NCCC-134
APPLIED COMMODITY PRICE ANALYSIS, FORECASTING AND MARKET RISK MANAGEMENT

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Suggested citation format:

Ward, C. E., and D. L. Lalman. 2003. "Price Premiums from a Certified Feeder Calf Preconditioning Program." Proceedings of the NCR-134 Conference on Applied Commodity Price Analysis, Forecasting, and Market Risk Management. St. Louis, MO. [http://www.farmdoc.uiuc.edu/nccc134].

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Paper presented at the NCR-134 Conference on Applied Commodity Price Analysis, Forecasting, and Market Risk Management
St. Louis, Missouri, April 21-22, 2003

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Price Premiums from a Certified Feeder Calf Preconditioning Program

Practitioner's Abstract

Preconditioning calf programs, while not new, are becoming more prevalent. They provide benefits to cow-calf producers while adding value for feeder cattle buyers. However, questions remain regarding the marginal returns from marketing preconditioned calves exceeds the marginal costs for preconditioning. This paper reports estimates from two models to determine the premium paid by feeder cattle buyers for preconditioned calves in the Oklahoma Quality Beef Network (OQBN) program. One model assumes feeder calf characteristics are independent as most previous research. The other assumes interdependency between several characteristics that are affected by preconditioning. Data were from seven feeder calf sales in Oklahoma in 2001 and another seven sales in 2002. Estimated price premiums for OQBN certified calves from the second model were typically higher and more consisted across sales than were the price premiums from the first model.

Keywords

Animal health, Feeder cattle, Hedonic models, Marketing, Preconditioning, Prices, Value-added

Introduction

Preconditioning involves performing a series of management practices on the ranch to improve health and nutrition of calves. Its purpose is to reduce stress from shipping calves at weaning, improve the immune system, and boost performance in post-weaning production phases, i.e., stocker production and cattle feeding, and in carcass performance, i.e., higher grading carcasses with fewer defects.

The Oklahoma Cattlemen's Association, in cooperation with the Oklahoma Cooperative Extension Service, combined to sponsor a preconditioning and process verification system for calves in 2001. Certification requirements for the Oklahoma Quality Beef Network (OQBN) program include a minimum 45-day post-weaning period prior to sale or shipment. Bull calves must be castrated and healed, horned calves must be dehorned and healed, all calves should receive clostridial and bacterial vaccinations with boosters, and calves should be fed a concentrate supplement for a minimum of 14 days after weaning. The program also requires third party verification, which involves a ranch visit by a certified OQBN representative. This visit and the final certification steps must be completed at least 21 days prior to the sale or shipping date. The purpose for the ranch visit is simply to verify that the cattle have been weaned, castrated, dehorned, and that the records are complete.

The OQBN preconditioning program costs cow-calf owners about $55-75/head, depending on the nutrition ration, health of calves, and length of the preconditioning program. Therefore, a key question related to preconditioning programs in general and the OQBN program in particular is whether or not feeder cattle buyers pay a sufficient premium for preconditioned calves to cover this marginal cost of preconditioning. The purpose of this paper is to report results of

estimating two models attempting to determine the price premium (if any) paid by feeder calf buyers at sales of OQBN calves in 2001 and 2002.

Previous Research

Relevant prior research includes studies on price differentials for feeder cattle traits, production differences for healthy and preconditioned calves, and research on market effects from preconditioning programs. These topics are addressed in a cursory manner here.

Feeder Cattle Price Differences
Considerable research has estimated the market value for various traits of feeder cattle (Buccola; Faminow and Gum; Lambert et al.; Marsh; Schroeder et al. 1988; Smith et al.; Troxel et al.; Turner, Dykes, and McKissick). Preconditioning affects some feeder calf traits, such as weight, condition, horns, sex, and health, but does not directly affect others, such as breed, frame size, and muscle thickness.

Weight – Research consistently indicates feeder cattle prices decline as feeder cattle weight increases (Buccola; Faminow and Gum; Lambert et al.; Marsh; Schroeder et al. 1988; Smith et al.; Turner, Dykes, and McKissick). Preconditioning results in marketing heavier animals compared with marketing calves at weaning. Thus, cow-calf producers can expect lower prices for preconditioned calves due to heavier weights *ceteris paribus*. Some of this lower expected price may be offset by the seasonal price component associated with most preconditioning programs. The typical seasonal price pattern for feeder calves throughout the U.S. involves a higher price in November-December than October (Peel and Meyer). Thus, preconditioning may enable cow-calf producers to capitalize on the normal seasonal price pattern for feeder calves.

Sex – Previous research consistently shows significant feeder calf price differences among steers, heifers, and bulls (Faminow and Gum; Lambert et al.; Smith et al.; Troxel et al.; Turner, Dykes, and McKissick). Therefore, to the extent that cow-calf producers sell bull calves at weaning vs. steers after preconditioning, they can expect higher prices for the castration requirement in preconditioning programs.

Horns – Polled feeder calves normally receive a price premium when compared with horned calves and often compared with dehorned calves (Schroeder et al. 1988; Smith et al.; Troxel et al.). Therefore, to the extent cow-calf producers market preconditioned dehorned calves versus marketing horned calves at weaning, they can expect higher prices from the dehorning requirement in preconditioning programs.

Condition – Condition of feeder cattle can significantly affect feeder cattle prices (Schroeder et al. 1988; Smith et al.; Troxel et al.). Fleshy cattle are usually discounted, i.e., a recognition by buyers that no compensatory gains are likely. In some cases, fleshy cattle are preferred as long as the degree of fleshiness is slight or moderate and is associated with health or thriftiness of the animals. Thus, in some cases, preconditioned calves may be discounted due to their fleshly condition.

Health – Unhealthy traits generally translate into severe price discounts (Schroeder et al. 1988;

Smith et al.; Troxel et al.). Preconditioned calves are expected to be healthier, less stressed, and have stronger immune systems than calves sold at weaning. Therefore, cow-calf producers should expect a price premium for preconditioned calves, simply due to improved health of the animals.

Lot Size and Uniformity – Two other factors commonly affecting feeder cattle prices are lot size and uniformity of animals within the sale lot. Increasing uniformity of sale lots through sorting and pooling like cattle often accompanies efforts to increase sale lot size. Therefore, some sorting and pooling with the intent to create larger, more uniform sale lots is common. Research has found that buyers pay premiums both for larger sale lots and more uniform lots (Faminow and Gum; Schroeder et al. 1988; Smith et al.; Turner, Dykes, and McKissick; Yeboha and Lawrence). Cow-calf producers can expect a price premium for larger, more uniform sale lots of calves.

Health Effects on Feedlot and Carcass Performance and Feedlot Profits
Gardner et al. (1996; 1999) found significant feedlot and carcass performance benefits and lower medicine costs from preconditioning. Preconditioning reduced feedlot morbidity and mortality rates compared with non-preconditioned calves (Cravey). Cravey also confirmed that preconditioned calves performed better in terms of higher average daily gains, lower feed conversion, and both lower medical costs and costs of gain. One key finding from the Texas A&M Ranch to Rail program has been the impact health has on the ability of cattle to express their genetic potential, both feedlot and carcass performance (McNeill).

Managers of Texas Cattle Feeders Association's (TCFA) member feedlots concur with this prior research. TCFA feedlot managers were asked to estimate performance differences between preconditioned calves and non-preconditioned calves (Avent, Ward, and Lalman). Managers' estimated significant advantages in several performance categories from preconditioning, i.e., reduced morbidity, reduced mortality, increased average daily gains, improved feed conversion, higher percentage of Choice grade carcasses, and fewer non-conforming or severely discounted carcasses, frequently referred to as "outs".

Studies have investigated factors affecting cattle feeding profitability (Lawrence, Wang, and Loy; Langemeier, Schroeder, and Mintert; Schroeder et al.1993). A few consistent factors include feeder and fed cattle prices, cattle performance, and carcass characteristics. Net returns in the Texas A&M Ranch to Rail program from 1992-1993 to 1999-2000 ranged from $49.55 to $123.86/head higher for cattle that had not been sick compared with cattle that had been sick (McNeill).

Preconditioning programs improve health and thriftiness of calves. Thus, cow-calf producers can expect a price premium due to the improved health of preconditioned calves marketed.

Preconditioning Price Effects
King annually estimated the price effects from specific preconditioning programs for calves marketed through Superior Livestock Auction for 1994 to 2001. He found price premiums for three value-added health programs over the eight years. Premiums have increased over time and differ by degree of management practices required. The highest annual average premium was

$4.06/cwt. in 2001 and was associated with the most stringent management program, similar to the OQBN protocol. For this management program over the eight years, the average premium was $3.04/cwt.

Avent, Ward, and Lalman estimated models for two data sets, both from the Joplin (MO) Regional Market. One was a time series of special preconditioned and regular public sales over a four-year period, December 1997 to March 2001. The other was more detailed feeder calf sale data from three consecutive-day sales, one regular weekly public sale and two special preconditioned calf sales in December 2000. Over the four-year period, preconditioned calves received a premium of $2.59/cwt. when compared to non-preconditioned calves. For the consecutive-day sales, the premium price for one preconditioning program with a single protocol was $3.36/cwt. compared with the regular weekly auction. A second program generated premiums of $1.96/cwt. compared with the regular weekly auction. The lower premium for the second program could be attributed to having several different vaccination and weaning guidelines.

There are several preconditioning programs and sponsors. Some producers enrolling in these programs experienced lower-than-expected price premiums, especially for the first few years as the program develops a positive reputation (Turner, McKissick, and Dykes; Stough). Reputation building takes time. Buyers of feeder calves pay premiums for what they feel is the quality of the cattle, given the confidence they have that producers treated the animals according to the specified program (Yeboha and Lawrence).

TCFA feedyard managers indicated preconditioned calves were worth $5.25/cwt. more on average than non-preconditioned calves (Avent, Ward, and Lalman). Note their expressed difference was higher than previous research findings. One reason for the difference may be reputation and integrity questions surrounding existing preconditioning programs. Cattle feeders might pay up to the expected performance difference if there was higher perceived assurance and confidence that cow-calf producers followed the preconditioning protocol, thus resulting in actual expected performance differences.

Data and Models Estimated

Six Oklahoma livestock markets sponsored seven sales at which 7,558 OQBN calves were sold in 2001.[1] In the second year of the program, five Oklahoma livestock markets sponsored seven sales at which 5,678 OQBN calves were sold.[2] Market managers operated their sales differently. In some cases, sale lots of OQBN calves were intermingled with public market sale lots throughout the sale day. In most cases, the sale began with public sale lots, then an announcement was made that OQBN calves would be sold, and the sale ended with remaining

[1] The final sale of the season was in February 2002, but is considered here with the 2001 sale data.

[2] A sixth livestock market agreed to sell OQBN calves at a sponsored sale in 2002 but did not mention that calves had been certified under the OQBN protocol so data from that sale were omitted in the 2002 analysis.

public sale lots. One market required calves to have EID (electronic identification) tags that were scanned so calves could be sorted into uniform (i.e., frame and muscling), 50-lb. weight groups.

For purposes of the analysis, each sale was treated as independent. The objective of the first model specified was to determine the market price premium for OQBN certified, preconditioned calves compared with calves marketed that same day in the same sale.[3] The model specified was similar to hedonic-type models cited earlier that were estimated to determine price differentials for feeder cattle characteristics. Each data observation was a sale lot of feeder calves. Data available consisted of lot size, average weight, breed group, fleshiness, muscling, frame size, sex, status of horns, uniformity, healthiness, and management category. A complete description of variables can be found in Table 1. Model 1 was

$$P = \alpha + B_1 Head_i + B_2 Head_i^2 + B_3 AvgWt_i + B_4 AvgWt_i^2 + \sum_{j=1}^{3} B_{5j} Sx_{ij} + \sum_{j+1}^{4} B_{6j} Brd_{ij} + \sum_{j+1}^{3} B_{7j} Flsh_{ij} + \sum_{j=1}^{3} B_{8j} Musc_{ij} + \sum_{j=1}^{3} B_9 Frm_{ij} = \sum_{j=1}^{2} B_{10j} Horns_{ij} + \sum_{j=1}^{2} B_{11j} Hlth_{ij} + \sum_{j=1}^{2} B_{12j} Uniform_{ij} + \sum_{j=1}^{6} Mgmt_{ij} + e_{ij} \quad (1)$$

where *P* is average sale lot price, *Head* is number of head in the sale lot, *AvgWt* is average weight of the lot, *Sx* is sex of the cattle, *Brd* is breed group, *Flsh* is degree of fleshiness, *Musc* is degree of muscling, *Frm* is frame size, *Horns* is status of horns, *Hlth* is the healthiness, *Uniform* is uniformity, *Mgmt* is the health program followed by calf owners, and *i* denotes each sale lot. The model was estimated using the REG procedure in SAS (SAS Institute). One variable from each set of dummy variables (sex, breed, flesh, muscling, frame, horns, health, uniformity, and management) was dropped to properly estimate the model. The variables dropped will be denoted subsequently as the base variables for comparison.

Model 1 treated each variable or group of dummy variables as independent of others. However, there are known interdependencies of feeder calf variables association with preconditioning. For example, certified OQBN bull calves have been castrated, all horned calves have been dehorned, and preconditioned calves are typically healthier and more uniform. Often preconditioned calves are sold in larger sale lots. Therefore, the second model specified considers these interdependencies by creating a separate interaction variable. Variables are defined in Table 1. Model 2 was

$$P_i = \alpha + B_1 AvgWt_i + B_2 AvgWt_i^2 + \sum_{j=1}^{3} B_{3j} Sx_{ij} + \sum_{j=1}^{4} B_{4j} Brd_{ij} + \sum_{j-1}^{3} B_{5j} Flsh_{ij} + \sum_{j=1}^{3} B_{6j} Musc_{ij} + \sum_{j-1}^{3} B_7 Frm_{ij} + \sum_{j=1}^{2} B_8 Cert_{ij} + e_i \quad (2)$$

where *P* is average sale lot price, *AvgWt* is average weight of the lot, *Sx* is sex of the cattle, *Brd* is breed group, *Flsh* is degree of fleshiness, *Musc* is degree of muscling, *Frm* is frame size, and

[3] In one sale each year, public market calves were not sold the same day as OQBN calves. Thus, the comparison for that sale is between OQBN sale lots and the public market sale lots sold that same week.

Cert is sale lots of 10 head or more of polled or dehorned, healthy, uniform calves managed under the OQBN protocol and certified. Number of head for this variable was chosen somewhat arbitrarily. Results from Model 1 plus from previous feeder cattle price research typically indicate a price advantage for sale lots of 10 head or more compared to smaller or single-head lots.

It was hypothesized that the *Mgmt* variable of Model 1 for OQBN certified calves would be positive and significant, similar to previous research on preconditioning price premiums by King and Avent, Ward, and Lalman. Further, it was hypothesized that the *Cert* variable coefficients in Model 2 would be larger than the *Mgmt* variable coefficients of Model 1 for preconditioning. However, no comparison with previous research is possible since no models comparable to Model 2 have been reported in the agricultural economics literature.

Results

Tables 2 and 3 show preliminary summary results from Model 1 for 2001 and 2002, respectively. Tables 4 and 5 show similar preliminary summary results from Model 2 for 2001 and 2002, respectively. Some data were not available for certain sales, thus variables corresponding to the missing data were excluded in some models as indicated by NA. NS represents variables included in the model but which were not statistically significant at the 0.10 level. Since the focus of this research is on the estimated price premium paid by buyers for preconditioned calves, most attention is placed on those variables and coefficients relative to others.

Coefficients for most variables differed among sales and while some results were consistent with previous research, some were not. As indicated earlier, sale operations differed, which may have contributed to some differences. Also, the individuals collecting data differed among sales, also potentially contributing to estimation differences for some variables.

Buyers generally paid price premiums for larger sale lots and discounted heavier weights of feeder cattle. Buyers generally preferred medium frame, medium muscled cattle with moderate flesh. Heifers, calves with horns, and unhealthy calves were discounted. Breed premiums and discounts varied from sale to sale but Angus and Angus x English crossbred cattle frequently brought a premium but not always.

Coefficients from Model 1 for OQBN, certified calves were significantly higher than for at least one less stringent management group in four of seven sales in 2001. For one sale, another management category received a price premium relative to the OQBN calves and for two sales there was no significant difference. Premiums for OQBN, certified calves ranged $4.12/cwt. to $14.33/cwt. for the four sales where a premium was found. For sales in 2002, there were fewer significant differences for OQBN calves, just three of seven sales. The price premium for OQBN, certified calves ranged from $3.94/cwt. to $9.82/cwt.

Model 2 coefficients for the variable representing 10 head or more of OQBN certified, dehorned, uniform, healthy calves differed considerably from Model 1. Buyers paid a premium for these OQBN sale lots in six of seven sales in 2001 and six of seven sales in 2002. Price premiums ranged from $2.28/cwt. to $9.79/cwt. in 2001 and from $4.34/cwt. to $11.58/cwt. in 2002.

Estimating the price premium needed to warrant added preconditioning costs is difficult. Preconditioned calves are heavier when sold (added revenue) but may be sold for a lower price (due to being heavier and too fleshy). However, they may be sold into a rising seasonal price period. Preconditioned calves are healthier with a better immune system (usually meaning increased value), but that requires a higher degree of nutrition (added costs) and additional animal health costs. Avent developed a spreadsheet to weigh marginal costs and benefits of preconditioning. Given some "best guess" or "base" assumptions, OQBN calves would return $5.79/head in marginal returns relative to marginal costs for preconditioning, assuming a price premium of $5/cwt. for preconditioned calves. Decreasing the price premium to $2/cwt., toward the lower end of the regression results, causes marginal costs to exceed marginal revenue by $16.34/head. Whereas increasing the price premium to $8/cwt., toward the upper end of the regression results, causes marginal revenue to exceed marginal cost by $16.86/head.

Regression model results combined with the marginal cost vs. marginal revenue comparison for several production and market combinations provide mixed results. Model 2 results confirm the interdependent nature of several feeder calf characteristics related to preconditioning.

Additional work is needed. Data needs to be pooled by sale location within and between years. This might provide some insight into how different operating practices by market managers affect price premiums. Data also needs to be pooled by year across sales to get a season-average price premium. Lastly, a more objective means of selecting the minimum size lot for Model 2 would be useful.

Yet a much different approach is possible. That would involve comparing a regional market's price for the week prior to and following each OQBN sale with the average OQBN sale for comparable sex-weight-grades of feeder calves might indicate how offering OQGN calves affected the average price of those sales.

Summary and Conclusions

Preconditioning programs are not new but interest in them has increased sharply in recent years. Preconditioned calves are healthier, with a stronger immune system, so are more valuable to feeder cattle buyers than are non-preconditioned calves. The question is how much more valuable? Is the increased value to buyers reflected in the price difference paid for preconditioned calves?

Feedlot managers indicated a significant perceived performance difference favoring preconditioned cattle. Those differences, in turn, increased the perceived value of preconditioned calves for feedlot managers by $5.25/cwt.

Two sets of sale data were used to estimate the premium price paid by buyers for preconditioned calves. Two models were specified and estimated for each set of sales for 2001 and 2002. The first model treated all independent variables as independent, recognizing no interdependencies. Price premiums ranged relatively widely, from a discount in one sale to no significant difference in six sales, to premiums ranging from $3.94/cwt. to $14.33/cwt. in the other seven sales.

The second model recognized the interdependent nature of larger sale lots for OQBN calves along with calves being dehorned, more uniform, and healthier. Premiums were still varied but were higher in most cases. No significant difference was found in two sales but the premium in the remaining ten ranged from $2.28/cwt. to $11.58/cwt. Thus, for Model 2, the range was narrower and more consistent.

It is generally considered that preconditioning programs can be profitable for cow-calf producers, but not from the premium price alone. Several factors contribute to enhanced returns from preconditioning; selling added weight, marketing into a seasonally upward trending market, marketing steers rather than bulls, dehorned rather than horned or mixed lots, larger and more uniform lots, and healthier calves.

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Table 1. Definition of Regression Variables and Expected Signs.

Dependent Variable	Variable Definition	
P_i	Transaction price ($/cwt) for the i^{th} sale lot of calves	
Independent Variable	**Variable Definition**	**Expected Sign**
$Head_i$	Number of head in a sale lot	+
$Head^2_i$	Quadratic term for number of head	-
$AvgWt_i$	Average weight of cattle in a sale lot	-
$AvgWt^2_i$	Quadratic term for average weight	+
Sx_{ij}	Zero-one dummy variable for the sex of calves in a sale lot, j=1-3, 1=Steers, 2=Heifers, 3=Mixed steers and heifers, Base=Steers	-
Brd_{it}	Zero-one dummy variable for breed of calves in a sale lot, j=1-4, 1=English, Angus, Angus crossbred, 2=Exotic, Exotic crossbred, 3=Braham crossbred, 4=Hereford; Base=English, Angus, Angus crossbred	-
$Flsh_{ij}$	Zero-one dummy variable for condition or fleshiness of cattle in a sale lot; j=1-3; 1=Thin flesh, 2=Average flesh, 3=Fleshy; Base=Average flesh	+/-
$Musc_{ij}$	Zero-one dummy variable for muscle thickness of calves in a sale lot, j=1-3; 1=Thick, heavy muscled, 2=Medium, average muscled, 3=Slightly thin, thin muscled; Base=Medium, averaged muscled	+/-
Frm_{ij}	Zero-one dummy variable for frame size of calves in a sale lot, j=1-3; 1=Large, 2=Medium, 3=Small; Base=Medium	+/-
$Horns_{ij}$	Zero-one dummy variable for the presence of horns on calves in a sale lot, j-1-2, 1=No horns, 2=Horns, unhealed, mixed; Base=No horns	-
$Hlth_{ij}$	Zero-one dummy variable for health of calves in a sale lot, j=1-2; 1=Healthy, 2=Not unhealthy, dead hair, sick, bad eye, lame, lump; Base=Healthy	-

Table 1. Definition of Regression Variables and Expected Signs. (con't)

Dependent Variable	Variable Definition	
P_i	Transaction price ($/cwt) for the i^{th} sale lot of calves	
Independent Variable	**Variable Definition**	**Expected Sign**
$Uniform_{ij}$	Zero-one dummy variable for uniformity of calves in a sale lot, j=1-2; 1=Uniform, 2=Not uniform; Base=Uniform	-
$Mgmt_{ij}$	Zero-one dummy variable for management program for calves in a sale lot, j=1-6, 1=Vaccinations unknown, not weaned, 2= Vaccinated, not weaned, 3=Weaned, vaccinations unknown, 4=Vaccinated, weaned, not certified, 5=OQBN certified, 6=Other certified; Base=OQBN certified	-
$Cert_{ij}$	Zero-one dummy variable for specified, certified sale lots of calves, j=1-2, 1=OQBN certified, 10 or more head, no horns, healthy, uniform, 2=all other; Base=OQBN certified, 10 or more head, no horns, healthy, uniform	-

Table 2. Comparison of Significant Regression Coefficients from Similar Models of OQBN Sales, 2001.

Dependent variable = Average price for each sale lot

Independent variable	**Sale Location Significant Coefficients at 10% Level ($/cwt.)**						
	Apache	**El Reno-Oct**	**Woodward**	**Enid**	**Idabel**	**Holdenville**	**El Reno-Feb**
Lot size	NS	NS	0.468	0.768	0.515	0.329	0.300
Lot size squared	NS	NS	-0.005	-0.0072	-0.0048	-0.003	-0.002
Average weight	-0.197	-0.182	-0.302	-0.215	-0.181	-0.209	-0.164
Average weight squared	0.000103	0.000106	0.000192	0.000136	0.000102	0.000098	0.000085
Vaccinations unknown, not weaned	NA	NA	NA	NS	4.099	-6.583	NS
Vaccinated, not weaned	NS	-4.118	NA	-14.331	NA	NA	NA
Weaned, vaccinations unknown	NS	NA	-7.378	NS	NA	NA	NA
Vaccinated, weaned, not certified	NS	NA	-7.244	NS	NA	NS	NS
OBQN certified	Base	Base	Base	Base	Base	Base	Base
Other certified	NS	NA	-9.619	NA	NA	NA	NA
English, Angus, Angus X	Base	Base	Base	Base	Base	Base	Base
Exotic, Exotic X	NS	-3.762	NA	6.157	NS	NS	-2.684
Brahman influence	NS	-9.522	NA	4.332	4.093	NS	-5.365
Hereford	NS	-5.434	NA	6.316	5.205	NS	NA
Thin flesh	NS	NS	NS	NS	NS	-5.984	NS

Table 2. Comparison of Significant Regression Coefficients from Similar Models of OQBN Sales, 2001. (con't)

Dependent variable = Average price for each sale lot

Independent variable	**Sale Location Significant Coefficients at 10% Level ($/cwt.)**						
	Apache	**El Reno-Oct**	**Woodward**	**Enid**	**Idabel**	**Holdenville**	**El Reno-Feb**
Average flesh	Base	Base	Base	Base	Base	Base	Base
Moderately fleshy	NS	NS	NS	-6.634	-5.85	NS	NS
Fleshy or fat	NA	NS	-8.978	NS	NA	NS	NS
Heavy muscled	1.67	NS	NS	NS	NS	3.474	NS
Moderately muscled	Base	Base	Base	Base	Base	Base	Base
Slightly thin muscled	NA	NS	NS	-14.174	-4.83	-24.288	-6.611
Thin muscled	NA	NS	NS	NA	NA	-11.697	NA
Large frame	-2.218	NS	NS	NS	NS	NS	NA
Medium frame	Base	Base	Base	Base	Base	Base	NA
Small frame	-11.584	NS	-5.274	-19.152	NS	NS	NA
Uniform lot	Base	Base	Base	Base	Base	Base	NA
Uneven lot	NS	NS	NS	NS	NS	NS	NA
Very uneven lot	NS	NA	NA	NA	NA	NA	NA
Steers	Base	Base	Base	Base	Base	Base	Base
Heifers	-10.362	-9.614	NS	-5.963	-6.51	-6.418	-11.501
Bulls, mixed steers/heifers	NA	NS	-5.318	NS	NS	NS	-8.692

Table 2. Comparison of Significant Regression Coefficients from Similar Models of OQBN Sales, 2001. (con't)

Dependent variable = Average price for each sale lot

Independent variable	**Sale Location Significant Coefficients at 10% Level ($/cwt.)**						
	Apache	**El Reno-Oct**	**Woodward**	**Enid**	**Idabel**	**Holdenville**	**El Reno-Feb**
No horns	Base	Base	Base	Base	Base	Base	NA
Horns, mixed	NS	NS	-8.017	-5.229	NS	NS	NA
Guant fill	NA	NA	NA	NS	NA	NA	NA
Average fill	NA	NA	NA	Base	NA	Base	NA
Full or tanked	NA	NA	NA	NS	NA	NA	NA
Observations	221	129	201	202	261	212	99
Adjusted R squared	0.804	0.708	0.772	0.666	0.607	0.555	0.874

Table 3. Comparison of Significant Regression Coefficients from Similar Models of OQBN Sales, 2002.

Dependent variable = Average price for each sale lot

Independent variable	**Sale Location Significant Coefficients at 10% Level ($/cwt.)**						
	El Reno-Oct	**Idabel**	**Woodward**	**Holdenville**	**Enid-Nov**	**El Reno-Nov**	**Enid-Dec**
Lot size	0.287	0.736	0.272	1.582	0.565	0.461	NS
Lot size squared	-0.002	-0.012	NS	-0.030	NS	-0.004	-0.024
Average weight	-0.273	-0.170	-0.102	-0.222	-0.116	-0.286	-0.119
Average weight squared	0.000188	0.000110	NS	0.000160	NS	0.000222	0.000076
Vaccinations unknown, not weaned	NS	NS	NS	NS	-3.940	NS	-9.816
Vaccinated, not weaned	NS	NA	NS	NA	NS	NS	NA
Weaned, vaccinations unknown	NS	NA	NS	NA	NS	NS	-5.113
Vaccinated, weaned, not certified	-3.944	NA	NS	NA	NS	NS	-9.282
OBQN certified	Base	Base	Base	Base	Base	Base	Base
Other certified	NA	NA	NA	NA	NS	NA	NA
English, Angus, Angus X	Base	Base	Base	Base	Base	Base	Base
Exotic, Exotic X	NS	NS	NS	NS	NS	-3.683	-3.742
Brahman influence	NS	NS	-6.116	NS	NS	-8.631	NS
Hereford	NS	NS	NS	-9.293	NS	-7.975	NS
Thin flesh	-3.801	NS	NS	NS	NS	NS	NS
Average flesh	Base	Base	Base	Base	Base	Base	Base

Table 3. Comparison of Significant Regression Coefficients from Similar Models of OQBN Sales, 2002. (con't)

Dependent variable = Average price for each sale lot

Independent variable	**Sale Location Significant Coefficients at 10% Level ($/cwt.)**						
	El Reno-Oct	**Idabel**	**Woodward**	**Holdenville**	**Enid-Nov**	**El Reno-Nov**	**Enid-Dec**
Fleshy	-3.503	NA	NS	NA	NS	NS	-6.283
Thick, heavy	NS	NS	NS	NS	NS	NA	NS
Medium, average	Base	Base	Base	Base	Base	Base	Base
Slightly thin, thin	NS	NA	NA	NS	NS	NS	-6.220
Large frame	NS	NS	NS	NS	NS	NS	NS
Medium frame	Base	Base	Base	Base	Base	Base	Base
Small frame	NA	NA	-11.307	NA	-6.477	NS	NA
Uniform lot	Base	Base	Base	Base	Base	Base	Base
Uneven lot	-2.056	NS	NS	NS	5.356	NS	NA
Steers	Base	Base	Base	Base	Base	Base	Base
Heifers	-6.748	-9.458	-8.902	-7.496	-11.718	-9.416	-6.598
Bulls, mixed steers/heifers	-3.783	NA	NS	NS	-5.586	NS	-6.798
No horns	Base	Base	Base	Base	Base	Base	Base
Horns, unhealed, mixed	NS	-8.666	NS	NS	NS	NS	NS
Healthy	Base	NA	Base	Base	Base	Base	Base
Not healthy	NS	NA	-23.187	NS	-18.516	NS	-9.638
Observations	162	184	211	222	185	91	65
Adjusted R squared	0.792	0.614	0.705	0.362	0.635	0.725	0.700

Table 4. Comparison of Significant Regression Coefficients from Similar Models of OQBN Sales, 2001.

Dependent variable = Average price for each sale lot

Independent variable	**Sale Location Significant Coefficients at 10% Level ($/cwt.)**						
	Apache	**El Reno-Oct**	**Woodward**	**Enid**	**Idabel**	**Holdenville**	**El Reno-Nov**
OBQN certified, 10 hd, uniform, healthy, no horns	NS	6.471	4.695	9.794	5.137	6.736	2.283
All other lots	Base	Base	Base	Base	Base	Base	Base
Average weight	-0.175	-0.133	-0.281	-0.213	-0.170	-0.233	-0.156
Average weight squared	0.000084	0.000072	0.000175	0.000143	0.000104	0.000131	0.000079
English, Angus, Angus X	Base	Base	Base	Base	Base	Base	Base
Exotic, Exotic X	NA	-2.272	NA	7.300	NS	NS	-3.224
Brahman influence	NS	-10.136	NA	5.922	4.975	NS	-6.340
Hereford	NS	NS	NA	4.637	5.195	NS	NA
Thin flesh	NS	NS	NS	NS	NS	-6.159	NS
Average flesh	Base	Base	Base	Base	Base	Base	Base
Fleshy	NS	-11.330	-8.106	-9.541	-6.389	NS	NS
Thick, heavy	1.911	NS	NS	4.008	NS	NS	NS
Medium, average	Base	Base	Base	Base	Base	Base	Base
Slightly thin, Thin	NA	NS	NS	-11.338	-3.727	-14.672	-7.836
Large frame	-2.902	NS	NS	-3.413	-2.561	NS	NA
Medium frame	Base	Base	Base	Base	Base	Base	Base

Table 4. Comparison of Significant Regression Coefficients from Similar Models of OQBN Sales, 2001. (con't)

Dependent variable = Average price for each sale lot

Independent variable	**Sale Location Significant Coefficients at 10% Level ($/cwt.)**						
	Apache	**El Reno-Oct**	**Woodward**	**Enid**	**Idabel**	**Holdenville**	**El Reno-Nov**
Small frame	-12.601	NS	NS	-18.971	NS	NS	NA
Steers	Base	Base	Base	Base	Base	Base	Base
Heifers	-10.157	-10.068	-3.067	-7.317	-7.180	-8.695	-11.554
Bulls, mixed steers/heifers	NA	NS	-6.399	-5.514	NS	NS	-10.730
Observations	221	129	201	202	261	212	99
Adjusted R squared	0.803	0.636	0.643	0.559	0.531	0.495	0.835

Table 5. Comparison of Significant Regression Coefficients from Similar Models of OQBN Sales, 2002.

Dependent variable = Average price for each sale lot

Independent variable	**Sale Location Significant Coefficients at 10% Level ($/cwt.)**						
	El Reno-Oct	**Idabel**	**Woodward**	**Holdenville**	**Enid-Nov**	**El Reno-Nov**	**Enid-Dec**
OBQN certified, 10 hd, uniform, healthy, no horns	7.512	6.786	4.406	NS	11.581	4.335	7.600
All other lots	Base	Base	Base	Base	Base	Base	Base
Average weight	-0.262	-0.165	-0.080	-0.166	-0.093	-0.235	-0.101
Average weight squared	0.000174	0.000110	NS	0.000111	NS	0.000170	0.000064
English, Angus, Angus X	Base	Base	Base	Base	Base	Base	Base
Exotic, Exotic X	NS	NS	NS	-4.218	NS	NS	-4.375
Brahman influence	NS	NS	-5.967	-4.478	NS	-6.686	NS
Hereford	NS	NS	NA	-14.361	NS	-5.198	NS
Thin flesh	-4.850	NS	NS	NS	NS	-7.724	NS
Average flesh	Base	Base	Base	Base	Base	Base	Base
Fleshy	-4.668	NA	NS	NA	NS	NS	-6.619
Thick, heavy	NS	NS	NS	NS	NS	NA	NS
Medium, average	Base	Base	Base	Base	Base	Base	Base
Slightly thin, thin	NS	NA	NA	NS	NS	NS	-7.212
Large frame	NS	NS	NS	NS	NS	NS	NS
Medium frame	Base	Base	Base	Base	Base	Base	Base
Small frame	NA	NA	NS	NA	-7.774	NS	NA

Table 5. Comparison of Significant Regression Coefficients from Similar Models of OQBN Sales, 2002. (con't)

Dependent variable = Average price for each sale lot

Independent variable	**Sale Location Significant Coefficients at 10% Level ($/cwt.)**						
	El Reno-Oct	**Idabel**	**Woodward**	**Holdenville**	**Enid-Nov**	**El Reno-Nov**	**Enid-Dec**
Steers	Base	Base	Base	Base	Base	Base	Base
Heifers	-8.351	-10.872	-8.350	-7.025	-10.993	-8.124	-6.023
Bulls, mixed steers/heifers	-6.584	NA	NS	NS	NS	NS	-7.183
Observations	162	184	211	222	185	91	65
Adjusted R squared	0.704	0.431	0.496	0.302	0.556	0.645	0.594