Managing for Today's Cattle Market and Beyond

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Understanding and Using Feeder and Slaughter Cattle Basis

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Basis is defined as the difference between the local cash market and a futures contract price (Basis = Cash Price - Futures Price). Knowledge of historical basis patterns can be useful when estimating expected sale or purchase prices at the conclusion of a futures or options hedge, when evaluating a current cash market quote, and when evaluating forecasted cash prices. This fact sheet explains how feeder and slaughter cattle basis is computed, outlines an approach to developing a history of local basis levels, and discusses how historical basis data can be used to forecast basis.

Introduction

A futures contract price represents today's opinion of a commodity's value at the time the futures contract expires. Moreover, the futures price quote is for a specific grade of the commodity at a particular location. Likewise, a commodity's local cash price represents the price at which buyers and sellers are willing to trade the commodity on a particular date at a given location. Thus, futures and cash prices on a given date can differ because they reflect differences in location, quality or time of delivery.

The difference between a commodity's futures contract and cash prices, for a particular grade at a specific location, is known as the basis. Basis is sometimes referred to as the price of a cash commodity at a particular location, relative to a specific futures contract, because it provides a measure of the local supply and demand conditions versus the aggregate supply and demand situation depicted by the futures contract's price.

Defining Basis

The formula for computing basis can be stated as:

Basis = Cash Price - Futures Price. (1)

The formula indicates that, if basis is negative, the futures price is greater than the cash price. Conversely, a positive basis indicates the futures price is less than the cash price.

Basis is usually computed using the nearby (closest to expiration) futures contract. For example, in October the nearby corn futures contract is the December futures contract and the December contract is generally used to compute basis for corn to be delivered in the fall. Similarly, in January the nearby

live cattle futures contract is the February contract since it is the contract closest to expiration.

Feeder and slaughter cattle basis are always computed using the nearby (closest to expiration) futures contract because it generally is not possible to store cattle into the expiration period of a subsequent futures contract. However, grain basis can be computed using a deferred futures contract price. A deferred futures contract is any futures contract farther away from expiration than the nearby futures contract. For example, in the fall you could choose to compute corn basis using the July corn futures contract, which is a deferred contract since the December contract is the nearby contract in the fall. It makes sense to do this with grains since they are a storable commodity, unlike cattle. Computing grain basis using a deferred futures contract makes it easier to evaluate expected changes in the basis over a long period of time, which can be helpful when evaluating storage profitability.

Basis is much easier to predict than either the cash or futures price. This is because most of the factors that influence a commodity's price affect both cash and futures prices simultaneously. Usually there is a one-to-one relationship (approximately) between cash and futures prices. This means that cash and futures prices tend to move together, i.e., if April live cattle futures prices go up by $1.00 per cwt., cash prices during April also tend to go up by about $1.00 per cwt.

Using Basis Information

The mathematical formula used to compute basis is a powerful tool. If we rearrange equation (1) and solve for the cash price we discover the following relationship:

Cash Price = Basis + Futures Price. (2)

Hedgers can use expected basis for the time frame when they expect to deliver (or accept delivery of) the cash commodity to estimate their expected price if they place a hedge at today's futures price level. This works because a hedger effectively locks in the futures price when the futures contract is sold, in the case of a short hedger, or when the futures contract is purchased, in the case of a long hedger. Effectively, this means that the difference between a hedger's actual price, at the conclusion of the hedge, and the expected price, at the outset of a hedge, will be attributable to the difference between the actual and expected basis.

Suppose, for example it is April and you will have slaughter cattle ready for market in September. Assume the October Live Cattle contract is currently trading at $78 per hundred weight (cwt.). What does that mean to you when feeding and selling finished steers in Hereford, Texas? To more accurately estimate your expected sale price (net of any gain or loss in the futures market) if you decide to sell October live cattle futures at $78, you need a basis estimate for fed steers at Hereford, Texas during September. Suppose, historically, the September fed steer basis at Hereford averaged negative $2.00 cwt. Given a $78 October futures price, your *Expected Sale Price* would be $76 cwt. [Futures Price ($78) plus Basis (negative $2) equals *Expected Sale Price* ($76)]. This *Expected Sale Price* is what you can expect to receive for the cattle if you sell October Live Cattle futures at $78 and the actual basis when you sell the cattle in September matches your basis forecast of negative $2/cwt.

If the actual basis does not match the basis forecast, the *Actual Sale Price* will not equal the *Expected Sale Price*. For example, if the actual basis in September turns out to be more positive than your forecast, the *Actual Sale Price* will exceed your *Expected Sale Price*. Conversely, if the actual basis in September is more negative than your forecast, your *Actual Sale Price* will be lower than your *Expected Sale Price*.

Knowledge of historical basis levels also can be useful when judging the acceptability of a local cash market price. As equation (2) indicates, a commodity's cash price can be decomposed into its futures price and basis components. The basis component can be compared with historical basis levels for that particular time of year and a judgement made regarding the acceptability of the cash price. If the basis differs substantially from historical levels, some additional research would be warranted to determine why the difference exists and whether it is likely to persist.

Finally, you can generate a forecast of the cash price by replacing basis with *expected* basis. In this case the formula becomes

Expected Cash Price = *Expected* Basis + Futures Price. (3)

This means you can use a basis forecast, in conjunction with the futures price, as a cash price forecasting tool (Kastens, Jones and Schroeder). The technique is straightforward. Simply add today's futures price (choosing the futures contract that will be the nearby contract during the forecast period) and a forecast of the basis during the forecast period to obtain a cash price forecast. To clarify, assume that you need a western Kansas fed steer cash price forecast for mid-November. Take today's December live cattle futures price and add a forecast of the mid-November western Kansas slaughter steer basis to the futures price. The result will be an expected mid-November cash price, based upon today's futures market price and your basis forecast. This futures based price forecast can then be compared to a producer's breakeven price or to forecasts from alternative sources such as university extension economists, the U.S. Department of Agriculture, and market advisory firms.

Constructing Historical Basis Tables

Basis tends to follow the same pattern year after year (i.e., basis is seasonal). As a result, historical basis data can be used to forecast basis. The first step when forecasting basis is to generate a historical basis table to compare basis across years. Setting up weekly basis tables is the preferred approach since it provides enough detail to be useful for forecasting without requiring that you spend an inordinate amount of time collecting prices.

Feeder cattle basis can be computed one day per week for most markets since most feeder cattle auction markets trade just one day per week. When calculating feeder cattle basis, it is important to use futures and cash prices from the same date.

When recording slaughter cattle basis, you have to choose between recording daily or weekly average basis data. However, many cash slaughter cattle markets, such as in western Kansas, the Texas Panhandle, or western Nebraska, do not have an active cash trade everyday. As a result, picking a single day per week (i.e., every Wednesday, which works well when recording grain basis data) to compute basis will yield a surprisingly large number of weeks with no basis to report, simply because the cash trade occurred on days other than the one chosen. To avoid this problem, you can either track daily basis data, taking care to record the cash and futures price from the same date, or average both cash and nearby futures prices for the week and use them to calculate weekly average basis. Whether you choose the weekly average or daily techniques, it's a good idea to use the same approach from week-to-week and year-to-year to ensure consistency.

Calculating basis for slaughter and feeder cattle requires that a rule be established regarding when to change the futures contract used to compute basis. One rule that works well is to continue using the futures contract closest to expiration, as long as it continues to trade the entire week. If the nearby contract expires during the middle of the week, switch all of your calculations for that week to the next closest to expiration contract. To clarify, examine how this rule would have been employed with the February 2001 and April 2001 live cattle futures contracts. February 2001 live cattle futures expired on Wednesday, February 28. Consequently, the last week to compute live cattle basis using the February contract was the week ending Friday, February 23. Basis for the week ending March 2 was computed using the April live cattle futures contract since, by the end of that week, it was the new nearby futures contract.

Remember, anything that affects local cash prices will have an impact on basis. For example, since feeder steer and heifer basis is computed using the same futures contract, feeder steers and heifers will generally have a much different basis because heifer prices typically trade at a substantial discount to steer prices. Similarly, different feeder cattle weight classes will also have substantially different basis levels and patterns because light weight cattle prices generally trade at a premium to heavy weight cattle prices and follow a different seasonal pattern. As a result, it's important to have data available for the appropriate sex and weight cattle.

Other factors that influence cash prices can also have a big impact on basis. Prices for Choice and Select slaughter cattle vary and, as a result, basis for these two quality grades differs. Similarly, there are a wide variety of physical characteristics that influence cash sale prices for feeder cattle, all of which will impact the basis for a particular pen of steers or heifers.

Forecasting Basis

Since basis is seasonal, historical basis data can be used to help forecast future basis levels. The basis tables described previously can be a great help when

forecasting feeder or slaughter cattle basis. The simplest technique, and one of the most reliable, is to use the historical average basis level for the week of interest as a forecast. Recent research indicates that, generally, three year averages are preferred when forecasting feeder cattle or slaughter cattle basis (Dhuyvetter and Parcell).

Forecasting Example

Table 1 provides historical weekly feeder steer basis data for steers weighing 700-800 pounds which were sold at the Winter Livestock Auction in Dodge City, KS. If you are interested in forecasting basis for 700-800 pound steers which will be marketed in southwest Kansas the week of October 17, 2001, it's reasonable to expect basis to be near the three-year average of negative $1.77 per cwt. However, you should also recognize that the actual basis could be above or below that level.

Updated Basis Information Available on the World Wide Web (WWW)

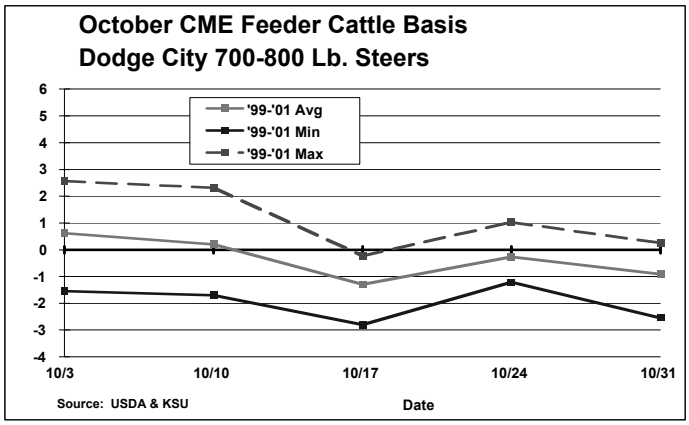
Although it's best to maintain your own historical basis data for markets that you customarily use, current livestock basis data for several major markets is available from Kansas State University on the World Wide Web. Point your web browser to the following address:

http://www.agecon.ksu.edu/livestock

to obtain historical basis information for feeder cattle (Dodge City, KS), and slaughter cattle (Kansas slaughter steers and heifers). Weekly historical basis charts are available for each futures contract and the nearby basis chart is updated each week. In addition, many other state university Extension programs have historical cattle basis available for local markets.

Table 1. Dodge City, KS 700-800 Lb. Feeder Steer Basis Chicago Mercantile Exchange October Feeder Cattle Futures

Sale Dates (2001)	1999	2000	2001	3 Year Average
		$/cwt.		
10/3	0.83	-1.55	2.57	0.62
10/10	-1.70	-0.01	2.31	0.20
10/17	-0.83	-2.80	-0.23	-1.29
10/24	-1.22	-0.62	1.03	-0.27
10/31	-0.43	-2.55	0.25	-0.91



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