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## Impact of cash settlement on feeder cattle hedging risk

### Abstract

One of the principal motivations for the introduction of cash settlement in feeder cattle futures contracts was to reduce basis risk. This study examined expected changes in hedging risk attributable to the adoption of cash settlement. The estimates of cash settlement futures hedging risks were generally small than estimates of hedging risks using the physical-delivery futures. The reduction in hedging risk was greatest for feeder steers meeting futures contract weight specifications, but reductions were also common for other weight classes and for heifers.

### Keywords

Cattlemen's Day, 1989; Kansas Agricultural Experiment Station contribution; no. 89-567-S; Report of progress (Kansas State University. Agricultural Experiment Station and Cooperative Extension Service); 567; Beef; Feeder cattle; Market; Hedging

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## IMPACT OF CASH SETTLEMENT ON FEEDER CATTLE HEDGING RISK<sup>1</sup>

J.R. Minter<sup>2</sup> and T.C. Schroeder<sup>2</sup>

### Summary

One of the principal motivations for the introduction of cash settlement in feeder cattle futures contracts was to reduce basis risk. This study examined expected changes in hedging risk attributable to the adoption of cash settlement. The estimates of cash settlement futures hedging risks were generally smaller than estimates of hedging risks using the physical-delivery futures. The reduction in hedging risk was greatest for feeder steers meeting futures contract weight specifications, but reductions were also common for other weight classes and for heifers.

### Introduction

The viability of the feeder cattle futures contract as a hedging mechanism has been a source of controversy for some time. Successful hedging requires that the hedger be able to accurately forecast basis (cash price minus futures price) on the expected sale date. Basis risk represents the inability to accurately forecast basis for the intended sale date. Concern has been expressed that the large amount of basis risk present at both futures contract delivery and non-delivery points discouraged cattle producers from hedging in the feeder cattle futures market. As a result, the Chicago Mercantile Exchange significantly modified its feeder cattle futures contract specifications in 1986. Settlement via physical delivery was eliminated and cash settlement was adopted beginning with the September 1986 feeder cattle futures contract. Under cash settlement, futures contracts still outstanding at contract expiration are settled at the Cattle-Fax U.S. feeder steer price (USFSP). The USFSP is an average of 600 to 800 lb feeder steer prices weighted by the census of feeder cattle in each of four U.S. regions (comprising a total of 27 states) on January 1.

It was predicted that cash settlement would alter basis, and that basis risk would be significantly reduced because the volatile incremental cost of making or taking delivery would be eliminated. Our study tested whether the change to cash settlement of feeder cattle futures was likely to impact hedging risk for 600-700 lb and 700-800 lb feeder steers.

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## Experimental Procedures

The relationship between feeder cattle cash and futures prices was examined using both delivery settlement feeder cattle futures prices and the USFSP. Basis risk was examined for nearby futures contracts only, covering the period from 4 weeks prior to contract expiration through the week of expiration.

The relationship between the cash and futures prices was estimated using the following equation:

$$\text{Cash Price} = b + h(\text{Futures Price})$$

The coefficient,  $h$ , is called the hedge ratio. The hedge ratio is an estimate of the relative price change between the futures and cash markets and is 1.0 if each dollar move in cash price corresponds to a 1 dollar move in futures. The hedge ratio indicates how large a hedger's futures market position should be relative to his cash market position. The  $b$  term in the equation could be referred to as a hedge ratio-weighted basis. If the hedge ratio ( $h$ ) equals one, then  $b$  represents the standard basis definition; cash price minus futures price.

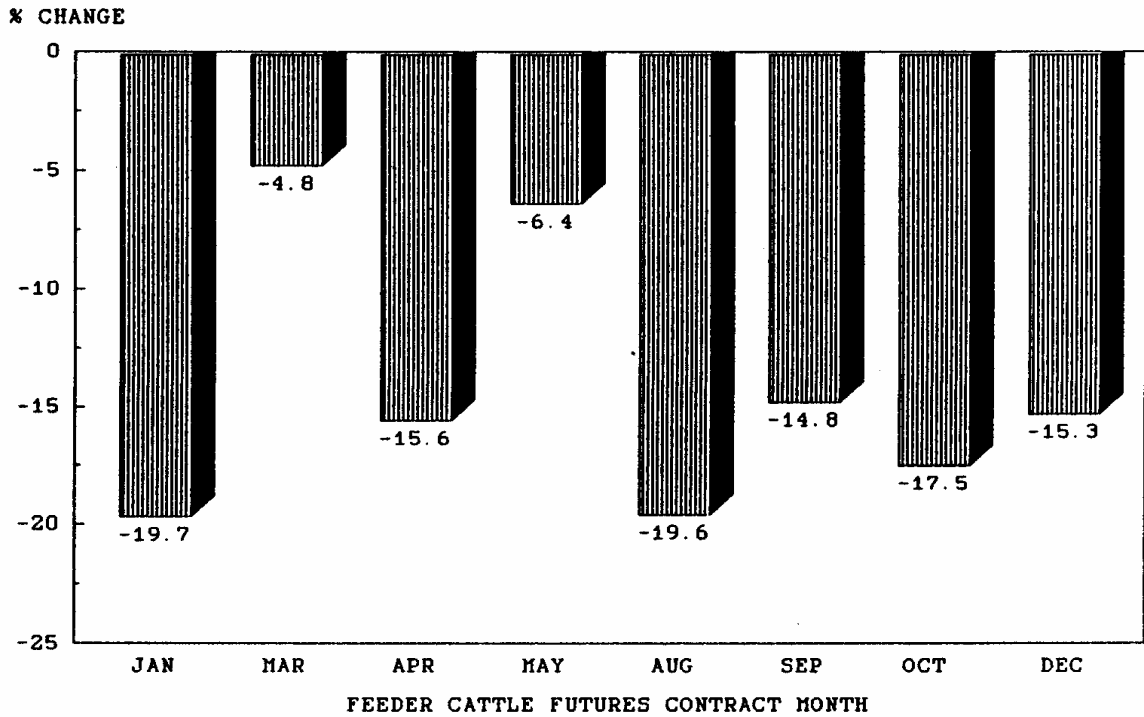
Estimates of hedging risk were computed using weekly Dodge City, Kansas cash feeder cattle prices for the delivery settlement and cash settlement feeder cattle futures contracts over the 1977 through August 1986 period. Since there was no cash settlement prior to the September 1986 contract, the USFSP was used as a substitute for the cash settled feeder cattle futures prices over this historical period. That price series is a good substitute for the nearby cash settlement futures price, since it is now used to settle any contracts outstanding at expiration.

## Results and Discussion

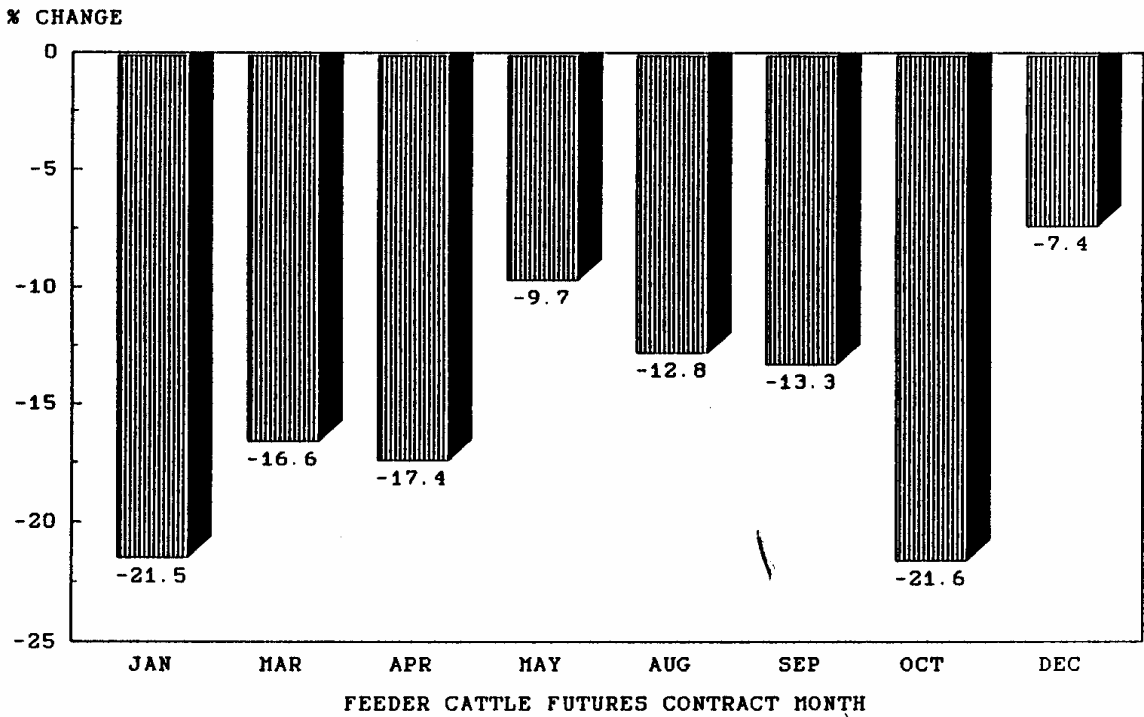
Hedge ratios for 600 to 800 pound feeder steers generally were not significantly different from one, which was expected since these cattle match the feeder cattle futures contract specifications. Since the hedge ratio is approximately one for this class of cattle, changes in hedging risk essentially measure changes in basis risk. Cattle not meeting contract specifications, such as lighter weight steers and heifers, have hedge ratios that differ from one. In that case, estimated reductions in hedging risk assume that the hedger has weighted his futures market position relative to his cash market position by the hedge ratio. As a result, reductions in hedging risk for cattle not meeting feeder cattle futures contract specifications generally differ from a reduction in basis risk.

For all of the contract months, there was less hedging risk in the cash-settled feeder cattle futures for 600-700 lb (Figure 36.1) and 700-800 lb (Figure 36.2) steers than in the physical delivery futures contract. Seventy-five percent of the reductions in hedging risk were significantly different from zero ( $P < .05$ ). The reductions in hedging risk attributable to the change to cash settlement were frequently greater than 15 percent.

Estimated reductions in hedging risk attributable to cash settlement vary by weight, sex, market location, and contract month. Results detailing the changes in hedging risk for cattle that do not meet futures contract specifications are available from the authors.



**Figure 36.1. Changes in Hedging Risk Attributable to Cash Settlement, Dodge City 600-700 lb Steers.**



**Figure 36.2. Changes in Hedging Risk Attributable to Cash Settlement, Dodge City 700-800 lb Steers.**