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# Book Reviews

## Expanding the Risk Analysis Toolkit

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**The Competitive Firm's Response to Risk.** By Lindon J. Robison and Peter J. Barry. New York: Macmillan Publishing Company, 1987, 324 pp., \$37.50

Reviewed by Beverly Fleisher

"Risk is like love, we have a good idea of what it is, but we can't define it precisely." This statement, made by Stiglitz several years ago, describes the position of risk in decision theory today. Economists acknowledge the importance of risk in both individual decisionmaking and policy formation. However, like other students of decisionmaking, economists are often stymied by the absence of concrete answers to basic questions, including a rigorous definition of "risk."

Although rigor itself would dictate against building a superstructure of risk analysis on shaky foundations, the immediate need for economists to address risk-related questions suggests that an evolutionary approach to the development of tools must be taken. Robison and Barry respond to the need of economists for tractable tools by developing expected value-variance models as a means of conducting comparative static analysis of the competitive firm's response to risk.

Robison and Barry carefully delimit the area of their work. They point out that microeconomic theory under risk or uncertainty is only one area within the realm of decision theory. And, expected value-variance is only one of several analytic tools that analysts can use to extend microeconomic theory into the world of risk.

This narrowing of focus from decision theory as a whole to one method of analyzing specific types of risk-related problems in economics is, in fact, what makes the book useful. The lack of a consensus on risk theory and methods and the fact that risk influences nearly every economic situation or decision makes it impossible for any one book to cover the field in both breadth and depth. Three approaches have been used, each with

its own strengths and weaknesses. One approach is an overview of risk and its effects on a given environment. *Risk Management in Agriculture*, edited by Peter Barry, is an example of this genre. The second approach is a summary, comparison, or review of models and methods. John Hey's *Uncertainty in Microeconomics* represents this approach. The third approach, taken by Robison and Barry, is the development of single method and its application to a variety of situations.

The book's early chapters set the stage by reviewing many risk-related concepts and issues and defining terms. This process is more than a nicety, it is a necessity in an interdisciplinary field where even individuals in one discipline do not agree on the meaning of basic terms. Although all readers will glean something from the review, individuals unfamiliar with risk analysis may need to supplement this material.

Examination of the competitive firms' response to risk begins in earnest in the second part of the book. Robison and Barry present the expected value-variance framework and provide careful mathematical and intuitive expositions of income and substitution effects under risk.

Robison and Barry consider a wide variety of possible responses to risk by the firm. Each chapter addresses either one risk management tool, such as hedging, or a set of parameters, such as the firm's financial structure, that can be altered to manage risk.

The authors first consider situations in which the distributions of outcomes available to the firm are positive linear transformations of the random variable. This property of the distribution leads to a ranking of outcomes that are guaranteed to be consistent with those obtained by expected utility models. Among the decision situations meeting this criterion are the choice of optimal output under price uncertainty, optimal input use under risk, and the use of risk-reducing inputs, hedging, diversification, share leasing, and information as risk responses.

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Perhaps more interesting are the cases where there is no obvious, direct linkage between the random variable and the outcome of concern. In these cases the consistency between expected value-variance and the results of expected utility models can no longer be guaranteed. Robison and Barry argue that, when properly framed in terms of indirect and direct outcome variables, many *ad hoc* decision rules will lead to rankings of choices consistent with expected utility models. It is unfortunate that the chapter detailing this argument may leave readers with questions. But, the concepts become clearer as Robison and Barry lead the reader through subsequent analyses of insurance, management of financial structure, flexible durables, participation in public programs, and new technology as responses to risk.

Although most of these situations have been modeled many times, Robison and Barry are not content just to report earlier findings. In addition to discussing pertinent literature, they extend previous work by relaxing assumptions and specifying and testing new hypotheses.

The book draws together much of the literature on firms' response to risk that is scattered throughout journals and other technical outlets. Because the literature is presented within a consistent framework, *The Competitive Firm's Response to Risk* is an important addition to the reference library of any economist concerned with microeconomic analysis.

However, users must keep in mind that the book presents just one of the many models, methods, and theories that comprise decision science.

The book expands the limited number and types of texts available for teaching economists about risk decisionmaking. Almost any course related to risk and decisionmaking would benefit from the statistical appendix, which provides the background necessary to understand the stochastic specifications of risk-related models. The curriculum for those receiving their first introduction to the economics of risk should also include the foundation-building chapters supplemented by additional, less cursory material to provide the framework for analysis. Graduate students and professionals for whom risk is not a primary focus would also benefit from the presentation of expected value-variance as an analytic method as well as the specific models that are pertinent to their interests.

Although this book is not for the mathematically fainthearted, the reader need not be mathematically sophisticated, 1 year of calculus, the statistical review provided in the appendix, and a willingness to spend some time working through areas of specific interest are all that are required. Both students and professionals will be rewarded with an analytic tool that, though imperfect, is a foundation for thinking about the many risk-related questions economists face in the course of their work.

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### In Earlier Issues

Our analysis shows that the researcher involved in policy research must carefully evaluate the relationships among the price elasticities in the model. The researcher can use sensitivity analysis to evaluate the effect of differing sets of elasticities on the magnitude and direction of impacts, particularly when the researcher doubts the quality of the empirical estimates.

Philip L. Paarlberg and Robert L. Thompson  
Vol. 32, No. 4, October 1980

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