Demand for Pasture-Raised Livestock Products in Michigan: Results of Consumer Surveys and Experimental Auctions

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Pasture-raised livestock products present a niche-marketing opportunity for small- and medium-scale farmers; growth of this market may enhance the economic, social, and environmental sustainability of livestock agriculture. Results from an earlier statewide poll in Michigan found that consumers place great importance on product attributes associated with the pasture-based production model. This report presents findings from a combination of consumer surveys conducted at three Michigan retail locations and a series of experimental auctions. Participants in both the survey and auction components view pasture-raised beef and milk products very favorably, believing these products are healthy for humans to eat and are raised in environmentally friendly and humane ways. Survey respondents reported high likelihood of purchase; both the survey and auction subjects expressed willingness to pay a premium for pasture-raised products. We discuss these findings, particularly implications for the "four P's" of marketing.

Although humans have raised animals on pasture for millennia, promotion of pasture-raised products as different from those produced with the more common confinement method is relatively new. A working definition of pasture-raised emphasizes that animals spend their lives outdoors, on pasture (barring birthing, inclement weather, and other limited circumstances), and, particularly in the case of ruminants like cattle, forage for most (or, during the growing season, all) of their diet. Many pasture-based (PB) farmers utilize Managed Intensive Rotational Grazing, where animals are rotated onto fresh pasture, often daily, and eschew the use of added hormones, growth enhancers, and sub-therapeutic antibiotics, preferring a more natural method of production (Conner and Hamm 2005).

Our interest in pasture-raised (PR) products and PB agriculture in general has two principal motivations. First, selling PR products provides a niche-market opportunity for farmers wishing to pursue a product-differentiation strategy that meets demand for specific attributes (Lancaster 1974; Porter 1985). Attributes that may credibly be touted include improved animal welfare (Washburn et al. 2002; Wells, Garber, and Wagner 1999, Wilson, et al., 2002) and human health (Clancy 2006). Previous studies find segments of consumers willing to pay a premium for pasture-based products (Cox et al. 2006; Pirog 2004; Thilmany, Grannis, and Sparling 2003; Umberger et al. 2002).

Second, growth in the market and incidence of PB agriculture would enhance the sustainability of livestock agriculture in general. In the context of the environment, compared to row crops (the feed source for confinement operations) pastures produce greater carbon sequestration and less sediment and phosphorus (Bishop et al. 2005; Digiacomo et al. 2001; Guo and Gifford 2002). Economically, grazing dairy farms incur lower costs and earn more profit per cow and per hundredweight of milk (Conner et al. 2007). The pasture-based model, with its lower investment costs, has been cited as a good option for start-up and transitioning farmers (Conner et al. 2007; Kriegl n.d.). Socially, the PB model offers improved quality of life for farmers (Ostrom and Jackson-Smith 2000; Taylor and Foltz 2006) and may avoid the community disputes commonly encountered by large-scale confinement farms (Conner and Hamm 2005; Ferretti 2007; Lydersen 2007).

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Previous Research

Previous research in Michigan finds that many PB farmers are promoting their products on the basis of high standards of animal and environmental stewardship and of natural (i.e., no added hormones or antibiotics) qualities. Several farmers identified the need for help with pricing and promotion (Conner and Hamm 2005).

A series of questions on a representative state-

wide poll in Michigan (Conner, Campbell-Aravi, and Hamm 2007) measured how consumers view these attributes and their associated behaviors toward and perceptions of pasture-raised products. Attributes concerning how the animals were raised scored very high: about two-thirds rated environmentally friendly, raised without hormones and antibiotics, and humanely raised as "very important," with roughly another 25 percent stating these attributes are "somewhat important."

Building on these findings and addressing a number of unanswered questions, we conducted further research on this topic, with the following objectives:

- Measure consumers' awareness of and beliefs about PR products
- Compare the effectiveness of different informational messages
- Measure consumer's likelihood of purchase and willingness to pay (WTP) premiums on PR products
- Provide pricing and promotion information to producers and vendors

Methods

This project used two complementary methods: written surveys and experimental auctions. Surveys gather rather large amounts of information at relatively low cost, while experimental auctions address a shortcoming of contingent valuation-type surveys by imposing a budget constraint onto willingness to pay questions (Buzby et al. 1998).

We used a two-page written survey that was administered to shoppers at three retail stores in Michigan: an independent grocery store and a cooperative natural foods store in East Lansing, and a cooperative natural foods store in Ann Arbor. These stores were chosen because they sell pasture-raised and other alternative livestock products and were good locations to encounter likely consumers of PR products, our target subjects. The choice of stores also ensured that consumers had access to the products. An intercept sampling method was used.

The survey began with definitions of "pasture-raised" and "confinement-raised" products. Equal numbers of consumers (approximately 25 percent each) filled out surveys that contained one of three messages touting the efficiency of the confinement system or the increased animal welfare or environmental benefits of the pasture-raised system; a fourth group received no message, serving as a control. Both the definitions and messages were developed in consultation with a professor of Animal Science at MSU. This part of study has similarities to research of Gifford and Bernard (2004), who measured consumer response to differing messages about organic products.

The survey asked if the respondent had heard of and bought PR products ("yes" or "no" for each), then to rate their agreement with a number of statements on a four-point Likert scale (strongly disagree, somewhat disagree, somewhat agree, strongly agree) with each of three statements about PR products: that compared to confinement raised products, PR products are (i) healthier for people to eat, (ii) produced in a more environmentally friendly way, and (iii) better for animals' welfare.

Next, the consumer was asked to consider the choice between two products, one labeled "pasture-raised" and the other with no such label, but otherwise identical in price, size, appearance, quality, and freshness,. First, they were asked to rate on a five-point scale how likely they are to buy pasture-raised beef and milk. They were then given anchor points of $3.99 per pound for unlabeled beef and $2.99 per gallon for unlabeled milk and asked the most they would be willing to pay for the items labeled "pasture-raised." The final section of the survey measured the respondents' socio-demographic attributes: year of birth, sex, education level, race or ethnicity, marital status, household size (total and members less than 18 years old), employment status, and income. Copies of the survey, including definitions and messages, are available from the authors.

As a comparison to the stated-choice WTP, we then conducted a series of three experimental second-price English auctions measuring consumers' WTP for pasture-raised milk. A total of 63 people took part in an experiment between March and June 2007. The first experiment (N = 22) was conducted with students in an environmental decision-making class at Michigan State University (MSU). The second (N = 23) took place in an MSU classroom, using subjects recruited from the authors' department faculty, staff, and graduate student email lists and from the newsletter of MSU's Student Organic Farm. The third session (N = 18) was at an East

Lansing, Michigan church with active environmental-justice and hunger ministries.

The instructions gave an overview of second-price English auctions (including, in lay terms, a discussion of its dominant strategy property, suggested by Hoffman et al. (1993)), and included brief definitions of pasture-raised and confinement-raised livestock products (the same definitions as were given on the retail surveys). Each participant also completed a survey with the same behavioral, attitudinal, and demographic questions as in the aforementioned retail survey.

Each participant was given a $25 stipend for participating, used to pay for any item won. Two items were auctioned: half-gallons of 2 percent Vitamin A and D milk, one confinement-raised and one pasture-raised, purchased from a local grocery store (the actual purchase prices paid at the store were $4.49 for the PR milk and $1.99 for the regular milk). Participants were (truthfully) told that one of the bottles of milk contained a label that said, "we pasture our cows" and that the other contained no such label. In order to control for wealth effects, three trials for each item were conducted and only one was binding. The determination of order (i.e., whether the labeled or unlabeled milk was auctioned first) in the first and third rounds was determined by a coin toss. The order of the second round was the reverse of the first round. The exact number of rounds was not revealed to avoid final round biases and the binding round was determined by a random draw and not known until the end of all auctions. Participants were then given their payment and signed a receipt, concluding the experiment.

In one case, the last two participants standing sat at the same price; in this case, a coin toss determined the winner. The bid of each participant for each round was recorded. In the cases where one participant was standing at the last price, no bid was recorded, as the true reservation price is not known.

Results

Overall, survey respondents are aware of PR products and associate them with favorable product attributes. Eighty-six percent had heard of PR products and 74 percent said they had bought them in the past. Large majorities either somewhat or strongly agreed with claims about PR products (Table 1).

When asked how likely they are to buy PR beef and milk, about 70 percent said very likely to both and more than 90 percent said either very or somewhat likely. Less than three percent answered somewhat or very unlikely to either one. When asked the most they would pay, 88 percent would pay more than the anchor price ($3.99) for PR beef and 87 percent would pay a premium for PR milk. The mean WTP is $5.45 for beef and $4.05 for milk (35 percent and 37 percent premiums, respectively). The median figures are $5.00 (25 percent premium) for beef and $3.99 (33 percent premium) for milk.

We used a series of tests comparing group means to compare the effect of messages on consumers' beliefs and behaviors, specifically, do the four treatment groups (those receiving the pro-confinement, environment, and animal welfare messages and those receiving no message) have different mean responses to beliefs about PR products, purchase likelihood, and WTP? Results of a Kruskal-Wallis test (KW) indicate the messages had no significant effect. The asymptotic significance was not significant at the 0.10 level for any of the seven variables. There is no statistical difference in means between the four treatments. Table 2 shows the means for each variable for each message group.

Table 1. Survey Responses.

	Responses (percentage of respondents)			
"Compared to confinement-raised products, pasture raised products are…"	Strongly disagree	Somewhat disagree	Somewhat agree	Strongly agree
Healthier to eat	2	2	41	56
More environmentally friendly	1	4	25	69
Better for animal's welfare	2	2	16	80

The KW test did reveal significant differences among shoppers at the different locations. In general, the grocery store (i.e., not co-op) shoppers had lower means for each variable than did either group of co-op shoppers; the asymptotic significance for each of the seven variables above was less than 0.05, suggesting location had significant impact on responses. Table 3 reports the mean responses for each location group.

The auction participants were willing to pay, on average, $0.72 more for the labeled pasture-raised milk than for the unlabeled milk. The average bid over the three rounds was $1.96 for the labeled and $1.24 for the unlabeled milk, a 59-percent premium.

Discussion: Implications for the "4 P's" of Marketing

Consumers see value in the products and the attributes they embody. Second, when promoting these products, it is likely that health claims, to the extent that they can be substantiated, would be effective. USDA grass-fed standards may help to bolster consumer awareness and confidence in PR products, although many have called for stricter standards than what USDA has proposed (Burros 2006). Third, many consumers would be willing to pay more for PR products, suggesting a premium pricing strategy. As a note of caution, both methods measure WTP for a single unit purchased; neither addressed quantity or repeat purchases. Finally, place matters: the survey results suggest that cooperative natural food retail stores are good potential outlets.

Conclusions

This paper presents results of retail survey and experimental auction data which build upon previous research in Michigan and further suggest opportunity for growth in the market for PR products. Meeting demand for these products may provide

Table 2. Effects of Messages upon Beliefs, Purchase Likelihood and Willing to Pay.

	Variables						
Message	Healthier	Envir. friendly	Welfare	Likely beef	Likely milk	WTP beef	WTP milk
None	3.43	3.68	3.73	4.57	4.48	5.31	4.02
Confinement	3.50	3.60	3.80	4.52	4.57	5.42	3.99
Welfare	3.46	3.55	3.70	4.55	4.56	5.39	4.03
Envir	3.65	3.65	3.70	4.68	4.71	5.64	4.14
All	3.51	3.62	3.73	4.58	4.58	5.45	4.05

Table 3. Effect of Survey Location upon Beliefs, Purchase Likelihood and Willing to Pay.

	Variables						
Location	Healthier	Envir. friendly	Welfare	Likely beef	Likely milk	WTP beef	WTP milk
Co-op1	3.59	3.67	3.83	4.73	4.68	5.52	4.18
Co-op2	3.63	3.78	3.91	4.70	4.72	6.02	4.53
Grocery	3.39	3.50	3.58	4.42	4.45	5.08	3.68
All	3.51	3.62	3.73	4.58	4.58	5.45	4.05

Note: Coop1 = Ann Arbor; Coop2 = East Lansing.

valuable niche markets for small- and medium-scale farms and also increase the overall sustainability of livestock agriculture.

While results of this study continue to build a case for opportunity in this market, its findings are limited. First, the selection of subjects, while convenient, does not create a representative sample, making generalizations to other populations difficult. Researchers' emphasis on PR products may have biased responses, although consultation with the Animal Science Professor helped ensure more balanced wording of statements, somewhat mitigating this potential bias. Further research is needed to determine whether attitudes and behaviors stated by this project's research subjects hold true for other populations in repeated and real market settings.

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