2. Ongoing Effort: Formulate your own Market Analysis

There are two basic approaches to market analysis. These are commonly referred to as fundamental analysis and technical analysis. Fundamental analysis tends to focus on factors that influence supply and demand while technical analysis focuses on historical patterns observed in price data, using those patterns to make forecasts of future price movements.

Fundamental analysis of expected cattle prices is a broad topic. Included in the subject matter are historical, existing or projected numbers of cattle in various weight and grade classes or anticipated supplies of beef, pork and poultry. Also included in fundamental analysis are factors influencing demand such as population, income and prices of substitute goods in both domestic and international markets.

Technical analysis is concerned with psychological factors influencing market prices as reflected in various types of charts and mathematical formulas, which often occur in response to changes in underlying market fundamentals, e.g., changes in supply and demand.

Traders react to government, private sector reports, and world events in somewhat predictable ways causing market price changes. Thus, you should have some familiarity with both fundamental and technical analysis. This is especially important information at the time when the buying and selling transactions are being negotiated.

Fundamental Price Analysis

The number of cattle available for slaughter or available for feedlot placement during has direct impact on prices for finished or feeder cattle. The supply of cattle available in these supply chain channels is dependent upon the number of breeding cows and heifers. As numbers are adjusted in response to favorable or unfavorable prices, cattle cycles occur. An understanding of the cycle and close attention to recent potential changes is critical to fundamental price analysis.

Other types of analysis valuable to producers and feedlot operators in projecting potential price movements are seasonal price movements, price changes between key marketing months, price comparisons between calves and yearlings and between steers and heifers, marketing margins between live cattle and retail beef and factors influencing consumer demand. This report will review several of these important analysis tools. However, cattle numbers numbers are constantly changing and the markets; local and regional, cash and futures are constantly reacting. For current fundamental market information, visit the Livestock Marketing Information Center (LMIC) web site at https://lmic.info Make it a habit.

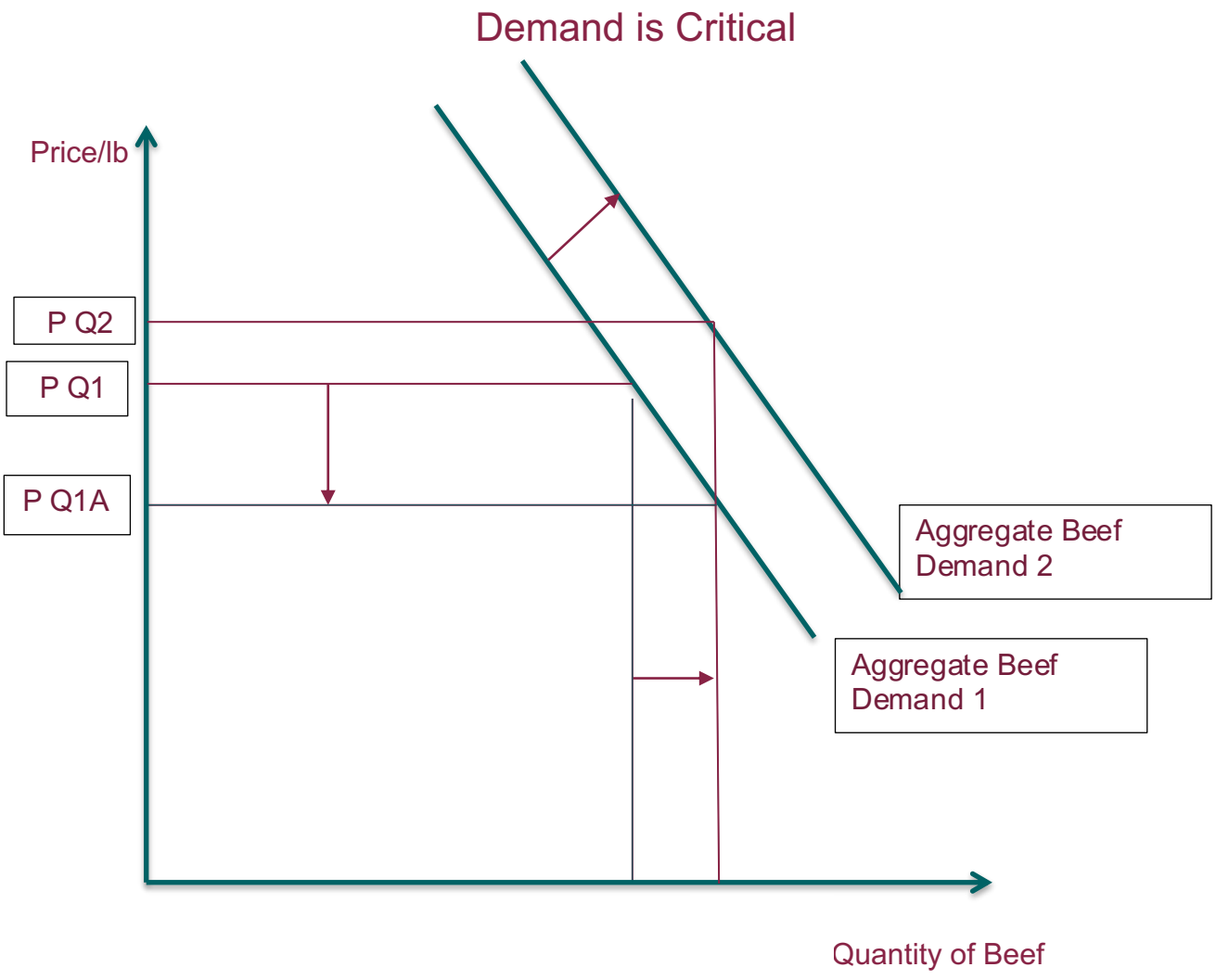
Cattle Price Cycles

Variations in cattle numbers are caused by the decisions of producers to build or liquidate their herds in response to available returns. A cycle is a pattern that repeats itself more or less regularly with the passage of time. The length of a cattle cycle is measure between successive identical stages of the cycle, such as the highest points (peaks) or lowest points (troughs) of cattle inventory or corresponding prices.

Cattle prices are unstable because of many factors such as prices of competing products, global markets and general economic conditions in the economy. However, one of the most important causes of longer run changes in prices levels is fluctuating cattle numbers, supply and demand.

Economists define "beef demand" as the amount of beef that consumers are willing and able to purchase over a range of prices, given that all other influences in the market are held constant. Figure 1 depicts a theoretical demand curve and illustrates how, for given demand curve, price must decline, from PQ1 to PQ1A in order for the quantity purchased to increase. This is a basic, fundamental relationship between beef quantity and beef price. "Change in quantity demanded" is movement along that demand curve. Figure 1 shows how when price moves down from PQ1 to PQ1A, the quantity purchased increases from Q1 to Q2.

Figure 1: Theoretical Beef Demand and Supply Curve



A "change in demand" occurs when the entire beef demand curve shifts up (demand increase) or shifts down (demand decrease). Figure 1 presents a demand increase by illustrating a theoretical Aggregate Beef Demand 1 shifting out to Aggregate Beef Demand 2.

Note that when beef demand increases, beef prices are higher for each and every beef quantity consumed than prior to the demand shift. This change is indicative of what US beef industry has experienced this past cattle cycle, including during the unprecedented impacts of COVID-19.

One very important point in developing strategies to grow beef demand is clarification of the role of per capita consumption in beef demand. Per capita consumption is, in effect, per capita availability of beef. Demand, on the other hand, effectively refers to the quantity of beef that consumers will purchase at a given price, with all other factors held constant. Because beef is a perishable product, we consume what we produce. If more is produced, more is consumed. If less is produced, then less is consumed. As a result, per-capita consumption is more related to available supply than demand.

The point, changes in beef price or the quantity of beef consumed did not cause the beef demand curve to shift out in Figure 1. Rather, changes in other factors, such as price of competing meats, consumer personal incomes (both domestically and internationally), and producers/industry focus on beef quality aspects: taste, appearance, convenience, and freshness caused the beef demand curve to shift.

Historically, cattle cycles have averaged 12 to 14 years but in more recent periods the cycle seems to be shortening to as few as four to five years (Figure 2). The shortening of the cycle may be due to improvement in physical herd management, i.e., feeding, breeding, etc. However, it is more likely due to the greater attention to changing economic conditions, global demand, communication technology, and industry response to these changes to maximize profits or to minimize losses. Figure 3 reports the January 1, 2020 Cow Inventory and Figure 4 reports the January 1, 2020 retention of Heifer Held as Beef Cow Replacements. Both figures affirm herd liquidation is now underway for the current cattle cycle.

Figure 2: Annual Average Cattle Prices, Southern Plain.

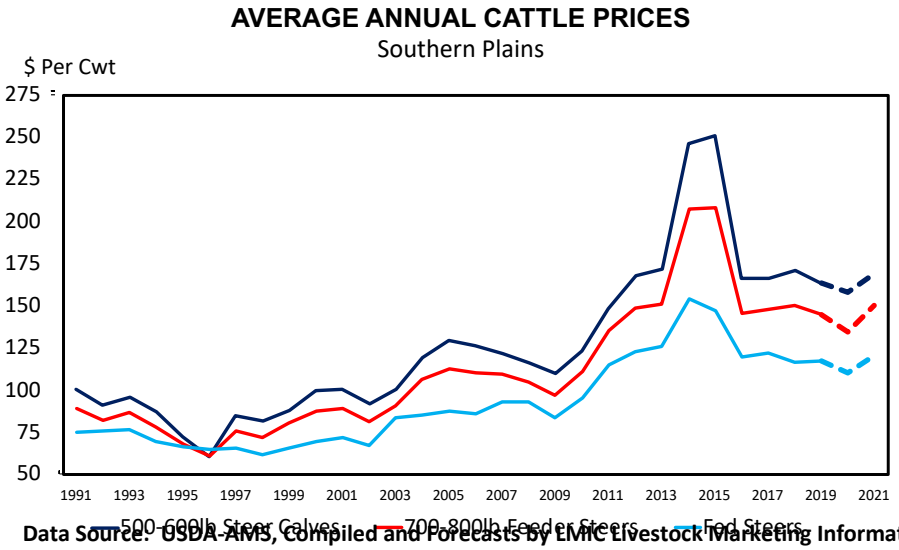
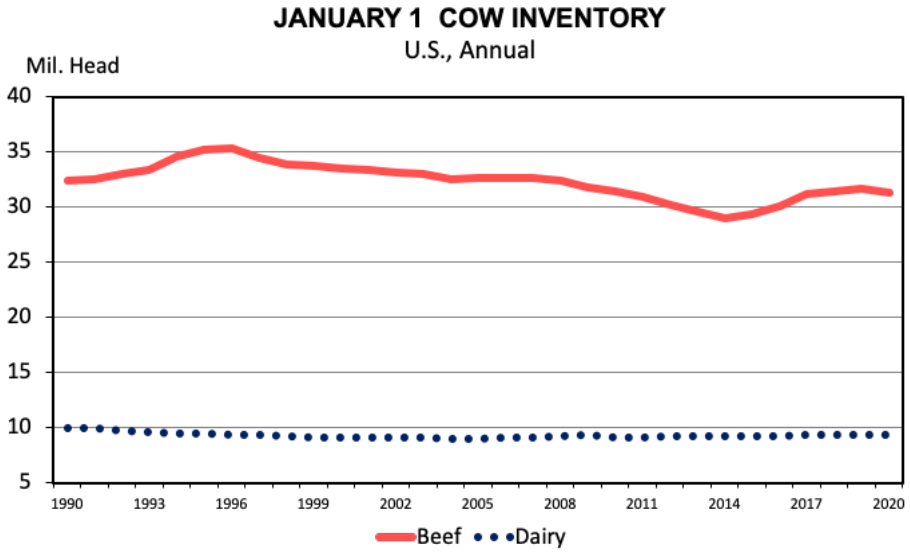
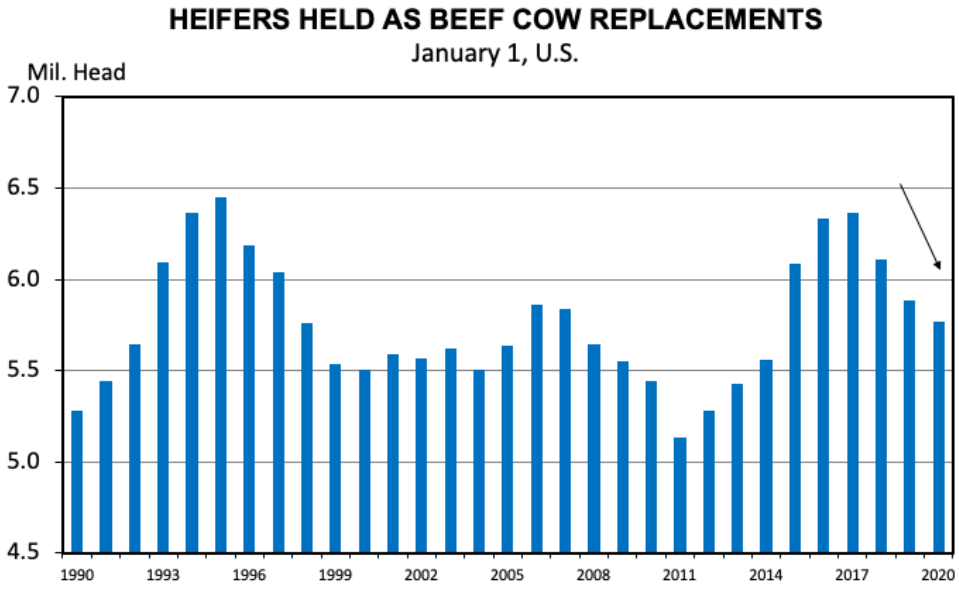


Figure 3: January 1, 2020 Cow Inventory.



Data Source: USDA-AMS, Compiled and Forecasts by LMIC Livestock Marketing Information Center

Figure 4: Heifer Held as Beef Cow Replacements.



Data Source: USDA-AMS, Compiled and Forecasts by LMIC Livestock Marketing Information Center

Both feeder cattle producers and cattle feedlot operators can benefit from a careful analysis of the cattle cycle. Even though there are seasonal price variations, marketing decisions can be improved if managers know they are in the downward side of a cycle, upward trend in the cycle, or nearing a cycle peak or trough.

Seasonal Prices

Cow-calf producers and cattle feeders are faced with prices that fluctuate greatly from one time of year to another (Figure 4). Converting monthly prices to price indices is an analytical tool that makes it easier to visualize seasonal price movements. This involves relating prices of each month to a base period. For example, the annual average price may be selected as the base.

Table 2 reports the monthly price per cwt from published reports in the first two columns, next to the month. The next two columns are the monthly price index, computed by dividing each month by the annual average price. For example, for the month of June the 400-500 steer price index is calculated as $163.94 (June price) / $170.45 (annual average) x 100 = .9618. The last two columns report the seasonal monthly difference in price, as compared to annual average price, where the average price has a seasonal index of 1.0. Considering June 4---500 steer seasonal index, the seasonal difference is -3.82%. June price was -3.82% less than the annual average price for the year. Note that prices in April were nearly 12% higher for 4-5cwt and 5.7% higher for 5-6cwt compared to annual average price. Both these indexes reflect the seasonal supply and demand for feeder cattle, at their respective weights.

This example identifies relative price movements throughout 2019. A summary of monthly price movements during the past several years would provide additional insight to how drought has impacted price seasonality.

Table 2: 2019 Monthly Seasonal Index for 4-5 cwt.5cwt and 5-6 cwt.6cwt Steers, New Mexico Combined Auctions.

Month, 2019	Steers 400-500 (Average Price/cwt.)) $/cwt	Steers 700-800 (Average) $/cwt..)	Steers 400-500 Seasonal Index	Steers 700-800 Seasonal Index	Steers 400-500 Seasonal Difference %	Steers 500-600 Seasonal Difference %
Jan	169.83	133.89	0.99635	1.003	-0.36%	0.30%
Feb	189.06	138.13	1.10917	1.03477	10.92%	3.48%
Mar	187.87	139.32	1.10219	1.04368	10.22%	4.37%
Apr	190.56	141.11	1.11797	1.05709	11.80%	5.71%
May	177.09	135.91	1.03895	1.01814	3.89%	1.81%
Jun	163.94	129.45	0.9618	0.96974	-3.82%	-3.03%
July	165.89	133.95	0.97324	1.00345	-2.68%	0.35%
Aug	156.23	130.61	0.91656	0.97843	-8.34%	-2.16%
Sep	159.12	130.85	0.93352	0.98023	-6.65%	-1.98%
Oct	159.18	129.91	0.93387	0.97319	-6.61%	-2.68%
Nov	160.63	131.75	0.94238	0.98697	-5.76%	-1.30%
Dec	166.02	126.99	0.974	0.95131	-2.60%	-4.87%
Average	$170.45	$133.49				

Data Source: USDA-AMS, Compiled and Forecasts by LMIC Livestock Marketing Information Center
New Mexico Combined Auctions, weighted average pries

Two methods used in long-term seasonal analysis are:

1. Compute monthly indices for each year being considered as was demonstrated above. This would provide the relative monthly price movements for each year.

2. Compute one seasonal index representing the average of 3 to 5 years, then compare to the longer-term average. For example, consider the long-term average price for 12 years, as the base year. The 12-year average price for each month is then divided by the annual average price for the 12-year period.

To visually compare indices, a graph of the seasonal index numbers can be compared to long-term price indices to show the closeness of the seasonal patterns.

In the past few years, there have been many changes in the beef industry from both changes in consumer demand and production adjustments. Therefore, recent years may be more representative of seasonal pricing patterns than earlier periods. Using the summary of NM Combined Auction Data, index numbers from 2007 through 2019 can be computed using the 2007-2019 average prices as base. To test the performance of this seasonal index as an indicator of current pricing patterns, we compare to the 2019 seasonal index, computed above and graph the two series. Figures 5 and 6 provide a visual comparison between the average seasonal price index for the periods 2007-2019, compared to the 2019.

Figure 5: Average Seasonal Price Index for New Mexico Weighted Average Combined Auction Prices, 4-5 Cwt. Steers, for periods 2007-2019 vs 2019.

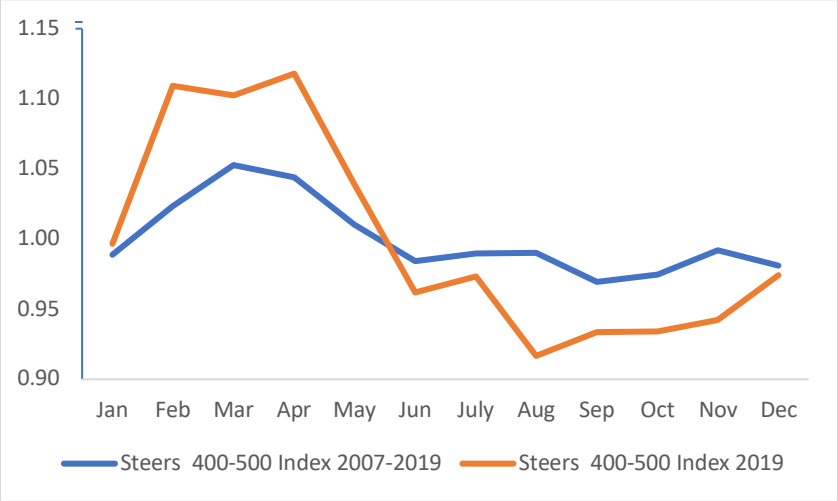
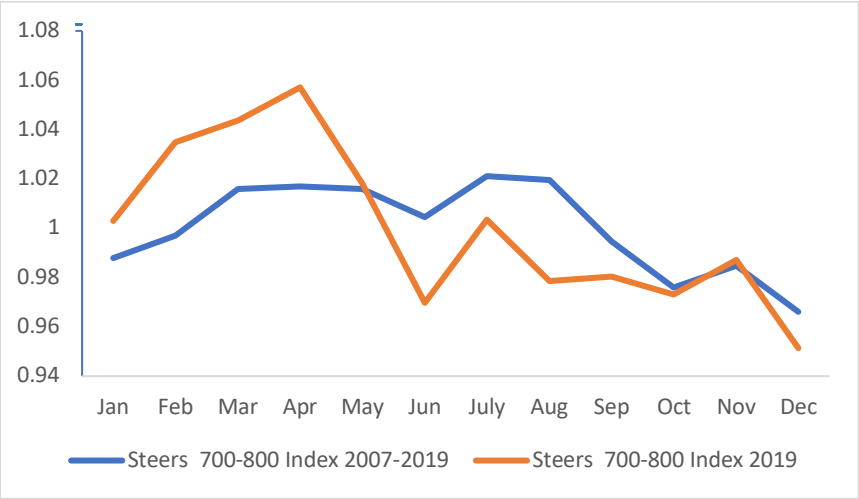


Figure 6: Average Seasonal Price Index for New Mexico Weighted Average Combined Auction Prices, 7-8 Cwt. Steers, for periods 2007-2019 vs 2019.



Data Source: USDA-AMS, Compiled and Forecasts by LMIC Livestock Marketing Information Center
New Mexico Combined Auctions, weighted average pries

The seasonal price movement for the single year, 2019 clearly illustrates seasonal price movements and volatility that accrued in 2019. The figures also clearly illustrate the strong seasonal relationship over time, acknowledging the seasonal movement is impacted by current national and international market events.

Individuals should select relevant price series for his/her own market area or class of cattle and compute the seasonal indices for those data. Figure 7, 8, and 9 reports seasonal price index for several market classes of New Mexico cattle, 2007-2019. For comparison, Figures 10, 11, 12 and 13 report seasonal price index for the Southern Plains region, 2009-2018.

Figure 7: Seasonal Price Index, NM Combined Auctions Steers 4-5 Cwt., 2007-2019.

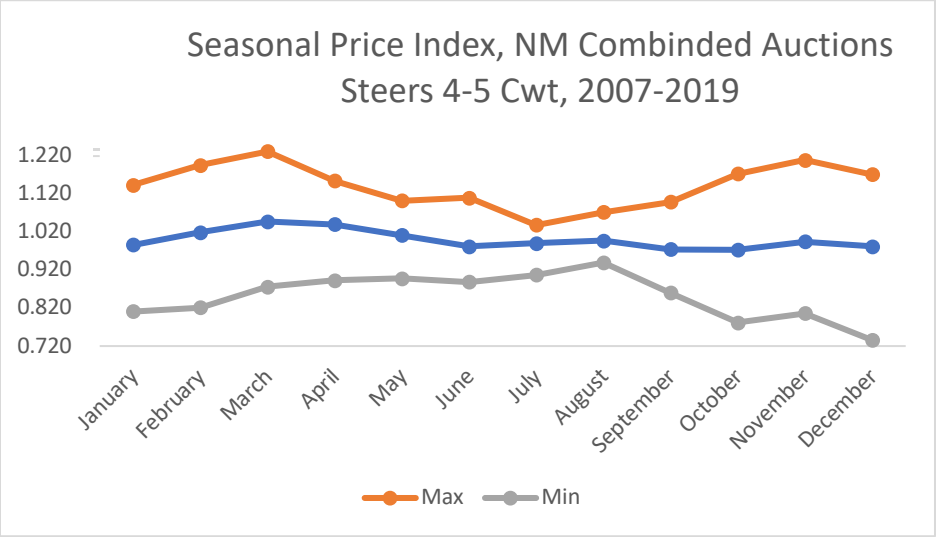


Figure 8: Seasonal Price Index, NM Combined Auctions Steers 5-6 Cwt., 2007-2019.

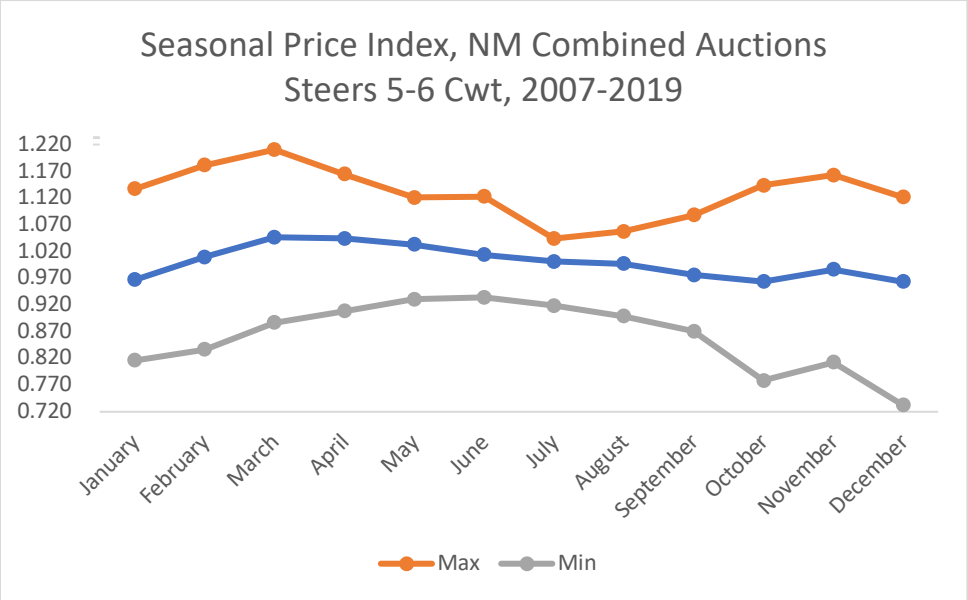


Figure 9: Seasonal Price Index, NM Combined Auctions Steers 7-8 Cwt., 2007-2019.

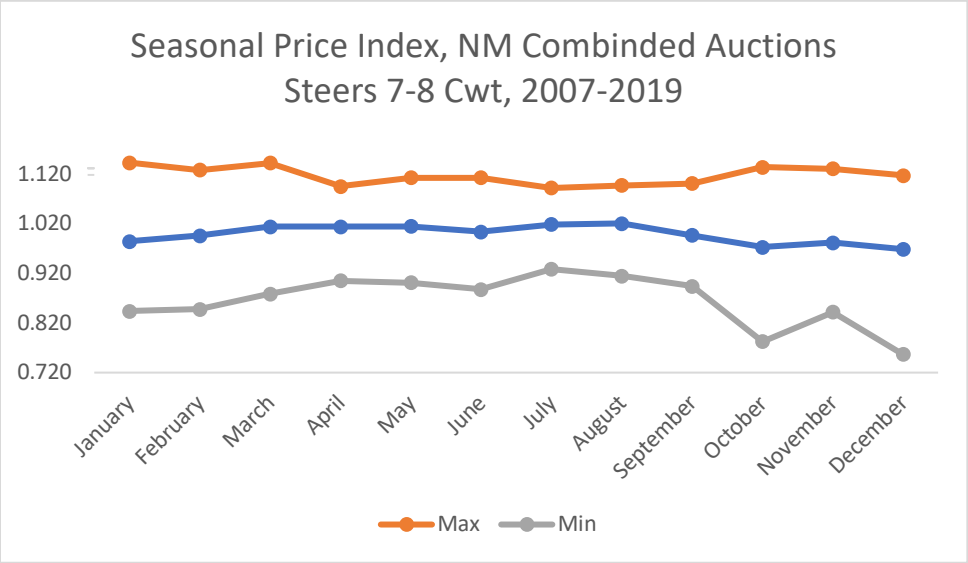


Figure 10: Season Price Index, Fed Steers, Southern Plains, 2009-2018.

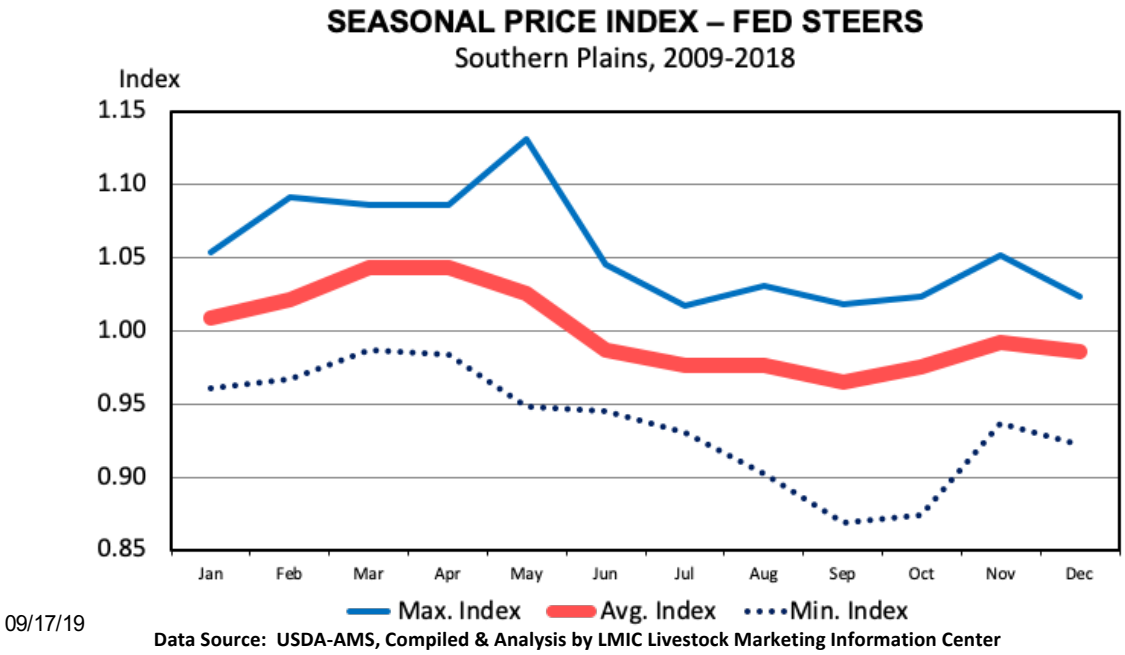


Figure 11: Seasonal Price Index—Feeder Steers, 700-880 Pounds, Southern Plains, 2009-2018.

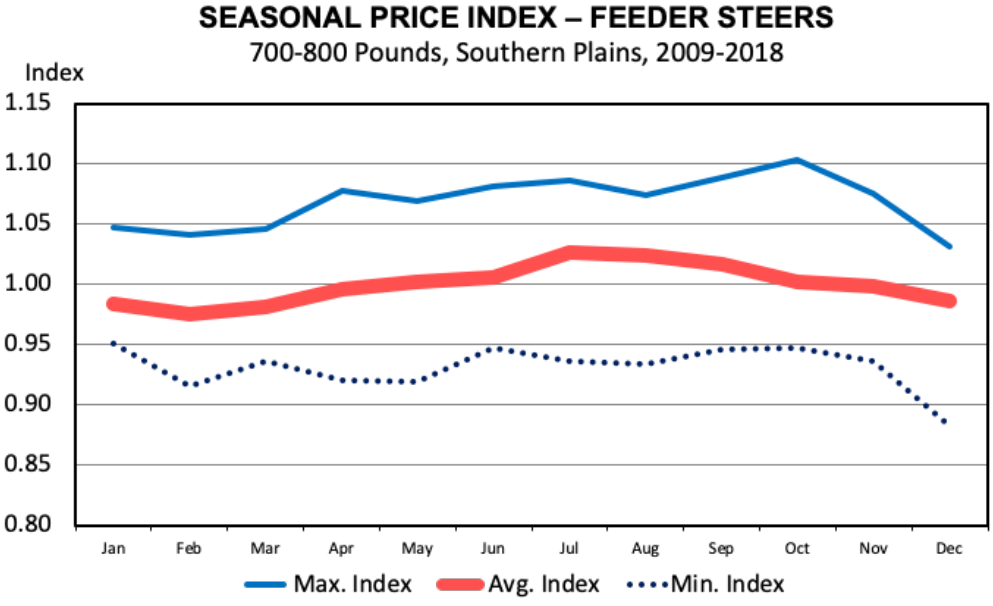
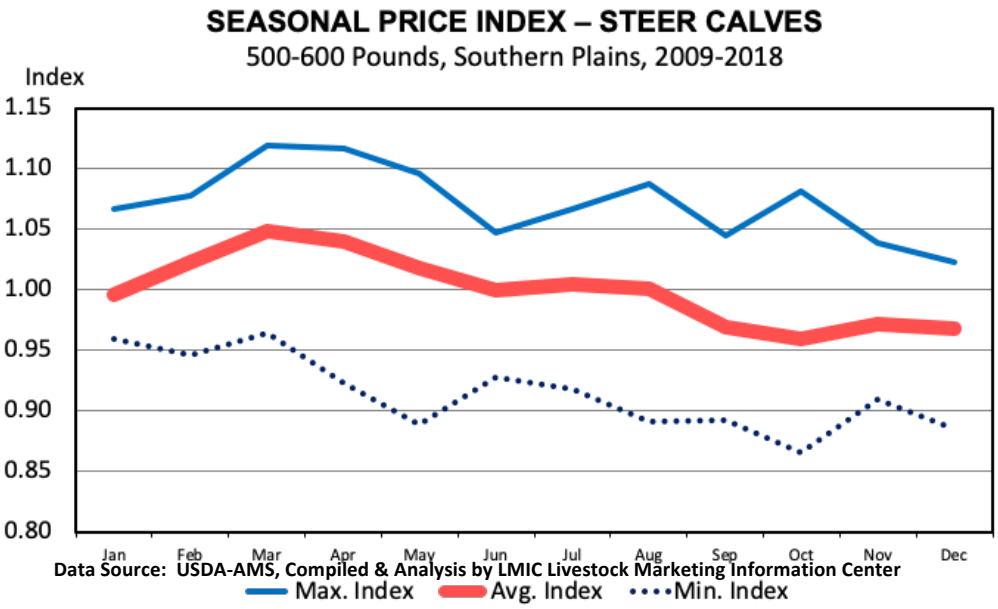
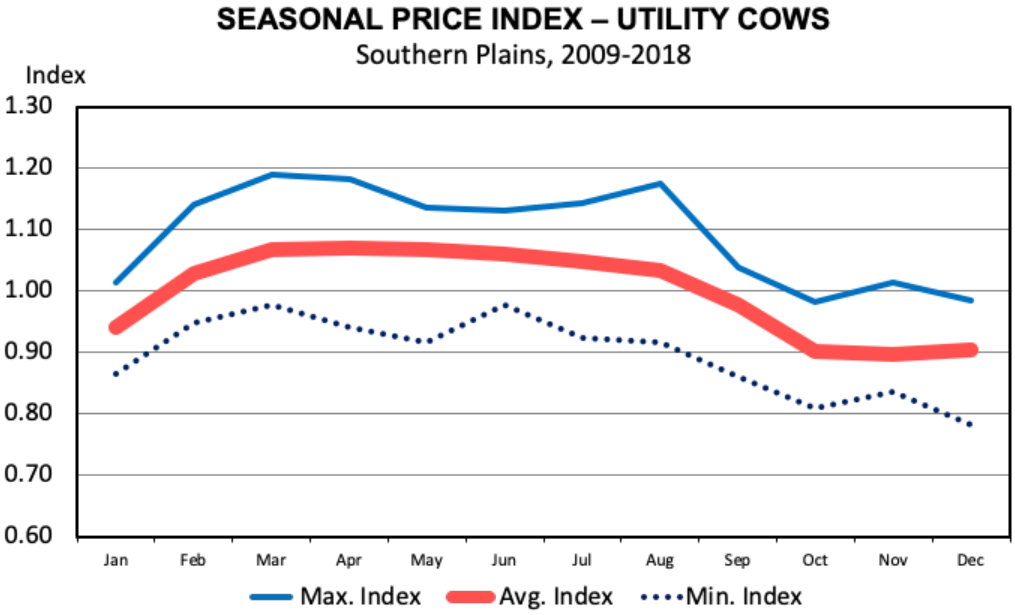


Figure 12: Seasonal Price Index-Steer Calves, 500-600 lbs., Southern Plains, 2009-2018.



Data Source: USDA-AMS, Compiled & Analysis by LMIC Livestock Marketing Information Center

Figure 13: Seasonal Average Price Index for Utility Cows, 2009-2018.



Data Source: USDA-AMS, Compiled & Analysis by LMIC Livestock Marketing Information Center

Technical Price Analysis

An Introduction to Basis

A commodity **basis** provides significant 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, the basis tends to follow historical seasonal patterns and by understanding these patterns a producer or agribusiness person can make better marketing management decisions and reduce risks involved in those decisions.

What is Commodity Basis?

A 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:

Basis = Cash Price - Futures Price

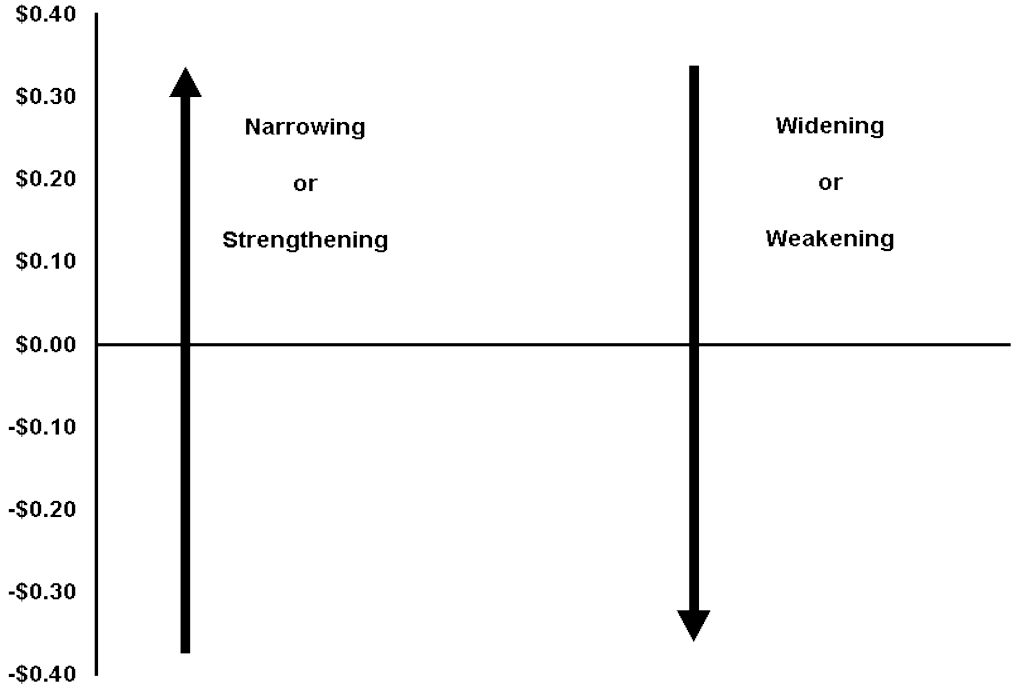
Where *Cash Price* is the cash price for a specific commodity at a given location and *Futures Price* is the relevant futures price for that commodity. An example illustrates:

Assume High Desert Cattle raises feeder cattle in Tucumcari, New Mexico. On July 14, 2020 the local elevator is buying corn for $3.20/bushel and the local livestock auction is selling 7-8 cwt. feeder cattle for $130/cwt. On this same day, the closing price of the September corn futures price at the Chicago Board of Trade is $3.29/bushel and the closing price of the August feeder cattle futures price at the Chicago Mercantile Exchange is $139.95/cwt. Now, if the manager of High Desert Cattle wants to know their basis, the calculation is simply, take the cash price and subtract the futures price for each commodity.

July 14, 2020	**Corn $/bu.**	**Feeder Cattle 7-8 cwt**
Local Cash Price (Clovis NM)	$3.20	$130.02
Less Futures Market Price	$3.29	$139.95
----------	-------	-------
= Basis	**-$0.09**	**-$9.93**

A negative value represents a cash price "under" the futures price and a positive value represents a cash price "over" the futures price. Figure 14 is used to describe basis movements. A basis that becomes more positive or less negative over time is said to narrow or strengthen. A basis that become less positive or more negative over time is said to widen or weaken.

Figure 14. Basis Terminology and Movement.



What does Basis tell me?

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

Grain

For grain, basis is typically used as an indication of current local demand. A weak basis, relative to historical bases, indicates that the local market doesn't want grain now, but the market may or may not want it later. A strong basis indicates the local market wants the grain. The basis can be used in making selling decisions. Table 3 shows what a grain producer should do given 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, as there is little opportunity to better the current market price through storage and/or taking a futures position.

Table 3. Direction and Impact of Basis Movement for Short and Long Hedger.

	Long Hedge	**Short Hedge**
If basis weakens (widening)	Basis gain	Basis loss
If basis strengthens (narrowing)	Basis loss	Basis gain

Livestock

For livestock, basis refers to the difference between supply and demand in a local market and supply and demand for the national market. Like grains, basis contracts can be formulated for livestock. Thus, understanding the basis can help ranchers and agribusiness managers evaluate forward contracts and hedging decisions. For example, Table 3 describes a gain or loss to either a short or long hedger when basis strengthens or weakens. For the long hedger, the hedger prefers for the basis to weaken. That is, the hedger pays less in the cash market relative to the futures market and may gain more from their position in the futures market.

For the short hedger, the hedger gains from a strengthening basis. That is, the hedger realizes a cash price increase relative to the futures price and may gain more from their position taken in the futures market. We will explore hedging and forward contracts in greater detail a little later, but for now

Using Futures/Basis as a Price Forecasting Tool

Commodity futures prices can serve as a mechanism for price discovery either for the present price or for determining expected future prices. A market is defined as an efficient market if the market accounts for all public and non-public information in determining an equilibrium price in the market. Commodity futures markets are often referred to as efficient in the price discovery process. That is, the price quoted for a commodity on the futures market is thought to be the best measure of the actual price, either current or in the future. Therefore, if you would like a "good" predictor of what prices will be four months from now, the closest contract to the period of interest, i.e., four months from now, may be the best and easiest aggregate price forecasted.

Tables 4 and 5 provide closing future price quotes for corn and live cattle, respectively, for July 14, 2020. On July 14, 2020 these price quotes for corn and feeder cattle could be thought of as a forecasted price for the months listed on the left-hand side of the tables. For example, if you wanted a forecast of what corn price was going to be for the U.S. in December of 2020, you could use the December 2020 Chicago Board of Trade (CBOT) futures closing price of $3.36/bushel as a forecasted price. Similarly, if you were interested in a forecast of feeder cattle prices for November 2020, you could use the November 2020 Chicago Mercantile Exchange (CME) feeder cattle futures price quote of $139.33/cwt.

Table 4. Chicago Board of Trade Corn Futures Price Quotes (July 14, 2020)

Contract Month	Year	Closing Price ($/bu)
September	2020	$3.29
December	2020	$3.36
March	2021	$3.47
May	2021	$3.52
July	2021	$3.60

Table 5. CME Feeder Cattle Futures Price Quotes (July 14, 2020)

Contract Month	Year	Closing Price ($/cwt)
August	2020	$139.75
September	2020	$139.70
October	2020	$139.03
November	2020	$139.33
January	2021	$135.62

Why does someone care about forecasting price? Knowing what the grain price will be in December 2020 is helpful in evaluating storage decisions. Knowing what the feeder cattle price might be in November of 2020 is helpful in making retained ownership decisions. Knowing expected prices can help in making forward pricing decisions. That is, if you could forward price your feeder cattle for November 2020 at $140.00/cwt., you would know the price is above the expected price (typically this will not be the case in forward pricing agreements because the entity offering the forward price contract requires a price discount to assume your price risk). Cattle buyers offering a forward contract price will have considered the futures market price in their offer. Expected prices can help producers decide marketing alternative to pursue. Lastly, expected prices can be useful in planning annual cash flows and loan requests.

Basis: A Necessity for Predicting a Local Cash Price

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—your local market is not nearly 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. Research at Kansas State University suggest a 3-year average is a good predictor of expected basis; E[Basis]. An expected price, where E denotes an expectation, can be found using:

$$E[\textit{Cash Price}] = [\textit{Futures Price}] + E[\textit{Basis}] \ ,$$

For example, assume a cow-calf producer would like a forecast for November feeder cattle prices in their local market. The producer's best expectation of that cash price might be the futures market price.

The above calculation is not a stretch when we consider our earlier discussion about commodity basis, where:

Commodity Basis = Cash Price – Futures Price, therefore

Cash Price = Futures Price + Commodity Basis

November cattle futures price adjusted for an expected basis, say a 3-year average basis. Table 6 provides a worksheet format for calculating a local cash price or a localized futures price estimate. The example illustrated in Table 6 is for November feeders steers, 7-8 cwt. Looking back at the historical basis between the local cash market, the combined NM Auctions average price per month, compared to the average nearby futures price for the same month (November), we can compute an average basis between the local cash market and the futures market.

Table 6: Localized Futures Price Wooksheet

Price Forecast for: November feeder steers, 7-8 cwt			
14-Jul-20			
Year	Local Cash $/cwt	Less Futures $/cwt	Historical Basis $/cwt
2017	131.06	156.09	-25.03
2018	136	148.78	-12.78
2019	131.75	144.14	-12.39
2020	0	0	0
Average Basis			-16.73
Today's Futures Price ($/cwt)	141.67		
Basis Estimate((+/-$/cwt)	-16.7		
Localized Futures Price: (todays futures +/- basis	$ 124.94		
Asking Price Forcast $/cwt	???		

The 3-year average basis reported in Table 6 for this example is a negative -$16.73 per cwt. Note that the basis in 2017 is more negative than 2018 and 2019, likely a weak demand for feeder cattle in the fall of 2017. As a producer and or owner of feeder cattle, you can clearly see that a more positive or "stronger" basis would be more desirable. Keeping in mind this expected price

is an estimate based on historical cash and futures prices and does not reflect the quality of your cattle and or your current market opportunities and or channels. But is a good indicator of the absolute level of the market at a given point in time.

Ok, this is fine and good, but what if you are trying to predict a local price for 4-5 cwt. feeder calves, steers and or heifers--"What price can I expect?" No matter the time of year, this question always looms in producers or agribusinesses decision process. Cow-calf producer are often faced with the decision "should I forward contract my calves and for how much or should I retain ownership on all or a portion of the herd beyond weaning?" Similarly, cattle buyers must determine price expectations to know what forward price to offer. A local cash price for lighter weight cattle/calves can be estimated using the average or expected basis between local cash and futures for feeder cattle, but you must keep in mind that market uncertainty relative to weight, location, seasonal price, difference and quality will play an even greater role in the cash/futures price relationship for lighter cattle. Nonetheless, making a basis adjusted forecast for your feeder steers and heifers can be useful when combined with other technical and fundamental market information. Table 7 presents an example for November 4-5 cwt. steers, providing a localized futures price forecast. In this example, the expected 4-5 cwt. steer price for November is $173.29/ cwt.

Table 7: Localized Futures Price Wooksheet

Price Forecast for: November feeder steers, 4-5 cwt

14-Jul-20			
Year	Local Cash $/cwt	Less Futures $/cwt	Historical Basis $/cwt
2017	178.15	156.09	22.06
2018	176.43	148.78	27.65
2019	160.63	144.14	16.49
2020	0	0	0
Average Basis			22.07
Today's Futures Price ($/cwt)	151.22		
Basis Estimate((+/-$/cwt)	22.1		
Localized Futures Price: (todays futures +/- basis estimate)	$ 173.29		
Asking Price Forcast $/cwt	???		

What does Basis not tell me?

Cattle production is a continuous, year-round process. By comparison, in grain markets the supply available for an entire market year is known once the harvest is complete. This production-utilization pattern affects the nature of the basis, sometimes referred to as the "cash basis."

A basis that results from location and quality differences between the futures market and the cash market for a lot of cattle is important. However, the time portion of a basis which is especially important to grain markets, is not as relevant in livestock futures markets. This is because:

1. There is no storage period and, therefore, no cost of storage that must be reflected in futures prices, or, at least that used to be the case. Recent experience with the COVOD-19 pandemic suggest that "storage" cost for delayed harvest of cattle will be reflected in the market. Since this is a new phenomenon, it may cause surprising changes in expected basis.
2. Cash and futures markets in cattle do not show a consistent relationship from one time period to another except at the maturity of a contract. The two markets must be close at that time or substantial delivery of product will occur. At other times, cash prices may be either above or below a particular futures contract, depending on current market conditions. Inverted markets in livestock futures are fairly common but not as common in stored commodities.
3. The prices of individual contracts may be fairly independent of each other because of the continuous nature of the production process. Supplies and utilization in one period do not necessarily affect the market in later periods.

All the above strongly suggest that frequent estimation of an expected price for your feeder cattle is a good idea. Most producers do this, formally or informally simply by monitoring local cash markets and future market activity. Saving this information on paper or in a spreadsheet can help see trends over time.

Cash and Futures Positions: Futures markets for cattle differ from many grain futures markets in another way. The cash and futures position are not comparable until the livestock achieves the weight and quality characteristics specified in the futures contract.

Hedging provides a measure of price protection during a production process instead of for storage or merchandising operation. However, there is some uncertainty about how closely the final product will conform to contract specifications. This limits the precision with which a hedging position can be estimated.

Price-Quality Relationships: Prices in the cash markets for live cattle are typically within a fairly wide range for a particular weight and grade category. By contrast, the futures market is represented by a single price within this range.

Cattle feeders who hedge by selling live cattle or feeder cattle contracts do not know with certainty how their cattle will compare with the quality-weight combination represented by the futures price. Unless quality and price relationships can be accurately predicted, this condition can limit the price protection obtainable from hedging.

Price relationships between different weight-quality combinations within a live cattle grade are not constant over time. Thus, choice 1,050-pound steers may sell at the top of the price range at one time, but near the lower end of the range a few weeks later. Even within grades of cattle, supply and demand play a role. We see this in the seasonal demand for primal cuts.