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Use of Futures and Options in a Retained Ownership Program

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Summary

Four alternative marketing strategies were evaluated for cattle placed in the South Dakota Retained Ownership Program on October 13, 1993. The strategies were 1) cash marketing only, 2) a futures hedge, 3) a put option, and 4) an options "fence." Each of these market alternatives were described and expected net prices were determined. The actual net prices from using each of these strategies were calculated for three different marketing periods. For steers marketed in April, the cash only alternative provided the highest net price. The options "fence" net price was only $.20/cwt to $.25/cwt lower than the cash price. However, for the steers marketed in June, the futures hedge provided the highest net price. There is not one "best" marketing strategy to follow. Each producer needs to evaluate their attitudes toward price risk and select the marketing strategy that "best" fits their goals and situation.

Key Words: Marketing Alternatives, Futures, Options

Introduction

South Dakota cow-calf producers have had the opportunity over the last four years to feed some of their calves through the South Dakota Retained Ownership Program. The primary goal of this program has been to provide educational opportunities to cow-calf producers. Producers could learn more about the cattle feeding and meat packing industries, learn how their cattle would perform in the feedlot, and what quality of carcass would be produced. In addition, each year some marketing exercises have been conducted in which various futures and options strategies were outlined for producers seeking risk protection if they retained ownership of their calves.

The first three years of the program have been profitable on average. In each of these years, the cash market moved higher in the spring than was anticipated in the fall by the futures market. As such, a strategy of only using the cash market was more profitable than using a futures hedge or buying a put option for price floor protection. However, 1994 was a different story. From mid April until late May prices declined sharply, from $75/cwt to $65/cwt. While some of the retained ownership cattle were marketed prior to this price break, the majority were marketed during or after the price decline. Cattle that were not marketed prior to the price decline generally were not profitable. Could futures or options have been used to offset some or all of these losses? The answer to that question is the focus of this article.

Materials and Methods

To correctly answer the above question, one first must evaluate the market situation when the cattle were placed on feed and determine what strategies could be used. Then, the actual market at the end of the feeding period is used to evaluate each of the marketing strategies.

Information on the futures and options markets for October 13, 1993, when the fall steers were placed on feed, is contained in Table 1. This information will be used to evaluate three marketing strategies: (1) a futures hedge, (2) buying a put option, and (3) establishing a "fence" by buying a put option and selling a call option. Each of these strategies will be discussed briefly and then they will be evaluated.

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Table 1. Market situation on October 13, 1993, when fall steers were placed on feed

	APR LC futures			JUN LC futures		
Futures price	$75.50			$73.00		
Options strike prices	Put	Premiums	Call	Put	Premiums	Call
$70	$0.37			$1.00		
$72	$0.77			$1.65		
$74	$1.35			$2.50		
$78	$3.35		$1.10			$0.45
$80			$0.57			

A futures hedge involves taking an opposite position (selling) on the futures market than that on the cash market (view feeding cattle as buying the cattle into a feeding process). This is accomplished for the cattle feeder by selling a Live Cattle futures contract for the month of, or the month following, the expected slaughter date. When cattle are sold at slaughter, the hedge is lifted by buying back the same contract that was sold.

With a futures hedge, price risk is eliminated, but there still is some basis risk. Basis is defined as the local cash price minus the futures price. With a futures hedge if the actual basis (cash price minus futures price at the time of cash sale) equals the expected basis (estimated when placing the hedge), then the net price will always be the futures price at the time of sale plus or minus the expected basis. This strategy protects a feeder against downward price movements but also prevents the feeder from participating in upward price moves.

Buying a put option is a strategy that allows a feeder to establish a price floor but still take advantage of higher prices, should they occur. Buying a put option is like buying insurance against lower prices. And like buying insurance, you must pay a premium to get this price protection--the higher the protection desired the higher the premium will be.

Sometimes the price floor on a put option may seem low compared to your break even. In addition, you may not want to spend the premium to establish this price floor. Another option strategy that can be employed is the use of a "fence." A fence is designed to establish both a minimum and maximum price and do it for little or net premium expense. This transaction is accomplished by buying a put for the price floor protection but selling a call option to capture that premium to offset the put premium. However, selling the call creates a ceiling on the maximum price you can receive.

Results and Discussion

Based on the information in Table 1, APR Live Cattle futures could have been sold for $75.50/cwt on October 13. If APR Live Cattle futures price increased to $77.00/cwt by April, then a loss of $1.50/cwt would be incurred when the contract is bought back. However, if cash prices at Sioux Falls were expected to be $1.00/cwt under the futures, then initially a feeder would have expected a price of $74.50/cwt ($75.50 - $1.00) for his cattle. If the actual price at Sioux Falls was $76.00 ($1.00 under $77.00) in April then the net price would be $74.50/cwt ($76.00 - $1.50 futures loss). However, if futures had declined to $73.00 and cash was $72.00, then the net price would still be $74.50/cwt ($72.00 + $2.50 futures profit). If in the last example cash price had declined to $71 (basis of -$2.00) then the net price would be $73.50 ($71.00 + $2.50 futures profit).

The put premiums for various levels of protection (strike prices) for the APR and JUN Live Cattle contracts are provided in Table 1. Looking at the $74.00/cwt strike price for the APR contract, the premium is $1.35/cwt.

Buying this put option would result in a minimum expected price of $71.65/cwt (74.00 - $1.35 premium - $1.00 basis). This is lower than the expected price with a futures hedge, but remember, this is only the minimum price. As cash prices rise, your net price will be the higher cash price minus the $1.35/cwt premium you paid out.

Using the information in Table 1, you could purchase a $74 put on APR Live Cattle for $1.35/cwt and sell a $78 call and receive a $1.10/cwt premium to establish an options fence. Your net cost of this transaction is $0.25 ($1.35 - $1.10). You now have created a minimum price of $72.75 ($74.00 - $1.00 basis - $0.25 net option premium) but have also established a maximum price of $76.75 ($78.00 -$1.00 - $0.25).

The expected outcome of each of the market alternatives is shown in Table 2 for both the APR and JUN Live Cattle contracts. A graphical representation of these alternatives is presented for the APR contract in Figure 1.

Table 2. Expected price for alternative marketing strategies for steers placed on feed on October 13, 1994

Alternative	Expected price	Expected minimum	Expected maximum
Cash market	???	None	None
APR futures hedge	$74.50	$74.50	$74.50
JUN futures hedge	$72.00	$72.00	$72.00
APR Put options			
$70		$68.63	
$72		$70.33	None
$74		$71.65	
$78		$73.65	
JUN Put options			
$70		$68.00	
$72		$69.35	None
$74		$70.50	
APR fence			
$72 Put/$80 Call		$70.80	$78.80
$74 Put/$78 Call		$72.75	$76.25
JUN fence			
$70 Put/$78 Call		$68.45	$76.65

Note: All futures and options alternatives are calculated with an expected basis of -$1.00/cwt (Local cash price will be $1.00 lower then the Live Cattle Futures.).

Expected Net Price for Alternative Marketing Strategies

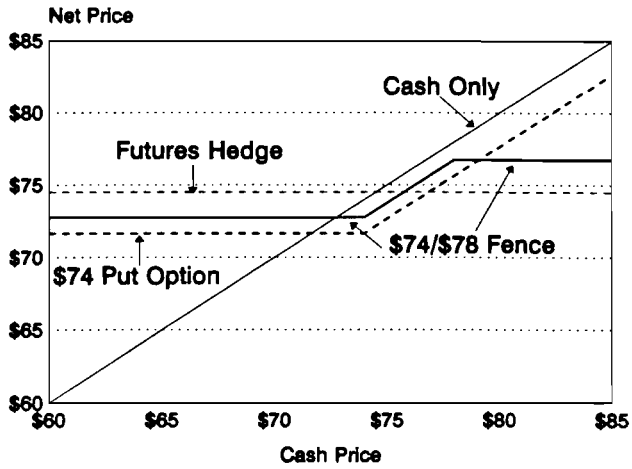

Figure 1. Graphical representation of expected outcomes for alternative marketing strategies.

Steers were marketed on several slaughter dates over a three month period. Three particular dates will be evaluated. The first steers sold were priced on March 30 and delivered on April 7. March 30 is also the last day of trading for the APR Live Cattle options. This date will be used to evaluate the market strategies for the steers slaughtered on April 7 and April 20. There was another set of steers sold on May 3 and slaughtered on May 12. May 3 will be used to evaluate the marketing strategies. Two groups of steers were slaughtered in June, one on June 8 and the other on June 14. The first group was sold on May 31. May 31 is also the last day of trading for the JUN Live Cattle option and will be used to evaluate the strategies.

On March 30, the APR Live Cattle futures contract could have been bought back (to close out the futures account) at $76.40/cwt. This would have resulted in a loss of $0.90/cwt (sold for $75.50 and bought for $76.40) for the futures hedge. Since the steers are sold on a grade and yield basis, each producer's cash price will be different. However, the average cash price was around $75.40/cwt for live weight. The net cash price, if a hedge had been placed, would be $74.50/cwt ($75.40 - $0.90 futures loss). This was the expected price since the actual basis was equal to the expected basis. The net prices for the alternative market strategies for the March 30 sale date are displayed in Table 3.

Table 3. Net price with alterative marketing strategies for March 30, 1994

Alternative	Price or value	Futures/Options Gain/Loss	Net price
Cash	$75.40		$75.40
APR futures hedge	$76.40	-$0.90	$74.50
APR Put options			
$70	$0.00	-$0.37	$75.03
$72	$0.00	-$0.77	$74.77
$74	$0.00	-$1.35	$74.05
$78	$1.60	-$1.75	$73.65
APR option fence			
$72 Put/$80 Call	$0.00	-$0.20	$75.20
$74 Put/$78 Call	$0.00	-$0.25	$75.15

With the exception of the $78 strike price, all of the put options expired with zero value because the market was higher than the strike price. The $78 option had a value of $1.60/cwt and could have been sold to capture the premium. The net price for the put options is the cash price of $75.40 less the put option premium that was initially paid out. However, for the $78 put, $1.60 of the original $3.35 premium is recovered, so the net premium is $1.75/cwt.

Since the actual futures price is within the boundaries established by both option fences, none of the options have any value and are allowed to expire. The net price is the cash price less the net option premium of $0.20 or $0.25 originally paid to establish the fence.

For the March 30 date, using the cash market is the most profitable alternative followed by the two option fence strategies and then the lower priced put options. However, less than $2.00/cwt separates the highest net price from the lowest net price for this date.

By early May the cash market had started to lose ground and by the end of May prices were considerably lower. How do the market alternatives compare during these time periods? On May 3, JUN Live Cattle was trading at $69.30/cwt and the cash price was around $71.00/cwt. The basis at this time was a $1.70/cwt, rather than the expected -$1.00/cwt. All of the futures and options alternatives should have a net price that is higher than expected, because the basis strengthened by $2.70/cwt. The net price for the various alternatives are displayed in Table 4.

Table 4. Net price with alternative marketing strategies for May 3, 1994

Alternative	Price or value	Futures/Options Gain/Loss	Net price
Cash	$71.00		$71.00
JUN futures hedge	$69.30	$3.70	$74.30
JUN Put options			
$70	$1.50	$0.50	$71.50
$72	$2.75	$1.10	$72.10
$74	$4.75	$2.25	$73.25
JUN options fence			
$70 Put/$78 Call	$1.50	$0.95	$71.95

The JUN futures contract is bought back at a gain of $3.70/cwt ($73.00 sale less a $69.30 purchase). This gain is added to the cash price of $71.00/cwt to get the net price of $74.30. Since the futures market is lower than all of the Put option strikes considered, they all have an intrinsic value (intrinsic value is the strike price minus the futures price). In addition, since there is still almost a month of trading, these options also have a time value. This value will decrease as the options near expiration and, in general, the more volatile a market the higher the time value will be. All of the put options are sold to capture the premium value. The cost of the original Put premiums are subtracted from the Put premiums earned from the sale of the Puts to obtain the net options gain or loss. In this case, there was a net gain on all of the Put options. This gain was added to the cash price to obtain the net price. The Put option for the fence is also sold and the net gain determined.

For this time period the ranking of the strategies from highest net price to lowest net price is almost the reverse of the March 30 time period. The straight futures hedge results in the highest price and the cash only alternative is the lowest price. The option strategies are between cash and futures in terms of net price. There is a difference of $3.30/cwt from the highest to lowest net price. This is not an extremely large difference, but it may represent the difference of earning a modest profit or incurring a slight loss on the cattle.

By May 31, the @#$&% market had gone to &#$% ... Well, you probably know where it went. JUN Live Cattle futures were at $66.30 and cash was around $65.50/cwt. The net prices for the various alternatives are shown in Table 5. Since this is the last day for JUN options to be traded, they do not have any time value, but all of them have intrinsic value. With the market even lower than on May 3, the cash alternative is even less attractive than the other alternatives.

Table 5. Net price with alternative marketing strategies for May 31, 1994

Alternative	Price or value	Futures/Options Gain/Loss	Net price
Cash	$65.50		$65.50
JUN Futures Hedge	$66.30	$6.70	$72.20
JUN Put Options			
$70	$3.70	$2.70	$68.20
$72	$5.70	$4.05	$69.55
$74	$7.70	$5.20	$70.70
JUN Options Fence			
$70 Put/$78 Call	$3.70	$3.15	$68.65

From this analysis, several general conclusions can be made concerning the alternative marketing strategies. When the market moves higher than expected by the futures traders, a cash marketing strategy will result in the highest net price. This was generally the case for the retained ownership project for 1991-1993. If prices when you sell are near where they were expected to be based on the futures price, then generally cash marketing only will still result in the highest net price. However, there will probably not be much difference between the cash price and the net price from an options fence strategy. This was the case for the first sale of 1994. If the market moves lower then was expected, then the futures hedge will result in the highest net price. This was the case for the latter sales this year. Another observation is that the options strategies will never be the "best" strategies in terms of highest net price, but generally they will not miss the highest net price by very much (the most they will miss the highest net price by is the initial amount of the option premium).

In conclusion, there is not one "best" marketing strategy. The best strategy for individual producers depends upon the amount of risk they are willing to bear, their costs of production, and obviously the actual market conditions. It is hoped that this article has provided additional insight into some of the alternative pricing strategies that are available.

For those producers who entered cattle into the project in the winter, the results of the alternatives would be very similar to the JUN results for the October steers. The initial market conditions on January 19 were very similar to the October 13 conditions. The market was, in fact, $0.90/cwt higher. As a result, the futures and options positions would be a little more favorable compared to the cash only alternative.