

## Estimating the Value of Source Verification in Iowa Feeder Cattle Markets

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#### Summary

**Source verification and pooling of feeder cattle into larger lots resulted in higher selling prices compared with more typical sales at a southern Iowa auction market. After accounting for higher prices due to larger lot sizes, cattle that received a specified management program and were source verified as to origin received additional price premiums. The data do not distinguish between the value of the specific management program and the value of the source verification process. However, cow-calf producers participating in the program took home more money.**

#### Introduction

Source verification (SV) has various definitions. For this discussion, it is defined as the process of identifying the origin and ownership of cattle and the management practices they have received. With SV, it is possible to assemble like kinds of cattle from many small operators into uniform groups in order to get larger lot sizes and give the buyer confidence in the type of cattle being purchased. Depending on the program, sellers who participate in SV may have to agree to a number of conditions concerning the management and handling of their cattle prior to sale. Clearly defined protocol and identification of origin is expected to increase the price prospective buyers are willing to offer.

Pooling is the process of sorting cattle of similar weight, sex, frame size, muscling, etc., into larger lot sizes. The animals are tagged, allowing each animal to be identified and verified back to the source. Auction market operators or government graders inspect the animals and assign them grades. Thus, although cattle are grouped into larger lot sizes, they still maintain their individual identity, and can be traced to the producer who sold them. The cattle may also have similar health management programs. Common pre-sale management practices increase the similarities of the cattle. Pooling allows buyers to buy larger, uniform lots of cattle.

#### *Factors influencing feeder cattle prices*

Research that identifies the factors that influence feeder cattle prices has focused exclusively on market characteristics, and cattle and lot characteristics. The seller can and does influence the cattle and lot characteristics to some extent, but has little or no influence on the market conditions.

Cattle and lot characteristics include health, frame, breed, weight, color, sex, age, fill of the feeder cattle, the presence or absence of horns, lot size, and uniformity within the lot. The market characteristics include time of sale, time of year, fed and feeder cattle futures price, corn futures, total number of buyers present at an auction, and the number of lots offered for sale for a given day. One 1993 study looked at the impact of the reputation of the seller in addition to the market, lot, and cattle characteristics on feeder cattle prices. The reputation of the seller was found to be significant only in markets that transfer less information to the buyers.

#### *Current trends in feeder cattle marketing*

Studies have shown that some sales programs mirroring SV do produce price premiums. Graded sales aim to assemble like kinds of cattle from small to mid-sized cow-calf operations into uniform groups in order to raise the price prospective buyers are willing to offer. One study reported that premiums for graded calves sold in larger pens ranged from \$4.00 to \$8.00/hundredweight. Another study reported that graded sales averaged 2 to 8 cents per pound over weekly sales (normal auctions).

The main objective of the study is to use statistical analysis to determine if SV and/or pooling of feeder cattle result in higher prices compared with the normal live auction sale prices of feeder cattle in Iowa.

#### Methods and Materials

Feeder cattle auction prices and characteristics were obtained from the Bloomfield Auction Market, Bloomfield, Iowa, for the fall of 1997, and fall of 1998. The SV sales are part of the Iowa Missouri Beef Improvement Organization (IMBIO) organized by the Bloomfield Auction Market. IMBIO determines the requirements for cattle to participate in the special sales, including the health program administered by an approved veterinarian. Each calf must have an IMBIO ear tag with a unique number that can be traced to the individual farm.

Buyers and sellers were informed in advance of the specific dates on which IMBIO source-verified sales would occur. On the day of the sale, sellers delivered feeder cattle to the auction market where they were sorted into larger lot sizes by their sex, weight, frame, breed, and color. The selling weight was taken during the sorting process before cattle were pooled. Individual lots may have contained cattle from several different sellers. The pooled lot size was targeted to equal half or whole truckloads, by weight, of similar type cattle. The pooled lots were auctioned in the evening.

#### *Data*

The weight, grade, and price data were obtained from the USDA Agricultural Market Service (AMS) live auction

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report on feeder cattle. The data were collected from October 1 to December 17, 1997, and October 7 to December 30, 1998, respectively, including both IMBIO sales and regular twice-weekly feeder cattle auction markets. Cash corn prices for the periods were obtained from the Commodity section, Iowa Department of Agriculture and Land Stewardship, whereas spot prices of fed cattle were obtained from the agricultural market report, USDA.

### *Pricing model*

The model used in this study is the characteristic (hedonic) feeder-cattle-pricing model. Feeder cattle price is determined by a combination of cattle and lot characteristics, and market forces (see Table 1 for a description of variables used in the study).

$$P = f\{Hd, Wt, Fed, Sex, SV, Corn, Hd-Sq, Wt-Sq\}, (1)$$

**Table 1. Variables and definitions used in the empirical model.**

Variable	Definition	Measurement
P	Price of feeder cattle	(\$/cwt)
Hd	Number cattle in a lot	Actual number
Hd-Sq	Number of cattle in lot squared	Actual number
Wt	Weight of cattle (lbs)	Actual weight 300-950lbs
Wt-Sq	Weight of cattle squared	Actual weight squared
Fed	Spot price of fed cattle	\$/cwt
Corn	Spot price of corn	\$/bu
SV	Source verified	1 if SV, 0 if non SV

The variables Hd and Hd-Sq are expected to capture the effect of pooling. Larger groups are expected to receive a higher price, but the benefit increases at a decreasing rate. Weight of feeder cattle is known to have an inverse relationship to price. Feeder cattle prices are also known to be impacted positively by fed cattle prices and negatively by corn price as they directly impact the profit potential, and therefore, demand by the buyer. The final variable is to measure the effect of the special IMBIO source-verified sale. After accounting for all the other variables listed, is there a premium for feeder cattle sold through the IMBIO sale?

Four separate equations were estimated, one each for steers and heifers in 1997 and in 1998. The results are shown in Table 2.

### **Results and Discussion**

The proposed models performed reasonably well, although the results were more robust for steers than heifers. The R-square values indicate that the models explained most of the variation in prices. With few exceptions, the variables had the expected sign and were significant.

From the results of the study, one can conclude generally that SV and pooling are associated with price premiums. Fall 1997 steers and heifers, and fall 1998 heifers did show price premiums being offered for SV and pooled cattle with their coefficients being significant. Pooling feeder cattle into large sized lots generally increased prices \$.08 to \$.10 per hundredweight for each head added.

In 1997 the SV premium was larger for both steers (\$2.14/cwt) and heifers (\$1.53/cwt) than in 1998 where it was -\$0.34 and \$.96 for steers and heifers, respectively. For fall 1998 steers where a SV premium was not observed, the coefficient was not significant. However, the actual premiums were less than those suggested by the previous research after accounting for all the variables that influence price (see Table 2).

Source-verification of cattle offered with all background information and documentation helps the potential buyer determine the value of the calves. The buyers are offering premiums for the quality they expect, for background information, and for confidence in the reliability of the information presented about the feeder animals. Because the quality cannot be determined solely by inspection, the issue of reputation of the market and sellers does influence the buyers. However, in this study, SV was a newly introduced, innovative approach to feeder cattle management and marketing. The reputation of the sellers cannot be established because cattle from several sellers are pooled into a single lot. The emphasis of reputation is shifted to the auction market operator who is responsible for sorting the cattle and enforcing the SV standards. However, when combining lot size and SV, the premiums are comparable to these earlier studies. For example, steer calves in a pooled lot of 90 head at the IMBIO SV sale received \$6.30/hundredweight more than those in a 10 head lot in a regular sale in 1997.

### **Implications**

**The IMBIO feeder cattle program of pooling source-verified calves into large uniform lots resulted in higher selling prices compared with regular feeder cattle auction market prices. After accounting for market conditions, sex, and average weight, source verification and large lot size produced by the IMBIO program resulted in statistically higher selling prices. The value of an additional animal in a lot increased at a decreasing rate, and source verification added \$.96 to \$2.14 per hundredweight depending on the year and sex. For example, a pooled group of 90 head of 550 pound steers received \$6.30 per hundredweight (\$34.65/head) more in the 1997 IMBIO sale than 10 head of similar steers in a non-IMBIO sale during the same year in the same auction market, all else being equal.**

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**Table 2. Estimated premiums and discounts associated with feeder cattle and market characteristics for fall 1997 and 1998 at the Bloomfield Auction Market--parameter estimates (t-values).**

Independent Variable	Steer		Heifer	
	Steer 1997	Steer 1998	Heifer 1997	Heifer 1998
Intercept	84.83 (7.86)	65.15 (19.01)	106.28 (9.98)	87.27 (22.32)
Head	0.08 (5.34)	0.09 (8.20)	0.09 (5.05)	0.10 (6.00)
Weight	-0.05 (-32.90)	-0.06 (-72.70)	-0.03 (-16.83)	-0.03 (-31.58)
Fed	1.31 (7.24)	0.37 (7.07)	0.68 (3.78)	0.31 (5.48)
SV	2.14 (2.91)	-0.34 (-.73)	1.53 (2.33)	0.96 (1.92)
Corn	-37.07 (-12.49)	-6.37 (-4.71)	-30.36 (-9.92)	-19.87 (-13.35)
Hd-Sq	-0.00035 (-1.45)	-0.00065 (-4.52)	-0.00082 (-2.48)	-0.00094 (-3.58)
Wt-Sq	0.000068 (7.79)	0.0000954 (20.65)	-0.0000027 (-0.30)	0.000020 (3.48)
R-Square	0.84	0.88	0.66	0.69