# Weaned Calf Risk Protection

# Regional Factors and Price Adjustment Factors Methodologies

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The pricing methodology for weaned calves uses factors applied to feeder cattle prices. The factors are derived from historical regional calf prices and feeder cattle prices from the futures market. Each projected and harvest price will have their own associated factors by region.

The methodology uses: 1) USDA Agricultural Marketing Service (USDA-AMS) auction price data for the 23 price-determining states to produce a regional-weighted average price series for cattle weighing between 200 and 750 pounds, and 2) Chicago Mercantile Exchange (CME) prices for feeder cattle.

The AMS price series consists of daily auction data compiled into weighted average monthly prices for the two respective regions. The regions of South Central and North Central correspond to the stated AMS regions with the states within a region listed in the Appendix. On occasion, certain values in the price series may not be reported. If the data is incomplete in a given year, available information will be used to estimate missing values. The data is collected by USDA/State Market News Reporters and released on the following web sites:

https://mymarketnews.ams.usda.gov

https://www.ams.usda.gov/market-news

The CME Feeder Cattle contract settles against the CME Feeder Cattle Index which was designed to use cattle within major feeder cattle producing states in the United States. The index uses steers weighing between 700 and 899 pounds, meeting prescribed muscling frame score requirements (Medium & Large #1 and Medium & Large #1-2), and not exhibiting predominantly dairy, exotic, or Brahman breeding characteristics. Non-US origin cattle are also excluded. The steers must also be publicly reported from within the specified twelve feeder cattle producing states: Colorado, Iowa, Kansas, Missouri, Montana, Nebraska, New Mexico, North Dakota, Oklahoma, South Dakota, Texas, and Wyoming. The data is collected by USDA/State Market News Reporters and also released on the web sites listed above.

A regional price relationship is established to account for variations in the price for calves sold in areas that are not recorded within the CME Feeder Cattle Index. Additionally, cattle weights that meet the specifications of the index are heavier than the calves that will be covered under the program. Thus, a standard baseline weight of 650 pounds is used to determine the relationship between the differences in weights associated with the futures prices and the AMS data.

The Regional Factor (RF) is calculated by dividing the weighted average price for a 650-pound calf within a respective region by the corresponding feeder cattle futures price, noted as:

$$\text{Regional Factor: RF} = \left( \frac{y_{\text{Region}_{P1}}}{y_{\text{Futures}_{P1}}} \right)$$

Where $y_{\text{Region}_{P1}}$ is the regional weighted average price for 650-pound calves, and $y_{\text{Futures}_{P1}}$ is the futures price during the appropriate discovery period. The factor will be applied to relevant futures prices with the price discovery periods using the current methodology to calculate a regional base price $y_{\text{RegBase}_{P1}}$. The discovery periods will be differentiated by a projected price discovery period and a harvest price discovery period, as well as sales closing date.

$$\text{Regional Base Price: } y_{\text{RegBase}_{P1}} = RF * y_{\text{Futures}_{P1}}$$

Calf prices depend on the weight of the cattle with lightweight calves typically having the highest price per pound and lower prices for heavier calves. This relationship is commonly referred to as a price slide and is a measure of the amount of price adjustment as weight changes from a base weight. Price slides depend on the price level and thus are more accurately stated as a percent of the base price which adjusts appropriately to changing market prices.

Therefore, a Price Adjustment Factor will be applied to the previously mentioned regional base price. The Price Adjustment Factor will allow for differences in weight to be accounted for around the 650-pound base weight.

To determine a Price Adjustment Factor, a differential, $\hat{y}_{\text{RegD}_1}$, is calculated by taking the ratio of the maximum AMS regional price for the 300, 350, and 400-pound weight increments and the regional price for a 650-pound calf, subtracting one, and dividing by the difference. This is the price adjustment on a per-pound basis. To reflect this adjustment as a percent of price, the weight differential is divided by the regional base price $y_{\text{RegBase}_{P1}}$ determined during the price discovery period.

$$\text{Weight Differential: } \hat{y}_{\text{RegD}_1} = \left( \left. \left( \frac{y_{RegMAX(300-400)_1}}{y_{\text{Reg650}_{P1}}} \right) - 1 \middle/ (650 - 300) \right. \right)$$

$$\text{Price Adjustment Factor: } \hat{y}_{\text{RegPAF}_1} = \left( \hat{y}_{\text{RegD}_1} \middle/ y_{\text{RegBase}_{P1}} \right)$$

# Appendix

## List of States in Each Region

**South Central (SC)**

Texas

**North Central (NC)**

Colorado, Nebraska, and South Dakota

**Price Determining States by AMS Region**

Data from the twenty-three states below are utilized for determining projected and harvest prices for weaned calves in the specified AMS National Feeder and Stocker Cattle Summary report regions.