



BRIEFING

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What is the Value of Cattle Quality Information? Evidence from the Montana Beef Network

Kevin McNew and Gary Brester

Agricultural Marketing Policy Center
Linfield Hall
P.O. Box 172920
Montana State University
Bozeman, MT 59717-2920
Tel: (406) 994-3511
Fax: (406) 994-4838
email: ampc@montana.edu
website: www.ampc.montana.edu

Contact:

Kevin McNew
(406) 994-7816
kmcnew@montana.edu

Gary Brester
(406) 994-7883
gbrester@montan.edu

Objective
Analysis
for Informed
Decision Making

In recent years, the cattle sector has moved towards grid pricing of cattle as opposed to pricing cattle on a live weight basis. Grid pricing rewards livestock producers for producing high-quality cattle while discounting cattle with low-quality characteristics. Grid pricing of cattle represents an important step towards improving beef quality to consumers and compensating livestock producers for high-quality cattle.

The shift from live weight pricing to grid pricing alters relative risk between producers and packers. With live weight pricing, livestock producers have no risk in terms of end quality of their cattle, whereas the packer absorbs all of the quality risk. In contrast, livestock producers have all of the risk of cattle quality with grid pricing while packers have no quality risk.

One way producers can reduce quality risk is to acquire information about the quality of their cattle. Producers historically had to retain ownership of their cattle until slaughter and sell their cattle on a grid in order to learn about the quality of their cattle. This can prove costly. As a result, some cattle organizations are forming information collection services to acquire cattle quality data for individual producers. In doing so, it is hoped that cattle producers will learn more about the end-quality of their cattle and therefore, be able to

make better management and marketing decisions.

The Montana Beef Network is an example of a data collection service for cattle producers. Along with collecting data on cattle production and end-quality characteristics, the Montana Beef Network provides educational and certification programs. It is jointly managed by the Montana Stockgrowers Association and Montana State University Extension Service. Currently, the Montana Beef Network is financially supported with public funds and small user fees, but eventually it will likely be self-supportive.

If the program is to be self-supported through user fees in the future, how much would cattle producers be willing to pay to acquire quality data on their cattle? This briefing looks at this issue by examining differences in pricing with a grid system versus a dressed weight pricing system. The key premise is that producers will make better decisions about which method to use for selling their cattle if they have better information regarding end-use quality.

Overview of Montana Beef Network Data

The Montana Beef Network helps producers collect and analyze data on the performance of their cattle.

Producers apply an identification tag to each animal which aids in data collection. Data collected includes cattle specific data such as birth weight, weaning weight, vaccination histories, feedlot performance and in some cases, the quality grade and yield grade of the cattle at slaughter.

Our interest is in estimating the value of quality information to cattle producers. As a result, we retained and evaluated information on the cattle that had data on yield grade and quality grade at slaughter. There were over 9,600 head of cattle that had quality and yield grade data in the Montana Beef Network between 1999 and 2001. Figures 1 and 2 show the distribution of these cattle for quality grade and yield grade, respectively. As a means of comparison, quality and yield grade data for all U.S. cattle over this same

period are shown in the figures. Montana Beef Network cattle tend to be more concentrated at Choice quality grade as compared to the U.S. average, with small porportions grading Prime or Select. However, the differences between Montana and the U.S. are only statistically different for Prime and Standard grades. Yield Grade results also suggest noticeable differences between cattle in the Montana Beef Network and the U.S. averages. Montana Beef Network cattle tend to be concentrated at Yield Grade 3, as compared to U.S. cattle which tend toward Yield Grade 2. With the exception of Yield Grade 5, the differences between cattle from the Montana Beef Network and the U.S. average are statistically significant. The average Yield Grade for Montana Beef Network cattle is 2.58, while the U.S. average is 2.35.

Grid Pricing Premiums and Discounts

Producers generally have three options for pricing their cattle. The first is a live weight sale, implying that the cattle are weighed prior to slaughter and a price is set based on local cash market prices.

The second option is to have cattle slaughtered to determine carcass weight, and then apply a corresponding dressed weight price. In each of these two cases, the packer bears all of the quality risk of the cattle while the producer bears no quality risk.

Figure 1. Distribution of Quality Grade for Montana Beef Network Cattle and U.S. Cattle: 1999-2001

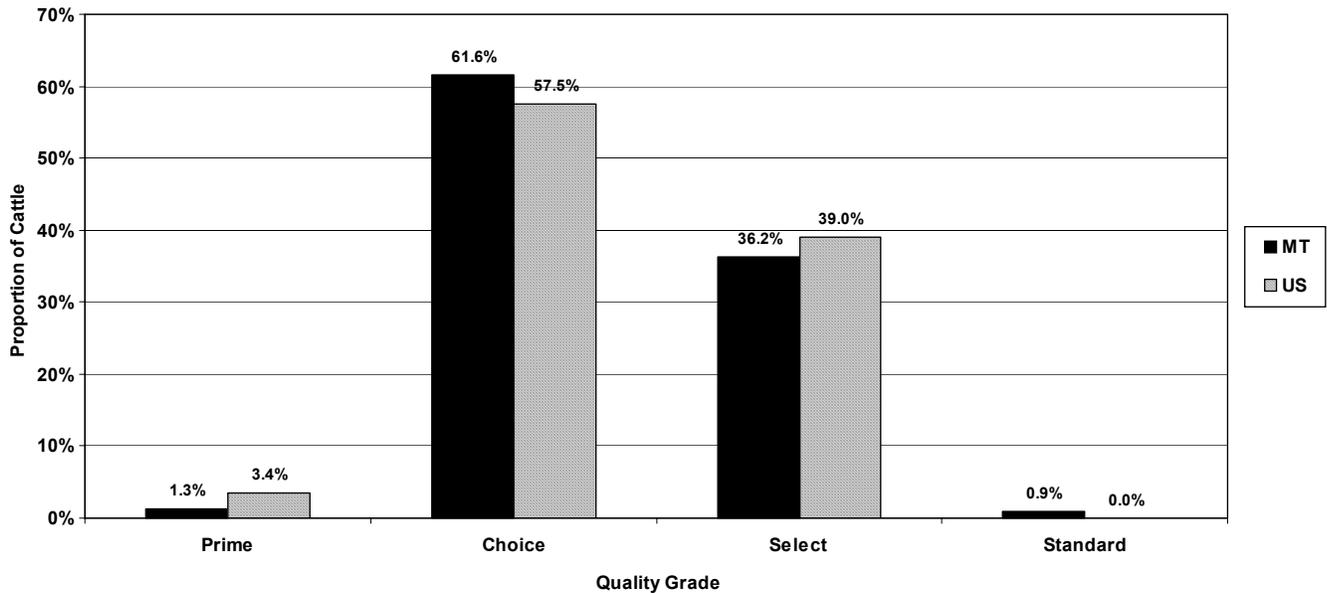
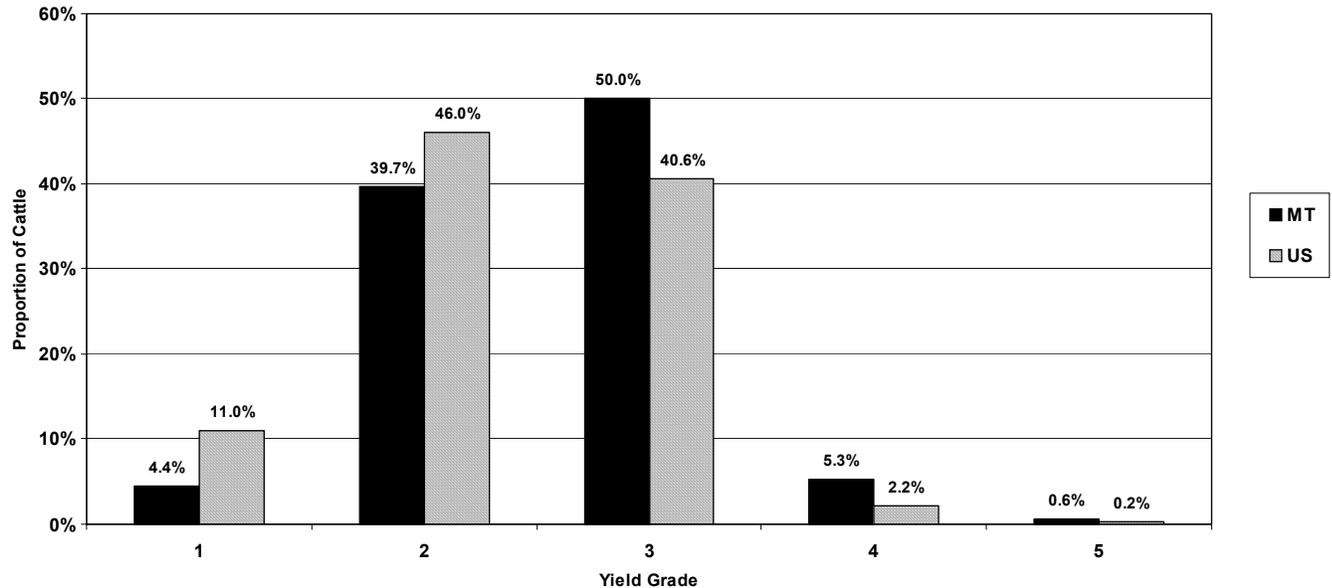


Figure 2. Distribution of Yield Grade for Montana Beef Network Cattle and U.S. Cattle: 1999-2001



Under the third grid pricing option, cattle are slaughtered and graded with a quality grade and yield grade designation assigned. When cattle are sold on a grid, packers pay premiums or discounts depending on the outcome of the quality grade (Prime, Choice, Select, or Standard) and yield grade (1, 2, 3, 4 or 5). The premiums and discounts are in reference to a base price, usually the dressed weight price. Like any competitive price, the premiums and discounts paid will usually vary across packers as well as over time as market forces change. With grid pricing, all the risk of cattle quality falls on producers.

Whether a producer should sell on the grid or not depends on two factors. First, the size of the premiums or discounts for quality and yield grades will play a factor in pricing decisions. All things equal, higher premiums or smaller discounts will give producers better prices by selling on the grid versus dressed weight or live weight.

Table 1 illustrates premiums and discounts for some example grids. The first, labeled U.S. Average, is reported weekly by the USDA Agricultural Marketing Service and represents an average over various packers. Values reported in table 1 are averaged over the period January 1998 through April 2002. The Gelbvieh Alliance Muscle Grid is used by a major meat packer to reward high quality cattle. An important feature of grid pricing is the asymmetry in premiums and discounts. For cattle grading Prime on the Gelbvieh grid, there is a \$6 per cwt premium over Choice as compared to a \$7.83 per cwt discount under Choice for grading Select. Likewise, producers earn a \$1.50 premium for yield grade 2 but are discounted \$20.00 per cwt for a yield grade 4.

The rewards for high quality cattle are smaller than the discounts for poor quality cattle, which makes it important for a producer to truly understand cattle quality.

The second factor that influences whether a producer should sell a grid is the quality of a producer's cattle. Higher quality cattle should be sold on a grid that rewards quality. Lower quality cattle should be sold either live or dressed weight or on a live or carcass basis, or perhaps on a grid which rewards producers for yields opposed to grade.

Because of the asymmetry of the premium/discount schedules even "average" cattle may best be sold on a dressed or live weight basis. As an example, applying the distribution of cattle displayed in figures 1 and 2 to the average premiums and discounts of table 1, producers would on average receive a discount for their cattle if sold on the grid. For example, cattle from the Montana Beef Network would average a discount of -\$3.46 per cwt if sold using the U.S. average premium/discount schedule or a -\$3.36 per cwt discount if sold on the Gelbvieh grid. Using the U.S. average distribution of cattle also shows a discount on average, although smaller than the discount for cattle from the Montana Beef Network.

**Table 1. Average Grid Prices for the U.S. and Gelbvieh Alliance:
January 1998 – April 2002**

	U.S. Average Grid	Gelbvieh Alliance Muscle Grid
Prime	\$5.51	\$6.00
Choice	\$0.00	\$0.00
Select	-\$7.83	-\$7.83
Standard	-\$17.38	-\$17.83
Yield Grade 1	\$2.13	\$4.00
Yield Grade 2	\$0.97	\$1.50
Yield Grade 3	-\$0.20	\$0.00
Yield Grade 4	-\$15.11	-\$20.00
Yield Grade 5	-\$20.54	-\$25.00
U.S. Average	-\$2.66	-\$2.23
MT Average	-\$3.46	-\$3.36

Although average cattle should not be sold on the grid this does not imply that all cattle should not be sold on the grid. Some producers have high quality cattle and can earn better prices for those cattle by selling on the grid. From the cattle producer's standpoint, however, it is difficult to judge cattle quality until they have been graded. As such, producers face significant uncertainty about their cattle quality as well as financial risk.

One way producers can learn about their cattle's quality is to retain ownership of the cattle until slaughter and then sell them on the grid. This may prove costly, especially for those producers that have low quality cattle.

The Montana Beef Network and other organizations like it are attempting to reduce these costs of learning by collecting data on cattle quality, without the producer retaining ownership and pricing the cattle on a grid. Through repeated collection of cattle quality data, it is hoped that producers can improve management decisions as well as marketing decisions.

Value of Cattle Quality Information

The value of information is determined by the added benefits (or reduced costs) that the information will give to the user

from knowing the new information. For a cattle producer, learning about his/her cattle quality could lead to management decisions that may improve the quality of their cattle or it could result in a change in how the cattle will be sold (grid versus dressed weight). If these actions lead to higher profits, then the information is of value to the producer.

We explore the issue of economic value within the context of how cattle quality information would influence the decision to sell on a grid or sell dressed weight. Producers who participate in the Montana Beef Network acquire information on their cattle regarding their quality and yield grade. Over time as a producer sends more and more cattle through the program, they can gain a better understanding of their distribution of cattle over yield and quality grades. In essence, they can build histograms for their own cattle showing distribution by grade and by yield similar to those displayed in figures 1 and 2.

Based on the Montana Beef Network data, we selected those producers that had 20 or more cattle with quality/yield grade information. This resulted in 79 producers over the period 1999 through 2001. On average, these 79 producers had 118 head of

cattle go in the Montana Beef Network. For each of these 79 producers, quality and yield grade distributions were computed based on the observed cattle grading, which we assumed to be the true distributions of their cattle.

To determine the value of knowing their distribution of cattle, we examine two different selling strategies. The first can be thought of as a "naïve" strategy where a producer assumes that his/her cattle have identical quality/yield grade characteristics as the overall population of all cattle producers. In this case, the producer observes the premium and discount schedule and computes the expected premium based on selling on a grid. If the expected premium is positive, the producer would sell on a grid otherwise the producer will sell the cattle on a dressed weight basis. The second selling strategy is similar to the first, except the producer makes his/her pricing decision on the basis of his/her true cattle distribution and not the overall cattle distribution. If the expected premium is positive from selling on the grid the producer will sell on the grid.

Grid prices were used for the U.S. average as reported by USDA and the Gelbvieh Alliance Muscle Grid over the period January 1998 through April 2002. Premiums and discounts are reported weekly, so we assume that each producer delivers cattle weekly and the distribution of those cattle across quality and yield grades is identical to their distribution computed historically.

Table 2 reports the results of the analysis. Since the U.S. average grid prices are generally lower for higher quality as compared to the Gelbvieh grid, very few producers would actually sell on the grid. Only 2.5 percent of all producers would ever

find it advantageous to sell on the grid if the U.S. Average Grid were in effect. For those 2.5 percent of all producers, they would sell on the grid only 35.7 percent of the time and the average premium would be \$0.053 per cwt. If the Gelbvieh grid were in effect 24 percent of the producers would find it worthwhile to sell on the grid at least once over this time period. On average, this group (24 percent of all producers) would sell on the grid 11 percent of the time and earn an average premium of nearly \$0.04 per cwt.

What is the value of knowing this information? Obviously, for producers that would choose to sell

on the grid the information is more valuable than those that would not. However, in pricing information all users are generally charged the same price. For participants in the Montana Beef Network, the value of the information on cattle quality and yield grade ranges from \$0.001 per cwt when the U.S. average grid is used up to \$0.009 per cwt when the Gelbvieh grid is used. The information may be of higher value than these numbers if the quality/yield grade information can be used to alter management or production practices. However, we do not have available data to address that issue. As such, these estimates are likely to be conservative.

Table 2. Producers Selling on the U.S. Average Grid and Gelbvieh Grid: 1998-2002

	U.S. Average Grid	Gelbvieh Alliance Muscle Grid
Producers Selling on the Grid		
Proportion of Producers	2.5%	24.1%
Proportion of Time Sold on Grid	35.7%	11.1%
Average Grid Premium (\$/cwt)	\$0.053	\$0.039
All Producers		
Proportion of Time Sold on Grid	0.9%	2.7%
Average Grid Premium (\$/cwt)	\$0.001	\$0.009

