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IMPLICATIONS OF LIVESTOCK RISK PROTECTION SUBSIDY RATE CHANGES FOR FEEDER CATTLE

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INTRODUCTION

Price risk is a primary source of risk for cattle producers. Larger cattle operations have traditionally managed this risk using futures and options contracts. However, futures and options contracts are traded in 50,000-pound increments, which makes these tools inefficient for producers marketing less than 50,000-pounds at one time

An alternative for managing price risk is Livestock Risk Protection insurance (LRP). LRP can be used to manage price risk on as few as one animal, and it pays policyholders at the time of policy expiration if a cash price index is lower than the insured price, which is set when the policy is purchased. LRP is flexible in that several coverage levels and endorsement lengths (period) are available each day. Premiums for LRP increase as coverage level (coverage price) and endorsement length (number of weeks in the future in which to insure a price) increase. Coverage levels range from 70 to 100 percent of the expected ending value and when multiplied by the expected ending value, result in the coverage price. For more specifics on LRP, please refer to Griffith, 2021.

LIVESTOCK RISK PROTECTION INSURANCE (LRP)	SUBSIDY RATE
Initial subsidy on insurance premiums (Merritt et al. 2017)	**13%**
Current coverage level between 95 and 100 percent*	**35%**
Current coverage level between 90 and 94.99 percent*	**40%**
Current coverage level between 85 and 89.99 percent*	**45%**
Current coverage level between 80 and 84.99 percent*	**50%**
Current coverage level between 70 and 79.99*	**55%**

** USDA RMA, 2021a*

When the LRP program was initiated, insurance premiums received a 13 percent subsidy. Nonetheless, at this subsidy rate, LRP policies were expensive and would only pay indemnities when prices would rapidly decline in a short period (Merritt et al. 2017). Subsidy rates were increased in both 2019 and 2020. The new subsidy rate structure is a 35 percent subsidy for a coverage level between 95 and 100 percent, 40 percent for coverage between 90 and 94.99 percent, 45 percent for coverage between 85 and 89.99 percent, 50 percent for coverage between 80 and 84.99 percent, and 55 percent for coverage between 70 and 79.99 percent (USDA RMA, 2021a).

The objective of this research was to determine the impact of the 2020 LRP subsidy rate change on price protection for feeder cattle, and determine the probability of the LRP insured price being greater than the actual ending price (e.g., an indemnity being paid). These results could help cow-calf and stocker producers identify the contract that best fits their needs.

LIVESTOCK RISK PROTECTION

LRP premiums are determined by the coverage level, endorsement length and date of purchase. Similar to a put option contract, a higher coverage level provides a higher price floor but has a higher premium. At insurance policy expiration, the actual ending price of the policy is recorded and payments are calculated. Upon policy expiration, policyowners either receive an indemnity payment or must pay part or all of their premium. The indemnity is zero if the coverage price, which is the expected ending price multiplied by the coverage level, is less than the actual ending price. However, if the coverage price is greater than the actual ending price then the indemnity is the difference between the coverage price and actual ending price. A partial payment of the premium occurs when an indemnity payment is greater than zero, but less than the cost of the insurance policy (i.e., Net LRP Price = Actual Ending Price + Indemnity; Indemnity = Coverage Price – Actual Ending Price - Premium Cost)

DATA

LRP insurance data from January 2014 through December 2018 were provided by the USDA RMA (2021b) to evaluate the impact the subsidy rate changes in 2020 would have had on LRP premiums. Data from 2014 through 2018 were used due to major market movers (i.e., Tyson beef processing facility fire and the COVID-19 pandemic) influencing market prices. Additionally, this study was performed immediately following the subsidy changes. Thus, any change to premiums was not accounted for in this study due to the data not being available. Daily offerings were aggregated by month of the expected ending date. This paper focuses on 600- to 900-pound feeder cattle, making the results applicable to cow-calf and stocker operators. Few contracts offered exceeded 30 weeks (210 days), which is why insurance periods over 30 weeks were excluded from the analysis. Additionally, coverage levels less than 85 percent were excluded, because they were less than 2 percent of these data. These data are not LRP policies that were sold but those that were offered.

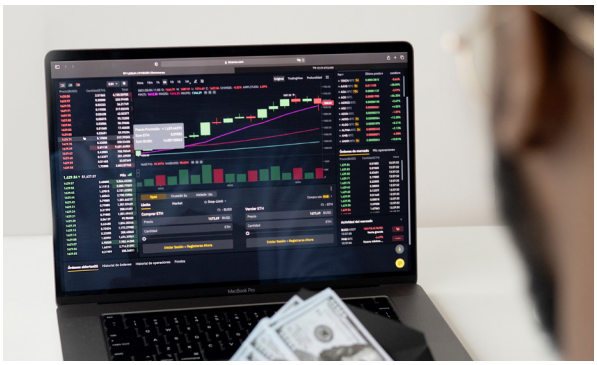

Table 1 shows the summary statistics of the difference in net LRP prices and actual ending prices and the probability of the net LRP price being greater than the actual ending price by month. The highest probabilities occur from October through March. The likelihood of the net price being greater than the actual ending price in June, July and August was less than 7 percent. On average, the LRP net price was lower than the actual ending price in eight months (February through September) and positive the remaining four months (October through January). The probability of the net LRP price being greater than the actual ending price based on coverage level and length is presented in Figure 1. As coverage level increased, so did the probability of the net LRP price exceeding the actual ending price while shorter endorsement lengths (13- and 17-week contract length) provided the highest likelihood of the LRP price being greater than the actual ending price.

Table 1. Summary Statistics of the Difference in Net Livestock Risk Protection (LRP) Price and Actual Ending Price and Probability Net LRP Price was greater than the Actual Ending Price by Month from 2014 to 2018.

MONTH	AVERAGE	MINIMUM	MAXIMUM
	Probability Net LRP price > Actual Ending Price (%)		
January	20.40%	0	1
February	23.40%	0	1

MONTH	AVERAGE	MINIMUM	MAXIMUM
March	21.60%	0	1
April	16.40%	0	1
May	17.10%	0	1
June	6.60%	0	1
July	2.50%	0	1
August	1.70%	0	1
September	15.60%	0	1
October	26.80%	0	1
November	27.60%	0	1
December	21.50%	0	1
	Net LRP Price minus Actual Ending Price ($/cwt)		
January	$0.14	($9.31)	$50.21
February	($0.22)	($10.91)	$39.07
March	($1.01)	($9.93)	$28.29
April	($1.68)	($10.59)	$29.32
May	($1.47)	($10.55)	$28.15
June	($2.53)	($11.16)	$15.16
July	($2.84)	($11.59)	$15.50
August	($3.16)	($12.02)	$11.77
September	($1.18)	($11.76)	$27.75
October	$0.81	($9.23)	$36.02
November	$0.94	($9.62)	$41.69
December	$1.95	($10.57)	$62.27

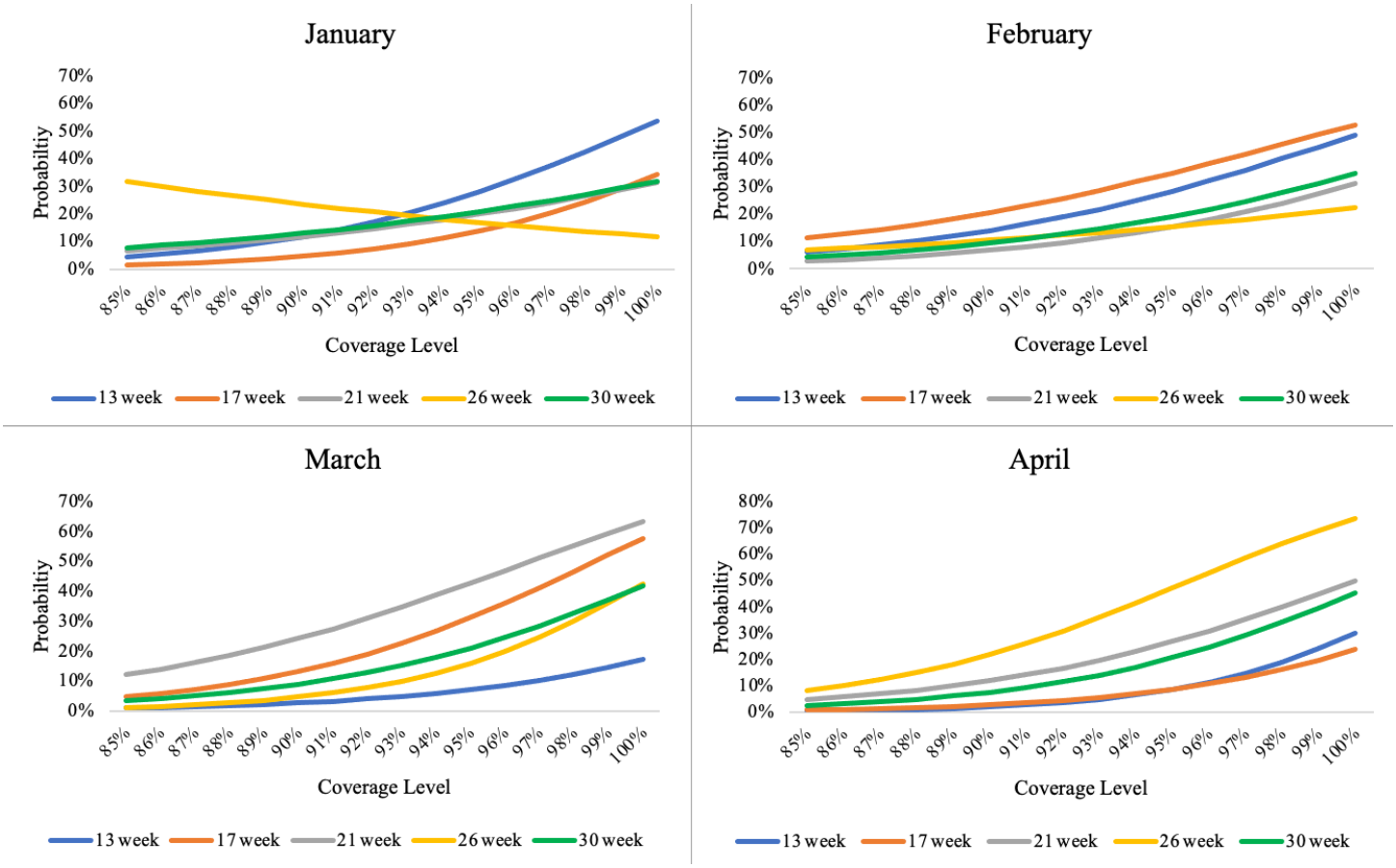

Figure 1. Predicted Probability of Net Livestock Risk Protection Price being Greater than the Actual Ending Price under the 2020 Subsidy Structure for January, February, March and April.

LRP premiums and indemnity payments by month are presented in Table 2 with the average cost ranging from $3.69 per cwt (December) to $4.31 per cwt (April) while average indemnity payments ranged from $0.27 per cwt (July) to $5.16 per cwt (December). LRP premiums during the time period analyzed ranged from $0.10 per cwt to $14.18 per cwt while at least one indemnity payment was nearly $70 per cwt.

Table 2. Summary Statistics of the Livestock Risk Protection (LRP) Premiums and Indemnity Payments by Month from 2014 to 2018.

MONTH	AVERAGE	MINIMUM	MAXIMUM
	LRP Premiums ($/cwt)		
January	$3.98	$0.33	$12.63
February	$4.15	$0.16	$12.54
March	$4.26	$0.10	$11.75
April	$4.31	$0.24	$13.44
May	$4.17	$0.18	$14.18

MONTH	AVERAGE	MINIMUM	MAXIMUM
June	$3.91	$0.11	$13.34
July	$3.80	$0.15	$13.60
August	$3.94	$0.27	$14.18
September	$3.84	$0.22	$13.52
October	$3.94	$0.39	$12.28
November	$3.84	$0.26	$12.30
December	$3.69	$0.27	$12.15
	LRP Indemnity Payment ($/cwt)		
January	$3.59	$0.00	$57.48
February	$3.40	$0.00	$45.91
March	$2.70	$0.00	$33.35
April	$2.07	$0.00	$39.27
May	$2.16	$0.00	$38.28
June	$0.87	$0.00	$26.04
July	$0.46	$0.00	$25.58
August	$0.27	$0.00	$22.31
September	$2.16	$0.00	$34.13
October	$4.24	$0.00	$41.13
November	$4.29	$0.00	$49.92
December	$5.16	$0.00	$69.45

RESULTS

The probability of the net LRP price being greater than the actual ending price by month for each contract length and coverage level is plotted in Figures 1 (January through April), 2 (May through August), and 3 (September through December). In January, the 13-week contract length with 100 percent coverage provides the highest likelihood (54 percent) of the net LRP price being greater than the actual ending price while any coverage level less than 96 percent and all other endorsement

lengths has a less than a one in three chance of such happening. The probabilities for February are similar to January in that the 13- and 17-week endorsement lengths at a 100 percent coverage level yield a 49 percent and 53 percent probability, respectively, of the net LRP price being greater than the actual ending price. Similar to January, the probabilities decline rapidly with longer contract lengths and lower coverage levels. Considering March, the 17- or 21-week contracts appear the most advantageous. The 21-week 100 percent coverage level has a 63 percent probability of the Net LRP price being greater than the actual ending price with coverage levels of 97 percent and higher having better than a 50 percent likelihood. Similarly, the 17-week contract with a 99 percent coverage level or higher has greater than a 50 percent likelihood of producers receiving a payment. April and May results show the 26-week contract is preferred and net LRP price has a 74 percent and 61 percent, respectively, chance of being greater than the actual ending price at 100 percent coverage.

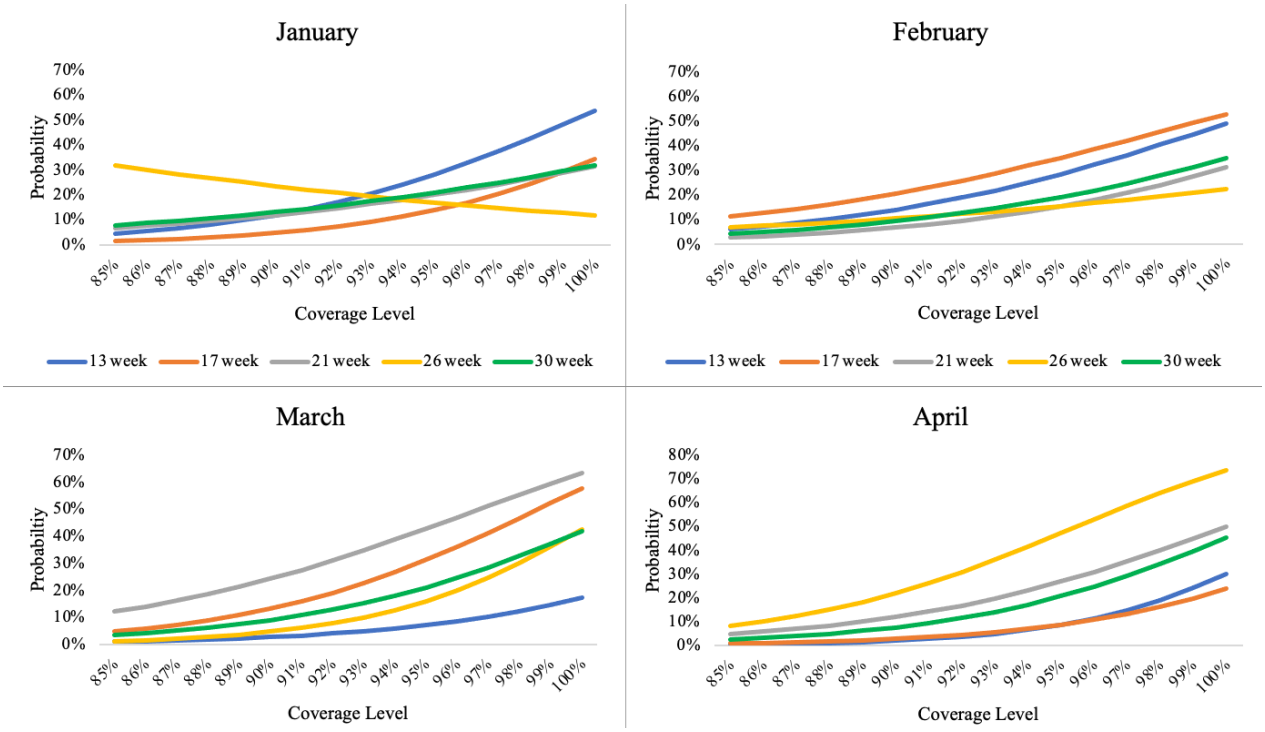

Figure 1. Predicted Probability of Net Livestock Risk Protection Price being Greater than the Actual Ending Price under the 2020 Subsidy Structure for January, February, March and April.

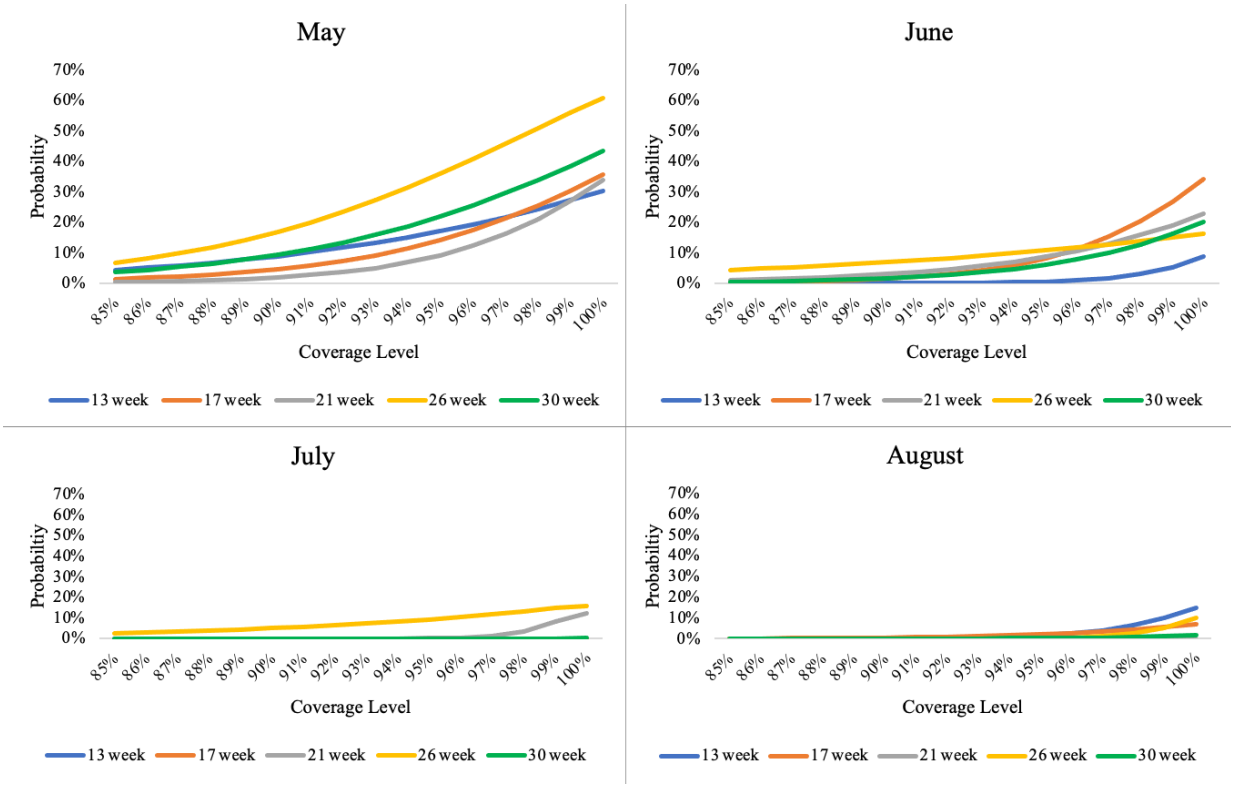

Figure 2. Predicted Probability of Net Livestock Risk Protection Price being Greater than the Actual Ending Price Under the 2020 Subsidy Structure for May, June, July and August.

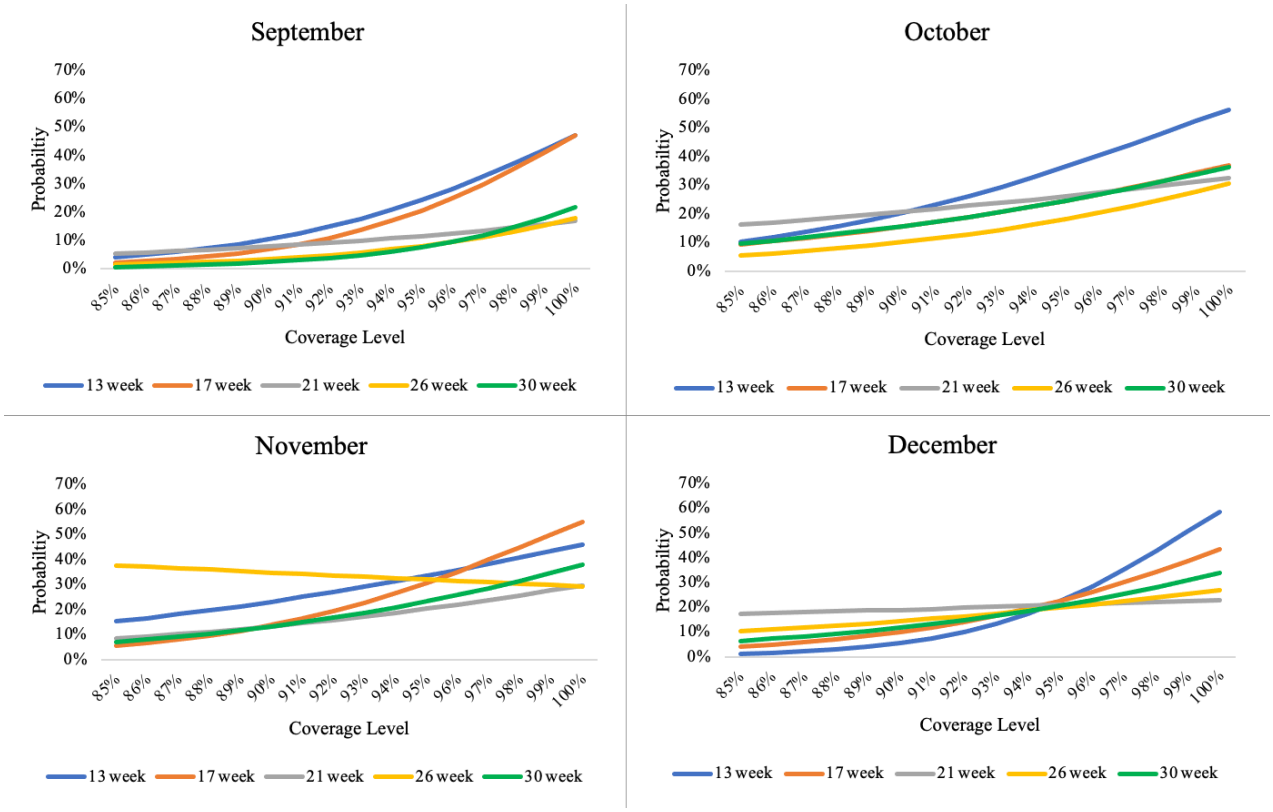

Figure 3. Predicted Probability of Net Livestock Risk Protection Price being Greater than the Actual Ending Price Under the 2020 Subsidy Structure for September, October, November and December.

The likelihood of LRP contracts resulting in a positive payment to purchasers for June, July and August (Figure 2) are relatively low. This means producers marketing cattle in these months may be better off assuming the price risk themselves instead of trying to transfer it through purchasing insurance. This does not mean producers cannot successfully use LRP in these months as transferring price risk by setting a price floor can ease concerns related to market price declines. For September, both the 13- and 17-week endorsement lengths at a 100 percent coverage level had a 47 percent probability of the net LRP price being greater than the actual ending price, but no other coverage levels and coverage lengths evaluated provided much price protection. The 13-week (October and December) and 17-week coverage length (November) with a 99-100 percent coverage rate were the only two alternatives evaluated for each month that had probabilities greater than 50 percent.

The probabilities of receiving a payment from LRP insurance purchase help clarify the decision to use LRP to mitigate price risk. Production systems that result in marketing cattle from June through August may not see much benefit from LRP policies while production systems marketing the remaining nine months of the year may find it more beneficial. Looking at the probabilities that the net LRP price will be greater than the actual ending price, the most benefit from insurance purchase will come from a producer selecting a high coverage level (greater than 95 percent) and endorsement lengths of 13- to 21-weeks. This general finding is a factor of longer-term endorsement lengths having higher costs than shorter contract lengths and cattle prices rarely decreasing a great deal over a three- to five-month period, which is why the results would suggest purchasing insurance with a high coverage level and endorsement lengths of 21 weeks or less.

The new subsidy structure did increase the likelihood of insurance resulting in a payment to purchasers, but its impact varied across months. Again, it should be reiterated that the subsidy rate increase would have reduced the cost to producers under the insurance premium structure prior to the policy change. The change in probabilities under the new subsidy structure sheds light on how often producers were owed indemnity payments under the old structure that did not exceed the initial producer premium cost. The likelihood for January and February increased between 1 and 6 percent, while the months of March, April and May had instances of the probabilities increasing as much as 10 percent. The likelihood increases for September through December were not as prominent, but there were instances of increases up to 4 percent.

Average producer premiums (total premium minus the subsidy) for both subsidy structures by coverage level and length are shown in Table 3 as well as the difference in the two. The new subsidy structure reduced producer premiums between $0.42 per cwt and $1.48 per cwt, depending on the coverage level and coverage length. However, the actual reduction in producer premiums due to the subsidy change is unknown, because it is likely the premium structure changed with the new subsidy structure.

Table 3. Average Livestock Risk Protection (LRP) Premium Cost for Producer ($/cwt) with the Pre-2019 and 2020 Subsidy Structure.

COVERAGE LENGTH	PRE-2019 SUBSIDY STRUCTURE	2020 SUBSIDY STRUCTURE	REDUCED COST FROM SUBSIDY CHANGE
Coverage Level 85% - 89.99%			
13	$1.14	$0.72	$0.42
17	$1.48	$0.94	$0.54
21	$1.81	$1.14	$0.66
26	$2.20	$1.39	$0.81
30	$2.55	$1.61	$0.94
Coverage Level 90% - 94.99%			
13	$1.88	$1.29	$0.58
17	$2.36	$1.63	$0.73
21	$2.76	$1.90	$0.86
26	$3.27	$2.26	$1.02
30	$3.57	$2.46	$1.11
Coverage Level 95% - 100%			
13	$3.98	$2.97	$1.01
17	$4.50	$3.36	$1.14
21	$4.94	$3.69	$1.25
26	$5.47	$4.09	$1.38
30	$5.86	$4.38	$1.48

CONCLUSIONS

LRP is an insurance tool to protect against price risk. However, adoption has been limited. In 2020, the LRP subsidy rate was increased to lower the cost to producers, which was intended to encourage use of LRP. The findings of this study demonstrate LRP contract endorsement lengths and coverage levels providing the most protection vary by month. For example, purchasing LRP for feeder cattle sold in June, July and August does not appear advantageous. Alternatively, there are other months in which purchasing LRP will result in a higher price than not purchasing LRP 50-60 percent of the time. The new subsidy structure increased the likelihood of the net LRP price being greater than the actual ending price in some months (i.e., feeder cattle marketed in spring).

The new subsidy structure lowered the cost of LRP assuming premiums did not increase at the same rate. Similarly, the lower cost increases the likelihood of the net LRP price being greater than the actual ending price for several months. However, LRP contracts in June, July and August did not appear to be that effective. It is important to reiterate that it is unknown how the premium rate structure changed when the subsidy rate structure changed. Thus, it is important to evaluate the new subsidy structure against current premiums to determine the overall impact for current LRP offerings

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