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## Quantitative Finance

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### Harry Markowitz: Selected Works, edited by Harry M. Markowitz

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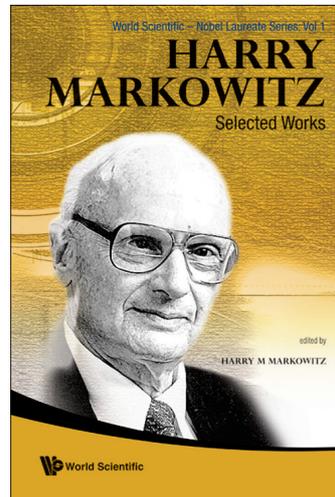
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## Book review



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**Harry Markowitz: Selected Works**, edited by Harry M. Markowitz, World Scientific - Nobel Laureate Series Vol 1 (2010), Hardbound. ISBN 978-981-283-363-1.

Type the generic phrase ‘portfolio selection’ into a web browser and something remarkable happens. The top hits point to a single source: a 1952 *Journal of Finance* publication that has been scanned and posted on numerous public websites. The author is Harry Markowitz, Nobel Laureate, winner of the John von Neumann Theory Prize and father of modern portfolio theory. ‘Portfolio Selection’ is among the most influential articles in the social sciences. Google Scholar provides a low-ball estimate of 14,009 citations.

Those wondering how it is possible for one person to shape six decades of research in financial economics can now look for the answer in Volume 1 of World Scientific’s Nobel Laureate Series. This enlightening and accessible 700-page volume includes Markowitz’s best known research articles as well as many that are less well known. The articles are reproduced in original format and interspersed with comments from the author.

The book begins with a brief essay entitled ‘Trains of Thought,’ which was published in 1993 in *The American Economist*. Markowitz writes about a few of his favorite topics: how to distinguish between what we do and don’t know, Darwin’s *Origin of Species*, the merits of diversification, sparse matrices, the progression from Newton’s model to Einstein’s, computer simulation, the influence of

David Hume, game theory, rational utility and human behavior, Bayesian statistics, and the ‘train of thought’ that led to the synthesis of mean-variance optimization. Markowitz’s wide-ranging curiosity, contemplative and playful nature, and appreciation of his collaborators and critics, are evident throughout.

The book continues with ‘Portfolio Selection,’ which famously frames investing as a tradeoff between expected return (mean) and risk (variance), and then explains how to find an optimal portfolio. Historical importance aside, anyone working in financial economics will enjoy reading this article. It cleanly illustrates how to identify an economic problem, to translate that problem into quantitative terms, and to solve it. Growing interest in mean-variance optimal portfolios led to questions about their relationship to standard economic theory. Then as now, an important economic conceit was a utility maximizer or Rational Decision Maker: one who ‘is not omniscient, but makes no mistakes in logic or arithmetic.’ In ‘Approximating Expected Utility by a Function of Mean and Variance,’ a 1979 paper published in *The American Economic Review*, Levy and Markowitz show that many Rational Decision Makers select portfolios that are approximately mean-variance optimal.

Even as he was developing mean-variance optimization, Markowitz was considering the limitations of the Rational Decision Maker. In ‘The Utility of Wealth,’ published in 1952 in *The Journal of Political Economy*, Markowitz considers an economically heterogeneous

population that includes insurance buyers (risk evaders, those with concave utility) and buyers of lottery tickets (risk seekers, those with convex utility). The article resolves contradictions stemming from Milton Friedman and Leonard Savage's economic analysis of this population, and it is a foundational element of behavioral finance.

The remaining chapters correspond roughly to epochs in Markowitz's career, which began in the 1950s at the RAND Corporation, and is currently flourishing at the Harry Markowitz Company in San Diego. Three themes are pervasive: economic context, parsimonious mathematical modeling, and computer simulation. The latter plays an important role in Markowitz's work since 'closed form formulas,' which most scientists find easiest to work with, and which facilitate rapid computing, are not adequate to describe important features of financial markets. Markowitz became interested in simulation early in his career when he was at RAND. Approximately a third of *Harry Markowitz: Selected Works* is concerned with SIMSCRIPT, a simulation language that 'reduces computation time by allowing the programmer to describe the system to be simulated rather than describing the actions which the computer must take to accomplish this simulation.' The development of SIMSCRIPT, along

with his work on sparse matrices, are cited in the award to Markowitz of the John von Neumann Theory Prize.

Simple ideas and techniques that Markowitz developed early in his career are relevant today. An example is found toward the end of Chapter 7 in a 2005 *Financial Analysts Journal* publication entitled 'Market Efficiency, A Theoretical Distinction and So What?' In that article, Markowitz applies geometric analysis he developed in the 1950s to show how leverage constraints can lead to the mean-variance inefficiency of the market portfolio. This elementary and insightful perspective enables a broad audience to expand its decision making toolkit to take account of the complex phenomena that pervade markets today.

Since I acquired my copy of *Harry Markowitz: Selected Works* earlier this year, I have consulted it frequently, sometimes for practical reasons and sometimes for fun. The book has not (yet?) given me the power to influence future generations of financial economists. However, it always reminds me of the joy that comes from wide-ranging curiosity, contemplation, playfulness, critical thinking, and plain old hard work.

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