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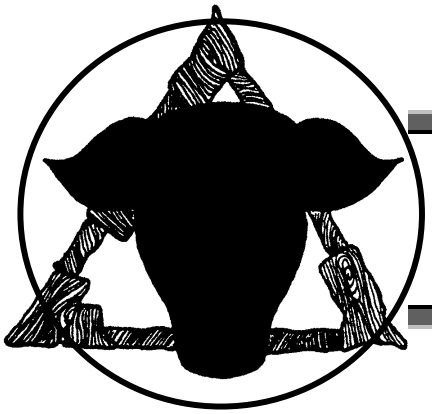

Managing for Today's Cattle Market and Beyond

March 2002

Alliances and Vertical Arrangements

By
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Strategic alliances and various types of formal vertical arrangements have been of particular interest in the beef industry in recent years. Some believe these arrangements are the beef industry's answer to a long-term decline in beef demand, unclear price signals, and lack of adequate profitability. Some industry participants are looking at alliances as *the* quick solution for increased returns and higher prices. Others believe alliances contribute further to industry problems, especially captive supplies. This fact sheet discusses some of the motivations and characteristics for these arrangements, and presents what is known about their growth and development.

Strategic Alliances and Vertical Coordination

Vertical coordination encompasses many broad and varied methods of harmonizing or synchronizing farm-level supplies with retail-level demand. Vertical coordination via market prices with no attribute information is at one extreme of a continuum of vertical coordination methods, while vertical integration is at the other extreme. Between the two extremes are numerous vertical cooperation arrangements, including various types of contracts, joint ventures, cooperatives, partnerships, and alliances.

Vertical cooperation is defined as the relationship between individual firms or organizations in two or more adjacent stages of the production-marketing channel without full ownership or control by individual firms (den Ouden et al.). This broad but useful definition seems applicable to vertical arrangements in the beef industry. In essence, vertical cooperation participants or partners fundamentally maintain their independence but share information to more effectively price products and improve the flow of products and information among the vertical production-marketing stages. This definition generally describes many of the alliances and vertical arrangements in the beef industry even though some organizations do not classify themselves as a strategic alliance. They might use cooperative, partnership, program, or another term to describe their organizational structure and operation. The term "strategic alliance" is used here in a broad sense to encompass many types of vertical arrangements.

Motivation for Strategic Alliances

The vertical beef production-marketing channel from seedstock producers to ultimate consumers is complex and segmented, with numerous product ownership exchanges. This segmentation potentially creates impediments to the efficient flow of information up and down the production-marketing channel.

Alliances attempt to reduce segmentation by more closely linking stages in the vertical production-marketing channel. Participants work jointly toward mutual benefits. One reason for creating alliances is to share information among

participants that may or may not be exchanged in cash market transactions. With better information, producers, who find themselves situated at one end of the vertical value chain, can more accurately respond to consumer demand at the other end of the vertical chain. By sharing information about products and markets, in addition to market prices, information flow should be more efficient and alliance participants can respond more quickly and correctly to clearer market signals.

Alliances are helping the beef industry more quickly move towards value-based pricing. This involves improving the price signaling function between stages in the vertical production-marketing channel. Overall, alliances are attempting to reduce the amount of adversarial tension between vertical stages in the marketing channel, thus increasing understanding and cooperation in the beef industry.

Growth and Dynamics of Alliances

Twenty-seven alliance organizations provided information on selected characteristics which were requested by researchers at Oklahoma State University (OSU) (Ward and Estrada). The list of alliances was compiled from industry organizations and trade publications. *Beef* magazine reported selected characteristics for 31 consumer-based alliances or programs as part of their "Alliances 2000: The Yellow Pages" section. Ten alliances in the OSU study were not part of the *Beef* list and 15 alliances in the *Beef* list were not part of the OSU study. This provides anecdotal evidence to support the notion that alliances and vertical arrangements are still changing and evolving. Some may no longer exist or are changing and new ones are created or replacing them.

Of the alliances included in the Beef listing, 13 began between 1996-2000 and another 11 began between 1991-1995. The remaining 7 began over the preceding 15 years (1976-1990). Again, this provides evidence of the increased interest and growth in beef industry alliances in recent years.

Characteristics of Alliances and Vertical Arrangements

The OSU study compiled information from participating alliances during 1998-1999 on nine characteristics. The nine characteristics, grouped under four broader categories, are as follows.

- Organizational characteristics – Stated objectives; Stages of cooperation; Commitment
- Input requirements – Breed specifications; Source verification; Management practices
- Marketing programs – Branded beef programs; Pricing method
- Information exchange – Carcass data

Information from the *Beef* magazine survey provides somewhat of an update for 2000 regarding some overlapping characteristics. The following includes a brief rationale for the characteristics in the OSU study and a general summary of findings for each characteristic.

Organizational Characteristics: Stated Objectives

The objectives for a successful strategic alliance must be mutually beneficial to the participants. Thus, specific and clear wording of objectives can enable producers to more accurately match their goals with the goals of the alliance. It was believed that an organization with a long-term focus would contribute more to vertical coordination than one with a short-term focus because organizations with a long-term focus are more likely to change and adjust over time. Also, long-term goals demonstrate to a producer that the alliance has interest in improving the industry and benefiting all that are involved, not just the organization itself.

Objectives in over half of the alliances mentioned a customer focus, improved communication between stages, the exchange of information, value-based marketing, beef industry improvement, or product enhancement. The remaining alliances had objectives that did not specify a customer focus or mention improved communications. Objectives may have only mentioned the exchange of data, a focus on one or two production stages, breed improvement, or increased revenue.

Organizational Characteristics: Stages of Coordination

One basic presumption was that the greater the number of production-marketing stages included in an alliance, the more valuable would be the information shared among the participants. It was thought that information would flow more efficiently through the vertical channel because the adversarial relationships between each stage would more likely be dissolved through mutual agreement and understanding. The stages of the production-marketing chain used for this study included: (1)

seedstock or cow/calf producer, (2) feeder or feedyard, (3) packer, and (4) retailer/food service distributor.

Over three-fourths of the alliances spanned three or four of the production-marketing stages. Thus, while some alliances were primarily concerned with the seedstock or cow/calf producer, most encompassed the entire production chain up to and including retail and/or food service.

Organizational Characteristics: Commitment

Commitment was believed to be important because it contributes to the stability and longevity of the alliance. Parties in a strategic alliance must invest significant time and commitment to build and maintain beneficial relationships. Stability and longevity are necessary for strategic alliances to be successful. For example, if producers are willing to become certified or licensed, they likely have a greater incentive to ensure the alliance is successful. The same holds true if producers must make capital investments or are willing to be subject to non-performance penalties. The level of commitment was derived from: (1) formality of arrangements, (2) quantity commitment, and (3) capital requirements for participation.

Formality was seen as a continuum. On one end was an informal arrangement, essentially a verbal agreement. On the other end was a very formal arrangement, such as licensing agreements or some form of certification. Included in the middle group were written membership and participation agreements.

Quantity commitment was considered to be important in three ways. First, if an alliance is linked with a processing outlet, volume may be important to reduce costs. Second, if an alliance is targeting a specific branded product program, quantity commitments allow enhanced control over the supply of the product. Lastly, producers willing to make a quantity commitment to one outlet have an increased interest in the success of that outlet.

The analysis of capital requirements was based on monetary requirements for participation. Most alliances require some fee for producers to receive information about the cattle marketed. The fees in this category consisted only of payments made either to be a member or to participate in the alliance. The greater the capital requirement, the greater the incentive for producers to help the alliance be successful.

About one-third of the alliances had various forms of licensing agreements, non-participation penalties, exclusive participation statements, certification requirements, and/or required investment/membership fees. The remainder had oral or written membership or participation agreements with small or no membership fees.

The *Beef* article provided some additional information on commitment. Of the alliance programs that indicated how much it cost to participate, two-thirds charged either no participation fee or less than $5/head. Charges for the remainder ranged from $6-12/head. Smaller and larger producers can participate in many alliances. Nearly half of the alliance programs required only 1 head to participate. At the other extreme, one-fourth of the alliance programs required load lots or more to participate.

Input Requirements: Breed Specifications

Identifying many of the desirable performance traits and predicting the interaction among traits in commercial cattle operations is difficult. Some argue that a broad genetic base and inadequate knowledge of genetic outcomes have contributed to inconsistency in fresh beef products. Thus, breed specification was thought to be potentially important because it represents one step towards attempting to reduce end-product variability. But the correlation between reduced breed variability and improved consistency is not known. Breed specification was also assumed to help establish mutual interest among alliance participants. Cattlemen who produce cattle of the same breed have something in common and a mutual interest in the success of the alliance.

Over half the alliances identified a specific breed or breed group in the OSU study, while the remainder had little or no breed specification. Required genetics were required in three-fourths of the alliance programs in the *Beef* article, whereas about one-fourth of the alliance programs required no specific genetics.

Input Requirements: Source Verification

There is increasing interest and importance for identifying animals from conception to consumption. Source verification can increase the amount of information being exchanged in the alliance. It may also be a means of marketing identity-preserved beef products and providing food safety assurances for consumers.

In the OSU study, just over half the alliances had some type of requirement for source

verification, though the degree of information required varied considerably. Source verification was required in just under two-thirds of the *Beef* article list of alliance programs. Similarly, just under two-thirds of the programs required the capability of using some type of electronic identification for the cattle.

Input Requirements: Management Practices

Producers are expected to have an advantage in production, and retail/food service marketers in understanding consumers. Sharing information means potentially improving management practices to produce animals that more accurately and consistently meet consumers' demands. Improved management should be beneficial for all alliance participants. Specified management practices *may* reduce variability in production outputs. There appears to be evidence of that in the poultry industry where genetics and management are tightly controlled by the integrators. Certainly another motivation involves food safety. How important production control is in the beef industry in not known with certainty. Adhering to specified management practices may demonstrate a higher degree of commitment because producers may be required to place objectives of the alliance ahead of their personal objectives.

A few alliances in the OSU study required specific products and practices, such as vaccination programs, feeding regimes, particular feedlots and packers, quality assurance programs, growth promotant programs, and antibiotic restrictions. With a few exceptions, alliances were about evenly divided between those with optional or general management practices and those without specified management practices.

One-fourth of the alliances in the *Beef* listing required no specific management practices. About 40 percent had requirements relating to weaning and/or preconditioning. One-fourth placed restrictions on use of antibiotics and growth promotants since they were natural beef programs.

Marketing Programs: Branded Beef Programs

The beef industry has learned that there are several consumer markets for beef products. Some require tight control over quality. A branded product program serves both as a goal and a direct link to consumer preferences. The value of the information producers receive is arguably higher and the probability of being able to make changes to meet consumer demands for specific target markets is increased.

Over three-fourths of the alliances in the OSU study either targeted a single retailer brand or packer brand program or targeted more than one branded beef program. Thus, only a few alliances had no direct link with any branded beef program. Information in the *Beef* magazine update corresponded with the previous work. There, too, just over three-fourth of the alliances were tied to a branded beef program. Thus, alliances appear to be providing a closer coordination linkage between producers and consumers.

Marketing Programs: Pricing Method

Prices send production signals to producers from buyers. In recent years, there has been increased interest and use of grid pricing systems in the beef industry. Grid pricing enables pricing fed cattle on individual carcass merit, thereby improving pricing accuracy (Ward, Feuz, and Schroeder). Each grid (or matrix) consists of a set of premiums and discounts for quality attributes relative to a base or standard set of quality attributes (see three fact sheets in this series on grid pricing). Premium-discount grids enable rewarding better quality cattle and penalizing poorer quality cattle. Premiums and discounts are stated relative to some base price.

Nearly all alliances in the OSU study utilized grid pricing. However, both the base price used and the premium-discount schedules differed across alliance programs. Base prices may be plant average prices (costs) for cattle purchased by the slaughter plant for the week prior to or the week of slaughter. Base prices also may be tied to cash market reports, such as the highest reported price for a specific geographic market for the week prior to or week of slaughter. Over three-fourth of the alliances either used a formula base price tied to an average live or dressed weight price, plant average, or other reported price, or used another type of base price or pricing method. Base prices tied to plant average prices have several potential problems (Ward, Feuz, and Schroeder). They do not contribute to price discovery, change across plants as the quality of cattle slaughtered changes, and may not be representative of the cattle being marketed with grids.

Alternative base price methods can alleviate some of the concerns with base prices tied to plant averages and cash market prices. Other base prices can be negotiated dressed weight prices or formula

prices tied to the wholesale beef or futures markets. Formula prices tied to wholesale boxed beef cutout values link fed cattle prices to wholesale prices that packers have an economic incentive to increase. Formula prices tied to futures market prices link the cash market to another arena for price discovery.

The *Beef* survey asked what type of grid the alliance program used. Some grids favor high quality grade carcasses; some, high yielding carcasses; and some, both quality and yield grade. Nearly two-thirds of the alliances said they used grids that target both high quality and high yield grades. The remainder were split nearly equally between those targeting high quality grades or high yield grades.

Information Exchange: Carcass Data

One contributor to vertical coordination is sharing information among alliance participants. Importantly, information differs from data. Data are raw numbers. Information is generated after the data are analyzed and interpreted. Thus, accumulating numbers alone, such as kill sheet or carcass data, will not necessarily help producers or the industry. Rather, the entire production-marketing chain should understand what the carcass data mean, so appropriate production-marketing changes can be made. Alliances that help producers interpret data are sharing information, not just providing access to data.

According to information obtained in the OSU study, essentially all alliances provided some assistance in interpreting carcass data. However, the extent of assistance and interpretation seemed to vary widely though no measure of the variation was possible.

One of the most significant expected benefits of alliances and formal vertical arrangements is using information not generally available to improve decision-making. Those decisions begin with genetic selection and breeding programs, continue to cowherd and calf management programs, stocker management, feeding management, and fed cattle marketing decisions. They extend further to include beef and byproducts processing and wholesale, retail marketing and merchandising. While there are independent stages from seedstock production to retail and food service distribution, the transmission of key information and finding ways to work together are critical to the success of the entire chain (Tronstad and Unterschultz).

Evidence of Economic Benefits

The *Beef* survey asked participating alliance programs to indicate the returns to participants in terms of the premium received. For the sixteen that responded, average premiums were $34/head and ranged from about $10 to $65/head. Six reported premiums less than $20/head; 4, $21-40/head; 4, $41-60/head; and 2, more than $60/head. Given participation costs discussed above, average net premiums were about $30/head. Thus, the economic advantages to participate in alliance programs appear to be substantial.

Conclusions

Alliances appear to be moving the beef industry in the direction of improved vertical coordination. However, there are several alliance organizations and programs and considerable differences among them. Producers interested in joining an alliance have several alternatives. Some are likely to match their objectives and their production system more effectively than others. And some may require more commitment and more changes than others.

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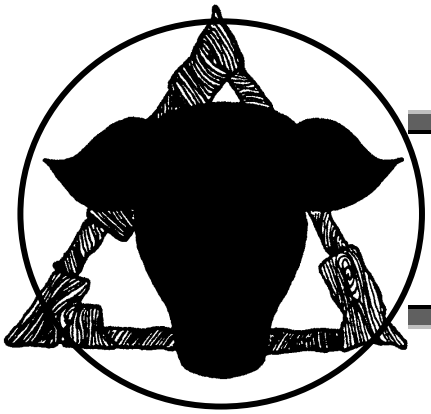

Managing for Today's Cattle Market and Beyond

March 2002

Understanding Grid Pricing

By
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Recently there has been a much greater emphasis on improving the quality and consistency of beef. Cattle producers, breed associations, feed suppliers, and beefpackers have all initiated value based pricing methods commonly referred to as grid pricing. While these various grid pricing schemes may differ substantially in the carcass traits they seek to reward or penalize, they all have one common feature: price is established on each individual animal based on carcass merit. This fact sheet introduces the concept of grid pricing and discusses several management and marketing implications if fed cattle are sold on a grid as compared to being sold on a live or dressed weight basis. Two additional fact sheets in this section will go into greater detail on: 1) base price considerations, and premiums and discounts over time; and 2) risk associated with grid pricing and the value of information.

Grid Pricing Mechanics

Packers claim to have used price grids for years and to a limited extent they are correct. However, in the examples presented later, some differences will be noted between what packers used for years and what they are using today. With most grids, price is discovered after animals have been slaughtered. There may be a few exceptions, but most grids are based on dressed weights for fed cattle. Unlike live weight pricing or dressed weight "in the beef" pricing where there is a single average price for the entire sale lot, a price is discovered for each animal with grid pricing. As a result, higher quality cattle receive higher prices and lower quality cattle receive lower prices, thereby improving pricing accuracy and rewarding cattlemen who market desirable types of cattle.

Most grids consist of a base price with specified premiums and discounts for carcasses above and below the base or standard quality specifications. (See the following fact sheet: Grid Base Prices and Premiums and Discounts) Individual packers have developed their own grids with alternative base prices and varying premiums and discounts. Table 1 contains an example grid. It does not represent the grid for any specific packer. The premiums and discounts in Table 1 can be put into a matrix format. The term grid comes from the matrix framework of premiums and discounts for specified carcass characteristics. Quality grade and yield grade premiums and discounts compared with the base price are shown in the Choice row and Yield Grade 3 column of Table 2. To complete the matrix in Table 2, we assume quality grade and yield grade premiums and discounts are additive. For example, the premium for a Prime grade, yield grade 1 carcass in Table 2 is $11/cwt. That amount is the sum of the $6/cwt. premium for Prime grade carcasses plus the $5/cwt. premium for yield grade 1

carcasses.

For years, head buyers at meatpacking firms have developed a daily buy order which is given to their field buyers to implement. Their order resembles the sample grid in Table 1. Most packers paid only small premiums for higher quality cattle and larger discounts for lower quality cattle. Grids or formulas used in recent years differ from previous years in that premiums for higher quality cattle are frequently larger than before. Discounts for lower quality cattle may still be larger than premiums for higher quality cattle, but packers are sending clearer signals with the grids being used today than in previous years. Packers want higher quality cattle because lower quality cattle have a considerably lower wholesale value and are much more difficult to market profitably. Thus, discounts for lower quality cattle are and should be large.

Packer grids may identify additional premiums for carcasses meeting specifications of Certified Angus Beef (CAB) or other marketing programs. Likewise, packers may specify discounts for hide damage, injection site blemishes, condemnations and other "out" or unmarketable carcasses (in addition to discounts for dark cutters and light or heavy carcasses as shown in the sample grid).

Table 1. Example Grid, as Presented by a Packer ($/dressed cwt.)

Choice YG3 550-950#	Base Price
Prime-Choice Price Spread	6.00
Choice-Select Price Spread	-6.00
Select-Standard Price Spread	-10.00
Dark cutters	-20.00
Light Carcasses (<550 lbs.)	-10.00
Heavy Carcasses (>950 lbs.)	-20.00
Yield Grade 1	5.00
Yield Grade 2	3.00
Yield Grade 4	-20.00
Yield Grade 5	-25.00

Table 2. Example Grid in a Completed Matrix Format ($/dressed cwt.)

	Yield Grade				
Quality Grade	1	2	3	4	5
Prime	11.00	9.00	6.00	-14.00	-19.00
Choice	5.00	3.00	Base	-20.00	-25.00
Select	-1.00	-3.00	-6.00	-26.00	-31.00
Standard	-11.00	-13.00	-16.00	-36.00	-41.00
Dark Cutters			-20.00		
Light Carcasses (<550bs.)			-10.00		
Heavy Carcasses (>950 lbs.)			-20.00		

To compute a grid-based price, the distribution of carcasses by quality grades and yield grades from a sale lot of fed cattle must be known. That distribution also is put into a matrix framework. A hypothetical distribution of carcasses for a 100-head sale lot of steers is shown in Table 3. Our hypothetical pen is a fairly typical pen of cattle (61 percent Choice and Prime quality grade) and (53 percent yield grades 1 and 2).

Table 3. Example Distribution of Carcasses by Quality and Yield Grades (100 Head Total)

	Yield Grade					
Quality Grade	1	2	3	4	5	Total
Prime	0	1	5	3	0	9
Choice	6	23	26	1	0	56
Select	10	19	5	0	0	34
Standard	1	0	0	0	0	1
Total	17	43	36	4	0	100

Once the base price is know for the grid in Table 2, the net price can be computed for a pen of cattle by multiplying the percent of carcasses in each matrix cell in Table 3 times each premium and discount cell in Table 2. For example, if the base price were $110/dressed weight, then the weighted average price for the pen distribution in Table 3 is $109.68/cwt. For our example, we assumed there were no "out" carcasses. The actual net price for a pen of cattle may vary somewhat from the calculated price because of differences in carcass weights for animals in each matrix cell.

A higher base price is probably more critical to receiving a higher net price from a grid than are the specific premiums and discounts. The base price affects all cattle in the sale lot, whereas premiums and discounts affect only selected carcasses.

Grid Pricing Considerations and Management Issues

Perhaps the two *primary* implications of marketing fed cattle on a grid are:

- Cattle feeders *MUST* know their cattle quality; and
- Cattle feeders *MUST* know how the grid price is calculated.

Many producers do not know how their cattle perform in carcass form. Without knowing the carcass quality of their cattle, marketing on the basis of a grid may be disappointing. Grids can provide an incentive to market higher quality cattle. However, the penalty for not recognizing and marketing lower quality cattle is large. Even a few lower quality cattle, priced at large discounts to higher quality cattle, can offset the premiums for higher quality cattle. The bottom line results might be a price which is lower on average than a live weight or dressed weight cash price.

For example, in Table 3, there are 30 head of Prime and Choice, YG1-2 carcasses. Together, using the grid in Table 2, they add a premium of $1.08/cwt. to the base price. Also in Table 3 there are just 4 YG 4 and 1 Standard carcasses. Together their discounts reduce the base price by $0.96/cwt. Discounts from 5 lower quality carcasses nearly offset completely the premiums from 30 higher quality carcasses. Cattle quality significantly affects the bottom line price results when marketing by a grid method.

Cattle producers need to ask other questions. Do my cattle naturally fit the grid? Can they be fed to fit the grid? Can they be sorted to fit the grid?

Should pens of cattle be sorted to fit different grids or sorted to sell some cattle on the cash market? Sorting cattle to fit different grids may be economical provided a producer has a good idea how the different groups of sorted cattle will perform in carcass form. Sorting out "out" or lower quality cattle just before marketing them and mixing them with a pen of cattle sold on an average live weight or dressed weight price is a short-sighted approach to marketing. Profit from sorting may be higher for both pens, but over time, packers will likely bid lower for the cash market cattle. In addition, it fails to signal clearly the need to rid the industry of lower quality cattle, resulting in a continued loss of the consumers' food dollar and loss of market share for beef. However, sorting cattle earlier may enable the feeder to manage both pens of cattle to meet specifications in more than one grid. This management change may reduce feeding costs, increase returns, and enhance both short-run and long-run profitability.

Cattle have a natural, economical end feeding weight. This end weight or point varies by frame

size, breed, genetics within a breed, and market prices for inputs and fed cattle. For example, one pen of cattle may produce carcasses averaging 850 pounds of dressed weight, which grade mostly Select yield grade 2. Another pen may produce carcasses averaging 700 pounds of dressed weight, and grade mostly upper Choice yield grade 3. With the first pen, a grid that pays a premium on yield grades 1 and 2, minimally discounts Select carcasses, and does not penalize heavy weight carcasses will likely be advantageous. For the second pen, a grid that pays a large premium for upper 2/3 Choice and Prime, does not discount yield grade 3 carcasses, and has only a small discount on yield grade 4 carcasses will likely be advantageous. Feeding the pen of cattle that averaged 850 pounds of dressed weight for several additional days with the intent of improving quality grade probably will result in a significant number of heavy weight carcasses. The discounts for the heavy weight carcasses will likely exceed the added premium from improved quality grade.

Producers need to realize that if feeding and other management practices are altered, then receiving the highest *price* doesn't imply the greatest *revenue*, nor does the greatest revenue imply the largest *profit*. Revenue is price multiplied by weight, and profit is revenue minus costs. To maximize profit on a pen of cattle, the selling weight and feeding costs need to be considered, in addition to the selling price.

Summary and Conclusions

Grid pricing methods have become more common in recent years. The grids have the advantage of pricing each animal, thereby improving pricing accuracy. Cattle are paid on actual dressed weights and the price is adjusted for various carcass traits. Better quality cattle are rewarded and poorer quality cattle are penalized.

Cattle producers need to know the quality of their cattle and how grid prices are calculated before knowing whether or not grid pricing will be advantageous for them. Producers also need to consider profit (cost *and* revenue) implications of attempting to adjust feeding period length to target specific grids. Grid pricing has definite advantages. However, cattle producers must understand them *thoroughly* to take advantage of the benefits and avoid the pitfalls.

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Grid Base Prices and Premiums-Discounts Over Time

By
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The previous fact sheet (Understanding Grid Pricing) included an example of grid pricing and some of the implications from using grid pricing. The objective of this extension facts is to better distinguish formula pricing and grid pricing, discuss price discovery implications from using alternative base prices with premium-discount grids, and show how premiums and discounts have varied over time.

Formula Pricing versus Grid Pricing

Formula pricing refers to establishing a transaction price using a formula that includes some other price as a reference. As such, formula prices are not discovered for each transaction. Rather, some other price is used; a price discovered external to the particular formula priced transaction.

Grid pricing consists of a base price with specified premiums and discounts for carcasses above and below a base or standard set of quality specifications. Grid pricing may use a formula for establishing the base price. Interviews with feeders and packers revealed several base prices being used (Schroeder et al.):

1. Average price (cost) of cattle purchased by the plant where the fed cattle were scheduled to be slaughtered for the week prior to or the week of slaughter
2. Specific market reports, such as the highest reported price for a specific geographic market for the week prior to or week of slaughter
3. Boxed beef cutout value
4. Futures market price
5. Negotiated price.

Of these methods, all involve formula pricing except where base prices are established by negotiation. Thus, grid pricing is not necessarily synonymous with formula pricing. Formulas have one thing in common; all are based on some external price. Therefore, all require a minimal amount of market information to establish prices across transactions under the same formula. However, important differences exist among the formulas. These differences include the source of the external price (for example, plant averages vs. USDA quoted prices) and the market level of the external price (for example, live or carcass weight cash market, futures market, or wholesale beef market). These differences lead to important implications regarding the formula pricing method and impacts on other markets.

The final transaction price with most grid pricing methods is established after fed cattle have been slaughtered. Most grids are based on dressed or carcass weights. The intent is to assign higher prices to higher quality cattle and lower prices to

lower quality cattle. Both feeders and packers indicated that premiums and discounts present in grids also varied (Schroeder et al.). Some were based on:

1. Plant averages
2. Wholesale price/value spreads
3. Negotiated values.

Grid premiums and discounts that are based on plant averages are related to the quality of cattle being delivered to a specific plant. In contrast, those based on wholesale price spreads reflect wholesale supply and demand conditions for boxed beef.

To summarize, formula pricing is not necessarily grid pricing, and grid pricing does not necessarily involve formula pricing. Most formula pricing in recent years refers to the method of finding the base price in grid pricing systems. Formula pricing relies on prices discovered for transactions external to the ones involving the formula. The base price in grid pricing may be established by a formula but may also be negotiated between feeders and packers.

Base Prices and Price Discovery

Grid pricing attempts to better match price with quality, thus rewarding producers for marketing higher quality carcasses and penalizing them for marketing lower quality carcasses. Perhaps the most significant concern regarding grid pricing is the method of establishing the base price. Base prices that are in fact formula prices, those using either plant averages or either live or dressed weight reported price, raise serious concerns from the standpoint of price discovery and pricing accuracy.

Base prices that depend of plant averages vary over time due purely to the types of cattle processed by the plant during the time period for which the plant average is calculated. This variation is not necessarily consistent with market trends. Also as a result, plant average base prices can send incorrect market signals to producers.

In addition, base prices derived from plant averages or from live or dressed weight reported prices, may not represent the type of cattle being marketed with the grid. The type of cattle typically being marketed on a grid system would be expected to be higher quality cattle targeted towards meeting grid premiums and avoiding discounts. The cattle on which plant averages or reported market prices are based may not be the same quality as cattle being priced with a grid; and in fact, may be a lower quality. Thus, formula base prices may decline (relative to previously) as increased numbers of higher quality cattle are diverted away from the cash market to grids. Also, reference prices in formula base prices can become thinly traded or thinly reported, making them less reliable as an accurate reflection of market conditions. For these reasons, base prices that are formula priced using plant averages or other cash market trade are potentially problematic for the producer involved in grid pricing and are detrimental to overall price discovery.

Base prices do not need to be formula arrangements. They can be negotiated, market reported prices like other carcass weight (in the beef) transaction prices for fed cattle. Negotiated base prices are relatively expensive to discover in terms of information needed by the parties involved. However, they do not rely on unrepresentative prices such as plant averages. In addition, negotiated base prices would contribute to market information and subsequent price discovery.

If formula pricing is to be used to establish the base price in grid pricing, reference prices discovered in competitive markets is essential. One alternative is to tie the base price to the reported wholesale-level, for example boxed beef cutout values or to reported boxed beef prices. Packers have an incentive to increase wholesale prices as much as possible, so as to increase packer revenues. Thus, the base price is tied to a price which packers have an economic incentive to raise, rather than to cash market or plant average prices which packers have an economic incentive to lower. Another possibility is tying the base price to a futures market price, an alternative market for price discovery. Either of these alternatives is subject to fewer problems than those discussed for base prices that are formulas tied to plant averages or reported cash market prices. These formulas are not as susceptible to thin trading or of moving randomly in ways not reflective of market conditions. Formula prices have advantages that include keeping costs of price discovery low for the parties involved. From this perspective, formulas based on wholesale boxed beef cutout or live cattle futures prices involve both low cost to negotiate and yet are representative of market conditions.

Premiums and Discounts Over Time

Premiums and discounts associated with various carcass traits vary across packers at any

point in time as well over a period of time. Premium-discount grids are reported weekly by the Agricultural Marketing Service, U.S. Department of Agriculture (AMS-USDA) in its national carcass premiums and discounts for slaughter steers and heifers report. In the six-packer survey of grid prices for the week of December 11, 2000 (prior to mandatory price reporting), the range in premiums for Prime quality grade carcasses was from $3/cwt to $14/cwt over Choice grade carcasses. Select grade carcass discounts typically closely follow USDA wholesale Choice to Select boxed beef price spreads. Nonetheless, Select grade carcasses had discounts ranging from $7/cwt to $8.50/cwt across packers relative to Choice quality grade. Standard grade carcass discounts relative to Choice ranged from $9/cwt to $32/cwt. Premiums for Yield Grade 1-2 relative to yield grade 3 ranged from $0/cwt to $6.50/cwt, and discounts for heavyweight carcasses (greater than 950 lbs) ranged from $5/cwt to $30/cwt.

Premium-discount differences among packers are likely related to the kinds of market opportunities different packers have for merchandising beef of varied quality, as well as to the handling/sorting/processing cost differences that may be present for carcasses having varied attributes across different plants or firms. The important point regarding this variability is that a producer needs to compare several grids for the type of cattle the producer has in order to determine which grid offers the highest expected price without undue risk for large discounts. Of course, as discussed earlier, varying base prices should also be considered when a producer assesses various grid price alternatives.

Producers need to understand that premiums and discounts vary over time due to wholesale beef market conditions. Some premiums and discounts are more stable and predictable than others. This information is important if producers make production decisions targeting particular grid price signals. How likely is it that producers will realize premiums close to the ones expected at the time the production decision was made (whether breeding, purchasing, or feeding decisions)? Longer run genetics decisions, feeder cattle purchasing, and feeding management decisions which are oriented toward value-based systems are necessary but are difficult if the "target" continues moving. Therefore, stability of the marketing target is important.

Figures 1-4 illustrate trends in average USDA reported grid premiums and discounts for various carcass attributes over the time period for which such data are available. Quality grade premiums and discounts are all quoted relative to Choice. Average premiums for Prime and certified premiums have been stable over the time period whereas discounts for Select and Standard quality beef vary considerably (Figure 1). The average discount for Select carcasses relative to Choice closely matches the USDA Choice-to-Select price spread for wholesale boxed beef on a weekly basis. Standard discounts are typically $8/cwt to $10/cwt greater than the Select discount.

Yield grade premiums and discounts are illustrated in Figure 2. Yield Grade 1 and 2 carcasses have had relatively stable premiums compared with Yield Grade 4 and 5 carcasses whose discounts have varied over time by as much as $5/cwt. Price discounts for heavy or light carcasses (Figure 3) and dark cutters and other "out" carcasses (Figure 4) vary considerably over time.

Management of cattle can help deal with some of the variability associated with selected grid premiums and discounts. For example, close sorting of cattle can reduce the incidence of and discounts for heavy and light carcasses. To some extent, careful handling may help to reduce the incidence of and discounts for dark cutters. Perhaps adoption of ultrasound or other imaging technology at the feedlot can improve management of yield grades by helping signal when to market cattle to reduce the incidence of yield grades 4 and 5 carcasses. Longer run management of cattle genetics may help target higher quality grades of beef, thus reducing risk associated with widely varying Select and Standard discounts.

Pricing Alternatives and Terms of Trade

Table 1 contains a summary and comparison of issues associated with typical fed cattle pricing alternatives. Differences across the various methods of marketing fed cattle are important because price will likely differ across the various pricing methods. Prices may differ for the same pen of cattle because different kinds of information are used in the various pricing methods to arrive at a price. The key element is that as a producer moves from live weight pricing, to dressed weight pricing, to grid pricing, it is increasingly important to understand the type of cattle being marketed, the pricing system being used, and to assess net price received.

Table 1. Assessing Ways to Market Fed Cattle

	Fed Cattle Pricing Method		
Pricing Attribute	Live	Dressed	Grid
Value Based	No	No	Yes
Pricing Level	Pen	Pen	Individual carcass
Quality Premiums/Discounts	Minimal	Minimal	Yes
Yield Premiums/Discounts	Minimal	Minimal	Yes
Price Range Across Carcasses	None	None	High
Trucking Costs Paid by	Buyer	Seller	Seller
Base Price	Live	Dressed	Formula or negotiated
Carcass Performance Risk	Buyer	Buyer	Seller

Conclusions and Implications

Since base prices often vary and both premiums and discounts vary from one packer to another, producers must understand how price is computed. With plant-average formula-based grid pricing, cattle quality is paid for on the basis of cattle quality relative to other cattle slaughtered previously in the same plant. With other base prices and premium-discount grids, cattle quality is being priced on its own merit, not relative to other cattle.

Many grid pricing systems use formula prices to establish the base. However, base prices in grid pricing do not need to be formula based. Are there effective alternatives to formula base prices? The most concern regarding base prices is with those that are based on plant average prices. Formula base prices based on plant averages do not contribute to price discovery, change across plants as the quality of cattle slaughtered by the plants changes, and may not be representative for the cattle being marketed using a grid.

Grid pricing has several economically desirable attributes. However, to be used effectively by cattle producers, the grid pricing method needs to be understood thoroughly, including differences in premium-discount grids among packers and how premiums-discounts change over time. In addition, cattle quality characteristics must be estimated accurately to avoid a few low-quality, discounted animals offsetting many high-quality animals receiving premiums.

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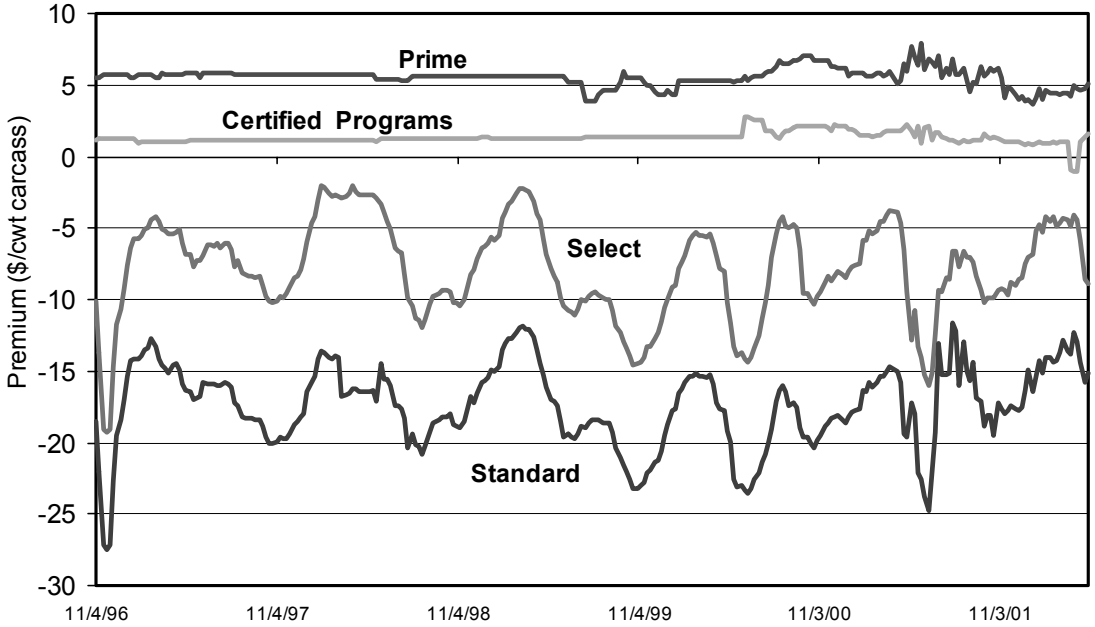
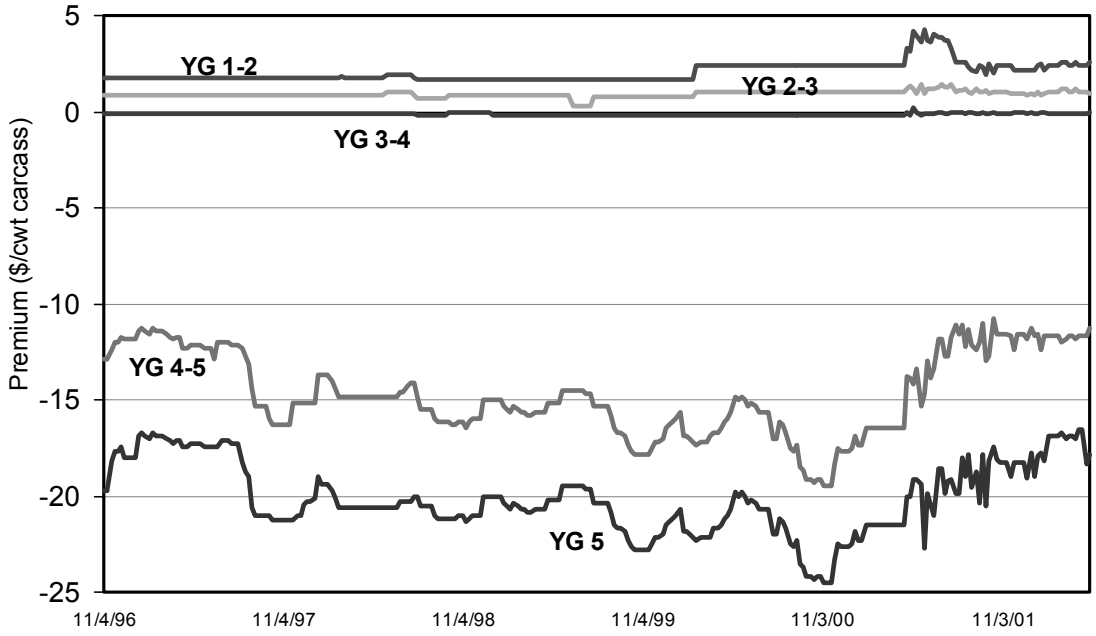
Figure 1. USDA Quality Grade Premiums/Discounts, Nov. 4, 1996 – Apr. 29, 2002.



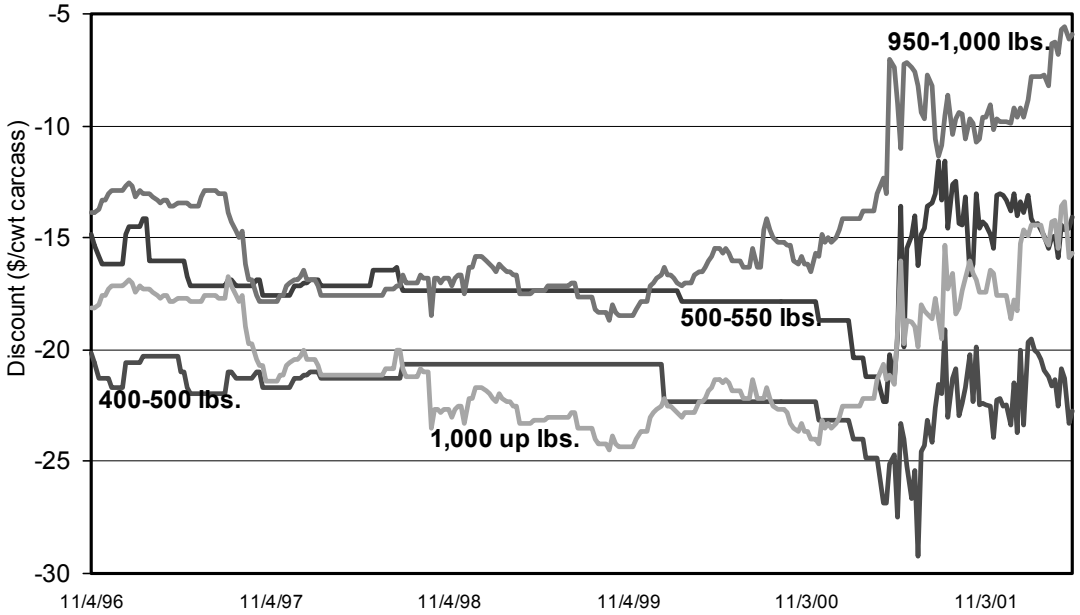
Source: USDA

Figure 2. USDA Yield Grade Premiums/Discounts, Nov. 4, 1996 – Apr. 29, 2002.



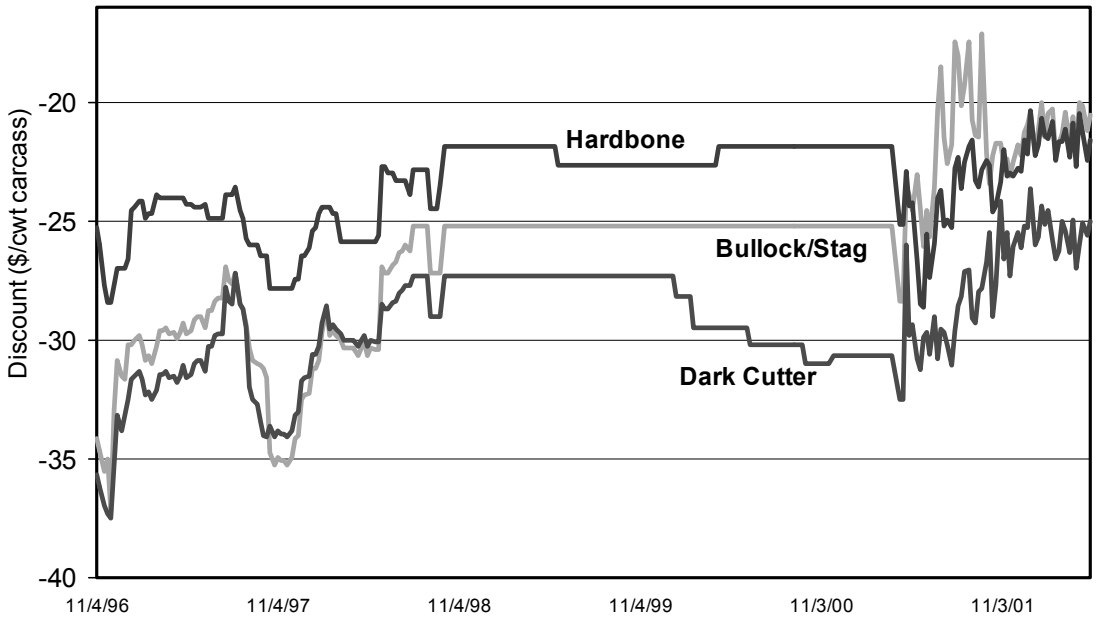
Source: USDA

Figure 3. Discounts for Light and Heavy Carcasses, Nov. 4, 1996 – Apr. 29, 2002.

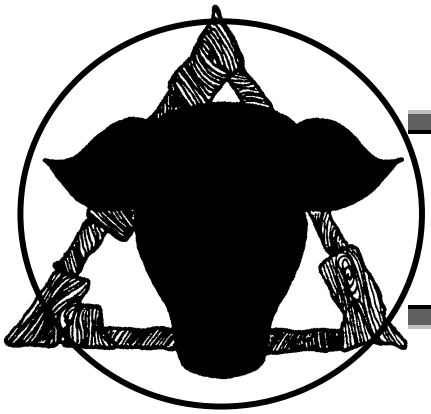


Source: USDA

Figure 4. "Out" Cattle Discounts, Nov. 4, 1996 – Apr. 29, 2002.



Source: USDA



Managing for Today's Cattle Market and Beyond

March 2002

Grid Pricing: Risk, Value of Information, and Management Implications

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The previous two fact sheets (Understanding Grid Pricing; and Grid Base Prices and Premiums-Discounts Over Time) introduced grid pricing and identified how some terms of trade change when using alternative fed cattle pricing methods. This fact sheet focuses on the increased risk and the many sources of risk with grid pricing. Results from research on estimating the value of carcass information and potential improvement in pricing accuracy with grid pricing are reviewed. Lastly, management implications are discussed for producers choosing to price fed cattle with grid systems.

Increased Risk with Grid Pricing

A move toward value-based pricing, or carcass merit pricing, is essential if the beef industry is going to send proper economic signals to producers. Grid pricing is one way cattle producers will be adequately rewarded for producing high quality beef and properly discounted for producing low quality beef.

At the same time, producers need to understand that the potential for higher prices compared with pricing on averages also entails more risk. For example, with live weight pricing, packers bear the risk that actual carcass characteristics for cattle purchased will equal or exceed estimated carcass characteristics by buyers in the price discovery process. With dressed weight pricing, a step closer to value-based pricing, packers continue to bear the risk of some carcass characteristics (for example, quality grade, yield grade, "out" or non-specification carcasses). However, producers now bear the risk of dressing percentage. Packer buyers do not have to worry about carcass weight risk because they pay on the basis of the known carcass weight, not an estimated weight.

Grid pricing introduces a marked change for producers. Producers now bear the risk for all carcass characteristics. Producers are paid on the basis of what is brought to slaughter. Premiums are paid for better quality cattle and poorer quality cattle are discounted.

In economics, typically one can expect a risk and return tradeoff. Whoever accepts the most risk also has the opportunity to receive the greatest return. This concept applies to fed cattle pricing alternatives. Feuz, Fausti, and Wagner confirmed work conducted three decades ago. As pricing methods move closer to true value-based pricing, that is, from live weight, to carcass weight, to grid pricing (a refinement of grade and yield selling), prices also increased. Producer risks increased but so did their returns.

Higher prices with grid pricing do not always result since prices depend importantly on cattle quality. The Ward, Feuz, and Schroeder study contained three component pieces of work. Feuz estimated live weight, dressed weight, and two grid prices for 5,520 fed cattle (85 sale lots) marketed from one feedlot over a year-long period. He estimated prices for three points in time. The average of estimated prices (all converted to a live weight price) was highest in all cases for the two grid pricing methods ($68.61 and $68.54/cwt.), followed by the dressed weight basis ($68.07/cwt.), and followed lastly by the live weight basis ($67.60/cwt.). Average grid prices were highest for these cattle because there were relatively few carcasses which received discounts in the two grids.

Schroeder and Graff also compared estimated live weight, dressed weight, and grid prices for 11,703 fed cattle (71 sale lots) marketed from one feedlot over a one-year period. Because a higher percentage of carcasses received discounts, the average of estimated prices (all converted to a live weight price) was highest for selling on a dressed weight basis ($67.16/cwt.), followed by grid prices ($66.90/cwt.), followed lastly by the live weight method ($65.60/cwt.). The variation (standard deviation) of prices was nearly twice as high for grid pricing ($3.91/cwt.) as for the other two methods; dressed weight pricing ($1.84/cwt.) and live weight pricing ($1.78/cwt.).

In the third component, Ward and Lee estimated live weight and dressed weight prices and seven grid prices for 19,426 cattle slaughtered in four plants on the same day. The variation (standard deviation) of prices across slaughter plants and pricing methods was highest for grid prices, ranging from $3.32 to $5.39/cwt. across the four plants and compared with $0.48/cwt. for dressed weight prices and $0.69/cwt. for live weight prices.

In summary, while producers can expect *on average* higher prices with grid pricing compared with dressed weight and live weight prices, *higher prices will not occur for poorer quality cattle with grid pricing*. Producers also need to recognize that the variation in grid prices is much higher than with either dressed weight or live weight pricing. Over time and across a wide range of cattle qualities, the higher risk and greater return tradeoff will likely occur.

Sources and Extent of Risk

Price variability increases with grid pricing. However, increased price variability is essential if the industry expects to improve pricing accuracy and send the correct economic signals from the wholesale level to producers. The industry needs to move away from "pricing on the average." In doing so, price variability will accordingly increase. Price variability can arise from several sources.

In the Schroeder and Graff study of 11,703 head of cattle (71 pens) sold over a year-long period, over 50% of the cattle received a price in a $2/cwt. range when sold on a live weight basis. On a dressed weight basis, just under 50% received a price in a similar $2/cwt. range. However, when sold on a packer grid, just over 50% of the cattle received a price in a $6/cwt. range. They found that the largest percentage impact on grid price variability was the Choice-to-Select price difference for wholesale boxed beef. Thus, over time, the Choice-Select price spread can be an important source of variation with grid pricing. The next most important factor was the variation in quality grade of cattle sold. When assessing factors affecting revenue per head, weight variability was most important, followed by the Choice-Select price spread.

Producers need to be aware of the changes in premiums and discounts over time when pricing cattle with premium-discount grids. Historical premiums and discounts were discussed in the previous fact sheet (Grid Base Prices and Premiums-Discounts Over Time).

For a given point in time, such as a single day, there can be several sources of price variation with grid pricing. In the Ward and Lee study of 19,426 cattle (140 sale lots) slaughtered on the same day in four plants, plant average base prices were calculated. The estimated plant average base price for Choice, Yield Grade 3 cattle ranged from $112.91 to $110.74/dressed cwt., a variation of $2.17/cwt. or over $16/head. Thus, cattle feeders may experience a significant difference in the base price when that base price is tied to a plant average cost of cattle. The plant average base price depends on the quality of a given pen of cattle relative to the quality of cattle slaughtered *in that plant* for the period in which the plant average is calculated, usually the preceding week or a three to four week

moving average.

When the base price is a formal price tied to a reported market price or price quote, the base price may also vary significantly. For the week chosen in the Ward and Lee study, the base price varied over $2/cwt or over $15/head. These variations in the base price occur *before* considering any variation from the premium-discount grids and variation in cattle quality.

Prices can vary substantially when selling the same pens of cattle on several packer grids. Table 1 shows mean prices associated with each of seven grids with a single base price for the 140 pens of cattle across the four plants. Average grid prices varied across the seven grids by $2.38/cwt. for the Northern Plains 1 plant, $2.35 for the Northern Plains 2 plant, $2.92 for the Southern Plains 1 plant, and $2.61 for the Southern Plains 2 plant. Thus, the variation from different grids exceeded the variation from the base price. However, together, the variation could exceed $5/cwt on a dressed weight basis or over $38/head.

Table 1. Average Estimated Prices for Seven Grids with One Base Price (in $/dressed cwt.)

	Plant				
Price	Northern Plains 1	Northern Plains 2	Southern Plains 1	Southern Plains 2	Total
Observations	*52*	*22*	*25*	*41*	*140*
Grid One	100.68	101.56	98.16	99.14	99.92
Grid Two	100.29	102.19	96.43	98.57	99.40
Grid Three	99.22	100.18	96.22	97.52	98.34
Grid Four	101.60	102.53	99.08	99.93	100.81
Grid Five	100.56	101.87	97.80	99.10	99.85
Grid Six	100.92	101.93	98.21	99.48	100.17
Grid Seven	101.34	102.08	99.14	100.13	100.71

The variation in average prices across plants within a single grid also varied, ranging from $2.94/dressed cwt. for grid 7 to $5.76/cwt. for grid 2 or a range of $22 to $45/head. Quality of cattle slaughtered varies from plant to plant which, when combined with alternative premium-discount grids, results in substantial variation. Quality variation across plants is one reason the authors do not recommend using plant average base prices with premium-discount grids.

Reporting average prices across plants and across grids, not the full range of estimated prices (maximum less minimum price), understates the true variation that can be encountered with grid pricing. Recall that this variation may not necessarily signify a problem. However, it is emphasized because anyone using grid pricing needs to be aware of the variation which can be experienced.

Ward and Lee summarized the variation from pricing each sale lot (the same cattle on the same day) with seven premium-discount grids and using a single base price. Their results paralleled those by Schroeder and Graff. The price range for over half the sale lots (55.7%) ranged from $2 to $3.99/dressed cwt. or $15 to $31/head. Several sale lots (22%) had prices ranging above $4/cwt. or over $31/head. Thus, marketing a given sale lot of cattle on any given day can result in wide differences in prices due to the premium-discount grid used *and* cattle quality.

Research showed carcass characteristics typically receiving premiums contributed far less to variation in the price level and to variability (standard deviation) across grids than did the carcass characteristics that are discounted. The contribution to average grid prices from positive carcass characteristics (Prime quality grade and yield grades 1 and 2) was $0.02/dressed cwt., while the negative contribution from carcass characteristics that are discounted was $0.19/cwt. Discounted characteristics also contributed significantly to variability, while characteristics that receive premiums did not.

Value of Information and Pricing Error

To determine the value of information on cattle quality attributes to the cattle feeder, each carcass in the Schroeder and Graff study was priced using the method that resulted in the highest price among the

three methods (live weight, dressed weight, and one grid). Selling all carcasses using the pricing method having the highest price increased total revenue by $34.74/head relative to simply selling all cattle using live weight pricing. The highest pricing method increased total revenue by $15.14/head compared to selling all cattle on a dressed weight basis and $18.67/head compared with selling all cattle on the grid. Thus, there is a considerable economic incentive to have a better understanding of cattle quality, as well as to properly market cattle by the specific method that returns the highest price. This represents short-term value of information. The long-term value is influenced by management changes that are made in response to the information.

To determine the value of pricing cattle on a grid instead of live weight or dressed weight pricing, the differences in revenue received for the carcasses by pricing method were compared. Schroeder and Graff assumed the grid price for each carcass was an efficient price in the sense that it fully reflected the market value of each carcass. Then, any carcass that sold for a higher price brought more than the efficient price and any carcass sold for a lower price brought less than the efficient price. Essentially, this is what many have argued is the case of poorer quality cattle being subsidized by higher quality cattle. That amounts to a welfare transfer from owners of higher quality cattle to owners of lower quality cattle when cattle are sold on a live or dressed weight basis with little price differentiation for quality differences. To determine the amount that cattle were "over-priced" or "under-priced" relative to the assumed efficient grid price, the difference in revenue from selling the cattle on the grid relative to live or dressed weight was computed.

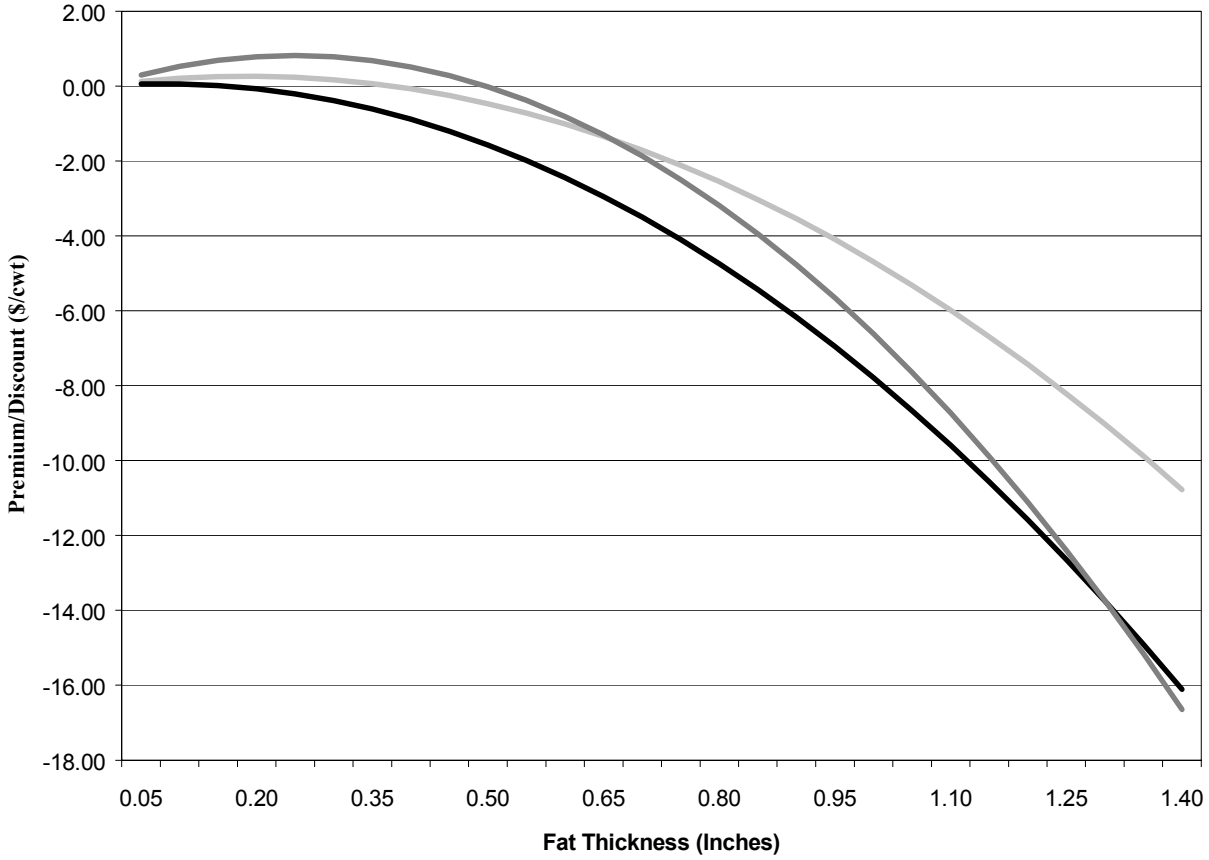
For the 11,703 cattle in this study, Schroeder and Graff presented the amounts of "over-pricing" or "under-pricing" that would have been present had the cattle been sold by live weight or dressed weight instead of on a grid. For 3,650 of the cattle, the grid price was less than the live weight price by an average of $2.90/cwt. or $36.80/head. This means that if these cattle were sold on a live weight basis, they would have received $36.80/head *more* than they were actually worth (assuming the grid price is the efficient value). For the remaining 8,053 head, the grid price exceeded the live weight price and if these cattle were sold live instead of on the grid they would have received $40.04/head *less* than they were worth. Similar magnitudes of pricing errors are present for dressed pricing relative to grid pricing. The primary conclusion is that if these cattle were sold via live or dressed weight pricing, assuming the grid pricing system is the most efficient in terms of sending appropriate pricing signals, this would have resulted in typical "pricing errors" (positive or negative) of $30/head or more.

Management of cattle can help deal with some of the variability associated with selected grid premiums and discounts. For example, close sorting of cattle can reduce the incidence of heavy-weight and light-weight discounts and, to some extent, careful handling may help to reduce incidence of dark cutters. Perhaps adoption of ultrasound or other imaging technology at the feedlot can improve management of yield grades by helping signal when to market cattle to reduce the incidence of Yield Grade 4s and 5s. Longer run genetic management may help target higher quality grades of beef, thus reducing risk associated with varying Select and Standard discounts. Since a few heavily-discounted carcasses can offset many carcasses receiving premiums, any efforts to eliminate the discounted carcasses will likely have a high return for the cost incurred.

Feuz examined the relationship between individual animal carcass characteristics price premiums and discounts from selling on three grids. Marbling and fat thickness were important to explaining premiums and discounts for individual carcasses. However, rib eye area was not significant for two of the three grids. Marbling had a positive effect but varied for each grid. The premium associated with marbling reached a maximum when there was sufficient marbling to change from the mid-Choice to high-Choice grade. Differences among the grids were also found for fat thickness. The premiums/discounts associated with varying fat thickness for each of the three grids is shown in Figure 1. Back fat is discounted at thicknesses above 0.38, 0.17, and 0.50 inches for grids A, B, and C, respectively.

These results suggest knowledge of each grid is important and how to manage cattle marketings to receive the highest premiums. Also, depending on how base prices are calculated in a grid system (especially plant average base prices), the Choice-Select price spread may have a different impact on the premiums/discounts for each grid.

Figure 1. Premium/Discount Associated with Various Levels of Fat Thickness for Three Different Grids.



Conclusions and Implications

Several conclusions and implications can be drawn from recent grid pricing research.

Grid pricing resulted in more than twice the variability in price received per cwt. (live weight basis) across carcasses compared with live and dressed weight pricing. This indicates that grid pricing is more discriminating in terms of pricing signals conveyed to producers.

Cattle with low dressing percentage and low quality grade tended to receive a higher price when sold on a live basis. Cattle with low quality but high dressing percentage tended to receive the highest price when sold on a dressed weight basis. Grid pricing resulted in the highest price for high quality grade, better yield grade, and not excessively heavy or light carcasses. Only about half of the cattle evaluated would have received the highest price by selling them using a grid. This is not an indictment against grid pricing, rather it is a reinforcement that grid pricing leads to more price dispersion associated with cattle quality than do live or dressed weight pricing.

If cattle could have been sorted and sold to the option offering the highest price, approximately $15/head more could have been made relative to selling the cattle using the next highest price method (dressed weight). About $18/head more could have been made compared with selling all on a grid, and $35/head more than marketing all under live weight pricing. This indicates substantial value of information for producers who understand the kind of cattle they market and target the cattle to the best pricing opportunity. However, over time if producers target cattle accordingly, the live and dressed weight markets will represent predominantly lower-quality cattle and grids will be used to price higher quality cattle. If enough producers adopt such a marketing strategy, live and dressed weight prices could decline relative to grid pricing opportunities, or beef packers would be over-paying for live and dressed weight cattle. This could result in the live and dressed weight markets having less advantage than they do currently relative to grid pricing, even for lower-quality cattle.

If grid pricing is efficient at sending appropriate price signals, large pricing errors exist in

both under-pricing and over-pricing carcasses on live and dressed weight selling methods compared with grid pricing. High-quality cattle subsidized low-quality cattle by an average of more than $30/head. This quantifies how poorly average live weight or average dressed weight pricing conveys accurate price signals to cattle feeders. Cattle feeders that want to get paid for the quality of cattle they produce will only realize this value if the cattle are sold using grid pricing methods rather than live or dressed weight average pricing methods.

It is likely that pricing efficiency improves with grid pricing and production efficiency may also improve if producers can identify the type of cattle they are producing and sell them on a grid that rewards that type of cattle. However, there are often additional costs to selling on a grid, and producers may have more costs in sorting cattle to "fit" a grid. Producers must therefore analyze added costs as well as added benefits in deciding what strategy fits their operation.

The Choice-to-Select boxed beef wholesale cutout price spread had the most impact on variability of price per hundredweight for carcasses sold on a grid followed by variability in quality grade of carcasses in a pen. Carcass weight variability followed by the Choice-to-Select price spread had the largest influence on variability of revenue per head. Yield grade variability did not have a statistically significant impact on price or revenue variability. This shows the importance of the Choice-to-Select price spread and quality grade on grid price variability. Producers trying to manage the increased price risk associated with grid pricing will find the most benefit from managing cattle quality grade, carcass weights, and monitoring the Choice-to-Select price spread.

Several sources of variation exist in grid pricing. Base prices can vary $2/dressed cwt., or $15/head, whether using plant averages or formulas tied to reported cash-market prices. Prices across grids can add another $2-4/cwt. of variation, another $15 to $30/head. In addition, variation in carcass characteristics contributes significantly to the variation in grid pricing, especially discounted characteristics such as Select and Standard carcasses, Yield Grade 4-5 carcasses, light and heavy carcasses, and non-conforming or "out" carcasses. Relatively large numbers of carcasses with discounted characteristics alone can double the amount of variation arising from grid pricing.

Grid pricing is a step towards value-based pricing when used correctly. Cattlemen can learn much about the cattle they market with grid pricing and can then use the information to make management and genetic improvements. However, simply trying to match a given sale lot of cattle to the best grid, while potentially beneficial from a short-run price, revenue, and profit perspective, is not moving the industry to value-based marketing. Only when genetic and management changes result from grid pricing information can long-term value-based marketing be achieved.

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Managing for Today's Cattle Market and Beyond

March 2002

Industry Opportunities and Some Issues for Value Based Marketing

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Grid pricing is commonly associated with value based marketing because each animal's price is based on individual quality and yield grades rather than group or pen averages. This pricing system has been regarded as superior to traditional average pricing because it eliminates estimation error from the sale transaction. Schroeder and Graff estimate that selling cattle via live or dressed weight pricing results in an average per head pricing error of roughly $30 per head, assuming that grid pricing reflects the true value of a carcass.

While grid pricing has the potential to provide better incentives for the livestock industry to improve genetics and management, we also believe that value based marketing in the future will involve much more than just grid pricing. That is, we are of the opinion that marbling score and yield grade information conveyed through grid pricing falls short in adequately capturing all of the attributes of beef that are noticed by the consumer. In addition, we feel that more customized beef products will be attained in the future through more targeted genetics and narrow management paths.

Identity preservation or traceability, as discussed by other articles in this section, is a tool that we feel has the potential to help facilitate these customization efforts on a much broader scale than current alliances. One insightful beef industry alliance, that has relatively specific genetics and mandated feeding practices, is Ralphs' California Beef program. This particular program has identified consumer problems with beef tenderness, consistency and flavor and developed a beef program to meet consumer demand. To meet consumer demand in their markets, Ralphs is structured to use the consistent genetics from the dairy industry and combine this with a specialized feeding program. This California program offers key insights to the beef industry on meeting consumer demand for beef.

A California Beef Program

Ralphs Grocery Co., a subsidiary of The Kroger Co., is the largest supermarket operator in southern California with 295 conventional supermarket stores and 84 Food 4 Less warehouse stores. To address quality problems for beef that consumers expressed to Ralphs' meat department employees in the 1980s, Charlie Bergh, group Vice President of Ralphs' perishable division at that time, developed the California Beef program. This program targeted the three quality attributes of tenderness, consistency, and flavorful meat identified as most lacking in their meat counters. Furthermore, these quality attributes were identified as having a big reward potential since virtually all of their competing retail stores were equally or more

deficient in providing these attributes. The California Beef program was launched in April of 1993, after roughly three years of consumer testing to address these quality issues of tenderness, consistency and flavor.

Several breeds of cattle were considered for their program. First, English breeds were considered as a supply source for their program, but they were unable to identify a year-round supply of 2,500 head of young aged animals per week that met the program's criteria. Continental and Brahma lines were found to have unacceptable tenderness. In the end, the largest bovine breed in the U.S. or Holsteins, were shown to have the most promise for their program. Given that there are few strains of Holsteins, the consistency of this breed stood out.

In addition, Holsteins were rated as being very tender in all of their shear force and consumer tasting trials. Yield grade for Holsteins was also a genetic factor that sold Ralphs on this breed and the overall economic viability of their proposed California Beef program. Holsteins were found to produce more yield 2 grades and have a 3 to 5 percent better retail cutout than traditional Crossbreds. Similar results on yield grade and cutout were verified with information supplied by Packerland, which was slaughtering 15,000 Holsteins per week in Wisconsin at the time, and Texas A & M (Stiffler *et al.*). Holsteins have a higher bone to meat ratio than other breeds, but they were found to have more retail cutout than the Crossbreds studied due to less internal and external fat.

Beyond genetics, Ralphs identified age and pre-slaughter feeding practices as other keys to producing a desirable meat product. While beef cattle can go the management path of a stocker operation and be fed on a high-energy grain ration for only 90 days, Ralphs mandated that their animals be grain fed for 300 days. This feeding requirement also ensured that their animals would be young since Holsteins will reach their desired slaughter weight of 1,150 pounds in about 13 months. Commercial Crossbreds rarely see the slaughterhouse before 15 months of age and often not until they are 18 to 24 months of age.

Other management practices were directly or indirectly imposed by Ralphs to ensure consumer satisfaction. In the beginning, feedlots had a problem of overfeeding since the steers would get too fat and big to be accepted. But the problem of overfeeding was quickly rectified with all carcass data going back to the feedyard (Kay, 1993). Feedlots immediately fine-tuned their sorting, nutrition programs, and days on feed to the specifications set by Ralphs. Specifications initially written by Ralphs were quite detailed and included the following: a) fat coverage can not exceed mid-point USDA yield 3 grade standards, b) exterior fat shall be clean and white to creamy white, c) fat coverings that exceed three-fourths of an inch "measured at a point equal to one-third of the loin eye or rib, measured from the outer tip of the lion eye muscle, shall be rejected," d) surface of carcass shall be light red to deep blood red with no noticeable dehydration, bruises, or "dark cutters," e) exposed surfaces shall be free from any tackiness, f) all carcass bones will be "porous and red with buttons that are soft and white," g) hot carcass weights shall range from 600 to 820 pounds, h) internal carcass temperature shall not exceed 45 degrees Fahrenheit, and i) all animals shall be from Select and Choice quality grade young steers. The consistent genetics from the dairy industry permitted Ralphs to set specific production standards and guidelines.

Feedlots in Southern California were contracted by the Tolleson, AZ packing plant of Sun Land Beef (SLB) for Ralphs to raise Holsteins. SLB offered their first contracts to over 10 different feedlots in Southern California and had 5 sign up to produce Holsteins for Ralphs. A $23 per head premium was paid by Ralphs with $22 going to the feeder and $1 going to SLB for sorting, identifying, and tracking the animal. This premium was roughly $3.25 per cwt. on a carcass basis. At SLB's slaughter and processing facilities, Holsteins were slaughtered separately from "Crossbreds." A Ralphs' grader visually selected carcasses that received the California label and then carcasses with a Ralphs stamp were separated from the other Holstein carcasses right before chilling. Ralphs was primarily looking for select grade carcasses and they had an agreement with SLB to buy no more than 30 percent of their carcasses with a Choice grade.

Ralphs' confidence in their product consistency and desirability was so great when they initiated their program that they offered customers a "double your money back" guarantee if they were not satisfied with any California Beef purchase. Ralphs introduced the product in 134 of 165 stores and found an increase in beef sales of 4.3 lbs. per 1000 shoppers for stores with California Beef after

six months. Beef sales increased 3.7 percent during the first seven months of the program while overall supermarket sales of beef were flat to negative in Los Angeles for the same period (Kay, 1994).

Although vitamin E supplementation was not initially adopted as a management practice when Ralphs launched their program, they did identify this practice as something they should consider. In simplistic terms, vitamin E works as an antioxidant to retard the ugly browning and eventual green coloring of beef exposed to the air. Ralphs relied on research that was done by the University of Wisconsin-Madison and a pharmaceutical company, Hoffman-La Roche, Inc. to evaluate shelf life attributes of beef from feeding additional vitamin E. Dr. Scott Williams led this research in the early 1990s that evaluated Holstein and Crossbred steers sold by Sam's Warehouse Stores. They concluded that feeding 375 International Units of Vitamin E for the entire feeding period cut retail meat losses or "retail shrink" by more than 60 percent. Shrink for the vitamin E supplemented beef was 1.98 percent while the control product had a 5.62 percent shrink. Vitamin E was not regarded as a consumer concern given that the level of daily animal supplement was lower than the daily human intake of someone receiving Vitamin E supplement. Ralphs later adopted the requirement of vitamin E supplement.

Currently, feedlots raising beef for Ralphs will feed their "normal mix" of vitamin E supplement until 30 to 40 days before slaughter. Then a heightened level of vitamin E supplement is fed until the Holsteins are slaughtered. Currently, Holsteins account for almost two-thirds of SLB's cattle slaughter. Ralphs' "California Beef" label has changed to "California Branded Beef" since many of the Holsteins are now fed in Arizona feedlots.

Adding Value through Customization

Moving the beef industry towards a production-marketing system that will be more highly valued by today's consumer is a formidable challenge. This challenge is most noteworthy given that two pieces of meat with the same "label" at most retail counters could easily have come from strikingly different genetic and management paths. We highlight opportunities and issues below that we feel will be important for the beef industry to address in order to add more consumer value through producer customization activities.

Vitamin E Supplementation

Vitamin E fed at adequate levels was found by Ralphs to reduce retail shrink by over $15 per carcass while the estimated cost of feeding vitamin E was around $2 per head. The National Cattlemen's Beef Association has estimated that vitamin E supplementation reduces retail shrink by 5.2 percent, saving $50 per carcass on beef sold overseas. Clearly, vitamin E supplementation is a relatively simple management issue at the producer level that would result in a good rate of return for the industry.

However, problems associated with getting everyone to adopt vitamin E feeding or free riding and monitoring costs would need to be addressed. Assuming that a unique animal identification system will eventually be introduced for food safety reasons, an opportunity would exist to tag management practices like vitamin E feeding to this kind of database. If producers fail to take advantage of customization through vitamin E feeding, where it is done most efficiently, customization will continue to occur with similar levels of retail shrink at the retail level. But this also results in a lower derived demand for live cattle. In part, better education and appreciation for the derived demand process will help sell producers on the value of customization activities like vitamin E supplementation. In addition, the beef industry should also conduct additional research to identify and verify the returns associated with value-enhancing activities.

Identity Preservation/Traceability

As discussed in another article in this section, Canada will implement a traceback program for all their cattle on 1 January 2001. All cattle are to be tagged with an approved Canadian Cattle Identification Agency (CCIA) ear tag when they leave their herd of origin. After 1 July 2001, all Canadian packing plants are required to "transfer the information to the carcass and maintain that identity to the point of carcass inspection." Each animal will have a unique identification number. A 90 percent traceback is targeted so that containment of a potentially devastating disease or major food safety defect can be quickly isolated and rectified. Although the CCIA has been enacted to address food safety and animal disease concerns, consumer feedback issues could also be tagged into the database that houses each CCIA animal number. Additional data collection and coordination could also make tracing retail primal cuts to a specific

genetic-management path a reality. If consumers have the ability to voice their satisfaction or dissatisfaction with a particular genetic-management path, the beef industry would be able to more precisely identify and react more swiftly to any changes in consumer demand.

Market development should be incorporated as a goal of any identity preservation system even if liability concerns related to food safety issues are driving the industry and policy makers to the table. As noted in the article entitled, "Identity Preserved Red Meat Products," other countries are clearly ahead of the U.S. in establishing their traceback systems and this could erode our competitive position for many export markets.

Narrowed Genetic-Management Paths

Holsteins were the only breed Ralphs found available to supply consistent, acceptable quality, and steady supplies of fresh beef throughout the year. While programs like Certified Angus Beef, Farmland Supreme, and Certified Hereford Beef narrow genetic diversity, their genetic requirements are still rather loosely defined and limited. More objective measurement of meat characteristics is another possibility, but it is doubtful that measurement can account for the same level of quality attributes that could be built into an identity preserved marketing system. Given consumer demand for consistency and palatability, every sector from seedstock to retail level should try to come together and establish a few standardized quality targets and acceptable genetic-management paths for those targets. Identity preservation is a tool that could be used to narrow the genetic-management paths for the industry. For example, an age limit and acceptable percentage ranges of Continental, English, and other characteristics (e.g., maximum percentage of 15 percent Brahma for heat tolerance) could be set before animals could be classed as say tender. With artificial insemination, producers could use semen or first generation bulls from 10 to 15 endorsed semen alternatives on approved cows. Different classes of animals could be shipped on different days of the week in order to segment product while maintaining high plant throughput. With the potential to implement genetic markers on a large scale with relatively short turn around and low cost, management issues related to age, feed, and environment may become more of a challenge to narrow in the future than genetics.

Regional/Ethnic Markets

Both Ralphs and SLB indicated that the southwest is more of a Select than a Choice market. In contrast, consumers from other regions like the Midwest and east coast are referred to as more of a Choice than Select market. In addition to regional demand preferences, ethnic groups can have very distinct preferences. For example, Benedict Feeding, Inc. near Casa Grande, AZ, custom feeds a few pens of 2-3 year old Brahma bulls and stags for a small butcher in the bay area of San Francisco. These animals have very little marbling and are relatively tough so that they would rank very poorly under USDA grading criteria. But these animals are apparently a good substitute for the water buffalo and ox that some ethnic groups are accustomed to.

Hispanics, African Americans, and Asian Americans currently make up 28 percent of the U.S. population and estimates are that they will account for 44.5 percent by 2040 (Silver). Since 1990, overall U.S. buying power has increased 56.7 percent while Hispanic, African American, and Asian American buying power has increased 72.9, 84.4, and 102 percent, respectively (Humphreys, 1998a, 1998b, 1999). Research related to a better understanding of these regional and ethnic demand differences should be considered with seedstock through retail sectors sharing a common vision for this effort. Given today's discriminating consumers, producing for the average is more likely than ever to miss the mark for any market segment.

Vertical Verification

While USDA does all the grading of carcasses at SLB, Ralphs still has one of their employees on the packing line in SLB's plant making selection decisions. Dietrich noted that this was a key component for making the California Beef program work because it insured credibility of the program to Ralphs. If the beef industry moves to identify more targeted meat products, retailers will need to have input into seedstock selection decisions for any program to work. Likewise, seedstock, cow-calf, and feeder input will be important to assure that production parameters are reasonable. Vertical verification should be encouraged at all levels of any coordinated genetic-management program to improve credibility and increase communication among sectors.

Mutual Gains

It is important to recognize that gains can be realized in every sector from the cow-calf to retail level with a better beef product. Although Holstein steers were fed before the California Beef program started, the price of day-old Holstein calves has increased from the program so that dairies now have a "good market" for newborns (Kay, 1996). Feedlots have also benefited from the California Beef program. In addition to the "premiums" received, some feedlots feel that the program has helped them keep cattle feeding alive in the southwest (Kay, 1994). These feedlots transport most of their grain in from the Midwest, making their per pound cost of feed significantly more expensive than other feeding regions. SLB indicated that the program has helped them operate their plant more efficiently by running closer to capacity (Dietrich). Ralphs claimed that beef drives meat department sales, and that when meat is in a customer's basket, individual sales double because individuals that purchase meat are "primary shoppers" (Kay, 1994). At 4.4 percent of total store sales, beef was the largest dollar-producing category of Ralphs' stores. Soft drinks were the only product category close to beef at 3.7 percent.

Captive Supplies/Pricing

In the California Beef program, captive supplies were deemed necessary to ensure that consumers could always go into a Ralphs store and make a repeat brand purchase. Captive supplies were also noted as being important for improving cost efficiencies and profit variability at both the feedlot and packer levels. In the California Beef program, SLB was contracting with feeders for cattle on behalf of Ralphs. A contracted feedlot, SLB, or Ralphs were required only to give a 30-day notice to end their participation in the program. Cattle in the feeding program prior to a 30-day notice would have to be purchased by Ralphs through SLB, provided they met contract specifications. A "see how it goes" approach was initiated from the beginning and appears to have worked for the long-term benefit of the relationships involved.

When problems would come up each partner gained a new perspective for each other's operation and through joint problem solving each relationship gained a new level of trust and confidence (Kay, 1994). For example, when the program was first initiated SLB had to purchase Holsteins outside of what they had contracted for due to bad weather. Advertising dollars had already been spent in anticipation of California Beef hitting the retail shelves, so SLB paid an extra $1 to $2 per cwt. than previously contracted. Although this poor start might have discouraged some, SLB was committed to the long-term vision of the program.

Because the program has been tested by all kinds of adverse events from earthquakes to company mergers, confidence has been built into their long-term relationships. As noted by SLB in reference to Ralphs, "whenever differences would come up we were committed to working through any problem. We believe that it is better for us to go into the future together building on our long-term relationship rather than going forward alone." If the beef industry can identify more targeted genetic and management paths, a "see how it goes" approach between any contracting parties would probably be wise.

While contracts can aid in planning and cost efficiencies, a long-term pricing contract for many years that fails to predict the mean price fairly accurately will be doomed for failure. SLB voiced that they would rather not "guess the longer-term trends for the industry." Coming up with the capital to cover losses for when the market steadily moves against SLB's contracted position is a risk they would rather not take. Technologies and policies can change the underlying structure of an industry rather quickly. Given the difficulty associated with predicting the long-term mean price for an industry, shared ownership or cooperator agreements appear to have a place for reducing income fluctuations between sectors while achieving a relatively high level of economic efficiency.

Conclusions

Genetics, management and the environment are key inputs for the beef industry. Ralphs found desirable palatability and consistent genetics by using grain fed Holsteins that would reach slaughter weight in about 13 months. SLB contracts with feedlots for Ralphs to apply feedlot management practices identified for producing quality, consistency, year-round availability, and consumer value. These elements are believed to be key for the consumer loyalty they have developed for their California Beef product. Their branded beef product was tested and re-tested for consumer acceptability

before they launched their program. Ralphs selected the Holstein breed from existing genetics largely because of product consistency, tenderness, and the ability to immediately produce year-round supplies. In addition to having a relatively narrow genetic base, a Ralphs employee visually selects animals that will carry their branded beef label. This was identified as a key component for making the California Beef program work. A steady supply of beef through the slaughterhouse was noted by SLB as being very important for keeping their per unit processing costs low.

Producing attributes of consistency and tenderness from even a selected sub-set of composite breeds raised in different climatic and range environments presents a formidable challenge to the beef industry. The experience of Ralphs suggests that seedstock selection decisions need to be more focused than just the grid pricing carcass quality attributes of marbling and yield. Palatability extends beyond grid measures for the consumer and consistency is more than producing animals that hit the same area of the grid. Better information sharing and coordination between seedstock and retail industries could help assure that consumer preferences of palatability and consistency are met while meeting high production standards. In addition, cow-calf, feedlot, and packing industries need to be involved with any genetic plan proposed between seedstock and retail sectors to ensure that management can take full advantage of any genetic-management path targeted.

Identity preservation should be considered as an industry management strategy to produce more targeted quality attributes, and enable traceback capabilities for food safety and animal disease problems. Through an industry recognized identity preserved marketing system, feedlots could also benefit from market customization activities like Vitamin E feeding. Regional and ethnic markets could be better serviced through identity preservation. Identity preservation can segregate targeted genetic-management paths while maintaining many of the slaughter and processing scale economies of size. Given the fragmented nature of the cow-calf sector, where genetic decisions occur, an identity preserved marketing system appears to be a logical tool for the beef industry to explore in order to develop more targeted genetic-management paths. Objectively measuring all quality attributes that consumers value for every carcass is likely to prove cost prohibitive for the long-term, given the competitive supply chain structure of the pork and poultry sectors. Furthermore, traceback capabilities of an identity preserved marketing system provide value to the beef industry for improving their product.

The inability of the current grid pricing system to identify genetic outliers within a pen is cause for concern. Under this pricing system, the "better performing" ranches or pens need to increase in size relative to the "poorer performing" ranches for genetic advances to occur for the industry. In addition, as noted by meat scientists and Ralphs, many problems associated with poor beef quality can occur after slaughter. An identity preserved marketing system would have the capacity to isolate management, environmental, and processing practices that are not utilizing the full genetic potential of an animal. Emerging technologies like "computer vision scanning" and the "tissue tenderness probe" will also do little to improve the genetic pool of the beef industry if these technologies just sort beef. An identity preserved marketing system is really needed to establish superior genetic-management paths that will consistently meet different regional and ethnic market consumer demands. Until such a system is implemented, beef could continue to lose market share under grid pricing to the more consumer driven and narrow genetic-management path orientation of the pork and poultry sectors.

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