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Research Review

Agricultural Options and Price Supports: Competitive or Compatible?

By Lyle P. Schertz*

The initiation of option trading raises important questions about the potential relationships between options for domestic agricultural commodities and Government price supports. These considerations logically fall into three categories: (1) contrasts and similarities between options and price supports, (2) conditions in which options and price supports could be competitive with each other, and (3) ways in which options might be used to transfer price risks from producers to the public.

Contrasts and Similarities

The roles of options differ from the roles of price-support programs. Option markets essentially deal with risks of changes in price within a marketing year. Option markets will not generate market prices different from those warranted by supply and demand conditions. Furthermore, they will transfer price risks only at a premium.

In practice, exchanges are expected to initiate trading of options with strike prices that approximate the then-current supply and demand conditions. As commodity prices change in response to changes in these supply and demand conditions, exchanges are expected to trade options with correspondingly different strike prices.

Government activity, natural phenomena, and actions of entrepreneurs will influence the probability distributions of prices, the alternatives available to producers and uses of farm products and, therefore, the combination of exercise prices and premiums in the option markets. Thus, the strike prices and related premiums of option contracts could reflect a variety of institutional arrangements. But, prices and premiums would vary with differing institutional environments. For example, if the Government were

facilitating the withholding of 50 million acres from production to protect a corn price support of \$3.00, prices and premiums would differ from a situation in which there was no acreage diversion and the support price was \$1.75.

Price-support programs also involve transfers of price risks. They involve put-type arrangements in that nonrecourse loans permit producers to avail themselves of the better of market prices or support prices. An initial choice to use price-support loans does not preclude repaying the loans if market prices become attractive. The public, through a Government agency, accepts the risk of market-clearing prices which are below price-support levels. This arrangement contrasts with option markets where market participants carry the price risks.

Options and price supports differ in two ways that are particularly relevant to discussions about whether they are competitive or compatible. First, price supports cost the producers nothing or represent a "minimal cost," such as diverting acreage from production. In contrast, options will not be free. Theory and observations of option markets such as the sugar options on the Coffee, Sugar and Cocoa Exchange and the initial trading in soybeans options on the Chicago Board of Trade suggest that the premiums will be substantial, especially compared with the nominal or zero cost to producers of the put feature of price-support loans.

Second, price-support levels have frequently been set to raise prices above longrun, market-clearing levels, thereby transferring income to farmers. To maintain these higher prices, the Government has taken steps: (1) to isolate stocks of the commodity from the market, (2) to restrain the use of resources such as by diversion of land to other uses, and (3) to expand product demand to protect the levels of price support. Dependence on price supports to effect income transfers has been reduced in recent years.

*The author is an economist with the National Economics Division, ERS.

Risk Management in Agriculture

Reviewed by David Trechter*

Peter Barry (editor). Ames: Iowa State University Press, 1984, 282 pp., \$35.95.

This accessible discussion of how agricultural economists treat risk in theoretical and empirical models fulfills Barry's stated purpose of "[providing] a comprehensive coverage of concepts, methods of analysis, and practical applications involving risk analysis in agriculture." The book is aimed at people who've had limited exposure to economic models incorporating risk concepts. Little mathematical sophistication is assumed or required to understand the material presented.

In addition to the book's accessibility, the general organization of material and the bibliography are praiseworthy. The book is organized into four parts: microeconomic foundations of risk models, farm management applications of these models, financial aspects of risk management, and the application of risk models to aggregate phenomena. Organization of the material into these broad subject areas should increase the book's usefulness, particularly for those wanting to examine a specific topic in more depth, since the authors include many references.

Given the audience for which this book is intended, the discussion is an appropriate mix of theoretical issues and empirical applications. Though not successful in all cases, the general approach is to introduce a topic area, discuss some of the conceptual issues, and describe and critique empirical investigations of the topic.

The book does have some shortcomings. As with most compendiums, the links between the various parts of the book are sometimes obscure. It is not always obvious how a chapter builds on earlier ones. This is particularly true in the first section of the book. Another general problem of edited readings, shared by this book, is repetition. Again, the first section of the book is more prone to this problem than the others. For example, risk models employing safety-first rules are described and discussed in chapters 2, 3, and 5. Additional information is added

in each case but the topic could have been adequately and completely treated in one part of one chapter.

Although the microeconomic foundations of risk models are better developed than are the corresponding macroeconomic foundations, the book's first section shows that even in microeconomic risk theory there are areas of disagreement. For example, the utility functions of decisionmakers in risky environments are described by economists in a variety of ways. Examples of different approaches examined in the first section of the book include the Expected Utility Hypothesis, Lexicographic Utility Functions such as Safety First models, and Mean-Variance models (and closely related approaches).

Another controversy discussed in the opening section is the appropriate density function to use in modeling behavior. Most in the field agree that the subjective probability beliefs held by a decisionmaker will be more successful in predicting behavior. However, it is also generally recognized that eliciting these beliefs is difficult, expensive, and susceptible to biases. Furthermore, the magnitude and likelihood of errors increase when one tries to estimate more complex relationships such as the covariance between the income-generating potential of several crops.

The first section also discusses different methods for reducing the size of the choice set confronting a decisionmaker (for example, various stochastic dominance criteria) and the very different approach to studying human behavior in risky situations used by psychologists.

The second section of the book examines the use of risk models in farm management. The most commonly used techniques for implementing these models in the farm management context include quadratic programming (QP), minimization of total absolute deviations (MOTAD, a linear alternative to QP), simulation (using econometric or systems science techniques), and decision trees with payoff matrices. The results of several empirical investigations are presented in this section.

*The reviewer is an agricultural economist with the National Economics Division, ERS.

The book's third section describes the financial aspects of agricultural risk. The treatment of this topic is broken into three parts, one for borrowers, one for lenders, and one on the general impact of inflation on the financial risks associated with agriculture. The treatment of the three is uneven because much less work has been done on risk models of lender behavior. The section develops the distinction between business and financial risk, describes borrower and lender responses to financial risk (such as credit reserves and various amortization plans), and discusses ways inflation affects the financial risk of borrowers.

The final section is the shortest and, in many ways, the most provocative. The application of risk models to macroeconomic phenomena such as international trade or agricultural policy is relatively new. The theoretical underpinnings in this area are still in flux, making empirical work uncertain. For example, farmers' response to agricultural policy changes can be modeled in a rational expectations or an adaptive expectations framework. How this response is modeled can have important consequences for the outcome of

the analysis. At the very least, the time period in which the uncertainty facing a farmer increases differs in the two approaches.

This final section presents arguments supporting an agricultural policy with automatic adjustment mechanisms. For example, it suggests that Commodity Credit Corporation loan rates be tied to reserve stock levels. If reserve stocks go up by a pre-established percentage, the loan rate would decline by a given amount. The information built into these automatic adjustments would reduce the policy risk faced by farmers and could be incorporated into their planning horizon thereby improving the economic decisions they make.

Risk Management in Agriculture is a good primer for someone interested in how economists model uncertainty in the agricultural environment. Its principal role may be as a starting point for those investigating a specific topic or method. The non-rigorous treatment and extensive bibliography are well suited for this endeavor.

Suggestions for Submitting Manuscripts for *Agricultural Economics Research*

Contributors can expedite reviewing and printing of their articles by doing these things:

1. **SOURCE.** Indicate in a memorandum how the material submitted is related to the economic research program of the U.S. Department of Agriculture and its cooperating agencies. State your own connection with the program.
 2. **CLEARANCE.** Obtain any approval required in your own agency or institution before sending your manuscript to one of the editors of *Agricultural Economics Research*. Attach a copy of such approval to the manuscript.
 3. **ORIGINALITY OF MATERIAL.** It is our policy to print original material. We consider alternative treatments of material published elsewhere, but such treatments need to differ substantially from the original approach. When submitting your manuscript, identify, if applicable, related material either published or submitted for publication.
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