



Agricultural and Resource Economics ARE UPDATE

Giannini Foundation of Agricultural Economics, University of California

Vol. 22, No. 5 May/June 2019

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What Value-Added Management Programs Are Enhancing Cattle Producer Revenues?

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As the quality attributes that consumers' demand from animal-based food products have expanded, ranchers have responded by marketing their cattle with an increasingly diverse array of value-added management programs. Yet, the additional revenue generated by producing cattle tagged with these programs is uncertain and highly variable. This paper analyzes the premiums/discounts associated with the most common programs utilized by ranchers in 2018.

Today's consumers are demanding an expansive and dynamic suite of quality attributes from their food products. This is especially true when making selections among product options derived from animals. More now than ever before, buyers have expanded their considerations beyond conventional product-quality characteristics and are increasingly interested in how animals are raised, what they are fed, the supplements, implants, or antibiotics that were given, and the provision of animal welfare broadly defined.

These downstream demands have driven cattle ranchers to diversify the attributes of their cattle and document the value-added management (e.g., cattle raised without hormones, cattle raised on operations that are animal welfare certified) and marketing programs they utilize. While ranchers are keenly aware of the costs associated with incorporating these programs on their operations, the additional revenue from participation is uncertain and highly variable. This adds substantial ranch-level complexity for cattle producers who are tasked with determining which programs and practices will maximize profit given that the premiums associated with these programs are unknown prior to sale.

While many studies suggest that consumers are willing to pay more for product characteristics they deem to be important (e.g., natural, organic, grass fed, etc.), there is little information about how these premiums paid at retail transmit upstream to cattle ranchers. This paper uses data from a satellite video auction in the Western United States, Western Video Market (WVM) Auction, to estimate the premiums/discounts associated with

value-added management and marketing practices used by ranchers selling their cattle in 2018. These results provide ranchers with information on the potential payoff associated with their program choices while also providing beef consumers with information on how their purchases of differentiated beef products in grocery stores and restaurants transmit through the supply chain to the ranch level.

Western Video Market Auction

Western Video Market (WVM) Auction is the second largest satellite video auction in the United States, serving as a sales outlet for 14 western states. This type of auction format operates much like a traditional auction except that buyers can bid on cattle from remote locations (i.e., via phone or over the internet). Thus, these auctions can provide cattle producers with a larger base of potential buyers. Cattle being sold via video auction remain on their home ranch until the buyer arranges transportation. This format eliminates the cost and stress of cattle traveling to an auction yard for sale.

Cattle are sold in groups, referred to as lots, based on the average weight

of the animals comprising the lot at the time of delivery. The sales catalog available to buyers using video auctions provides sellers with an opportunity to communicate a tremendous amount of information about their cattle (e.g., what they have been fed, what vaccines they have received, available delivery date, and much more). In 2018, more than 272,500 head were sold through 12 auctions held throughout the calendar year.

Calf and yearling sales were analyzed using separate models. Calves were classified based on the average anticipated weight of the lot being between 450 and 650 lbs. in order to focus on price effects at time of weaning. Yearling lots had average anticipated weights at time of delivery in the 750 to 950 lb. range. In total, 961 lots of calves and 682 lots of yearlings were analyzed.

A hedonic regression model was used to analyze the 2018 auction data in order to estimate how different lot-level sales attributes influenced sales price. Price, expressed in dollars per hundredweight (cwt.), is the dependent variable (i.e., variable we are attempting to explain) in both of the statistical models. As a result, all of the estimates reported can be interpreted as the incremental premium/discount for that attribute or program in dollars/cwt. terms.

Across the 12 sales conducted by WVM in 2018, the average price for calves was \$166.25/cwt., while the average price for yearlings was \$143.43/cwt. Yet, these averages do little to communicate the price dispersion observed for lots of cattle sold in a given month, or even at a given auction. For example, the average sale price for calves at WVM's January 2018 auction was \$159.78/cwt. In that same month, lots of calves sold for as little as \$143.50/cwt. and for as much as \$203.75/cwt. Large price differences are influenced by both cattle characteristics and management and

marketing programs, all of which are controlled for in the model, such that attribute-specific price impacts can be isolated.

Lot-level cattle characteristics (e.g., breed, sex, weight, frame score, etc.) are included in the models to control for how these factors influence price, while catalog descriptions were used to determine the specific management and marketing programs associated with each lot of cattle sold. Several of these basic lot-level factors are common across the calf and yearling models, including:

- *Weight*, expressed in cwt., is the anticipated average weight of the cattle in the lot at time of delivery;
- *Heifer* is an indicator (i.e., yes or no) variable for a lot consisting of only heifers;
- *Split Load* is an indicator variable that identifies lots of cattle that include both steers and heifers; and
- *Miles to Omaha, NE* is used to measure spatial dispersion of lots of cattle sold, expressed in driving distance (100s of miles) from the concentration of cattle feeding and processing capacity in Omaha, Nebraska. Prior research has shown that cattle located increasingly far from the primary processing regions in the U.S. (proxied in the model by location of the lot relative to Omaha) receive price discounts associated with higher expected transportation costs.

Variables are also included in the model to control for how prices are impacted by the breed of the cattle in the lot, as well as within-lot variability in size (e.g., frame scores and flesh scores).

Value-Added Management and Marketing Programs

A proliferation of value-added management and marketing programs utilized by ranchers marketing their cattle through WVM was noted nearly

ten years ago. In the intervening years, research has documented that participation and returns associated with these programs have varied considerably. The programs available for consideration, based on sales through WVM in 2018, include:

- *Age and Source Verified* indicates that the cattle in the lot are enrolled in one of two U.S. Department of Agriculture programs (Process Verified Program or Quality System Assessment Program). This designation is needed for buyers that are targeting beef sales in export markets where traceability is required.
- *Natural* is a designation that means cattle have never been fed or injected with any antibiotics, never fed ionophores, not implanted with synthetic hormones, nor given any feed or supplements containing animal byproducts. Ranchers can participate in one of two natural programs: i) owner-certified via signed affidavit (*WVM Natural*) or ii) a third-party verified program (*Verified Natural*).
- *Non-Hormone Treated Cattle (NHTC)* indicates that lot is participating in a third-party certified program that ensures that cattle are not given hormonal growth promotants. *NHTC* is often also required for export markets and, thus, is typically paired with *Age and Source Verified*.
- *Global Animal Partnership (GAP)* is a designation that communicates participation in a third-party certified animal-welfare program.
- *Organic* signifies that cattle have been raised in a manner that complies with USDA Organic Standards.
- *Non-GMO* denotes lots of cattle that are not fed GMO feeds and indicates compliance with the voluntary GMO labeling system.

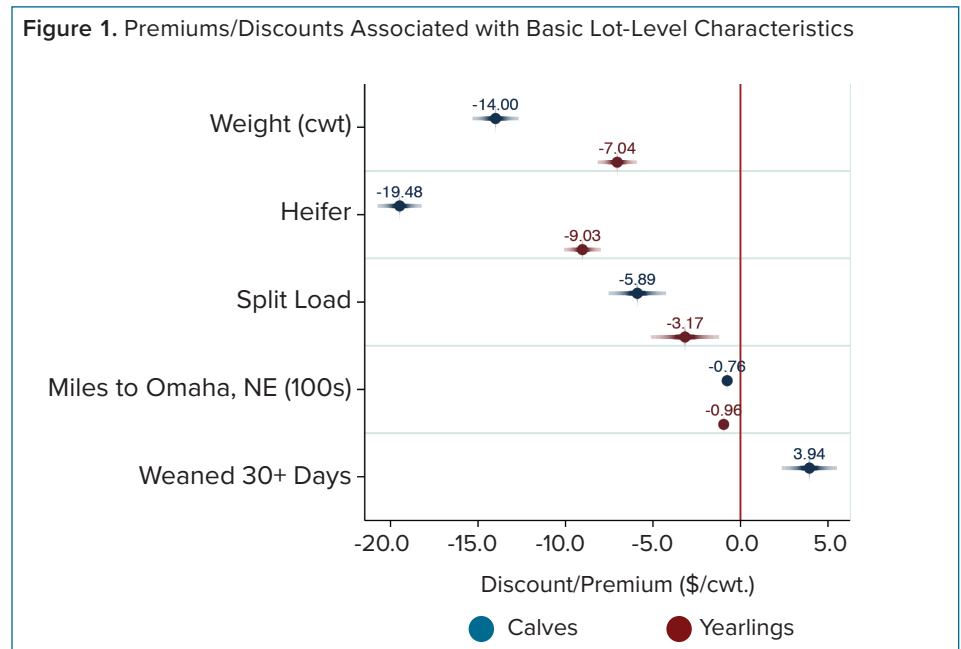
Cattle ranchers also utilize a variety of vaccination programs to maintain and enhance the health and well-being of their cattle. Some ranchers have

opted into self-certified or third-party certified vaccination programs and document these protocols when selling their cattle. These programs are included in the statistical models but the results are omitted herein for the sake of brevity (see further readings for details).

Results

Figure 1 shows the results from the calf (shown in blue) and yearling (shown in red) models for the basic lot-level characteristics that influence cattle prices. Each dot represents the estimated average premium or discount for that characteristic, while the lines extending from the dot depict the 95% confidence interval or the range in which we can be certain, with 95% confidence, that the true value falls. If the confidence interval includes zero (red vertical line), we cannot be certain that the premium/discount is not zero. All premiums/discounts are reported on a per hundredweight (cwt.) basis. The dot should be considered the best estimate of the true average value of the characteristic/attribute and the length of the line should be considered a measure of the precision of the estimate. The default lot, to which all results should be compared, is a lot comprised of only steers that have little (i.e., even) within-lot size variability.

As one would anticipate, the relationship between price and the average weight of cattle in a given lot is negative. Calf prices decrease by \$14.00 for every additional 100 lbs. of weight expected at time of delivery. As an example, consider two lots of steers, each consisting of 100 head, sold for delivery in the same month. The lots only differ by the average weight at delivery with one lot delivered at 550 lbs. (lot A) and the second lot delivered at 450 lbs. (lot B). In this example, the additional 10,000 lbs. of weight sold in lot A would only generate an additional \$1,400 (i.e., 14 cents per lb.).



Similarly, yearling prices decrease by \$7.04/cwt. as the average weight of the lot increases. This price-weight relationship exists because smaller animals have greater potential to gain weight, and thus buyers have a higher willingness to pay for lighter-weight animals, with other conditions remaining the same.

Heifer-only lots sold at an average discount of \$19.48/cwt. for calves and \$9.03/cwt. for yearlings. Split loads, lots consisting of both steers and heifers, are priced on a dollar per cwt. for steers and dollar per cwt. for heifers (i.e., the lot is associated with two prices, one for each sex). Thus, the coefficient on *Split Load* should be interpreted as the average discount for both prices (steers and heifers) in a lot comprised of both sexes. This means that these mixed lots are discounted, relative to what they would have brought on sale day if they had been sold in same-sex lots, by \$5.89/cwt. for calves and \$3.17/cwt. for yearlings.

Because buyers anticipate that their future sales prices will be reduced due to transportation costs (based on distance, anticipated shrink, and mortality risk) as cattle are sold downstream through the supply chain to feedlots and eventually to processors, they will

rationally reduce the price that they are willing to pay to compensate for these anticipated future discounts. And, thus, the *Miles to Omaha, NE* variable is inversely related to price. In the calf regression, the price of each lot is, on average, discounted nearly \$0.76/cwt. for every 100 miles that lot is away from Omaha, NE. For example, if a lot of cattle were sold and delivery originated in Redding, CA (1,642 road miles from Omaha, NE), the estimated discount would be \$12.48/cwt. For a lot of calves with the same characteristics but originating in North Platte, NE (280 road miles from Omaha), the discount is estimated to be only \$3.58/cwt.

There is a \$3.94/cwt. premium associated with calves being weaned from their mothers for 30 or more days. Buyers are willing to pay this extra amount to ensure that the stress of weaning, as well as any secondary illnesses caused by this stress, have occurred prior to delivery. Sellers are increasingly advertising longer weaned periods prior to shipping (e.g., 45 days, 90 days). Statistical tests indicated that there was no difference in the premium paid by buyers for extended weaned periods, compared to the 30-day period reported herein.

Figure 2. Value-Added Management and Marketing Program Premiums/Discounts

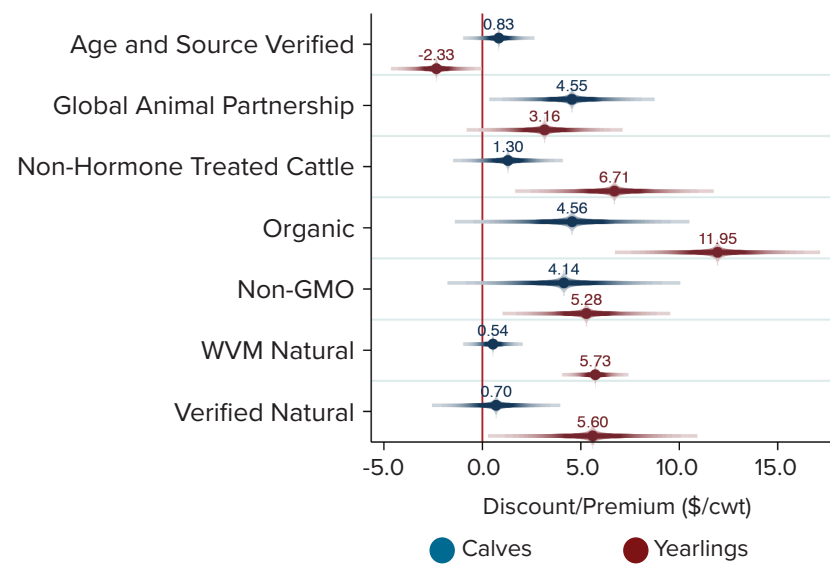


Figure 2 reports the estimates related to the value-added management and marketing programs employed by ranchers in 2018. *Age and Source Verification* did not generate premiums that were statistically different from zero for sellers of calves or yearlings in 2018. Calves sold carrying the *Global Animal Partnership* certification sold for a premium of \$4.55/cwt. For yearlings selling with the same certification, the premium is not statistically different from zero. Yearlings marketed with the *Non-Hormone Treated* certification received a premium of \$6.71/cwt.

Yearlings raised in accordance with U.S. Department of Agriculture’s organic standards sold for a premium of \$11.95/cwt. Calves raised according to organic standards sold for a premium of \$4.56/cwt., although this point estimate is not statistically different from zero. Yearlings fed in accordance with *non-GMO* specifications earned premiums on sale day of \$5.28/cwt., while calves raised in the same fashion sold for a premium of \$4.14/cwt. (not statistically different from zero). Finally, the premiums earned for cattle sold with the *Natural* designation, whether owner-certified or third-party certified, were very similar. In the case of yearlings, the

owner-certified natural premium was \$5.73/cwt., while the third-party certified alternative premium was \$5.60/cwt. Given that the third-party certification has higher costs than the owner-certified option, ranchers were better off self-certifying their production practices.

For the first time in 2018, ranchers marketed their cattle as “China market ready.” In technical terms, this meant that cattle had to be *Age and Source Verified* and *Non-Hormone Treated*. Thus, to get the value of this export market-specific designation, you can simply add the two premium estimates. For example, for calves in 2018, China market ready would have increased the price of a lot by \$2.13/cwt. (\$0.83/cwt. for *Age and Source Verified* and \$1.30/cwt. for *Non-Hormone Treated*).

Implications

Ranchers who market through WVM are often at the forefront of differentiating their cattle through a variety of value-added management and marketing programs. And, while these programs add complexity and cost at the ranch level, these factors are known ex ante. The revenue that a rancher will generate when selling calves or yearlings is not easily predicted and is

highly variable over time. This paper seeks to fill this void by estimating the average premiums paid for specific value-added management programs in 2018.

When supplies are tight and very few cattle with specific attributes are available, the premiums are often substantial. Yet, as more producers begin supplying these characteristics, premiums are eroded. Beyond these supply and demand considerations, larger macro considerations (e.g., national cattle supplies, drought, etc.) create substantial year-to-year variability in cattle prices and premiums paid for value-added management and marketing programs. Thus, programs that were profitable for a producer in one year may not be profitable the next due to changes in market conditions.

Suggested Citation:

Saitone, Tina L., “What Value-Added Management Programs Are Enhancing Cattle Producer Revenues?” *ARE Update* 22(5) (2019): 1–4. University of California Giannini Foundation of Agricultural Economics.

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For additional information, the author recommends:

Saitone provides updates and more in-depth analysis of these data and other livestock and rangeland related topics in her blog: <https://livestockecon.ucdavis.edu/>

Saitone, T.L. 2018. “[Beef Cattle Management and Marketing Programs: Do They Add Value for Ranchers in the Western United States?](#)” *Western Economic Forum* 16(2): 26-33.