

Options, LRP and LGM

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2007 Insurance Workshop

**“Policy and Structural Changes Affecting
Agricultural Risk”**

November 8, 2007

Courtyard by Marriott
Salina, Kansas



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Dr. Kevin Dhuyvetter assists farmers, landowners, and others throughout Kansas with risk and return assessment of alternative crop and livestock production and marketing systems. He works extensively with land-related issues such as buying and leasing land. Current research and extension efforts are examining relationships between energy prices and crop inputs, estimating crop yield and fertilizer and water relationships, economics of no-tillage, the economics of grazing systems, and factors affecting feeder cattle basis. One of Dr. Dhuyvetter's trademarks is his development of decision tools that can be used by clientele for helping them with the myriad of decisions they face in their operations.

Options, LRP, & LGM Insurance

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Crop Insurance Workshops
November 6,7, & 8, 2007

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Hedging Defined

Use of the futures 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

$$\text{Cash Price} = \text{Basis} + \text{Futures Price}$$

Hedging “locks in” the futures price

But Basis is not locked in, so

$$\text{Exp. Cash Price} = \text{Exp. Basis} + \text{Futures Price}$$

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Evaluating A Hedge

At outset of hedge we can estimate the Expected Net Sale Price

- ENSP is what the hedger expects to receive for the commodity net of any gains or losses in the futures, minus the brokerage commission

ENSP

Futures Price at which hedge is initiated

+ Expected Basis

- Brokerage commission

Expected Net Sale Price

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Futures Hedge Example

Assume Feb. L.C. are \$94.00/cwt. when hedge is initiated

Expect early Feb. basis will = - \$1.00/cwt.

Assume brokerage commission = \$80/ round turn or \$0.20/cwt.

What is ENSP?

Futures Price at which hedge is initiated	\$94.00
+ Expected Basis	-\$ 1.00
- Brokerage commission	-\$ 0.20
<hr/>	
Expected Net Sale Price	\$92.80

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At Hedge's Conclusion

Calculate Actual Net Sale Price (ANSP)

Price received in the cash market

+ Net gain on futures transaction

- Brokerage Commission

Actual Net Sale Price

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Futures Hedge Example

Assume Feb. L.C. are \$90.00/cwt. when hedge is concluded

Assume cash live cattle = \$89.00/cwt. when hedge concludes

What is ANSP?

Price received in cash market	\$89.00
+ Net gain on futures transaction	+\$4.00
- Brokerage commission	-\$ 0.20
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Actual Net Sale Price	\$92.80

Expected = Actual. Why?

Because Expected Basis = Actual Basis

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Option Hedging Strategies

- Buying a PUT gives option buyer right but not the obligation to SELL a futures contract
- So, we can use 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 Exp. 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 Exp. 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 Exp. 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 Exp. Net Sale Price?**

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Minimum Exp. Net Sale Price

\$94.00	Option Strike Price
- \$3.00	Put Premium
- \$1.00	Exp. Basis
- \$0.20	Max. Poss. Comm.
<u> </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

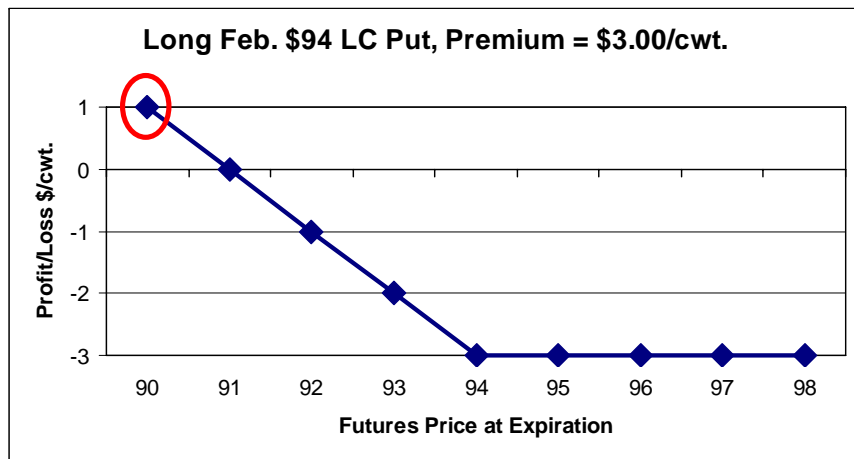
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Actual Net Sale Price

- 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 Comm.
<u>\$89.80</u>		Actual Net Sale Price

Expected = Actual. Why?

Because Expected Basis = Actual Basis & because prices declined after option purchase

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Option Trading

- What happens if the option has no value or value you can capture in option market is less than the brokerage commission required to trade it?
- Option buyer allows option to expire worthless
- In this case, the option buyer only has “one” brokerage commission because the “second” option trade never took place

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LRP-What Is It?

- Livestock Risk Protection Insurance
- LRP for feeder cattle available
 - Provides protection against a decline in 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 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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Restrictions On Cattle Eligible For Coverage

- 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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What's Eligible for 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 now be insured and will receive a 10% price adjustment to reflect the fact that 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 (# of hd. & ending wt.)
- 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
 - This is similar to a premium for a CME traded option

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LRP Feeder Cattle Premium

- To calculate actual LRP premium you must know
 - Number of cattle ready for market (weighing less than 9.0 cwt) on End Date
 - Target Weight per head
 - Ownership share in cattle

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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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LRP Feeder Cattle Premium

- Insured Value Equals
 - $\text{Number of Head} \times \text{Target Weight (cwt)} \times \text{Coverage Price} \times \text{Ownership Share (\%)}$
- Total Premium Equals
 - $\text{Insured Value} \times \text{Rate}$
- Producer Premium Equals
 - Total Premium minus USDA Subsidy
 - $\text{USDA Subsidy} = 13\% \text{ of Total Premium}$

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

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Premium Calculation Example

- \$75,565 * rate of 3.2348% = \$2,444 Total Premium
- \$2,444 * .13 (subsidy) = \$317 subsidy
- \$2,444 (total premium) minus \$317 subsidy = producer premium of \$2,127 = \$3.03/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 |
| <hr/> |
| \$ 105.92/cwt. MENSP |

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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 Exp. 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 1.00 = 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?

\$ 98.95
+(\$10.00 – \$3.03) (Indemnity minus premium pd.)

\$105.92/cwt. ANSP

Min. Expected = Actual because expected and actual basis were equal and because price declined

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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 = neg. \$4.05/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 Availability

- When prices are published on RMA web site after CME market closes (about 3:30 p.m.) until 9 a.m. Central Time during the week
- Not Available on Federal holidays
- Not Available if RMA web site down
- Not Available if company you're working with exceeds their company's limit

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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 slightly less than 100%

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Premium

- Premium quotes via RMA's Premium Calculator available on USDA-RMA's web site
- Premium must be paid on day LRP insurance is purchased for coverage to be provided
- Rates available at

<http://www.rma.usda.gov/tools>

Under livestock reports

Or use link on AgManager

www.agmanager.info/livestock/marketing

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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 vs.
 - Feeder cattle futures that represents about 67 steers weighing 750 pounds
 - Live cattle futures that 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) Premiums 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
- Will get an LRP order 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

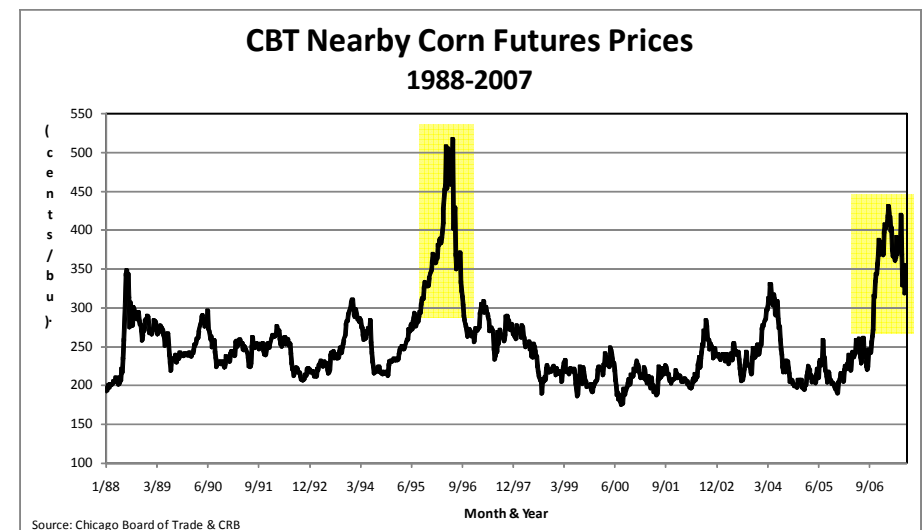
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Livestock Gross Margin Insurance

- Purpose:
- Provide insurance against declines in livestock producers feeding margin
- What is “feeding margin”?
 - Revenue minus feeding costs
 - Cattle: cattle revenue – corn costs
 - Hogs: hog revenue – corn & soybean meal costs

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LGM Helps Address Input Price Risk



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Livestock Gross Margin (LGM) Insurance

- Protection against declines in cattle feeding or swine feeding 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 & feeder cattle prices drops below their insured coverage level

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LGM Insurance

- Indemnity payable based upon difference between gross margin guarantee (GMG) and total actual gross margin (AGM).

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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
- For both cattle and hogs the insurance period covered is 11 months, commencing one month after purchase date.

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Target Marketings

- Number of slaughter ready cattle or hogs 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

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LGM Example

LGM 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. - SEPT. 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

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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) to determine whether 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 & 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
- 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

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Visit

www.agmanager.info

www.beefbasis.com

Thank You!

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