Autobiography

I was born in Chicago in 1927, the only child of Morris and Mildred Markowitz who owned a small grocery store. We lived in a nice apartment, always had enough to eat, and I had my own room. I never was aware of the Great Depression.

Growing up, I enjoyed baseball and tag football in the nearby empty lot or the park a few blocks away, and playing the violin in the high school orchestra. I also enjoyed reading. At first, my reading material consisted of comic books and adventure magazines, such as *The Shadow*, in addition to school assignments. In late grammar school and throughout high school I enjoyed popular accounts of physics and astronomy. In high school I also began to read original works of serious philosophers. I was particularly struck by David Hume's argument that, though we release a ball a thousand times, and each time, it falls to the floor, we do not have a necessary proof that it will fall the thousand-and-first time. I also read *The Origin of Species* and was moved by Darwin's marshalling of facts and careful consideration of possible objections.

From high school, I entered the University of Chicago and took its two year Bachelor's program which emphasized the reading of original materials where possible. Everything in the program was interesting, but I was especially interested in the philosophers we read in a course called OII: Observation, Interpretation and Integration.

Becoming an economist was not a childhood dream of mine. When I finished the Bachelor's degree and had to choose an upper division, I considered the matter for a short while and decided on Economics. Micro and macro were all very fine, but eventually it was the "Economics of Uncertainty" which interested me--in particular, the Von Neumann and Morgenstern and the Marschak arguments concerning expected utility; the Friedman-Savage utility function; and L. J. Savage's defense of personal probability. I had the good fortune to have [Friedman](http://www.nobelprize.org/nobel_prizes/economics/laureates/1976/index.html), Marschak and Savage among other great teachers at Chicago. [Koopmans'](http://www.nobelprize.org/nobel_prizes/economics/laureates/1975/index.html)course on activity analysis with its definition of efficiency and its analysis of efficient sets was also a crucial part of my education.

At Chicago I was invited to become one of the student members of the Cowles Commission for Research in Economics. If anyone knows the Cowles Commission only by it influence on Economic and Econometric thought, and by the number of Nobel laureates it has produced, they might imagine it to be some gigantic research center. In fact it was a small but exciting group, then under the leadership of its director, T. Koopmans, and its former director, J. Marschak.

When it was time to choose a topic for my dissertation, a chance conversation suggested the possibility of applying mathematical methods to the stock market. I asked Professor Marschak what he thought. He thought it reasonable, and explained that Alfred Cowles himself had been interested in such applications. He sent me to Professor Marshall Ketchum who provided a reading list as a guide to the financial theory and practice of the day.

The basic concepts of portfolio theory came to me one afternoon in the library while reading John Burr Williams's *Theory of Investment Value*. Williams proposed that the value of a stock should equal the present value of its future dividends. Since future dividends are uncertain, I interpreted Williams's proposal to be to value a stock by its expected future dividends. But if the investor were only interested in expected values of securities, he or she would only be interested in the expected value of the portfolio; and to maximize the expected value of a portfolio one need invest only in a single security. This, I knew, was not the way investors did or should act. Investors diversify because they are concerned with risk as well as return. Variance came to mind as a measure of risk. The fact that portfolio variance depended on security covariances added to the plausibility of the approach. Since there were two criteria, risk and return, it was natural to assume that investors selected from the set of Pareto optimal risk-return combinations.