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July 2005

## Basis Risk Reduction with LRP Insurance

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Smith, Rik R. and Mark, Darrell R., "Basis Risk Reduction with LRP Insurance" (2005). *Cornhusker Economics*. 225.

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# CORNHUSKER ECONOMICS

UNIVERSITY OF  
**Nebraska**  
Lincoln

July 27, 2005

University of Nebraska–Lincoln Extension

Institute of Agriculture & Natural Resources  
Department of Agricultural Economics  
<http://agecon.unl.edu/pub/cornhusker.htm>

## Basis Risk Reduction with LRP Insurance

Market Report	Yr Ago	4 Wks Ago	5/22/05
<b><u>Livestock and Products,</u></b>			
<b><u>Weekly Average</u></b>			
Nebraska Slaughter Steers, 35-65% Choice, Live Weight . . . . .	\$84.54	\$81.40	\$79.02
Nebraska Feeder Steers, Med. & Large Frame, 550-600 lb . . . .	138.99	*	128.17
Nebraska Feeder Steers, Med. & Large Frame 750-800 lb . . . .	118.27	117.06	111.96
Choice Boxed Beef, 600-750 lb. Carcass . . . . .	136.93	134.61	129.77
Western Corn Belt Base Hog Price Carcass, Negotiated . . . . .	77.21	64.45	68.14
Feeder Pigs, National Direct 45 lbs, FOB . . . . .	42.78	45.02	45.97
Pork Carcass Cutout, 185 lb. Carcass, 51-52% Lean . . . . .	78.56	64.81	71.01
Slaughter Lambs, Ch. & Pr., 90-160 lbs., Shorn, Midwest . . . . .	*	113.25	105.00
National Carcass Lamb Cutout, FOB . . . . .	226.72	254.58	250.36
<b><u>Crops,</u></b>			
<b><u>Daily Spot Prices</u></b>			
Wheat, No. 1, H.W. Omaha, bu . . . . .	3.48	3.00	2.97
Corn, No. 2, Yellow Omaha, bu . . . . .	2.16	1.86	1.83
Soybeans, No. 1, Yellow Omaha, bu . . . . .	6.23	6.54	6.55
Grain Sorghum, No. 2, Yellow Columbus, cwt . . . . .	3.20	2.93	3.14
Oats, No. 2, Heavy Minneapolis, MN, bu . . . . .	1.51	1.75	1.87
<b><u>Hay</u></b>			
Alfalfa, Large Square Bales, Good to Premium, RFV 160-185 Northeast Nebraska, ton . . . . .	115.00	115.00	117.50
Alfalfa, Large Rounds, Good Platte Valley, ton . . . . .	62.50	62.50	37.50
Grass Hay, Large Rounds, Good Northeast Nebraska, ton . . . . .	57.50	57.50	52.50

\* No market.

Livestock Risk Protection Insurance (LRP) is a pilot program from the USDA-Risk Management Agency (RMA) that provides minimum price protection for fed cattle, feeder cattle and swine producers. The program works like a put option in that a minimum price is established, but if prices increase producers can benefit from the increase. Producers pay a premium in exchange for this price insurance, which is available from licensed crop insurance agents.

With traditional futures hedging, producers can calculate an expected selling price to estimate what future cash flows will be. This expected selling price is based on a price hedged with futures or options contracts, plus expected futures basis for the local market on the projected selling date. The expected basis level is often estimated based on a historical average for the local cash market where the livestock will be sold. For example, assume a Nebraska cattle feeder wants to hedge the sale of fed steers that will be ready for market the first week of February. The cattle feeder sells February live cattle futures at \$85.50/cwt. Expected basis for the first week of February in Nebraska is about -\$1.90/cwt, based on the four-year historical average. Therefore, the cattle feeder has an expected selling price of \$85.50/cwt + -\$1.90/cwt or \$83.60/cwt. (For simplicity, assume no commission).

When the fed steers are sold, the actual selling price will depend on actual basis levels. If futures basis is stronger than expected, the producer will receive a higher cash price and, as a result, a higher actual selling price than the expected hedged price. Conversely, if basis weakens, the actual selling price will be lower. Increases or decreases in the futures market will have no affect on the actual selling price. Consequently, accurately forecasting expected basis levels is important in order to estimate future net selling prices and cash flows.

When hedging livestock sales with LRP, producers must make the same consideration for basis. However, when hedging with LRP, traditional futures basis is no longer relevant. LRP price protection is based on national cash market prices. Coverage prices are established based on



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expected future cash price levels, or expected ending value (EEV), and coverage is purchased as a percentage of EEV ranging from 70 to 95 percent. If the national or regional cash price index (called the Actual Ending Value or AEV) is below the covered price level at the end of coverage, an indemnity is paid in the amount of the difference. LRP basis, then, is the difference between the local cash price and AEV. Because the AEV incorporates local cash prices to a smaller or larger extent depending on market volume and geographic location, there is potential for LRP basis to be smaller and less than variable than futures basis. This would make forecasting future basis levels and selling prices more accurate.

To analyze basis risk to Nebraska producers, traditional futures and LRP basis were compared over time. Futures and LRP basis were calculated using weekly average prices from 2000 to 2005 for fed cattle, from 2002 to 2004 for feeder cattle and from 2001 to 2005 for Western Corn Belt (WCB) base hog prices. Average, minimum, maximum and standard deviation for these time periods were then calculated for each type of livestock. Table 1 shows summary statistics for fed steers, 700-800 lb. feeder steers and WCB base hog prices.

As Table 1 indicates, the mean LRP basis for fed cattle is \$0.07/cwt. This is \$0.36/cwt higher than futures basis. More important, the standard deviation, which is a measure of variability or risk, for LRP basis was \$0.94/cwt. This was less than half the standard deviation for futures basis, which was \$2.46/cwt. In addition to a reduced standard deviation, the range (maximum – minimum) for LRP basis was also less than half of the range for futures basis, suggesting it is easier to predict fed cattle LRP basis more accurately than futures basis, because LRP basis is historically bound in a tighter range.

Western Corn Belt base hog basis shows a similar reduction in basis risk when using LRP relative to futures hedging. Standard deviation for LRP basis was \$2.36/cwt compared to \$4.36/cwt for futures basis. The range for LRP basis for WCB base hog price was about a third less than for futures basis. Both statistics suggest a reduction in basis risk using LRP relative to futures hedging.

Feeder cattle basis does not show the same reduction when using LRP relative to futures hedging. Standard deviation for 700-800 lb. steer LRP basis is only slightly smaller than for futures basis. There is also a slight reduction in the range of LRP basis compared to futures basis; however, the reduction is minor in comparison to the reduction observed in fed cattle and swine basis. The basis risk reduction observed in fed cattle and swine when using LRP relative to futures hedging is not observed with feeder cattle.

The large reduction in basis variability observed with Nebraska fed cattle and WCB hog prices when using LRP is primarily a result of the incorporation of Nebraska cash prices in the cash indexes used to determine AEV. Fed cattle LRP uses the 5-Area Direct Steer price as its AEV. A large proportion of the prices comprising the 5-Area price are direct sales from Nebraska. Therefore, the LRP AEV will closely reflect cash market prices in Nebraska, and LRP basis will be small. Similarly, the CME Lean Hog Cash Index is used as the swine LRP AEV. WCB prices (and consequently Nebraska prices) are incorporated relatively heavily into the CME Lean Hog Index, so LRP basis for WCB hog prices tends to be smaller than futures basis.

Conversely, the feeder cattle LRP AEV uses the CME Feeder Cattle Cash Index. This index incorporates cash prices from across the country. Additionally, quality premiums and/or discounts associated with feeder cattle from different parts of the country increase the range of prices incorporated into the index. This means that while the index is generally representative of overall cash prices, it does not reflect Nebraska prices as closely as do the fed cattle and swine AEVs.

For more information about hedging with LRP and basis risk implications, see “Hedging and Basis Considerations for Swine, Fed Cattle, and Feeder Cattle Livestock Risk Protection Insurance,” Extension Circulars 04-833, 834 and 835.

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**Table 1. Fed Cattle, WCB Swine and Feeder Cattle LRP & Futures Basis**

	Mean	Minimum	Maximum	Standard Deviation
	(\$/cwt)	(\$/cwt)	(\$/cwt)	(\$/cwt)
<b>Fed Steer</b>				
LRP Basis	0.07	-2.99	5.32	0.94
Futures Basis	-0.29	-7.52	13.24	2.46
<b>WCB Base Hogs</b>				
LRP Basis	-2.68	-17.07	2.58	2.36
Futures Basis	-2.33	-23.60	8.42	4.36
<b>700-800 lb. Feeder Steer</b>				
LRP Basis	4.44	-3.13	13.58	2.62
Futures Basis	5.32	-1.02	18.43	2.77