Timing the Purchase of Livestock Risk Protection Insurance for Feeder Cattle

Andrew P. Griffith, Karen E. Lewis, and Christopher N. Boyer
Department of Agricultural and Resource Economics, University of Tennessee
314-B Morgan Hall, 2621 Morgan Circle Knoxville, TN 37996
Email: agriff14@utk.edu

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Abstract

Livestock Risk Protection Insurance (LRP) is a risk management tool available to cattle producers protecting against price declines. It can be used to establish a price floor much like a put option. The primary difference between put options and LRP is LRP can be purchased for as few as one animal while put options are based on 50,000 pound contracts. Thus, LRP can be utilized by cattle producers of any size. LRP is generally offered five times a week with insurance termination dates ranging from 13 to 52 weeks and coverage levels from 70 to 100 percent. The objective of this research is to determine how far in advance feeder cattle producers should purchase LRP to maximize their expected price received given an expected cattle marketing month. Daily LRP offerings were obtained for 600 to 900 pound feeder cattle in Tennessee from 2007 through 2014. Expected price received is defined as the CME Feeder Cattle Index price plus the indemnity payment less the LRP premium. Data were subjected to a mixed model to determine differences in the expected price received for different coverage periods given an expected cattle marketing month.

Keywords: Insurance, Risk management, cattle

Area: Production and Risk

JEL Codes: Q12, Q13

Introduction

The cattle industry has experienced large price swings for several years resulting in increased price risk. The management of risk is an important and potentially complex task for livestock producers (Hardaker et al., 2004). Hall et al. (2003) examined cattle producers' perceptions of potential risk factors affecting ranch/farm income and found drought and cattle price variability were the primary concerns. Hall et al. (2003) also gauged beef producers' perception of potential risk management strategies affecting ranch/farm income and found price risk management tools, such as forward contracting and futures and options contracts, to be the least effective mechanisms in reducing price risk. The lack of confidence in price risk management tools by producers could be due to the perception that livestock price risk management tools are inadequate or that producers lack the understanding, training, and motivation to utilize the tools (Hall et al., 2003). Additionally, the lack of confidence in the effectiveness of price risk management tools could be caused by scale issues preventing small producers from using the available tools efficiently (Burdine and Halich, 2014).

However, as price risk continues to increase, producers of all sizes might have to confront the challenges associated with price risk management tools and engage in using these tools for price protection. A possible alternative to the price risk management tools mentioned above that has the capability of addressing the scale issue and the lack of understanding issue is Livestock Risk Protection Insurance (LRP). LRP was introduced to the cattle industry in 2003 (USDA-RMA) as a single-peril price risk insurance program for feeder cattle and fed cattle that provides an indemnity payment if a regional cash price index (CME Feeder Cattle Index) falls below an insured coverage price on the end-date of the policy (Coelho, Mark, and Azzam, 2008). LRP policies can be purchased by producers with various coverage levels of price over various time

frames, and producers' premiums are a function of the coverage levels and time frames. The key difference between LRP and futures/options contracts is the flexibility in the quantity of cattle that can be covered at one time. For instance, a feeder cattle producer can purchase LRP on as few as one animal while the smallest unit of purchase for futures/options contracts is 50,000 pounds of feeder cattle. Moreover, insurance is widely understood by the general public. Thus, cattle industry participants may feel more comfortable using an insurance product rather than a derivative (i.e., futures and options contract).

Previous studies have compared the level of price protection provided by the use of LRP relative to other price risk management tools (Burdine and Halich, 2014; Coelho, Mark, and Azzam, 2008; Feuz, 2009). Coelho, Mark, and Azzam (2008) compared LRP basis and futures basis for fed cattle and found LRP basis was less variable than futures basis which can be advantageous for hedgers using LRP. Feuz (2009) compared expected net returns and variability of returns from using cash, futures, options, LRP and AGR-Lit pricing strategies in a cow-calf production system. Feuz (2009) determined futures, put options, and LRP can be used to reduce variability of returns while also finding LRP to be a good substitute for the purchase of put options. Burdine and Halich (2014) evaluated payouts of LRP for feeder cattle. Specifically, the objective was to determine feasible levels of price protection for producers in summer grazing programs and winter backgrounding programs given producer risk preference. Burdine and Halich (2014) concluded net payouts increased as downward price risk increased.

Each aforementioned study addressed integral questions and provided valuable information with regards to price risk management using LRP. However, previous studies do not address the timing of purchase of LRP to maximize expected returns. Depending on when a producer markets their cattle, the optimal timing and coverage of price insurance purchase might vary,

which could impact producers' net returns. Cattle producers from the cow-calf sector to the feedlot sector generally have a defined time frame in which they plan to market cattle which results in a time period to manage price risk. This time frame can range by as much as a couple of months, but in general the marketing time frame is within two to four weeks. Additionally, the marketing time frame is known when the producer takes ownership of the animal. For instance, a spring calving cow-calf producer knows when s/he will market a certain weight class of calves in November. Similarly, a stocker producer purchasing calves in November knows s/he will market feeder cattle of a certain weight in April. Thus, the producer has the opportunity to purchase LRP during the time of cattle ownership to establish a price floor for the cattle on the intended marketing date.

In general, long-run expected net returns when using livestock insurance products have been found to be lower than when not using insurance products (Bhattacharyya and Garrett, 2006; Feuz, 2009). Feuz (2009) found the cash price to have the highest expected return compared to four price risk management strategies when simulating four separate risk scenarios. However, Feuz (2009) also reported a reduction in variability of returns when using LRP. Thus, using price insurance products in agriculture improved a producer's ability to maintain cash flow versus defaulting on a loan in a specific year. A reduction in net return variability becomes increasingly important as input costs increase and for producers without an established capital base.

The objective of this research was to determine how far in advance feeder cattle producers should purchase LRP to maximize their expected price received given an expected cattle marketing month. More specifically, the objective was to determine the month and coverage rate of insurance in which producers should purchase insurance to maximize their expected price received assuming LRP was purchased.

Data

LRP coverage level and insurance period data were provided by the USDA – Risk Management Agency (RMA). Insurance periods offered through the program include 13, 17, 21, 26, 30, 34, 39, 43, 47 and 52 weeks. Coverage levels range from 70 to 100 percent of the expected ending value price. Not all insurance period lengths and coverage levels were offered each time policies were available. Daily LRP data for the state of Tennessee for feeder cattle weighing between 600 and 900 pounds was collected from July 2007 through August of 2014. The data collected included the effective date (date the insurance was offered), insurance period length, expected ending value at purchase of the insurance, coverage price, coverage level, insurance cost per hundredweight, ending date of the insurance coverage, and actual ending value at the end of the insurance period.

Coverage levels under 85 percent were omitted from the analysis since this coverage level was less than four percent of the observations and 0.6 percent of policy offerings that received an indemnity payment. Additionally, coverage periods greater than 34 weeks were excluded from the analysis as they represent 1.7 percent of the total insurance policy offerings.

Daily LRP offerings were aggregated into monthly values based on the ending date of the insurance coverage. Additionally, data were aggregated into five quantiles to create coverage levels representing very low (85.00 – 90.55%), low (90.56 – 93.33%), moderate (93.34 – 95.63%), high (95.64 – 97.67%), and very high (97.68 – 100.00%) coverage level groups.

Methodology

In general, producers know approximately when they will market their cattle, but feeder cattle producers rarely know in advance the exact day to market feeder cattle. LRP policies are

indemnified at an exact date; thus, producers utilizing LRP select policies with coverage periods ending near the anticipated marketing time period.

Generally speaking, a cattle producer's objective was to maximize the profit of the operation. Thus, all revenues and costs associated with production must be accounted for. However, though the use of LRP directly affects total profit, LRP does not impact all other production decisions and costs. Therefore, a producers objective when using LRP was to maximize the price received for the given weight and quality of feeder cattle being marketed. The price received for feeder cattle when utilizing LRP can be calculated by subtracting the subsidized cost of insurance from the CME Feeder Cattle Index price on the day the insurance policy comes due and adding the indemnity payment. The indemnity payment was the difference between the purchased policy coverage price and the CME Feeder Cattle Index price if the index price was less than the purchased coverage price. Otherwise, the indemnity payment was zero.

An analysis of variance was performed for each month by year based on the available coverage lengths and coverage levels which allowed means to be compared for each month of each year. A stochastic dominance analysis was then conducted for each month to determine which coverage length and coverage level was dominated the choice set given risk preferences. Simetar was the risk management modeling tool used to simulate the choice sets for each month as well as rank risky alternatives (Richardson, Schumann, and Feldman, 2015).

Results and Discussion

There was a possibility of thirty choice sets for each marketing month given five coverage level ranges for each of six insurance coverage lengths. The optimal choice from year to year for any month changed depending on the direction of the cash market. In time periods when cattle prices were trending up, the choice set with the highest mean price was shorter term coverage

lengths with very low or low coverage rate levels. In time periods when markets were in a long-term downtrend, the choice set with the highest mean price was generally longer term coverage lengths with high or very high coverage rate levels.

Additional results from the stochastic dominance analysis are forthcoming.

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