the random error term, the probability Pi of individual i choosing product j must now be expressed as (Louviere et al., 2000):

$$P_i = \frac{1}{\sum_{j=1}^J} \exp - (V_i - V_j)$$

- Marginal effects
 - The estimated coefficients do not directly represent the marginal effects of the independent variables on the probability of choice
 - Since the explanatory variables are discrete:

$$\frac{\partial P_i}{\partial x_{ij}}$$
 does not exist; instead we use a binary explanatory variable 1/0.
 - The marginal effect is determined as (Train, 2002):

$$\frac{\partial P_i}{\partial x_{ij}} = P(x_{ij} = 1) - P(x_{ij} = 0)$$
- WTP
 - We evaluate WTP as expenditure minimization constrained by a given level of utility (Lusk and Hudson, 2004)
 - To identify the change of a good's quality, the value measurement becomes

$$WTP = M(p, U, q_0) - M(p, U, q_1)$$

Where p is the price of the good; q is the quality of the good; and U is the constant level of utility. Using this approach, WTP is the amount a consumer would be willing-to-pay for the respective increase in quality, maintaining constant utility

- Final model specification with hypothesized signs:

$$Y = \beta_1 - \beta_2 PRICE + \beta_3 TRACE + \beta_4 AZG + \beta_5 USDA + \beta_6 AWARE + \beta_7 AZGSAFE + \beta_8 AZGLCLSP + \beta_9 AZGAGE + \beta_{10} AZGINC + \beta_{11} AZGEDU + \varepsilon$$

RESULTS

Phase I: State Brand Programs
t-test for mean difference at .10 significance
H0 : m1=m2

Groups	Count	Mean	P-value	Hypothesis
federal funding	20	333	0.01	Reject
no federal funding	21	903	0.01	Reject
state funding	33	689	0.07	Reject
no state funding	8	363	0.07	Reject
funding sources >1	23	428	0.06	Reject
funding sources <=1	18	877	0.06	Reject
commodity group members	29	783	0.00	Reject
no commodity group members	12	244	0.00	Reject
providing mark assistance	31	706	0.09	Reject
not providing mark assistance	10	374	0.09	Reject

Phase II: WTP Estimates for Locally Grown

	Carrot	Spinach
Marginal Utility of Income	\$11.79	\$18.25
Traceability	-\$0.41	-\$0.51
Certified Arizona Grown	\$0.17	\$0.26
Certified USDA	-\$0.14	\$0.08

Brand Awareness on Purchase Frequency
t-test for mean difference at .10 significance
H0 : m1=m2

Brand Awareness	Sample Size	Mean	t-stat
Aware	140	2.49	-6.02
Unaware/Unsure	173	3.24	-6.02

* Purchase scale is 1=daily, 2=weekly, 3=bi-monthly, 4=monthly, 5=never

Phase II: Overall Fit of Choice Model

- Log-likelihood at convergence = $-2(LL_J - \sum LL_i) = 42$
- Critical Value @ .005 significance = 25.88
- Pseudo R-squared = $\rho^2 = 1 - (L^* (\hat{\beta}) / L^* (O))$

	Carrot	Spinach
No. of Observations	6838	6827
Likelihood Function Value	-4575.63	-4336.31
Pseudo R-squared	0.424	0.468
Chi-Squared Statistic	6741 (p=.000)	7631 (p=.000)
Percentage of Correct Predictions	66%	66%

Phase II: Parameter Estimates and Marginal Effects for Carrots

Product Specific Attribute	Y=1	Marginal Effects	Y=2	Marginal Effects	Y=3	Marginal Effects
Constant	-7.44	-0.261	-6.32	0.259	-4.8	0.0019
Price	11.79	0.046	11.59	-0.047	11.8	0.00099
Traceability	4.83	-0.099	5.26	0.1	4.57	-0.0004
Certified AZ Grown	-1.97	-0.116	-1.47	0.118	-3.5	-0.0015
Certified USDA	1.72	0.291	0.47	-0.292	1.27	0.00002
Aware of AZG Brand	0.976	0.054	0.743	-0.054	0.7	-0.0001
AZG is safer	-0.42	0.006	-0.45	-0.006	-0.82	-0.0003
AZG is more supportive of local economy	0.24	0.034	0.09	-0.034	-0.07	-0.0002
Arizona Grown*Age	-0.91	-0.011	-0.85	0.013	-2.79	-0.0017
Arizona Grown*Income	1.66	0.006	1.63	-0.005	1.58	-0.00006
Arizona Grown*Education	1.08	0.023	0.99	-0.02	-2.06	-0.0027

*Bold is used to indicate significance at the .1 level.

Phase II: Parameter Estimates and Marginal Effects for Spinach

Product Specific Attribute	Y=1	Marginal Effects	Y=2	Marginal Effects	Y=3	Marginal Effects
Constant	-12.71	-0.188	-11.92	0.188	-9.52	0.0002
Price	18.25	0.031	18.11	-0.031	18.33	-0.00001
Traceability	9.34	-0.17	10.06	0.17	9	-0.00004
Certified AZ Grown	-4.79	0.032	-4.93	-0.031	-19.4	-0.001
Certified USDA	-1.45	0.288	-2.68	-0.288	-1.85	0.000005
Aware of AZG Brand	-1.99	0.035	-2.14	-0.035	-2.32	-0.00002
AZG is safer	-0.32	-0.005	-0.29	0.006	-0.67	-0.00003
AZG is more sup. of local economy	0.72	0.041	0.54	-0.04	0.3	-0.00003
Arizona Grown*Age	0.19	-0.018	0.27	0.018	-2.51	-0.0002
Arizona Grown*Income	0.43	0.002	0.42	-0.002	0.48	0.000004
Arizona Grown*Education	1.87	0.012	1.82	-0.012	0.66	-0.00009

*Bold is used to indicate significance at the .1 level.

CONCLUSIONS

Phase I: State Brand Programs

Attributes of a successful state brand program are

- Uses state funding
- Has a single funding source
- Includes commodity group members/Provides marketing assistance
- Federal funding had significant negative impact on success, as this has declined in recent years.
- Charging member fees and length of time a program has been established were insignificant

Phase II: Consumer perception, stated preference and brand awareness

- Less than half of the respondents were aware of the Arizona Grown brand
 - Those that were aware purchase locally grown almost twice as frequently
- A rebranding effort of the Arizona Grown program should highlight attributes of: support for local farmer/economy, superior taste and freshness, a safe food supply in the value proposition
- Phase II: WTP estimates
 - Higher premium for local brand when considering food that has had a recent food safety recall
 - Consumer's perceive AZ Grown as safer than USDA
 - Negative WTP for traceability
 - Consumer's rated traceability second to last in importance
 - Public Good

Phase I findings show five program attributes had significant effects on membership totals: the existence of state/federal funding, consistent funding sources (e.g., membership fees), the inclusion of commodity groups' members, and the provision of marketing assistance were associated with increased membership. These attributes provide an indication for best practices to increase membership for the respective states. Further F-test results suggest that decreasing federal funding, along with inconsistent multiple funding sources, were associated with significantly lower membership rates.

Phase II findings reveal that consumers are willing to pay a premium of \$0.26 per pound for locally grown spinach marked with the Arizona Grown label over locally grown spinach that was not labeled. This premium was higher than the \$0.17 premium that would be paid for state-branded carrots. This difference highlights consumers' perceptions of locally grown as an indicator, or "cue," of safety in their food supply. Additionally, local produce bearing the Arizona Grown label had a higher WTP than local produce labeled USDA certified. The gap between labels was lessened, but still significant when associated with spinach. This result corroborates the association consumers have between local food and safe food. Interestingly, traceability carried a negative WTP in both commodities; this may be explained by it being an *ex post* attribute that is regarded as a public good.