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Regional Demand for Natural Beef Products:

Urban vs. Rural Willingness to Pay and Target Consumers

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Abstract: Interest and sales for natural meats continue to grow, with increased offerings in supermarkets and other mainstream marketing channels. Still, little is known about interest in various production attributes and methods to target likely customers. This study focuses on the market for natural meat, including freezer beef offerings, in Colorado with special attention to whether rural and urban consumers differ in their interests and propensities to purchase.

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Regional Demand for Natural Beef Products: Urban vs. Rural Willingness to Pay and Target Consumers

Prodigious growth in the organic and natural foods sector during the 1990's has led livestock producers to consider these markets as possible alternatives to the low margins received in commodity markets (Wheatly, 2001; Roosen et al, 2001; McGarry Wolf and Thulin, 2000). Following this trend, two Colorado producer cooperatives decided to investigate the feasibility of marketing their livestock as 'naturally produced' and 'locally produced' with assistance from Colorado State University. In 1998, Rocky Mountain Farmers' Union and the Colorado Community College Federation sponsored a study of consumer demand for natural beef and pork in Colorado and Northern New Mexico. Purposes of the study were threefold: to quantify consumer willingness to pay a premium for 'natural meat' products, to identify those consumers with willing to pay premiums, and to identify which properties of 'natural meats' are most important to these consumers.

Previous work with this survey has resulted in some interesting findings and conclusions (Sparling, Thilmany and Grannis, 2001; Grannis and Thilmany, 2001):

- 1. Consumers are willing to pay a higher percentage premium for natural ground beef than for natural beefsteak. At a premium of 36%, the market share of natural ground beef was estimated to be 25%..*
- 2. A substantial majority of all respondents view "no-hormones" as 'important' or 'very important.' "No antibiotics" and environmental factors are nearly as important.*

Other findings of interest include differing willingness to pay for natural meats across regions and income groups, and associations between willingness to pay and

concern about factors such as hormones, antibiotics, and environmentally sound grazing practices.

This study focuses on identifying market shares and characteristics of customers that it would be beneficial and straightforward to target, with special emphasis on how market positioning would differ between urban and rural areas. To counter concerns about access to retail outlets, we will specifically focus on demand for direct marketed freezer beef. Analysis of freezer beef market potential, together with a discussion of growing consumer awareness about health effects of various beef production systems, will conclude the paper.

The Consumer Survey

The main thrust of the study was a mail out survey using the National Family Opinion Inc. (NFO) panel. The two primary advantages of using NFO are that they guaranteed a return rate of over 60%, and extensive demographic data for all respondents and non-respondents. The target audience was determined to include three geographic regions: The Front Range of Colorado between Fort Collins and Colorado Springs, The Western Slope of Colorado, and Northern New Mexico and Southern Colorado. We focus on the Colorado Front Range, including the metro counties at the Eastern foot of the Rocky Mountains, and for comparison, the Western Slope, representing 5 counties on the Western side with a few sizable towns but in a less concentrated urban setting.

A questionnaire was designed to determine what consumers felt about the special qualities of naturally produced meats. In this context, ‘naturally produced meats’ were defined as coming from, “animals raised using sound grazing practices with no antibiotics or hormones, and never confined to small or crowded pens.” Focus groups were then held

in each of the three regions. In the process of doing these focus groups, we were surprised at how many participants bought freezer beef, so a question on interest in freezer beef was included in the final surveys. Over three thousand surveys were sent in early 1998⁴. For the full survey and details see Sparling et.al., 2001

Survey Findings

The presentation of survey findings will be divided into three sections: analysis of meat shopping choices, integration of some demographic and consumer profiles with shopping choices and willingness to pay for natural beef. Each of these sections will particularly focus on the differences between urban and rural areas. While we realize the limited value of generalizing results from any regional study, we feel this comparison will be somewhat representative of the market conditions producers face when approaching rural and urban market areas. Finally, each of these pieces is needed to describe the full set of market factors that a direct marketing plan for freezer beef needs to address.

The actual logistics of getting product to customers, directly or through retail accounts, is often the most challenging aspect of targeting a market niche (Wilson, 2002), so the initial analysis focuses on current shopping choices among consumers. Consumers were asked to identify the places where they purchased products, the amount they spent on groceries each week, and whether they had ever purchased meat identified as “natural beef.” Specifically, consumers were asked to note where they did “Most”, “Some” and “None” of their meat shopping given choices of supermarkets, natural food stores, specialty

⁴ The returned sample frequency over income and education does not differ much from the whole sample, showing no evidence of selection bias. Sample frequency over ‘life stages’ does differ substantially from the whole sample in all but the Western Slope region, resulting in an under-representation of younger households.

shops and direct from producers. Each respondent was allowed to choose all the choices that applied, so sums from the columns may not add to 100%.

Table 1 shows the percentages of purchasers reporting for the four major shopping choices from each region. Patterns differ from region to region since natural food stores and specialty shops are found primarily in urban counties. A couple of important things should be noted about this table:

1. **About 20% of urban respondents purchase at least some of their meat from either specialty shops or from natural food stores:** Over 8% for natural food stores, and over 18% for specialty shops.
2. **24% of Western Slope respondents buy at least some meat from producers:** Fully 11% of Western Slope respondents report buying “Most” and another 13% report buying “Some” of their meat from producers.

It seems that substantial ‘niche’ markets already exist in each region, with over 5% of respondents buying most of their meat outside of supermarkets, and with over 20% buying at least some of their meat outside of supermarkets in both regions.

Table 1 Regional Meat Purchase Responses by Type of Supplier

Region Type Vendor	Relative Frequency of Purchase from Vendor Percent Respondents		
	<i>Most</i>	<i>Some</i>	<i>None</i>
Front Range			
Supermarkets	89.4%	7.3%	3.3%
Natural Foods	1.2%	6.8%	92.0%
Specialty Shops	2.2%	16.2%	81.6%
Producers	3.3%	3.9%	92.8%
Western Slope			
Supermarkets	80.1%	9.6%	10.3%
Natural Foods	0.0%	2.1%	97.9%
Specialty Shops	0.0%	6.9%	93.1%
Producers	11.0%	13.4%	75.6%

Consumers who buy directly from producers form a surprisingly sizable segment. Referring to Table 1, we see that in the rural regions, at least one in four families report

buying at least some beef from producers. On the Front Range the number of respondents purchasing beef from producers surpasses the number buying from natural food/health stores. How big is this market? If our sample was a representative one, then we should be able to infer that 24% of the whole population bought beef from producers. Taking figures from the US Census 1997 population projections for the Western Slope counties, we see that each of our 280 respondents is a representative for 329 families. Using this 'back of the envelope' computation, we can infer that about one fourth of about 60,000 households, or about 15,000 families, were buying at least some of their beef from producers in 1998. Similarly, the 46 Front Range respondents buying from producers allow us to conservatively estimate that more than 80,000 families between Colorado Springs and Fort Collins were buying beef from producers. Of course it is possible that our sample is not representative, but even if substantially lowered, this is a sizeable market segment.

Household Income and Where Meat Purchases are Made

Reported weekly expenditures for groceries were modified to reflect expenditures per person. Among respondents who report buying meat from natural food stores, per capita grocery store expenditures are above the modal value for the population as a whole while those buying from specialty shops are more likely to be below the modal value. Those buying from producers are in between. Data also shows a tendency for purchasers from any special outlet (besides supermarkets) to have higher than average income.

Figure 1 illustrates how special source buyer groups are distributed between five income categories. For reference, the distribution of the whole Front Range sample is shown. It must be remembered that the bars represent percentages of each group, not total number of responses. We can see that as a group, all three special source buyer responses

are under represented in the three lowest income levels and over represented in the two highest income groups

Figure 1. Income Distribution by Where Respondents Purchase Meat—Front Range

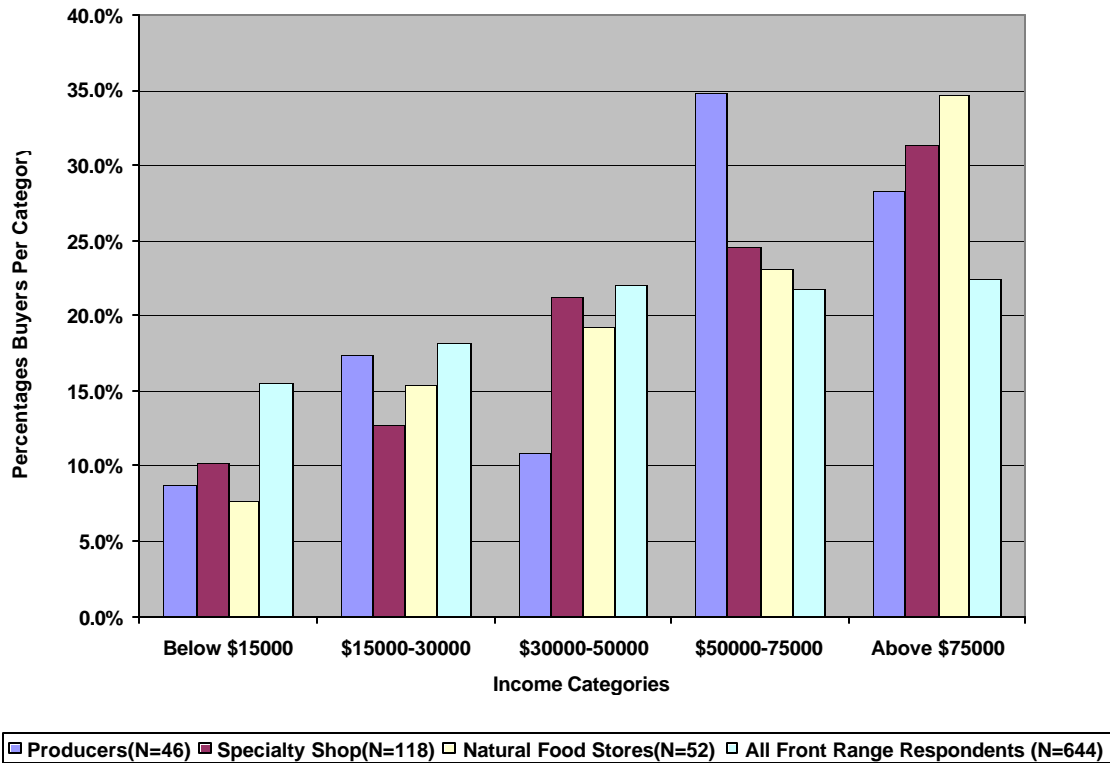
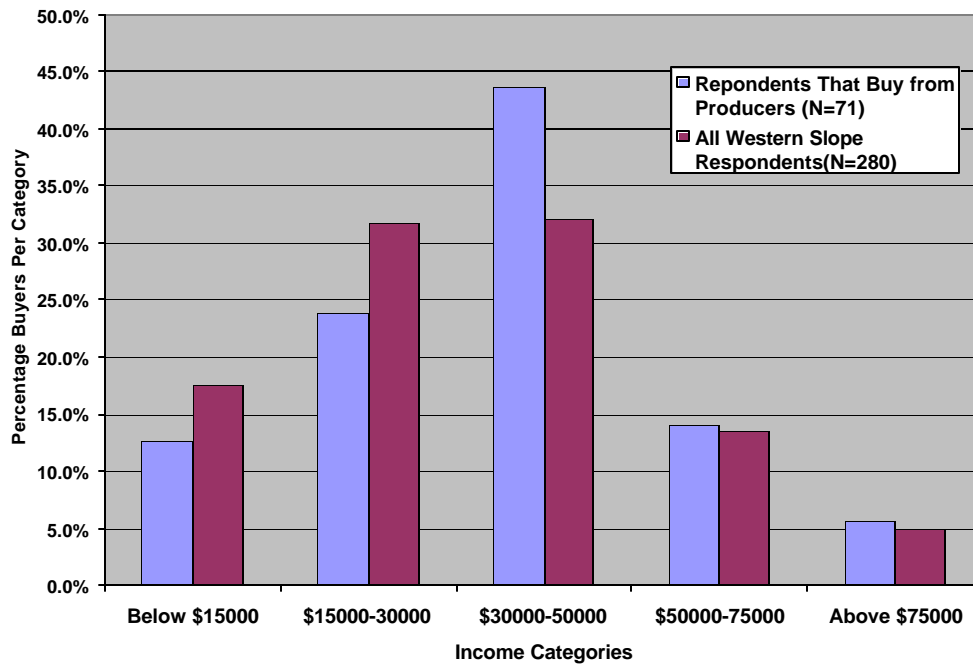


Figure 2 is a similar illustration for the Western Slope, but specialty stores and natural food stores are not available there. Hence the comparison is between the respondents who buy from producers (N=71) and all respondents (N=292). Note that Western Slope respondents reporting purchases from producers are most heavily represented in the middle-income category.

Buyers of rancher beef tend to be congregated in the age groups between 30 and 65, and in the middle-income categories (Figures 1 and 2). However, on the Front Range,

likely buyers are most commonly in the middle to high-income category while Western Slope buyers are most concentrated in the median income category.

Figure 2. Income Distribution of Western Slope Consumers who Buy From Producers



There is one other specific demographic that became a focus of our study after focus groups were held. To further the investigation of shopping choices, households with hunters became an attractive target group because of some interesting traits they have in common. If hunters try for large game (elk, deer, or antelope), they are likely to have freezers. Moreover, they are more likely than others to come into contact with ranchers in the course of obtaining permission to hunt. This was the motivation for asking respondents if there were a large game hunter in their household, and whether they had a freezer. Table

2 summarizes the numbers of households with hunters, freezers, and respondents that report purchasing beef from producers, as well as the interactions among those categories.

Several results are worth noting here. One is the wide difference between the rural and urban region with respect to both hunters and freezers. Although the number of urban hunters is higher than expected, those in rural areas are still more likely to participate. The very high incidence of freezers in households across all four regions was also surprising, and at least half the households in urban regions report owning freezers even though relative frequency is less than Western slope residents.

Table 2- Freezers, Hunters, and Households That Buy from Producers, By Region

Region	Households With Freezers	Households That Buy from Producers	Households With Hunters	Hunter Households With Freezers %	Hunter Households That Buy from Producers %
Front Range	347(54%)	46 (7.2%)	135(21%)	85.20%	17.80%
Western Slope	218(77.9%)	71(24.4%)	130(46.4%)	93.10%	33.80%

**Percent of respondents from each region for a given category are given in parentheses .*

Together, the results suggest a potential for a freezer beef market in even urban areas—especially in the Front Range of Colorado. Moreover, where hunters are convenient to ranches, they are likely to purchase at least some of their beef from producers—half of Western Slope hunting households already buy beef from producers. The large number of hunters in urban areas who have freezers but do not purchase beef from producers suggests a market opportunity. If we consider that many freezers in urban areas are in non-hunter households, it is clear that there is an even larger potential for ranchers to direct market.

Given the interesting results from this cross-tabulation of the survey, a more detailed interaction table was developed covering several categories, and allowing for comparisons to categorical means (Table 3). For example, the intersection of the Natural Food Shopper row and the Hunters column shows 7%, which is slightly below the 8% share of Natural Food Shoppers among the whole population. This means Natural Food Shoppers are under

Table 3- Frequency of Eight Shopping Behaviors and Demographics on the Front Range

	Natural Foods Shoppers	Buy from Producers?	Buy from Meat Shops?	Hunters	Buy Natural Beef?	Interested in Sides?	Children in HH	Own a Freezer	Total Population
Natural Food Shoppers Are What % of:	*	11%	11%	7%	25%	7%	6%	7%	8%
Those who Buy from Producers Are What % of	10%	*	7%	18%	10%	13%	8%	6%	7%
Those who buy from Meat Shops Are What % of:	25%	17%	*	24%	30%	22%	20%	22%	18%
Hunters Are What % of:	17%	52%	27%	*	18%	30%	22%	33%	21%
Those who Buy Natural Beef Are What %of:	56%	24%	30%	16%	*	22%	18%	20%	18%
Households Interested in Sides Are What % of	42%	85%	57%	69%	57%	*	62%	64%	48%
Households with Children Are What % of	33%	50%	47%	44%	43%	57%	*	45%	43%
Those who Own Freezers Are What % of:	25%	95%	66%	85%	59%	72%	56%	*	54%

represented among hunters. By contrast, we can see that Hunters are 52% of the buyers from producers, compared to 21% of the entire population. Table 4 presents similar results for the Western Slope, although there are fewer categories since shopping choices are more limited in rural areas.

Table 4- Frequency of Four Categories among Western Slope

	Hunters	Buy from Producers?	Those Interested in Freezer Beef	Households With Children	Total Population
Hunters Are What % of:	*	62%	59%	65%	46%
Those who Buy from Producers Are What Percent of:	34%	*	36%	30%	25%
Those Interested in Freezer Beef Are What % of:	28%	90%	*	82%	64%
Households With Kids are What % of	49%	42%	45%	*	35%

It is not surprising to find that families with children are over represented among respondents who purchase beef from producers. Families with children were more likely than those without children to buy from producers, although results show that having children does not seem to change the likelihood that a household has a freezer. This intersection between families with hunters and families with children appears to be a well disposed market for freezer beef.

Natural food stores are a growing presence in urban areas, even though they are less accessible for rural consumers. At the time of the study Wild Oats had a significant presence in Colorado, and both Whole Foods and Vitamin Cottage were expanding in Colorado. By 2001 all three chains had multiple outlets in the Colorado Front Range, and all three carried at least one brand of natural meat that meets the standard defined in our

survey. Therefore, it is somewhat surprising that, in 1998, natural food stores held a smaller share of the meat market than did specialty meat markets (Table 1). In the Front Range, producers and ranchers also had a larger share of the meat market than did natural food stores. This may have changed in the three years since the survey because of growth among the major natural food stores.

Front Range respondents who buy from specialty meat shops do not differ significantly from the population as a whole with respect to life stages which includes: age, having children, and being married. Yet, they are more likely (66%) than the general population to have a freezer at home. One in four Front Range hunters shop in specialty meat stores, and 24% of specialty meat store shoppers are from families with hunters. About 11% of Front Range specialty store buyers also buy meat at natural food stores.

Willingness to Pay

Natural meats are new in consumer consciousness, but the idea has been around for some time. Coleman has been selling beef that has never been given hormones or antibiotics for over 20 years. Other, smaller producers have been selling other meat and livestock products raised 'naturally,' 'organically,' or 'biodynamically' for decades. Growing consciousness of what animals are fed, how they are medicated, and how they are confined has led to markets where consumers pay substantial premiums (sometimes more than double) for natural beef or range poultry. To guide this set of producers, willingness to pay estimates were developed from survey responses on two hypothetical beef products.

Respondents were asked to imagine themselves at a meat counter and to imagine that they could choose between a conventional beef product and a natural beef product of the same apparent quality. They were then asked to specify three prices for each product:

one they felt was 'reasonable,' one they felt 'begins to be expensive,' and finally, one that is 'just too expensive.' Sensitivity functions were built for each respondent that defined the probability that respondent would choose the organic product at each level premium. If the premium was at or below what the respondent defined as 'reasonable,' the probability was defined to be 1.0, or certainty. If the premium was at or above what the respondent defined as 'just too expensive,' the probability was defined to be zero, or certainty that the natural product would not be chosen. If the premium was at the level defined as 'begins to be expensive,' the probability was set to .5, or an equal likelihood that the natural product would or would not be chosen. If the premium was between the markers, the probability was computed as a linear extrapolation.

Weights were assigned to each family according to the number in the household and the number of times the family prepared beef at home each week. These weights were used as a proxy for the amount of beef the family bought relative to the total bought by all families. At any premium, the estimated market share is a function of the probability that each family would purchase the natural product and the weight assigned to the family. All of these weights were then added to give a sum representing the 'natural' market share at the given premium. When these shares are plotted on a graph with one axis being premium levels and the vertical axis being the market share, we have market share curves for the respective product⁵.

Demand curves were generated in aggregate for both steaks and ground round for the Front Range and Western Slope (Figures 3- 6). Overall, consumer willingness to pay

⁵Simple, piece-wise linear distributions are built for each respondent and then added up. It is possible to derive confidence intervals by using bootstrapping (Efron and Tibshirani). At each premium the 1st, 5th, 50th, 95th, and 99th percentiles are computed to give confidence intervals.

Figure 3 Estimated Demand for Natural Ground Beef, Front Range Counties

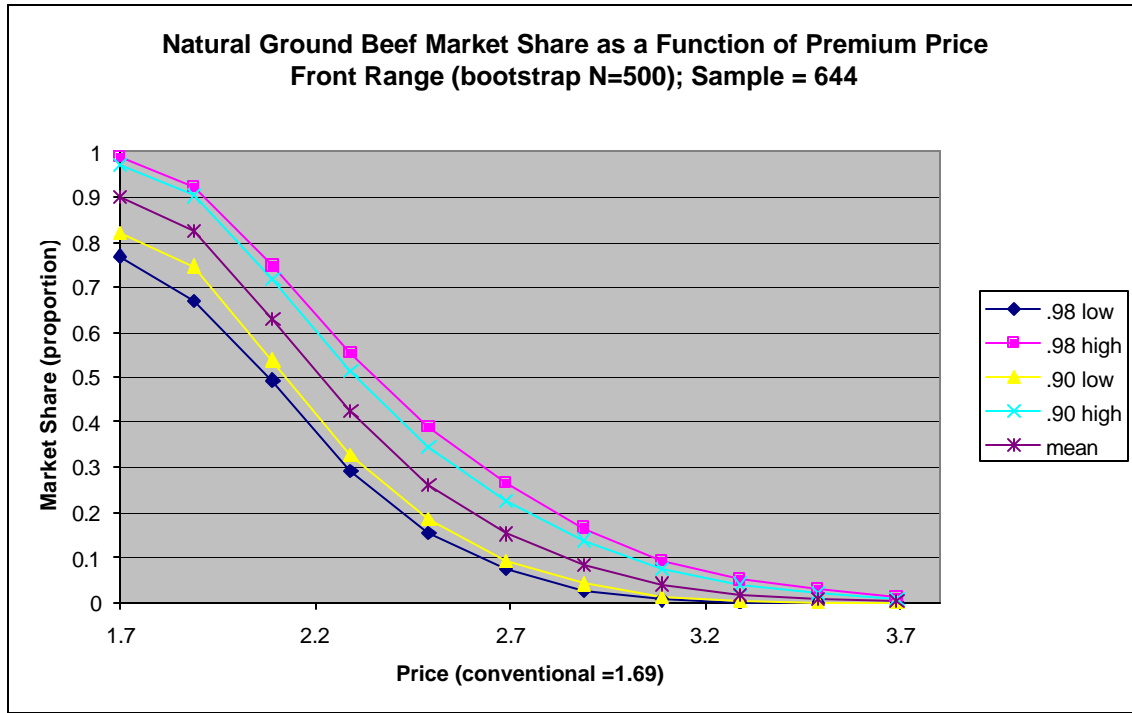


Figure 4 Estimated Demand for Natural Steak, Front Range Counties

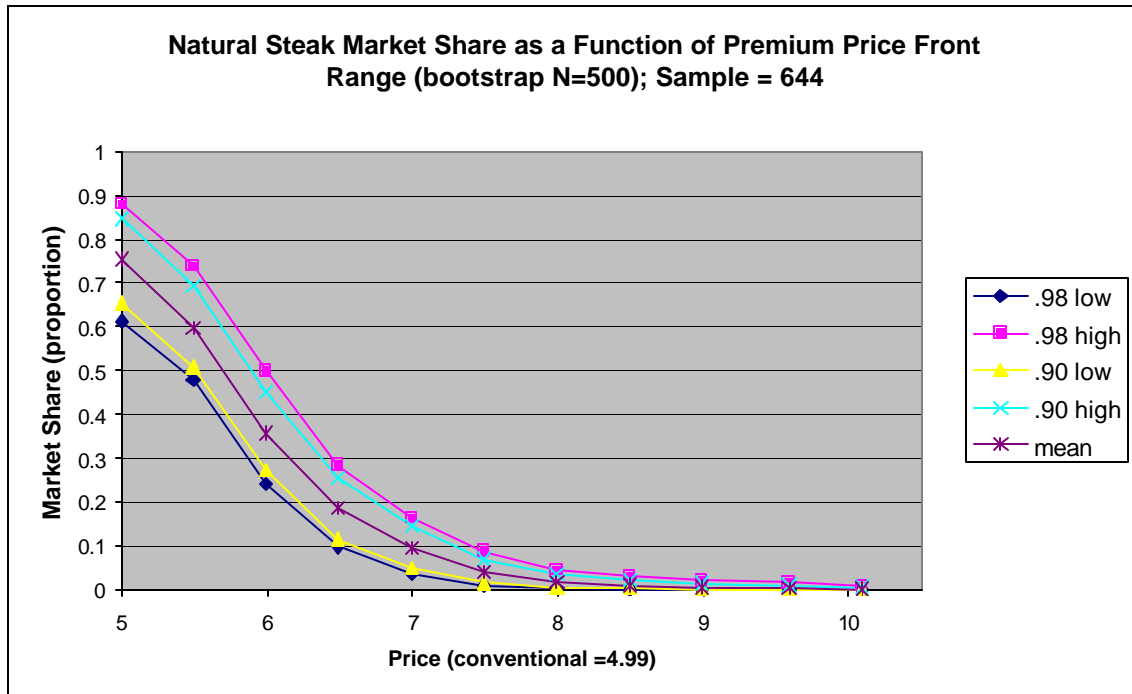


Figure 5 Estimated Demand for Natural Ground Beef, Western Slope

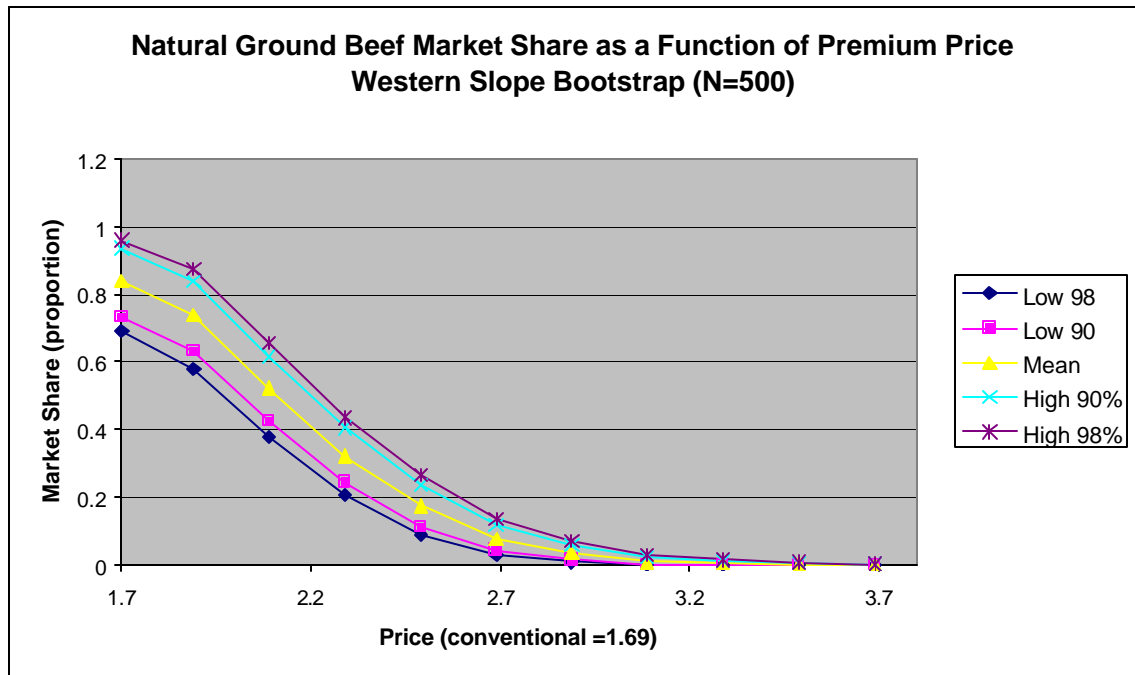
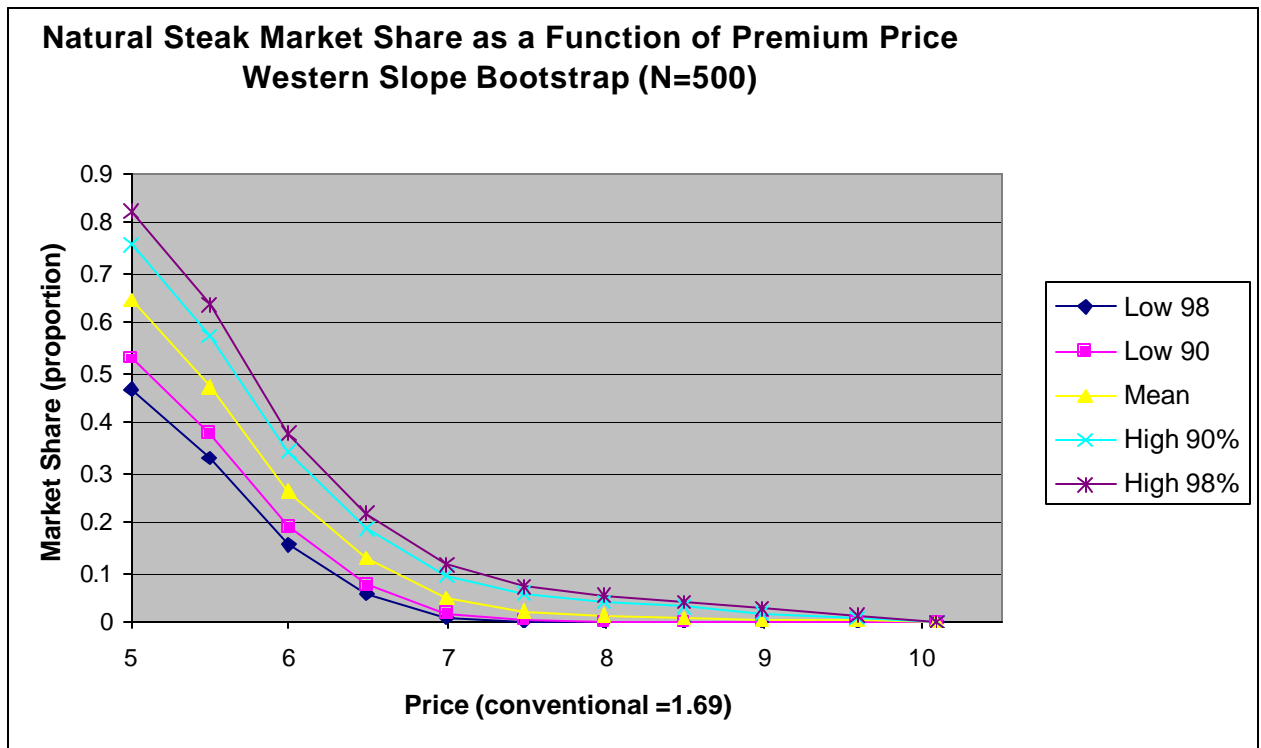


Figure 6 Estimated Demand for Natural Steak, Western Slope



for natural ground beef is lower on the Western Slope. It can be seen that ground round is far less sensitive than steak to pricing with premiums. For example, at a premium of \$0.40 over prevailing market prices (a premium of about 24%), the market share of natural ground round would be between 50% and 70%. Meanwhile, at a 20% premium (\$1.00), the market share of natural steak would be between 20% and 40%. The higher market share at higher price premiums is consistent across urban and rural counties, but the demand for natural ground beef is more pronounced on the Front Range. Regardless of region, we believe the difference in market shares across the two beef products is partly due to the fact that steak is a higher priced item to start with, and possibly due to negative perceptions about ground beef food safety and handling.

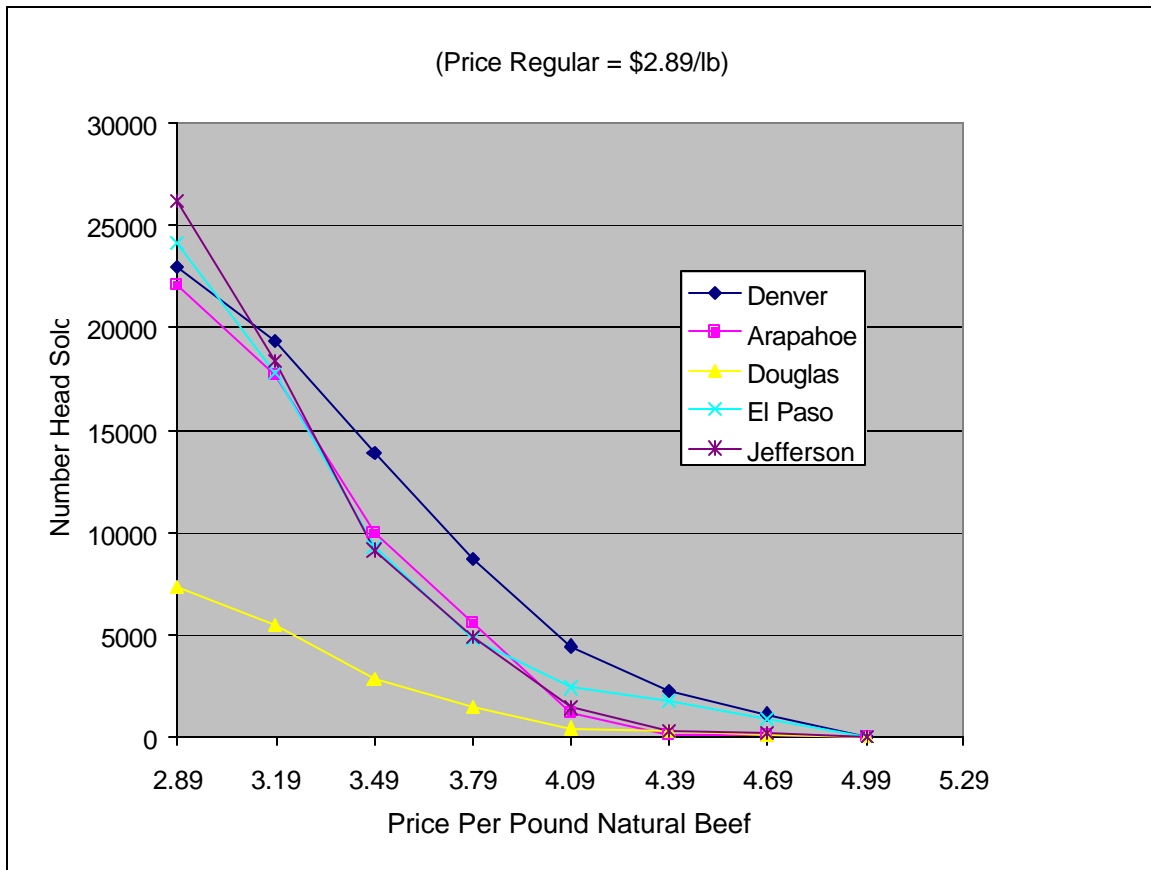
Freezer Beef

Relatively high interest in freezer beef is possibly the most interesting finding of this study. So, demand for freezer beef was also estimated (Figure 7). Before discussing results, it is important to notice that the freezer beef chart is not market share, but rather, how many head of natural freezer beef could be sold at each premium level, assuming that regular freezer beef were available at \$2.89 per pound. Respondents were asked if they would be interested in freezer beef. If yes, then they were asked whether they would prefer a quarter or a half a beef.

The results for five Front Range counties are summarized in figure 7. Each curve represents the most likely number of beef which could be sold in each county at various prices, assuming that all households in the Front Range are accurately represented by this study's sample. These counties have the five highest per capita demands at a 30% premium (\$3.79). The demand range between \$3.79 and \$4.09 is of particular interest.

At \$3.79 the premium is 30%, yet there is a substantial demand. An increase above \$3.79 apparently reduces demand by more than one half. Ordinarily, economic analysis would suggest that setting a premium beyond \$3.79 would be ill advised because sales would drop by 50% just to gain 10% on the margin.

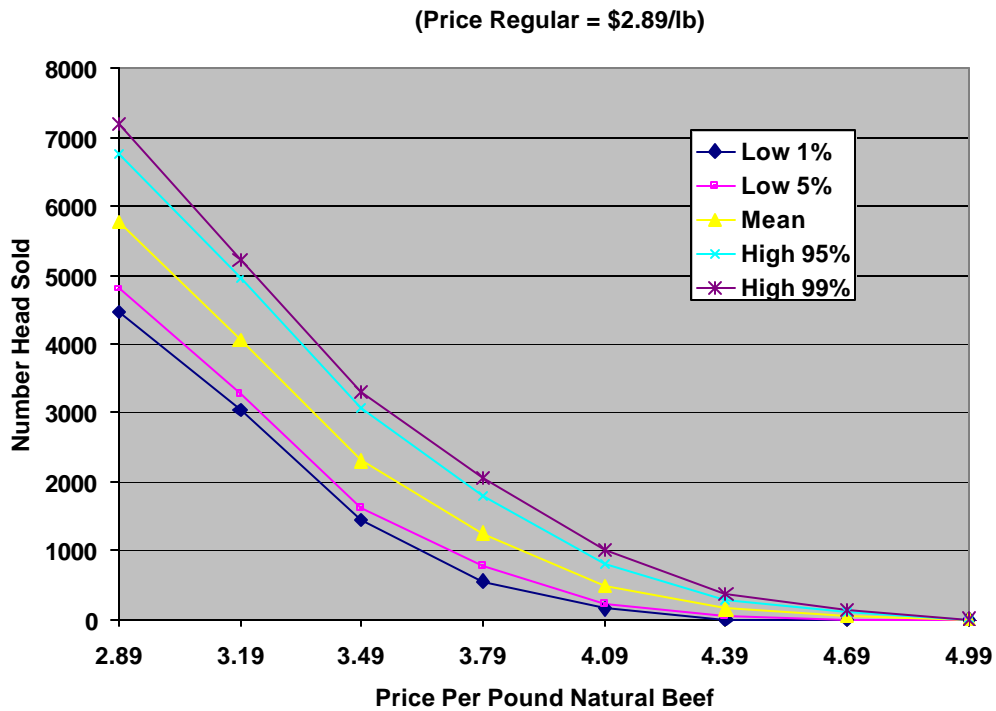
Figure 7 Estimated Demand for Natural Freezer Beef, Front Range Counties



The total sample on the Western Slope was small enough that treating counties individually was not feasible. Instead four counties were aggregated into two markets that make some sense. Delta and Montrose Counties have populated areas that are very close, and putting them together makes good sense, so for brevity's sake, all Western Slope results will be based on those two counties (Figure 8). In the Montrose-Delta market, a premium of 20% decreases demand from about 6000 head per year to about 2,100 head per

year. A further increase to a 30% premium reduces the demand to about 1,200 head per year. The corresponding confidence intervals are between 1,500 head and 3,500 head at a 20% premium and between 700 head and 2,000 head at a 30% premium.

Figure 8 Predicted Demand for Natural Freezer Beef, Montrose & Delta Counties



Interest in freezer beef is particularly high in the Western Slope counties. First, it is remarkable that 25% of the whole population already buys some beef from producers. Second, 64% of the population expressed interest in buying at least a quarter of natural freezer beef. The overlap of households with hunters and households with kids is substantial—two thirds of households with kids also have at least one hunter, and half of all households with hunters have at least one child. Results are not substantially different between these two counties and the remainder of the Western Slope.

Conclusions

While much has been made of the growth of natural food stores, this study suggests that 'direct from producer' and specialty shop sales may have greater potential for producers than securing space in natural food stores. This is true even in large urban areas like Colorado Springs and Denver. It is worthwhile repeating several of the most important findings regarding the potential for alternative meat market strategies.

1. **About 20% of urban respondents purchase at least some of their meat from either specialty shops or from natural food stores:** Over 8% for natural food stores, and over 18% for specialty shops.
2. **24% of Western Slope respondents buy at least some meat from producers:** Fully 11% of Western Slope respondents report buying "Most" and another 13% report buying "Some" of their meat from producers. Over 70% of these consumers own freezers, many of whom are hunters, and are likely freezer beef consumers.

An important authority on growth of this market is Hartman (1996,1997). Hartman's categories focus on attitudes toward 'natural' and 'organic' foods, and those most likely to buy organic are "True Naturals" and "New Green Mainstream." Based on findings in this study, we hypothesize that there may be another potential group, hunters. Hunters tend to have an interest in environmental issues, and they also tend to understand health and animal rights issues implicit in the qualities that distinguish 'natural' meats from regular meats. Yet, they are less likely than others to shop in natural food stores.

Future Directions

It is important to conclude with a few points on what issues will drive the likely success of future ventures by cattle producers such as those who funded this study. First, although grassfed did not rate high as an attribute in this project (Grannis and Thilmany, 2001), recent publicity on grass-fed beef may change consumer priorities. Recent studies

suggest that grassfed beef may offer an attractive protein source to health-conscious consumers because it is lower in calories and fats, and concentrated in important omega-three fatty acids (Burros, 2002; O'Neil, 2002). Citing studies from Colorado State University and the University of Guelph, in addition to the *European Journal of Clinical Nutrition*, these authors argue that some of the downturn in beef demand due to health concerns may be reversed with a healthier, grassfed product. In addition to nutritional value, there is some evidence that antibiotic usage, *E. coli* and mad-cow occurrences, and incentives for hormone implants may be lessened with grassfed production.

Similar to organic vegetables in past decades, there is some evidence that grassfed beef will move into mainstream markets (Burros, 2002). Even producers who do not believe some of the scientific claims may be drawn to the consumer niche if it offers higher operating margins (Bell, 2002). Still, there are great challenges to managing a niche marketing venture whether it be for grassfed, natural or freezer beef with any differentiated attributes (Wilson, 2002).

Several individual beef producer alliances continue to explore direct marketing opportunities in Colorado, guided by the results from this survey and the full project report (Sparling, Thilmany and Grannis, 2001). The findings from this study suggest that future research and planning should focus on the growing interest in grassfed beef, operational models that would allow producers to take advantage of freezer beef sales and customer segments with particularly keen interest in naturally produced meats. In the Mountain West, there is a natural affinity between hunters and livestock producers because many hunters must obtain permission to hunt on ranches, a connection that should be taken advantage of with any marketing strategy.

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