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Livestock Risk Protection: Selecting Optimal Coverage Contracts for Producers

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Abstract

We evaluate the optimal producer-selected coverage options comprised of coverage length and level for each marketing month for feeder cattle steers (600-900lbs.) insured with Livestock Risk Protection insurance. The optimal contracts are identified as those which have historically provided the highest probability of a positive net return and the highest average net return. We find that, regardless of marketing month, the optimal contracts consist of relatively high coverage levels whereas the optimal length of the contracts varies across months. The results are compared against actual policies purchased to evaluate whether producer decision patterns align with the current findings.

Introduction

Livestock producers regularly strive to maximize profits while simultaneously mitigating risks—most importantly, price risk. The past few years have demonstrated the volatile nature of agricultural markets, especially livestock markets. While price risk will always be a concern, producers have tools available to help mitigate this risk. Some of the more commonly known risk management tools include forward contracts, futures put options, and livestock risk protection (LRP) insurance. While each of these tools show to be effective at helping to reduce price risk (Coelho, 2008; Feuz, 2009; Burdine & Halich, 2014; Griffith, Boyer & Lewis, 2017), some work better for one operation compared to another. LRP insurance was created by the Risk Management Agency (RMA) of the United States Department of Agriculture (USDA) in 2003. This risk management tool is an insurance product for livestock producers to help mitigate and compensate for losses as a result of unexpected low prices in the market. LRP differs from other risk management tools by offering producers the ability to insure as little as one animal, creating greater flexibility that favors smaller-scaled producers. Historic participation rates in the LRP program have been low with actual total contracts purchased in 2019 and 2020 equaling 1,092, and 1,108 respectively (U.S. Department of Agriculture, 2022). Previous studies propose that the lack of participation is due to a variety of factors including lack of program understanding, uncertainty of which contract options to choose, and the optimistic thought process that prices will remain high (Burdine & Halich, 2008, 2014; Griffith, Boyer & Lewis, 2017). LRP program participation increased significantly in 2021 with participation continuing to trend upward in 2022. This increased participation comes in part due to an increase in the premium subsidy levels offered by the government (Parsons, 2021). When the program was first rolled out, the government offered a flat 13% subsidy for premiums regardless of the selected coverage level. For the 2019 crop

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year,³ the subsidization rate was increased to 20%. In 2020, the subsidy rate increased greatly. The current subsidy rates range from 35-55% varying inversely with the coverage level selected. These increased subsidy levels have been shown to often make LRP more affordable than futures put options and have increased the demand for the product from producers looking to mitigate price risk (Parsons, 2021).

The purpose of this study is to determine the optimal producer-selected coverage options comprised of coverage length and coverage level for each marketing month⁴ for feeder cattle steers (600-900lbs.). The optimal contracts are determined to be those that have historically maximized the probability of a positive net return while also providing the highest average net return. After determining the optimal coverage options, we compare them with the actual contracts purchased from 2019 to April 2022 to determine if producers are currently making optimal coverage decisions when purchasing LRP insurance. This study is sorely needed, as previous literature with similar objectives was performed before the changes in subsidy levels that started in 2019. These significant changes warrant reexamination of the optimal choice sets of producer-selected coverage options. Many producers are overwhelmed by the vast array of coverage options. The hope is to partially alleviate the concern of producers being overwhelmed by coverage options and present a more concise choice set of selections for feeder cattle producers.

Literature and Background Information

Because LRP is an insurance product administered by the RMA, producers wanting to use this tool must go through the proper process. First, the producer submits an application with an approved livestock insurance agent. After application acceptance, producers can watch the daily LRP expected ending price and coverage options posted on the USDA website. Once a producer finds a contract that they like with a specific coverage length (weeks) and level (percent of expected ending price) they can contact their agent to purchase a specific coverage endorsement (SCE). The insured contract ending prices are not based on an individual producer's spot market price they receive, but rather a 12-state index based on the futures market prices, called the Chicago Mercantile Exchange Feeder Cattle Index (CME FCI). Upon contract expiration there are two possible scenarios: 1) prices rose during the time the contract was held such that the actual ending value is now above the coverage price from the policy resulting in full premium (less subsidy) paid by the producer with no indemnity received or 2) prices fell during the time the contract was held such that the ending value is less than the coverage price resulting in the producer receiving an indemnity payment equal to the difference between the two prices.

While this program has been around for almost two decades now, the number of participants is relatively low compared to most other risk management tools (Burdine & Halich, 2014). Major reasons influencing this lack of participation include the absence of knowledge regarding how effectively the program works, and which coverage options to select (Burdine & Halich, 2014; Griffith, Boyer & Lewis, 2017). Only recently has research been conducted to determine which

³ The LRP insurance crop year is from July 1st to June 30th.

⁴ A marketing month is the month in which producers intend to sell their livestock.

combination of producer-selected coverage options would provide the best outcomes. In other words, which coverage length and level would most likely return an indemnity payment exceeding the amount of premium paid (Griffith, Boyer, and Lewis, 2017). While this research helped producers make more informed coverage option selections at the time, the substantial change to the subsidy rate structure since that time suggests that the findings are now outdated.

Boyer and Griffith (2022) analyzed the effect of the most recent subsidy changes on the probability of a positive net return by comparing pre and post subsidy change probabilities. They concluded that the new subsidy rate structure lowered the overall cost of purchasing LRP insurance assuming the premium rate structure remained constant from pre to post subsidy rate change. However, no research has readdressed the optimal producer-selected coverage options post-subsidy rate change leaving producers partially uninformed in making these coverage decisions.

Data and Methods

Historical LRP policy data was retrieved from the USDA RMA from 2005 to September of 2021. This data is comprised of all LRP contracts offered for feeder cattle steers 600-900 lbs. (weight 2). The data contains information regarding the length of the contract which can consist of 13, 17, 21, 26, 30, 34, 39, 43, 47, and 52 weeks. The coverage level is also provided and can range from 75% to 100% coverage of the expected ending price. Other variables in the dataset are the expected ending price, the premium cost, and the actual ending price all expressed as dollars per hundredweight (\$/cwt).

For our analysis, only coverage lengths of 13, 17, 21, 26, and 30 weeks are analyzed as relatively few contracts are offered and sold at higher lengths (U.S. Department of Agriculture, 2022). We also exclude coverage levels below 85% as contracts below that threshold only account for 1% of the policies purchased (U.S. Department of Agriculture, 2022). For our analysis, the coverage levels are split into five different category levels expressed as follows: 1 = (85.00% - 89.99%), 2 = (90.00% - 92.49%), 3 = (92.50% - 94.99%), 4 = (95.00% - 97.49%), and 5 = (97.50% - 100.00%). These categories are aligned with the new subsidy levels to ensure that each category level only has one subsidy level assigned to it. Then, the producer premium paid can be calculated as the cost per hundredweight multiplied by one minus the subsidy amount. While the most recent subsidy rate changes only came into effect in 2020, we apply those subsidy levels across the entire span of the data from 2005 until now to evaluate the expectations given the new subsidy rate structure.

The data for the actual contracts selected was retrieved from the USDA RMA for the years 2019 to April 2022. Data before these years was not available, and since we are looking at the changes in the program due to the increase in subsidies occurring in 2019 and 2020, this data is sufficient to accomplish the objective. The sample size for this dataset was $N = 72,539$.

Empirical Methods

The first part of determining the optimal LRP feeder cattle coverage options is to determine which combinations of coverage length and level have historically provided the highest likelihood of receiving a positive net return. The net return for each contract can be defined as

$$(1) \quad NR_i(L, C) = I_i(L, C) - P_i(L, C)$$

where $NR_i(L, C)$ is the net return (\$/cwt) for the i^{th} insurance contract and is a function of coverage length L in weeks, and of coverage level C between 85% - 100%. I_i is the indemnity payment to the producer, and P_i is the producer premium (net of subsidy). Using probit regression models the marginal probabilities of a LRP contract having a positive net return for the various coverage lengths and levels are estimated for each marketing month. We also calculate the historical average net return of each combination of coverage length and level. Using ordinary least squares regression, we make statistical inferences for the coverage options that have historically provided the highest average net returns.

Results

Following the estimation of the probit model for each marketing month, marginal probabilities are estimated and pairwise comparisons are made for all 25 combinations of coverage length and level at the 5% significance level. Tables 1 and 2 depict the predicted probabilities of a positive net return for the marketing months of January-June, and July-December respectively. The coverage lengths and levels marked with an 'a' superscript designate the contract options that have historically provided the highest ($\alpha=0.05$) probability of a positive net return within a specific marketing month. There are only four months in which the probability of having a positive net return was over 50% if a producer would have selected the probability maximizing coverage options. This suggests, on average, producers holding LRP feeder weight 2 contracts should not expect to be indemnified to a level that exceeds the producer premium cost. The results clearly indicate a strong positive correlation of coverage level and the probability of a positive net return. Figure 1 shows the results for the marketing months of January and April as well as the annual average (across all months) with the combination of coverage length and level being plotted against the predicted probabilities. The figure shows a cyclical effect occurring across all marketing months with higher coverage levels associated with an increased probability of a positive net return regardless of coverage length. The results also suggest a connection between the coverage lengths and the probability of a positive net return. For the month of April (as seen in Figure 1), increases to coverage length are correlated with an increased probability of a positive net return as seen by the overall upward trend in the cyclical stair-step pattern. However, this trend is not consistent across all marketing months (e.g., January demonstrates a negative correlation), suggesting that the effect of coverage length on the probability of a positive net return varies across marketing months.

Historical average net return values are estimated by coverage length and level for each marketing month and are shown in Tables 3 and 4 for marketing months January-June and July-December, respectively. The coverage lengths and levels marked with an 'a' superscript designate the contract options that have historically provided the highest ($\alpha=0.05$) average net return within a specific marketing month. The results indicate that over half of the contract options have historically provided a negative average net return, which is expected when purchasing an insurance product. The month with the highest average net return was April at \$2.21/cwt across all coverage length and level combinations. Within April the 26-week coverage level 5 (97.5-100%) contract provided the highest average net return of \$6.16/cwt. The second highest average net return was for the 26-week coverage level 5 (97.5-100%) contract in May at \$4.45/cwt.

Combining the coverage options (lengths and levels) for each marketing month that have historically provided the statistically highest probability of a positive net return and highest average net return provides producers with a choice set of coverage options that have historically mitigated risk and maximized return. Table 5 displays the amount of LRP feeder cattle steers (weight 2) contracts that were sold by combination of coverage length and level for each marketing month from 2019-2022. Within Table 5, the coverage lengths and levels that have been highlighted in gray correspond to the combinations that were determined to historically provide the highest probability of a positive net return and highest average net return. This choice set of producer-selected coverage options can be useful to producers when purchasing LRP contracts to make informed decisions. For example, if a producer were to typically market feeder cattle in April, then referencing Table 5, the optimal coverage length and level (combinations that historically minimized price risk and maximized net returns) would be a contract for 26 weeks with a coverage level of 4 or 5 (95.00-100.00%). In this example, the producer would plan to purchase the LRP contract in October to capture the 26-week contract length.

By comparing the counts of actual purchased LRP contracts by coverage length and level within Table 5 to those suggested as our optimal choice set (highlighted in gray) we can gain a better understanding of if producers have already been choosing contracts that match this optimal set of choices. The actual purchase patterns suggest that producers are choosing policies on average with higher coverage levels which is consistent with the findings of our research of coverage level being positively correlated with the probability of a positive net return and average net return. The highest density of policies is in the level 5 coverage zone which covers 97.50% - 100%. However, Table 5 also demonstrates that producers may be less informed when selecting coverage length as the purchase patterns are less aligned with the suggested optimal choice set. While this could suggest that producers are less informed as pertaining to contract length it may also simply be a result of producers not planning far enough ahead or thinking about purchasing LRP until they are close to their respective marketing months. Planning out ahead 30 weeks can be a challenge for producers, but our results suggest that for some marketing months it may be beneficial to purchase the contracts with these longer lengths.

Conclusion and Implications

This study can help producers make informed coverage option selections when purchasing LRP insurance contracts. The study also informs producers who are considering incorporating LRP into their risk management plans about the historical effectiveness of the program. In general, we conclude, regardless of marketing months, higher coverage levels should be preferred to lower levels as they are shown to provide a higher probability of positive net returns and higher average net returns. The effect of coverage length is less consistent and dependent upon the marketing month. Future research could consider how the subsidies have affected participation and the premiums and pricing of LRP contracts, as well as including other insurable commodities available through LRP insurance. Researchers and extension and insurance agents can use the results of this research to inform producers about LRP and how to select coverage options to best match with the risk preference and management of their individual livestock operations.

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Table 1. LRP Predicted Probabilities (%) of a Positive Net Return for Feeder Cattle Steers Weight 2 by Coverage Length and Level: January-June, 2005-2021

Coverage Length/Level	January	February	March	April	May	June
Length (weeks)						
13	15.57	--	20.57	27.32 ^d	27.16 ^b	13.67 ^b
17	25.4 ^b	16.18	24.05 ^a	29.66 ^{c,d}	27.22 ^b	15.86 ^b
21	25.96 ^a	17.61	26.12 ^a	32.28 ^{b,c}	32.66 ^a	18.82
26	17.45 ^a	16.66	15.55	39.38 ^a	34.36 ^a	26.95 ^a
30	9.74 ^b	--	--	34.79 ^{a,b}	35.53 ^a	29.68 ^a
Level ^a						
1	9.23	--	--	19.03	12.34	5.98
2	17.26	7.47	14.88	29.3	24.43	13.29
3	23.99	15.14	24.86	34.45	33.05	20.22
4	22.75	22.25	34.34	39.42	47.67	34.9
5	32.81 ^a	35.66 ^a	46.77 ^a	45.70 ^a	53.51 ^a	40.72 ^a
Length/Level						
13/1	4.02 ^{h,i}	--	6.40 ^l	15.13 ^j	5.72	3.38 ^m
13/2	11.91 ^{f,g}	5.12 ^{f,g}	17.72 ^{h,i,j}	22.90 ^{h,i}	19.94 ^{h,i,j}	6.46 ^l
13/3	19.24 ^{d,e}	13.64 ^{d,e,f}	21.94 ^{g,h,i}	32.28 ^{e,f,g}	34.15 ^{d,e}	14.05 ^{i,j}
13/4	25.15 ^{c,d}	24.56 ^d	31.64 ^{e,f}	36.13 ^{d,e,f,g}	51.79 ^{a,b}	33.24 ^{c,d,e}
13/5	34.64 ^{a,b}	34.92 ^{a,b}	37.99 ^{d,e}	41.53 ^{c,d}	57.70 ^a	42.25 ^b
17/1	17.00 ^{e,f}	2.61 ^g	5.13 ^l	18.35 ^{i,j}	12.60 ^k	1.68 ^m
17/2	23.23 ^{c,d}	6.77 ^{f,g}	16.84 ^{i,j}	28.90 ^{f,g,h}	23.59 ^{g,h,i}	10.61 ^{j,k}
17/3	27.57 ^c	15.66 ^{d,e,f}	30.95 ^{e,f}	36.67 ^{c,d,e,f}	30.13 ^{d,e,f,g}	19.19 ^{g,h,i}
17/4	27.13 ^c	32.43 ^{a,b}	39.60 ^{c,d}	33.18 ^{d,e,f,g}	37.68 ^{c,d}	42.47 ^b
17/5	36.45 ^a	40.69 ^a	47.87 ^{a,b}	39.44 ^{c,d,e}	46.69 ^b	50.46 ^a
21/1	19.88 ^{d,e}	4.83 ^{f,g}	5.39 ^l	19.87 ^{i,j}	17.24 ^{j,k}	9.63 ^{k,l}
21/2	25.98 ^{c,d}	11.64 ^{e,f}	19.23 ^{g,h,i,j}	31.16 ^{e,f,g,h}	26.77 ^{f,g,h}	15.77 ^{h,i,j}
21/3	25.29 ^{c,d}	21.10 ^{c,d,e}	30.57 ^{e,f}	36.68 ^{c,d,e,f}	34.30 ^{d,e,f}	20.61 ^{g,h}
21/4	24.62 ^{c,d}	21.11 ^{c,d,e}	41.99 ^{b,c,d}	37.71 ^{c,d,e,f}	46.50 ^{b,c}	25.66 ^{f,g}
21/5	37.27 ^a	35.55 ^{a,b}	54.77 ^a	45.50 ^{b,c}	52.23 ^{a,b}	33.46 ^{c,d,e,f}
26/1	9.52 ^g	3.23 ^g	1.85	27.80 ^{g,h}	18.15 ^{i,j,k}	17.11 ^{h,i}
26/2	13.79 ^{e,f,g}	18.52 ^{c,d,e}	8.56 ^{k,l}	33.06 ^{d,e,f,g}	27.96 ^{e,f,g}	26.32 ^{e,f,g}
26/3	27.87 ^{b,c}	15.09 ^{d,e,f}	21.00 ^{g,h,i,j}	31.13 ^{e,f,g,h}	34.96 ^{d,e,f}	28.17 ^{d,e,f}
26/4	15.04 ^{e,f,g}	13.64 ^{d,e,f}	25.95 ^{f,g}	57.80 ^a	50.33 ^{a,b}	35.23 ^{b,c,d,e}
26/5	26.92 ^{b,c,d}	42.74 ^a	48.77 ^{a,b}	58.18 ^a	54.76 ^{a,b}	35.80 ^{b,c,d}
30/1	1.40 ⁱ	--	--	18.99 ^{i,j}	18.10 ^{i,j,k}	19.62 ^{g,h,i}
30/2	10.59 ^{f,g,h}	1.20 ^g	6.94 ^{k,l}	37.89 ^{c,d,e,f}	28.86 ^{d,e,f,g}	27.03 ^{d,e,f,g}
30/3	21.50 ^{c,d,e}	6.25 ^{f,g}	13.45 ^{j,k}	34.62 ^{c,d,e,f}	31.95 ^{d,e,f,g}	31.45 ^{c,d,e,f}
30/4	13.25 ^{d,e,f}	8.70 ^f	27.37 ^{f,g,h}	42.31 ^{b,c,d,e}	57.43 ^{a,b}	41.96 ^{a,b,c}
30/5	17.44 ^{d,e,f,g}	15.31 ^{d,e,f}	49.61 ^{a,b,c}	53.98 ^{a,b}	58.20 ^a	36.43 ^{b,c,d}

Note: Marginal probabilities within a marketing month column sharing a superscript letter are not statistically different at the 5% level.^aCoverage levels: 1 = (85.00% - 89.99%), 2 = (90.00% - 92.49%), 3 = (92.50% - 94.99%), 4 = (95.00% - 97.49%), and 5 = (97.50% - 100.00%)

Table 2. LRP Predicted Probabilities (%) of a Positive Net Return for Feeder Cattle Steers Weight 2 by Coverage Length and Level: July-December, 2005-2021

Coverage						
Length/Level	July	August	September	October	November	December
Length (weeks)						
13	9.05	5.76	5.99 ^b	15.29 ^{a,b}	28.89 ^a	19.27 ^a
17	13.13 ^b	8.11 ^b	7.47 ^{a,b}	13.74 ^b	16.54	21.70 ^a
21	14.01 ^b	11.33 ^a	7.72 ^{a,b}	15.92 ^{a,b}	14.38	11.48 ^b
26	19.44 ^a	10.02 ^{a,b}	10.45 ^a	18.54 ^a	12.53	8.28 ^{b,c}
30	21.76 ^a	11.45 ^a	9.54 ^a	16.90 ^{a,b}	13.03	6.62 ^c
Level ^a						
1	3.15	2.28	0.86	3.48	5.39	5.89
2	10.53	6.75	5.26	12.65	16.76	14.39
3	16.99	11.8	10.77	19.03	24.45	21.42
4	26.78	16.24	21.87	31.93	28.08	19.49
5	32.00 ^a	20.32 ^a	28.97 ^a	36.74 ^a	37.69 ^a	27.39 ^a
Length/Level						
13/1	1.53 ^k	2.20 ^{k,l}	0.58 ^l	2.30 ^j	16.52 ^{g,h}	7.29 ^{e,f,g}
13/2	7.07 ^{h,i}	5.04 ^{h,i,j}	3.09 ^{i,j,k}	11.37 ^{h,i}	24.32 ^{c,d,e,f}	20.13 ^{c,d}
13/3	11.51 ^{f,g}	7.39 ^{g,h}	8.87 ^{f,g,h}	21.09 ^{e,f}	31.94 ^{b,c}	23.15 ^c
13/4	17.11 ^e	7.94 ^{g,h}	20.41 ^{c,d}	32.09 ^{b,c}	37.40 ^{a,b}	24.92 ^c
13/5	25.94 ^{c,d}	10.69 ^{e,f,g}	26.21 ^{b,c}	43.12 ^a	44.78 ^a	33.44 ^{a,b}
17/1	3.06 ^{j,k}	1.11 ^l	0.64 ^l	3.05 ^j	3.52 ⁱ	10.77 ^{e,f}
17/2	8.62 ^{g,h,i}	6.79 ^{g,h}	6.02 ^{g,h,i}	11.72 ^{h,i}	16.67 ^{g,h}	21.20 ^{c,d}
17/3	16.40 ^e	12.98 ^{d,e,f}	9.92 ^{f,g}	16.36 ^{f,g,h}	25.00 ^{c,d,e,f}	23.55 ^c
17/4	25.90 ^{c,d}	17.88 ^{b,c,d}	25.50 ^{b,c}	29.69 ^{b,c,d}	22.34 ^{d,e,f,g}	25.62 ^{b,c}
17/5	30.91 ^{a,b,c}	18.04 ^{b,c}	26.55 ^{b,c}	30.85 ^{b,c}	37.72 ^{a,b}	37.12 ^a
21/1	2.35 ^k	3.35 ^{j,k}	0.77 ^{k,l}	4.65 ^j	2.22 ^j	3.76 ^{g,h}
21/2	9.31 ^{g,h}	7.07 ^{g,h}	4.46 ^{i,j}	19.42 ^{f,g}	16.36 ^{g,h}	7.84 ^{e,f,g}
21/3	16.84 ^e	14.35 ^{c,d,e}	13.04 ^{e,f}	16.17 ^{f,g,h}	21.24 ^{e,f,g}	23.90 ^c
21/4	30.63 ^{a,b,c}	22.62 ^{a,b}	23.60 ^{b,c}	29.00 ^{b,c,d,e}	24.22 ^{c,d,e,f}	12.10 ^{e,f}
21/5	37.18 ^a	23.18 ^{a,b}	27.54 ^{b,c}	28.22 ^{b,c,d,e}	33.33 ^{a,b}	21.59 ^{c,d}
26/1	8.07 ^{g,h,i}	3.68 ^{i,j,k}	1.64 ^{j,k,l}	4.83 ^j	2.78 ⁱ	1.91 ^h
26/2	16.73 ^{e,f}	6.59 ^{g,h,i}	13.79 ^{d,e,f}	12.12 ^{g,h,i}	10.78 ^{h,i}	8.24 ^{e,f,g}
26/3	19.81 ^{d,e}	10.50 ^{e,f,g}	11.93 ^{e,f}	21.69 ^{d,e,f}	17.92 ^{f,g,h}	13.91 ^{d,e}
26/4	31.43 ^{a,b,c}	14.08 ^{c,d,e,f}	18.42 ^{c,d,e}	35.25 ^{a,b}	21.54 ^{c,d,e,f}	13.95 ^{d,e,f}
26/5	33.47 ^{a,b}	27.36 ^a	30.51 ^{a,b}	46.97 ^a	28.99 ^{b,c,d,e}	14.12 ^{d,e,f}
30/1	5.30 ^{ij}	1.98 ^{k,l}	1.85 ^{j,k,l}	4.55 ^j	2.65 ⁱ	2.74 ^{g,h}
30/2	19.59 ^{d,e}	9.09 ^{f,g}	4.32 ^{h,i,j}	7.69 ^{ij}	6.93 ^{ij}	4.65 ^{f,g,h}
30/3	29.28 ^{b,c}	15.48 ^{c,d,e}	12.12 ^{e,f,g}	23.36 ^{c,d,e,f}	16.18 ^{f,g,h,i}	11.32 ^{d,e,f,g}
30/4	38.73 ^a	22.73 ^{a,b}	20.00 ^{b,c,d,e}	39.08 ^{a,b}	33.33 ^{a,b,c,d}	9.52 ^{e,f,g,h}
30/5	36.05 ^{a,b}	27.27 ^a	41.51 ^a	38.36 ^{a,b}	34.78 ^{a,b,c,d}	10.00 ^{e,f,g,h}

Note: Marginal probabilities within a marketing month column sharing a superscript letter are not statistically different at the 5% level.^aCoverage levels: 1 = (85.00% - 89.99%), 2 = (90.00% - 92.49%), 3 = (92.50% - 94.99%), 4 = (95.00% - 97.49%), and 5 = (97.50% - 100.00%)

Table 3. Historical Average Net Returns for LRP Feeder Cattle Steers Weight 2 Insurance by Coverage Length and Level: January-June, 2005-2021

Coverage						
Length/Level	January	February	March	April	May	June
Length						
13	0.08	-0.08	0.39	2.04	1.03	0.17
17	0.37	-0.20	0.45	2.08	1.42	0.30
21	0.83	-0.40	0.61	2.13	1.61	0.39
26	-0.13	-0.85	-0.37	2.79	1.61	0.91
30	-0.52	-1.62	-0.62	1.18	1.48	0.66
Level ^a						
1	-0.25	-0.61	-0.52	0.87	-0.06	-0.33
2	0.04	-0.70	-0.44	1.47	0.40	-0.18
3	0.57	-0.47	0.02	2.04	1.10	0.23
4	0.03	-0.59	0.57	2.87	2.82	1.15
5	0.82	0.19	1.72	3.80	3.56	1.66
Length/Level						
13/1	-0.37	-0.49	-0.12	1.06	-0.28	-0.23
13/2	-0.20	-0.58	0.00	1.54	-0.04	-0.32
13/3	0.05	-0.22	0.33	2.13	0.63	-0.12
13/4	0.18	0.08	0.78	2.81	2.17	0.62
13/5	0.88	0.92 ^a	1.14	3.18	3.47	1.21
17/1	-0.15	-0.50	-0.50	1.18	0.21	-0.45
17/2	0.30	-0.70	-0.44	1.56	0.67	-0.56
17/3	0.61	-0.23	0.26	2.54	1.53	-0.16
17/4	0.19	0.09	1.12	2.43	2.36	1.19
17/5	1.02	0.40 ^a	2.14 ^a	3.13	2.94	2.03 ^a
21/1	0.09	-0.50	-0.54	0.97	0.12	-0.24
21/2	0.84	-0.66	-0.35	1.68	0.70	-0.14
21/3	1.14 ^a	-0.46	0.39	2.03	1.51	0.36
21/4	0.26	-0.94	1.35	2.91	3.18	0.86
21/5	1.95 ^a	0.50 ^a	2.59 ^a	3.75	3.43	1.48 ^a
26/1	-0.18	-0.91	-0.81	0.92	-0.07	-0.24
26/2	-0.43	-0.48	-1.02	1.49	0.65	0.50
26/3	1.25 ^a	-0.43	-0.80	1.98	0.93	0.98
26/4	-0.90	-1.81	-0.66	4.65 ^a	3.15	1.85 ^a
26/5	-0.63	-0.71	1.59	6.16 ^a	4.46 ^a	2.07 ^a
30/1	-1.02	-1.04	-1.08	-0.40	-0.42	-0.57
30/2	-1.04	-1.41	-0.89	0.75	0.02	0.01
30/3	-0.19	-1.86	-0.83	0.87	0.79	0.75
30/4	0.01	-1.97	-0.92	1.76	4.22 ^a	2.06 ^a
30/5	-0.23	-1.95	0.74	3.91	4.06 ^a	1.76 ^a

Note: Marginal probabilities within a marketing month column sharing a superscript letter are not statistically different at the 5% level.

^aCoverage levels: 1 = (85.00% - 89.99%), 2 = (90.00% - 92.49%), 3 = (92.50% - 94.99%), 4 = (95.00% - 97.49%), and 5 = (97.50% - 100.00%)

Table 4. Historical Average Net Returns for LRP Feeder Cattle Steers Weight 2 Insurance by Coverage Length and Level: July-December, 2005-2021

Coverage						
Length/Level	July	August	September	October	November	December
Length						
13	-0.35	-0.82	-0.50	0.35	1.00	0.34 ^{a,b}
17	-0.14	-0.75	-0.54	0.36	0.17	0.76 ^a
21	0.03	-0.54	-0.67	0.30	0.11	0.27 ^{a,b}
26	-0.01	-0.72	-0.46	-0.05	-0.38	-0.18
30	-0.21	-1.05	-0.99	0.44	-1.18	-1.13
Level ^a						
1	-0.54	-0.68	-0.73	-0.55	-0.44	-0.23
2	-0.53	-0.80	-0.83	-0.24	-0.09	-0.14
3	-0.28	-0.69	-0.75	-0.10	0.32	0.59 ^a
4	0.31	-0.85	-0.45	1.06	0.46	0.51 ^a
5	0.51	-0.84	-0.04	1.86	1.20	0.90 ^a
Length/Level						
13/1	-0.44	-0.44	-0.46	-0.31	0.16	-0.21
13/2	-0.43	-0.51	-0.63	-0.26	0.56	0.10
13/3	-0.38	-0.47	-0.47	0.23	1.38 ^a	0.66
13/4	-0.26	-1.07	-0.37	0.73	1.16	0.34
13/5	-0.20	-1.84	-0.56	1.81 ^a	2.07 ^a	0.96
17/1	-0.50	-0.65	-0.69	-0.56	-0.35	-0.21
17/2	-0.53	-0.77	-0.75	-0.07	-0.14	0.61
17/3	-0.34	-0.68	-0.67	-0.38	0.47	0.82
17/4	0.37	-0.72	-0.11	1.52 ^a	0.26	0.82
17/5	0.48	-0.97	-0.31	2.02 ^a	0.84	2.11 ^a
21/1	-0.47	-0.66	-0.89	-0.60	-0.74	0.11
21/2	-0.58	-0.76	-1.01	0.18	-0.01	-0.46
21/3	-0.31	-0.51	-0.91	-0.07	-0.24	1.34 ^a
21/4	0.57	-0.27	-0.13	1.25 ^a	0.50	0.22
21/5	1.23 ^a	-0.45	-0.12	1.30 ^a	1.48 ^a	0.04
26/1	-0.59	-0.70	-0.93	-0.89	-0.89	-0.65
26/2	-0.44	-0.85	-0.66	-0.82	-0.74	-1.07
26/3	-0.09	-0.81	-0.78	-0.50	-0.04	-0.36
26/4	0.53	-1.18	-0.77	0.48	-0.43	1.12 ^a
26/5	0.75 ^a	-0.03	1.32 ^a	2.17 ^a	0.39	0.33
30/1	-0.86	-0.98	-0.91	-0.52	-1.54	-0.82
30/2	-0.75	-1.18	-1.34	-0.63	-1.53	-2.05
30/3	-0.15	-1.07	-1.27	0.30	-1.95	-2.00
30/4	0.56 ^a	-1.11	-1.41	1.38 ^a	-0.31	-0.03
30/5	0.40	-0.93	0.13	2.38 ^a	-0.23	-0.67

Note: Marginal probabilities within a marketing month column sharing a superscript letter are not statistically different at the 5% level.

^aCoverage levels: 1 = (85.00% - 89.99%), 2 = (90.00% - 92.49%), 3 = (92.50% - 94.99%), 4 = (95.00% - 97.49%), and 5 = (97.50% - 100.00%)

Table 5. Number of Actual LRP Feeder Cattle Steers Weight 2 Insurance Contracts Purchased by Marketing Month from 2019 to April 2022 with Values Shaded in Gray Indicating the Combinations of Coverage Length and Level that Have Historically Provided the Highest Probability of a Positive Net Return and the Highest Average Net Return

Coverage Length/Level ^a	Jan.	Feb.	Mar.	Apr.	May	Jun.	Jul.	Aug.	Sep.	Oct.	Nov.	Dec.	Grand Total
13/1	6	8	6	9	14	14	8	4	6	5	8	9	97
13/2	3	6	8	6	24	11	8	2	7	11	12	2	100
13/3	25	29	46	43	42	45	12	10	22	27	25	22	348
13/4	22	27	45	50	59	28	21	15	24	29	34	34	388
13/5	332	372	445	403	575	423	165	201	254	499	584	299	4552
17/1	6	10	12	7	6	12	12	8	5	4	6	10	98
17/2	7	7	11	7	12	14	17	7	7	9	18	12	128
17/3	17	25	42	36	40	42	31	26	13	20	17	13	322
17/4	26	27	45	20	34	50	37	24	11	25	27	28	354
17/5	220	163	377	280	344	357	349	256	167	412	437	269	3631
21/1	13	11	7	15	10	7	13	30	9	6	6	10	137
21/2	8	4	14	15	8	13	17	10	9	7	11	6	122
21/3	22	14	25	43	25	26	36	40	27	29	18	21	326
21/4	28	28	23	38	22	28	40	42	18	16	18	31	332
21/5	300	153	241	366	287	286	405	561	204	261	409	283	3756
26/1	11	10	15	15	18	13	14	20	20	11	6	7	160
26/2	8	6	3	10	18	4	8	32	15	10	8	3	125
26/3	19	17	10	14	28	24	23	58	51	40	10	23	317
26/4	34	20	19	38	26	21	19	58	34	15	9	13	306
26/5	213	210	157	204	191	193	270	577	474	338	171	242	3240
30/1	0	8	11	5	6	6	6	8	10	14	4	0	78
30/2	6	4	5	3	5	3	4	14	12	4	8	2	70
30/3	12	14	15	5	10	15	15	16	41	43	11	8	205
30/4	13	19	12	6	9	7	9	30	31	34	10	14	194
30/5	163	150	175	98	120	130	83	308	367	534	318	98	2544
Grand Total	1514	1342	1769	1736	1933	1772	1622	2357	1838	2403	2185	1459	21930

^aCoverage length/levels: defined as the length in weeks and the levels coded as 1 = (85.00% - 89.99%), 2 = (90.00% - 92.49%), 3 = (92.50% - 94.99%), 4 = (95.00% - 97.49%), and 5 = (97.50% - 100.00%)

Figures

Figure 1. The Probability of a Positive Net Return by Coverage Length and Level for Marketing Months January and April and Averaged Across All Marketing Months

