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Literature Review: Price Risk Management Contributions to Economic Sustainability in the Cattle Industry

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Background

Environmental and social sustainability have historically been the focus of beef sustainability research and are probably the most familiar among the public. However, there is considerable need for research related to economic sustainability in the beef cattle industry. Economic sustainability is commonly understood to be a farm's capability to survive or to be economically viable in over time, and a key component is access to and using effective tools and strategies to reduce losses.

Cattle producers manage many forms of risk including price risk (Hart, Babcock, and Hayes, 2001). Researchers have investigated the effectiveness of various ways to mitigate price risk (Burdine and Halich, 2014; Hall et al., 2003; Hill, 2015; Williams et al., 2014), but producers have been reluctant to adopt these management tools (Hill, 2015). The events occurring in 2019 (Finney County Tyson Foods slaughterhouse fire) and 2020 (COVID-19) strengthen the argument that managing price risk is vital for long-term economic sustainability for beef cattle producers.

Providing stocker and cow-calf producers with information on how to utilize price risk management tools would benefit these producers in making economically sustainable decisions and allowing them to endure and continue operating during and following economic shocks. Therefore, the specific objectives of this literature review were to:

1. Determine the positive attributes of currently available price risk management tools for beef cattle including futures contracts, options and livestock risk protection insurance; and
2. Determine the attributes of currently available price risk management tools that lead to non-use or fail to mitigate risk.

The goal of this literature review is to provide a comprehensive summary of research on risk management tools for beef cattle producers and help guide continuing education to beef cattle producers as well as inform policy makers and private industry on ways to improve price risk management to enhance economic sustainability for beef cattle producers.

Review of Literature

Cattle producers have a few alternatives to manage price risk including futures and options contracts and Livestock Risk Protection (LRP) insurance. Below we briefly define these risk management methods and discuss studies that have evaluated their effectiveness.

Futures and Options

Understanding futures and option contract markets and effectively using them to manage price risk can be time consuming and confusing for most producers (Fields and Gillespie, 2008). A futures contract is a derivative based

financial tool traded on a futures exchange, meaning the contract value is derived from an underlying asset. Futures exchanges are in place to help facilitate market transactions, standardize regulations and establish a universal market process.

Hedgers (i.e. agricultural producers) participate in the futures market to utilize the market as a risk management strategy. For example, if a feeder cattle producer plans to sell a load of steers and expects the cash price to decline, they will adopt a sell position in the futures market at the present date. When it comes time to sell the steers in the cash market, the producer will offset their selling futures position by buying back the contract. It is a commonly held economic concept that the futures market will trend the same direction as the cash market. Therefore, because the producer sold a futures contract when prices were higher and bought it back when prices declined, they have made a profit in the futures market. This profit can be used to offset losses in the cash spot market.

Option contracts are another tool available to feeder cattle producers. Option contracts give the right, but not the obligation to enter a position in the futures market at a specific price, known as the strike price. Option contracts allow the holder flexibility if they are not sure how the futures market will move. Options contracts can be allowed to expire, meaning that they are not used to purchase a futures contract. Options can be exercised, which means the holder of the option executes a futures contract position at the price determined by the option. Lastly, options contracts can be offset by purchasing or selling back.

Futures and options contracts for feeder cattle and live (fed) cattle are traded through the CME Group Inc in 50,000- and 40,000-pound increments, respectively. Contracts are offered throughout the year but are not offered every month. Two major limitations exist for these price risk management tools. First, feeder cattle producers with less than 50,000 pounds of cattle to market have to over-hedge (selling less pounds of cattle than hedged through the contract), which could increase their risk and lead to nonuse. The other major limitation is that contracts are not offered each month, which could leave producers exposed to price risk if they cannot match their marketing month with the available futures and options contracts.

Livestock Risk Protection

LRP was introduced to address the issue that most cattle producers do not produce enough feeder cattle to fulfill a futures or options contract. LRP can be used to insure a single animal to as many as 12,000 head on a specific coverage endorsement as of 2022. Producers are limited to insuring 24,000 head in one federal crop year. LRP coverage levels range from 70 to 100 percent of the expected CME Feeder Cattle Index (FCI) price, and insurance periods offered through the program include 13, 17, 21, 26, 30, 34, 39, 43, 47 and 52 weeks. The price of a given LRP policy changes daily across states for feeder and fed cattle based on the CME Feeder Cattle and Live Cattle futures. Policies are indemnified at an exact date. Therefore, producers utilizing LRP select policies with a coverage length ending near the anticipated marketing day for their cattle. LRP insurance covers feeder cattle including steers, heifers, and bulls under 600 lbs.; steers and heifers between 600 and 900 lbs.; and unborn calves.

The cost of LRP depends on the producers' coverage level, coverage length, state and date of purchase. Like a put option contract, a higher coverage level provides a higher floor price (or coverage price) but has a higher premium. Government subsidy rates are based on the coverage level that is chosen by the producers. The new guidelines state a 35 percent subsidy rate for a coverage level between 95-100 percent, 40 percent for coverage between 90-94.99 percent, 45 percent for coverage between 85-89.99 percent, 50 percent for coverage between 80-84.99 percent, and lastly 55 percent for coverage levels between 70-79.99 percent (Flourney 2020).

Indemnity payments are calculated at the end of the LRP contract, which might be slightly different from when cattle are sold. Producers do not have the opportunity of exercising the LRP contract during the coverage term. Therefore, producers must wait until the expiration date to know if they will receive an indemnity payment. The indemnity is zero if the coverage price is less than or equal to the CME FCI price at the day of termination, but if the reverse is true, the indemnity is the difference between the coverage price and CME FCI price at the day of termination. Producers benefit from LRP if their net LRP price, which is the CME FCI price on the day the insurance policy expires plus any indemnity payment minus the cost of the policy, is greater than the CME FCI price on the date the policy expires.

Effectiveness of Futures, Options and LRP

Feuz (2009) evaluated estimated net returns and variability of those returns for cow/calf operations using cash, futures, options, LRP and AGR-Lite . They found futures hedging eliminates the most variability but stops producers from gaining from positive price swings. LRP is advantageous for producers that are more comfortable dealing with an insurance agent instead of a commodity broker to substitute for a put option. LRP is once again found to be applicable for producers unable to fulfill a 50,000 lbs. futures contract.

Wei (2019) determined which price risk management tools are ideal for small feeder cattle producers. Futures contracts were found to be the optimal choice for risk management in times when cattle cash prices are increasing. LRP was preferred by the smallest producers due to their limited output of cattle being a barrier for the futures market.

Mark (2005) reiterated the difference between the strategies of using futures, options and LRP insurance. The study's goal was to educate producers on risk management strategies by highlighting how futures, options and LRP could be used in a variety of situations. The report indicates that options contracts and LRP insurance are best positioned for use when the futures market is expected to increase in price. Futures contracts are perhaps more effective when prices are expected to decline. One advantage of futures and options contracts is that they are more liquid options for risk management as they can be offset or exchanged before the date of expiration. LRP, on the other hand, must be held all the way through its predetermined period. As was mentioned previously, LRP's major advantage is being applicable to small numbers of cattle over many time periods, unlike futures and options which have predetermined contract sizes and fewer choices for the timing of contract expiration. Futures hedging allows producers to shield themselves against price risk but are still vulnerable to basis risk (i.e. the risk of the futures price and cash price not moving in the same direction dollar for dollar). Options contracts also allow producers to set a favorable price level, but offer the additional flexibility to capitalize on favorable market changes. However, options are more expensive than a futures contract, and producers are still exposed to basis risk.

Coelho, Mark and Azzam, (2008) developed an understanding of the factors affecting LRP basis and compared those effects to their impacts on futures basis for the five-area region. The goal of this study was to analyze factors impacting LRP basis and contrast the changes in LRP basis with changes in futures basis. This is intended to help producers and educators to better understand LRP basis risk and determine market factors influencing LRP basis risk, which then assists in managing LRP basis risk.

One downside to futures contracts is that producers are limited on the upside gains that can be realized with this risk management tool. Any gains in the cash market are cancelled by losses in the futures market and vice versa. Futures usually provide price security at the cost of potentially missing out on additional gain (Feuz, 2009). Another factor that can disincentivize producers from using this tool is the requirement for margin calls and maintenance fees. This fraction of the overall value of the derivative contract can be a barrier for producers that are limited on available capital. The idea of maintaining a margin account is a barrier to use for many producers as it is an additional cost if additional capital must be infused into the account. The need to meet margin requirements can increase producer anxiety by putting a strain on operating capital, and potentially stressing banking relationships if the banker does not understand the need to cover the margin and maintain a position to protect the hedge. The futures contract margin requirement is like an options contract in that the premium cost producers must pay for the right to hold that option position can be a barrier for utilization due to limited cash availability. However, the purchase of an option has no margin obligation. Furthermore, Wei (2019) shows that options can net higher average returns for producers while futures contracts are more effective at reducing fluctuations in earnings. Producers can utilize this knowledge to pick the most logical tool based on their risk management goals.

LRP is a good alternative to using options. It can also be preferred because it allows producers to deal with an insurance agent instead of a commodity broker, a process they are likely much more familiar with (Fuez 2009). LRP, unlike futures and options contracts, can be purchased to hedge against various weights of cattle and can be purchased to expire the exact date of marketing cattle.

Burdine and Halich (2014) showed net payouts (indemnity being greater than the premium cost) increased with a decrease in feeder cattle prices, suggesting LRP was effective at providing a price floor. However, net payouts were negative unless the cattle price dropped more than \$15/cwt over the 17-week contract length, which is a large and unlikely drop.

Similarly, Merritt et al. (2017) evaluated LRP for feeder cattle and reported LRP to provide minimum risk protection, and there was no clear contract length and coverage level that was optimal, leaving producers confused. They reported that most contracts were purchased by producers for 13 weeks and only 1.7 percent purchased LRP contracts longer than 21 weeks. This means producers were not setting price floors very far out before their set marketing date, which may be due to LRP indemnity dates being inflexible. They showed in most situations, a producer would be better off not purchasing LRP.

Despite LRP being available, Hill (2015) reported that only 7 percent of beef cattle producers across the United States were using LRP to manage price risk, which was fewer than futures (37 percent) and options (27 percent) contracts. A potential explanation for the lack of use of LRP by beef cattle producers might be the overwhelming number of available coverage lengths and levels.

Figure 1 shows USDA RMA Summary of Business Data (2021) for LRP use on feeder cattle. In 2020, a total of 3,404 LRP policies were purchased for feeder cattle. These policies insured a total of 41,707 head of cattle with a total liability value of \$44,971,339. This compares to a 2020 calf crop that exceeded 35 million head. The average contract insured 12 head per contract. This is a decline from peak usage in 2015 when 5,291 feeder cattle contracts were sold for over 150,000 head. In June 2015, cattle prices began declining, which roughly happened until October 2016. This long-run price decline could have triggered higher adoption of LRP; however, relative to the population of producers, adoption was low.

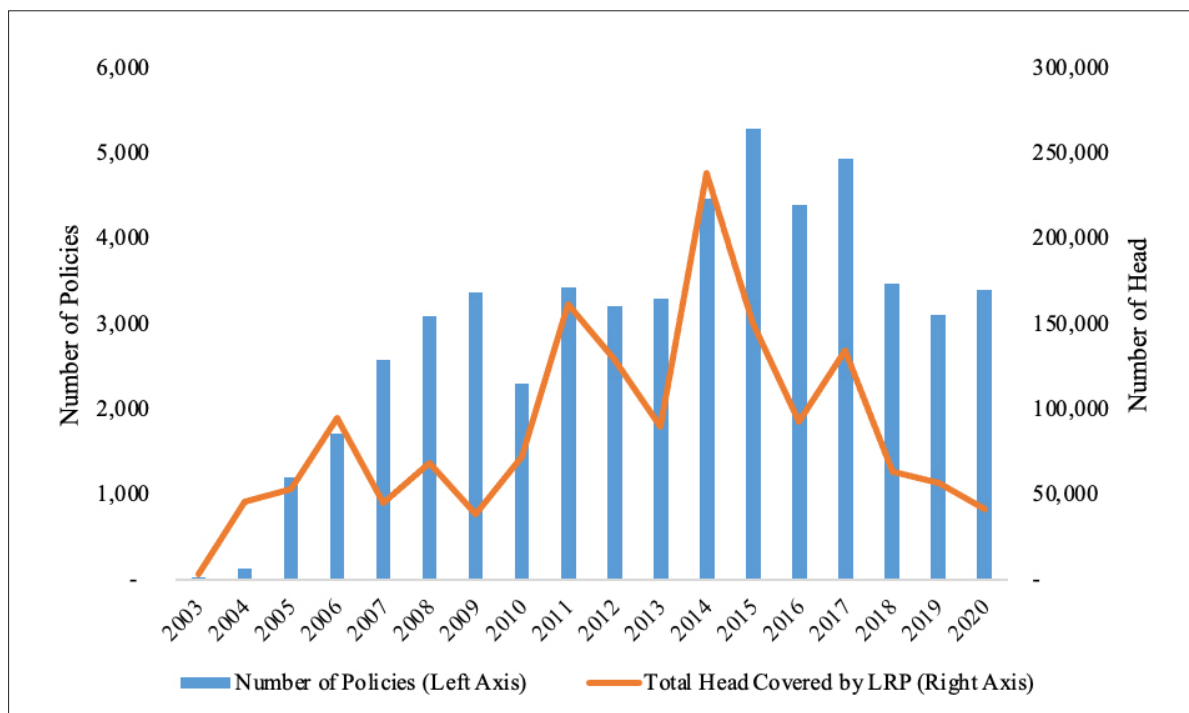


Figure 1. USDA RMA Summary of Business Data for LRP Feeder Cattle Contract.

Summary

Research demonstrates several challenges faced by cattle producers when attempting to utilize price risk management tools. It is clear futures and options are not conducive to small producers who cannot fill an entire contract and, in many cases, use of such tools would result in greater risk than not using those tools. Similarly, larger producers face barriers to using futures and options as it relates to capital constraints. LRP overcomes the contract size constraint of futures and options for small producers, and the cost of insurance and the likelihood of a return from insurance purchase does encourage use of the product. Continued research is necessary as these products continually evolve.

Companion Publications

Griffith, A.P., C.N. Boyer, I. Kane. 2022. Summary: Price Risk Management Contributions to Economic Sustainability in the Cattle Industry. University of Tennessee Extension Publication W 1097-A.

Griffith, A.P., C.N. Boyer, I. Kane. 2022. Producer Focus Groups: Price Risk Management Contributions to Economic Sustainability in the Cattle Industry. University of Tennessee Extension Publication W 1097-C.

Acknowledgement

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