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# MEMORANDUM

DATE August 24, 1984

TO AAEA paper presented at its annual meetings, 1984

FROM John Ikerd

SUBJECT Producer Attitudes Toward Risks and Options

I did not prepare a formal paper for presentation in the Options symposium at Ithaca. However, I did use a set of visuals that you might find useful. The basic propositions put forth in my presentation were as follows:

A. Producer attitudes toward risk, ie. risk preferences, are important in explanation and prediction of producer behavior if risk is important to producer decisions "and" if producers understand the nature of risk associated with decision alternatives.

B. We observe producers using risk management tools and strategies in cases where there is a broad, basic understanding of the nature of risks they face and of the impact of risk management strategies on those risks. But, relatively few producers use futures markets for hedging.

C. Produers' reluctance to use futures could be explained by unimportance of market risks, but in fact most recognize that market risks and very important. A more logical explanation is they they don't understand enough about market risks and impact of hedging on market risks to make wise use of futures. (Another possibility discussed is that futures contract specificantion are not suitable to many farmers or livestock producers.)

D. Justification of risk analysis as a basis for decision making does not depend on producers understanding of risks, only on the importance of risk to decision outcomes. We do not have to know risk preferences to help farmers analyze riskiness of alternative decisions. They can use their risk preferences, whatever they may be, to make decisions consistent with their objectives. Neither we nor they have to explicitely indentify those preferences.

C. Risk associated with options are related to risks in cash and futures markets. Risk is defined as the probability of a loss or otherwise adverse outcome. Thus risk depends on the expected level as well as variability of possible net returns. The time related premium of a put option reduces expected net returns relative to futures or cash expectations and thus increases the risks associated with any

given net revenue variability. Downside options risk is related to basis variability, since options represent an option to hedge or sell a futures at the option sprike price. Upside options profit potential is related to cash market variability since the option can be allowed to expire worthless in a rising cash market situation.

D. Hedging narrows the range of possible price outcomes, once the hedge is placed, from that represented by price forecast error to that represented by basis forecast error. Standard errors of price forecasts, 4-6 months prior to delivery, have been shown to be 5 to 7 times as great as basis forecast error. The chart shows the 2/3 probability, or standard error range, associated with an outlook price of $75 and an expected hedge price of $75, based on Oklahoma research. Assuming normality, risk of outcome less than $70 is cut dramatically even throgh expected outcome is same.

E. A $2 option premium would cut the expected outcome from $75 to $73. The variability below $73 would be same as futures variability below $75, but the downside risk would be greater, ie. probability of outcome less than $70 would be greater in this illustration. But, downside risk would still be much less than in cash market. Upside potential with options would be much greater than with futures, but less than cash market potential by amount of premium. Thus risk characteristics of option are related to premium and distribution of possible cash and basis outcomes.

F. Colored overlay was used in presentation to contrast cash market risks with both futures and options risks.

G. Producers acceptance or lack of acceptance of options likely will depend as much or more on their ability to understand and evaluate risks associated with options as on any other single factor. Research on producers' risk preferences will shed little if any light on producers likely acceptance of options unless they know enough about risk characteristics of options to make logical choice to use or not to use options as a marketing tool. Our research efforts might be much better spend on evaluation of risks associated with various market and production alternatives rather than determining producers' risks preferences. Our extension programs should focus using risk measures to help producers analyze riskiness of decision alternatives, including options, and facilitating wise risk management decisions.

## IMPLICATIONS FOR RESEARCH AND EDUCATION RELATED TO COMMODITY OPTIONS

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* Knowledge of producers' preference functions will not explain or predict unless producers are educated with respect to risks.

* Information concerning distributions of outcomes from futures, cash markets and options.. and education concerning managing risks for profits; are key to effective use of options by producers.

# PRODUCERS' ATTITUDES TOWARD RISK AND IMPACTS ON DECISION MAKING

**Antle, AJAE Dec. 1983**

Explanation and prediction of producer behavior must incorporate risk if:

A. Objective functions depend on parameters of probabilistic prices, yields, etc.

B. Producers know enough about prob. distributions to use them in decision making

## OBSERVED RISK BAHAVIOR OF PRODUCERS

*They use irrigation and other measures to manage production risks.

*They participate in government programs to reduce market risks.

*They will contract with local buyers for forward price or delivery terms.

*They make very limited use of futures markets for hedging.

## WHY HAVE PRODUCERS BEEN RELUCTANT TO USE FUTURES MARKETS?

A.____ Their objective functions do not depend on probabilistic prices.

B.__X__ They do not know enough about the nature of distributions of price outcomes from cash and futures markets to make a logical choice.

WHAT MUST WE KNOW ABOUT RISK ATTITUDES OF PRODUCERS TO JUSTIFY INCORPORATION OF RISK ANALYSIS INTO DECISION MAKING?

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* Only that producers' objective functions depend on probabilistic outcomes. Antle, AJAE 1983

* Farmers bring their risk preferences with them, to a decision or a meeting, and can use them whether or not they know what they are. Holt, AJAE 1983

# PUT OPTIONS

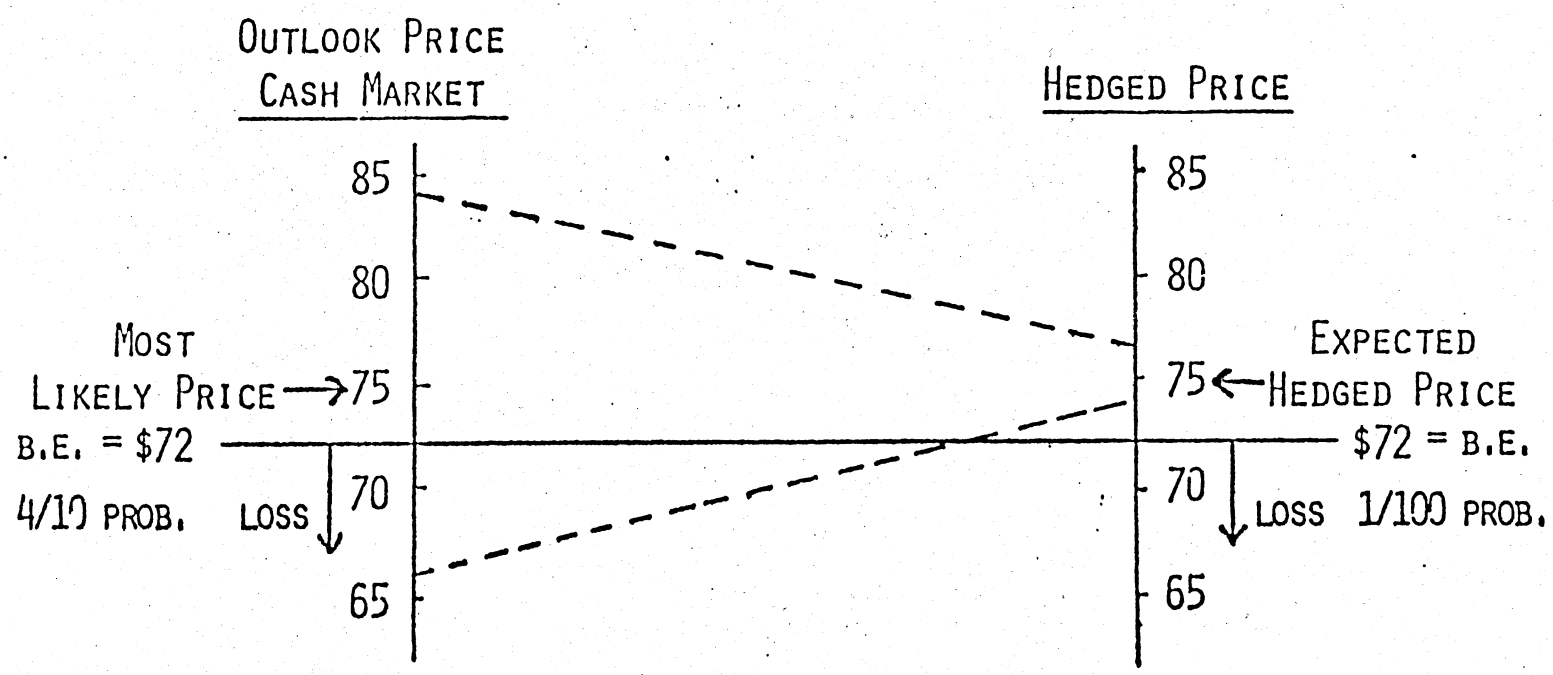
## NATURE OF POSSIBLE OUTCOMES

* OPTION PRICE OR PREMIUM REDUCES EXPECTED OR MOST LIKELY PRICE OUTCOME.

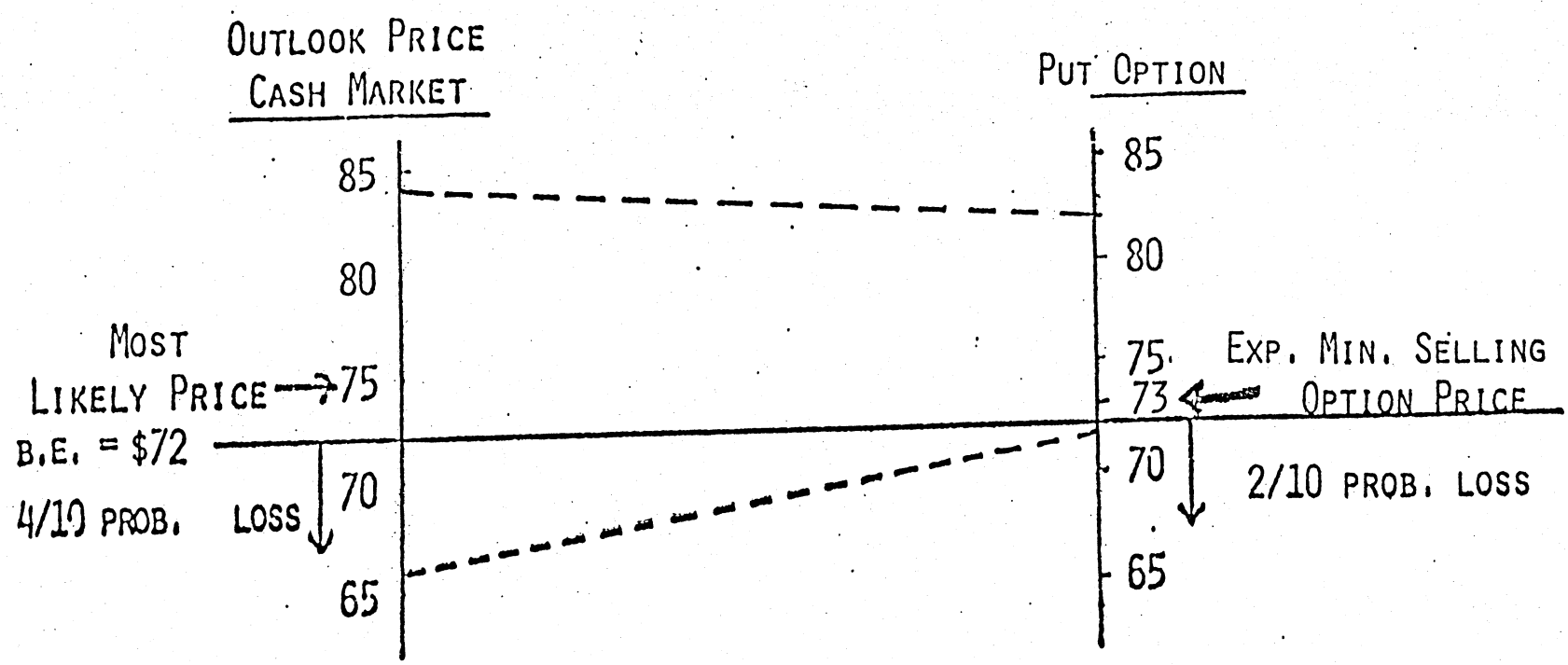
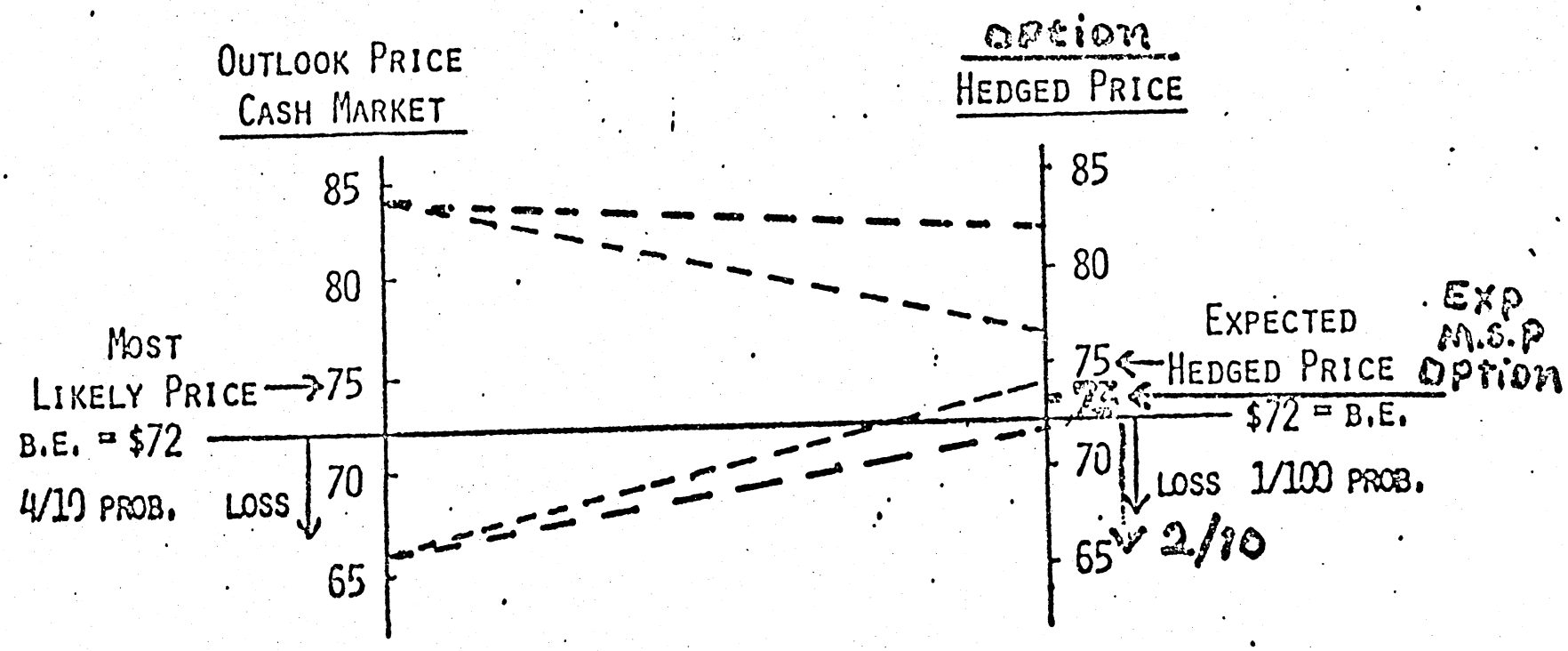
* CHANCES OF OUTCOME BELOW EXPECTED ARE RELATED TO BASIS FORECAST ACCURACY.

* CHANCES OF OUTCOME ABOVE EXPECTED ARE RELATED TO CASH MARKET FORECAST ACCURACY.

# + MARKET RISK - BASIS RISK RELATIONSHIPS



# RISK RELATIONSHIPS



# + MARKET RISK - BASIS RISK RELATIONSHIPS