The Economic Club of New York

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Panel Honoring Dr. Harry Markowitz

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Webinar

Introduction

President Barbara Van Allen

Good afternoon and welcome to the 732nd meeting of The Economic Club of New York. I'm Barbara Van Allen, President and CEO of the Club. The Economic Club of New York is known as the nation's leading nonpartisan forum for discussions on economic, social, and political issues. We've had more than 1,000 prominent guests appear before the Club over the last century and have a strong tradition of excellence that continues up to today.

I would like to extend a warm welcome to students from NYU Stern School of Business, Columbia Business School, and Mercy University who are joining us today, as well as members of our largest-ever Class of 2023 Fellows – a select group of diverse, rising, next-gen business thought leaders. As a reminder, applications for the 2024 Fellows Program are now available on our website.

Today, we have a very special event. The three panelists with us will be discussing and honoring the life and economic contributions made by Dr. Harry Markowitz. He was an economist who launched a revolution, really, in finance upending traditional thinking about buying stocks and earning the Nobel Prize in Economic Science in 1990 for his breakthrough.

In 1952, he published his dissertation, “Portfolio Selection,” which overturned this common-sense approach with what became known as modern portfolio theory. This breakthrough insight and its corollaries have now permeated all aspects of money management, and few professionals are unfamiliar with his work.

I’d like to pause and turn your attention to a tribute video in his honor.

Video Presentation

Stock markets, retirement plans, and investment strategies could look a lot different today if the world had never met Dr. Harry Markowitz, the father of modern portfolio theory. With investors still reeling from the market crash of 1929 and the Great Depression of the 30s, risks outweighed the promise of returns. But the son of a small Chicago grocer captivated by the social sciences of Darwin and Descartes would alter the landscape of finance and investing forever.

Harry Markowitz was intellectually curious from a young age, and it was his passion for philosophy that led him to economics. At the University of Chicago, he studied under Milton Friedman. There, he was the first to measure the free lunch of diversification and the power of a portfolio of investments. In a booming post-war economy and armed with his pioneering theories, Markowitz authored a groundbreaking paper in 1952 that

codified and quantified the benefits of diversification, establishing, as he put it, an efficient frontier with clear principles for portfolio management. With neither economics or mathematics completely covering his work, a new field of study was born: finance.

Markowitz's insights were acknowledged throughout the world earning him the John von Neumann Theory Prize in 1989 and carrying him to Sweden where he would receive academia's highest praise, the Nobel Prize.

Much like Darwin and Descartes, Dr. Harry Markowitz became a philosophical founding father in his own right. His ideas blossoming into a comprehensive philosophy of portfolio management that elevated the basic arithmetic of investing into a new art form, blending quantitative analysis with human judgment. His legacy stands immortalized in the field of finance and his enduring contributions live on through the generations of academics and investors who stand on the shoulders of a giant, the father of modern portfolio theory, Dr. Harry Markowitz.

President Barbara Van Allen: Honoring Harry Markowitz today, we have three panelists, all of whom are very accomplished economists in their own right – Glenn Hubbard, Sander Gerber, and Anurag Pandit.

Glenn is the Russell L. Carson Professor of Finance and Economics at Columbia

University. He previously served as the Dean of Columbia Business School from 2004 to 2019. He also was Chair of the U.S. Council of Economic Advisers from 2001 to 2003, and Chair of The Economic Club of New York from 2007 to 2010. Currently, he sits on the boards of ADP, BlackRock Fixed Income Funds. He's the co-Chair of the Committee on Capital Markets Regulation and MetLife where he is Chair.

Sander Gerber is Chief Executive Officer and Chief Investment Officer of Hudson Bay Capital, a global investment management firm. Sander has more than 30 years of investing experience in multiple security classes and derivatives across a broad range of strategies.

In 2008, he developed the Gerber Statistic, which was accepted as an innovation, complementary to his own work, by Dr. Harry Markowitz. The Gerber Statistic is utilized by his firm to identify the co-movement of financial assets, enabling early detection of concentration risks and insufficient diversification. Gerber and Markowitz, in a landmark research paper published in the Journal of Portfolio Management gave further validation to replacing historical correlation in the calculation of covariance with the Gerber Statistic.

Sander is a member of the Council on Foreign Relations and, of course, The Economic Club of New York. He's a fellow and board member of the Jerusalem Center for Public

Affairs and serves as a member of the U.S. Agency for International Development's Partnership for Peace Fund Advisory Board. Sander served as a member of the Senior Advisory Group to the Director of National Intelligence from 2017 to 2019. Formerly, he was Vice Chair of the Woodrow Wilson International Center for Scholars and Chairman of its Investment Committee.

Anurag Pandit is the Chief Investment Officer of ALSAC, the fund raising and awareness organization for St. Jude's Children's Research Hospital. He's responsible for managing the investment portfolio of the organization in close cooperation with the Investment Committee, Investment Consultant, and Executive Leadership Team. He oversees the operations and staff of ALSAC's investment team.

Prior to this, in June 2015, he had accumulated 25 years of investment experience in multiple investment disciplines. He served as a Director of Investments and a senior member responsible for setting up a new investment office to manage Boston Children's Hospital's $3 billion Endowment and Pension Fund. Prior to Boston Children's Hospital, he was the founder and managing partner at Lexicon Management, a global long-short equity hedge fund for about four years. In the ten years prior to that, he was an SVP and leader of the Small Cap Growth team at John Hancock Funds, where he also managed a couple billion dollars in multi-cap, small cap and technology mutual funds.

Today's discussion is a panel discussion, and time permitting, our speakers will take questions from the chat box. This panel is going to be surely a very robust conversation, so we do plan to go the full hour for those of you who have the time to remain with us online. As a reminder, this conversation is on the record, and we do have media on the line. Without further ado, I'm happy to pass the time over to Sander to get the panel started.

Panel Discussion Honoring Dr. Harry Markowitz

SANDER GERBER: Great, and thank you, Barbara. Thank you also for your leadership of the Economic Club. I've really seen how it's grown and become even more influential under your guidance.

So, Harry was a really special guy, and it's so wonderful that we are able to do a tribute. And I appreciate Glenn and Anurag, both of you, joining me for this special tribute to Harry. He would want it to be upbeat, you know, knowing Harry. I thought he'd live forever. I worked with him for 13 years. But I'd like to ask each of you just in one sentence, first Glenn, could you describe Harry or his contribution, one sentence just to kick it off.

R. GLENN HUBBARD: Well, it's a great question, and I would give a two-part answer in

a sentence. The first and obvious part being modern portfolio theory, the idea of moving from stock selection to thinking about a portfolio, maximizing return for any collective chosen level of risk. That sounds standard. It wasn't then. But the second part is he is the leader among finance economists for decades in bridging theory and practice. We owe him a debt of gratitude.

SANDER GERBER: Absolutely. Anurag, how would you phrase it?

ANURAG PANDIT: So I never met Harry personally, but I got my master's from MIT, and in the halls of the Sloan School of Management Harry Markowitz was omnipresent. And actually since then, he has constantly been on our minds and, in fact, I think we all have anchors to which we make decisions and one of the strongest anchors that I've had ever since I was at Sloan School have been the diversification and the role of modern portfolio theory and efficient frontiers. So even though I never met him, he has been around.

SANDER GERBER: You know, for me to take that, I would say, I would just say the remarkable Markowitz. And I think that his ability to be known around the world for his contributions stems from Glenn's point that he was able to take the theoretical, the practical, to combine the math, the statistics to virtually create a new field of finance and layer onto it even computer programming.

You know, he was always more proud – we know him for the Nobel, but he would always tell me he was more proud of the von Neumann award that he won for SIMSCRIPT and for sparse matrix, which had applications for portfolio construction but also far beyond that. And yet despite all of these tremendous achievements, he was so humble and willing to help. When I came to him first, he sat down with me, gave his time, the mentoring. He knew so much about so many things, but he was always searching to learn more. And maybe that was part of his greatness.

But, Glenn, I'd like to turn to you. Tell us how you came to know of Harry.

R. GLENN HUBBARD: Well, it's interesting. I had done my doctoral dissertation research in part on portfolio allocation of households, both in the presence of tax factors and unmarketable assets. I sent part of the dissertation that was on that to Professor Markowitz and much to my surprise, he responded with wonderful and invigorating comments. Not something you see from a lot of prominent economists. I was always envious of him as a young person and to this day because, you know, first of all, how many of us publish our dissertation and win the Nobel Prize because of it. The 1952 paper that was in the video is really the reason he principally got the Nobel Prize.

And second, he had a storied twist of fate with Chicago. The video mentioned Milton Friedman, but he also had worked with Jacob Marschak, who is the one who suggested

he focus on the stock market because that's what Alfred Cowles was interested in and the Cowles Foundation might support the research. And so one thing led to another with Harry discovering risk and the rest, of course, as they say is history.

SANDER GERBER: And Harry was living history. He went through all this with the early progenitors of exactly what you said. So Anurag, tell us how you came to incorporate Harry at MIT in particular.

ANURAG PANDIT: So, you know, of course, the foundation of what we did to finance Harry, but it sort of permeated even beyond that. There was a certain common sense about looking at the big picture and not just returns, looking at the portfolio as a whole. And that has even permeated today because when you think of endowments and foundations, typically they sort of use a 60/40 or a 70/30 stock/bond framework. And that 60/40, 70/30 framework really places back to Markowitz's efficient frontier, doesn't it? And the common sense that he expressed in terms of looking at diversification in a very sensible manner and looking at the portfolio as a whole was really the big contribution that pervades our thinking.

SANDER GERBER: So I actually didn't come to understanding, I studied MPT in school, but I really came to understand portfolio construction as a floor trader on the American Stock Exchange trading options. And I saw that there's a lot of noise. Not

every tick on the stock makes a difference, and I saw that models are based upon the inputs. But I also saw that it was much easier to have a stable portfolio when it was diversified, when it was larger. And then the question is how do you measure that diversification?

And I was always skeptical of parametric statistics, Pearson correlation, because linear regression might work for maybe rocket trajectories, but not in the behavioral sciences, you know, and the markets are behavioral science. And so I was always searching for something more robust. And I came up with a way to measure diversification called the Gerber Statistic. And that's what I, I went out to see Harry and it surprised me, he liked it. We went for a walk. He used to like to take a walk by the beach in San Diego.

And I said, Harry, you know, I don't think that historical correlation is predictive. And he said, "I agree with you." And I was like, oh, my goodness. And that was like the foundation for our collaboration. It was really quite, you know, surprising. But Glenn, tell me about your views on an MPT. You know, how do you feel after all these decades? Is it still a core part of the curriculum at Columbia? Is it still relevant?

R. GLENN HUBBARD: Well, it absolutely is, Sander. If you think about it, at the time that Markowitz started writing in the 1940s, the idea really was about stock selection and the thinking about individual securities. He's really one of the first to think of the

idea of a portfolio and of the effects of diversification on a portfolio. I think it's attributed later to Jim Tobin, that don't put all your eggs in one basket, but the same idea is earlier in the work of Markowitz. That's a tremendous contribution for many of the reasons that you suggested. First of all, the idea of an efficient frontier, even among assets of different levels of risk, but then combining that with a risk-free asset was a way he also showed that you could get a significant return.

So the idea of a collective risk and maximizing return given that risk is very, very important. Now, that said, as you mentioned, you know, if you think about, just to be a little in the weeds a minute, the math of what he did, you really have a covariance matrix of returns. And, of course, underlying that means correlations, and where do you get the correlations? That, I think, is what's interesting about what you were talking about with the Gerber Statistic because the standard way you often think of in econometrics of getting the correlation would be from historical data and certainly that was early Markowitz. But there may be other ways of measuring co-movements.

SANDER GERBER: And that's what he was open to. That's exactly what he told me, which was surprising.

R. GLENN HUBBARD: And later work has also touched on the idea of moving beyond just continuous measures to thinking about extreme points of risk. So rather than just

thinking about standard deviation of variants, thinking about tail events in portfolio construction. But none of this today would be possible without Markowitz's earlier contributions. You know, after Markowitz comes the capital asset pricing model and other measures of trying to separate, diversifying idiosyncratic risk from systematic risk. But all of that is post-Markowitz. He really is the founder of what we would call today academic finance.

SANDER GERBER: Exactly. So Anurag, before I turn to you, I really have to highlight how wonderful St. Jude's Research Hospitals is – a free hospital for children. It's amazing. I mean it's tremendous. But how has Harry's MPT work impacted you as a CIO and the way you view portfolio construction?

ANURAG PANDIT: I think, you know, Harry Markowitz's work was really phenomenal at a very broad level. But I really like the fact that he left open the idea that it may not be standard deviation alone, or you have to look deeper sometimes to understand what it represents. So I think it works really well if you're a short-term bond trader or you've got a one-month or six-month timeframe or a one-day time frame. Standard deviation may explain risk better.

In an institutional framework where we might have private equity and we might have longer tail-type events, the behavior in the tails is very, very important. And, in fact, one

of the things that we found was that there aren't enough observations in the tails to really understand how the tails work. But Markowitz actually left open that idea that it was diversification and not necessarily a normal distribution that explained that risk. And we take that into account as we put together the portfolio. We actually separate the portfolio, both including the privates and excluding the privates. The reason, of course, is that the private markets, you know, the standard deviation and the correlations don't get marked as frequently. So we separate the two to come up with optimal portfolios.

But fundamentally, we look at the agents of diversification within the portfolio and we look for multiple areas of that diversification, which is originally what led us to Hudson Bay. And so that's how we've incorporated it. So at the highest level, it's most important in our marketable segment of the portfolio, but we even, when we go granular, when we look at our marketable alternatives, we do look at that on an MPT framework as well just to see that we've got different variables of diversification when we are constructing the portfolio.

And, Sander, thanks so much for mentioning St. Jude's. You know, we are a unique organization. We are able to do unusual things because of our operating hardware where no patient or family receives a bill. And so we are able to do some pretty innovative things like bringing children from Ukraine to Memphis and working with the World Health Organization to help pediatric cancer globally. So thank you for that.

SANDER GERBER: Yes, it's amazing. And I'm glad you're helping them to manage their endowment, to accomplish their mission. You know, it's interesting listening to Glenn and Anurag, both from the theoretical construct as well as the practical implementation. And having worked with Harry, he would always say he loved David Hume. And Hume was what, now I studied philosophy in college, Hume was always very complicated for me.

But Hume talks about causation and induction. And he says that it's hard for us to really identify causation. And we try to use an inductive method which means we have specific instances and from that we try to generalize from the specific. And that's what induction is, to generalize from the specific to the general. But there's uncertainty and we don't really know that we can do it. And that's part of the challenge and maybe the fun of being an investor is that, you know, what happened in the past might not happen again in the future. You can't necessarily take from something that happened in the past to the future. We can't really know, is it a direct causation? Or is it just coincidence?

And so Harry, you know, thinking about this, created a framework. And he didn't mean, I think, Anurag, actually you said that maybe, I think you're actually applying it precisely the way Harry would want you to apply it, which is, he says in his '52 paper that you should combine statistics and practical judgment to run this framework. And I think that, you know, he felt that sticking too strictly to using data mine statistics and incorporating

that into MPT, he actually thought that was the wrong way to implement it. That the way that you should do it is looking forward. How does a stock analyst think that the future expected return will be? How will the future volatility of that return be? How will that interact? So, yes, you should include statistics, but you should also use the judgment of practical men.

And he was always searching for how to improve, and I think that was the notion of a lot of the work that he did with SIMSCRIPT, which was queuing and looking at stochastic relationships between data and the sparse matrix to understand better how can you better refine the statistics and also how can you better incorporate human judgment in it. So I'd like to ask you, Glenn, what do you think going forward in the schools, how will they teach MPT going forward given the world of AI, given machine learning, given all these new tools that are available?

R. GLENN HUBBARD: Well, it's a great question, Sander. I think first, the developments in portfolio theory and construction since Markowitz is important work. So when I was in grad school in the late 1970s, early 1980s, I first took finance from John Lintner, who was one of the people who came up with the idea for the capital asset pricing model. And I asked him, how do you think up something like that? And he said, not too dissimilar from Markowitz's experience, that I have these conversations with people in the world who have this problem they're trying to solve, and I think I know how to do

that.

And Markowitz's insights as to how to construct modern portfolios led to a wave of innovation we teach in schools. So wave one is the basic principles of the CAPM so that you can separate systematic risk from diversification. But beyond that, a variety of economists over the years then said, well, what about taxes and portfolio allocation? What about non-marketable assets, like your human wealth, like pensions, like differences in liquidity? What about enhanced differences in risk? Rather than, as said earlier, rather than just focusing a standard deviation or variance, what about tail events?

Particularly here at Columbia, there's been a lot of work on factor models as well. Sort of taking the idea of the CAPM, then moving – if I can be academic for a second – to the Fama-French construction, which is decades later than the CAPM, to currently a variety of factor models that are used by practical people, but also by academics. All this is still building fundamentally on Markowitz. I would argue that work that's going on too on bearing idiosyncratic risk, something that in basic finance we say, don't do it. But think about an entrepreneur or anybody who is owning a piece of a business, he or she must be bearing idiosyncratic risk. And how does that affect optimal portfolio construction?

A lot of what we do at a practical level for MBAs is, you know, whether it's index

investing, how to think about asset allocation and portfolio construction really comes from the same spirit of early Markowitz. Not really about individual stocks, it's about constructing a portfolio. The only exception to that here at the school would be the huge finance emphasis on value investing which is very much about picking individual stocks. But for most of it, it's about asset allocation.

SANDER GERBER: Right. Yes, he was really ground zero for asset allocation, portfolio construction. Absolutely. And our co-author on our work, Philip Ernst, who at the time was Assistant Professor of Stats at Rice and now he's Chairman of Stats, Imperial College, London, and he was able to crunch a lot of the data that we had to go through, which was dealing with the fundamental issue, as both of you mentioned, the outliers. You know, how do you, when you're using parametric statistics, how do you not have the outliers bias the data?

And then the other thing that people don't think about is how do you get rid of the noise? You know, the noise that I saw on the floor, because usually if the S&P moves by ten basis points, that's not a data point that's going to communicate any kind of causal relationship. And the whole point of, you know, covariance correlation is to understand, is there a causal, you know, try to incorporate a causal relationship within the portfolio construction yet it's too noisy. And so with Philip, we set to work to incorporate the Gerber Statistic within modern portfolio theory, and we were able to achieve higher

returns with less risk.

But tell me, Anurag, can you explain more in detail how you use the framework? You must work with an investment committee as well, is that right? Or is it just you? How does the framework help you to make better decisions or actually to come to decisions?

ANURAG PANDIT: And I'll also spend a little time on the question you had asked earlier on how you think about it in the future, because that's a really important part. How do you get these statistics to work and in combination? Because, you know, there is endpoint sensitivity, right, in terms of how you look at the analysis, what it shows. And I think you have to get a good picture by using different endpoints, understanding what the ranges are.

For example, if you just think about the beta of bonds, if you look at it over a really long period of time, it may be zero. It hasn't been in the last two years. And if you look at it over the last, now 20 years, it's starting to show a little bit of beta. So these things have to be incorporated in your decisions. But even all of those do not capture the range of all outcomes, and that's part of the challenge is that how do we put together this, you know, sort of reasoning for the future and have the outcome by getting the most robust framework?

We do that really by doing a lot of quantitative work and figuring out how we think about it with different endpoints and with future expectations of returns and covariances and stuff like that. And in our portfolio, actually this is a veiled kind, what we found is that the standard 60/40 portfolio, because of the correlations of bonds and stocks in the last two years, the passive portfolio has become more risky than our portfolio that we constructed because we don't have as much in bonds. And so now the standard 70/30 portfolio is showing a beta of .73 over five years and our portfolio is still showing .7, which is what it was designed to do.

So it's that kind of work that we do to come up with the answers. We try to keep, one of the jobs of me as a CIO is to communicate the answers in the most clear and untechnical terms to my committee, so we don't get that involved in explaining MPT to other people. It's what I would call behind the scenes work that we do. And then we just come up with recommendations for the committee. But behind that recommendation is a lot of technical work that we do along with our consultant.

SANDER GERBER: I've always thought that MPT enables a collection of people with different opinions to come together and actually have to make a decision. And if you don't do that, you can go off in this direction or that direction because, you know, the world of investments is like a big candy store. And, you know, you might like cinnamon, someone else likes butterscotch or chocolate, and who's to say what's better. And that's

the fun of it, the uncertainty is the fun of it, but in some way you've still got to boil it down to be able to make a decision. And you have to be able to back up the decision in some way. You can't do it just based upon personal taste. There has to be some kind of standard that can enable people to make the decision. And I think that's part of the reason why this framework has been adopted by 90% or some enormous number of pensions and endowments worldwide.

So, Glenn, you know, post-Harry, where is, you know, you touched on it before with the factor work, but who is picking up the torch in terms of the cutting edge of portfolio construction today? Or is it just broadly dispersed and everyone's working to improve MPT?

R. GLENN HUBBARD: Well, that's another great question. And just to pick up something you said first about pensions and endowments. I think there's many academic reasons we celebrate people like Harry Markowitz, but for millions of people the ability to achieve better returns, either through a great organization like St. Jude's or on your own individual pension is because of portfolio construction. So this is not just some academic thing that got you a Nobel Prize, it is extremely important in the world.

To your question about who is carrying the torch, I would say it's balanced between academics and in finance. So much of the very interesting world of factor models today

is actually among great investment managers, some of which comes from people who have moved from universities, but some from people who have spent their lives on Wall Street. So I think this work is going all around. I don't think it's just refining MPT, because a lot of the things I mentioned are, you know, perhaps more than a refinement. But going to something I said, again, at the beginning, I think it was always very important to Markowitz that his work meet a market test. That is, that it be useful. And in that sense, he was a financial person's finance expert from day one.

SANDER GERBER: Yes, he wanted to be practical. And maybe that came from his humble beginnings. I think his family were grocers. And he wanted to make sure that it actually did something, which was to make money, but I think he did understand the significance of what you said, is that it helped pensioners all over to better manage the stable growth of their wealth. And, you know, I think he felt, I think he did have a great degree of satisfaction in that. But as I said before, he had an insatiable curiosity, and he was not going to stop at anything to keep learning about all kinds of subjects.

R. GLENN HUBBARD: Can I just add to that one second, if I might. One of the things that's interesting about Markowitz, as opposed to many academic leaders in finance, is his ability, not just to bridge theory and practice, but different kinds of theories. So when I think about the work he did in operations research, he referred to some of it in sparse, I think of just even at the very beginning, the critical line algorithms that he developed,

really bridged into his economic work. If I think of other people in academic economics who were more mathematical, take someone like Herb Scarf, who sadly has passed away as well. The Scarf algorithm is what's responsible for the solution of computable general equilibrium models, but Scarf himself never did that work. What's amazing about Markowitz is he did both the foundational work, but also the finance work and also the practical work. That's a hat trick.

SANDER GERBER: And he created a computer language which was a precursor to Fortran. I don't know how many people still remember Fortran.

R. GLENN HUBBARD: I took Fortran. I'm old enough to remember it.

SANDER GERBER: So did I. I was a kid, but I did Fortran. And Harry had a programming language he developed. And he developed it to help, you know, in part to help deal with stochastic data and the relationships for stochastic data into queuing. And, you know, it was an extension of modern portfolio theory and the challenges of the data of the financial markets, but it had much broader applications beyond that. And you're right, he did the work himself.

He told me a story that when he went to get his doctorate, I think Milton Friedman didn't know exactly what to give it. You know, was it statistics? Was it math? Was it

economics? They didn't know. And then they called it finance. Is that accurate, Glenn? Is that what happened?

R. GLENN HUBBARD: I think that's right. And I think it is the serendipity for Marschak too saying, look, if you want funding, the Cowles Foundation is interested in this subject, and there's not much rigor, see what you can do.

SANDER GERBER: Yes, Cowles was an amazing fellow, amazing. So, Anurag, as you look going forward, and you're the practitioner, I mean you are the ultimate practitioner, where do you look for inspiration to enhance your processes?

ANURAG PANDIT: Really a lot of the inspiration I get from managers as well as, sort of academic theory on where modern portfolio theory and mean variance optimization does. Estimating things like that are pretty important for us. Behavior, like I mentioned about, is a big area of focus. So I really like to, I get my energy from people who are very, very based and speak to the theory of finance. You mentioned Fama-French. We have, we do have investments in some of their type of strategies. As Mr. Hubbard mentioned, factors. We look at those in a very scientific basis. So I get my energy really from other people who are intellectually curious on the subject and look at data and evidence to come up with very good insights.

And Sander, may I ask, the two of you are great practitioners, and I would love to get your opinions on which economists really got their energy from Markowitz in a special way. Was it William Sharpe, others, that sort of got their energy in an unusual way from Professor Markowitz?

SANDER GERBER: I think everyone did. But, Glenn, I'll turn it over to you.

R. GLENN HUBBARD: Yes, I mean that's the quick answer. I mean I would think that Sharpe and Lintner obviously, there's a straight line from Markowitz to their work. But when I think of work by economists in general, I think of Sandmo and Feldstein in the 1960s with taxation and portfolio allocation. This is all, taxation of risky assets, this whole line of work that ran a generation really is a descendant of Markowitz. And virtually anybody who is studying factors and portfolio allocation today, it's rare that one paper, like that 1952 paper, can be a straight line to so much. And as I say, I'm personally envious because it was a dissertation that was that influential, not something of somebody much older.

SANDER GERBER: Right, it's amazing. And you can get it online. It's still the print. You know, it's really incredible. Harry said that at Hudson Bay we actually are using his MPT. And I thought about it and, you know, we have thousands of positions and we have, like 30 different portfolio managers. And we have a portfolio construct that looks

at each idea on its own, tries to hedge it on its own, limit the loss, and we measure wins versus losses. And so these three characteristics, Harry said, oh, that's MPT, it's just a different way of expressing the data inputs. Because he wasn't really tied, he said that looking at expected return of a stock versus the volatility of stock, that was well known.

But he said he was in the Stacks in Chicago and he looked up and there was a book, on the spine it said Correlation. He said, oh, correlation, huh. So he incorporated, that's how, Glenn, he said he got to the eureka moment in his paper. He was studying the Stacks and he saw this spine on the book. And he didn't mean correlation necessarily to be strictly construed as the row statistic that you mine. It was only in the 1960s, as computing power increased, that they could actually data mine the statistic and then it became standard to incorporate it. But he meant it more in terms of how do these things relate to each other. What's the judgment of practical men on it? And so that construct can be applied in many, many different ways.

For me, I was always concerned with that third leg, that correlation leg, because too much noise, outliers can bias the data. And so in the Gerber statistic we ignore data below a certain threshold. We only count data above a threshold. And when we count the data above the threshold, we just look, does it move together or opposite? And that simple difference actually helps to narrow, I think, the problems of historical correlation. In other words, if you look at it in terms of an electron, an electron cloud, if you try to

pinpoint the exact position of that electron, you'll be pretty far off. But if you try to describe the cloud generally, you can get a more precise description of the electron cloud generally than trying to pinpoint a location. And I think that that's the innovation that Harry liked.

Was there anything, Anurag or Glenn, that we should discuss before we go on to questions?

ANURAG PANDIT: Yes, one of the things you mentioned, Sander, that I would like just talk a little bit about is that general framework that's important. Because, you know, when we look at our management across the spectrum, we have to look at lots of things. We have to look at skew, batting average, how does it work? They use a lot of options. Options are not continuously, you know, there are asymmetric payoffs. And so incorporating all of that is a pretty important part of the analysis that we have to do. So I just wanted to reiterate that the general location is pretty important in terms of figuring out where you're going, and especially at the tails.

SANDER GERBER: Yes, yes. I mean Harry, you know, again, the implementation by many thinks that you should only use the statistics. That is not what he meant at all. He wanted to combine practical judgment with statistical bases within a framework.

R. GLENN HUBBARD: And also, if I might add to that, Sander, you talked about AI earlier. That's a way of expanding the definition of practical judgments. When Markowitz wrote, he meant a wise man or a wise woman, but today, of course, we can pick up signals from things other than the constellation of asset prices and returns yesterday and today, i.e. signals from textual analysis, from a number of things that may be very informative about returns and correlations. That's a way of building up judgment. It's not just the intuition of a wise person. It's informed by all of that. But, yes, it's still a good complement to the formal statistics.

SANDER GERBER: I agree. I mean I think that generative AI enables that transition from the specific to the general in a more robust manner, in a way that statistics attempts. And there's different degrees of robustness. But I do think that the more that you can add into it, so adding in human judgment makes it more robust, that causation relationship. Adding in generative AI can also make it more robust. It doesn't mean it'll be perfect, but you can make it more robust.

We do have a question that came in. And the question seems to be directed towards me, which is how does Hudson Bay adapt to the changing macro forces in the market, the changes in correlations? As Anurag, you mentioned, you know, the different betas with bonds, it's different now than it was before. And, you know, I think we really have to bifurcate that, you know, portfolio construction is about assembling the best portfolios,

as we mentioned. But the judgment that goes into it is something different. The judgment that goes into it and the statistics that go into it, not that that's the secret sauce, but that is the differentiator. And I think, Anurag, you know, you as CIO, your value is working within the framework but deploying your expertise, your years of knowledge, your understanding of market behavior, when to use statistics, when to ignore statistics. And that is the value. And, of course, you know, investing is a behavioral science. It's not a pure quantitative science. Would you have anything to add to that, Anurag?

ANURAG PANDIT: The only thing I would add is that I also, it's important to note that I don't act individually. We work with consultants and others to make sure that our framework is robust. And that's really important because you don't want to get caught in one person's estimates or one person's thoughts, but really bring everyone together in the functions.

SANDER GERBER: Yes, okay. Well, Glenn, is there anything else you'd like to add to this discussion?

R. GLENN HUBBARD: No, I think you hit the key points.

SANDER GERBER: Okay, well, listen, it was really a great honor to discuss with you,

Glenn and Anurag. As I mentioned, it was maybe the highlight of my professional career to work with Harry, the godfather, the kind godfather, you know. And it's terrific that we could have this tribute to Harry and his contribution to investing and to the world of the savers.

PRESIDENT BARBARA VAN ALLEN: Absolutely. And thank you, Sander. Thank you, Glenn and Anurag. That was just a fantastic conversation. I think we all learned a lot. And for those of us that need to learn more about his work, I think now is a good time to go back and take a look and re-appreciate it.

So I want to just mention that we have a number of great speakers still coming up this fall. As always, we invite our members to include guests when they come. Tomorrow, we have a luncheon honoring Erika James. She's going to be in a conversation with John Williams. Erika is the Dean of the Wharton School of Business at the University of Pennsylvania. On the 15th of November, we'll have the Superintendent of New York Department of Financial Services, Adrienne Harris. I know a number of our bankers that are online will want to attend that one. That's also a Signature Luncheon. On November 27th, by popular demand, we will have General Petraeus returning. He will be in a conversation with Marie-Josee Kravis, and that should be very timely, and he will be discussing the situation certainly in Ukraine but also the situation in the Middle East. On November 30th, we have Club Trustee, Bill Lewis, the Partner at Apollo Global

Management. He's going to talk about his career and it should be just a wonderful webinar for those that are following particularly our equity and inclusion work.

On December 7th, we are fortunate enough to have Bill Gates joining us for our end of year dinner. And he'll be receiving the Peter G. Peterson Leadership Award. This is going to be a special night. We're going to honor our over 70 fellows. We're going to announce the winners of the Innovation Challenge awards. So it'll be a very special evening. So try to put that down on your calendars. And then on December the 11th, we are going to have a luncheon, I guess a closing luncheon with Brad Jacobs, who is the Executive Chair of XPO Logistics. They were very important during the supply chain situation we all went through during Covid. This is going to be a very interesting conversation, and it'll be followed that even, by the way, December 11th, with our Holiday Party for members, a complimentary party. We did it for the first time last year. It was very successful so we're going to do it again this year. So try to mark your calendars for these approaching events.

And I want to just mention as well, on November 14th, Tuesday evening, we are going to have another Candidate Reception. And this is a great opportunity for members to bring a prospective member that you think would make a good member of the Club to join us. And again, that's November 14th, 6:00 - 7:30. Stop by with a candidate. Have a quick drink and head to dinner or whatever your schedule might allow. We'd love to have you

join us.

And lastly, I want to take a moment to recognize those of our 368 members of the Centennial Society joining us today as their contributions continue to be the financial backbone of support for the Club. We have the Centennial Campaign underway right now, our year end campaign for our members. Please take a look at your communications on that, and we'll be celebrating Centennial folks as well, of course, at that December 7th dinner honoring Bill Gates. So thank you everyone for joining us this afternoon. And we hope we'll see you soon. Again, thank you, Glenn. Thank you, Sander. And thank you, Anurag. Wonderful.