Risk Assessed Marketing
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Dear Art

I am confused as to why the cost of the Livestock Risk Protection (LRP) insurance has more than doubled since July 1.

Example: 750 lb. steer

July 1 quote: 21 week $86.732 exp. end value; $81.83 cov. Price; .942 cost/cwt $ 7.06/head prem.

Sept.23 quote: 21 week $87.989 exp. end value; $83.09 cov. Price; 2.491 cost/cwt $18.68/head prem.

What happened-the coverage is relatively the same yet the premium has more than doubled? I was going to buy a policy on my cattle but now I am second guessing.

Livestock Producer

Dear Livestock Producer,

I passed that question on to some of the people who worked on this USDA project. Their response is below:

ART

Dear Art,

That is a good question. The bottom line answer is that the market perceived more risk between July 1 and September 26 (the information the producer quoted was from the 26th not the 23rd).

As you know, we price off of the put options at the CME (Chicago Mercantile Exchange). We looked at the June 30th settlement prices for options to get the LRP endorsement premiums for July 1. The implied volatility for the $80 put option used in pricing had about an 11% implied volatility. For the September 26 sales date, the $82 put used for pricing had an implied volatility of about 18%. Both of the endorsements had a coverage level of about 94%, so they are very comparable except for the implied volatility.

As you know, an increase in implied volatility has a disproportionate impact on price. Increasing implied volatility by a little more than 50% (as was the case here) will more than double the cost of the coverage.

So as for the question of whether or not to buy coverage; LRP is only reflecting the risk in the market. Many people do not buy coverage when the implied volatility reaches a historically high level since it is likely to decrease. The other side is that implied volatility is itself showing a high probability of lower prices. By the time lower premiums are available, feeder cattle prices may have already dropped significantly. The overall decision to buy coverage should probably consider the benefits of getting coverage as much as the cost of coverage.

Thanks for the question.

LRP Analyst

Art's Analysis of LRP[1]

The answer provided by the analysts above makes sense but then the question becomes how competitive is the LRP premium compared to the close substitute of a CME put.

The above response on behalf of the LRP contract demonstrates why the premiums have increased during this period of time. The smaller livestock producers may still find the LRP for feeder cattle the preferred alternative because one can buy LRP on a single head of cattle up to 1,000 head per Specific Coverage Endorsement (SCE), while the put option is a fixed sized contract based on 50,000 pounds or a little more than 66 calves weighing 750 pounds.

Table 1 below compares the LRP premium contract with the CME futures premium for a similar coverage. The put option based on a market close of $89.50 on 10/06/03 and an out-of-the-money put of $82 carried a premium of $1.65. The April put option expires on 4/29/04. The producer must buy this contract in units of 50,000 pounds and the premium was calculated for a total put contract equaling $825. The producer would also need to pay commissions and in the example it was assumed to be $75. The total cost for a 50,000 pound put contract would be $900 based on the market close[2].

The LRP contract on 10/06/03 offer was based on the closing prices October 3, 2003 or the prior Friday. The LRP with a 26 week coverage contract would expire on 4/05/04 or 24 days earlier than the April put as quoted on October 6, 2003. The highest LRP guarantee available on October 6, 2003 was $82.78 (Table 1, line 21). The premium cost, including subsidy was $13.59 per head for 750 pound calves. The LRP contract was then converted to a similar size contract as the 50,000 pound put option. The total LRP premium cost for a similar number of calves as covered by the put would have been $906 (Table 1, line 24). The producer does not pay any commissions.

On this date the put option would appear to be cheaper than the LRP contract. However, one can not directly compare the put and LRP unless they just happen to have the same strike and expiration date.

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[2]The analysis is based on the market close. However, it is very unlikely that a livestock producer would have a put order filled at the closing premium. Producers will likely need to bid higher premiums to get a put order filled, especially on deferred contracts.

Simultaneous expiration and strike prices did occur on 10/02/03, when the strike for the put and LRP was $82 and both will expire on 4/29/04. On 10/02/03 the LRP and put offered nearly the same coverage and the put was the least expensive. The total cost of the put was $1,075 (Table 1, line 13 and line 15) versus $1,132 for the LRP (Table 1, line 24) on a similar number of calves.

Comparing the LRP and the put based on the same coverage requires one to adjust the put premium to reflect the difference in (lower) strike and longer time to expiration. The put premium was adjusted (line 14) based on the LRP days to expiration (line 16), LRP strike (line 21), and the implied volatility (line 7) in Table 1. The adjusted put premium plus commission (line 15) would then be compared with the total LRP premium for a similar number of calves (line 24).

Assuming that both contracts could be filled on the selected date, the put option would be the preferred coverage on 10/02/03 while LRP would be the preferred coverage on 10/3/03. LRP on 10/03/03 generated 9.40% less premium (line 26) than similar coverage under a put. However, livestock producers would still not want to purchase the LRP because the market was higher. Because the LRP is based on a one day lag in the market one would only consider purchasing LRP on a down market day. When markets decline puts are priced in "real" time but the LRP offer is based on the previous day's higher close and in most cases will be the better buy.

In theory the LRP should cost 13 percent less than similar coverage under a put because of premium subsidy. However, this is seldom the case when the current market is higher than the previous day. In Table 1, the market increased each day until 10/09/03. The LRP premium was 26.92% lower than the adjusted put premium. If one only buys LRP on days when the market is lower, then over the long run livestock producers should capture most (all ?) of the subsidy. If the selection is based on analysis similar to Table 1, then the expected return is likely to be higher than 13%. The odds of collecting most heavily favor producers on market limit down days. The odds most favor the insurance company\Risk Management Agency (RMA) on market limit up days.

On days when prices fall, the current bids for put options will normally increase but the LRP will be purchased based off of yesterday's higher market meaning lower LRP premiums. The extreme example will occur if the market were to receive some really bad news and lock limit down. On a lock limit down day, the LRP should offer an extremely attractive premium because it will be based off of the previous day's higher market close while the put is priced in real time. The puts continue to trade on limit down days and give information on how fast one wants to lock in an SCE.

This analysis assumes the livestock producer has enough cattle to fill a full put contract, while the LRP allows much smaller contract purchases. In addition, it assumes the put option would actually be filled. If one checks the option volume for $84.00 April puts the number of open contracts are less than 25 and the number of contracts traded on a single date may be none. Assuming one's agent is writing coverage for an insurance company that has livestock insurance capacity left, then the LRP contract order will be filled at the stated premium, while the put option may not be filled or may require a higher premium to get a fill.

The ability to adversely select on the LRP contract because of this one day price lag in a catastrophic market situation has been covered in a previous Web page publication at: http://www.agmanager.info/crops/insurance/risk_mgt/rm_pdf03/lrpas.pdf. The contract clearly needs an underwriting rule that would shut off the LRP sales should the market lock limit down. Currently, the only way sales would be shut off is if the company runs out of capacity to write the contracts. This is a possibility because there would undoubtedly be a run to the market to buy LRP coverage immediately on a lock limit down day.

Why was the LRP guarantee lower on 10/09/03? The LRP guarantee has a one day lag so guarantees and premiums are based on the prior day's CME futures market. The prior day April futures closed lock limit up of $1.50 at $92.50. However the next day's LRP guarantee, based on that lock limit up move, was lower on 10/09/03. Therefore, the question is if the market was lock limit up why did the guarantee also not increase? The premium costs were lower to reflect the LRP guarantee was further out of the money on 10/09/03. But that does not answer the question of why the LRP guarantee was lower, declining from $86.72 on 10/08/03 to $86.66 on 10/09/03 (Table 1, line 21).

LRP expected CME cash settlement price is based on a forecasting model that is not publicly available (Table 1, line 19). The April futures price on 10/08/03 was $92.50 based on 4/29/04 expiration date. However, the 10/09/03 LRP contract offer expires on 4/08/04 so the model also considers the March futures price on 10/08/03 that was $94.325 based on a 3/25/04 expiration date. Therefore, the LRP model estimates the CME cash price that would occur between the two futures contract expiration dates. The LRP forecasted CME cash settlement price on 10/09/04 for the LRP contract that will settle on 4/08/04 was $93.153 (Table 1, line 19).

The LRP rate procedure requires the rate to be based on options with open interest. The April contract on 10/08/03 had open interest in the $86 and $88 puts. However, there is a legal limit that the LRP guarantee price can not exceed 95% of the expected cash settlement price. On 10/09/03 the LRP price guarantee was $86.66 and the next available LRP guarantee was $88.66 and that guarantee would have exceeded 95% of the forecasted CME cash settlement price on line 19.

The coverage level also changes daily but is simply a calculated result from the LRP guarantee and forecasted CME cash settlement price (Table 1, line 18). However the coverage has been between 93% and 95% but setting the LRP guarantee price is the critical value.

What does this mean to livestock producers? When the market increases then the next day's LRP offer will either provide a higher price guarantee or the premium will be less. Following a limit up day, most producers would not have expected a 6 cent lower LRP guarantee but the premium per head was 87 cents lower. The premium would have been even lower but the volatility was higher.

Livestock producers will simply want to compare put premiums with LRP premiums on line 13 versus line 24. The author has taken the additional step to estimate put premiums assuming the put has the same strike and expiration date as LRP on line 15. Because the LRP and the April put have the same expiration date and strike on 10/02/03, the premiums were compared without any adjustment. However, the put is worth more because it is an American option while the LRP is closer to a European option. The LRP supporters also point out that one will likely have to pay more than the closing put premium to actually get a put order filled. There is also a problem filling LRP orders if the insurance company has reached its liability limit.

Livestock producers should only purchase LRP on a market down day, never on market up days because either the premium will be lower or the coverage will be higher on the next day. The only reason this might not be the case is a big one day change in volatility.

It would be helpful if the LRP expected price and price guarantee were removed from the "black box". If one had the formula, then one would not only know the current LRP offer that will expire at 8:00 p.m. Central Standard Time, but after the CME market closes one would also know the LRP expected price and guarantee for the next day. All one can say with current available information is that when the CME market increases the next day's LRP offer will be better.

Summary. What is this analysis telling producers, who are comparing put options with LRP? Livestock producers need to consider commission cost, expiration dates and strike prices when calculating the product that gives the most coverage for the least premium. LRP will likely be less expensive if the current day's market is lower. This will be especially true if the current day's market were to lock limit down. Producers have until 8:00 p.m. Central Standard Time to get a SCE purchased on their LRP policy from a licensed crop insurance agent. However, time will be critical so if livestock producers already have an LRP policy it will increase the odds they will be able to purchase an SCE. Because there is no cost until the SCE is purchased it is a good idea to apply for an LRP policy with a licensed crop insurance agent now so that one is in the position to purchase the SCE quickly if the market should change suddenly.

Looking at current offers a logical conclusion might be the insurance company's are expecting to capture some or most of the 13 percent farmer premium subsidy and in some cases an underwriting gain as is the case on 10/02/03 because the subsidized LRP premium is higher than the put premium. However, I don't expect very many livestock producers will buy the LRP contract on a market up day because of the one day lag in pricing the LRP coverage. They will nearly always find a better offer if they wait for a down market day even though they are planning to buy coverage. If livestock producers wait until the market closes lower, then the LRP premium and coverage will be based on the previous day's higher close. If most livestock producers buy the LRP contract on a market down day, which is the reverse of selecting the optimal day for picking loan deficiency payments, then over time one would expect much of the USDA subsidy to shift back to the producers.

Most insurance companies have transferred the maximum allowable LRP risk to USDA\RMA. Therefore, if the subsidy were being captured by the insurance company then ultimately a share of the subsidy will be captured by RMA. However, because producers currently can buy LRP after the CME put market closes one would expect producers to only buy the LRP coverage when it is considerably cheaper. Not only would producers over time expect to capture the 13 percent subsidy but they would also capture the expected underwriting loss.

While the odds may favor the producer on a given day, that does not necessarily mean the producer will collect an indemnity payment. However, if producers were able to "play the game" enough times with the odds in their favor then ultimately they will capture the net benefits. In aggregate one would expect this to be the result because a larger number of producers purchasing the coverage will generate the expected out come. Also, one would expect that many producers will use the LRP to scale in a minimum price by purchasing several smaller SCEs.

The livestock gross margin contract on Iowa hogs had a 2 week lag on price rather than a 1 day price lag before purchase. The result was a large amount of sales on the final sales closing date for the insurance contract. The rating of the livestock insurance products assumes the coverages are spread over time. Time is the only risk spread in the LRP contract, unlike crop insurance coverage that is spread over acres. It is possible that one part of the country will have good crops (likely) while other parts of the country will have a disaster. Therefore, not all crop insurance contracts will have a claim. In the case of the LRP contract everyone who buys an $82 LRP contract on a single day and if that contract ends up owing an indemnity payment then that indemnity payment will be paid to all LRP insured producers with an $82 LRP guarantee. If there is no spread in this contract, then over time the underwriting gains will either be 100 percent or 100 percent underwriting loss, and in most cases the underwriting loss will be even greater than 100 percent. This is a very unusual insurance instrument because companies don't typically expect an insurance product to generate a 100 percent gain or alternatively underwriting losses that exceed 100 percent. Because current underwriting rules now allow for sales to be concentrated on a single day and there is no stoppage of sales if the market locks limit down, then it is a good insurance company business to transfer the maximum risk to RMA.

The LRP reinsurance contract with RMA is different then the reinsurance contract on crops. Not all company's and insurance agents are writing the LRP contract either. Some companies may have already reached their capacity limit on the sale of LRP contracts. The previous paper covers many of the underwriting issues and explains further how livestock producers can adversely select on the LRP contract.

The Table below will also be posted on the Web site and updated periodically so that livestock producers can get a feel for when the LRP is the preferred contract versus when the put contract is the preferred alternative based solely on premium costs. The updated LRP-Put comparison is posted on the WEB at: http://www.agmanager.info/crops/insurance/price_risk/pr_pdf03/volatility04LRP.pdf. As stated previously, this will not be the only consideration because with such thin markets the puts may not be filled or the livestock producer may lack sufficient size to fully utilize a put option relative to the flexibility of being able to insure smaller units.

The optimal time to buy a put is at the top of the market. The optimal time to buy LRP is one day after the top of the market. However, livestock producers will only know the top of the market after the fact. (I am certain that I can NOT pick market tops!) Livestock producers should develop a written plan on how many steers they are willing to purchase SCEs on and the price guarantee they desire. Once the minimum price objective has been met, then take advantage of the one day lag and the maximum premium discount compared to puts. Because there is no cost, livestock producers should get a "free" LRP policy now so they are set to purchase the SCE when their minimum price objectives are met. With current cattle prices, one would think that if LRP does not make good business sense for livestock producers then it will probably never make sense.

Table 1. Compare Livestock Risk Protection (LRP) Contract with Chicago Mercantile Exchange (CME) Put Option Premiums for Similar Coverage

		Current	History				
1	Coverage Date	10/9/2003	10/8/2003	10/7/2003	10/6/2003	10/3/2003	10/2/2003
2	Option Expires	4/29/2004	4/29/2004	4/29/2004	4/29/2004	4/29/2004	4/29/2004
3	April Futures Price						
4	**Futures Increase/Decrease**	**($1.300)**	**$1.500**	**$1.500**	**$1.275**	**$0.225**	**$0.750**
5	April Feeder Cattle Futures Close	$91.200	$92.500	$91.000	$89.500	$88.225	$88.000
6	**April Feeder Cattle Put Strike**	**$86.00**	**$86.00**	**$84.00**	**$82.00**	**$82.00**	**$82.00**
7	Calculated Implied Put Volatility	19.30	18.42	17.33	17.24	17.06	17.08
8	**Weeks to Expiration**	**29.000**	**29.100**	**29.300**	**29.400**	**29.900**	**30.000**
9	Short-term Interest Rate	1.47%	1.44%	1.46%	1.33%	1.33%	1.33%
10	April Put Premium	$2.900	$2.300	$1.850	$1.650	$1.920	$2.000
11	Total Contract Premium	$1,450.00	$1,150.00	$925.00	$825.00	$960.00	$1,000.00
12	Commission[1]	$75	$75	$75	$75	$75	$75
13	**Total Producer Costs**	**$1,525.00**	**$1,225.00**	**$1,000.00**	**$900.00**	**$1,035.00**	**$1,075.00**
14	Premium Adjusted for Strike Price and LRP Expiration Date[2]	$2.895	$2.313	$1.852	$1.648	$1.950	$2.000
15	**Comparison Premium**	**$1,522.50**	**$1,231.50**	**$1,001.00**	**$899.00**	**$1,050.00**	**$1,075.00**
16	LRP Expires	4/8/2004	4/7/2004	4/6/2004	4/5/2004	4/2/2004	4/29/2004
17	**LRP Weeks Covered[3]**	**26.000**	**26.000**	**26.000**	**26.000**	**26.000**	**30.000**
18	Coverage Level	93.0300%	94.5500%	93.9100%	93.0100%	93.2400%	93.9800%
19	Expected Price	$93.153	$91.719	$90.289	$89.001	$88.835	$87.253
20	**LRP Expected Price Change**	**$1.434**	**$1.430**	**$1.287**	**$0.166**	**$1.583**	
21	**LRP Guarantee "Put Strike"[4]**	**$86.66**	**$86.72**	**$84.79**	**$82.78**	**$82.83**	**$82.00**
22	**Premium/head/750 lbs calf[5]**	**$16.69**	**$17.56**	**$14.58**	**$13.59**	**$14.27**	**$16.98**
23	LRP Adj. to CME Contract Size[6]	$1,112.67	$1,170.67	$972.00	$906.00	$951.33	$1,132.00
24	**Total Producer Costs**	**$1,112.67**	**$1,170.67**	**$972.00**	**$906.00**	**$951.33**	**$1,132.00**
25	**Adjusted Premium Difference**	**($409.83)**	**($60.83)**	**($29.00)**	**$7.00**	**($98.67)**	**$57.00**
26	**% LRP Discount vs Adj. Put**	**(26.92%)**	**(4.94%)**	**(2.90%)**	**0.78%**	**(9.40%)**	**5.30%**

[1]Commissions vary and some brokers charge a flat commission for options that includes the sale of the option, if it is in-the-money.

[2]The strike price and time value left in the option do not match the LRP guarantee on most days. Therefore, the put premium was adjusted to reflect the LRP strike and remaining time value so the two products could be compared.

[3]The LRP contract based on the April Put declines in time coverage daily. For example the coverage weeks declined from 30 weeks on 10/2/03 to 26 weeks on 10/3/03.

[4]The LRP strike varies daily and is based on the expected market price and can not exceed 95% of the expected market price.

[5]LRP premiums are based on the previous day's close of CME option market.

[6]LRP premiums were adjusted to cover 66.67 head of 750 pound calves or 50,000 pounds that is equivalent to a CME option. Unlike the futures and options, LRP does not have a fixed size contract. For example a producer could purchase an LRP contract on 10 head of 750 pound calves for a total of 7,500 pounds.