

GRID PRICING AS A FED CATTLE MARKETING STRATEGY

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INTRODUCTION

Grid or formula pricing is an alternative marketing avenue for fed cattle. It is based on the value each individual carcass contributes to the total weight in the transaction. It is for this reason that grid pricing differs greatly from other beef pricing systems (live or dressed weight pricing). As such, this pricing system permits buying cattle based on their merit or lack thereof. Under such system, packers can pay better prices for carcass that fit market specifications, and discounts for those that do not fit market specifications, or that exhibit anti-quality factors (age or dark cutting beef). This is likely the reason all major packers today offer grid marketing as an alternative to live or dressed weight pricing systems. It is estimated that currently over 45% of USDA graded fed cattle marketed in the U.S. are priced on a formula or grid. Within 5 years, this figure may reach 90%. Most components of the grid are largely determined by genetics of the calf; although, feeding factors such as diet energy and protein content, implant management, and days on feed, among others, further impact carcass characteristics. Therefore, genetic decisions made by cow-calf producers, and management and marketing decisions made by cattle feeders affect the ultimate value of cattle. Cattle feeder who wish to consider grid pricing as a marketing strategy must first understand the various components that constitute a grid, know how grid pricing works, especially how base price is obtained, evaluate differences between grid, live or dressed weight pricing systems, and be reminded that revenue is still a function of weight sold (live or carcass), and that greater revenue does not necessarily mean greater profits.

COMPONENTS OF A GRID

The main components of a grid are quality (QG) and yield grade (YG), and whatever carcasses do not fit the grid, or “out-cattle”. The latter are defined as carcasses that reached B-maturity and score slight for marbling or less (sometimes these carcasses are referred to as no-roll), carcasses for which weight falls outside the range stipulated by the formula (often carcass weights \geq 900 lb or weights = 550 lb), and carcasses that display dark ribeyes (dark cutting beef). Quality grade is determined first by age, then by degree of marbling. Age and degree of marbling are estimated at chain speed. Carcasses determined to be within A (9-30 months) or B maturity (30-42 months) may fall into quality grades widely recognized as Prime, Choice (only average or high Choice for B-maturity), Select (only A maturity), standard, and utility (only B maturity). Within A maturity, carcasses with marbling considered to be slightly or moderately abundant reach Prime, those with marbling considered to be small, modest, or moderate reach Choice, those with marbling considered to be slight reach Select, and those with marbling considered to be traces or devoid reach only Standard grade. Within B maturity, the only change is that carcasses that reach small marbling cannot be graded as Choice, and Select grade was eliminated in 1997 in an effort to reduce tough-eating beef. Therefore, B-maturity carcasses that reach small or slight marbling are graded

Standard. Yield grade is an estimate of carcass primal cut yield relative to total carcass weight (these cuts represent a small but highly priced components of the carcass), which varies between 54.6% for YG 1 and 45.4% for YG 5. Factors driving YG up are carcass weight and fat content (fat cover and internal fat); the only factor driving YG down is degree of muscling (area of the ribeye).

GRID PRICING SYSTEM

Grid pricing is based on a pre-determined price (base) that reflects industry or plant averages and specified premiums and discounts for carcasses above and below the base or standard quality specifications. Base prices are established by packers or alliances based on average prices of cattle purchased by the plant where the cattle are scheduled to be slaughtered for the week prior to or the week of slaughter, specific market reports, such as the highest reported price for a specific geographic market for the week prior to or the week of slaughter, boxed beef cutout value, reported price for the live cattle futures market price, futures market price, and/or a negotiated price (Schroeder et al., 1997).

The word grid describes the arrangement of all possible QG and YG arrangements (Table 1), with a separate discount list for cattle that do not fit QG and YG categories (B-maturity carcasses with small or less defined marbling, heavy or light carcasses, dark cutting carcasses, bullock or heiferette carcasses). In the example (Table 1), base price is defined by the plant for the specific day of the transaction, to which quality and yield grade premiums or discounts are added or subtracted to arrive at the price for which that carcass or group of carcasses will be bought. Thus, any and all Choice, YG 3 carcasses will be bought for the base price. Alternatively, a Choice, YG 4 carcass would be discounted \$20/cwt, and a Select, YG 4 carcass would be discounted \$27.40/cwt (-\$7.40 and -\$20.00/cwt discounts for QG and YG, respectively). Similarly, a group of Prime, YG 3 carcasses would be bought at a premium of \$8/cwt. Grid price discounts on this grid example between \$17 and \$32/cwt carcass translate to live fed price discounts between \$7.50 and \$15/cwt. Thus, the net price for discounted fed cattle may readily approach that paid for cull bulls or cows, especially when combinations of discounts (such as a Select, YG 4 carcasses) are encountered.

It is obvious from this example that price discounts are more significant than premiums paid for QG or YG (between \$9.50 and \$11/cwt). Because in practice some features of the grid displayed as an example vary, cattle feeders are encouraged to study the details of the various grid-pricing structures they may be considering. For instance, most grids today offer a premium intermediate between low Choice and Prime grades that describes carcasses that fit certain special marketing programs such as Certified Angus Beef®, Certified Hereford Beef®, Sterling Silver®, etc. However, requirements for these programs are quite specific to carcasses grading average to high Choice, YG 1 to 3 displaying a specific marbling pattern (smaller flecks). Additionally, the example displayed above assumed that all price adjustments for the combinations of QG and YG between Select and Prime, and YG 1 and 5, respectively, were additive. In reality, packers or marketing alliances may have fixed discounts regardless of QG or YG. This concept was illustrated in the example for Standard grade, and all discounts for “out” cattle.

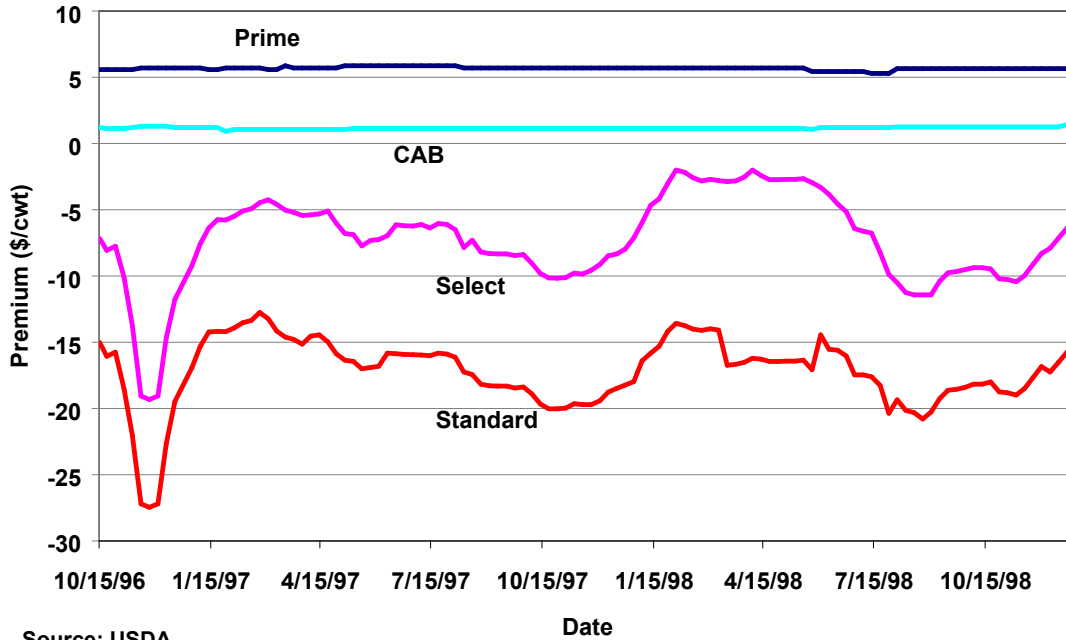
Table 1. Grid arrangement of premiums and discounts for carcasses falling in various quality and yield grade categories (the top figure within each cell defines the quality grade adjustment, the bottom figure defines the yield grade adjustment).

Quality	Yield				
	1	2	3	4	5
Prime	+ 8.00	+ 8.00	+ 8.00	+ 8.00	+ 8.00
	+ 3.00	+ 1.50		- 20.00	-25.00
Choice	+ 3.00	+ 1.50	Base	-20.00	-25.00
Select	- 7.40	- 7.40	- 7.40	- 7.40	-7.40
	+ 3.00	+ 1.50		-20.00	-25.00
Standard	- 35.00	- 35.00	- 35.00	- 35.00	-35.00
Out cattle:	Weight < 650	Weight > 950	No roll	Dark cutter	Age
Discount:	20.00	20.00	20.00	20.00	20.00

Cattle feeders that are considering grids for marketing fed cattle must understand that premiums and discounts vary over time due to wholesale beef market conditions (Ward et al., 1999). Most QG and YG premiums tend to be quite stable over time (Figures 1 and 2), while discounts, especially those reflecting Choice-Select grade differences, follow the Choice-Select price spread for wholesale boxed beef on a weekly basis (Figure 1; Ward et al., 1999). Select carcass discounts were lowest for the periods between January and April 1997 (\$5/cwt), and January and June 1998 (approximately \$3/cwt). During these periods, the Choice-Select price spread for wholesale-boxed beef was similar (Figure 3). Weight discounts are highly variable and likely dependent on market outlets for extreme weight carcasses (export or niche markets). Similarly, dark cutting beef, bullock and heiferette carcass discounts vary considerably.

Due to this system of pricing, cattle feeders are forced to discover the value of the cattle before they market them, or even before they purchase them. Therefore, astute cattle feeders who seek to be compensated for the value of the cattle they produce must evaluate this pricing alternative from the moment they make a purchasing decision, throughout the feeding program (paying close attention to diet composition, feed delivery, implant management, and length of feeding period), and especially when deciding where and how (base price) to market on a grid.

**Figure 1. USDA Packer Survey Quality Grade Grid
Premiums/Discounts, October 1996-December 1998**



**Figure 2. USDA Packer Survey Yield Grade Grid
Premiums/Discounts, October 1996 - December 1998**

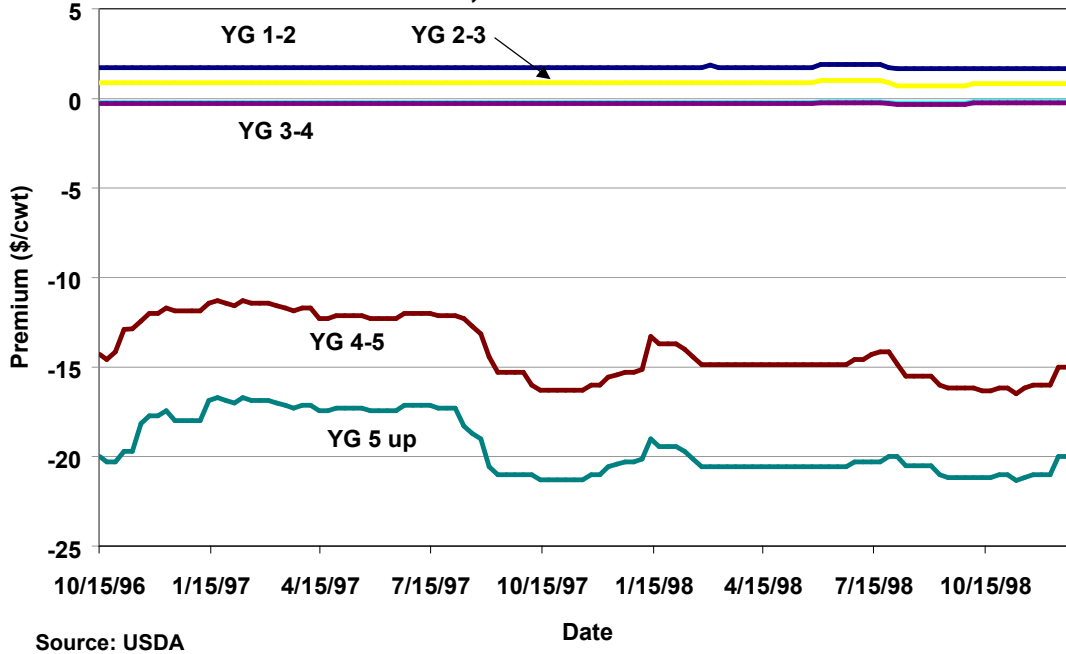
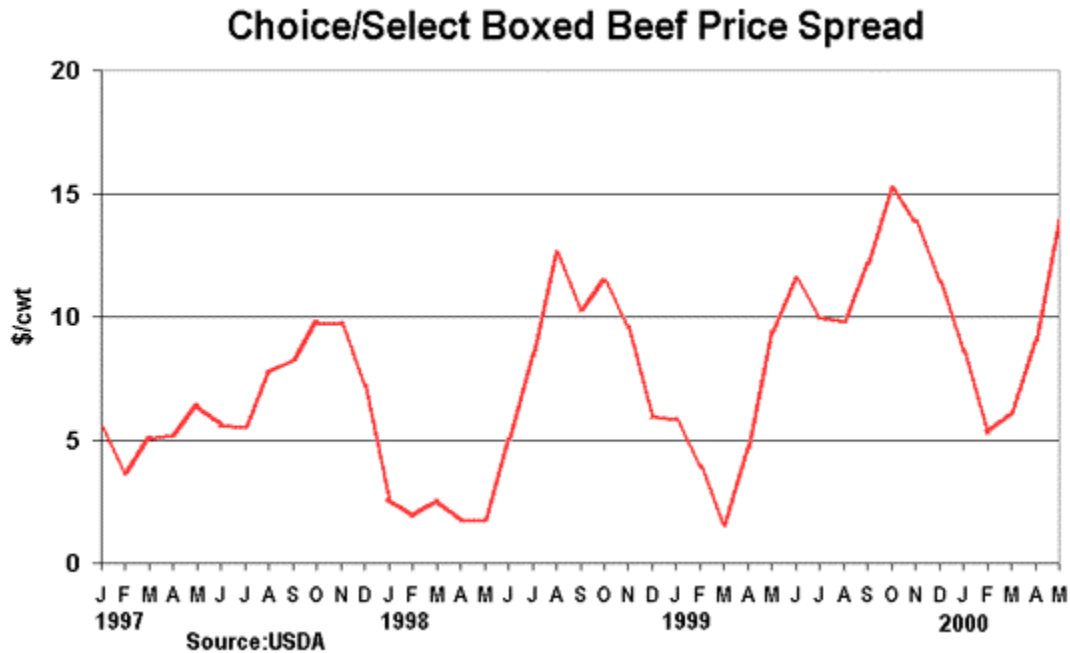


Figure 3. Choice/Select Boxed Beef Price Spread For January, 1997 Through March, 2000 (Cattle-Fax).



Calculating Base Price

Base prices for grids are based given as dressed weight. Most grid base prices are either based on the value of boxed beef price per head plus byproducts minus slaughtering-fabricating costs and packer profits (Ward et al., 1999). In some cases, base prices are tied to plant average prices or packer cost of cattle (grids thus priced are ordinarily defined by a previous week or current week price for the plant in question). Differences in base price can be substantial as described in the examples in Table 2. Two base prices were estimated based on slaughter results from the previous week in Plants A or B, or from boxed beef cutout value (Plant C). The example illustrated in Table 2 for plant averages was drawn from (Ward et al., 1999). These examples are intended for informational purposes, and not as a comparison between methods for determination of base price.

When base price is estimated from plant averages, price bids reflect the mix of cattle that are processed at a given plant for a given period, and not what the market is willing to pay for beef. Thus, although dressed weight price and the Choice-Select spread were the same for Plants A and B, the base price differed because it reflected a different mix of cattle in each plant. Plant A slaughter averaged 60% Choice carcass harvest while Plant B averaged 40% Choice carcass harvest. When estimating the effect of the Choice-Select spread effect in each plant, base price for Plant A reflected a higher supply of Choice grade carcasses, while that for Plant B reflected a lower previous supply of Choice grade carcasses. Therefore, price bids for Plant B were increased in an attempt to rectify this situation. In the example for Plant C,

data from USDA Market News for November 10, 2000 were used to generate an estimate of base price based on boxed beef and drop value, and slaughter and processing costs. Packer profits were not included in this example.

Table 2. Estimation of base price by plant average (Plant A or B; Ward et al., 1999) or boxed beef cutout value (Plant C).

Information	Plant A	Plant B	Information	Plant C ^a
Carcass, \$/cwt	110.00	110.00	Boxed beef, \$/head	870.15
Choice-Select, \$/cwt	6.00	6.00	Byproduct value, \$/head	8.65
Avg Choice, %	60.00	40.00	Processing, \$/head	8.75
Avg Select, %	40.00	60.00	Slaughter, \$/head	38.00
			Value – costs, \$/head	832.05
			Carcass weight, lb	750
Choice-Select effect, \$/cwt	2.40	3.60		
Base price, \$/cwt	112.40	113.60	Base price, \$/cwt	110.94

^aPacker profits not included in estimate.

In either example, price adjustments would be made based on QG, YG, special marketing programs, and “out” cattle. These adjustments would be applied to the base price to determine net price for carcasses falling into each of these categories.

It is clear from these examples that the value placed on fed cattle by grid formulas that depend on plant averages is not reflecting the true value of cattle, but that of the cattle mix that plants are currently slaughtering. This system actually creates a market inefficiency that can prevent efforts by the beef industry to improve the quality and consistency of their product (Ward et al., 1999).

Differences in methodology used to determine base prices between and within plants and alliances should motivate cattle feeders to understand the details of the process used at arriving at base prices for the plants or alliances they wish to market their cattle through. This is especially true if plant averages are used to estimate base prices because even within the same packer, plant averages vary among plants. Information that cattle feeders need to monitor to estimate base prices for various plants or alliances should at least include:

- Regional live or dressed weight price
- Dressing percentage
- Regional average for incidence of Choice grade carcasses
- Choice-Select spread
- Boxed beef value
- Drop credit
- Slaughter and processing costs
- Some idea of how cattle currently on feed at their lot will perform on the rail

Differences Between Pricing Systems

With the establishment of grid pricing systems, cattle feeders can contemplate the decision to market fed cattle in one of three pricing systems; namely, live weight, dressed weight or grid pricing (price adjustments to dressed weight). A simple method to explore differences among these marketing alternatives was proposed (Table 3; Feuz et al., 1998; Ward et al., 1999). As indicated in Table 3, traditional pricing systems (live or dressed) do not take into consideration the value of individual cattle in the pen. However, because packers have to assume the risk of discovering the value of cattle once they are slaughtered (after the purchase), base prices reflect averages with minimal QG or YG price adjustments. In contrast, the burden of risk for cattle performance on the rail is transferred to the cattle feeder when selling on the grid; therefore, QG and YG premiums and discounts are significant and force price variability in this system (Table 3).

Live animal bids, and to a great extent, dressed weight bids are influenced by the price of Choice carcasses to which QG and YG price adjustments are made for the pen being considered. In the case of live weight, the price is adjusted for projected dressing percentage. This live price is credited with byproduct and hide values and adjusted for slaughter costs, transportation costs, and the packer's profit margin, to establish the estimated live bid price (Feuz et al., 1998). Dressed weight bids are derived similarly, except that a projection to live weight is not necessary, as price is established on the actual hot carcass weight.

Table 3. Fed cattle pricing systems and attributes (adapted from Feuz et al., 1998; Ward et al., 1999).

Pricing attribute	Fed cattle pricing system		
	Live	Dressed	Grid
Value based	No	No	Yes
Pricing unit	Pen	Pen	Carcass quality and yield
Price variability among animals	None	None	High
Price variability among packers	Little	Moderate	High
Trucking costs paid by	Buyer	Seller	Seller
Pricing location	Feedlot*	Plant	Plant
Prices reflect meat yield	Estimated	Dressed	Yield grade
Prices reflect quality grade	Estimated	Estimated	Detailed actual
Base price determination	Live	Dressed	Varies
Discounts for "out" cattle	No	Some	Yes
Carcass performance risk burden	Buyer	Buyer	Seller
Need to know carcass quality	No	No	Yes

* Adjusted to a 4% shrink.

Feeders who are apprehensive about cattle performance on the rail, or wish to maintain flexibility in cattle pricing until the transaction price is established may opt to sell their show lists on a live or dressed weight bid. However, because the packer assumes the burden of risk, bids reflect prices for cattle that yield average quality carcasses.

Evidence to the “industry and economic inefficiency” of selling cattle without adjustments for QG or YG was presented by Schroeder and Graff (1999). They assumed that grid pricing for each carcass sold in a data set containing 11,703 cattle in 71 lots marketed from one feedlot over a year period represented the “efficient price”, as it reflected the market value of each carcass. Thus, in a subsequent simulation, any carcass sold for a live price higher than its efficient (grid) price was considered over-priced relative to its value. Similarly, any carcass that sold live for a price lower than its efficient (grid) price was considered under-priced relative to its value. A total of 3,650 cattle (31.2% of the total) sold live for \$2.90/cwt (\$36.80/head) more than their efficient price. These cattle would have been overpriced \$36.80/head had they sold live. The remaining 8,053 head (68.8%) sold live for \$3.20/cwt (\$40.04/head) less than their efficient price. These cattle would have been penalized \$40.04/head had they sold live. Similar observations were made when comparing dressed weight vs grid pricing. These findings demonstrate two things. Live or dressed weight pricing over- or underestimates the value of cattle. More often than not (68.8% vs 31.2%), live or dressed weight pricing underestimates the value of cattle. Cost of over- or underestimating the value of cattle is \$30/head or more. If this simulation would be typical of any given cattle feedlot transaction, the cost of overestimating the value of cattle to the packer is \$11.48/head ($\$36.80 \times .312$). In contrast, the cost of underestimating the value of cattle to the cattle feeder is \$27.55/head ($\$40.04 \times .688$). This observation, the result of the continued application of the law of averages, is reminiscent of the old adage, “*The house wins all*”.

Because grid pricing is based on the merit of each individual carcass, grid pricing does not always result in prices that are better than live or dressed weight prices. In a recent study, records from 5,520 fed cattle (85 lots) marketed from one feedlot over a year-long period (Table 4) were used to compare live and dressed weight, and grid pricing (two grid structures) for three points in time (Table 5; Feuz, 1999).

Because of relatively low incidence of Select or Standard grade carcasses, or those displaying YG > 3 (Table 4), average estimated prices (live weight basis) were highest at each of the three points in time when based on the two grid structures (\$68.61 and \$68.54/cwt), followed by dressed weight (\$68.07/cwt), and live weight basis (\$67.60/cwt). Given the amount of cattle, their live weight, and differences in pricing systems, selling cattle on the grid returned \$.98/cwt (\$11.73/head or \$64,758.38) or \$.50/cwt (\$6.02/head or \$33,209.42) when compared to selling them live or “on the rail”. Similarly, a demonstration study that evaluated records for 2,654 head of cattle (93 lots and 40 owners) sold in 1998 in Iowa (IBC, 1998) revealed that due to the low incidence of Standard grading carcasses (less than 1%), and relatively low incidence of Select grading carcasses (less than 25%), 72% of the owners would have received at least the Nebraska weighted average price or higher.

In contrast, a similar analysis of pricing systems (11,703 head of cattle marketed during 1997) demonstrated that even when percentage of Select grading carcasses was lower (27.47%) than observed in the study by Feuz (1999), the greater incidence of No-roll (5.84%), YG 4 and 5 (5.46%), heiferette, and miscellaneous “out-cattle” (1.72%) carcasses resulted in lower prices paid for cattle sold on the grid (Schroeder and Graff, 1999).

Table 4. Summary statistics on the carcass characteristics of 85 pens and 5,520 individual fed cattle (Feuz, 1999).

	85 pens		5,520 individual fed cattle	
	Mean ^a	Std. dev.	Mean ^a	Std. dev.
Live weight, lb	1203.24	74.91	NA	NA
Dressing, %	62.81	1.15	NA	NA
Hot carcass weight, lb	755.80	49.20	758.41	80.17
Prime, %	1.69	3.14	1.45	NA
Upper 2/3 Choice, %	19.87	14.18	18.89	NA
Low Choice, %	39.43	13.52	40.22	NA
Select, %	37.04	17.70	37.52	NA
Standard, %	1.97	2.79	1.92	NA
Yield grade 1, %	15.94	17.24	15.33	NA
Yield grade 2, %	47.89	15.79	46.88	NA
Yield grade 3, %	35.59	21.41	36.96	NA
Yield grade 4 and 5, %	0.59	1.37	0.83	NA
Marbling score ^b	4.32	0.44	4.30	0.90
Fat thickness, in	0.41	0.11	0.41	0.19
Rib eye area, in ²	12.81	0.85	12.74	1.45

^a Pen means and individual means differ because of unequal pen sizes and the means of the pens are simple means and not weighted by pen size.

^b Marbling score: 1-2 = Standard; 3 = Select; 4 = Low Choice; 5 = Choice; 6 = High Choice; 7-8 = Prime.

Table 5. Prices used in the analysis of pricing systems (\$/cwt; Feuz, 1999).

	Show list		Pen level		Choice- Select spread	Grid A base	Grid B base
	Live	Dressed	Live ^a	Dressed ^a			
Dec. > 96	67.77	111.48	66.27-69.27	110.48-112.48	19.06	118.50	118.71
May > 97	68.94	111.09	67.44-70.44	110.09-112.09	6.79	114.00	113.71
May > 98	66.04	106.05	64.54-67.54	105.05-107.05	2.69	107.07	106.00

^a Price depends upon the percent Choice in the pen; for live, the dressing percent of the pen.

These observations demonstrate that cattle prices derived from grid pricing systems are highly variable and dependent on carcass QG and YG, especially on the degree of incidence of Standard, YG 4 or 5, or “out-cattle” carcasses. Observations of live weight and dressed weight prices, and seven grid prices for 19,426 cattle slaughtered in four plants on the same day (Ward and Lee, 1999) indicate that the variation of prices across slaughter plants and pricing methods was highest for grid prices. This variation ranged from \$3.32-\$5.39/cwt across the four plants. Price variation for dressed and live weight prices were only \$.48/cwt and \$.69/cwt, respectively.

This is why it is important for cattle feeders to know the value of the cattle they feed, and understand that although better prices may be expected from grid pricing systems, severe discounts are also possible, especially when marketing poor quality cattle.

Calculating Price Adjustments

Several attempts have been made to provide cattle feeders with tools to determine if grid-pricing systems are viable options for marketing their cattle. Because of the complexity of grid pricing systems and their dependence on wholesale beef cutout value over time, a single method to predict grid pricing is unlikely to apply to all situations. Additionally, models that best fit grid-pricing data tend to be complicated and cumbersome to use in practice; although, their ability to predict price is moderate to high. Models that have been tested explained between 60 and 94% of the variation in grid price prediction (Feuz, 1999; Schroeder and Graff, 1999; Ward and Lee, 1999).

A simplified multiple regression model was fitted based on price adjustments for simulated fed cattle lots marketed on eight commercially available grids. Because impacts of discounted carcasses on net price are best calculated directly (net price discount from one percentage point discounted carcass = value of discount, \$/cwt/100), simulated data included only carcasses that graded Select or better, and YG 3 or better. Price adjustment (the sum of premiums and discounts, \$/cwt) for eight grids was estimated from simulated cattle lots that yielded carcasses with QG ranges between 40% and 70% Choice, and YG 1 and 2 ranges between 35% and 70%. Resulting price adjustment was regressed on the differential between an ideal situation comprised by 70% incidence of Choice and 70% incidence of carcasses reaching YG 1 and 2, and a simulated situation (less than ideal). Target values of 70% Choice and 70% YG 1 and 2 carcasses were used as they represent a target that the beef industry is aiming at (Schiefelbein, 1998). Thus, from a modeling standpoint, the initial equation to predict net price adjustment was depicted as follows:

$$\text{Net price adjustment, \$/cwt} = ((70\% \text{ Choice target} - \text{observed \% Choice}) * \text{parameter}) + ((70\% \text{ YG1 and 2 target} - \text{observed \% YG1 and 2}) * \text{parameter}) - \text{Discounts (\% discounted cattle * discount, \$/cwt/100)}$$

Once the model was fitted by multiple regression procedures, the following parameters were estimated:

$$\text{Net price adjustment, \$/cwt} = 2.58 - ((70\% \text{ Choice target} - \text{observed \% Choice}) * .06669) - ((70\% \text{ YG1 and 2 target} - \text{observed \% YG1 and 2}) * .02607) - \text{Discounts (\% discounted cattle * discount, \$/cwt/100)}$$

For model fitted by regression:

$$R^2 = .4040$$

$$\text{Mean square error} = 1.1825$$

In spite of having a low coefficient of determination (the amount of variation in fitted values that is accounted for by the model), as a result of fitting only narrow ranges in carcass YG and QG, this oversimplified model yielded estimates of price adjustments for positive traits that were similar to those fitted previously (.04648, this model, vs .025, Ward and Lee, 1999). Similarly, when calculating the impact of “out-cattle”, YG 4 and 5, and Standard grading carcasses by the method proposed herein, the value of discounts approaches that observed previously (-.09 to -.20, this model, vs -.194, Ward and Lee, 1999). Because the inputs used to develop this model do not account for the value of Prime or special program premiums, it is expected that prediction of price adjustments will underestimate actual adjustment when greater proportions of carcasses fall in these categories. Similarly, the ability of this model to account for the impact of discounted carcasses depends on whether the user enters an average discount value or specifies each discounted point at the actual discount value. If the former is used with a flat discount of \$20/cwt or more, then the model will overestimate the overall discount.

Data from 1,132 head of cattle (8 lots) processed through the Minnesota Carcass Merit Program between 1994 and 1998 (Table 6) were used to estimate the average price adjustment using the eight grids evaluated in the regression model fitted above. Discounts were assessed using a flat discount value of \$20/cwt. Results from the evaluation are listed at the bottom of Table 6.

Overall, the model under- or overestimated the actual price adjustment when premiums or discounts, respectively, were realized. If the adjustment was supposed to be positive, the model underestimated the adjustment (it was not as positive). Similarly, if the adjustment was supposed to be negative, the model overestimated the adjustment (it was more negative). Also, as expected, when lots with fewer than 1% Prime or 12% special program carcasses were estimated ('94 or '95 calves) the model predicted the adjustment within 10%. When greater percentages of Prime or special program cattle, and large discounts were expected due to “out-” or “off-weight” cattle carcasses, the model under- or overestimated the actual adjustment by 27%-50%.

In spite of these deficiencies, because the model yields conservative estimates, it may be useful to provide an initial rough estimate of the price adjustment a cattle feeder may receive.

A series of iterations were conducted to determine the minimum QG and YG requirements in a fed cattle load for cattle feeders to consider marketing cattle on a grid. Assuming there are no discounts for YG 4 and 5, Standard grade, or “out-cattle” carcasses, the minimum required QG and YG to consider marketing on the grid is carcasses reaching 38% Choice or better QG and 53% YG 1 and 2. Also, for cattle feeders that usually feed cattle of higher quality or yield grading ability, this recommendation can be adjusted. Thus, when cattle feeders purchase cattle with the propensity to reach Choice or better QG, the minimum requirement to market cattle on the grid would be having carcasses that reach 45% Choice or better and 35% YG 1 and 2. In contrast, when cattle feeders purchase cattle with a high propensity to reach YG 1 and 2, the minimum requirement to market cattle on the grid becomes having carcasses that reach 32% Choice or better and 70% YG 1 and 2. Using this oversimplified guideline for the data in Table 6 would aid in explaining why, in spite of 7.87% of total carcasses reaching YG

4, and .79% of total carcasses falling into Standard grade, calves from the 1998 Minnesota Carcass Merit Program (36.22% YG 1 and 2; 86.61% Choice or better) received the greatest premiums (Table 6) of all lots evaluated. Also, because carcasses of calves fed in 1997 reached QG and YG near the minimums (35.95% Choice or better and 57.52% YG 1 and 2), but experienced severe discounts due to YG, QG, and “off-weight” cattle (10% of the carcasses), the price adjustment was negative and severe. This explanation also applies to yearlings (9.13% discounted cattle) and heifers (12.44% discounted cattle) fed in 1996 (Table 6). In contrast, cattle fed in 1994 had a greater propensity to produce leaner carcasses (higher proportion of YG 1 and 2), calves fed in 1996 had a greater propensity to produce carcasses of higher QG (higher proportion of Choice or better carcasses), and those fed in 1995 represented a fairly balanced mix. All these combinations of QG and YG with the relatively small proportion of discounted carcasses (1.87% or less) led to price adjustments that were largely positive.

Table 6. Average price adjustments (\$/cwt) calculated directly from eight grids (average) or estimated from a multiple regression model.

Component	1994 yearling	1994 calf	1995 calf	1996 heifer	1996 calf	1996 yearling	1997 calf	1998 calf
Head	129	104	214	41	160	197	160	127
Live, lb	1274	1253	1279	1139	1246	1254	1330	1272
Carcass, lb	781	781	778	688	755	751	823	800
Carcass, %								
Choice 1	3.88	1.94	5.14	2.50	0.00	0.00	2.61	3.15
Select 1	6.98	6.80	6.54	15.00	1.26	2.03	1.96	0.00
Choice 2	23.26	26.21	37.38	20.00	22.01	14.21	13.73	25.98
Select 2	28.68	29.13	22.43	5.00	13.84	19.80	39.22	7.09
YG 3	36.43	34.95	26.64	47.50	59.12	54.82	37.25	54.33
YG 4	0.78	0.00	0.47	10.00	2.52	7.61	2.61	7.87
YG 5	0.00	0.00	0.00	0.00	0.00	0.00	0.65	0.00
Light	0.00	0.96	0.00	2.44	0.00	0.00	0.63	0.00
Prime	0.00	0.97	0.00	2.50	4.40	0.00	0.00	3.14
CAB	11.14	11.14	7.01	5.00	14.47	8.12	3.92	28.35
High Choice Program	1.05	1.05	0.00	2.50	0.00	0.00	0.65	3.15
Low Choice Program	12.19	12.19	7.01	7.50	14.47	8.12	4.58	31.50
Select	33.54	42.17	56.54	47.50	55.97	41.62	31.37	51.97
No roll	54.26	44.66	35.05	42.50	25.16	48.22	61.44	12.60
Heavy	0.00	0.00	1.40	0.00	0.00	1.52	1.96	0.79
Adjust, \$/cwt								
Grid avg	.87	1.39	1.94	-.97	2.10	-1.01	-1.36	2.26
Model	.62	1.25	1.81	-1.46	1.54	-1.48	-1.94	1.07

These observations confirm what other researchers have concluded. When cattle feeders make the decision to market on a grid structure, they must not only understand how base price is calculated, but also what type of cattle (potential for discounts and premiums) they are feeding. Due to this, the decision to market cattle on the grid must ideally be made long

before cattle are ready to market; perhaps before cattle are purchased. Thus, when cattle feeders procure feeder cattle, they must keep in mind the grid pricing structures available to them. Once cattle are in the lot, they must be managed and fed so that grid premiums are maximized or at least maintained, and grid discounts are minimized.

Impact of Grid Pricing on Cattle Profits

A discussion on the details of grid pricing would not be complete if no effort is made to extend it to its implications on profit. As may already be gathered, analysis of summaries of premiums and discounts serves only the purpose of adjusting some base price. Also, it was emphasized that understanding base price is a must for cattle feeders who wish to market on the grid. However, grid marketing is merely an extension of the old grade and yield system. Therefore, to estimate net revenue for cattle marketed on the grid, carcass weights, and therefore, dressing percentages must be known.

$$\text{Revenue, \$/head} = \text{Net price (adjusted base price), \$/cwt} * \text{average carcass weight}$$

Because grid pricing values traits of individual cattle, price adjustments for positive traits may be offset by price adjustments for negative traits depending on the total weight of carcasses falling into positive trait or negative trait categories. A recent analysis of the impact of carcass traits and carcass pricing information (Ward et al., 1999) indicated that the Choice-Select boxed beef wholesale cutout price spread had the most impact on variability of price/lb for carcasses sold on a grid followed by variability in quality grade of carcasses in a pen. Carcass weight variability followed by the Choice-Select price spread had the largest influence on variability of revenue/head. Yield grade variability did not have a statistically significant impact on price or revenue variability.

Because grid pricing systems demand that cattle feeders focus on variability of carcass traits, additional market information, and specific details of grids they wish to market through, they may become distracted from other important determinants of profit. In spite of the potential for better prices, and revenue/head, cattle feeders are encouraged to maintain close control over costs of production, and to manage and feed cattle to optimize performance on grids.

Several studies have evaluated the impact of grid pricing on profitability of cattle feeding operations. Nonetheless, factors that were important profit determinants before grid pricing became available continue to be profit determinants under grid pricing systems. For instance, grid price had the single largest impact on profit followed by feeder cattle price in a study that evaluated fed cattle marketing under two grid price structures (McDonald and Schroeder, 2000). The authors concluded that due to the intense management of these price factors, they offer the greatest opportunity to manage profit risk over time. Corn price, not surprisingly, followed grid and feeder cattle price as the third largest factor affecting profit. When evaluating factors that are the result of feeding and management decisions, or cattle genetics, average daily gain (ADG) or feed efficiency (FE) had the single largest impact on profit. Individual grid factors (incidence of QG, YG, and discounted carcasses) had a small impact on profit, but when taken all grid factors together their impact on profit was larger than that of ADG or FE. In both grid-pricing structures, days on feed had a relatively large negative

impact on profit – indicating that as cattle feeders seek to achieve greater premiums from QG, other components of profit such as ADG and/or FE decrease leading to lower profits. Additionally, seeking to increase QG in a pen of cattle by increasing days on feed may have a detrimental impact on YG.

A recent study evaluated effects of days on feed and price system on profitability (Greer and Trapp, 2000). Conclusions of this study support the observations made by McDonald and Schroeder (2000). If a grid is the pricing system selected for a given lot of cattle then days on feed will be reduced relative to pricing cattle live or dressed. Within this shorter time window, profit may be enhanced when pricing cattle on the grid by manipulating days on feed. For instance, large quality or small yield discounts increases the number of days on feed, while small quality or large yield discounts decreases the number of days on feed. Also, in grids that have large quality discounts, discounts for YG 4 and 5 carcasses are offset by increasing days on feed and achieving greater proportions of Choice or better QG carcasses. When marketing in grids that have small quality discounts, feeding for shorter periods would result in more carcasses in YG 1 and 2 categories without a large loss in revenue for carcasses that grade Select or Standard. Lastly, when grain prices are low, cattle may be fed longer to reach Prime premiums in spite of more carcasses reaching YG 4 and 5.

SUMMARY AND RECOMMENDATIONS

Cattle feeders that are considering marketing on a grid must be prepared to understand the markets better than previously necessary. Of special concern to the feeder is the need to understand base price and the intricacies of grid premiums and discounts offered by various plants. Monitoring information signals from the marketplace, seasonal trends in cattle prices and for Choice-Select spread, live or dressed weight prices, futures prices, and average performance of cattle in the region they feed cattle is a must when considering marketing in a grid. Additionally, current and past performance of cattle in their yard and on the rail must be collected, understood and used to improve on their grid marketing strategies. The following is a checklist for cattle feeders to review when considering marketing in a grid:

- ✓ Collect and understand grid information for the plants where they intend to market
- ✓ Keep a constant watch on market conditions, including:
 - Regional live or dressed weight price
 - Dressing percentage
 - Regional average for incidence of Choice grade carcasses
 - Choice-Select spread
 - Boxed beef value
 - Drop credit Slaughter and processing costs
- ✓ Understand how base price is derived by the plants where they intend to market
- ✓ Know as much carcass information as possible on cattle currently on feed
- ✓ Purchase cattle based on their projected ability to fit a grid
- ✓ Select a grid based on base price offering and projected carcass performance
- ✓ Feed and manage cattle so they “fit” the grid with the minimum amount of “out-cattle”

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