THE STOCKER STEER QUANDARY: THE PRICE SLIDE

Cow-calf operations typically come to mind when one thinks about ranching in the west. However, yearling stocker enterprises can also occur as stand-alone or in combination with an existing cow-calf operation. Yearling stockers can provide both ecological and economic flexibility. In a typical year, these cattle are turned out to pasture and graze from spring (mid-May) to fall (September/October). The date livestock are removed from pasture can be adaptively managed based on ecological conditions (e.g., drought and vegetation residual levels) and livestock market conditions. Yearling stockers are sold as feeder cattle, and this sale generates the majority of annual net revenue for yearling stocker enterprises.

MARKET PRICE

The market price received when yearling stockers are sold as feeder cattle to feedlots is one of the most variable and uncertain factors facing ranching operations. This price is dynamic and heavily influenced by supply and demand at different levels within the beef industry. Factors impacting steer market prices include: supply of beef slaughter animals, consumer demand for beef

products, livestock inventory numbers (cow herd size), and corn price (Hamilton & Kastens, 2000; Dhuyvetter & Schroeder, 2000).

The price slide is one key component of market price dynamics, and it can be included in the terms of sale for forward price contracts of yearling stockers (Ritten et al., 2018). The price slide is a price-weight relationship in which lighter cattle sell for a higher price per pound (or cwt) compared to heavier cattle (Figure 1). The magnitude of a price slide is affected by factors similar to those influencing general cattle market prices: corn price, expectations of fed cattle price, cattle-feeding margins, and seasonality (Dhuyvetter & Schroeder, 2000). If the price slide disparity is large enough it can have a substantial impact on an operation's annual net revenues (Windh, 2019). An understanding of the price slide can help producers make more informed management decisions specifically in regards to target weights at the anticipated time of sale for yearlings.

Example:
From Figure 1, a steer weighing 775 pounds receives an average price of $140 per cwt, and a steer weighing 875 pounds receives an average price of $134 per cwt. How much more is the 875 pound steer worth compared to the 775 pound steer? Is it worth $134 more (100 pounds × $1.34 per pound)? No, the correct answer is actually $87.50. How is that number determined? The 875 pound steer is worth $1,172.50 (875 pounds × $1.34/pound) whereas the 775 pound steer is worth $1,085.00 (775 pounds × $1.40/pound). This price difference is due to the first 775 pounds of the heavier 875 pound steer taking a $0.06 discount per pound due to the price slide ($1.40 - $1.34).

ANALYSIS

To evaluate interactions among corn price, fed cattle price, and the price slide, we completed an ordinary least squares regression analysis using the following equation for the feeder cattle price:

$$P(W, P_{corn}, P_{Fed}) = \beta_0 + \beta_1 \times W + \beta_2 \times W^2 + \beta_3 \times W^3 + \beta_4 \times P_{corn} + \beta_5 \times W \times P_{corn} + \beta_6 \times P_{Fed}$$
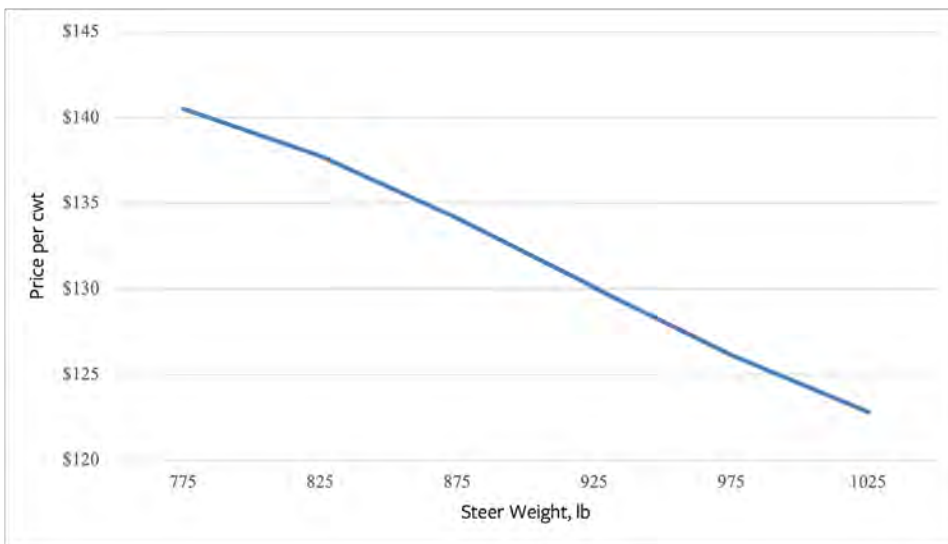

Figure 1. Estimated historical October price slide for yearling steers in Colorado from 2000-2019, adjusted for inflation.

where: P is October feeder cattle price ($/cwt), W is steer weight, P_{corn} is the annual average price of corn ($/bu), and P_{Fed} is the December Fed Cattle Futures price as reported in October only ($/cwt).

This equation determines the price per pound of feeder cattle, where the price is dependent upon the independent variables of feeder cattle weight, corn price, and December Fed Cattle Futures price. For our purposes, we focus on October prices as this coincides with the time of sale for the typical management scenario.

All prices were obtained from the Livestock Marketing Information Center (LMIC): 1) feeder cattle prices: Colorado and Western Kansas Auction Feeder Cattle Summary, medium and large frame #1 feeder steers, monthly October price, years 2000 to 2019, 2) corn price comes from the Monthly U.S. Agriculture Prices Feedgrains and Hay series, national average corn price per bushel, years 2000 to 2019, and 3) December Fed Cattle Futures price: Daily and Weekly Fed Futures Prices, December Monthly Live Cattle Futures in October, years 2000 to 2019. All prices are adjusted to October 2019 base using the 2019 Producer Price Index (Federal Reserve Economic Data, PPI, All Commodities).

RESULTS

Regression coefficient estimates are displayed in Table 1. We can use this equation to reasonably predict Feeder Cattle Prices if we know the weight of the yearlings we plan to sell, the price of corn, and the December Fed Cattle Futures Price.

Table 1. Price Slide Regression Output

	Coefficients
Intercept	78.745446
Weight	-0.271376
Weight^2	0.000315
Weight^3	-1.615E-07
Corn Price	-9.371725
Weight × Corn Price	0.004811
Dec Fed Cattle Futures Price	1.549688 (R^2 = 0.9499)

Corn price impact on livestock prices

As corn price increases, steer price decreases, as indicated by the negative coefficient for Corn Price in Table 1. This occurs as demand by feedlots for feeder cattle is reduced when corn prices increase (Ritten et al., 2010a.). A typical feedlot ration contains 70-90 percent grain or protein concentrates in order to achieve an average daily gain of 2.5 to 4 pounds per animal (Swanser, 2019). Therefore, grain (corn) prices are monitored closely by cattle feeders who are looking to achieve the cheapest cost of gain possible.

In Figure 2, relationships between the price slide and corn price are demonstrated by the steepness of slope and shifts in the price level. The steepness of slope is negatively influenced by differences in cost of gain (or the price of inputs like corn) for cattle feeders. Thus, as the corn price decreases, the slope of the price slide increases (becomes more negative). This causes the price per cwt for

lighter weight cattle to become more sensitive to fluctuations in corn price compared to heavier cattle (Swanser, 2019).

December Fed cattle futures price impact on livestock prices

The price of fed (live) cattle can also help predict the price received by yearling stocker enterprises for feeder cattle. The reason this may affect feeder cattle prices is because it partially impacts the profitability of cattle being fed, and thus, as fed (live) cattle prices increase (decrease) the demand for feeder cattle should theoretically increase (decrease). The fed (live) cattle futures price for December serves as a proxy for fed cattle prices which represent demand by meat processing facilities for fed steers and thus, affects demand for feeder cattle purchased to go to feedlots in October. In contrast to the price of corn, as the price of fed cattle increases, the price slide for steers will shift up (higher prices at every weight), compared to the average (Swanser, 2019) (Figure 3).
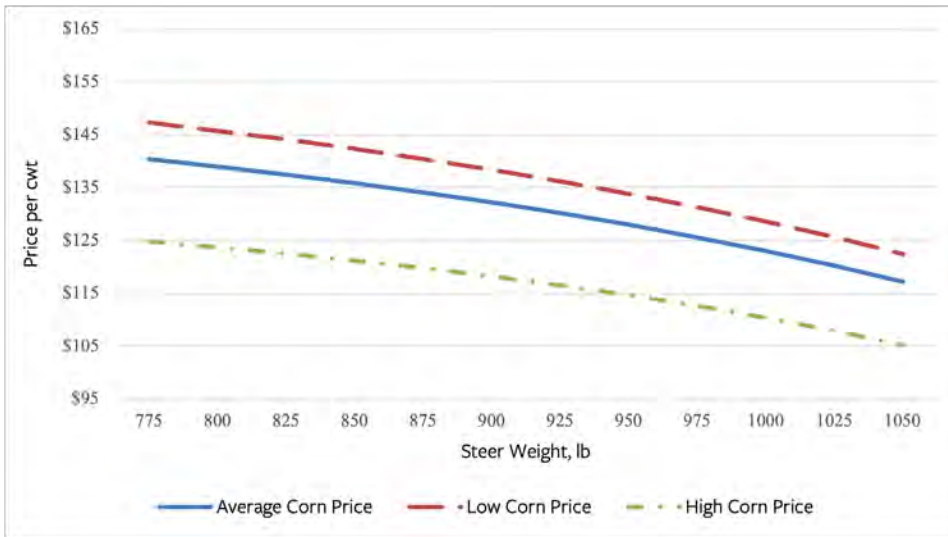

Figure 2. Estimated historical October price slide for yearling steers in Colorado with corn price from 2000-2019, adjusted for inflation.
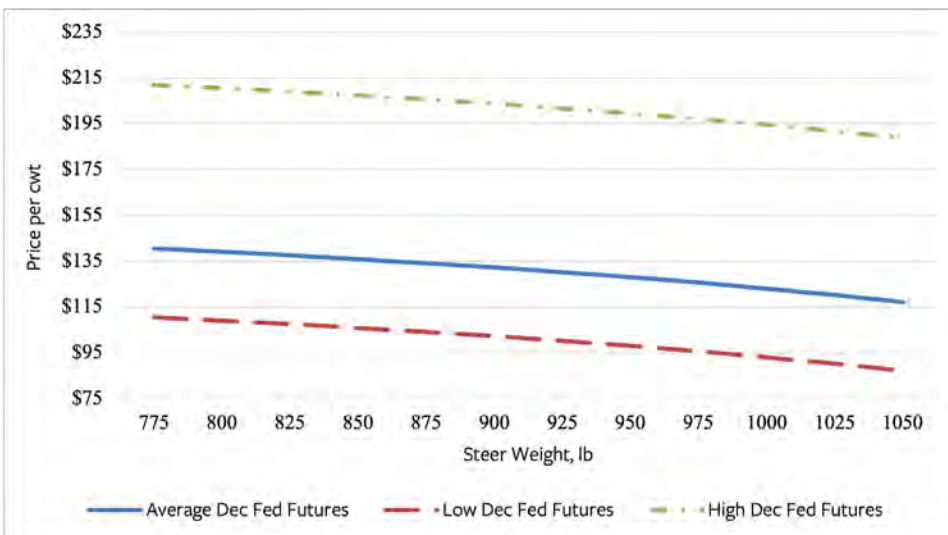

Figure 3. Estimated historical October price slide for yearling steers in Colorado with December Fed Cattle Futures price from 2000-2019, adjusted for inflation.

Figure 3 highlights the overarching influence of the December Fed Cattle Futures price on the price slide. For a given corn price, a higher December Fed Cattle Futures price will cause higher feeder cattle prices compared to the average.

VALUE OF GAIN

The significance of understanding price slide interactions lies in the value of gain. Value of gain is dependent upon cattle weight, thus it is important to decide how much weight to put on cattle. Value of gain is the difference in the expected future value per head and the current value per head, divided by the expected weight gain (Swanser, 2019).

Example:
A 775 pound steer has a current per head value of $1,088, and after gaining 25 pounds, the per head value is expected to be $1,112. To determine the value of gain one would subtract $1,088 from $1,112 (or $24) and then divide by the difference in weight (25 pounds). Thus the value of gain is $24 divided by 25 pounds: $0.96/lb.

Value of gain is monitored closely in feedlots, but can also be useful to producers grazing yearling stockers. For a yearling stocker operation, the value of gain from the next pound added determines the optimal time to sell those animals. This occurs when the feedlot no longer pays more for the next pound of gain than the cost of grazing to add that additional pound. Basic costs associated with grazing include labor, salt/mineral, grazing fees, and interest payments on borrowed capital. A yearling stocker operation manager could calculate their estimated costs per pound of gain and use observations from the market prices to determine the optimal time to sell animals based on the price slide situation.

The value of gain is not constant across yearling stocker weights, and can be highly impacted by corn prices and December Fed Cattle Futures prices. Using average prices for corn and December Fed Cattle Futures (solid blue line, Figure 4), the value of adding one more pound for an 800 pound
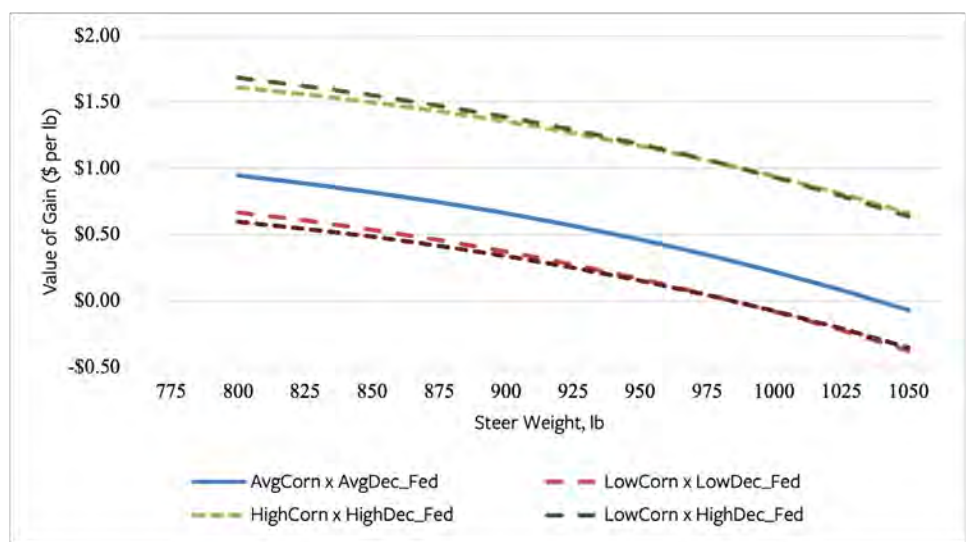

Figure 4. Value of gain per pound for yearling steers for October sale in Colorado with corn price and December Fed Cattle Futures price from 2000-2019, adjusted for inflation.

steer is $0.95/lb. The value of one pound of gain for an 800 pound steer can be as high as $1.68/lb when corn prices are low and December Fed Cattle Futures are high, or as low as $0.60/lb when corn prices are high and December Fed Cattle Futures are low.

ANOMALY: WHAT ABOUT 2014?

In 2014, a unique set of circumstances coincided to create the perfect market situation for beef producers: high cattle prices and high corn prices. Livestock inventory numbers played a key role in creating high cattle prices due to the herd expansion period – and shortened beef supplies – after the Southern Plains multiple year drought in 2012 and 2013. Total beef slaughter in 2014 was 378.2 million pounds compared to the most recent slaughter numbers (January 2021) of 550.2 million pounds (as reported by LMIC). While corn prices were also relatively high in 2014, national average of $4.46 per bushel (as reported by LMIC), the abnormally high demand for fed cattle resulted in high demand for feeder cattle and subsequently higher feeder cattle prices in 2014.

From Figure 5, compared to the average (solid blue line), in 2014 feeder cattle prices (dashed green line) shifted up and the price slide became marginally steeper. In contrast, the lowest feeder cattle prices in the last 20 years occurred in 2008 (dashed red line), and the price slide was shifted down but the slope remained the same as compared to the average over that time frame. Cattle inventory numbers were at their peak in 2008 and corn prices were higher (especially compared to 2014). Both of these factors caused depressed feeder cattle prices in 2008.

TYING IT ALL TOGETHER

Ranch and feedlot enterprises are generally considered separate sectors in the beef industry as they are on different levels of the beef animal production chain. However, it is apparent supply and demand for both inputs and outputs in each sector influence the prices received for animals or products at these different levels. Financial returns in ranch production are most sensitive to cattle market and corn prices because of the price slide, yet producers have little control over these market dynamics (Ritten et al., 2010a.).
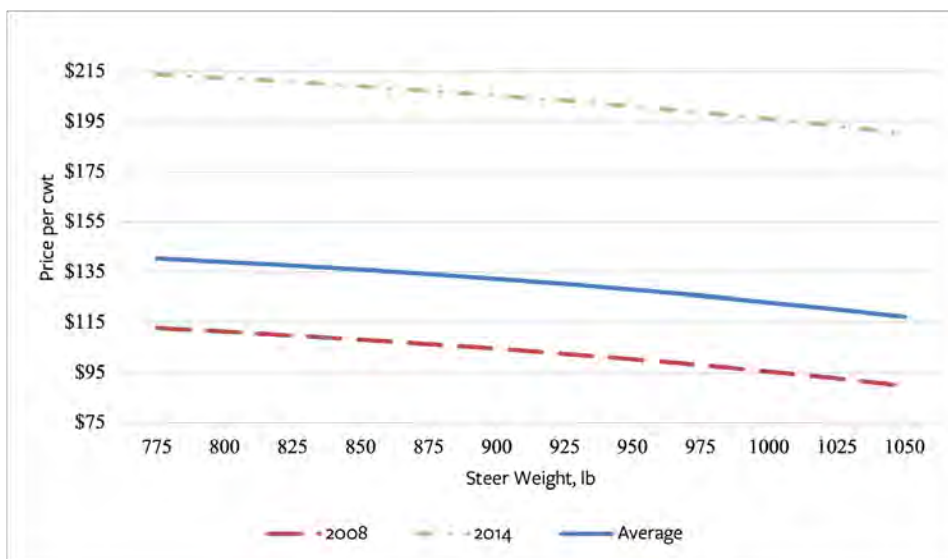

Figure 5. Actual price slide for extreme years (2008 and 2014) with average (2000–2019) for yearling steers in Colorado, adjusted for inflation.

Therefore, the complexity of cattle market prices and the price slide leads to our quandary and challenge: how can we take this uncertainty and use it advantageously to determine when to remove cattle from rangeland and sell them to a feedlot? Paying close attention to the grain (corn) markets and fed (live) cattle futures markets can assist producers in understanding how these two factors impact the value of the weight gained by their stocker cattle while on rangeland.

Price slide considerations are one piece of the puzzle for management strategies. If elevated corn prices are expected, the decision to have fewer, heavier-weight cattle may overcome the discount caused by the price slide as the discount for heavier cattle is decreased in years with high feed costs. In a year that corn prices are expected to be low, a feedlot would prefer to purchase light-weight cattle because they can capture the value of gain themselves, so selling more, lighter cattle may prove more profitable. Producers can influence yearling stocker weights through stocking rate and end date of grazing decisions by employing adaptive management strategies (however, keep in mind we do not evaluate price seasonality in this analysis). This sort of adaptive management may have the potential for greater net returns by altering annual stocking rate decisions and/or marketing yearling stockers at various times of the year.

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