

Options, LRP, & LGM Insurance

Kevin Dhuyvetter – kcd@ksu.edu – 785.532.3527

James Mintert, jmintert@ksu.edu – 785.532.1518

Department of Agricultural Economics
Kansas State University

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Hedging Defined

Use of the futures (options) market as a temporary substitute for an intended transaction in the cash market which will occur at a later date

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Relationship Between Cash & Futures Critical for Risk Management

- Basis = Cash Price - Futures Price
- Rearrange formula
- Basis + Futures Price = Cash Price

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Decomposing A Cash Price

- Cash Price = Basis + Futures Price
- Recall definition of hedging
- Hedging effectively “locks in” the futures price when the hedger sells (for a short hedger) the futures contract
- Hedging does not “lock in” the basis
- Therefore, the “cash price” is not locked in and the hedger is still exposed to basis risk

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Evaluating A Hedge

Cash price = Futures price + Basis

Hedging “locks in” the futures price

But basis is not locked in, so

Futures price
+ Expected basis
- Futures commission
Expected net sale price

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Option Hedging Strategies

- Buying a PUT gives option buyer the right but not the obligation to SELL a futures contract
- So, we can use the purchase of a PUT in place of selling a futures contract
- Therefore, you can use a PUT to establish a “Minimum Expected Net Sale Price”

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Minimum Expected Net Sale Price

- Buyer of put establishes “minimum” price, but not maximum
- Reason it’s a minimum: put buyer has right, *but not obligation*, to sell futures contract
- Calculations are similar to **Expected Net Sale Price**, but we must convert the put option’s purchase into a futures price equivalent

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Minimum Expected Net Sale Price

- Start with put option strike price
 - subtract the put option premium
- This creates a “futures equivalent”**
- then add basis forecast
 - subtract brokerage commission
 - remember that most brokers charge once to buy an option and once to sell an option
 - have to account for possibility of “double” commission in calculations

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Minimum Expected Net Sale Price

- Example: Buy \$94.00 Feb LC Put
- Premium = \$3.00/cwt.
- Feb. 3 basis forecast = -\$1.00/cwt.
- Assume brokerage commission is \$40 to buy an option contract and \$40 to sell an option contract
- For buyer of \$94.00 Feb LC Put what is **Minimum Expected Net Sale Price?**

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Minimum Expected Net Sale Price

\$94.00	Put option strike price
- \$3.00	Put premium
- \$1.00	Expected basis
- <u>\$0.20</u>	<u>Maximum commission</u>
\$89.80/cwt.	Min. Exp. Net Sale Price

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Actual Net Sale Price

- Start with price received in cash market
- Look at futures price and use point on profit/loss diagram to determine “net” on option trade
- Add the “net” from option trade
- Subtract actual brokerage commission

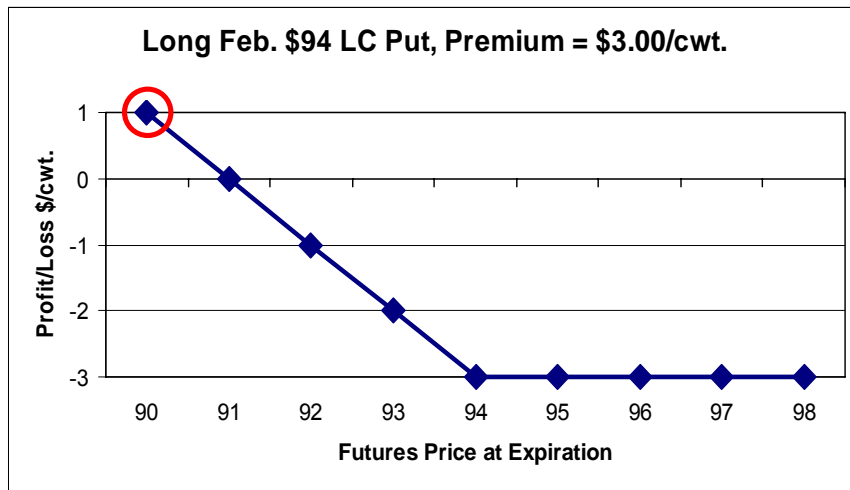
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Actual Net Sale Price

- Sell cash cattle on Feb 3 for \$89.00/cwt.
- Feb live cattle futures are \$90.00
- What does Profit/Loss diagram say?

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Profit/Loss Graph



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Actual Net Sale Price

\$89.00		Cash market price
+ 1.00	+	Net on option trade
- 0.20	-	Brokerage commission
<hr/>		
\$89.80		Actual Net Sale Price

Expected = Actual Why?

Because expected basis = Actual basis and because prices declined after option purchase

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LRP - What Is It?

- Livestock Risk Protection Insurance
- LRP for feeder cattle available
 - Provides protection against a decline in the Chicago Mercantile Exchange (CME) Feeder Cattle Price Index while you own cattle
 - CME Feeder Cattle Price Index is a 7-day weighted average of cash feeder cattle prices across the U.S.
- LRP for slaughter cattle is also available
 - Provides protection against a decline in the 5-Area Weekly Weighted Average Price reported by USDA

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Buying LRP Similar to Buying Put Options

- LRP for Feeder Cattle is similar to buying a put option on the CME Feeder Cattle Index
- LRP for Fed Cattle is similar to buying a put option on USDA's 5-Area Weighted Average Price for Fed Cattle

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Cattle Eligibility Restrictions

- Feeder cattle must weigh less than 900 lbs. at the end of the insurance period
- Fed cattle must weigh between 1,000 and 1,400 lbs. at the end of the insurance period

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Eligible Coverage

- Can insure steers, heifers, Brahma and dairy breeds
- Coverage is available for 13, 17, 21, 26, 30, 34, 39, 43, 47, or 52 week periods
- Cattle weighing less than 600 lbs. (at end of insurance period) can be insured – price adjusted 10% to reflect lighter weight cattle generally trade at a premium to heavier cattle

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How Does LRP Work?

- To use LRP to protect against a price decline,
- purchase LRP insurance for a particular set of cattle (number of head and ending weight)
 - buyer must choose
 - Coverage Price (this is similar to an option's *Strike Price*)
 - End Date (e.g., the date coverage ends)
 - price paid is known as LRP premium
 - Similar to a premium for a CME traded option

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LRP Premium Calculation Example

- An operation has 100 head of feeder cattle on Oct. 29
- Expects to market the feeder cattle at a target weight of 7.00 cwt each in late February
- Insured share is 100 percent
- Assume Expected End Value (updated daily by RMA on its website) is \$109.07 per live cwt

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Premium Calculation Example

- Producer selects a coverage price which is a % of the Expected End Value published by RMA
- Assume producer selects \$107.95 per cwt. coverage price (e.g., 99% of RMA's Expected End Value)
- For this coverage price, the rate is 3.2348%
- The premium subsidy is 13 percent

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Premium Calculation Example

- $100 \text{ head} * 7 \text{ cwt} = 700 \text{ cwt.}$
- $700 \text{ cwt.} * \text{coverage price } (\$107.95) = \$75,565$
- $\$75,565 * \text{insured share } (1.00) = \$75,565 \text{ Insured Value}$

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Premium Calculation Example

- $\$75,565 * \text{rate of } 3.2348\% = \$2,444 \text{ total premium}$
- $\$2,444 * 0.13 \text{ (subsidy)} = \317 subsidy
- $\$2,444 \text{ (total premium) minus } \$317 \text{ subsidy} = \$2,127 \text{ producer paid premium}$
 $= \$3.03/\text{cwt. producer paid premium}$

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Minimum Expected Net Sale Price?

- \$107.95/cwt. coverage price
(similar to option strike price)
- Producer paid premium = \$3.03/cwt.
- Basis forecast = + \$1.00/cwt.

\$107.95

- \$ 3.03

+\$ 1.00

\$ 105.92/cwt. MENSF

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Calculating Indemnity

- Indemnity is payable if actual ending price is less than coverage price
- Calculate indemnity by:
 - Multiplying number of head by target weight (in live cwt.)
 - Subtract actual ending value from coverage price
 - Multiplying total weight by difference between actual ending value & coverage price

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Indemnity Calculation Example

- Expected End Value for 17 weeks of coverage is \$109.07 per live cwt.
- Producer selects a coverage price of \$107.95 per cwt. (e.g., 99% of Expected End Value)
- Actual End Value is \$97.95 per cwt. (e.g., CME Feeder Cattle Index = \$97.95 on End Date)

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Indemnity Calculation Example

- $100 \text{ head} * 7.00 \text{ cwt} = 700 \text{ cwt.}$
- Subtracting actual ending price of \$97.95 from the coverage price of \$107.95 = \$10.00/cwt.
- Multiplying 700 cwt. by \$10.00/cwt = \$7,000
- Multiplying \$7,000 by insured share of 100% equals gross indemnity payment of \$7,000
- Net indemnity payment = \$4,556

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Actual Net Sale Price

Assume cash cattle price = \$98.95/cwt.

What is Actual Net Sale Price?

$$\begin{array}{r} \$ 98.95 \\ +(\$10.00 - \$3.03) \text{ (Indemnity minus premium)} \\ \hline \$105.92/\text{cwt. ANSP} \end{array}$$

Actual Net Sale Price = Minimum Expected Net Sale Price because price declined and expected and actual basis were equal

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Indemnity Calculation Example

- What happens if CME Feeder Index on End Date = \$112?
- Subtracting actual ending price of \$112 from the coverage price of \$107.95 = $-\$4.05/\text{cwt}$.
 - Therefore, no indemnity payment is made to producer
 - This is analogous to a feeder cattle put option that *expires worthless*

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LRP Coverage Prices & Levels

- Price guarantees change daily
- Premiums change daily
- Coverage available ranges from
 - 70% to about 100% of Expected End Price,
 - Max guarantee generally less than 100%

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RMA premiums

LRP Coverage Prices, Rates, and Actual Ending Values - Report for 11/07/2007

USDA subsidizes 13 percent of total LRP premium

* See notes at bottom of page

State	County	Endorsement Length	Commodity	Type	Practice	Crop Year	Exp. End Value	Coverage Price	Coverage Level	Rate	Cost Per CWT	End Date	Actual End Value
20 KANSAS	998 ALL COUNTIES	13	0801 FEEDER CATTLE	810 STEERS WEIGHT 2	997 NO PRACTICE SPECIFIED	2008	107.347	\$105.420	0.982000	0.025640	2.703	02/06/2008	
20 KANSAS	998 ALL COUNTIES	13	0801 FEEDER CATTLE	810 STEERS WEIGHT 2	997 NO PRACTICE SPECIFIED	2008	107.347	\$103.420	0.963400	0.019455	2.012	02/06/2008	
20 KANSAS	998 ALL COUNTIES	13	0801 FEEDER CATTLE	810 STEERS WEIGHT 2	997 NO PRACTICE SPECIFIED	2008	107.347	\$101.420	0.944800	0.014593	1.480	02/06/2008	
20 KANSAS	998 ALL COUNTIES	13	0801 FEEDER CATTLE	810 STEERS WEIGHT 2	997 NO PRACTICE SPECIFIED	2008	107.347	\$95.420	0.888900	0.005921	0.565	02/06/2008	
20 KANSAS	998 ALL COUNTIES	17	0801 FEEDER CATTLE	810 STEERS WEIGHT 2	997 NO PRACTICE SPECIFIED	2008	107.854	\$105.930	0.982200	0.028849	3.056	03/05/2008	
20 KANSAS	998 ALL COUNTIES	17	0801 FEEDER CATTLE	810 STEERS WEIGHT 2	997 NO PRACTICE SPECIFIED	2008	107.854	\$103.930	0.963600	0.022967	2.387	03/05/2008	
20 KANSAS	998 ALL COUNTIES	17	0801 FEEDER CATTLE	810 STEERS WEIGHT 2	997 NO PRACTICE SPECIFIED	2008	107.854	\$101.930	0.945100	0.016179	1.853	03/05/2008	
20 KANSAS	998 ALL COUNTIES	17	0801 FEEDER CATTLE	810 STEERS WEIGHT 2	997 NO PRACTICE SPECIFIED	2008	107.854	\$95.930	0.889400	0.008798	0.844	03/05/2008	
20 KANSAS	998 ALL COUNTIES	21	0801 FEEDER CATTLE	810 STEERS WEIGHT 2	997 NO PRACTICE SPECIFIED	2008	109.120	\$107.220	0.982600	0.034219	3.669	04/02/2008	

LRP Summary

- LRP protects against a decline in
 - Feeder cattle price level as measured by CME Feeder Cattle Price Index
 - Fed cattle price level as measured by USDA's 5-Area Weighted Average Price
- LRP does NOT guarantee the basis
- LRP does not guarantee a cash price
- Policy does not cover any other peril

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LRP Summary

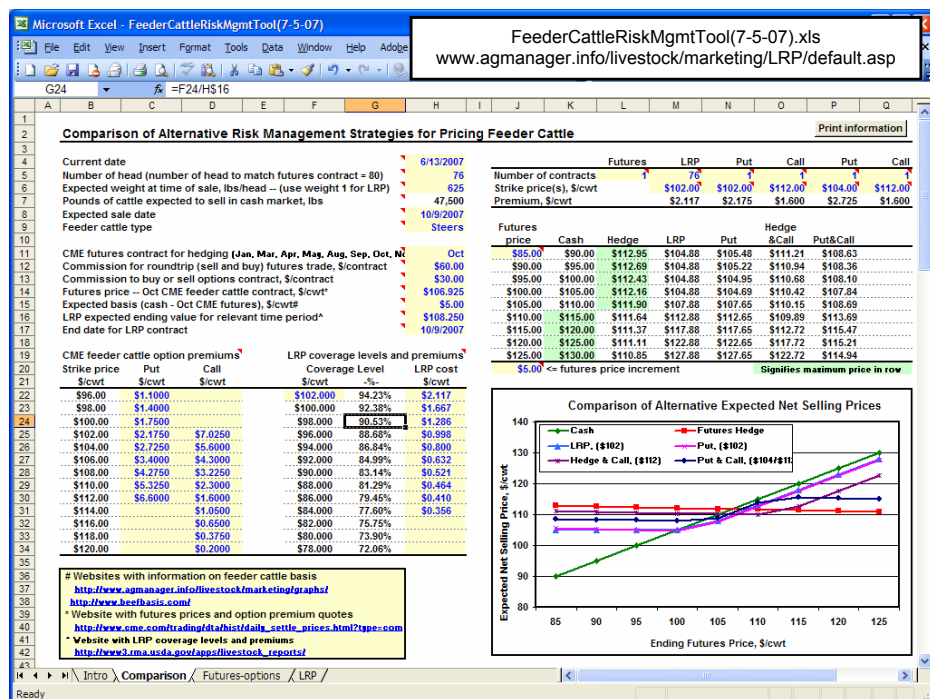
- Insure the exact number of head that you choose
- Flexible contract size matches “small” operations compared to futures where,
 - feeder cattle futures contract represents about 67 steers weighing 750 pounds
 - live cattle futures contract represents about 33 steers weighing 1200 pounds
- Can incrementally minimum price a few head at a time using LRP

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Livestock Risk Protection (LRP) vs. CME Put Option Premiums for Similar Coverage

- LRP premiums are “fair” but they are priced similar to “market value”
- LRP advantage is its flexible contract size
- LRP order will be filled at the stated premium – sometimes difficult to do with CME options
- LRP is insurance and fully tax deductible
- Lenders might prefer insurance to options

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Livestock Gross Margin Insurance

- Insurance against declines in livestock producers feeding margin
- What is “feeding margin”?
 - Revenue minus feeding costs
 - Cattle: cattle revenue – feeder cattle & corn costs
 - Hogs: hog revenue – corn & soybean meal costs
 - Dairy: milk revenue – corn & soybean meal costs

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Livestock Gross Margin (LGM) Insurance

- Protection against declines in cattle or swine feeding margins or dairy milk margins
- Effectively a “bundle” of options
- Cattle feeding
 - Inputs: Corn, feeder cattle futures prices
 - Outputs: Live (fed) cattle futures price

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LGM Insurance

- LGM insurance buyers receive a payment when spread (margin) between fed cattle sale price and corn and feeder cattle prices drops below the insured coverage level
- Indemnity payable based upon difference between gross margin guarantee (GMG) and total actual gross margin (AGM)
- $GMG = \text{Expected Gross Margin (EGM)} - \text{deductible (i.e., coverage level)}$

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Purchasing LGM

- LGM for cattle sales only on last business day of each month
- LGM for swine sales on second last business day of month
- LGM for milk sales on third last business day of month
- For cattle and dairy the insurance period covered is 11 months, commencing one month after purchase date (6 mo. for hogs)

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Target Marketings

- Number of slaughter ready cattle or hogs (pounds of milk) that are expected to be marketed during insurance period and that producer wants to insure
 - Producers not required to insure all livestock they feed during insurance period

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Expected Gross Margin (EGM)

- Gross margin forecast by RMA for end of insurance period
- EGM based upon 3 day average of appropriate futures contracts, adjusted for state specific basis levels
 - Cattle: live cattle, corn & feeder cattle futures
 - Hogs: lean hogs, corn, & soybean meal futures
 - Dairy: Class III milk, corn & soybean meal futures

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RMA EGM and AGM

Livestock Reports - Windows Internet Explorer
 http://www3.rma.usda.gov/apps/livestock_reports/main.aspx
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LGM Expected and Actual Gross Margin - Report for 2008, KANSAS, CATTLE

CATTLE (803) CALF FINISHING (807) AUG. - JUN. INSURANCE PERIOD (908)											
	1	2	3	4	5	6	7	8	9	10	11
Expected Gross Margin	N/A	354.52	347.41	320.03	322.86	327.43	305.91	311.07	315.94	294.91	255.39
Actual Gross Margin	N/A	327.72	290.71	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A

CATTLE (803) YEARLING FINISHING (808) AUG. - JUN. INSURANCE PERIOD (908)											
	1	2	3	4	5	6	7	8	9	10	11
Expected Gross Margin	N/A	194.15	244.68	257.55	247.38	239.68	225.88	222.65	214.38	189.95	158.60
Actual Gross Margin	N/A	165.03	180.18	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A

CATTLE (803) CALF FINISHING (807) SEP. - JUL. INSURANCE PERIOD (909)											
	1	2	3	4	5	6	7	8	9	10	11
Expected Gross Margin	N/A	326.13	309.33	322.75	329.62	308.96	312.98	316.65	299.84	262.63	220.73
Actual Gross Margin	N/A	290.71	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A

CATTLE (803) YEARLING FINISHING (808) SEP. - JUL. INSURANCE PERIOD (909)											
	1	2	3	4	5	6	7	8	9	10	11
Expected Gross Margin	N/A	221.55	243.98	243.28	236.13	229.33	228.95	213.75	188.75	157.03	125.53
Actual Gross Margin	N/A	180.18	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A

CATTLE (803) CALF FINISHING (807) OCT. - AUG. INSURANCE PERIOD (910)											
	1	2	3	4	5	6	7	8	9	10	11
Expected Gross Margin	N/A	306.11	317.03	327.93	308.47	304.54	301.46	289.24	266.06	224.31	215.89
Actual Gross Margin	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A

LGM Example for Yearling Finishing

- Nov. 07 – Sep '08 Policy
 - sold at end of October '07
 - RMA's Expected Gross Margins listed below

CATTLE (803) YEARLING FINISHING (808) NOV. - SEP. INSURANCE PERIOD (911)											
	1	2	3	4	5	6	7	8	9	10	11
Expected Gross Margin	N/A	209.90	190.65	198.85	233.58	243.00	194.20	168.30	139.60	114.70	115.30
Actual Gross Margin	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A

1=Nov, 2=Dec, 3=Jan, ..., 10=Aug, 11=Sep
 11 month total = \$1808.08

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LGM Example

- Producer asked to identify target marketings by month
- RMA computes EGM for 11 month period
 - Monthly target marketings X monthly EGM
 - Example, assume 1 head/month, then EGM for the 11 month period is \$1808.08
 - RMA's producer premium was \$275 for the 11 month contract

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LGM Indemnities

- RMA computes Actual Gross Margin (AGM) by month
- Monthly difference between EGM & AGM computed & summed then compared with the Gross Margin Guarantee (\$1808.08, i.e., \$0 deductible) to determine if payment is due
 - If 11 month AGM > 11 month EGM, no indemnity paid
 - IF 11 month EGM > 11 month AGM, indemnity is paid to producer

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What Drives LGM Indemnities?

- Changes in the combination of output and input prices
- Live cattle, feeder cattle, & corn futures
- AGM's can fall below EGM's because of a combination of
 - Falling live cattle prices
 - Increasing feeder cattle & corn prices

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LGM Summary

- LGM offers protection against margin risk
- LGM can provide protection against input price risk, but still have basis risk
- Many farmer feeders don't have sufficient volume to manage all input and output risks directly in futures market
- LGM provides a way to manage these risks
- LGM does not cover any other perils (i.e., production, death loss risk)

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LRP and LGM: Livestock Insurance - Windows Internet Explorer

http://livestockinsurance.unl.edu/

Nebraska Lincoln LRP | LGM Livestock Insurance

About LRP | Study Guide | Lecture Series | Resource Center About LGM | Study Guide | Lecture Series | Resource Center

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- ▶ Eligible Livestock: LRP | LGM
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- ▶ USDA-RMA Livestock Reports

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LRP Study Guide GO

LGM Study Guide GO

LRP & LGM: What's the Difference?

Livestock Risk Protection (LRP) Insurance covers the risk of price declines for feeder cattle, fed cattle, and swine. It provides producers an indemnity if a regional or national cash price index falls below an insured coverage price. Similar to a put option, the LRP policy is price insurance only, providing single-penit price risk protection for the future sale of insured livestock.

Livestock Gross Margin (LGM) Insurance offers protection against a decline in the feeding margin for cattle and swine. An indemnity is paid if the insured gross margin is greater than the total actual gross margin at the end of the insurance period.

Both insurance policies are available through the crop insurance agent system. Neither of these products guarantee a cash price received as the producer's actual cash market selling price is not used to determine indemnities. LRP and LGM Insurance programs allow producers to customize these products to their individual needs and efficiently manage price risk without the use of the futures market.

To learn more about LRP and LGM, take advantage of the University of Nebraska-Lincoln's online study guides, lecture series, and resource centers.

Important! USDA-RMA has revised the LRP policy. The 2008 LRP

RMA
Nebraska Extension
Nebraska Pork Producers
Nebraska Farm Bureau
North Central Risk Management
Education Center

Additional resources developed by Darrel Mark at UNL.

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Grain Outlook Radio Program
November 2, 2007 by Mike Woolverton

Kansas Grain Price Differentials
November 1, 2007 by Daniel O'Brien

Updated Crop Basis Tool
November 1, 2007 by Kevin Dhuyvetter

In The Cattle Markets
October 29, 2007 by Jim Minter,LMC

Livestock Outlook Radio Program
October 29, 2007 by Jim Minter,LMC

KFMA Monthly Newsletter
October 26, 2007 by KFMA NE Economists (Althausser, Simons & Hennigan)

Current Grain Outlook Newsletter
October 26, 2007 by Mike Woolverton

Livestock and Hay Charts
October 19, 2007 by Jim Minter

Crop Basis Maps
October 18, 2007 by Kevin Dhuyvetter

KSU-Vegetative Buffer Excel Tool
October 15, 2007 by Craig Smith and Jeff Williams

KSU-Streambank Stabilization Excel Tool
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KSU-Tillage Excel Tool
October 15, 2007 by Craig Smith, Kevin Dhuyvetter and Jeff Williams

World Grain Supply and Demand Estimates (WASDE)
October 12, 2007 by Jim Minter and Mike Woolverton

Seasonal Grain and Cattle Price Spreadsheets (Excel)
October 3, 2007 by Kevin Dhuyvetter

Futures-Based Price Forecasts for Diesel Fuel
October 2, 2007 by Kevin Dhuyvetter

Water Quality Indices and Net Returns for Crop

Done Internet 100%

Kevin C. Dhuyvetter
785-532-3527
kcd@ksu.edu