

# Lamb Price Risk: LRP-Lamb and Basis Change

ASI

August 20, 2009

# Lamb Price-Risk and the LRP-Lamb Plan of Insurance

There are two major types of price-risk associate with marketing lambs:

1. Price risk due to unexpected declines in the overall national level of slaughter lamb prices.
2. Basis-like risk---risk due to changes in local or regional lamb prices in relation to the national or overall slaughter lamb price level.

When markets are sufficiently competitive and unit sizes of sales and quality are equivalent, price level differences between geographical regions can generally be explained by transportation cost. When unit sizes of sales, quality or market competition vary between markets, price differences are to be expected.

National price levels are aggregates from many sales or transactions during given time periods. Local, regional and packer-direct prices all relate to the overall national lamb price level. All of these various marketing channels likely have different prices at any given point in time but they all move together (trend together) in the same direction over time.

The difference between the overall national price level and local or regional price levels is what is referred to here as “basis”. (Note: “basis” is normally associated with grain and livestock commodity trades and futures marketing discussions, but the term is used here for clarity because it is commonly known.)

Purchasing LRP-Lamb insurance can help mitigate risk due to price changes in the overall, national level of slaughter lamb prices. By doing so, producers and feeders are insuring against unexpected price declines in the overall slaughter lamb market even though their local price may be different. Producers purchase LRP-Lamb insurance based upon an overall national (formula) price but may sell their lambs locally.

Since formula lamb prices in the direct trade are used as an “indicator” of or proxy for weekly price levels in the overall national slaughter lamb market, producers and feeders who market their lambs direct to packers through a formula transaction will likely have a much lower basis risk than those who do not.

Basis risk can be defined for this purpose as unexpected changes in the difference between a local or regional cash market and the overall national slaughter lamb market's price level.

*LRP-Lamb insurance does not protect producers or feeders against basis risk.* It is useful however for producers and feeders to be aware of their own local price basis as a normal business practice to help them evaluate their marketing alternatives.

# Lamb Basis Calculations

$$\text{Basis} = \text{Local cash price}^* - \text{National price}^{**}$$

\*Local or cash price received by the producer or feeder

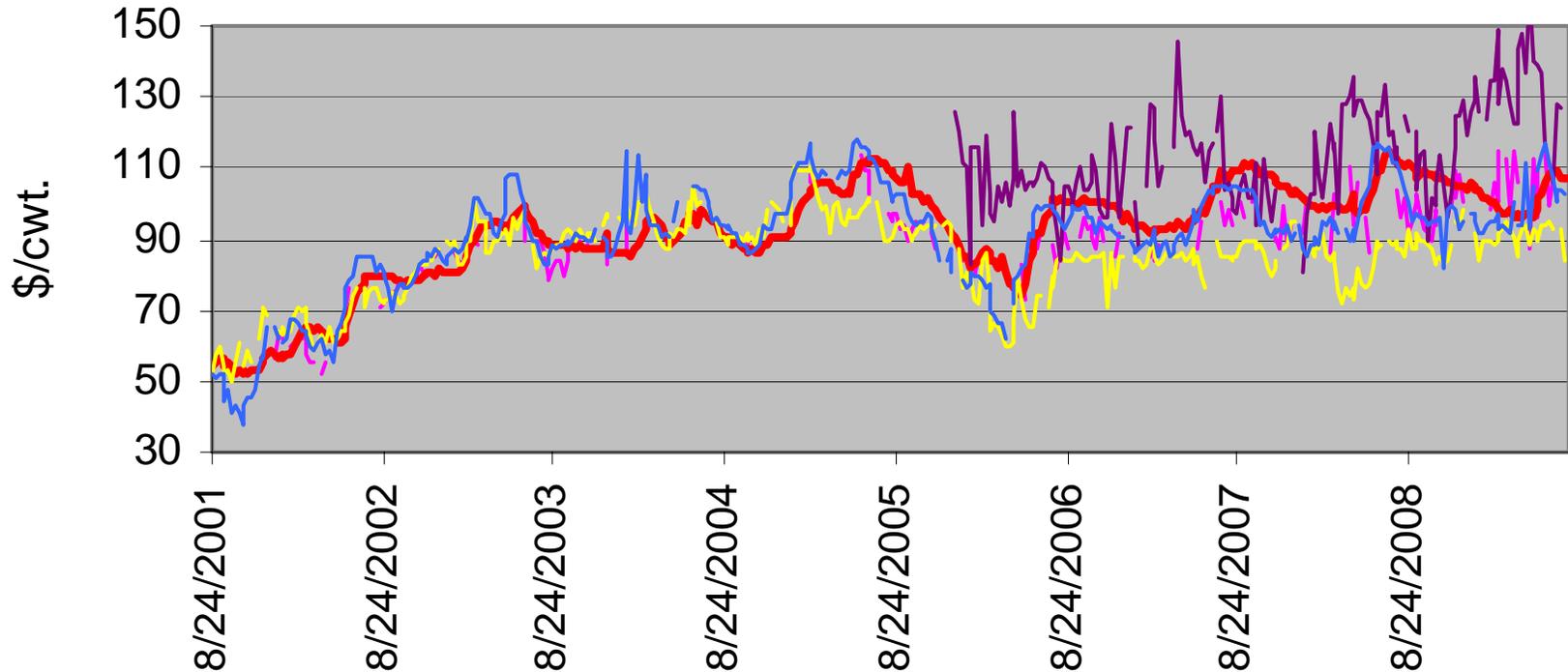
\*\*National price (i.e., Calculated Formula Live Slaughter Lamb Price)

*Note: The calculated formula live price per hundredweight is derived by multiplying the weekly reported formula carcass price by the reported dressing percentage then divide by 100.*

# LRP-Lamb can help insure against overall declines in price. Local and national prices do track one another.

- A simple correlation coefficient is a statistical measure of how well two price series track each other.
- A correlation of 1 means that prices move perfectly together, both up or both down.
- Correlations (Aug. 2001 to July 2009) between national slaughter lamb formula calculated live price and:
  - Negotiated, Live: 0.91
  - Sioux Falls, SD Auction Slaughter Lamb: 0.88
  - Sioux Falls, SD Auction Feeder: 0.57
  - San Angelo, TX Auction Slaughter Lamb: 0.60
  - San Angelo, TX Auction Feeder: 0.63
  - Ft. Collins, CO Slaughter Lamb: 0.83

## 5-Market Price Comparisons



- Ft. Collins, CO
- Formula (Calculated Live Basis)
- San Angelo, TX
- New Holland, PA
- Sioux Falls, SD

\*Note: The calculated formula live price is reported as a weighted-average while the other prices are not.

# Variation (Standard Deviation) of Basis

- Basis is the average difference between the and the local cash price and the national calculated formula live slaughter lamb price.
- To be more precise, the average is only an average, it doesn't capture the variation, the highs and lows.
- The standard deviation of the basis tells us how variable the basis is expected to be year after year. If the standard deviation is relatively small, the basis can be expected to be relatively stable year-to-year. On-the-other-hand, a large standard deviation indicates a higher degree of year-to-year variation and uncertainty.
- About two-thirds of the time, the actual basis is expected to lie within a range of plus or minus one standard deviation from the average basis.

For Example:

## Sioux Falls, SD Auction

Basis = Sioux Falls Slaughter Lamb Price – Calculated Formula Live Price  
(Aug. 2001 – July 2009)

Average: -\$1.14/cwt.

Standard deviation: \$3.82/cwt.

Expected range\*: -\$4.96 to +\$2.69/cwt.

Historical minimum: -\$6.88/cwt.

Historical maximum: \$9.43/cwt.

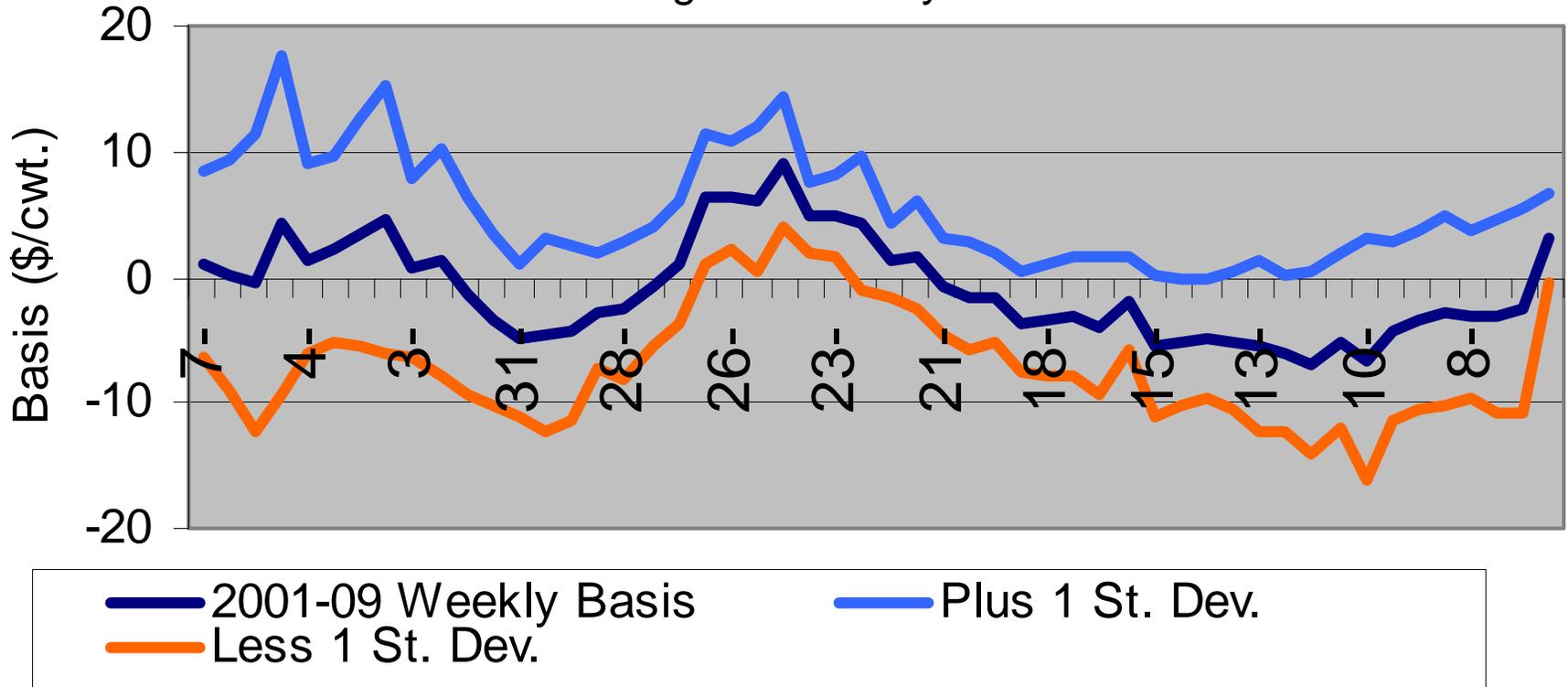
\*Approximately 2/3 of actual basis observations are expected to lie within this range.

In other words:

- Over the entire period August 2001 to July 2009, weekly slaughter lamb prices at the Sioux Falls market were, on average, \$1.14/cwt. lower than the national Calculated Formula Live price.
- Two-thirds of the time, slaughter lamb prices at the Sioux Falls market can be expected to lie somewhere between \$2.69/cwt. above the national calculated formula live price and \$4.96/cwt. below the national calculated formula live price (i.e., +\$3.82 +/- one standard deviation).
- Between August 2001 to July 2009, weekly slaughter lamb basis for the Sioux Falls market ranged from a low of \$4.96/cwt. below the national slaughter lamb price (historical minimum) to a high of \$2.69/cwt. above the national price (historical maximum).

# Weekly Basis Ave. & Standard Deviation: Sioux Falls Auction Slaughter & Calculated Formula Live

Note: Aug. 2001 - July 2009



**Note: The basis scale on the graph on the left-hand axis represents the historical maximum and minimum in basis. The narrower the range, the more consistent the relationship between the local and the national price.**

# Using basis graphs for individual markets to make projections for specific time periods:

1. Select a time period from the horizontal axis (expected marketing week) then go to the dark blue line and read the basis from the vertical axis. This gives the historical average basis.
2. About two-thirds of the time, the actual basis is expected to lie somewhere in the range between the light blue and orange lines.

For example:

- In June the average basis (dark blue line) is at 0 (\$0.00/cwt.). Therefore, on average, you would expect the local price to equal the national price.
- Two-thirds of the time you would expect the local price to fall within a range of about plus or minus \$3.00/cwt. (between the light blue and orange lines).
- One-third of the time, the basis can be expected to fall either above or below the dark blue and orange lines.

Producers are encouraged to calculate their unique basis from the prices they actually receive.

The basis formula can also be rewritten as:

**Expected local price = Basis + Expected national price**

Year-to-year relative stability in the basis means that historical basis trends can be useful in forecasting future basis levels.

## **The following example demonstrates both major types of price risk:**

Out of the 2000 head he is feeding, Producer A has 500 head of lambs that he expects to weigh 130 lbs each the middle of May.

*1. Price risk due to unexpected declines in the overall national level of slaughter lamb prices.*

On November 24<sup>th</sup>, Producer A purchases 650 hundredweights (65000 lbs) of a 26-week endorsement of LRP-Lamb insurance with an Expected Ending Value (EEV) of \$108.17/cwt. at a 95% Coverage Price of \$102.76/cwt. for May 12<sup>th</sup>.

On May 12, the actual weekly average calculated formula live price reported (the Actual Ending Value for LRP-Lamb insurance) was \$96.05/cwt. Thus, the overall national slaughter lamb market as measured by formula lamb prices in the direct trade was \$12.12 lower than the EEV (\$108.17/cwt. - \$96.05/cwt.). The actual ending value was \$6.71 less than the 95 % Coverage Price when he bought the insurance back in November (\$102.76/cwt. - \$96.05/cwt.).

Producer A will receive an indemnity of \$6.71/cwt. for the lambs he insured on November 24<sup>th</sup> (\$102.76/cwt. - \$97.05/cwt.). Therefore, Producer A successfully protected himself against an unexpected price decline in the overall national slaughter lamb market. The expected ending value was \$108.17/cwt., but the actual ending value (formula live direct price) was only \$96.05/cwt.

*2. Basis-like risk---risk due to changes in local, spot or regional lamb prices in relation to the national or overall slaughter lamb price level.*

Producer A normally sells his lambs through his local livestock market in Sioux Falls, South Dakota. Producer A sold his lambs on May 12th for \$95/cwt. (actual price received).

Producer A did not receive as high a price in his local market as he expected. According to Producer A's analysis of past years and of seasonal prices, his lambs should have brought about \$0.50/cwt. above the direct formula priced lambs that week.

Producer A knows this because he calculated his *individual* basis for the second week of May over the past six years. He tracked the difference between what his slaughter lambs brought at Sioux Falls in mid-May in relation to the calculated formula live prices reported in the direct trade over the past six years.

For the second week of May, Producer A's Sioux Falls-Calculated Formula live basis averaged \$0.50/cwt., with a range of minus \$2.50/cwt. to plus \$3.50/cwt.

Producer A received \$95/cwt., \$1.05/cwt. less than the calculated formula direct price of \$96.05/cwt. While this is within his historic range, it is not as high as his historic seasonal average of plus \$0.50/cwt. that he projected. Thus, Producer A received \$1.55/cwt. less than he projected (\$0.50 plus \$1.05). Producer A was not protected against this unexpected difference or the basis-like risk.

# Sioux Falls, SD Auction Feeder Lamb Basis

Average: \$12.86/cwt.

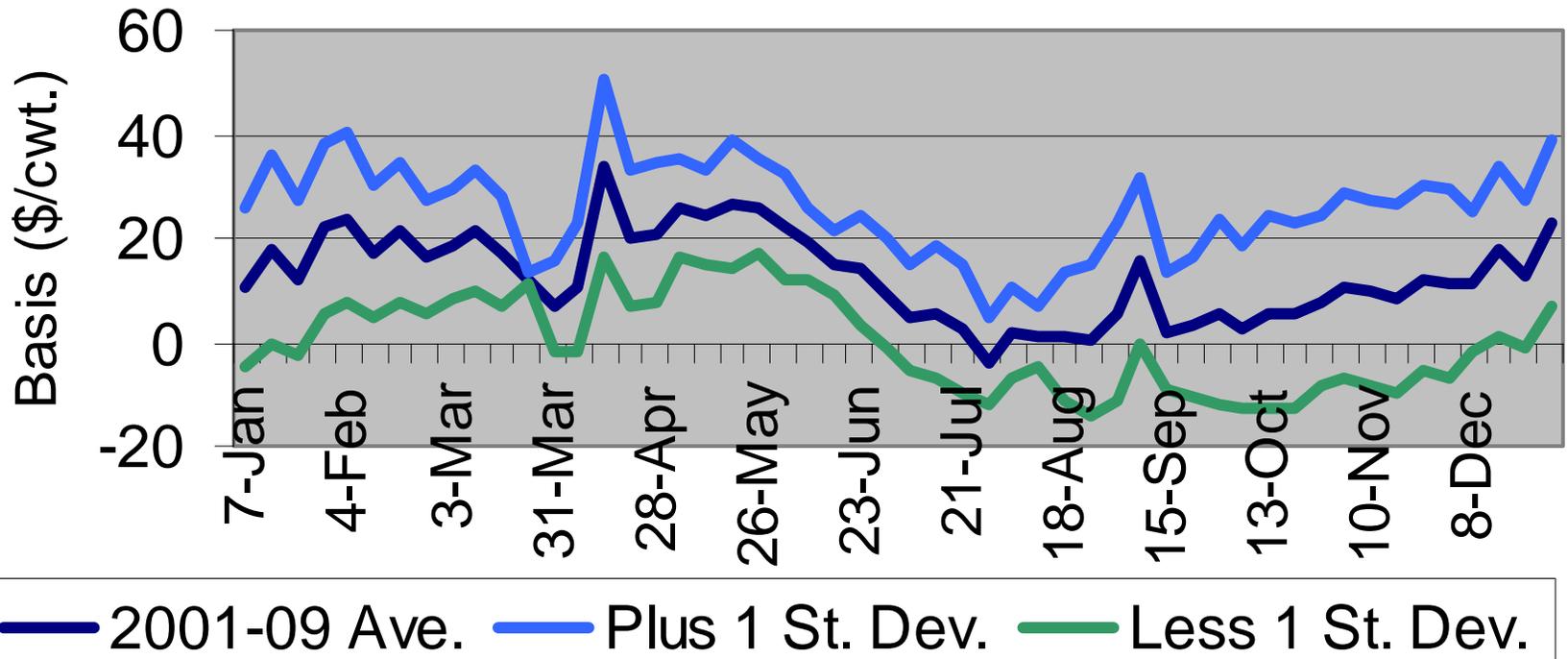
Standard deviation: \$8.46/cwt.

Historical Minimum: -\$3.75/cwt.

Historical Maximum: \$33.50/cwt.

## Average Basis & Standard Deviation: Sioux Falls, SD Auction Feeder & Calculated Formula Live

Note: Aug. 2001 - July 2009

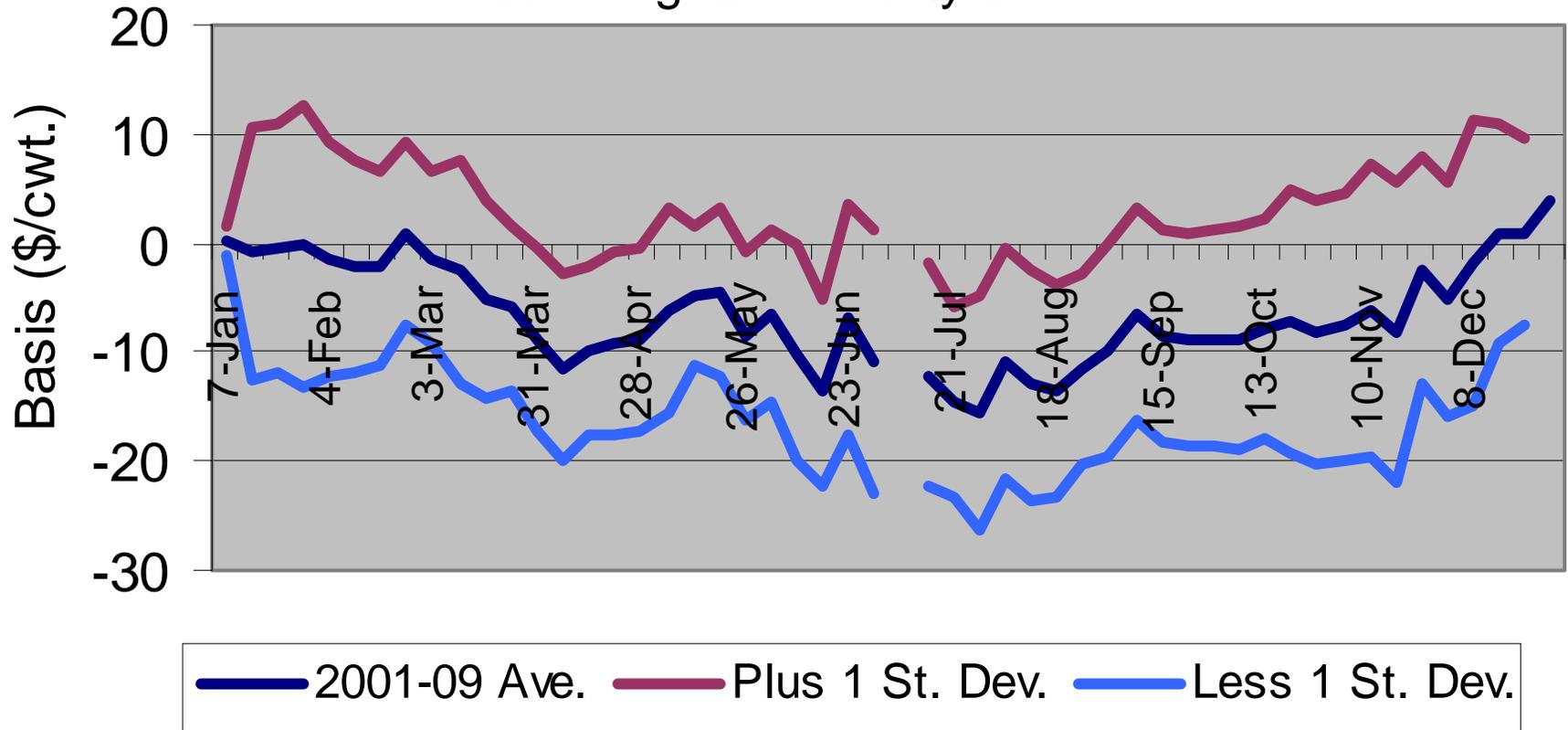


# San Angelo, TX Auction Slaughter Lamb Basis

- Average: - \$6.35/cwt.
- Standard deviation: \$4.78/cwt.
- Historical Minimum: -\$15.62/cwt.
- Historical Maximum: \$3.79/cwt.

# Weekly Basis Ave. & Standard Deviation: San Angelo Auction Slaughter & Calculated Formula Live

Note: Aug. 2001 - July 2009



# San Angelo Auction Feeder Lamb Basis

Average: \$14.18/cwt.

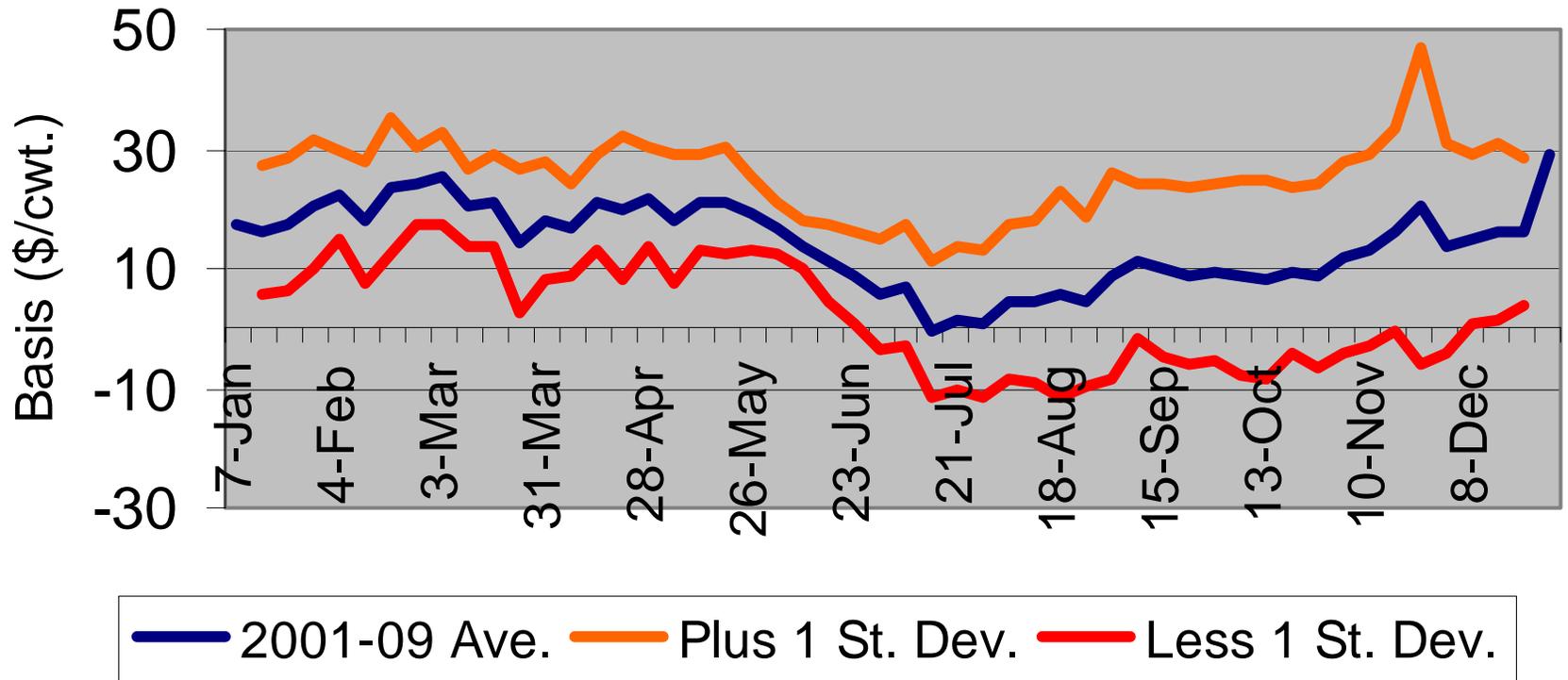
Standard deviation: \$6.91/cwt.

Historical Minimum: -\$0.30/cwt.

Historical Maximum: \$29.17/cwt.

## Ave. Basis & Standard Deviation: San Angelo Auction Feeder & Calculated Formula Live

Note: Aug. 2001 - July 2009



# Ft. Collins, CO Auction Slaughter Lamb Basis

Average: -\$3.06/cwt.

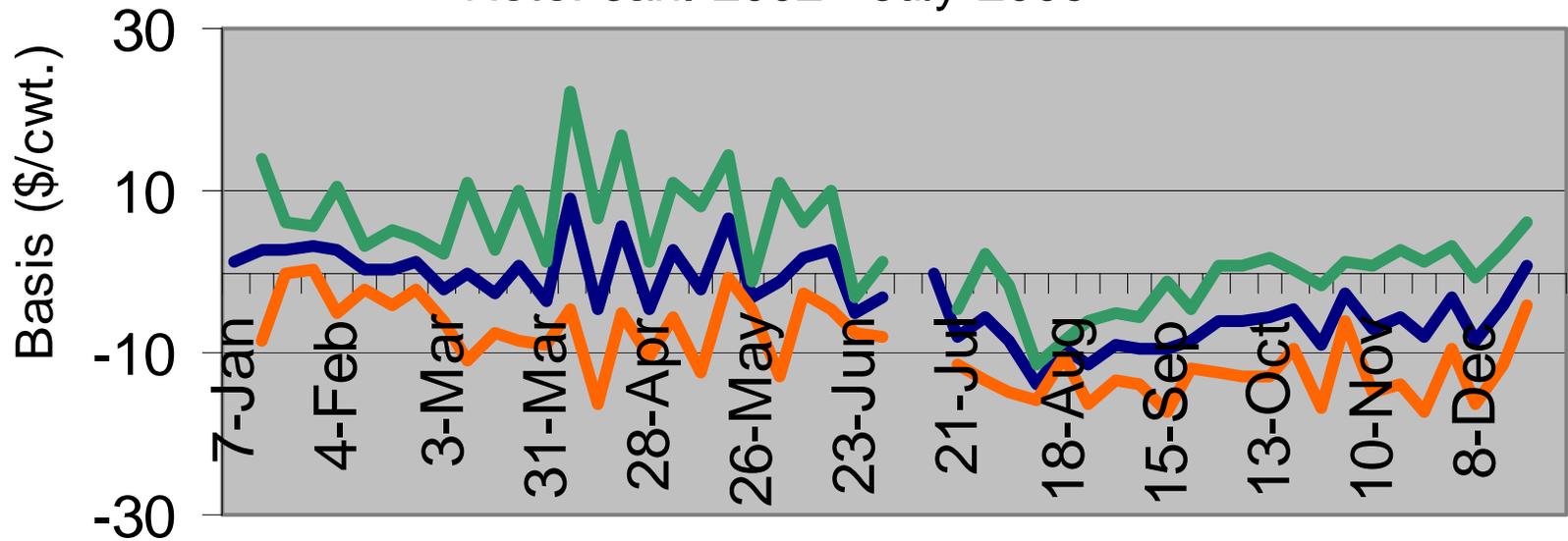
Standard deviation: \$5.04/cwt.

Historical Minimum: -\$13.76/cwt.

Historical Maximum: \$8.95/cwt.

# Weekly Ave. Basis & Standard Deviation: Ft. Collins, CO Auction Slaughter & Calculated Formula Live

Note: Jan. 2002 - July 2009



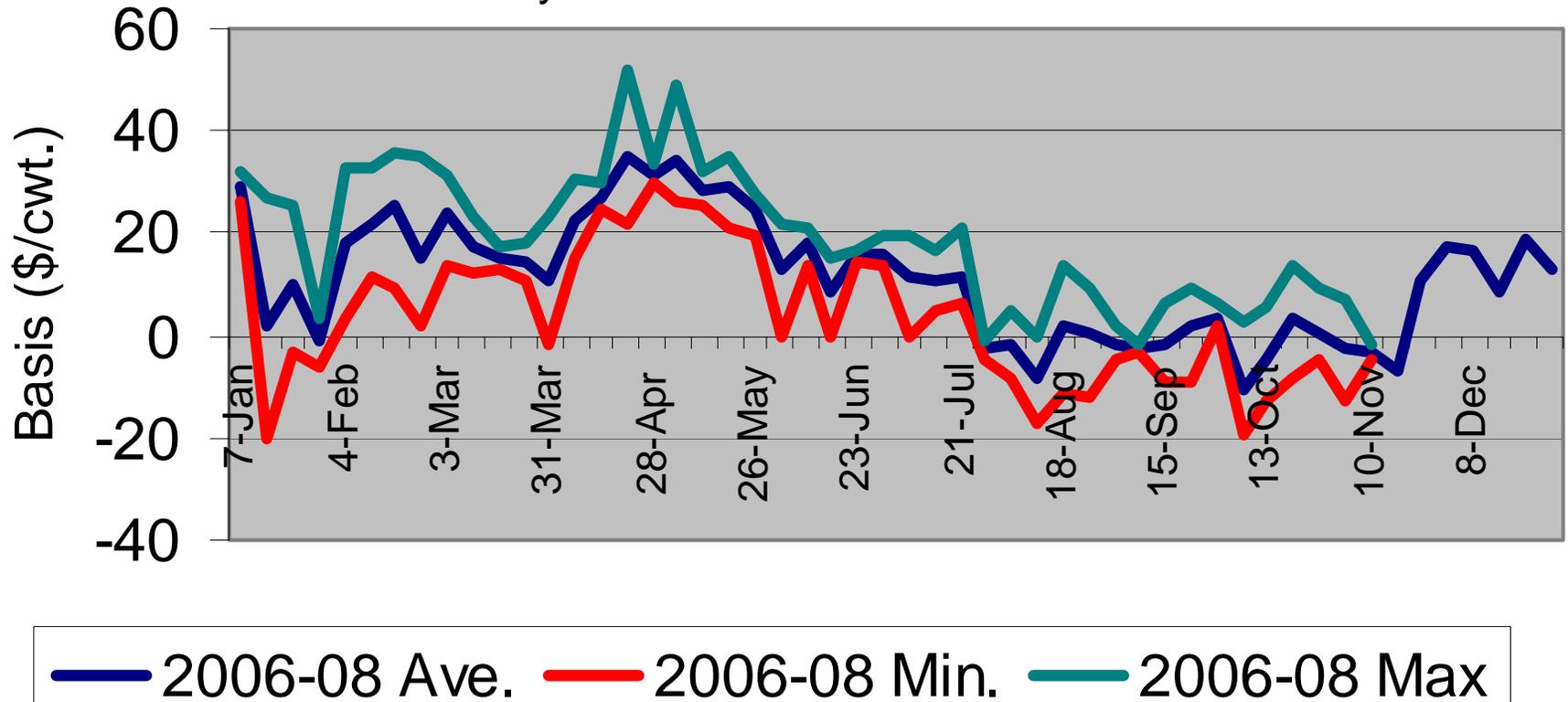
— 2002-09 Ave. — Plus 1 St. Dev. — Less 1 St. Dev.

# New Holland, PA Auction Slaughter Lamb Basis

- Average: \$11.34/cwt.
- Standard deviation: \$11.97/cwt.
- Historical Minimum: -\$10.75/cwt.
- Historical Maximum: \$34.88/cwt.

## 2006-2008 Basis: New Holland, PA Auction Slaughter Lamb - Calculated Formula Live

Note: Only 2006 had sale in late Nov./Dec.



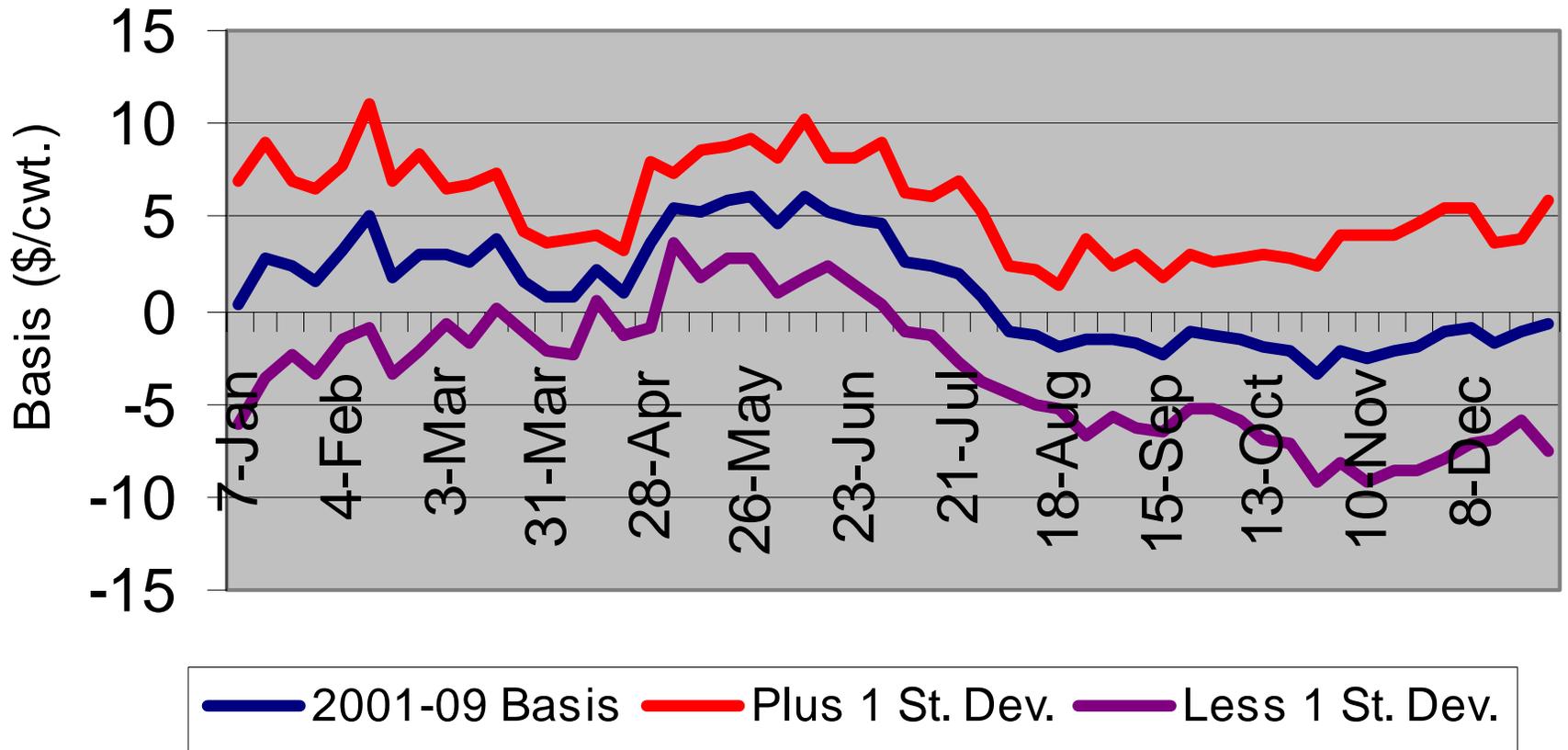
Note: Insufficient data to calculate standard deviations.

# Negotiated, Live Slaughter Lamb Basis

- Average: \$1.10/cwt.
- Standard deviation: \$2.80/cwt.
- Historical Minimum: -\$3.45/cwt.
- Historical Maximum: \$6.05/cwt.

# Weekly Basis Ave. & Standard Deviation: Negotiated, Live & Calculated Formula Live

Note: 2002 - July 2009



# **Lamb Price-Risk and the LRP-Lamb Plan of Insurance**

LRP-Lamb protects against price risk due to unexpected declines in the overall national level of slaughter lamb prices.

LRP-Lamb does not protect against basis-like risk---risk due to changes in local or regional lamb prices in relation to the national or overall slaughter lamb price level.

In the preceding presentation, basis was calculated over 7 years. As more price data becomes available, the accuracy will improve.