Value of Gain Projections:

Overview of Forecasts Accuracy

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This year's cattle market has presented what many producers probably feel like is a roller coaster ride. This corresponds with the nationwide drought, escalated prices for feedstuffs, and expanded uncertainty regarding pasture conditions. Nonetheless, as fall weaning of calves approaches, cattle producers need to assess what the marketplace is suggesting the return for additional weight gain may be. Narrowly, cow-calf producers interested in retaining ownership that have sufficient facilities and expected feedstuffs need to make the decision as to whether or not they can increase returns by adding weight to their calves. Similarly, stocker and backgrounding operators who also possess or may procure necessary resources need to examine what they can pay for calves they may add weight to. The cattle markets constantly provide updated information regarding expected returns to adding weight to calves such as might be done with fall and winter grazing or backgrounding programs. A fact sheet published last year provides an overview of how value of gain is calculated and decision tools that are available to producers to assist with making these assessments.[1] The purpose of this fact sheet is to overview a recent analysis of different approaches to projecting the value of weight gain and to highlight implications for producers making similar decisions.

Alternative Approaches

All efforts to forecast the price of something in the future are subject to prediction error. That is, no approach is perfect, no "crystal ball" exists, and all techniques "miss the mark" by some degree when used routinely. Recognition of this and observing that competing methods exist for projecting prices at dates in the future leads economists to regularly step back and assess the appropriateness of various forecasting approaches of commodity prices. When it comes to projecting value of gain in the cattle marketplace there are two main classes of projection approaches. The first and probably most common approach used by industry stakeholders is

[1] This fact sheet is available at: http://www.agmanager.info/livestock/budgets/production/default.asp.

what we refer to as a *naive approach*. The naive approach takes prices for two different weight classes of cattle in the current cash market place, derives the increased total value implied contemporaneously, and divides by the total weight gain providing a value of gain estimate. In other words, this approach basically assumes that what we are observing today will hold for some point in the future. Since this approach is simple to understand and readily available, it is not surprising many producers use it. However, a critical issue with this approach is it is not "forward looking" and fails to account for any information provided in the marketplace for cattle transactions at a time in the future when the heavier weight cattle in question would actually be sold. That is, the market may value the heavier calf at some point in the future at a different value (higher or lower) than the current market and this naïve approach fails to account for that. Recognition of this trait leads to the second class of approaches which we refer to as *basis-adjusted, futures market approaches*. The feeder cattle futures market regularly provides estimates of how the cattle market is expected to change between now and some date of interest in the future. Coupling this information with basis forecasts (difference between cash and futures market prices) enables analysts to derive forecasts which are forward-looking and more theoretically correct given the inherent change in market timings involved in purchasing (or retaining) a lighter weight animal and selling it at a heavier weight sometime in the future. In practice, basis forecasts can also be derived several ways. Here we consider a simple, four-year historical average approach and a regression based approach provided by the BeefBasis.com website (http://www.beefbasis.com/). While basis-adjusted, futures market approaches may be more theoretically correct, this is irrelevant if they do a poorer job of predicting value of gain because of inaccurate price forecasts.

What has been lacking is a comparison of how the *naive approach* and *basis-adjusted, futures market approaches* perform in the context of value of gain projections. In this assessment, we considered the common situation of a Kansas cattle producer. Narrowly, we examined the case of buying a 550 lb steer in the current month and selling it at 750 lbs three months later using the Salina, KS market for evaluation. This corresponds to an average daily gain of approximately 2.20 lbs. As stated earlier, forecasts of value of gain for adding 200 pounds were made each month for the following three methods:

1) Current price of 550 lb steer and current price of 750 lb steer *(naïve)*
2) Current price of 550 lb steer and futures price adjusted for basis of 750 lb steer three months into the future *(futures-implied historical basis)*
3) Current model-estimated price of 550 lb steer and model-estimated price of 750 lb steer three months into the future, where model-estimated price is from BeefBasis.com website.

The forecasts for VOG for of each of these methods were then compared to the actual VOG over the three-month period (i.e., value of 750 lb steer today versus value of 550 lb steer three months earlier). Forecast errors were calculated as actual VOG minus projected VOG. Forecast accuracy was also examined with absolute forecast errors (does not allow positive and negative errors to cancel each other), squared forecast errors (penalizes large errors), and percentage absolute forecast error. These alternative accuracy measures simply provide another way of comparing alternative methods of forecasting VOG.

Table 1 presents the average values for the different accuracy measures for the three different approaches to forecasting value of gain from January of 2007 through July 2012 (67 months). Regardless of the forecasting accuracy measure used, the futures implied - historical average basis approach ranks as best (least error) and the naive approach ranks as worst (most error). Moreover, when evaluating the approaches using squared errors (which places a larger penalty on errors of greater magnitude) the naive approach performs even worse. The take home implication is that producers should give second thought to simply using information solely from the current cash marketplace as a projection for value of gain in the future. As previously noted, this finding is consistent with the appeal of using an approach which better accounts for the changing time periods involved in the biological process of adding weight to cattle. Finally, the differences among the forward-looking approaches vary depending on the evaluation measure used (e.g., differences are not statistically significant among absolute, squared, and percentage absolute errors) suggesting either approach may be reasonable to utilize.

Table 1. Value of Gain Forecasting Comparisons, January 2007 to July 2012			
Accuracy Measure	*Naïve*	*Futures + basis (historical average)*	*Futures + basis (BeefBasis.com)*
Forecast error, $/cwt	7.77	-2.59	6.06
Absolute forecast error, $/cwt	26.61	23.27	23.59
Squared forecast error, $/cwt	1,082.65	899.54	965.48
Percentage absolute forecast error, %	35.52	27.87	31.28
Notes: Projections assumed three month horizons for adding 200 lbs to a 550 lb steer in Salina, KS.			
Values are averages for the evaluation period.			

Conclusions

Cattle producers looking to add weight to calves can benefit from the improved decisions associated with using better performing approaches for forecasting value of gain (VOG). This analysis found the common approach of simply using current cash market price differential information to form value of gain forecasts would have been less accurate than forward-looking approaches informed by the feeder cattle futures market over the last five years. Given basis information is readily available online (either at AgManager.info or BeefBasis.com) and the existence of associated decisions tools outlined in previous fact sheets, producers are encouraged to move away from the common practice of employing what we describe here as the naive approach for projecting future value of gain.