SKYVIEW INVESTMENT ADVISORS LLC

Special Interview

HARRY MARKOWITZ

SKYVIEW INTERVIEW WITH THE:

FATHER OF MODERN PORTFOLIO THEORY

A special interview with
Dr. Harry Markowitz, Nobel
Laureate in Economics

Dr. Harry M. Markowitz

NOBEL LAUREATE
ESTEEMED ADVISOR TO SKYVIEW INVESTMENT ADVISORS

In this special interview, Steve Turi and Andy Melnick sat down with SkyView's esteemed advisor Dr. Harry Markowitz to discuss his journey through providing the foundation for both modern portfolio theory and behavioral finance.

- Attended University of Chicago as an undergrad, studying philosophy and physics, then continued on to the Ph.D. program in Economics
- Published his seminal theory of portfolio allocation under uncertainty in 1952 in the *Journal of Finance*
- Received his Ph.D. from the University of Chicago with a thesis on the portfolio theory in 1955
- Published the critical line algorithm in a 1956 paper, with a subsequent 1959 book on portfolio allocation in 1959
- Won the Nobel Prize in Economics in 1990, while a professor of finance at Baruch College of the City University of New York
- Currently serves as Adjunct Professor of Finance at UC San Diego's Rady School of Management, while working on volume two of his four volume series titled *Risk-Return Analysis: The Theory and Practice of Rational Investing*, which builds on his 1959 work

"I think therefore I am: cogito ergo sum. I am therefore I think. If I stopped working, I wouldn't be me."

-HARRY MARKOWITZ

Harry Receives the Nobel Prize - Image courtesy of Baruch College Alumni Magazine

In 1990, Harry M. Markowitz won the Nobel Prize for his seminal theory of portfolio selection, which was developed in his early work as a graduate student at the University of Chicago. To find out more about the transition from Chicago Schoolboy to Nobel Laureate, Chief Investment Officer and longtime friend, Steve Turi, sat down with Harry to discuss his early academic interests, the ah-ha moment that led to a successful dissertation meeting with Milton Friedman, and the big schools of thought that he influenced over the years.

STEVEN TURI: What inspired you to focus on the area of research that became the foundation for all the work you have done?

HARRY MARKOWITZ: As a teenager, I read, but I didn't read finance. I read philosophy. I read science at a non-technical level, like The ABCs of Relativity, and I read philosophers. I read Hume, so I was interested in what do we know and how do we know it. I went to the University of Chicago like my Uncle Willy had. They had a two- year program that gave you a bachelor of philosophy, and it consisted of survey courses. There were survey courses in physical sciences, biological sciences, social sciences and so on.

I should say that when I applied to the University of Chicago, my grades weren't terribly good, because I didn't do lots of homework. That was nonsense. Like algebra would consist of 20 problems, 19 of which were the same thing, again, and very boring. The only problem with my work was the A students would come over to me, to work the hard problem, the 20th problem.

I wrote a little essay regarding philosophers and so on, so [The University of Chicago] said, "We usually don't take people with your standing, but we will let you take the placement exam, the entrance exam."

It turned out that the entrance exam not only determined whether you got in or not, but if you did sufficiently well in any particular area, you got out of the survey course in that area. They excused me from the survey courses in the physical sciences.

Since I did not have to take the survey courses in the physical sciences, I chose those in the social sciences. When it came time to choose an upper division, I had just had a course in economics as part of the survey, and I found economics very interesting, sort of a combination of empirical and theoretical, so I went into what was arguably the world's best economics department, certainly one of the most famous economics departments.

When it came time to pick a dissertation topic, I went over to my advisor, Professor Jacob Marschak, who was busy, and asked me to wait in the ante room. Another person was also waiting for him, a [stock] broker, so we started talking. I was there to pick a dissertation topic. The broker said, "Why don't you do a dissertation on the stock market? Use your mathematics and statistics on the stock market." Later, a biographer of mine said, "That's the best advice a broker has ever given."

The University of Chicago – Image courtesy of The University of Chicago

Anyway, when I went into Dr. Marschak's office, I said, "The guy out there thinks I ought to do a dissertation on the stock market." I was a student member of the Cowles Commission. He said that Alfred Cowles, who had endowed the Cowles Commission, was very interested in the stock market. He was one of the first people who figured out that, present company excepted, of course, stock market forecasters typically did not forecast the stock market.

I said, "Yes, I will give it a try." Marschak didn't know the finance literature. He sent me over to Marshall Ketchum, who I believe was the dean of the business school at that time. He gave me a reading list. His reading list included Wiesenberger's *Investment Companies and Their Portfolios*. Graham and Dodd was [also] on my reading list.

Then I was in the library of the business school, reading John Burr Williams' *Theory of Investment Value*, and Williams said that the value of a stock is the present value of its future dividends. I figured dividends are uncertain so he must mean the expected value. Later, he does confirm, when things are uncertain, use the mean expected value. I figured, if you only are interested in the expected value of a stock, you must be only interested in the expected value of the portfolio. Most people at the time assumed the way to maximize the expected value of the portfolio is by putting all your money into whatever stock has maximum expected value. That is not right. Everybody knows you are not supposed to put all your eggs in one basket.

STEVEN TURI: Maybe back then they didn't realize the importance of diversification?

HARRY MARKOWITZ: No, if you look at Wiesenberger, *Investment Companies and Their Portfolios*, or you look at Shakespeare, [in the] Merchant of Venice, somebody says, "Antonio, why do you look sad, is your business going bad?" He says, "Believe me, no: I thank my fortune for it, my ventures are not in one bottom trusted, nor to one place; nor is my whole estate upon the fortune of this present year, therefore my business makes me not sad."

I had also gone back and seen where people have an article called "The Early History of Portfolio Theory, 1600 to 1960," so 1600 is Shakespeare, and 1960 is when I had already written my '59 book.

Anyway, the notion of diversification was not new, but a formal theory, including covariance ... In other words, let's go back to John Burr Williams. Later, he says that you should invest according to the mean value, the expected value, and he says that it would seem like there is riskiness, but if you diversify sufficiently, you can eliminate all risk, and you will, in fact, get the expected value. That is true if there is zero correlation. However, according to chapter 5 of my 1959 book, if you diversify more and more and more, in correlated risks, the variance of your portfolio doesn't approach zero. It approaches the average covariance. Therefore, my contribution was not just diversification. It was a theory which took into account correlation and its impact on portfolio risk.

Harry Markowitz with SkyView's Andy Melnick and Steve Turi.

Andy Melnick: Correlation. We are looking at risk instead of just return including the correlation component of risk along with all ...

HARRY MARKOWITZ: John Burr Williams thought that you could eliminate risk. You only needed to invest according to expected return and then diversify enough, and risk would go away. It will not. That depends on covariance and correlation.

STEVE TURI: That's fascinating, amazing progress.

HARRY MARKOWITZ: Somebody asked did I know I was going to get a Nobel Prize at that moment. That was the ah-ha moment, right? I thought of the returns on securities, like random variables. Therefore, the portfolio is a sum, a weighted sum, of random variables where you choose the weights. I knew off-hand what the expected value of a weighted sum was, but I didn't know what the variance or the standard deviation of a weighted sum was. I was in the library of the business school and I took a book off the shelf, Uspensky's I*ntroduction to Mathematical Probability*, something like that, and found the formula for the expected variance of a weighted sum, and there it is, all these covariances or correlations. I think, ah-ha, that's it.

"John Burr Williams thought that you could eliminate risk. You only needed to invest according to expected return and then diversify enough, and risk would go away. It will not. That depends on covariance and correlation."

STEVEN TURI: That was the ah-ha?

HARRY MARKOWITZ: That's the ah-ha moment. Somebody asked me did I realize that I was going to get a Nobel Prize for that, and I said, no, but I knew I was going to get a dissertation, I would get a Ph.D. That was the ah-ha moment.

Harry Markowitz recalling the ah ha moment of modern portfolio theory.

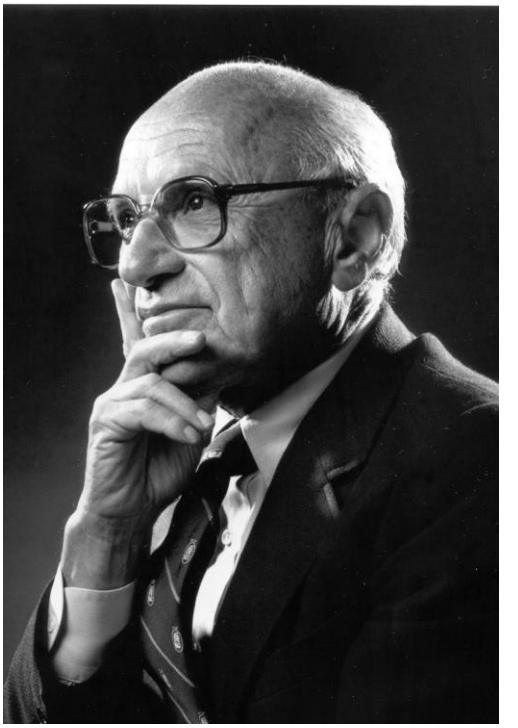
HARRY MARKOWITZ: I frequently tell this story, and I have told it to you, I don't know how many times, but thank you for asking.

I was working at the RAND Corporation which has its main offices in Santa Monica. I had spent a month or some time at the Washington office of the RAND Corporation, and flying back, I flew to Chicago first, and then ... That was before O'Hare Airport? I remember landing at Midway, thinking I know this subject cold. Not even Milton Friedman is going to give me a hard time.

Andy Melnick: Wishful thinking, right?

HARRY MARKOWITZ: The behavioral finance folks would refer to that as over-confidence. I was a smart-aleck young kid. Now that I have matured, I am a smart-aleck old man.

Anyway, about five minutes into my defense, Friedman says, “I have read your dissertation. I don’t find any flaws in it, but this is not a dissertation in economics, and we can’t give you a Ph.D. in economics for a dissertation that is not economics.” About 10 or 20 minutes later, he says, “We have a problem. It is not economics. It is not mathematics. It is not business administration,” and the head of my committee shakes his head, “It’s not literature.”



Milton Friedman – Image courtesy of Libertarian Party of Maryland

STEVE TURI: You are sweating now?

HARRY MARKOWITZ: Oh, my palms, my palms are sweating. After an hour and a half, mostly ... at one point, Allen Wall said, “What is your dissertation about?”; and I gave him a five-minute rundown. He sent me out in the hall, and about five minutes later, Dr. Marschak comes out and says, “Congratulations, Dr. Markowitz.”

I saw Friedman for some other reason [later on]. He was eventually in the Bay Area, and I was down in Southern California, but there was some kind of boondoggle that we were both consultants to or something. I asked him whether he was serious. I reminded him of the episode, no big deal in his life. I asked him, “Were you serious?” He said, “Harry, of course not, you know that we never flunk anybody at that stage.”

STEVEN TURI: What an amazing story.

HARRY MARKOWITZ: Yeah.

STEVEN TURI: Harry, 1952 was a very important year for you, and not just for Portfolio Theory but also Behavioral Finance

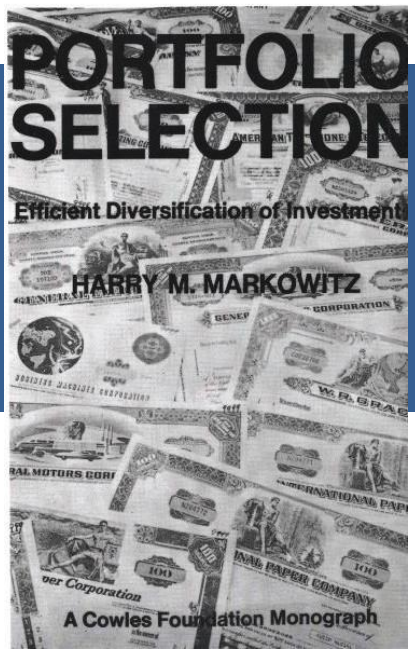


Image courtesy of: Yale University Press

HARRY MARKOWITZ: I wrote three ..., or jointly authored, three articles which are still remembered. One is "Portfolio Selection," which became Portfolio Theory. I didn't call it Modern Portfolio Theory, but since I am going on 88, I am delighted that I am still… It will always be MPT. Then there was an article called "The Utility of Wealth." This became behavioral finance. For example, if you look at the Kahneman ... you know Kahneman and Tversky?

At first, I didn't realize that there was a causal relationship. I knew that I had preceded them in some sense, but he said that he and Amos Tversky had this phenomena that they couldn't quite explain. He said, "Tversky called my attention to an article by Harry Markowitz who later got a Nobel Prize for something else, and it showed that there was this phenomena."

There was a paper by Friedman and Savage, two of my idols, but just because somebody is your idol, you read carefully, but you don't necessarily [accept it]. They were trying to explain the simultaneous existence of gambling and insurance by a population of people that are all following expected utility. This was, late '40s, probably 1948, something like that. I took Friedman's class in microeconomics, but he assigned, for optional reading, the article by Friedman and Savage.

They had a utility function that looked like a two-humped camel going uphill. It was concave, convex, concave. People over here are risk averse, and people here will gamble. If you take this two-humped camel going uphill and put a plank on it, there is a double-tangency.

"A good friend of mine, who is a behavioral, Meir Statman, said, "Now, you had these two intellectual children, and you give all your time to one. Why do you do portfolio theory, and not behavioral finance?" I told him, I said, "That is how I make my living, with Portfolio Theory."

Below the lower tangency, you are poor. Above the upper tangency, you are rich, and then there is in-between. Now, using the apparatus that they had explained, you could show as an immediate consequence that if you had two people that were halfway between these double tangencies, so they are real middle-class, [the optimal bet] is one where you flip a coin, and one becomes poor, and one becomes rich, which you do not see. [In this world] people below the lower tangency do not buy lottery tickets.

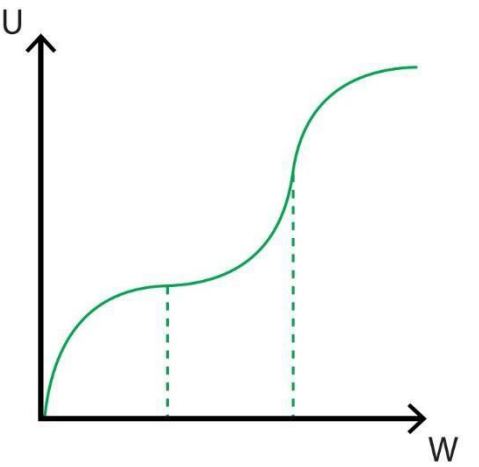


Image: Friedman and Savage Utility Function (1948) – Policonomics

The only point on their curve which sort of made sense was an inflection point where, to your left, down, you are concave, and you insure against losses, and going up, you are convex and then concave again, eventually, so you will buy a lottery ticket. I call that not current wealth, but customary wealth because if you had a recent windfall gain, you move into the convex part, and you become a little bit more devil-may-care, and if you had a recent windfall loss, you go into the concave part and you become more cautious. Amos Tversky explained to Danny Kahneman that there is this paper by Markowitz where it is the change in the wealth, not wealth that was [groundbreaking for behavioral finance].

This argument between the rational versus behavioral, I am on both sides. I am the father of portfolio theory and the grandfather of behavioral finance. In fact, Herb Shefrin has a three-volume handbook on behavioral finance, and volume three the first reading in there is "On the Utility of Wealth."

People say, "How can you be on both sides?" There are two different questions. One is the positive theory of how people act, and the other is a normative theory, how people should act. In 1952, when I wrote "Portfolio Selection," I said, I will propose mean variance both as a positive theory and as a normative recommendation. By 1959, I wasn't offering it as a positive theory. A good friend of mine, who is a behavioral economist, Meir Statman, said, "Now, you had these two intellectual children, and you give all your time to one. Why do you do portfolio theory, and not behavioral finance?" I told him, I said, "That is how I make my living, with Portfolio Theory."

STEVEN TURI: Oh, that's fascinating. Two groundbreaking works, and there was a third.

HARRY MARKOWITZ: There was a third. There was a paper by Goodman and Markowitz on social choice. This was at a time when Arrow had come out with his Impossibility Theorem about if you want a voting system that will have certain characteristics. There are five or seven conditions that you would like in a voting system, and he has a theorem that says you can't have it.

One of those conditions didn't seem that plausible to Bill Goodman and me, and we wrote an article about it, which I thought was little noted, nor long remembered, and when I did my selected works, I didn't include the social choice paper, the Goodman-Markowitz, because I thought nobody read it.

Then, in preparing for volume 2 of my current Markowitz and Blay book, I wanted to revisit the social choice literature because Portfolio Selection is a social choice between more than one stakeholder affected by a portfolio decision.

I did a little Ask Google search, anything written, and there was an article in the IEEE that said, "We have this rule for selecting which queue to pull from next on the Internet based on the seminal Goodman and Markowitz paper."

Harry Markowitz – Image courtesy of UC San Diego News

"This argument between the rational versus behavioral, I am on both sides. I am the father of portfolio theory and the grandfather of behavioral finance."

STEVEN TURI: It was a very important year.

HARRY MARKOWITZ: Yeah, it was my miracle year. I got three-fifths. I got three out of five I didn't get a special relativity or general ... Einstein, 1905 was his miracle year where he had these five fantastic contributions. Special Theory of Relativity and then… that is what quantum mechanics came from, that.

Andy Melnick: That is what he won the Nobel Prize for too.

HARRY MARKOWITZ: Yeah, but he didn't win it for relativity because it was too controversial, but he won it for something else. I should say that I am not comparing myself with Einstein. That is something else, again. I am a human, plugging along.

STEVENTURI: With all the technology today, I remember, when we first started working together, we had those PCs with green screens, and we thought that we could do a lot of computational work, but today you can do that on a watch. With all the analytical tools and capabilities, is it more difficult to add value, is the market more efficient in general?

HARRY MARKOWITZ: That is an empirical question. I am a theoretician. This is my unofficial opinion. As you know, Portfolio Theory is a mathematical technique whereby, if you pick a universe of investable assets, like, for example, you decide that you want to make portfolios of hedge funds. For this universe of investables, which may be asset classes rather than individual securities, you have to provide expected return estimates for each of the securities or whatever it is, in the universe. You have to provide variances or standard deviations, volatility estimates. You have to provide either covariance or correlation estimates or the equivalent, so you could have a factor model, which implies that, and in addition to that, you have constraints. Any kind of linear equality or inequality constraints, the sum of these securities must be less than or equal to that, and so on. My bit of mathematics takes your estimates about your universe, and your constraints, and it turns out a frontier.

Okay. Now, times change. People say, “We now have new asset classes.” Wonderful. Tell us your asset classes. We have hedge funds and things like that. Convertible arb, I used to be a convertible arb guy. I just did the convertible bonds, long the bonds and short the stock. In the 70’s and 80’s, it was a lot easier game. Now there are so many people in the industry that they have to use leverage to get any kind of expected return.

"Well over 50% of institutional investors, if this is an okay sample, use Portfolio Theory, and they are managing literally trillions, tens of trillions, of dollars. That's not bad for a four-eyed economist."

You didn't use leverage then, so times change. You are supposed to ... These estimates that you provide, these aren't supposed to be backward-looking. They are supposed to be forward-looking. Now, of course, you look back to see, historically, how have big caps, small caps, EFA or emerging markets done, but then you are supposed to think, well, what's different now. Times have changed, so what doesn't change is that you are worried about risk and return on the portfolio as a whole.

There is a story going around, which is half true. I can't remember his name, but a newscaster with really great, beautiful, big, deep-toned voice. He said, "Let me tell you the rest of the story." "In 1952, Harry was at the RAND Corporation, was offered bonds versus stocks, a TIAA versus CREF, of just bonds versus stocks", and he tells the story that he thought, if I am 100% in stocks and it goes down, I will feel like an idiot, and if I am 100% in bonds and it goes up, I will feel like an idiot, so essentially I minimized maximum regret. I did 50/50. He said, "Even Harry Markowitz doesn't use Portfolio Theory." That was 1952. A lot of things have happened since 1952. There is a body of experience of using this piece of math that has been built up; literally, there are trillions of dollars managed using, with the aid of, Portfolio Theory.

The 2013 survey by the Bank of New York Mellon, BNY Mellon, confirmed results of an earlier survey by Bank of New York, before it was Bank of New York Mellon, BNY Mellon, said that the vast majority of institutions ... they surveyed 100 or something ... surveyed use Portfolio Theory regularly, and most of the rest, a few of the rest, do it, periodically. Well over 50% of institutional investors, if this is an okay sample, use Portfolio Theory, and they are managing literally trillions, tens of trillions, of dollars. That's not bad for a four-eyed economist.

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Harry Markowitz with SkyView's Andy Melnick and Steve Turi.

SOURCES

Markowitz, Harry M. Personal interview with Steven Turi and Andy Melnick.

"Harry Markowitz." UC San Diego. Web. September 10, 2015. http://rady.ucsd.edu/faculty/directory/markowitz/

"Harry M. Markowitz - Facts". Nobelprize.org. Nobel Media AB 2014. Web. September 10, 2015. http://www.nobelprize.org/nobel_prizes/economic-sciences/laureates/1990/markowitz-facts.html

"The Prize in Economics 1990 - Press Release". Nobelprize. org. Nobel Media AB 2014. Web. 10 Sep 2015. http://www.nobelprize.org/nobel_prizes/economic-sciences/laureates/1990/press.html