AGRICULTURAL

MU Guide

An Introduction to Basis

Joe Parcell and Vern Pierce
Department of Agricultural Economics

This guide is one in a series designed to help you better understand available marketing strategies. The focus of this guide is to help agricultural producers and agribusinesses better understand commodity basis. As will be discussed, commodity basis provides a significant amount of information to producers and agribusinesses for making production, forward pricing, hedging, and storage decisions. Many producers believe that understanding basis patterns is the most fundamental means of evaluating marketing decisions. That is, basis tends to follow historical and seasonal patterns, and by understanding these patterns a producer or agribusiness person can make better management decisions and reduce risks involved in those decisions.

What is commodity basis?

Commodity basis is the difference between a local cash price and the relevant futures contract price for a specific time period. For a specific commodity, basis is defined as follows:

$$\text{Basis} = \text{Cash Price} - \text{Futures Price ,}$$

where *Cash Price* is the cash price for a specific commodity at a given location and *Futures Price* is the relevant futures price for that commodity. An example illustrates:

Assume Jane raises corn and feeder cattle in Fayette, Missouri. On November 4 the local elevator is buying corn for $2.83/bushel and the local livestock auction is selling 7–8 cwt feeder cattle for $72.36/cwt. On this same day, the closing price of the December corn futures at the Chicago Board of Trade is $2.96/bushel and the closing price of the November feeder cattle futures price at the Chicago Mercantile Exchange is $70.98/cwt. Now, if Jane wants to know her basis, she would simply take the cash price and subtract the futures price for each commodity.

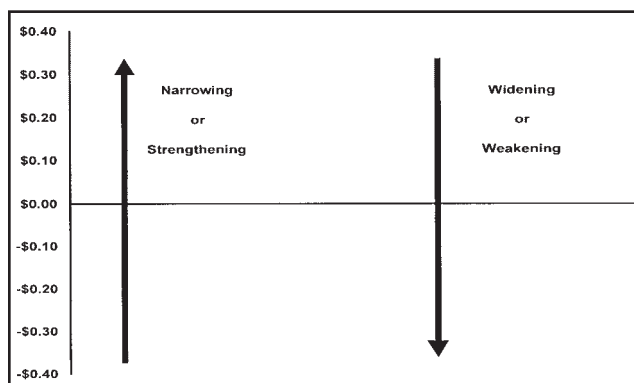|	Corn	Feeder cattle
Local cash price	$2.83	$72.36
Less Futures market price	$2.96	$70.98
Basis	−$0.13	$1.38

Figure1. Basis terminology and movement.

A negative value represents a cash price "under" the futures price, and a positive value represents a cash price "over" the futures price. A basis that becomes more positive or less negative over time is said to narrow or strengthen; one that becomes less positive or more negative is said to widen or weaken (Figure 1).

If the current basis is more positive than the expected (average) basis for the period, it is often referred to as "narrower" or "stronger" than normal. For example, if the current basis is −$0.10, when −$0.25 is "normal," the market is offering a strong or narrow, basis. A basis of −$0.40 when −$0.25 is "normal" would be a weak or wide basis. When basis is stronger or narrower than normal, the market is providing a financial incentive to make cash sales. When there is a wide or weak basis the market is discouraging cash sales and encouraging storage in the case of crops.

What does basis tell me?

Basis describes separate relationships for crops and livestock. Therefore, these enterprises are separated in the discussion below.

Crops

For grain, basis is typically used to indicate current local demand. Thus, basis varies by location depending on the regional supply and demand (Figure 2). Weak basis (i.e., lower than normal for this time of year) indi-
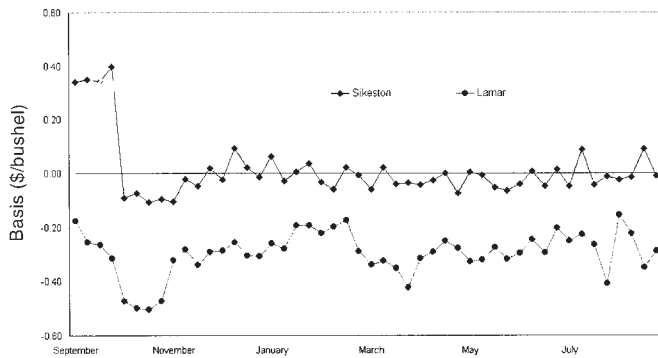
Figure 2. Soybean basis for Lamar and Sikeston, Missouri, for September 1998 through August 1999.

Table 1. How a crop producer should use basis in marketing strategies.

	High price	Low price
Strong basis	Sell for cash	Sell for cash Re-own with futures or options (if a higher price is expected)
Weak basis	Hedge with futures Short futures or buy put Delay cash sale	Store

cates that the market does not want grain now, but may want it later. Strong basis indicates the market wants the grain now. Basis is best used in deciding how to sell. Table 1 shows how a grain producer should respond to certain market situations. For instance, assume you are a corn producer who believes the corn price is high and basis is strong relative to historical patterns. What should you do? Sell in the cash market, because there is little opportunity to better the current market price through storage or by taking a futures position.

Livestock

For livestock, basis refers to the difference between local supply and demand in a local location and supply and demand for the aggregate market. Basis contracts can be formulated for livestock just as they can for grains. Thus, understanding the basis can help farmers and agribusiness personnel evaluate forward contracting and hedging decisions. However, livestock commodities cannot be stored like crops.

Hedging and basis?

Basis is a crucial factor in hedging through the use of futures. Table 2 shows the gain or loss to a hedger when basis strengthens or weakens. Long hedgers, seeking to protect against increasing price, prefer that the basis weaken. That is, hedgers pay less in the cash market relative to the futures market and may gain more

Table 2. Direction and impact of basis movement for short and long hedger.

	Long hedge	Short hedge
If basis weakens (or widens)	Basis gain	Basis loss
If basis strengthens (or narrows)	Basis loss	Basis gain

from their position in the futures market. For more details, see MU publication G607, *Long Hedge Example with Futures.*

Short hedgers, seeking to protect against decreasing price, gain from a strengthening basis. That is, the hedgers realize a cash price increase relative to the futures price and may gain more from their position taken in the futures market. For more details, see MU publication G608, *Short Hedge Example with Futures.*

How do basis patterns vary over time?

Basis tends to vary over time and within a marketing year for grains, oilseed crops, and livestock. As will be shown, basis trends tend to persist over time and provide opportunities to those who understand these trends. Figures 3 through 7 provide various examples of how basis patterns vary over time and within a marketing year.

Figure 3 outlines 5- and 10-year average seasonal soybean basis trends for Kansas City, Missouri. Clearly, basis is strongest during the period from August to October (old crop) and widens rapidly into the fall. Historically, soybean basis has strengthened consider-
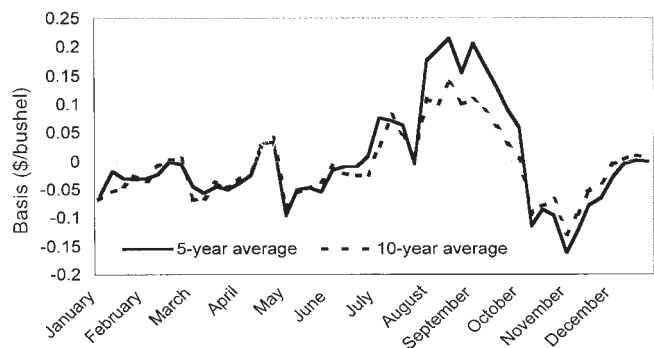

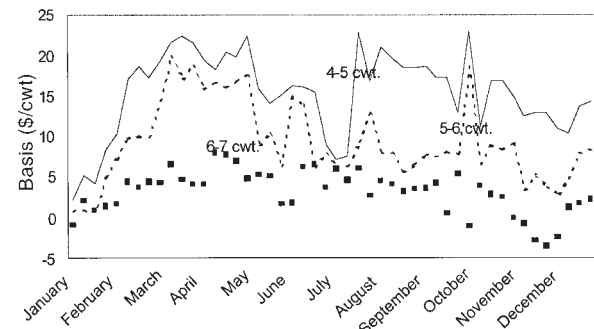**Figure 3. Five-year and ten-year average soybean basis for Kansas City.**

Figure 4. Dodge City feeder steer basis for various weight categories (1997).

ably from mid-November until early January. Furthermore, there has been little change in soybean basis patterns over time, thus the resemblance in 5- and 10-year average basis patterns.

Figures 4 and 5 show the seasonal trends and difference in seasonal trends across years, respectively. Because feeder cattle are sold at different weights, basis is substantially different for alternative weight classes of feeder cattle, and seasonal patterns differ between weight classes (Figure 4).

Figure 5 describes the difference in seasonal basis between 1996 and 1997 for 600- to 700-pound feeder steers. The reason for the relatively low basis in 1996 was the relatively high grain prices at that time. It was cheaper to purchase heavy cattle than to purchase grain and feed the cattle to higher weights.

Figures 6 and 7 show, respectively, the historical pattern and the difference in seasonal trends between years for live cattle. Figure 6 indicates that basis has
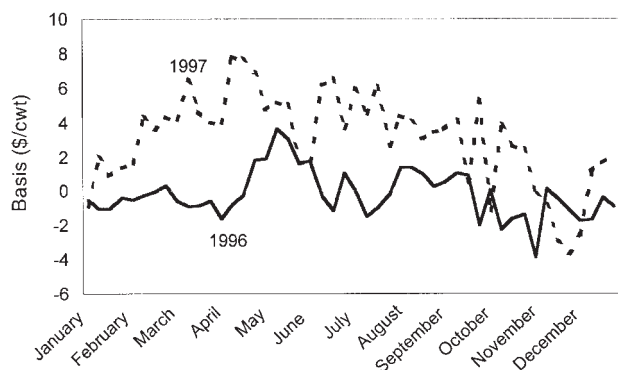

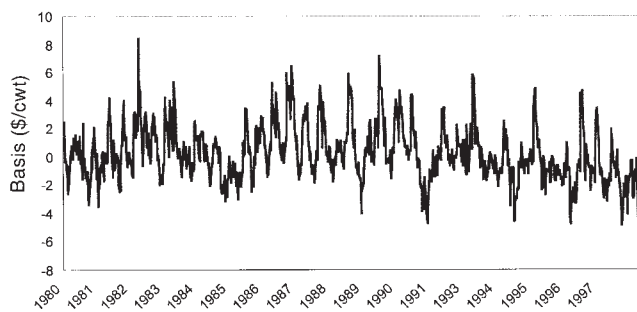**Figure 5. Dodge City basis for 6–7 cwt feeder steers.**

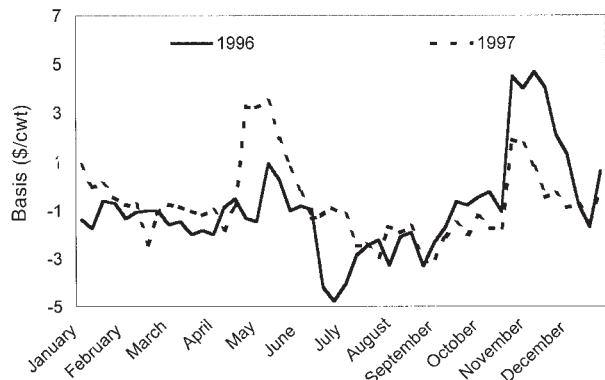**Figure 6. Western Kansas basis for choice fed steers (1980–1997).**

Figure 7. Western Kansas choice fed steer basis 1996 and 1997.

varied by as much as $14/cwt over time (ranging from -$6/cwt to $8/cwt). Figure 7 indicates that while basis patterns were fairly consistent between 1996 and 1997, the level of the basis value differed. The difference may be due to different local and aggregate supply-demand relationships.

Basis patterns will differ depending on the location where you market your commodity. Therefore, it may be necessary for you to track local basis patterns over time and within the marketing year. Otherwise, your local extension farm management specialist may be able to help you find the needed information.

Basis: A necessity for predicting a local cash price

Agriculture producers and agribusinesses face a diverse array of marketing and production alternatives. Each time a marketing or production decision is made, farmers or agribusinesses must determine what impact this decision will have on their risk management plan. None of these questions is more difficult to answer than, "What price can I expect?" No matter the time of year, this question always looms in the decision process. With the changes in the domestic farm program, producers must now ask themselves, which crop will I plant given my known input costs and expected harvest time prices? During this same time and the growing season, producers then must ask themselves, should I forward price a portion of my crop? Finally, in the fall producers must ask themselves, should I store my crop? Or for the cow-calf producer, should I retain ownership on a portion of my herd beyond weaning? Similarly, agribusinesses must determine price expectations to know what forward price to offer.

Commodity futures exchange markets provide a mechanism for price discovery on an aggregate level through arbitrage between multiple buyers and sellers. However, price discovery at a given location is not as clearly defined because local supply and demand relationships are not as well known. However, historical basis provides a linkage between these two markets. Therefore, a simple, low-cost, and relatively good predictor of the local cash price is the futures contract [month] price of interest adjusted for a multiple-year average basis for that time. An expected price, where E denotes an expectation, can be found using:

$$\textbf{E[cash price]} = \textbf{Futures Price} + \textbf{E[basis]}$$

For example, assume in December a cow-calf producer would like a forecast for April live cattle prices. The producer's best expectation of that cash price might be the April live cattle futures price adjusted for an expected basis (say 5-year average basis for that area). If the April live cattle future is trading for $65/cwt in December, and the 5-year average basis is $2/cwt, the expected price is $67/cwt.

Other Publications on Risk Management

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