

CFA INSTITUTE RESEARCH FOUNDATION / BRIEF

INVESTMENT LUMINARIES AND THEIR INSIGHTS

25 YEARS OF THE RESEARCH FOUNDATION VERTIN AWARD

BUD HASLETT, CFA
EDITOR



CFA Institute
Research
Foundation

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Statement of Purpose

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FOREWORD: CFA INSTITUTE CHIEF EXECUTIVE OFFICER

I believe that we stand at a pivotal moment for our industry. The modern investment professional is faced with a period of immense change in the infrastructure construct of our ecosystem, the broad investment landscape, and the overall societal context in which we're working in 2021. As we navigate times of rapid change and uncertainty, groundbreaking research remains a critical component to ensure we remain abreast of the latest investment concepts and are well-equipped to incorporate them into our everyday practices. This research helps us to understand the complexities of the evolving investment industry—and to face them with confidence.

The mission of CFA Institute is to lead the investment profession globally by promoting the highest standards of ethics, education, and professional excellence for the ultimate benefit of society. When we consider how we strive to fulfill this mission, the power of research to propel our actions and instill the fundamental investing concepts that ensure we continue to make informed, thoughtful decisions on behalf of our clients is integral.

Education is critically important to us at CFA Institute. We believe lifelong learning is a key component to uphold our professional expertise and to foster trust in our industry. The work of the Vertin Award winners over the past 25 years clearly depicts how our industry has changed at such an incredibly rapid pace, and it reinforces the importance of remaining intellectually curious throughout your career journey. Research is a cornerstone of the education process, providing data, theories, and analysis upon which policymakers and practitioners can base their decisions.

Although the progress we've made collectively as investment professionals has been significant over the past 25 years, I would be remiss if I did not mention the ongoing challenges we face as we look to integrate greater gender diversity into our field. I am optimistic that progress we see will continue to gain momentum around the world and that it will lead us to greater diversity in our profession—and, indeed, more female researchers in the lead of such meaningful work. I'm confident that there will be more women among the prestigious Vertin Award winners in the years to come.

I'm inspired by the incredible work showcased in this publication. The deep impact that research has on the trajectory of our industry shines through in each Vertin Award winner and the lasting effects their research has on the financial industry.

As we reflect on a quarter century of groundbreaking research, I am incredibly proud of the work of the CFA Institute Research Foundation. Its efforts to shine a spotlight on the concepts that drive our industry forward and award those luminaries who bring these investment theories to life take an incredible amount of tenacity and dedication. To our staff, volunteers, and contributors, I extend my deepest gratitude. We at CFA Institute look forward to what the next 25 years of Vertin Award winners will offer the investment world.

Margaret Franklin, CFA
President and CEO
CFA Institute

FOREWORD: CFA INSTITUTE MANAGING DIRECTOR, RESEARCH, ADVOCACY, AND STANDARDS

PUTTING THEORY INTO PRACTICE

The Vertin Award recipients represent a collection of intellectual leaders in the investment industry whose ideas are not only compelling in theory but meaningful in practice. Beyond the thousands of pages published by this esteemed group, there are also businesses that have been built on the knowledge they have shared, and these in turn have served the financial needs of many investors around the world. The award winners are indeed exemplars of the CFA Institute mission to set the highest standards of ethics, education, and professional excellence for the ultimate benefit of society.

Their legacies also include teaching many students along the way—both those taught in the classroom and the many who knew them through their books and publications. In an industry where risk and uncertainty are central concepts, it is breakthroughs by leaders like the Vertin Award recipients that have given it a structure and foundation. We should not forget that it was only 75 years ago that Benjamin Graham penned his appeal in the *Analysts Journal* (the predecessor to the *Financial Analysts Journal*) for the creation of an investment profession with a common body of knowledge. It is fitting that this award is named for Jim Vertin, a dedicated volunteer and professional who recognized the potential to create a

multiplier effect on the industry by connecting researchers with practitioners.

In reading the insights from these leaders, it is easy to see several recurring themes:

- (1) Although the recipients' knowledge is vast, they each have an underlying humility because they recognize that there is so much more to learn;
- (2) Models have limitations, assumptions are dangerous, and people can be surprising;
- (3) The recipients all have views about the future, but they also expect to be surprised;
- (4) Those who succeed in this industry understand fear and greed, and they know where they do (and do not) have an edge; and
- (5) This collection of leaders represents patience and perseverance as well as an insatiable curiosity for the next breakthrough.

We hope this compilation is an inspiration to all who will follow in their footsteps, and an encouragement to keep learning and to work to make an impact on the investment industry and the many individuals it serves.

Paul Andrews
*Managing Director
Research, Advocacy, and Standards
CFA Institute*

FOREWORD: CFA INSTITUTE RESEARCH FOUNDATION

As chair of the CFA Institute Research Foundation, I am delighted to be able to recognize this 25-year milestone, marking the period over which we have bestowed the Vertin Award to individuals who have produced research of enduring value to investment professionals. I consider my role as chair of the Research Foundation at this time a special privilege because I have benefited from the research of all of these individuals in my own four-decade professional career. I have had the extra bonus of knowing all but two or three of the reward recipients personally. If I had to make a list of academics and practitioners in finance who were pivotal in my understanding of investing, the list would be very similar to that of the Vertin Award winners (I would likely add Harry Markowitz and Fischer Black). I think most CFA Institute members¹ would agree that this group has been instrumental in developing the body of knowledge that we rely on today as the primary principles of investment management.

What is unique about this publication to honor the 25th anniversary of the Vertin Award is that we have collected in one place the award winners' thoughts on what publications inspire them, what they consider their most important accomplishments, important investment lessons they have learned, their biggest regrets (spoiler—many do not have any), and their expectations for the future. What a treasure trove!!!! For those who sadly are no longer with us—Jack Treynor, Peter Bernstein, William Fouse, and Jack Bogle—we have included

¹In the mainland of China, CFA Institute accepts CFA® charterholders only.

testimonials authored by individuals who know them well or who had the honor of working closely with them during their careers. (I contributed the piece on Jack Treynor.) This collection provides an extremely valuable perspective on the history of quantitative finance and the development of financial markets.

My own career began almost 50 years ago when I started my study of finance as an MBA student at Syracuse University and came under the wing of Professor George Frankfurter. He exposed me to groundbreaking articles by Markowitz, Sharpe, Treynor, Fama, Black, Scholes, and Merton, and highlighted their revolutionary approaches to investment analysis and portfolio strategy. This was a time when finance was breaking away from economics as a field of its own. Along with other early Vertin Award winners like Marty Leibowitz, Roger Ibbotson, Rex Sinquefeld, Marty Gruber, and Edwin Elton, these individuals represented the vanguard of new approaches to security analysis, risk measurement, performance analytics, and portfolio construction that engendered excitement in the field of finance. In many ways, this period in institutional investment management was not unlike the coming of the iPhone or the internet to the communications field. I was a happy convert to this new “religion” and set out on my career path to try to maximize my exposure to fresh thinking and approaches in investment management.

Bill Sharpe, Jack Treynor, Peter Bernstein, Marty Leibowitz, and Jack Bogle stand out for me from the group of Vertin Award winners. I relied on their insights, their journal contributions, and

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their practical investment applications for many years. Their research, as well as my personal interactions with them, significantly contributed to my understanding of investment management and my own ability to pursue research and apply it to investment problems. Peter Bernstein, whose books should be required reading for anyone starting a career in investing, encouraged me as one of the few women in academic finance to submit articles to the *Journal of Portfolio Management*, which he edited.

I was so proud to be able to nominate Jack Bogle for the Vertin Award in the fall of 2019. He was so thrilled to get the news of this honor just before his death in January of the following year. Jack was a maverick of his times, one of the founders of indexing in the 1970s, a prolific writer, and the founder and leader of Vanguard, the “Amazon” of investment management firms at its start and today one of the largest global investment management firms. I also got to see Jack in a separate realm, the speaker at my daughter’s high school graduation from Blair Academy, in Blairstown, NJ, where he went to

high school in the 1950s and where he has left a legacy of board service and student interaction over his entire lifetime.

I am proud to see this book added to the list of CFA Institute Research Foundation publications. It is an opportunity for the Vertin Award winners to tell us in their own voices what inspired them to develop their noteworthy research contributions, and it allows them to opine on the future of the field of investing and research in finance. Just as I and many other “seasoned” CFA Institute members learned from these individuals over several decades, we can provide an opportunity for new CFA Program candidates, CFA charterholders, and investment professionals of all ages to see the articles they highlight, the investment lessons they have learned, and what they think the future holds for innovation in investments down the road.

Joanne Hill
Chair
CFA Institute Research Foundation

INTRODUCTION

“If I have seen further, it is by standing upon the shoulders of giants.”

—*Sir Isaac Newton*

We may not all recognize their names, but virtually everyone in the investment industry owes a debt of gratitude to the recipients of the James R. Vertin Award profiled in this publication. Whether you are attending an investment class at a university in China or Singapore, London or Johannesburg, Abu Dhabi or Brasilia, your professor will eventually be discussing concepts developed by these luminaries. This publication pays tribute to the people whose shoulders we have stood upon and provides opportunities for us to learn from their greatness.



Professor Claudia Zeisberger teaching an investment class at INSEAD in Fontainebleau, France.

The CFA Institute Research Foundation is honored and delighted to present you with insights from 25 years of Vertin Award recipients. These legends of the investment field range in stature from Nobel Prize winners to billionaire hedge fund managers, from distinguished professors of finance who have shaped thousands of young

minds to editors of prestigious academic journals and authors of some of the most popular investment books ever published. Although their backgrounds vary widely, they have one thing in common: they have all made substantial lifetime contributions to the field of investments.

When I began work on this publication in mid-2021, it was with mixed emotions; I initially approached the project with both excitement and trepidation. The excitement was based upon the potential for this book to be a tremendous source of knowledge for the global investment professionals for whom the Research Foundation develops publications. The trepidation was from the nagging fear that—due to their busy schedules and substantial commitments—many of the recipients would not respond to my contribution requests.

It is our hope that once you finish reading this book, you will agree that it has achieved its goal of being a tremendous resource for the global investment professional. Your takeaways from this publication will all be different, but that is the beauty in what is presented here. You can incorporate what is most appropriate to you and your own career and knowledge, and apply this toward becoming a better investment professional. We all owe the Vertin Award recipients so much for the knowledge they have shared with us, and I am delighted to report that my trepidation about their participation was ill-founded. All 22 of the living Vertin Award winners promptly responded to our request to participate in this publication, and we were also fortunate to recruit four established investment professionals to create profiles for the recipients who are deceased.

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The initial requests asked for a brief write-up of the award recipients' proudest accomplishments, along with the most important lessons they learned during their investment careers and their most important expectations for the future. I purposely left out more specific instructions hoping to get a variety of interesting responses from the luminaries—and that is exactly what we received, and I think this variety makes for more interesting insights and reading for you.

As the responses began to roll in, more questions came to mind like “what are their favorite publications written and read?” and “what could we learn by asking them if they had any regrets?” I sheepishly decided to send out another request asking for more detail, and the winners were kind enough to add the additional information to their responses. These additions provide valuable insights and sources for further investigation that make this publication much more robust than it would be without them. Many thanks to the Vertin Award recipients for enduring the extra step in this process.

As far as the responses we received from the Vertin Award winners, they were all varied as desired, and provide, as previously mentioned, a list of their accomplishments as well as their favorite publications both written and read. This provides the more junior investment professionals (who might not recognize all the names listed here) an easy way to learn more about the recipients and what they are best known for as well as providing established investment professionals with additional information about the Vertin Award winners that they might not have known. Listing publications written and read provides the reader with a wealth of opportunity to further explore what these legends thought was important enough to write about—and important enough to influence their

thinking—so that the knowledge gained by you the reader can grow well beyond the insights actually provided here.

The “Important Investment Lessons Learned” and “Expectations for the Future” sections of this book provide both new and established investment professionals with insights on what the Vertin Award recipients thought vital in their careers and what might be significant in the future. This provides you the reader with valuable lessons to learn and apply to the knowledge and experience you have already gained in the investment business. This synthesis of known knowledge and knowledge gained can be extremely rewarding to you and your future. Each summary section in the profiles also contains additional insights on the things learned and expectations for the future so even more insights can be gained by reading the extended commentary in the recipients' profiles.

The regrets section of each profile highlights thoughts on how things might have turned out differently for some of the Vertin Award winners. Many had no regrets, or regrets not substantial enough to mention. But those that did often mentioned not working with a certain colleague they respected or doing enough teaching or donating enough money to charities. We should all spend a few minutes thinking of regrets we may currently have, and how with some extra effort on our part, we may be able to cross them off of our list.

The testimonials that follow the Vertin Award winner profiles were included to show a glimpse of what the recipients meant to various global investment professionals. They are interesting to read, so make sure to take some time to review them. As editor of this publication, I chose not to include a personal testimonial, but needless-to-say, all of the Vertin Award recipients have

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impacted me in one way or another during my schooling, CFA exam studies, or during my investment career. My time spent as executive director of CFA Institute Research Foundation has particularly been impacted by these investment legends and would not have been the same without the insights and counsel of many of the winners presented here.

Following the winners' profiles and investment professionals' testimonials is a section about getting the most out of this publication. This was coauthored by Laura Jarrell at CFA Institute and provides suggestions on how to efficiently get the most out of reading this book. There is so much information contained here, we wanted to make sure that you had an effective way to utilize the material depending on how you best personally learn new things. Several appendices list the Vertin Award winners' responses to various questions to assist you in your learning experience, as does a webinar featuring the 2021 Vertin Award recipient Aswath Damodaran and other winners from years past (available on the CFA Institute Research Foundation website).

One of the things that concerned me about this publication was the fact that 21 of the 22 recipients were male. In a world where diversity is so important, a lifetime achievement award takes some time to catch up. Also, most of the recipients are based in the United States. Although I can't change the constituency of the previous

winners, and all of the recipients are eminently qualified to receive the award, I have made every effort to provide a more diverse approach to those factors that I did have control over in this publication. It is my hope that these efforts will help soften these shortcomings, and it is my hope that the editor of the 50th anniversary edition of the Vertin Award will not have to go to such lengths to add diversity to the publication.

It is also my hope that when the 50th anniversary of the Vertin Award rolls around so many years from now, that one or more of you reading this will have the honor of receiving the Vertin Award. Hopefully, many thousands, or tens of thousands, or even hundreds of thousands, of you will have had a more successful career because of the insights you have learned from the great minds featured here, and many millions of your clients will be more financially secure because of the things you have learned. And perhaps, one special person out there reading this publication will eventually be fortunate enough to have the honor of becoming executive director of the CFA Institute Research Foundation, a position I have held for many years and that remains to this day the greatest honor of my professional career.

Bud Haslett, CFA
Executive Director
CFA Institute Research Foundation

A TRIBUTE TO JIM VERTIN, CFA

In 1996, the CFA Institute Research Foundation established an award to honor James R. Vertin, CFA, for his outstanding leadership in promoting excellence in research and education. An honor we enthusiastically endorsed at the time and are pleased to see honored again now.



Jim Vertin, CFA

We met Jim in the early 1980s when all of us were grading CFA Program exams in Charlottesville, Virginia. Two of us were new volunteers to the organization; one was a highly respected and actively involved volunteer in virtually all aspects of research and education at the Institute of Chartered Financial Analysts. Luckily for the organization, when Jim left Wells Fargo, where he was an integral part of the team that pioneered index fund investing in the early 1970s, he dedicated his heart and time to pursuing his passion of promoting excellence in research and education among investment professionals.

Jim's legacy is defined by his personality more than the quantity of committees and boards he chaired or the uncountable number of volunteer hours he performed. Jim was a passionate advocate for professional education, excellence, and ethics at every one of the CFA Institute predecessor organizations and most of its committees. He was the conscience of the CFA Institute standards and constantly endeavored to defend, strengthen, and expand the enduring principles of the profession.

Among his many contributions, his commitment to the pursuit and dissemination of new ideas might be his strongest legacy. Jim understood the danger to the profession—and its professionals—of knowledge complacency. He argued tenaciously for the organization to support

research—both the funding and publication of research relevant to investment professionals.

His passion and enthusiasm made him an ideal mentor for many over the years. As a perfectionist, he was a demanding but fair mentor, a good listener, and open to a different perspective if well-presented and reasoned. He challenged people to pursue excellence in everything they did, and to never accept the status quo without questioning whether a better outcome was possible. His ego was such that he enjoyed giving way to a better idea—no need-to-be-invented-here attitude in Jim.

Those fortunate to have worked with Jim know his passionate energy well. But Jim preferred to do much of his work behind the scenes and out of the limelight, thus the complete picture is known by few. We are pleased to see his legacy continue.



Maureen O'Hara—2020 Vertin Award Recipient

Katy Sherrerd, CFA
*Vice Chair, Research Affiliates, and former
Managing Director at CFA Institute*

Fred Speece, CFA
*Founder, Speece Thorson Capital Group, Inc.,
and former Chair, CFA Institute and CFA
Institute Research Foundation*

JIM VERTIN AND THE VERTIN AWARD

I would like to begin by sharing some comments about Jim Vertin. Although I did not personally know him well, we did meet on various occasions, and I do have some idea of the Wells Fargo story.

Jim was a high-level bank executive who achieved considerable success within the trust department. He had no need to put his reputational capital behind modern portfolio theory, which, at that time, must have seemed like an upstart and maybe even a wild-eyed new approach to the investment process. At the outset, this new theory must have seemed both alien and fundamentally antithetical to trust bank traditions.

But that is exactly what Jim did! And that act of vision and courage put him high in the pantheon of my heroes. So, I was particularly proud to be named the 1998 awardee by the CFA Institute Research Foundation, both because this award honored Jim Vertin and because the prior awardee just happened to be Bill Sharpe—another one of my heroes!

As the years unfolded with new awardees named, I must say that I found myself with ever-growing pride in being in their company.

Marty Leibowitz
1998 Vertin Award Recipient

VERTIN AWARD RECIPIENT PROFILES²

1996—William F. Sharpe: Winner of the 1990 Nobel Memorial Prize in Economic Sciences

1997—Jack Treynor³: President, Treynor Capital Management, and Senior Fellow of the Institute for Quantitative Research in Finance

1998—Marty Leibowitz: Wrote *Inside the Yield Book* with Sydney Homer

2000—Peter Bernstein⁴: Author, *Against the Gods*

2001—Roger Ibbotson and Rex Sinquefeld: Created the Stocks, Bonds, Bills, and Inflation database

2002—William Fouse⁵: Cofounder, Mellon Capital Management

2004—Martin Gruber and Edwin Elton: authors of *Modern Portfolio Theory and Investment Analysis*

2005—Andrew W. Lo: Originator of the adaptive markets hypothesis

2006—Cliff S. Asness: Cofounder of AQR Capital Management LLC and prolific author

2007—Campbell R. Harvey: Former editor, *Journal of Finance*, and Fellow, American Finance Association

2008—Keith Ambachtsheer: Director Emeritus, International Centre for Pension Management, Rotman School of Management, University of Toronto

²No prize was awarded in 1999 or 2011. Barr Rosenberg received the award in 2003 but was not included in this publication.

^{3,4,5,6}Recipient deceased.

2009—Robert J. Shiller: Winner of the 2013 Nobel Memorial Prize in Economic Sciences

2010—Roger G. Clarke: Writings on demystifying low volatility, minimum variance, risk parity, and maximum diversification strategies

2012—Elroy Dimson: Co-compiler of the DMS global investment returns database

2013—Richard Grinold: Assembled a world class team of researchers in equity, fixed income, and global asset allocation at Barclays Global Investors

2013—Ronald N. Kahn: Coauthor with Richard Grinold of *Active Portfolio Management* and *Advances in Active Portfolio Management*

2014—Kenneth R. French: A body of research on asset pricing, most of which is with Gene Fama

2015—Frank Fabozzi, CFA: Author of *The Handbook of Fixed Income Securities*, which was adopted for the CFA Program curriculum

2016—Terrance Odean: One of the first behavioral researchers to study individual investors

2017—William Bernstein: Author of *A Splendid Exchange: How Trade Shaped the World*

2018—William N. Goetzmann: Author of *Money Changes Everything*, tracing the vital role finance played in the history of societies

2019—John Bogle⁶: Founder and Chief Executive of The Vanguard Group

2020—Maureen O'Hara: Author of *Market Microstructure Theory*

2021—Aswath Damodaran: A teacher and champion of changing people's mindsets and lives

1996—WILLIAM F. SHARPE

STANCO 25 Professor of Finance, Emeritus, at Stanford University's Graduate School of Business



PROUDEST PROFESSIONAL ACCOMPLISHMENTS

- Nobel Prize in Economic Sciences (1990)
- Created the Sharpe ratio for risk-adjusted investment performance analysis
- Author of “Capital Asset Prices—A Theory of Market Equilibrium under Conditions of Risk,” *Journal of Finance*, 1964
- Contributed to the development of:
 - the binomial model for the valuation of options
 - the gradient method for asset allocation optimization
 - returns-based style analysis for evaluating the style and performance of investment funds
- “Asset Allocation: Management Style and Performance Measurement.” *Journal of Portfolio Management* 18, no. 2 (Winter 1992): 7–19.
- “Efficient Retirement Financial Strategies” (with Jason S. Scott and John G. Watson). *Recalibrating Retirement Spending and Saving*, edited by John Ameriks and Olivia Mitchell. Oxford: Oxford University Press, 2008.

Read

- Markowitz, Harry. “Portfolio Selection.” *Journal of Finance* 7, no. 1 (March 1952): 77–91.
- Arrow, KJ. “Le rôle des valeurs boursières pour la répartition la meilleure des risques.” *Econometrie* 11 (1953): 41–47. Translation: “The Role of Securities in the Optimal Allocation of Risk-bearing.” *Review of Economic Studies* 31, no. 2 (April 1964): 91–96.

INFLUENTIAL INVESTMENT PUBLICATIONS

Written

- “Capital Asset Prices—A Theory of Market Equilibrium under Conditions of Risk.” *Journal of Finance* XIX, no. 3 (September 1964): 425–42.

IMPORTANT INVESTMENT LESSONS LEARNED

The importance of diversification in investment management.

IMPORTANT INVESTMENT EXPECTATIONS FOR THE FUTURE

Growing importance of life cycle investing.

ANY PROFESSIONAL REGRETS

None of any consequence.

SUMMARY

If I had to summarize what I learned about investments in one verb, it would be *diversify*. If I had to choose one subject, it would be *the market portfolio*. I started my research with precious little practical knowledge of the world of investments. But relatively simple theorizing led to the idea that an extremely desirable investment portfolio would include all traded securities in market proportions. At the time, such a portfolio was impractical. But the idea caught on and, thanks to leaders like Jim Vertin, low-cost passive index funds became available. The rest is history.

I suspect that if I were starting a research career in 2021, I would focus on aspects of life cycle investing. Unlike other species, humans

typically produce more than they consume in the earlier years of their life, then consume more than they produce thereafter—often for many years. One way or another, a society must find a way to use the excess of production over consumption during the earlier years to finance the excess of consumption over production in the later years. Families and governments typically play a role in this process, but in many economies individuals and employees are expected to save and invest while working in order to finance at least some of their expenses in retirement. How can this best be done? What roles should investment, insurance, and other financial instruments play? What is the appropriate role for government in this process? Which portions of retirement financing should be mandated and which should be voluntary? How best to educate people so they can make informed decisions in this area? And what regulations should be imposed on the investment and insurance vehicles utilized in the process?

Diversification is an efficient procedure for investment and insurance. Securities markets facilitate the pooling of investment risk whereas insurance markets facilitate the pooling of longevity and other risks. There is much work left to be done to find the most efficient and cost-effective ways to use both to provide better lives for all.

1998—MARTY LEIBOWITZ

President, Advanced Portfolio Studies LLC
Senior Advisor, Morgan Stanley



PROUDEST PROFESSIONAL ACCOMPLISHMENTS

- Chief Investment Officer, TIAA-CREF, 1995–2004—helped to preserve and strengthen the hard-earned retirement funds for millions of educators, scientists, and health care workers.
- Franchise value, 1989–2021—a series of studies (written with coauthor Stanley Kogelman) on the theoretical foundations of price/earnings and price/sales ratios that led to the 2004 book, *Franchise Value and the Price/Earnings Ratio*, as well as a series of additional price/earnings studies culminating in a 2020 article published in the *Journal of Investment Management* on the theoretical evolution of the price/earnings ratio over time.
- Funding ratio studies, 1989–2020 (written with coauthors Stanley Kogelman, Anthony Bova, and Antti Ilmanen)—addressed the underlying dynamics of funding ratios, including their peaks and valleys, and culminating in the concept of a generalized funding ratio that describes the multiplicity of feasible fund risk preferences. For example, on one hand, an amply funded entity may *reasonably* choose to either take advantage of the surplus and seek more

risk, or—also reasonably—could actually reduce risk because the incremental return is less valued. On the other hand, a deficit fund could choose to either reduce risk—or, again reasonably, up the risk and roll the dice in pursuit of outsized returns.

INFLUENTIAL INVESTMENT PUBLICATIONS

Written

- *Inside the Yield Book*, 1st ed (with Sidney Homer). Hoboken, NJ: Prentice Hall, 1972—addressed some of the myths that were widespread in the bond market at the time.
- *Inside the Yield Book*, 3rd ed (with Stanley Kogelman and Anthony Bova). New York: Bloomberg Press, 2014—showed how the common institutional and retail bond management practice of duration targeting leads to predictable yield-based realized returns—regardless of whether subsequent rates rose or fell.
- *The Endowment Model* (with Anthony Bova and Brett Hammond). Hoboken, NJ: Wiley, 2004—focused on the key role of equity beta in determining the risk characteristics of most diversified funds and pointed out how the stress beta effect in adverse markets could

lead to portfolio declines that could actually be far worse in the more diversified funds.

- Equity Duration Studies—addressed the challenges in applying the duration concept to equities: “Total Portfolio Duration,” *Financial Analysts Journal* (Sept/Oct 1986), applied the duration concept to the fund as a whole; “A Total Differential Approach to Equity Duration,” with Robert Arnott, Eric Sorensen, and Nicolas Hansen, *Financial Analysts Journal* (Jan/Feb 1983)—how real rates and inflation can have very different effects on equity pricing; “Resolving the Equity Duration Paradox,” with Stanley Kogelman, *Financial Analysts Journal* (Jan/Feb 1983)—ties real rate effects to associated prospects for earnings and price/earnings ratios.
- “Alpha Hunters and Beta Grazers.” *Financial Analysts Journal* (Sept/Oct 2005)—the title tells most of the story.

Read

- Williams, John Burr. *The Theory of Investment Value*. Cambridge, MA: Harvard University Press, 1938.
- Sharpe, William F., and Lawrence G. Tint. “Liabilities—A New Approach.” *Journal of Portfolio Management* 16, no. 2 (Winter 1990): 5–10.
- Treynor, Jack. “Toward a Theory of Market Value of Risky Assets.” Unpublished manuscript (Fall 1962).

IMPORTANT INVESTMENT LESSONS LEARNED

The market is always changing in fundamental ways, and it writes its own story on the backside of our models!

IMPORTANT INVESTMENT EXPECTATIONS FOR THE FUTURE

As the market becomes both more efficient and, at the same time, more complex, the gap between alpha hunters and beta grazers will grow ever wider.

ANY PROFESSIONAL REGRETS

A twice-married friend of mine once said, “I wished I had married my second wife—first!” After having written a number of articles on a given topic, I often wished that I had also written my last paper—first! (But, of course, that probably would not have been possible...)

SUMMARY

These days, my research efforts are within the context of Advanced Portfolio Studies LLC, a consulting organization that we founded in 2020. Our current studies have focused on issues related to asset allocations that can achieve a sufficient probability of “success” relative to various return targets.

This research has been in conjunction with Dr. Stanley Kogelman of Delft Strategic Advisors LLC, and has led to a series of publications for Morgan Stanley, the *Financial Analysts Journal*, the *Journal of Portfolio Management*, and the *Journal of Investment Management*.

We have found that:

- (1) The efficient frontier, when viewed in isolation, can be misleading when it comes to target-matching because the indicated expected return only has a 50/50 chance of success.

INVESTMENT LUMINARIES AND THEIR INSIGHTS

- (2) The best achievable probability of success depends on both the shape and position of the efficient frontier relative to the target.
- (3) The portfolio with “peak” probability of success generally will not be at either the highest expected return or the maximum volatility point.
- (4) The trade-offs involved in maximizing success can be displayed by mapping the efficient frontier onto two different frontiers: a *success frontier* that reflects the probability of success for each portfolio, and an *assurance frontier* that represents the risk-adjusted returns associated with a given success probability.
- (5) In low return environments, a *return-adjusted* risk constraint (a counterpoint to the standard risk-adjusted return) may lead to volatility bounds that are lower than the standard 10 to 12 percent downdraft limit.
- (6) *The Endowment Model of Investing* (with Anthony Bova and Brett Hammond). Hoboken, NJ: Wiley, 2010.
- (7) *Inside the Yield Book*, 3rd ed (with Stanley Kogelman and Anthony Bova). New York: Bloomberg Press, 2014, includes new chapters on the duration targeting findings.

More broadly, my years in finance have provided me with many lessons. First, and perhaps most important, is the realization that those who have been doing a particular job for a long time, regardless of what it may be, have something to teach and should be listened to.

Other general lessons I have learned are:

Over the years, many of our learnings have been incorporated in the following books:

- (1) *Inside the Yield Book*, 1st ed (with Sidney Homer). Hoboken, NJ: Prentice Hall, 1972.
 - (2) *Return Targets and Shortfall Risks* (with Lawrence Bader and Stanley Kogelman). Burr Ridge, IL: Irwin Professional Publishing Company, 1995.
 - (3) *Franchise Value and the Price/Earnings Ratio* (with Stanley Kogelman). Charlottesville, VA: CFA Institute, 1994.
 - (4) *Inside the Yield Book*, 2nd ed (with Sidney Homer). New York: Bloomberg Press, 2004.
 - (5) *Modern Portfolio Management* (with Simon Emrich and Anthony Bova). Hoboken, NJ: Wiley, 2009.
- Be skeptical of yourself, especially when you think you know something the market doesn't!
 - Some of our best research starts with an often painful realization that we missed something in our prior work.
 - Return estimates are fragile and always in danger of becoming extinct.
 - Models are only approximations of a complicated, surprise-filled reality.
 - Even if you could correctly anticipate some future event, you might be wrong about the market's response.
 - The accumulation of realized return over time is the best defense against risk.
 - The Federal Reserve is not always right—but it is very big!
 - Growth alone is not enough. The gold star is *franchise value growth* in excess of the cost of all resources consumed in producing it.

INVESTMENT LUMINARIES AND THEIR INSIGHTS

- Some forms of growth are *pushed* by investment whereas others are *pulled* forward by future opportunities. It is better to be *pulled* than *pushed*!

Looking forward, extraordinary technical advances in computing power and communication capacity will enable the market to become ever more efficient in rapidly processing new

information. At the same time, we are encountering increasing complexity with a much wider range of both macro and micro risks.

The key challenge will be our ability to harness this rapidly available information, assess its implications, and reach actionable decisions—all within relevant time frames.

2001—ROGER IBBOTSON (WITH REX SINQUEFIELD)

Professor in the Practice Emeritus of Finance
at the Yale School of Management
Chairman, Zebra Capital Management LLC



PROUDEST PROFESSIONAL ACCOMPLISHMENTS

- Building the Stocks, Bonds, Bills, and Inflation (SBBI) database in 1974, promoting its use in all sorts of contexts, and keeping it up to date through the present.
- Founding Ibbotson Associates in 1977, and running the investment software, consulting, and advice company for almost 30 years, until its eventual sale to Morningstar, Inc. in 2006.
- Researching international capital market returns, valuation, asset allocation, lifetime investing, liquidity, and popularity, leading to nine Graham and Dodd Scrolls and numerous other awards.
- 1982, 1989); Ibbotson Associates (1983–2006); Morningstar, Inc. (2007–2015); and Duff & Phelps (2016–2020).
- *Lifetime Financial Advice: Human Capital, Asset Allocation, and Insurance* (with Peng Chen, Moshe Milevksy, and Kevin Zhu). Charlottesville, VA: CFA Institute Research Foundation, 2007.
- *Popularity: A Bridge between Classical and Behavioral Finance* (with Thomas Idzorek, Paul D. Kaplan, and James X. Xiong). Charlottesville, VA: CFA Institute Research Foundation, 2018.

Much of my career has been studying the demand and supply of capital market returns, starting with two *Financial Analysts Journal* articles:

INFLUENTIAL INVESTMENT PUBLICATIONS

Written

- *2021 SBBI Yearbook: Stocks, Bonds, Bills, and Inflation*. New York: Duff & Phelps, 2021. Previous editions published by CFA Institute Research Foundation (1977, 1979,
- “The Demand for Capital Market Returns: A New Equilibrium Theory” (with Laurence B. Siegel and Jeffrey J. Diermeier). *Financial Analysts Journal* 40, no. 1 (January/February 1984): 22–33.
- “The Supply of Capital Market Returns” (with Jeffrey J. Diermeier and Laurence B. Siegel). *Financial Analysts Journal* 40, no. 2 (March/April 1984): 74–80.

Read

All of the work listed here not only guided my thinking, but the authors deservedly won Nobel Prizes.

- Harry Markowitz's 1952 paper providing the mathematics of diversification and efficient frontiers.
- Two Miller and Modigliani papers on capital structure (1958) and dividend policy (1961).
- Eugene Fama's 1970 paper defining efficient capital markets.
- The Black and Scholes 1973 options paper.

IMPORTANT INVESTMENT LESSONS LEARNED

Managing investments is not like managing people. After you get your portfolio set up, it can run on autopilot for a while. There is no reason to constantly readjust unless you have a special edge or you need to rebalance because the environment has dramatically changed. Instead, you can focus on long-term investment principles.

IMPORTANT INVESTMENT EXPECTATIONS FOR THE FUTURE

My forecasting is long term. My original forecasts came from SBBI where I used historical risk premiums overlayed on the current yield curves to simulate stock, bond, and inflation returns probabilistically, a quarter century ahead. These turned out to be a remarkably accurate forecast of the year 2000. I still recommend similar methods today, but I also use demand methods (based upon risk and popularity) and supply methods (based upon gross

domestic product, earnings, dividend, etc. growth) to forecast expected returns in capital markets.

ANY PROFESSIONAL REGRETS

I have had many ups and downs (early failed jobs, missed promotions, rejected articles, negative profit years, etc.) in my career. I often joke that I am an example of the "reverse" Peter Principle, since each setback has caused me to reposition my activities, in each case moving me to a higher level. I might have regretted the setbacks at the time, but not in retrospect.

SUMMARY

Three Things to Know about Investing

I have always tried to focus my research on the practical aspects of investing, impacting not only others, but also my own personal investing. I am more than happy to pass along what I have learned, because I have so much enjoyed the interaction with my colleagues and the excitement of my students as we together tackle the big questions in finance and investments. There has been a financial revolution in my lifetime—completely changing how we think about investments. The concept of efficient capital markets permeates our entire thought process. Efficient markets and the idea that active management is a zero-sum game relative to the market, frees us up from trying to overly manage our money. Instead, our starting point can be buy, hold, and diversify. We need only step in when we actually have the edge to outperform, or we need to adjust our portfolios because conditions have changed. We are no longer just stock pickers, but portfolio managers who create customized portfolios to meet the needs of investors. We

have also learned a great deal about how markets work and what are their potential payoffs.

In this new world view we can focus on what really matters: the big questions. This is what I have attempted to do with my research. What are some of these big questions? Let me suggest a few that I have played a role in. What are the risk premiums and their magnitude? How do they behave across asset classes? How important is our asset allocation policy in determining our investment performance? How should we change our portfolio mix (including insurance products) as we age over our lifetime? How efficient are the capital markets, and how should that affect our investing? And, beyond risk, what else impacts prices and expected returns? How are prices and expected returns in equilibrium affected by demand and supply?

It is fitting that this essay is being published by the CFA Institute Research Foundation, because so much of my work has been published in prior Research Foundation monographs. It typically is not the original work that I have published through the Research Foundation, but rather after the ideas and the results have already been published in academic journals. However, the Research Foundation has allowed me and my coauthors to put the ideas forth in a more accessible form and to a wider professional audience. I will concentrate here on three categories of monographs that I have published through the Research Foundation: (1) *Stocks, Bonds, Bills, and Inflation* database, (2) *Lifetime Financial Advice*, and (3) *Popularity: A Bridge between Classical and Behavioral Finance*.

Stocks, Bonds, Bills, and Inflation (SBBI)

The SBBI dataset (with data from 1926 to present) was originally created by Rex Sinquefeld

and me back in 1976 and was initially published in two academic journal issues before being updated in CFA Institute Research Foundation monographs in 1977, 1979, 1982, and 1989. Starting in 1983, Ibbotson Associates published yearbooks every year until Morningstar Inc. purchased Ibbotson Associates in 2006. Thereafter Morningstar published the yearbook until the publication was eventually taken over by Duff & Phelps (now a Kroll Business). The raw SBBI data and the *SBBI Summary Edition* (coauthored by James Harrington) are now freely available to CFA Institute members on the CFA Institute website.

The original purpose of gathering the data was to measure the various risk premiums that were posited in the academic literature: the equity risk premium, the horizon risk premium, default risk premium, the real interest rate, and eventually the small stock premium. Starting in 1926, large-cap stocks had a compound annualized return of 10.3 percent through 2020, whereas US Treasury bills had a rate of return of 3.3 percent. Not only was this spread a substantial equity risk premium, but perhaps even more astonishing is how much \$1 grows over time when invested in equities while reinvesting all the dividends. One dollar grew over the 95-year period to \$10,945. Even after adjusting for inflation (2.9 percent over the period), \$1 in large-cap equities grew to \$752. Our work demonstrated the exponential wealth that can be created by investing in our capital markets over long periods of time. Of course, actual investments would be subject to taxation, trading costs, management fees, etc. Nevertheless, we clearly demonstrated that the equity risk premium is substantially positive, and that although stocks are more risky than bonds, stocks outperform bonds over the long run by a wide margin.

It turns out by understanding SBBI, one understands how to calculate returns, how returns

compound and are annualized, how risk is commonly measured, how large the risk premiums were across the various historical periods, and to what extent returns and premiums are random. Since most of the premiums are close to random or have easily identified serial correlation, we showed that these premiums can also be used for forecasting, along with current yield curves which have embedded within them expected inflation, real interest rates, and horizon premiums. In fact, our original forecast of the equity market from 1976 to 2000 turned out to be remarkably accurate—well within one standard deviation of its mean and median given in our probabilistic forecasts.

Lifetime Financial Advice: Human Capital, Asset Allocation, and Insurance

This CFA Institute Research Foundation monograph was originally published in 2007, a topic on which I previously had published in an earlier academic journal. The premise was based on human capital, which is the present value of the future earning power for each of us. We can think of our lives as having three stages: the education stage where we accumulate human capital, the accumulation stage where we save and invest (converting our human capital into financial capital), and the retirement stage when we spend down our financial capital. This framework helps us to configure our asset-allocation and our insurance needs over our lifetime.

When we are young and entering the accumulation stage of our lives, we typically have maximum human capital—which is wage earning and bond like—but little financial capital. During this stage of our lives, we often buy life insurance to protect our human capital, but with our financial capital we can go “all in” on equities, since financial capital is only a small

portion of our overall wealth. As we approach retirement, we need to take less risk because our financial capital takes on most of the burden. We do this either by buying bonds, insurance accumulation products, or other low-risk investments. During our retirement spend down stage, we often face longevity risk, which is the risk that we will outlive our assets. Here again insurance products such as payout annuities can play a supplemental role, since they are the opposite of life insurance in that they pay out as long as we live, much like Social Security or defined benefit plans.

Popularity: A Bridge between Classical and Behavioral Finance

This is my most recent CFA Institute Research Foundation monograph, with coauthors Thomas Idzorek, Paul D. Kaplan, and James Xiong. In it we develop a popularity asset pricing model (PAPM) that linearly prices assets according to premiums that are based on popularity. Risk and negative skewness are unpopular, but liquidity is popular, as is environmental, social, and governance (ESG), and well recognized brands. Securities with popular characteristics trade at higher prices relative to their expected cash flows than securities with unpopular characteristics. This means that the less popular securities have higher expected returns and a higher cost of capital. The PAPM prices not only risk, but other premiums that the market has a “taste” for in either a positive or negative way.

An additional benefit of the PAPM is that it can readily encompass heterogeneous expectations or divergent beliefs about the expected cash flows that firms supply. Since the prices and expected returns in equilibrium reflect the weighted average of these beliefs (positively weighted by wealth, negatively weighted by risk

aversion), market efficiency or “fair pricing” is on a knife edge. Prices reflect the average of all investor beliefs, including those who are misinformed. Thus, inefficiencies are not arbitraged away. This does not mean, however, that it is easy to outperform the market. Active investing is a zero-sum game dominated by professional investors. Even those who have an “edge” face costs that make it difficult to outperform the market.

The Three Sources

Ibbotson, Roger G. *2021 SBBI Yearbook; Stocks, Bonds, Bills, and Inflation; U.S. Capital Markets, Performance of Asset Classes 1926–2020*. New York: Duff and Phelps, 2021.

Earlier editions published by CFA Institute Research Foundation (1977, 1979, 1982, 1989); Ibbotson Associates (1983–2006); Morningstar, Inc. (2007–2015); and Duff and Phelps (2016–2020).

Ibbotson, Roger G., Peng Cheng, Moshe Milevsky, and Kevin Zhu. *Lifetime Financial Advice: Human Capital, Asset Allocation, and Insurance*. Charlottesville, VA: CFA Institute Research Foundation, 2007.

Ibbotson, Roger G., Thomas Idzorek, Paul D. Kaplan, and James X. Xiong. *Popularity: A Bridge between Classical and Behavioral Finance*. Charlottesville, VA: CFA Institute Research Foundation, 2018.

2001—REX SINQUEFIELD (WITH ROGER IBBOTSON)

Cofounder, Dimensional Fund Advisors



PROUDEST PROFESSIONAL ACCOMPLISHMENTS

- Establishing the first commingled S&P index fund (September 1974)
- Cofounding Dimensional Fund Advisors (1981)
- Leading the effort to reduce Missouri state income tax from 6.0 percent to 5.4 percent and continuing (2014)

INFLUENTIAL INVESTMENT PUBLICATIONS

Written

- *Stocks, Bonds, Bills, and Inflation: Historical Returns and Simulations of the Future* (with Roger Ibbotson). Charlottesville, VA: CFA Institute Research Foundation, 1976–1989.

Read

- Fama, Eugene. “The Information in the Term Structure.” *Journal of Financial Economics* 13, no. 4 (December 1984): 509–28.
- Fama, Eugene, and Kenneth R. French. “The Cross-Section of Expected Stock Returns.”

Journal of Finance 47, no. 2 (June 1992): 427–65.

IMPORTANT INVESTMENT LESSONS LEARNED

Market prices are correct, and if you let markets function, they will bring about the best allocation of resources for everything.

IMPORTANT INVESTMENT EXPECTATIONS FOR THE FUTURE

You are not going to beat the market; instead, let the market work for you.

ANY PROFESSIONAL REGRETS

None.

SUMMARY

The most important lesson I learned goes back to 1970 when I was studying at the University of Chicago. I was fortunate to have a class taught by Merton Miller. During the introduction of one of our classes, he discussed how we think about markets. This is when it hit home about

INVESTMENT LUMINARIES AND THEIR INSIGHTS

the market's worth. Market prices are correct, and if you let markets function, they will bring about the best allocation of resources for everything. That is when I knew it had to be true—it is the only principle that organizes all the data in the world. I utilized this thought process in 1973 to help introduce the first S&P 500 passively managed index fund.

This is the same strategy that we use at Dimensional Funds Advisors to create an optimal portfolio consisting of various funds that

emulate different style and size attributes of various securities markets worldwide. As such, one fund might behave like the S&P 500, another might correlate with just the value stocks in the S&P 500, whereas a third might emulate the performance of all small-cap stocks.

Although this is the most important lesson I've learned, I believe it can be utilized in the future just as effectively. You are not going to beat the market; instead, let the market work for you.

2004—EDWIN ELTON (WITH MARTIN GRUBER)

Scholar in Residence, Professor Emeritus of Finance,
New York University Stern School of Business



PROUDEST PROFESSIONAL ACCOMPLISHMENTS

- A wide variety, quality, and readability of research articles
- Coauthor of nine editions of the textbook *Modern Portfolio Theory and Investment Analysis*
- President, American Finance Association, 1997
- Coeditor, *Journal of Finance*, 1983–1988

INFLUENTIAL INVESTMENT PUBLICATIONS

Written

- “Marginal Stockholder Tax Rates and the Clientele Effect.” *Review of Economics and Statistics* 52, no. 1 (February 1970): 68–74.
- The simple rules articles such as “Simple Criteria for Optimal Portfolio Selection.” *Journal of Finance* 33, no. 1 (March 1978): 296–302.
- “Efficiency with Costly Information: A Reinterpretation of Evidence from Managed

Portfolios.” *Review of Financial Studies* 6, no. 1 (January 1993): 1–22.

- “Explaining the Rate Spread on Corporate Bonds.” *Journal of Finance* 56, no. 1 (February 2001): 247–77.

Read

- Everything written by Harry Markowitz or Bill Sharpe.

IMPORTANT INVESTMENT LESSONS LEARNED

The most important lesson I’ve learned is the importance of having your research grounded in an understanding of how markets and institutions work, including factors such as taxes and transaction costs.

IMPORTANT INVESTMENT EXPECTATIONS FOR THE FUTURE

None.

ANY PROFESSIONAL REGRETS

None.

SUMMARY

The most important lesson I've learned is the importance of having your research grounded in an understanding of how markets and institutions work, including factors such as taxes and transaction costs. One of the big advantages of having spent a career at NYU is that students and fellow faculty have a deep understanding of these issues and are not the least bit shy in letting you know if you are missing something important. Many times, external speakers come to NYU to present an elegant model missing important aspects of the problem they are analyzing and drawing conclusions that have no relevance. A short time into the presentation you can see the roll of eyes and usually a well-crafted question that allows everyone to understand the problem.

As I've gotten older more and more of my friends have come to me for asset allocation advice. This has made me realize the limitations of our formal models because much of the advice I've given has relied on common sense rather than insights from our models. For example, what is the impact on asset allocation of having a disabled child and the parents' desire to care for the child after death? Clearly this is a bequest desire, but how is it impacted by the availability of other resources, such as other

children who could help, and the uncertainty of the need given the potential of changing health conditions? How does this affect the asset allocation decision for the parents? As another example, consider the impact of wealth. All of the model portfolios show that, as you get older, more of your portfolio should be in bonds. People anywhere near my age lived through a great bull market. Many of my friends even earning relatively middle-class wages have accumulated enough in house appreciation and asset accumulation to live comfortably even with a major market decline. Should they be holding more bonds as they age, or is their asset allocation decision what is best for their children? As a third example, consider one of my friends with very limited resources. In this case annuities were a major part of the asset allocation. There were several reasons for this. First, annuities provided greater income than the interest on bonds because they have no terminal value. Second, I know of no good model guiding the systematic sale of bonds (which is an alternative way of increasing cash flow), and the uncertainty of when to sell in changing market conditions would have caused major anxiety for my friend. These and other similar compounding factors affecting asset allocation are all important issues that need better analysis.

2004–MARTIN GRUBER (WITH EDWIN ELTON)

Scholar in Residence, Professor Emeritus of Finance,
New York University Stern School of Business



PROUDEST PROFESSIONAL ACCOMPLISHMENTS

- President, American Finance Association, 1995
- Coeditor, *Journal of Finance*, 1983–1988
- Chair, Finance Department New York University Stern School of Business 1989–1997
- Director, National Bureau of Economic Research, 2004–present
- Member, NBER Investment Advisory Committee, 2005–present
- Director of five families of mutual funds
- Coauthor of nine editions of the textbook *Modern Portfolio Theory and Investment Analysis*

INFLUENTIAL INVESTMENT PUBLICATIONS

Written

- “Marginal Stockholder Tax Rates and the Clientele Effect.” *Review of Economics and Statistics* 52, no. 1 (February 1970): 68–74.

- “Simple Criteria for Optimal Portfolio Selection.” *Journal of Finance* 33, no. 1 (March 1978): 296–302.
- “Another Puzzle: The Growth in Actively Managed Mutual Funds.” *Journal of Finance* 51, no. 3 (July 1996): 783–810.
- “Why Do Closed End Bond Funds Exist?” *Journal of Financial and Quantitative Analysis* 48, no. 2 (April 2013): 405–25.
- “Target Date Funds: Characteristics and Performance.” *Review of Asset Pricing Studies* 5, no. 2 (December 2015): 254–72.
- “Review of the Performance Measurement of Long-Term Mutual Funds.” *Financial Analysts Journal* 76, no. 3 (2020): 22–37.

Read

The following two books, along with conversations with both authors, formed the foundation of all I have accomplished in the field of financial economics:

- Markowitz, Harry. *Portfolio Selection: Efficient Diversification of Investment*. Hoboken, NJ: John Wiley & Sons, 1959.
- Sharpe, William. *Portfolio Theory and Capital Markets*. New York: McGraw-Hill, 1970.

IMPORTANT INVESTMENT LESSONS LEARNED

Finance has been and will continue to be a wonderful field of study.

IMPORTANT INVESTMENT EXPECTATIONS FOR THE FUTURE

We continuously uncover new problems. We arrive at better solutions to old problems, but none of the solutions are perfect, and there is always more work to do.

ANY PROFESSIONAL REGRETS

No, at 84 years old, I realize that I wouldn't have done anything differently than I did.

SUMMARY

Most of our research in investments involves either analysis designed to understand the valuation of an instrument or valuing categories of portfolios.

As an example of analyzing the valuation of an instrument, we examined the rate spread between corporate and government bonds and the spread between rating classes for corporate bonds. Traditionally, these spreads had been assumed to be primarily a function of expected loss in default. Even after accounting for the spread needed to account for default risk and differences in taxes, a lot of the spread was unexplained. We showed that a large part of the unexplained spread could be related to risk factors that affect equity valuation. If equities require an extra return to compensate for exposure to these factors, then, in a reasonable

market, so must bonds. Thus, a large amount of the spread is a risk premium.

As a second example of understanding an instrument in the bond area, we examined why closed end bond funds exist. We showed that their primary way used to create value was to purchase long bonds while borrowing short. Thus, they were levered. This caused major problems when their ability to borrow in short-term markets collapsed in the financial crisis.

There are numerous examples of our research on whether a type of portfolio is a good or bad investment. For example, we studied commodity funds and showed all of the data investors looked at was biased. This data made commodity funds appear to be terrific investments. We showed that, once these biases were accounted for, commodity funds returned less than the risk-free rate on average and were a poor investment.

When we examined S&P index funds, we learned that future performance was highly predictable by using past fees or past performance. Furthermore, the differences in fees was so large that it could make a real difference to an investor's performance when selecting index funds. This was also true—although to a lesser extent—for actively managed mutual funds.

As a final example, we also studied target date funds. We showed that they weren't simple mixtures of a bond and stock fund but generally held over a dozen different types of investments. Across target date funds, performance differed greatly, depending on the fees of the funds held and the fee the target date fund added. Target date funds offered by mutual fund families primarily invested in only individual funds offered by the fund family. Furthermore, if the fund family offered several funds of the same type, often the one selected for the target date fund

met fund family objectives rather than shareholder objectives.

Lessons We Have Learned

Although we've learned many lessons in our long careers in finance, perhaps the most important consists of two parts: the necessity of using multi-index models rather than single-index models in analyzing investments and the difficulty of finding the best multi-index model. We first became aware of the importance of multi-index models in 1989. An influential article was published and cited by the investment industry that showed that mutual funds outperformed the S&P index on a risk-adjusted basis: the higher the fund's expense ratio, the greater the outperformance after fees. The results were due to three factors: during the period of the study, many mutual funds held stocks that had lower capitalization than the stocks in the S&P index; smaller stocks did better than the S&P index during the period of the study; and funds holding small stocks charged higher expenses. When the study was repeated using a three-index model, accounting for the influence of size, the results were reversed.

This simple finding led us on a long road examining multi-index models. Although our study was one of the first to use multi-index models in performance measurement, the use of multi-index models has become prevalent in both research and investment practice. For example, it plays a key role in both the evaluation and design of investment portfolios. In the industry, this has led to the creation of factor (index) portfolios and the widespread marketing of "smart beta" portfolios. There are more than a thousand smart beta ETFs on the market today. We have learned how multi-index, sometimes called multifactor, models can be used for many purposes. They have been used to explore why

securities move together (the covariance structure of security returns), to construct a portfolio that approximates an index with a small number of securities, for portfolio performance measurement and attribution, to understand risk over time, and to explain and predict expected returns.

We have learned that there are at least three different ways of identifying the indexes in a multi-index model:

1. Identify a set of indexes by statistically analyzing the history of security returns;
2. Determine a set of portfolios that span the characteristics of important sectors of securities;
3. Determine a set of macro variables that are believed to affect security returns.

We have explored these methodologies in previous studies. Each of these methods has been used by industry to develop investment products.

Perhaps the most important lesson we have learned in our extensive experience in developing and testing different methods in our research on multi-index models is that no one type of model works best for all applications. The model or set of models that work best for tracking an index are very different from those that best explain differences in expected return. Tests have been developed (some by us, some by others) that allow models to be compared for particular purposes. We know that more multi-index models will be developed and tested in the future.

Areas for Future Exploration

In what follows, I discuss three areas for future exploration.

The major change in pensions is the shift from defined benefit to defined contribution plans. With defined contribution plans, the choice of whether to invest and the asset allocation decision rests with plan participants within the constraints of the options offered by the plan sponsor. Evidence shows that most plan participants are ill equipped to make sensible asset allocation decisions. Plan sponsors can help by offering education and through the careful selection of the options offered to participants. The least the plan sponsor needs to do is to offer a sufficient number and type of funds so that a participant can construct an optimal or near optimal portfolio. A lot of analysis will be useful here. The other option plan sponsors have adopted is to offer a portfolio that makes the asset allocation decision for the plan participant. The current choice is target date funds. Target date funds have ages attached to them and an investor is encouraged to select one closest to his or her age. However, we know that age isn't the only variable that should affect asset allocation. We know that wealth, other investments that are required to be held (company stock or company options), bequest motives, a likelihood of early withdrawal (health or education needs), and other household incomes all affect asset allocation. Although there are a number of formal models dealing with these issues on a general basis, they have not been applied to constructing a portfolio for specific individuals. This is a fruitful area for analysis.

One of the most pressing problems for an analyst today is to ensure the data they use to make

decisions are free of bias. Survivorship bias has been present in many databases that analysts use and the public relies on. Most early databases contained survivorship bias: they eliminated data on firms that had ceased to exist. Early mutual fund databases and corporate databases (Compustat) had this problem. Other databases contained look back bias: adding firms to a database because they were successful and including past history of those firms. More and more databases are being produced to aid analysts. Analysts frequently construct their own sets of data for comparison purposes. The analyst must be aware of bias in these databases and how to correct for them. The profession will develop new specialized databases, and it is important that these databases are free of bias.

We have already hinted at what the future will hold for multi-index models. When you think of a single-index model, you invariably think of the Sharpe single-index model. When you think of a multi-index model, there is no one accepted standard model. The literature contains over 250 articles presenting and discussing alternative models. Most large investment firms use a multi-index model when examining their performance and attempting to achieve diversification. These models are becoming more prevalent. A financial analyst should understand the model their firm uses and the models that external sources use to evaluate the performance of their firm's products. More and more models will be developed and used in the future, and the analyst must be in a position to understand these models.

2005—ANDREW W. LO

Charles E. and Susan T. Harris Professor, MIT Sloan School of Management
Director, MIT Laboratory for Financial Engineering
Principal Investigator, MIT Computer Science and Artificial Intelligence Laboratory
Affiliated Faculty, MIT Department of Electrical Engineering and Computer Science
External Faculty, Santa Fe Institute
Research Associate, National Bureau of Economic Research



PROUDEST PROFESSIONAL ACCOMPLISHMENTS

- Originator of the adaptive markets hypothesis
- Coauthor, with Shomesh E. Chaudhuri, of *Healthcare Finance: Modern Financial Analysis for Accelerating Biomedical Innovation*, to be published in 2022 by Princeton University Press
- Cofounder of BridgeBio Pharma, a startup biotechnology company focused on treating genetic diseases, and using a portfolio approach first described in Fagnan, D. E., J. C. McKew, N. N. Yang, and A. W. Lo. “Financing Translation: Analysis of the NCATS Rare-Diseases Portfolio.” *Science Translational Medicine* 7, no. 276 (February 2015): 276ps3.
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INFLUENTIAL INVESTMENT PUBLICATIONS

Written

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Random Walks: Evidence from a Simple Specification Test.” *Review of Financial Studies* 1, no. 1 (1988): 41–66.

Read

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IMPORTANT INVESTMENT LESSONS LEARNED

(1) Markets can stay irrational longer than you can stay solvent; (2) in the long run, we're all dead, but make sure the short run doesn't kill you first; and (3) it's amazing how much more you can accomplish if it doesn't matter who gets the credit.

IMPORTANT INVESTMENT EXPECTATIONS FOR THE FUTURE

Markets will become far more adaptive in the future, and technological innovations will play a bigger role in creating new opportunities as well as new challenges.

ANY PROFESSIONAL REGRETS

I wish I had started collaborating on joint research projects with more academic and industry colleagues much sooner. I learn so much from each of my collaborators, we make progress so much more quickly, and it's also a lot more fun than working solo.

SUMMARY

Receiving the James R. Vertin Award from the CFA Institute Research Foundation in 2005 was one of the highlights of my professional career as a finance academic. It's an even greater privilege to have this opportunity to mark the occasion of the award's Silver Jubilee by describing the most important investment lesson I learned in my career.

That lesson has to do with the role of human behavior in determining financial market

interactions and fluctuations. The traditional approach taken by financial economists is largely a mechanistic view in which investors behave rationally by maximizing risk-adjusted returns in a mean-variance world, and market prices are determined by equilibrating supply and demand at all times. This framework of rational expectations and the efficient markets hypothesis (EMH) have led to enormous advances in our understanding of risk, reward, and how to invest as fiduciaries on behalf of clients. It's no exaggeration that the rise and dominance of indexation, passive investing, linear factor models, performance attribution, capital budgeting, and much of modern corporate financial practices can all be traced back to this single framework.

However, all financial models have their limits, including this one. Although the traditional approach explains a great deal about financial market dynamics, it doesn't explain everything in every circumstance. However, contrary to the critics of the EMH, the existing paradigm isn't wrong—it simply doesn't cover all possible scenarios. No theory does. This fact becomes particularly noticeable during periods involving highly dynamic business conditions, where the usual relationships no longer hold because of external shocks to the system to which all stakeholders are attempting to adapt.

This process of adaptation—which I call the adaptive markets hypothesis (AMH)—is the single most important investment lesson I've learned.

The financial system is, in fact, closer to a biological system than a physical system—its “laws of motion” aren't really laws, but rather heuristics that depend on the flora and fauna of market participants that inhabit the ecosystem at a given point in time. Once you acknowledge this basic truth, your views on investing will never be the same again. Instead of looking for

immutable mathematical relations that predict winners and losers, you'll focus instead on cataloguing and understanding the different species in the population, how they relate to each other via the financial "food chain," and how species adapt and evolve over time in response to competition, innovation, and natural (and unnatural) selection. And in doing so, you might just come up with products and services that will generate significant value for yourself and your clients.

AMH is not meant to replace the EMH but rather to complete it, and to reconcile it with all of the behavioral anomalies that have been documented and used to cast doubt on market efficiency. The fact is that the EMH is still the most successful financial paradigm we know of, and it explains a host of empirical phenomena that no other single theory has been able to match. But the AMH offers a framework in which the EMH can wax and wane, depending on the forces at work in the financial ecosystem.

For example, in liquid markets with relatively stable business conditions and a large number of sophisticated participants, the EMH is likely to be an excellent approximation under most conditions. Examples include US Treasury markets, S&P index futures contracts, and developed-market foreign currencies. However, in illiquid markets under drastically changing business conditions and relatively few sophisticated participants, the EMH may not perform nearly as well. Examples include the market for esoteric synthetic collateralized debt obligations during the 2008 global financial crisis, the market for personal protective equipment during the midst of a pandemic, and the market for newly formed cryptocurrencies and crypto exchanges.

Under the AMH, market efficiency is not a binary feature but rather a continuum. Just as engineers use measures of relative efficiency

to rate air conditioners, hot water heaters, and jet engines, we can refer to relative degrees of market efficiency. One such measure of relative efficiency is the first order autocorrelation of an asset's daily returns. If that asset's market is relatively efficient, the autocorrelation will be small in magnitude. However, large positive or negative values indicate the presence of predictable components that have not been competed away, presumably because the market is too illiquid for any arbitrageur to exploit the inefficiency.

Such a perspective immediately causes us to acknowledge the fact that market quality changes over time and across environments, so that no single investment thesis will hold under all conditions—unless that philosophy is the AMH, which takes change as a given. Value, growth, momentum, mean reversion, relative value, and any other investment strategy will outperform under certain conditions and underperform under others. In fact, it can be argued that each of these strategies emerged organically as an adaptation to a specific set of environmental conditions. For example, momentum investing likely emerged as a profitable adaptation to the fact that information takes time to be fully incorporated into market prices, creating price trends that less-informed participants can exploit simply by buying recent winners and selling recent losers.

But an important implication of the AMH is that, due to evolutionary forces, no single strategy is likely to consistently outperform in all environments. Therefore, the Holy Grail of the investment management business—consistent performance over time—can only be achieved by constantly adapting one's investment strategies to take advantage of the most current market opportunities as prior strategies become less profitable due to growing competition and/or changing environments.

INVESTMENT LUMINARIES AND THEIR INSIGHTS

Many investors and managers may bristle at such a chameleon-like approach to investing. In fact, a common concern among institutional investors is so-called style drift where, for example, a value manager secretly begins investing in growth companies during periods when value is underperforming growth. This concern is not unfounded. Investors may wish to create their own blend of investment styles through their asset allocation policies across managers, in which case they aren't necessarily seeking consistent performance from a given manager but may be attempting to achieve consistency by diversifying across managerial styles.

Therefore, before adopting an adaptive approach to investing, it's important to understand the constraints within which you're operating. In some cases, these very constraints create the opportunities for generating excess returns that

less constrained investors such as hedge funds and proprietary trading desks routinely exploit. Regardless of what type of investment objectives you're hoping to achieve, having a deeper understanding of the market environment in which you're competing will give you an edge in competing more effectively.

When John Maynard Keynes was criticized as a flip-flopper for changing his views on the gold standard, he replied, "When the facts change, sir, I change my mind; what do *you* do?" The same can be said for investing. When the economic environment changes, we need to change our investment approach. And when change occurs rapidly, the speed with which we adapt needs to keep pace. As one hedge fund manager observed, "Keynes may be right that 'in the long run, we're all dead,' but we should make sure the short run doesn't kill us first."

2006—CLIFFORD S. ASNESS

President and Managing Principal, AQR Capital Management LLC



PROUDEST PROFESSIONAL ACCOMPLISHMENTS

- This is an accomplishment I know I share with many of my fellow award winners, but I take the most professional pride in building an organization that I believe is a world class practitioner and a world class pure researcher, on par with the best academic institutions. This was the plan 23 years ago and, with some major ups and downs, so far, so good!
- On a more personal level, I pride myself on being able to explain complicated things with clarity and enough humor to make it palatable for the reader to get through. I think I've trained my readers that my footnotes will be a sea (a morass?) of substance, humor, and (occasional) score settling! If you can combine this with important contributions to finance and investing, it's a powerful cocktail (if you do only the humor without substance, you're just a court jester).
- Finally, I'm proud that I never had a disagreement I shied away from if I thought I was right (and, rumors aside, I do try to consider the opposite!)—I always went at it full steam.

INFLUENTIAL INVESTMENT PUBLICATIONS

Written

- “Value and Momentum Everywhere” (with Toby Moskowitz and Lasse Pedersen). *Journal of Finance* 68, no. 3 (June 2013): 929–85, in which we finally synthesized 20 years of work on these two bad boys.
- “Rubble Logic: What Did We Learn from the Great Stock Market Bubble?” *Financial Analysts Journal* 61, 6 (2005): 36–54, in which I reviewed the lessons learned from the great late 1990s' market and technology stock bubble. I may be pushing it calling this one “most influential,” but I'm also tacitly including its forerunner “Bubble Logic,” a 40+-page book draft I wrote during the height of the mania that I never finished (the bubble started coming down while I was still adding to it!). Together, I think they qualify.
- “Fight the Fed Model.” *Journal of Portfolio Management* 30, no. 1 (Fall 2003): 11–24, where I took on the venerable idea that low interest rates justify very high stock prices. It's an argument still raging today.
- “Do Hedge Funds Hedge?” (with Bob Krail and John Liew). *Journal of Portfolio*

Management 28, no. 1 (Fall 2001): 6–19, in which we showed that they did indeed hedge, but not as much as you’d think, and less than you’d find when just looking at monthly returns (which often aren’t fully marked to market). This reliance on, and often understatement of, market beta risk makes hedge fund returns less attractive than simpler analysis may show.

- “Pulling the Goalie: Hockey and Investment Implications” (with Aaron Brown). *Journal of Portfolio Management* 45 no. 4 (April 2019): 1–6, in which we applied simple dynamic optimization to one of the world’s most important and vexing problems. With the solving of Fermat’s last theorem there’s still the continuum hypothesis, dealing with global warming, unifying relativistic gravity with quantum mechanics, and the question of when a losing hockey team should pull their goaltender for an extra skater. Seriously, I love this article, but it’s a little sobering that in a working lifetime of writing on finance and investing by far my most downloaded article (and the only one that got me on Malcolm Gladwell’s podcast) was on hockey!

Read

- I read Eugene Fama’s *Foundations of Finance* (New York: Basic Books, 1976) three times cover-to-cover over 3 years as his student, and then teaching assistant for 2 years after that. It seared many vital concepts and important habits (rigor! respect the data! data is a plural!) into my still-forming brain.
- Eugene Fama and Kenneth French’s 1992 and 1993 publications on the cross section of expected returns: “The Cross-Section of Expected Stock Returns,” *Journal of Finance* 47, no. 2 (June 1992): 427–465;

and “Common Risk Factors in the Returns on Stocks and Bonds,” *Journal of Finance Economics* 33 (1993): 3–56. People are still fighting about them (including me where I take issue with the size effect and think value should be measured a bit differently), but these are the articles that were most formative for the field we’re in today. And, as always, they’re a model of clear writing impressing with their economic arguments and data not their deft use of Ito’s lemma.

- Anything by Jack Bogle. Jack wasn’t as rigorous as many of us “quants.” But he had the habit of usually being right, and always being the most honest man in the room. The man could also write.

IMPORTANT INVESTMENT LESSONS LEARNED

Finding an investment strategy you believe in for the long term turned out to be the easy part. Sticking with it through its ups and downs turned out to be the hard (but doable) part.

IMPORTANT INVESTMENT EXPECTATIONS FOR THE FUTURE

Lower long-term returns on traditional stocks and bonds than we’ve grown used to. Higher long-term returns on out-of-favor simple strategies like international diversification and a value tilt.

ANY PROFESSIONAL REGRETS

I regret that I never had a disagreement I shied away from if I thought I was right, but rather always went at it full steam. Yes, I’m repeating myself, and yes you can be most proud and most

regretful of the same thing. Sometimes doing what you're proud of has consequences!

Also, that I don't think I'm ever going to really know how Jim Simons did it.

SUMMARY

Finding an investment strategy (it can be a group of many strategies) that you believe in, that isn't just data mining, that hasn't been arbitrated away or destroyed by some other kind of regime change, that isn't very correlated to traditional asset classes—that is, one that you essentially believe to be real and true and additive to a portfolio—turns out to be the easy part (and it isn't so easy). I didn't see this one coming!

The real world is messy. Returns are very fat-tailed at very short horizons (crashes are no fun!), and at medium term horizons, they trend more than you think (another kind of fat tail as trends lead to 2- to 3-year returns, both good and bad, bigger than you would expect from a nice simple imaginary independent and identically distributed [IID] world). Furthermore, if you're not Jim Simons real world risk-adjusted returns are not superhuman. Like most in our field we hope to do better than this, but if you can create a 0.5 Sharpe ratio strategy (the better behaved the better!) that's not correlated to overall market direction, you've basically created a second, but very diversifying, stock market. I don't think I need to spend much time convincing you that this would be awesome. International stock markets are great to add to a domestic portfolio (again, more later), but they are still very correlated to domestic ones. An independent investment as good as, say, the S&P 500, but uncorrelated with it, would be far better. Anyone who believed they created such a strategy would add it to their portfolio. Now it's living with it that's the challenge...

At the risk of being trite and obvious, running real life investment strategies is ridiculously harder than what you might think looking at a backtest (or even successful real-life realized returns). And I don't mean the aforementioned difficulties like data mining and possible regime change. I'm saying that even if you're very comfortable that you have minimized these things and adjusted for them in your going-forward assumptions, it's still going to be a killer to live with. When things have been tough for a while your clients will doubt you, the press will more than doubt you (and do so less fairly than clients!), and, worst of all, you will doubt you. Also, compliance departments are generally uncomfortable with any admission of reasonable doubt! But, the counter-case, no doubts ever, is only present in the insane (I don't want an investment manager, attorney, or chiropractor who is 100 percent free of self-doubt!). All of this will be harder if your strategy is truly doing something different from the herd. "Uncorrelated" is wonderful except when it's not working. When you fail, even for a little while, failing like everyone else is far easier even if the math says that is precisely the worst time to suffer. A paradox that is all too real.

The proper response—although way more difficult than I ever would've imagined at the start of my career—to this difficulty is some odd combination of open mindedness (reexamine all the evidence and economic arguments admitting you may have been wrong) but not so open that, as my mother-in-law says, your brains fall out! You have beliefs. They are strongly held and the result of economic logic and long-term lived and studied experience. They are not to be given up for light and transitory reasons. But they must be continually subjected to intense scrutiny (and not just when they're not working—it may be even more important to be self-cynical when they have been working like gangbusters).

You do this reexamination for yourself, and you do it to share it with the world. If you, with your presumably deep knowledge and study of your own strategies, need to occasionally review (and question) everything just to hang on, imagine how hard it is for an investor who believes in what you're doing but isn't nearly as close to it as you are. Communication at these times is a massively underrated part of success or failure.

In other words, the job of real world investing is just incredibly harder than you'd likely have guessed going in, even assuming that you're right about your strategies over the long term. Getting through these tough times and ultimately realizing the long-term potential of what you do is not an ancillary last item on the checklist—it's absolutely first order. Ironically, it may even be why certain strategies persist long term. In good times everyone asks, "if these are so great why aren't they arbitrated away?" Well, because in bad times they are incredibly hard to keep at. The difficulty in sticking with them is a bug, but also, for those who can do it, likely a major feature.

More generally, looking forward, long-term expected returns are likely (though not definitely, we simply don't see enough long-term periods!) sensitive to starting valuations, and realized past returns are extremely sensitive to the change in valuations over the period examined. This leads—both through some bad statistical work (simple expanding window average return estimates go up when returns have been incredibly good, and that's often when future medium- to long-term expected returns are lower) and emotion (come on, who isn't influenced by the last decade, that's an eternity!)—to some misguided, even backward, estimates of future expected returns.

Applying this logic in mid-2021, future long-term (say, 10 or more years) expected returns

on passive equities will be lower than recent and even past long-term experience. For bonds it says returns should be more like 1950–2021 than the bull market of 1983–2021 (here I'm referring to excess returns over cash—the absolute level of total returns should be much lower given where rates are today). It says the United States has beaten the rest of the world's equity portfolio largely on the strength of it getting much more expensive (paying more for the same earnings, sales, cash flow, etc.), and expecting that to continue seems to be folly (international diversification is still the right thing!). Finally, it says that classic strategies, like systematic value, have expected returns well above the returns realized over the last, say, 30 years, and a bit higher than even over the last 70 years.

None of this means the quantitative investing world shouldn't constantly strive to innovate and improve (we certainly do!). But if traditional asset classes are poised to deliver less for the ensuing long term, and simple dynamic strategies available to all, like systematic value, poised to deliver more, it has deep implications.

So, what to do? Well, work on finding an investment strategy you believe in. Don't be fooled by valuation changes (hey, this thing has gotten much more expensive or cheap, and that will go on forever!). Be willing to be different but not so different you can't survive (and, as discussed, survival is much harder than you think). Be very cynical. Be very worried that what you believe in might be the result of data mining, or period specific, or subject to a host of other pitfalls. Try hard to prove yourself wrong. Do it all the time, but recognize you'll be doing it most ardently when times are very tough, as that's human nature. Then, if you don't succeed at proving yourself wrong, but rather remain convinced you're right, stick with what you believe in like grim death. It will work out.

2007–CAMPBELL R. HARVEY

Professor of Finance, Duke University Fuqua School of Business



PROUDEST PROFESSIONAL ACCOMPLISHMENTS

- Editor, *Journal of Finance*, 2006–2012
- Fellow, American Finance Association, 2017
- Declaring that likely half the research findings in empirical finance are likely false (“. . . and the Cross-Section of Expected Returns.” *Review of Financial Studies* 29, no. 1 [January 2016]: 5–68).
- Inverted yield curves predict recessions (“The Real Term Structure and Consumption Growth.” *Journal of Financial Economics* 22, no. 2 [December 1988]: 305–33).
- Contributed to the development of:
 - Investment finance in emerging markets (“Predictable Risk and Returns in Emerging Markets.” *Review of Financial Statistics* 8, no. 3 [July 1995]: 773–816)
 - Models of time-varying risk (“Time-Varying Conditional Covariances in Tests of Asset Pricing Models.” *Journal of Financial Economics* 24, no. 2 [1989]: 289–317)
 - Importance of higher order risk like skewness (“Conditional Skewness in

Asset Pricing Tests.” *Journal of Finance* 55, no. 3 [June 2000]: 1263–95)

- Bridging the theory and practice of finance (“The Theory and Practice of Corporate Finance: Evidence from the Field.” *Journal of Financial Economics* 60, no. 2–3 [May 2001]: 187–243)

INFLUENTIAL INVESTMENT PUBLICATIONS

Written

- “Presidential Address: The Scientific Outlook in Financial Economics.” *Journal of Finance* 72, no. 4 (August 2017): 1399–440.
- “The Economic Implications of Corporate Financial Reporting” (with John Graham and Shiva Rajgopal). *Journal of Accounting and Economics* 40, no. 1–3 (December 2005): 3–73.
- “The Strategic and Tactical Value of Commodity Futures” (with Claude Erb). *Financial Analysts Journal* 62, no. 2 (2006): 69–97.

Read

- Russell, Bertrand. *Scientific Outlook*. London: George Allen and Unwin Ltd., 1931.

- Markowitz, Harry. “Portfolio Selection.” *Journal of Finance* 7, no. 1 (1952): 77–91.
- Nakamoto, Satoshi. “Bitcoin: A Peer-to-Peer Electronic Cash System.” 2008, <https://bitcoin.org/bitcoin.pdf>.

IMPORTANT INVESTMENT LESSONS LEARNED

The importance of economic incentives in shaping research.

IMPORTANT INVESTMENT EXPECTATIONS FOR THE FUTURE

My new book, *DeFi and the Future of Finance* (with Ashwin Ramachandran and Joey Santoro; Hoboken, NJ: Wiley, 2021), sketches a vision of finance in the future where the traditional banks, brokers, and insurance companies are replaced by decentralized algorithms.

ANY PROFESSIONAL REGRETS

Spending only 3 years at the University of Chicago during my doctoral studies. There was much more to learn.

SUMMARY

Be Skeptical of Asset Management Research

In my 35 years as an academic, as an adviser to many asset management companies, and as an editor of one of the top academic journals in finance, I now realize the crucial importance of the role incentives play in the production of research.

About 90 percent of the articles published in academic journals in the field of finance provide evidence in support of the hypothesis being tested (Harvey 2017). Indeed, my research shows that over 400 factors (strategies that are supposed to beat the market) have been published in top journals (Harvey, Liu, and Zhu 2016; Harvey and Liu 2020a). How is that possible? Finding alpha is very difficult.

Consider the following narrative (Harvey 2017). Academic journals compete with impact factors, which measure the number of times an article in a particular journal is cited by others. Research with a positive result (evidence supportive of the hypothesis being tested) garners far more citations than an article with non-results. Authors need to publish to be promoted (and tenured) and to be paid more. They realize they need to deliver positive results.

To obtain positive outcomes, researchers often resort to extensive data mining. In principle nothing is wrong with data mining if it is done in a highly disciplined way, but it is often not.

Researchers frequently achieve statistical significance (or a low p -value) by making choices. For example, many variables might be considered and the best ones are cherry-picked for reporting. Different sample starting dates might be considered to generate the highest level of significance. Certain influential episodes in the data, such as the global financial crisis or COVID-19 pandemic, might be censored because they diminish the strength of the results. More generally, a wide range of choices for excluding outliers is possible as well as different winsorization rules. Variables might be transformed—for example, log levels, volatility scaling, and so forth—to get the best possible fit. The estimation method used is also a choice. For example, a researcher might find that a

weighted least squares model produces a better outcome than a regular regression.

These are just a sample of the possible choices researchers can make that all fall under the rubric of *p*-hacking. Many of these research practices qualify as research misconduct but are hard for editors, readers, and investors to detect. For example, if a researcher tries 100 variables and only reports the one that works, that is research misconduct. If a reader knew 100 variables were tried, they would also know that about five would appear to be significant purely by chance. Showing that a single variable works would not be viewed as a credible finding.

To compound the problem, researchers do a poor job in controlling for luck. Suppose a researcher does not engage in *p*-hacking and fully reports that 100 variables were tried. The researcher claims five are significant, yet we know by random chance that five should appear to be significant. Although statistical methods to account for the number of variables tried are available, they are rarely used (Bailey and Lopez de Prado 2014; Harvey and Liu 2014, 2015).

The incentive problem, along with the misapplication of statistical methods, leads to the unfortunate conclusion that probably half of the empirical research findings in finance are likely false.

Incentives also differ across academic institutions. The very top schools do not count just a faculty member's number of publications. These schools also look for publications that will have a lasting impact. The paper that tries 100 variables and cherry-picks the most significant one is unlikely to have a lasting impact, because the result is probably a fluke and further research will uncover its fragility. The vast majority of academic institutions, however, do only count the number of publications for promotion decisions.

We can find an important lesson here. A peer-reviewed article should be trusted more than a non-peer-reviewed article, but skepticism of peer-reviewed publications is also warranted.

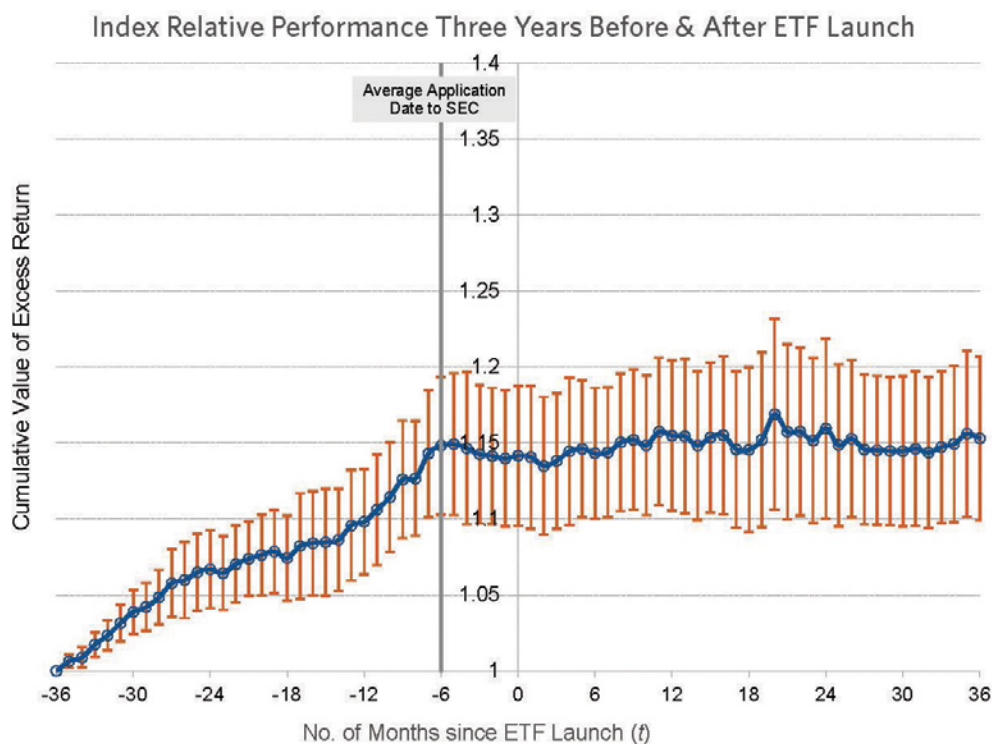
Of course, this problem spills over to the practice of finance. How many ETFs have been launched that claim to be based on peer-reviewed research published in the finest academic journals (**Figure 1**)? Little do investors realize that peer-reviewed research could have been *p*-hacked to such an extent that the results are unlikely to repeat out of sample. Indeed, the evidence points very starkly to this phenomenon (Brightman, Li, and Liu 2015).

Does the research conducted by asset management companies suffer from the same problems? The answer depends, again, on incentives.

One company might comb through the academic research and do its own data mining in order to launch many ETFs, fully knowing some will fail. Nevertheless, the company receives a fixed fee. Given the large number of funds launched, most remember the winners more than the losers.

Consider another company that has two high-quality researchers, let's call them A and B. Both of them pitch ideas to the CIO, and the CIO considers both research ideas promising. The research is conducted with great care and without *p*-hacking. A's idea shows great promise when applied to the data. B's idea fails. A's idea goes into live trading.

In my example, both A and B are equally high-quality researchers. The asset management firm makes a big mistake if A is promoted or given an extra bonus—or, even worse, B is terminated. Such treatment leads to a dysfunctional research culture in which, at the beginning of a research project, both A and B realize they need to deliver “significant” results in order to be

FIGURE 1. THREE-YEAR CUMULATIVE RELATIVE INDEX PERFORMANCE BEFORE AND AFTER ETF LAUNCH

Sources: Research Affiliates, LLC, using data from Bloomberg.

promoted, or possibly be retained, at the company. They may respond to these incentives by beginning to data mine and *p*-hack.

I believe *p*-hacking is less of a problem in asset management than in academia. The reasons are simple. First, in the presence of a performance fee, the asset management company's research needs to be optimized in a way that maximizes the chances of repeatable performance (Harvey and Liu 2018). This means the asset manager does not choose the best backtest, because it is likely the best because of overfitting and luck. If the manager launches a backtest-overfitted strategy, it will likely fail and no performance fees will be generated. The second reason is

reputation. Academic tenure has no equivalent in asset management. If an asset manager's products disappoint because of overfitting, the firm's investors will redeem. This market mechanism naturally minimizes the overfitting. That said, there is a lot of low-quality research in the practice of asset management. Similar to the academic research, investors need to be skeptical.

How Can We Improve?

The problem of *p*-hacking is not unique to finance. Indeed, many other academic areas are realizing they have this problem and are taking steps to address it. Indeed, the cost of the

p -hacking is arguably much higher in medical research—where a study’s results might mean the difference between life and death—than in finance where the primary concern is the size of the alpha. Curiously, we are experiencing an ongoing debate in academic finance about whether p -hacking in financial research is a crisis. Our field is not unique compared to other fields and does not warrant a free pass (Harvey and Liu 2021, and Bailey and Lopez de Prado 2021).

Investors can take a number of steps to mitigate the problem. First, be skeptical of both academic and practitioner research. Often a predetermined agenda or incentives make the results seem stronger than they are. Second, take the research culture into account. For example, when presented with a new strategy, ask if the company keeps a record of all variables that were tried. Third, try to quantify the costs of different mistakes (selecting a bad manager versus missing a good manager) (Harvey and Liu 2020b). Fourth, make sure the strategy has a solid economic foundation. Also, beware of *ex post* theorizing (after discovering the result, a story is concocted). Fifth, strategically ask questions such as, “Did you try X?” If the answer is “Yes, and it does not work,” and X is not reported, this is a red flag. On seeing one cockroach, you can safely assume a dozen are behind the wall.

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2008—KEITH AMBACHTSHEER

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Executive-in-Residence, Rotman School of Management, University of Toronto
Cofounder, CEM Benchmarking Inc.⁷
Cofounder, KPA Advisory Services Ltd.⁸



PROUDEST PROFESSIONAL ACCOMPLISHMENTS

- Provided empirical evidence that security analysts have modest capabilities to predict future alphas
- Thought leadership in developing investment policies for pension organizations
- Thought leadership in developing governance and organization design principles and practices for pension organizations

INFLUENTIAL INVESTMENT PUBLICATIONS

Written

- “Can Active Management Add Value?” (with James Farrell). *Financial Analysts Journal* 35, no.6 (Nov–Dec 1979): 39–47.
- “Pension Fund Asset Allocation: In Defense of a 60-40 Equity-Debt Asset Mix.” *Financial Analysts Journal* 43, no. 5 (Sep–Oct 1987): 14–24.

⁷CEM measures “value-for-money” outcomes for many of the globe’s largest pension organizations.

⁸KPA provides strategic advice to many of the globe’s largest pension and asset management organizations.

- *The Future of Pension Management: Integrating Design, Governance, and Investing*. Hoboken, NJ: Wiley, 2016.

Read

- Hodges, Stewart, and Richard Brealey. “Portfolio Selection in a Dynamic and Uncertain World.” *Financial Analysts Journal* 29, no. 2 (Mar–Apr 1973): 58–69.
- Keynes, John Maynard. “The State of Long-Term Expectation.” In *The General Theory of Employment, Interest, and Money*, 147–64. New York: MacMillan & Co, 1936.
- Drucker, Peter. *The Unseen Revolution*. New York: Harper and Row, 1976.

IMPORTANT INVESTMENT LESSONS LEARNED

Integrating the wisdom of John Maynard Keynes, who pointed to the fundamental dichotomy between short-term “beauty contest” trading and long-term “wealth-creating” investing, and of Peter Drucker, who asserted that effective investment organizations understand the difference between the two and choose the latter.

IMPORTANT INVESTMENT EXPECTATIONS FOR THE FUTURE

Continued acceleration in the transitions to long-term sustainable investment practices by effective investment organizations.

ANY PROFESSIONAL REGRETS

The two visionaries who inspired me most are economist John Maynard Keynes and management philosopher Peter Drucker. I had a live visit with Drucker in July 2005, when he was 95 years old. He died in November of that year. Sadly, I missed Keynes, who died at the much younger age of 63 in 1946. I was only 4 years old at the time.

SUMMARY

Rethinking Investing: My 50-Year Journey

“It is not the case of choosing those investments that, to the best of one’s own judgement, are really the most attractive, nor even those that average opinion genuinely thinks the most attractive. We have reached the third degree where we devote our intelligences to anticipating what average opinion expects average opinion to be....”

Adapted from John Maynard Keynes, The General Theory of Employment, Interest, and Money, 1936

“The institutions we have created to administer and invest pension

monies must have adequate management and be rendered legitimate. They must be autonomous institutions, be accountable to their constituencies, and free from any suspicion of conflict of interest.”

Peter Drucker, The Unseen Revolution, 1976

After Royal Military College of Canada and a brief military career in the 1960s, I immersed myself in post-graduate economics and then joined Sun Life Financial. My job was to understand modern portfolio theory (MPT) and assess its relevance to investing Sun Life’s own assets, and those of its clients. To start, I do two things: (1) Read the MPT literature and meet its academic creators, and (2) Understand institutional investing as it was practiced in the late 1960s/early 1970s.

I quickly discovered that MPT and real world institutional investing at that time lived in parallel universes. MPT assumed known return parameters and risk tolerances. Further, if all market participants had access to all available information and processed it identically, markets would be price-efficient and lead to the efficient markets hypothesis (EMH). In contrast, real world institutional investors believed they had a competitive advantage in attaining and using information that would produce excess returns (i.e., alpha) for them and their clients. They were mainly the “beauty contest” investors Keynes wrote about in his 1936 opus *The General Theory*.

So, whose investment beliefs to believe? The academics embedded in the EMH or the professionals embedded in beauty contest investing? I found that investment professionals could generate positive but low correlations

between their predictions and actual outcomes (i.e., more like 0.2 than 0.8).⁹ Was such limited predictive ability sufficient to generate positive portfolio alphas? In a 1979 *Financial Analysts Journal* article titled “Can Active Management Add Value?,” Jim Farrell and I provided a “yes” answer to that question, but only if the low quality of the predictions was explicitly recognized.

In fact, the low prediction quality reality was generally not recognized in how portfolios were managed in the 1970s. The combination of too much turnover and too high fees produced mostly negative rather than positive alphas in that decade. That set the stage for the triumph of the academics and their EMH: the introduction of low-cost, low-turnover index funds, with Vertin Award recipient Jack Bogle leading the way.

Enter Drucker and Keynes

That *Financial Analysts Journal* article marked my exit out of applied portfolio theory into the broader space of the design and management of retirement income systems. Peter Drucker’s 1976 book *The Unseen Revolution* provided the inspiration. He argued that workers would become the owners of the means of production not through Karl Marx’s violent revolution, but through their pension plans. Who would manage these pension plans? Drucker visualized high-quality, arms-length pension organizations governed under fiduciary umbrellas requiring them to generate pension wealth in the sole best interest of plan participants. Fast-forwarding to today, that kind of organization is no longer just a figment of Drucker’s imagination. They now exist in the real world—more on this later.

⁹With the active support of Vertin Award recipients Jack Treynor and Peter Bernstein, my modest contribution to the investment literature in the 1970s was to name these correlations *information coefficients*, or ICs for short.

What about the investment beliefs of these Drucker pension organizations? Should they simply accept the EMH and manage their retirement savings pools passively? Or should they rethink the meaning of active management? Personally, I chose the rethink option, inspired by the great economist John Maynard Keynes. While I had read parts of his 1936 opus *The General Theory of Employment, Interest, and Money* during my graduate study years, I had somehow missed Chapter 12 titled, “The State of Long-Term Expectation.” Belatedly reading it in the 1980s, I realized there was much more to investment beliefs than either those embedded in the EMH, or those that drove professional active management in the 1970s.

Keynes did not write Chapter 12 as an academic, but as the hands-on manager of Cambridge University/King’s College Endowment Fund. His three key insights were:

- Investment professionals seem to be continuously engaged in beauty contests, trying to outwit each other in predicting which stocks investors will find most attractive a few quarters hence.
- Real investing is based on understanding how well (or poorly) businesses allocate capital to be sustainably profitable over the long-term, and to focus the portfolio on companies that score well on this basis.
- Most investment committees seem to prefer being beauty contest conformists—“preferring to fail conventionally to succeeding unconventionally.”

And how well did Keynes do with this unconventional long-term approach to investing? Cambridge University’s David Chambers and Elroy Dimson estimate Keynes’s alpha to be an astounding 8 percent per year over the

1921–1946 period.¹⁰ I also learned that Keynes was not alone in producing extraordinary results using unconventional long-term approaches to investing. Multiple studies of this approach to investing reached similar conclusions. These findings, along with the accelerating institutional shift toward sustainable finance, are now redefining active management and lengthening investment time horizons.

The Birth of the Canadian Pension Model

What happens when you integrate Drucker’s ideas on organization design with Keynes’s ideas on investing? An opportunity to address this question arose in the late 1980s when the Canadian Province of Ontario assembled a taskforce to improve the functioning of its public sector pension plans. The taskforce recommended the Drucker pension organization model with its strong governance function that would be able to create and oversee a Keynes-type investment organization.¹¹ The treasurer of the province and the president of the Ontario Teachers’ Federation bought into the recommendation, leading to the creation of the Ontario Teachers’ Pension Plan (OTPP) in 1990.

A strong, diverse professional board of directors was assembled, who hired an entrepreneurial CEO, who in turn attracted a team of talented investment and pension administration professionals. OTPP started life with a \$20 billion portfolio of non-marketable Ontario bonds. Today it is fully funded, largely internally managed, with a \$220 billion portfolio diversified across multiple asset classes in the public and

private markets of 50 countries. Its net annual return since inception is 9.6 percent versus an equivalent risk reference portfolio return of 7.9 percent. Benchmarked against international peer groups, OTPP’s investment and benefit administration performance metrics are among the highest in the world.¹²

These developments did not go unnoticed. At first, other Canadian funds started to emulate OTPP. Then, slowly, major funds outside Canada also began to take notice. A 2012 article on these developments in *The Economist* publication, titled “Maple Revolutionaries,” received widespread attention. The article noted “these Canadian funds have won the attention of both Wall Street, which considers them rivals, and of institutional investors, which aspire to be like them.” Peter Drucker’s 1976 *Unseen Revolution* was unseen no longer.¹³

Lessons Learned . . . and Where to from Here?

What lessons are embedded in this 50-year journey? Three come to mind:

- Active management can indeed add value, but not through the still popular beauty contest route Keynes called out back in 1936.
- Instead, it requires building and sustaining arms-length fiduciary organizations that have the motivation, the governance capability, the investment skills, and the scale to be effective.

¹⁰See Chambers, David, and Elroy Dimson. “Retrospectives: John Maynard Keynes, Investment Innovator.” *Journal of Economic Perspectives* 27, no. 3 (Summer 2013): 213–28.

¹¹I was an adviser to the Rowan taskforce. Its report, “In Whose Interest?” was published in November 1987.

¹²From the 2020 OTPP Annual Report.

¹³See Ambachtsheer, Keith. “The Canadian Pension Model: Past, Present, and Future.” *Journal of Portfolio Management Investment Models* 47, no. 5 (April 2021): 150–58, for the full story. The article was written at Vertin Award recipient Frank Fabozzi’s invitation.

INVESTMENT LUMINARIES AND THEIR INSIGHTS

- Such organizations do not appear out of thin air. History shows it takes active leadership to build and sustain them.

And where does investing go from here? I offer three related thoughts:

- Climate change is no longer a known unknown. Scientific evidence confirms it has become the number one known threat to a livable planet Earth.
- The global finance sector must play a major role in the massively complex transition to the coming global zero greenhouse gas emissions economy.
- Through their financing and active ownership actions, the fiduciary-motivated,

skilled investment organizations that have evolved over the course of the last 30 years can and must play critical leadership roles in executing this transition on which so much depends over the next 30 years.

In closing, although the context was very different, Winston Churchill's words come to mind as Britain faced Nazi Germany alone in 1940. Paraphrasing him: "Let us therefore brace ourselves to our duties, so that if this planet lasts for yet another thousand years, historians will still say the 2021–2030 decade was the global finance sector's finest hour."

2009—ROBERT J. SHILLER

*Sterling Professor of Economics, Yale University
Advisor, Barclays Bank, S&P Global, Chicago
Mercantile Exchange*



PROUDEST PROFESSIONAL ACCOMPLISHMENTS

- I grew from being a believer in efficient markets theory to becoming an expositor of a view that it is only a half truth, to being a promoter of extension of the realistic reach of finance and of behavioral finance. For 25 years Richard Thaler and I held National Bureau of Economic Research workshops on behavioral economics.
- Online course “Financial Markets,” free to the world on Yale-Coursera.
- Author, *Finance and the Good Society* (Princeton, NJ: Princeton University Press, 2012)—about how finance has already made vast improvements in perennial economic problems (such as reducing capricious economic inequality and promoting economic growth) and how finance can do much more in the future.
- Author, *Irrational Exuberance* (Princeton, NJ: Princeton University Press, 2000, 2005, 2015)—about understanding changing market sentiment in stock, housing, and bond markets since 1890.

- With my former student John Y. Campbell, “The Dividend-Price Ratio and Expectations of Future Dividends and Discount Factors” (*Review of Financial Studies* 1, no. 3 [Autumn 1988]: 195–228)—allows a decomposition of variance to speculative fluctuations.
- With my colleague Karl E. Case, a repeat-sale real estate price index method that is now calculated by CoreLogic for S&P Global, for the S&P/CoreLogic/Case-Shiller Home Price Index, that has been copied by index providers around the world and is the basis for futures and options markets at the Chicago Mercantile Exchange.

INFLUENTIAL INVESTMENT PUBLICATIONS

Written

- Nobel Prize Lecture, “Speculative Asset Prices.” Stockholm University, December 8, 2013.
- Presidential Address, American Economic Association, “Narrative Economics” (2017), later turned into a book with the same title (Princeton, NJ: Princeton University

INVESTMENT LUMINARIES AND THEIR INSIGHTS

- Press, 2019), argues that a major cause of uncertainty in markets is the epidemic-like transmission among the general public of motivating narratives—stories with human interest that change our thinking patterns.
- “Do Stock Prices Move Too Much to Be Justified by Subsequent Changes in Dividends?” *American Economic Review* 71, no. 3 (June 1981): 421–36, an article that is still controversial, but I believe really does suggest other ways of thinking about market fluctuations. Also, “The Use of Volatility Measures in Assessing Market Efficiency.” *Journal of Finance* 36, no. 2 (May 1981): 291–304.
 - “The Efficiency of the Market for Single Family Homes” (with Karl E. Case). *American Economic Review* 79, no. 1 (March 1989): 125–37. We should have said *inefficiency*. This was the debut of the Case-Shiller Home Price Indices.
 - “Arithmetic Repeat Sales Price Estimators.” *Journal of Housing Economics* 1, no. 1 (March 1991): 110–26—describes home price index construction methodology closer to value-weighted stock price indices.
 - My former student Allan Weiss joined us in 1991 to found Case Shiller Weiss, Inc., and used our indices to offer the first online estimates of individual home value. The firm is now part of CoreLogic, Inc.
 - With George Akerlof, *Animal Spirits: How Human Psychology Drives the Economy, and Why It Matters for Global Capitalism*. Princeton, NJ: Princeton University Press, 2009.
 - With George Akerlof, *Phishing for Phools: The Economics of Manipulation and Deception*. Princeton, NJ: Princeton University Press, 2016.
 - “A 30-Year Perspective on Property Derivatives: What Can Be Done to Tame Property Price Risk?” (with Frank J. Fabozzi and Radu Tunaru). *Journal of Economic Perspectives* 34, no. 4 (Fall 2020): 121–45. Fabozzi, another winner of the Vertin Award, and Tunaru and I have written four articles on how institutional change can help households manage real estate risk.
 - Smith, Adam. *The Theory of Moral Sentiments*. London: George Bell and Sons, 1759—about the human nature that underlies the success of market economies, predecessor to his more famous *The Wealth of Nations*. London: W. Strahan and T. Cadell, 1776.
 - Wilson, E. O. *Consilience: The Unity of Knowledge*. New York: Vintage Books, 1998. Wilson, a biologist, argues that we professionals all must be amateur enthusiasts for other disciplines, as the diversified inspiration from outside is essential to our success as innovators. My psychologist wife Virginia Shiller, who has been an intellectual resource for me, and I together expanded on his theme in “Economists as Worldly Philosophers.” *American Economic Review* 101, no. 3 (May 2011): 171–75.
 - Markowitz, Harry. “Portfolio Selection.” *Journal of Finance* 7, no. 1 (March 1952): 77–91, wherein Markowitz was stepping out of the world of finance, as it then was conceived, to establish a new paradigm.

Read

IMPORTANT INVESTMENT LESSONS LEARNED

As Adam Smith recounted in 1759, we can normally rely on others because of a desire among normal adults for praiseworthiness, not just a desire for comforts or a desire to be praised. One must judge the character of investment advisers to see if they express this normal sentiment. As Akerlof and I wrote in *Phishing for Phools*, there are so many opportunities for manipulation and deception in business that we must rely on this better side of human nature.

IMPORTANT INVESTMENT EXPECTATIONS FOR THE FUTURE

At this point in history, August 2021, I see an unusually left-skewed probability distribution¹⁴

of future real returns in the United States and some other countries for all three major asset classes: stocks, bonds, and real estate.

ANY PROFESSIONAL REGRETS

I only wish I had savored great moments in my professional life more and allowed more time to develop relationships with students and fellow professionals when there was plenty of time. I would also quote the immortal words of ancient poet Horace, *carpe diem!*

SUMMARY

It is hard to summarize what has been for me a life adventure. I have been witness to great progress in finance and economics, and yet much more remains to be done.

¹⁴See <https://www.cboe.com/us/indices/dashboard/skew/>.

2010—ROGER G. CLARKE

President of Ensign Peak Advisors, Inc. (1997–2020)



PROUDEST PROFESSIONAL ACCOMPLISHMENTS

- The transfer coefficient and 130/30 strategies. The addition of the transfer coefficient (TC) as a component of the fundamental law of active management in building a portfolio captured the effect of constraints on the expected incremental return from information. The 130/30 strategy increases the TC and the potential usage of information by relaxing the long-only constraint in building portfolios.
- The measurement and use of “pure equity factors” in building equity portfolios. Some equity factors have experienced positive relative or risk-adjusted returns over the long term. If an investor wants exposure to those factors, there is an incremental benefit to jointly optimizing multiple factors in building a portfolio versus merely combining single-factor portfolios together.
- Demystifying low volatility, minimum variance, risk parity, and maximum diversification strategies. Portfolios resulting from these different objective functions have some similarities and some differences. The derivation of analytical solutions incorporating long-only constraints allowed for easier practical applications. The work also highlighted that low volatility strategies are essentially low beta strategies.

INFLUENTIAL INVESTMENT PUBLICATIONS

Written

- Clarke, R., H. de Silva, and S. Thorley. “Portfolio Constraints and the Fundamental Law of Active Management.” *Financial Analysts Journal* 58, no. 5 (September/October 2002): 48–66.
- Clarke, R., H. de Silva, and S. Sapra. “Toward More Information-Efficient Portfolios: Relaxing the Long-Only Constraint.” *Journal of Portfolio Management* 31, no. 1 (Fall 2004): 54–63.
- Clarke, R., H. de Silva, and S. Thorley. “Fundamentals of Efficient Factor Investing.” *Financial Analysts Journal* 72, no. 6 (November/December 2016): 9–6.
- Clarke, R., H. de Silva, and S. Thorley. “Risk Parity, Maximum Diversification and Minimum Variance: An Analytic Perspective.” *Journal of Portfolio Management* 43, no. 4 (Spring 2013): 39–53.

Read

- Sharpe, William. “Capital Asset Prices: A Theory of Market Equilibrium under Conditions of Risk.” *Journal of Finance* 19, no. 3 (September 1964): 425–42.

- Markowitz, Harry. “Portfolio Selection.” *Journal of Finance* 7, no. 1 (March 1952): 77–91.
- Haugen, Robert, and A. James Heins. “Risk and the Rate of Return on Financial Assets: Some Old Wine in New Bottles.” *Journal of Financial and Quantitative Analysis* 10, no. 5 (December 1975): 775–84.
- Grinold, Richard. “The Fundamental Law of Active Management.” *Journal of Portfolio Management* 15, no. 3 (Spring 1989): 30–38.

IMPORTANT INVESTMENT LESSONS LEARNED

Asking the question, “What do I believe in strongly enough that I am willing to risk the investment assets of the organization based on those beliefs?” in relation to:

1. Uncertainty and investor decision making
2. The real economy
3. Capital markets
4. Risk management

IMPORTANT INVESTMENT EXPECTATIONS FOR THE FUTURE

The impact of the substantial monetary liquidity and fiscal spending on the level of financial system stability, inflation, and economic activity.

ANY PROFESSIONAL REGRETS

None.

SUMMARY

“What do I believe in strongly enough that I am willing to risk the investment assets of the organization based on those beliefs?” I have grouped my fundamental beliefs into several broad categories along with some observations that have guided much of my investment career in managing large institutional portfolios.

Uncertainty and Investor Decision Making

- Uncertainty about the future is at the heart of the investment process. Current risks are eventually resolved but are always replaced with something new. The future never goes away.
- Past history and theory may be suggestive of future patterns and tendencies, but they should be tempered by current conditions—nothing is guaranteed to happen exactly as it has in the past.
- Expected returns are not guaranteed nor are risks always rewarded; periods of disappointment are inevitable. It is helpful to think through in advance how to react to disappointing results to avoid poorly thought-through actions.
- Even though the ability to predict the future with precision is limited, investors cannot avoid forming opinions and expectations as a basis for making decisions.
- Behavioral biases can affect the formation of investor expectations and subsequent decision making (i.e., overconfidence, recency bias, comfort in consensus, confirmation bias, and status quo bias). These tendencies are often quite resistant to change.
- Tolerance for risk is influenced both by the fear of losing and the fear of losing out.

These fears are often stronger than long-term resolve.

The Real Economy

- The underlying real economy provides the foundation of cash flows for the fundamental value of financial assets.
- Competitive economies change and grow, but the path of growth is not necessarily smooth over time. Extremes tend to reverse as economic excesses reach their limits and people adapt.
- Monetary and fiscal policies can influence the path of the economy through the cost and supply of credit, as well as fiscal stimulus and regulatory changes.
- Major changes in the underlying real economy tend to unfold sequentially as it takes time for consumers and businesses to adjust.

Capital Markets

- Open and competitive markets are dynamic and adaptive—they respond quickly to changes in investor expectations.
- Markets anticipate and often magnify the effects of underlying economic realities, which results in periodic extreme market volatility.
- Markets often provide feedback loops thus generating reactions in the underlying economy by government, businesses, and consumers.
- The ownership of equity securities allows investors to participate in the long-run growth of the economy.
- Changes in monetary policy, credit availability, and inflation expectations are likely to affect nominal interest rates.

- Markets are ultimately anchored to reasonable fundamental valuation whereas periodic excesses in markets are generally not permanent but tend to self-correct over time.
- Uncertainty leaves room for substantial differences of opinion about the future course of events and for investor judgment about the “fair” value of securities.

Risk Management

- The major drivers of asset returns tend to be economic growth and inflation. Investor expectations about these conditions help determine the expected risk premiums of assets.
- Diversification among the economic drivers of asset returns can balance the impact of changing economic conditions.
- If the strategic asset allocation of a portfolio is designed to ride through periodic market downdrafts, the allocation helps support the long-term continuity and staying power of an investment strategy.
- The volatility of returns for most diversified portfolios is dominated by core asset exposures: equity, interest rates, credit, and foreign exchange.
- Some liquidity is important for managing a portfolio through time. Tiered liquidity levels in a portfolio help accommodate the need for cash as it occurs.

I think that the most important investment expectation for the future is the impact of the substantial monetary liquidity and fiscal spending on the level of financial system stability, inflation, and economic activity. Expected risk premiums seem to be currently below average suggesting below-average returns over some period in the future. The timing and duration of those below-average returns are not clear.

2012—ELROY DIMSON

Professor of Finance, Cambridge Judge Business School
Emeritus Professor of Finance, London Business School



PROUDEST PROFESSIONAL ACCOMPLISHMENTS

- Co-compiler of the DMS global investment returns database,¹⁵ which now includes annual returns for 90 countries over 121 years.
- Originator of the Dimson beta for measuring risk when securities are traded asynchronously.
- Coauthor of “Active Ownership,” the first evidence on the impact of social and environmental engagement in a top finance journal, widely quoted by environmental, social, and governance (ESG) investing experts.

INFLUENTIAL INVESTMENT PUBLICATIONS

Written

- “Risk Measurement When Shares Are Subject to Infrequent Trading.” *Journal of Financial Economics* 7, no. 2 (1979): 197–226.

¹⁵See <https://impact.ref.ac.uk/casestudies/CaseStudy.aspx?Id=44521>.

- Dimson, Elroy, Paul Marsh, and Mike Staunton. *Triumph of the Optimists*. Princeton, NJ: Princeton University Press, 2002.
- Dimson, Elroy, Oğuzhan Karakaş, and Xi Li. “Active Ownership.” *Review of Financial Studies* 28, no. 12 (December 2015): 3225–68.

Read

- Fama, Eugene. “Efficient Capital Markets: A Review of Theory and Empirical Work.” *Journal of Finance* 25, no. 2 (1970): 383–417.
- Treynor, Jack, and Fischer Black. “How to Use Security Analysis to Improve Portfolio Selection.” *Journal of Business* 46, no. 1 (1973): 66–86.
- Roll, Richard, and Stephen Ross. “An Empirical Investigation of the Arbitrage Pricing Theory.” *Journal of Finance* 35, no. 5 (1980): 1073–103.

IMPORTANT INVESTMENT LESSONS LEARNED

I learned the value of blending theory with practice. Almost all my research has been informed by practical experience, and my investment experience has contributed to and had synergies with my research.

IMPORTANT INVESTMENT EXPECTATIONS FOR THE FUTURE

Given the importance of ESG issues, responsible investing is here to stay. However, superficial box-ticking approaches to ESG are a fad, and I anticipate major advances in this area.

ANY PROFESSIONAL REGRETS

Other than doctoral candidates, I have only ever taught students with work experience—MBAs, executives, businesspeople—but never an undergraduate. Was that a regrettable error?

SUMMARY

I have been fortunate to meet and learn from many of the founders of modern finance. But my passion—learned in part from several Vertin Award winners—is taking the long view. In my opinion, Winston Churchill was correct when he said, “*The farther backward you can look, the farther forward you are likely to see.*” Translated into an investment context, this is saying that estimates based on extensive data almost always beat those based on limited data.

This focus on the long term was initially a personal discovery, however. I had joined London Business School (LBS) as a doctoral student in 1972. My faculty mentors were Richard Brealey, author of *Introduction to Risk and Return from Common Stocks*, the first modern textbook in investment, published in 1969, and Robert Hamada, who was a visiting professor at LBS. They opened my eyes to insights that came from the finest financial economists and investment practitioners.

In 1972, Dick Brealey informed me about a UK stock return dataset he was working on in conjunction with a British stockbroking firm and encouraged me to replicate Bill Sharpe’s studies on market risk. The data suffered from infrequent trading on the London Stock Exchange. However, I persevered, and shared my ideas with Bill and other academics who I met at the end of 1973 at the American Finance Association. I received especially helpful responses in letters from Fischer Black—this being long before the era of fast communications. I submitted my paper to a conference being organized by Ned Elton and Marty Gruber in Garmisch-Partenkirchen, Germany, and presented it there. My solution came to be known as the Dimson beta (not a name I chose; it was Dick Roll’s idea in a *Journal of Finance* article).

Meanwhile, Bob Hamada had taken LBS’s doctoral students rigorously through a prepublication edition of Fama and Miller’s *The Theory of Finance*. I had by then taken an interest in initial public offerings on the London Stock Exchange, so Bob procured a PhD dissertation proposal by Roger Ibbotson. Roger had formulated a clever way for investigating the pricing of initial public offerings in the United States, and I was captivated by his ideas. I seized on British initial public offerings (IPOs) as the focus for my dissertation research.

My biggest debt, however, is to my friend and coauthor Paul Marsh, who was also an LBS student of Dick Brealey and Bob Hamada. In the 1970s, non-US evidence was sparse, so our research used the UK stock market database that we were assembling at LBS. We developed methods for risk estimation that we published in *Journal of Finance*, while also launching LBS’s *Risk Measurement Service*, a publication we have produced for 43 years. Those initiatives took us into index design.

In the early 1980s we initiated a total market index, designed a family of size-based benchmarks, and did the research for what became the FTSE 100 index. With our colleague Mike Staunton, we assembled a worldwide family of stock and bond indexes that now measures long-term historical returns for 38 markets, running in most cases from 1900 to the present. Our global research attracted practitioner attention after our book, *Triumph of the Optimists*, was published by Princeton University Press. Our work has been extended in 22 successive yearbooks, and Morningstar distributes the DMS (Dimson-Marsh-Staunton) index series, including our 121-year, 90-country world stock market index.

Like other Vertin Award winners, much of my research has involved working closely with peers. I knew Christophe Spaenjers as an academic visitor to LBS, David Chambers as a Cambridge colleague and coauthor, and Antti Ilmanen through my role chairing the Strategy Council for Norway's sovereign fund. They collaborated with me in studying the long-term returns from less conventional assets such as fine wines, investment-grade postage stamps, artworks, and other collectibles. I worked with them on evaluating the investment expertise of great investors such as John Maynard Keynes, studying the performance over more than 100 years of the most celebrated endowments, and developing a strategy for the world's biggest sovereign wealth fund.

Starting in 2009, I studied ESG issues jointly with Oğuzhan Karakaş and Xi Li for a paper on active ownership that was subsequently published in *Review of Financial Studies*. It provided insights from when I was chairman of the Strategy Council for the Norwegian Government Pension Fund Global on how to structure Norway's approach to responsible

investing. Together with studies using data generously provided by Principles for Responsible Investment, we have had a discernible influence on how asset owners can best influence investee companies and benefit the wider community, especially through participating in coordinated engagements. I have also written recently on endowment strategy, art investment, ESG ratings, exclusionary screening, fossil fuel divestment, and several related topics.

What else have I learned? Confronted with a big task many people feel overwhelmed. The challenge of writing a complete article, a case study, or a consulting report is initially overwhelming. Epic projects can be grueling; bite-sized assignments can be less daunting. Another coauthor, Stefan Nagel, once explained to me his strategy as a marathon runner. He divides the task into segments: from the starting line to the church, from the church to the school, from the school to the traffic lights, and so on. He writes articles following the same process, building up his research bit by bit. Professional investment research can be tackled the same way. We often need to prepare written documents and discover a work style that can make writing more enjoyable.

Looking back, I have retained a number of personal beliefs: (1) You can't win a lottery unless you buy a ticket—you have to take the important first step; (2) never do today what you can leave till tomorrow—prioritize crucial tasks and postpone trivia; (3) don't write articles that are mere footnotes—focus on big issues, not details; (4) finally, a good presentation is like a Christmas pantomime—ideally, your ideas should excite both experts (adults) and generalists (children).

My Investment Expectations

My investment expectations for the future fall into three clusters: return, risk, and

responsibility. Returns may differ from person to person and across institutions. Some reasons for this are disagreement about corporate prospects, differing tax burdens, transaction costs, and asset management fees. Tax burdens vary by geography and by individual tax status. Annualized costs vary when the bid-ask spread must be amortized over holding periods of varying duration. Fees are larger when the managerial task involves detailed analysis and costly intermediation. Expected returns from similar assets can therefore differ. One size will not fit all.

Risk is an unavoidable facet of investing. However, perceptions of risk can also be personal. To digress to when I was researching wine investment, I would often hear that one of the benefits of this asset class is that if the investment doesn't work out financially, it can always be consumed. This light-hearted observation highlights an important truth. Risk differs across assets and reflects the values of individual investors, it has to be viewed in relation to liabilities and expectations, and of course risk aversion varies across owners.

In a world with low interest rates, the price for investments that offer a nonpecuniary reward is bid up. When prices are elevated, subsequent financial returns are likely to be smaller. This applies not only to conventional financial assets, but also to real estate and aesthetic investments. Currently, businesses with strong social credentials and high aspirations for sustainability are attractive to many investors. Asset owners are therefore willing to pay more (and hence receive lower financial returns) for companies that are managed responsibly.

Based on these three factors—risk, return, and responsibility—I draw two conclusions. First, in

contrast to the traditional doctrine of portfolio theory, portfolio composition should reflect the tastes of investors. Second, if investor preferences are shared widely, then expected returns are likely to be impaired for the most attractive stocks.

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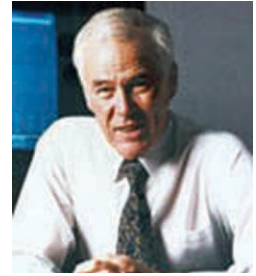
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Dimson, Elroy, Christophe Spaenjers, and Peter Rousseau. "The Price of Wine." *Journal of Financial Economics* 118, no. 2 (2015): 431–49.

2013—RICHARD GRINOLD (WITH RONALD N. KAHN)

Advisory Board Member and Founding Shareholder,
Vinva Asset Management, Sydney, Australia



PROUDEST PROFESSIONAL ACCOMPLISHMENTS

- Helping to move Barra from a struggling startup to a global leader in Asia, Europe, and North America.
- Writing the second-generation optimization code at Barra.
- Assembling a world class team of researchers in equity, fixed income, and global asset allocation at Barclays Global Investors.

INFLUENTIAL INVESTMENT PUBLICATIONS

Written

- “The Fundamental Law of Active Management.” *Journal of Portfolio Management* 15, no. 3 (Spring 1989): 30–38.
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- *Active Portfolio Management* (with Ronald Kahn). New York: McGraw-Hill, 2000.

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IMPORTANT INVESTMENT LESSONS LEARNED

Alpha is like a mushroom: when exposed to the light, it withers.

IMPORTANT INVESTMENT EXPECTATIONS FOR THE FUTURE

There is a lot of room to improve the service and reduce the cost of retail and institutional investment management.

ANY PROFESSIONAL REGRETS

I had an inkling that the quant meltdown of August 2007 was a possibility, but I did not act as strongly as I should have.

SUMMARY

Our best theories, such as the capital asset pricing model, and a great deal of performance history suggest that active portfolio management is very difficult. Use those theories as a starting point to partition your knowledge into what you know and what you don't know. Then subdivide: what you might possibly learn, and worry about what you think you know that isn't true. If you keep that perspective you'll never run out of challenges.

There are challenges on the operational front. In my retirement I occasionally turn to what I call the portfolio management problem. Consider the plight of a quantitative investor, QI, who is following hundreds maybe thousands of assets. QI is getting information about these assets from myriad sources on a nearly continuous basis; some of this information is periodic, some is episodic. Some of this data is relevant to future returns and some is not: QI must figure out how to separate the wheat from the chaff. QI has to distill the information along with predictions of risk and trading cost to produce trades and portfolios. QI should account for the dynamic nature of the process; current information will become stale and some types of information will have a shorter shelf life than others. The current state of the art is a collection of familiar heuristics. There is enough room for improvement in the portfolio management process to keep any dutiful QI occupied for an entire career.

If your motto is that you have a lot to learn, then you might avoid the pitfalls of investment hubris that can lead to disaster. Investment success can

lead to overconfidence, and overconfidence can lead to an unanticipated and undesirable educational experience, U^2E^2 . Some former colleagues of mine had a U^2E^2 in the portfolio insurance-enabled market crash of 1987 and others in the undoing of Long-Term Capital Management in 1996.¹⁶ Strive to avoid such notoriety and consider some recent wisdom from Ted Aronson urging investors to repeat six times before breakfast, "I am not so smart, and other people are not so stupid."

A more personal and painful example of a U^2E^2 was what has been called the quant meltdown of 2007.¹⁷ At the time I was with an organization managing a large amount of quantitative active equity funds. In the prior decade quantitative investing had moved from the fringes of institutional asset management toward the center. This movement prompted a lively internal discussion about investment capacity. What amount of assets under management is too much? How much is being managed in similar strategies by other managers? Will this run of success end with a bang, a whimper, or not at all? At year-end 2006, to emphasize the challenge, I gave a talk featuring the myth of Daedalus and Icarus where Icarus, despite being cautioned, flies too close to the sun on waxwings and has a fatal meltdown. But one could ask, as many did, how close is too close? What is the melting point of wax anyway?

An inkling of what might or might not happen was no preparation for the actual event in the following August when the bang arrived followed by a 6-month-long whimper as many

¹⁶Lowenstein, Roger. *When Genius Failed*. New York: Random House, 2001.

¹⁷Khandani, A., and A. Lo. "What Happened to the Quants in August 2007?" *Journal of Investment Management* 5, no. 4 (November 2007): 5–54.

INVESTMENT LUMINARIES AND THEIR INSIGHTS

institutional investors turned away from quantitative active equity.

No doubt there are many more specific lessons of this sort to be learned in what used to be called the school of hard knocks.

In my academic days I resorted to my residual Boston accent to emphasize the point that the results the students were seeing, like all results

in the social sciences, were, despite the mathematical mode of presentation, at best “sortah true mostah the time.” The caution was to avoid being captivated by the precision of the technical argument linking assumptions and results and forgetting that these results sat on a shaky foundation built from assumptions that are, at best, a crude description of reality. There is a lot to be learned.

2013—RONALD N. KAHN (WITH RICHARD GRINOLD)

Global Head of Systematic Investment Research, BlackRock



PROUDEST PROFESSIONAL ACCOMPLISHMENTS

- Coauthor with Richard Grinold of *Active Portfolio Management* and *Advances in Active Portfolio Management*.
- Led systematic research for two decades at one of the most successful quantitative active managers (BlackRock/BGI). Managed a pivot after the global financial crisis into big data and machine learning.
- Wrote *The Future of Investment Management* monograph for the CFA Institute Research Foundation.

INFLUENTIAL INVESTMENT PUBLICATIONS

Written

Books listed previously, and the following:

- “The Efficiency Gains of Long–Short Investing” (with Richard Grinold). *Financial Analysts Journal* 77, no. 4 (September/October 2000): 40–53.
- “Does Historical Performance Predict Future Performance?” (with Andrew Rudd).

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Great Firms to Fail. Boston, MA: Harvard Business School Press, 1997.

IMPORTANT INVESTMENT LESSONS LEARNED

We build quantitative investment models designed to work on average over time. Consistent investment success, however, requires us to navigate through unexpected and unprecedented environments. Investment success requires a healthy appreciation of markets and a deep understanding of when each model will and will not work.

IMPORTANT INVESTMENT EXPECTATIONS FOR THE FUTURE

The current explosive growth in unstructured data and associated analytics is the biggest opportunity for active management in at least the past decade.

ANY PROFESSIONAL REGRETS

Only that I didn't come across the wonderful world of quantitative investing earlier.

SUMMARY

Biggest Intellectual Contribution to the Investment Industry

My biggest intellectual contribution to the investment industry has been coauthoring the book *Active Portfolio Management* with Richard Grinold, as well as developing, educating, and

popularizing the concepts described in that book. As we noted in the book, “the art of investing is evolving into the science of investing.” Our goal was to provide an analytical framework—a process—for active management. We viewed active management as a dynamic optimization problem—trading off expected returns against risk and the cost of trading; and with new information flowing in regularly as old information decayed in value. Many of the pieces of this already existed. We pulled them all together into one coherent framework.

We developed that framework at a time when finance academics were dominated by the belief in market efficiency, and so a rigorous theory of active management was not going to come from the academy. We did, however, use the economist's trick of making an assumption and seeing where it leads. In our case, we started with the assumption that we have some valuable information the market has yet to understand. How would we invest based on that information? Forecasts of exceptional (nonconsensus) returns based on that information provided a key role in the active management optimization problem. Having a mathematical framework led to insights like the fundamental law of active management, showing how the *ex ante* information ratio of an active strategy depends on skill in forecasting, diversification or breadth of skill, and efficiency in building optimal portfolios. We taught this framework at Barra seminars and industry conferences over many years, to almost 20 years of Berkeley master of financial engineering students, and embraced and implemented this approach at Barclays Global Investors (BGI) and BlackRock Systematic. It is now widely known and understood, and very influential in the growing world of quantitative investors.

Most Important Investment Lesson

We build quantitative models for active investing that are designed to work on average over time. Unfortunately, consistent outperformance requires us to navigate through unexpected and unprecedented environments. In my career, I've needed to maneuver through many unprecedented regimes including the tech bubble of the late 1990s, the quant crisis of August 2007, and the global COVID-19 pandemic. We didn't always succeed during those periods, but we did learn useful lessons.

Consider for a moment the global COVID-19 pandemic. My group at BlackRock, the systematic active equity team, increasingly relied on machine learning to determine optimal weights on our hundreds of signals. That approach worked very well in the years leading up to the pandemic. However, we realized—based on having lived through prior crises—that signal behavior over the prior decade would tell us little about what would perform well after March 2020. We developed new ideas about which companies would fare well and which poorly, and then sought out the data that could help turn those ideas into investible signals. Beyond offense, we also considered defense, such as avoiding active risk on companies working on vaccines. In those early days, we didn't have any special insight into which companies might succeed.

In periods like the global COVID-19 pandemic, historical data provides little guidance. These periods require just as much rigorous analysis though provide less in the way of data. We need to understand the sensibility of each signal and determine whether that sensibility holds in the new regime. Beyond that, we need to understand what will work and what data do exist to

help us. Investment success requires a healthy appreciation of markets and a deep understanding of when each signal will and will not work.

Investment Expectations for the Future

The key investment trend over the past 100+ years has been that investing has become increasingly systematic—not necessarily quantitative, but based on data, models, and systems for investing. That trend will continue.

As an active manager, it's important to understand why successful active management is possible. Positive alpha can result from risk premiums, exploiting behavioral anomalies, or informational advantages (insights the market doesn't yet understand).¹⁸ The idea of using risk premiums to generate alpha goes back to Stephen Ross and the Arbitrage Pricing Theory.¹⁹ Even within markets, there exist some risk factors that many investors want to avoid. The risk premium is the extra expected return required to induce some investors to hold those risks.

The idea of exploiting behavioral anomalies goes back to Kahneman and Tversky.²⁰ It's not surprising that humans sometimes behave irrationally. It is surprising that the irrational behavior isn't random. Instead, we all make the same mistakes. That leads to exploitable opportunities in financial markets. Risk premiums and behavioral anomalies underlie many factor strategies.

¹⁸There are some other reasons too, for example exploiting structural impediments like the fact that most investors avoid leverage and shorting.

¹⁹Ross, Stephen A. "The Arbitrage Theory of Capital Asset Pricing." *Journal of Economic Theory* 13, no. 3 (1976): 341–60.

²⁰Kahneman, Daniel, and Amos Tversky. "Prospect Theory: An Analysis of Decision under Risk." *Econometrica* 47, no. 2 (1979): 263–91.

INVESTMENT LUMINARIES AND THEIR INSIGHTS

Active management might also succeed through informational advantages. Grossman and Stiglitz²¹ showed that market efficiency requires active managers to research assets and trade to push prices closer to fair value. In fact, active managers should earn a premium for doing this. This is the logic behind most fundamental active strategies.

This leads me to the key trend impacting active management today and for the foreseeable future. We are currently living through a period of explosive growth in available data (“big data” or unstructured data) as well as analytics driven by those data and increasingly powerful

computers. This explosion of unstructured data and analytics is *the biggest opportunity* for active management in at least the past decade. (What else is even in the running?) Furthermore, this opportunity is mainly about informational advantages. This is the great career opportunity for most active managers today.

Successful active management is so difficult that no active manager can ignore this. They need to either be able to handle unstructured data and machine learning themselves or hire people who can do it for them.

²¹Grossman, Sanford J., and Joseph E. Stiglitz. “On the Impossibility of Informationally Efficient Markets.” *American Economic Review* 70, no. 3 (1980): 393–408.

2014—KENNETH R. FRENCH

*Roth Family Distinguished Professor of Finance,
Tuck School of Business, Dartmouth College*



PROUDEST PROFESSIONAL ACCOMPLISHMENTS

- My body of research, most of which is with Gene Fama.
- The many students I have taught.
- The impact I have had on investment practice, both through my research and through my relationship with Dimensional Fund Advisors.

INFLUENTIAL INVESTMENT PUBLICATIONS

Written

- Fama, Eugene F., and Kenneth R. French. “The Cross-Section of Expected Stock Returns.” *Journal of Finance* 47, no. 2 (June 1992): 427–65.
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IMPORTANT INVESTMENT LESSONS LEARNED

The high volatility of realized equity returns obscures their information about expected returns. As a result, 5, 10, even 20 years of past returns may say little about the cross-section of future returns. A good strategy for investors is to presume that patterns in past equity returns are just noise and to require a compelling model and robust evidence to reject that hypothesis.

IMPORTANT INVESTMENT EXPECTATIONS FOR THE FUTURE

Financial markets will remain volatile, with lots of unexpected challenges and opportunities, and the turbulence will continue to provide great new topics for researchers like me.

ANY PROFESSIONAL REGRETS

I have many regrets, but none that others would find interesting.

SUMMARY

Investment returns have two parts: the expected return, which is the best guess of what will happen based on all the information available today, and the unexpected return, which is the surprise, the difference between what does happen and what was expected. Unexpected returns for stocks are volatile and cause almost all the high volatility of realized stock returns. As a result, for most equity investments and most investment horizons—a month, a year, 5 years, even 10 years—the realized return is driven far more by the unexpected return than the expected return. This observation is not novel, but it has a big impact on the way I think about investing and investment research.

A few examples illustrate the point. The equity premium is often defined as the difference between the annual return on the value-weight portfolio of all publicly traded stocks and the return on a safe asset, such as short-term Treasury bills. The expected value of the equity premium is an important input for many financial decisions. Suppose everyone agrees the long-run expected equity premium is 6 percent per year. If the permanent long-run expected

premium is now 8 percent, how long will it take to infer with the standard level of statistical precision that 6 percent is too low? To be precise, how many future annual observations do we need before the expected value of the t-statistic comparing the average premium to 6 percent is greater than 2.0? I have posed this question to literally thousands of people. Many say 5 to 10 observations will be enough to confidently conclude that the expected premium is above 6 percent. Estimates over 40 years are rare.

Even 40 annual observations is far lower than the actual number needed. The volatility of the annual equity premium from 1926 to 2020 is about 20 percent. If annual volatility will continue to be 20 percent and I make a few simplifying assumptions that probably reduce my answer, we need 400 years to produce an expected t-statistic of 2.0.

Noisy unexpected returns also make it hard to evaluate asset managers. Suppose that, after fees and expenses, a great hedge fund manager's annual expected α (their expected value-added) is a permanent 5 percent. If they have equity-like volatility of 20 percent per year and their fund's returns are uncorrelated with other investments, how many annual observations do we need to produce an expected t-statistic of 2.0 when we test whether their expected alpha is positive? The answer is remarkably high: 64 years.

Why do we need so much data to infer that the expected equity premium is above 6 percent or that the fund's expected superior performance of 5 percent is positive? The problem is that the expected part of the equity premium or hedge fund return is hidden in the unexpected part. In the hedge fund case, for example, the 20 percent annual volatility is four times the expected alpha and "returns are uncorrelated with other investments" means there is no benchmark to reduce the noise. As a result, about 40 percent of

realized annual alphas will be negative, obscuring the positive expected alpha. The challenge is even bigger for the equity premium. Its 20 percent annual volatility is 10 times the difference between the 8 percent expected premium and the 6 percent benchmark, so the probability that any particular year's premium will be below the benchmark is about 46 percent.

The imprecision in my examples has important implications. A discount rate based on an expected equity premium of 6 percent may justify many corporate investments that have negative present values at 8 percent. Young employees may be able to prudently reduce their retirement contributions a lot if the expected equity premium is 2 percent higher than they thought. And many investors will be reluctant to pay hedge fund fees if they understand that even a great manager may need 64 years to provide reliable evidence of outperformance.

The high volatility of unexpected returns and the lack of a good benchmark make it hard to evaluate many hedge funds. Index funds are easier to evaluate because each fund's target index is a perfect benchmark, providing direct evidence of whether the fund is delivering as promised. Most active equity investments are between hedge funds and index funds. A benchmark or asset pricing model can reduce the noise, but investors typically still need decades to infer whether a portfolio's under- or overperformance is the result of luck, skill, or a failed model.

The fog of volatility frustrates those of us who study asset pricing. The value factor is a prominent pattern in average equity returns. Fama and French (1992) find a strong positive relation between a stock's book-to-market ratio and its average return in the 28 years of US data from July 1963 to June 1991. Fama and French (2021) update the earlier tests with 28 years of

out-of-sample data, from July 1991 to June 2019. The value effect is much weaker out of sample. Notably, however, although the expected value premium for 1991–2019 is not reliably different from zero, it is also not reliably different from the 1963–1991 expected premium. Thus, realized returns are too noisy to tell us either that the expected premium disappears or that it does not change between the two periods.

Researchers have identified hundreds of other patterns in realized stock returns and constructed hundreds of factors to capture the patterns. I suspect that many reported patterns not motivated by a compelling (rational or irrational) model, especially the many improvements to existing patterns, are driven almost entirely by unexpected returns. Only time, and lots of it, will tell.

Because noisy unexpected returns obscure expected returns, I advise investors to emphasize facts and things that are easy to measure when they build their portfolios. We know, for example, that the average dollar invested holds the market. How do your tastes and circumstances differ from the average investor's? Sharpe (1991) tells us active investing is a negative sum game. That fact and the challenge of performance evaluation both push toward passive. You and almost all other investors are risk averse, and diversification is essentially free. Diversify a lot. Fees and expenses are easy to anticipate, and everything else the same, they lower your returns dollar for dollar. Taxes and transaction costs are a bit harder to predict, but still fundamentally important.

Inferences from realized returns are toward the bottom of the list but can still be important. Variances and covariances are typically easier to estimate than expected returns and can matter a lot when you are investing across asset classes or trying to manage the uncertainty about

your lifetime consumption. Long-run expected return differences across asset classes are measurable and important for most investors. And despite the noise, differences in expected stock returns—especially those based on compelling and robust models—can help investors tailor their portfolios.

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Sharpe, W. F. “The Arithmetic of Active Management.” *Financial Analysts Journal* 47, no. 1 (1991): 7–9.

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Fama, E. F., and K. R. French. “The Cross-Section of Expected Stock Returns.” *Journal of Finance* 47, no. 2 (June 1992): 427–65.

2015—FRANK FABOZZI, CFA

Professor of Practice, Carey Business School, Johns Hopkins University



PROUDEST PROFESSIONAL ACCOMPLISHMENTS

- Having the first few editions of *The Handbook of Fixed Income Securities* adopted for the CFA Program exam.
- Writing projects with four Nobel Prize laureates in economic science—three books with Franco Modigliani, two edited books and an article with Harry Markowitz, and articles with Robert Shiller and Robert Engle.
- Being given the editor’s position at the *Journal of Portfolio Management* in 1986.
- Being the recipient of the 2015 James R. Vertin Award and the 2007 C. Stewart Sheppard Award given by CFA Institute.
- Being inducted into the Fixed Income Analysts Society Hall of Fame in 2002.
- Surviving the coauthoring of a two-book series on asset management with my son, Francesco, this year.

INFLUENTIAL INVESTMENT PUBLICATIONS

Written

- Fabozzi, Frank J., Robert Shiller, and Radu Tunaru. “Real Estate Derivatives: What Can Be Done to Tame Property Price Risk.” *Journal of Economic Perspectives* 34, no. 4 (2020): 121–45.
- Engle, Robert, Sergio M. Focardi, and Frank J. Fabozzi. “Issues in Applying Financial Econometrics to Factor-Based Modeling in Investment Management.” *Journal of Portfolio Management* 42, no. 5 (2017): 94–106.
- Fabozzi, Frank J., Francis Gupta, and Harry M. Markowitz. “The Legacy of Modern Portfolio Theory.” *Journal of Investing* 11, no. 3 (Fall 2002): 7–22.
- Fabozzi, Frank J., and Jack C. Francis. “Mutual Fund Systematic Risk for Bull and Bear Markets: An Empirical Examination.” *Journal of Finance* 34, no. 2 (1979): 1243–50.

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- Lo, Andrew W. “The Adaptive Markets Hypothesis: Market Efficiency from an Evolutionary Perspective.” *Journal of Portfolio Management* 34, no. 5 (2004): 15–29.
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IMPORTANT INVESTMENT LESSONS LEARNED

“The more I learn, the more I realize how much I don’t know.” –Albert Einstein

IMPORTANT INVESTMENT EXPECTATIONS FOR THE FUTURE

To be successful as an investment professional, one must constantly learn and adapt to change.

ANY PROFESSIONAL REGRETS

As Frank Sinatra sang in *My Way*, “Regrets, I’ve had a few; but then again, too few to mention.” But here is one I have. I met Peter Bernstein, economist, financial historian, founder of the

Journal of Portfolio Management, and *New York Times* best-selling author. Peter passed away in June 2009. While we worked closely on the journal since 1984, we discussed several possible joint writing book projects. Because of other commitments, we were never able to get beyond a discussion of a topic for a book and the failure to have the opportunity to write a book with him is what I regret.

SUMMARY

Today, undergraduate students at many universities have flexibility in the selection of courses to fulfill their humanities requirement. Courses like the philosophy of *BoJack Horseman* (based on the Netflix comedy series) and philosophy of *Star Trek* make for a much more interesting course than theoretical philosophy courses covering topics such as metaphysics (the existence and nature of things) and epistemology (the theory of knowledge). What young adult wouldn’t find *BoJack Horseman* and *Star Trek* more interesting than the philosophies of the big three—Socrates, Plato, and Aristotle? Unfortunately, in the old days (meaning when I was an undergraduate in the 1960s), such interesting alternatives to the traditional theoretical philosophy courses were not an option and I was forced to learn metaphysics, epistemology, and logic. In one of the epistemology lectures, using an overhead projector and transparencies, the lecturer put up a transparency that said: “The more I know, the more I realize I know nothing.” The attribution was to the Greek philosopher Socrates in 400 BC. Attempting to look like a deep thinker, I recall rubbing my chin thinking that would be the best way to impress the lecturer (I sat in the front row since I didn’t realize I needed eye-glasses). What I was thinking was, “huh, what’s that guy saying?” Besides, it was the 1960s

and the popular phrase of students at the time was, “Don’t trust anyone over 30”—a phrase popularized in 1964 by student activist Jack Weinberg at Berkeley. Being adept at math (meaning I passed my calculus courses), I estimated that Socrates was clearly far older than 30 and his words should be heavily discounted.

Another “huh, what’s that guy saying?” moment was when I was researching a term paper for a physics course (more aptly described as “physics for poets”) on Albert Einstein. I came across the quote: “The more I learn, the more I realize how much I don’t know.” Since the encyclopedia said that Professor Einstein was born in 1879, that made him over 30 and, applying Weinberg’s rule, his words were discounted. (It wasn’t until 1994 when I saw the movie *I.Q.* with Walter Matthau playing Albert Einstein that I realized how “cool” Einstein may have been!)

Little did I know that it would be a decade later for me to truly appreciate the meaning of the quotes attributable to Socrates and Einstein! Here’s why.

As an undergraduate student in economics, finance was not typically taught in liberal arts programs. Even in a doctoral program in economics in the early 1970s, finance was rarely taught. After teaching my first undergraduate course in investment management, I realized I knew very little about real world asset management. To expand my knowledge in this area, I took the CFA Program exam (completed in 1977), which provided both the theoretical background I needed and the practical issues that were not covered in the standard textbooks in investment management. Being a CFA charterholder, I now felt comfortable holding myself out as an expert in asset management. Then I started reviewing financial statements and found I only knew the very basics beyond debits and credits and the purpose of financial

statements. (“The more I know, the more I realize I know nothing.”) Knowing nothing in this field, I studied for the CPA examination, which I was fortunate to complete in 1982. Now I was truly an expert in all that has to be known about asset management, including financial statement analysis.

Now I was well prepared to do academic research needed to maintain my position as a junior faculty member in finance. As I read the literature, my confidence regarding my expertise in investment management declined, not so much regarding portfolio theory but implementation. For example, I knew the theoretical benefits of indexing, which began in 1975 and was pushed by efficient market theorists to capture the market risk premium, but had no idea of the difficulties of implementing such a strategy in the days before program trading and electronic order transmission. Having interviewed in the late 1970s for a position at Bankers Trust to manage an equity indexed portfolio, I learned, in painstaking detail, the mechanics and issues associated with executing portfolio balancing trades at the end of each trading day—boring, I stayed in academia. But I now was an expert in indexing—or, at least I thought. Several years later, I learned about securities lending after being asked to serve as a consultant on a matter of index funds lending stocks from an indexed portfolio to generate incremental income to close the performance gap between fund return and the benchmark. I had not heard about securities lending until that time! (“The more I learn, the more I realize how much I don’t know.”)

My confidence as an expert dwindled further when I became the managing editor of the *Journal of Portfolio Management* in 1984. Being forced to read 8 to 10 papers a week as an initial screen before inviting reviewers, it was common that I would read a paper and find a

INVESTMENT LUMINARIES AND THEIR INSIGHTS

discussion somewhere within the paper (even in an obscure footnote) where I said to myself: “I didn’t know that.” Over the next 35 years as editor of the journal, I have read far more than 10 papers a week and it was rare to find a paper where I didn’t say, “I didn’t know that” about some asset management–related topic. (“The more I learn, the more I realize how much I don’t know.”)

In 1988, I was invited to join the board of trustees of a startup asset management firm, Blackstone Financial Management, which was a subsidiary of the investment banking firm Blackstone. (Today it is a small company named BlackRock.) I felt confident about my abilities given I was familiar with products (mostly mortgage-backed securities at the time), strategies, and performance attribution analysis. Perfect member for a fund management board; I was an expert, at least that is what I thought. It didn’t take long to figure out that moving from theory and theoretical concepts to practice required a far more in-depth understanding of how real world markets operated, how transactions must be structured to comply with both US and

foreign securities law, and the tax issues associated with fund management. Even that field of securities lending had many wrinkles requiring special education to identify the best program for fund investors. Along the way, there were several financial crises that made me realize there was much that I did not know about financial markets and investor behavior. (“The more I know, the more I realize I know nothing.”)

These four decades of participation in one form or another in the investment management profession have taught me that my true expertise is recognizing that there is much that I don’t know in this field. Continuing my education by reading practitioner-oriented journals and updating my knowledge by taking advantage of the CFA Institute professional learning credits is essential to increase the odds of being a successful investment professional. But there are two things that I did learn. First, I learned that Weinberg’s rule is false, something I discovered when I turned 30 in 1978. Second, it has reinforced my conviction that to be successful as an investment professional, one must constantly learn and adapt to change.

2016—TERRANCE ODEAN

Rudd Family Foundation Professor of Finance, Haas School of Business, University of California, Berkeley



PROUDEST PROFESSIONAL ACCOMPLISHMENTS

- Earned my PhD the year I turned 47 and still managed to have an academic career.
- One of the first behavioral researchers to study individual investors.
- Shared data on investor trading with hundreds of other researchers.

INFLUENTIAL INVESTMENT PUBLICATIONS

Written

- “All that Glitters: The Effect of Attention and News on the Buying Behavior of Individual and Institutional Investors” (with Brad Barber). *Review of Financial Studies* 21, no. 2 (2007): 785–818.
- “Boys Will Be Boys: Gender, Overconfidence, and Common Stock Investment” (with Brad Barber). *Quarterly Journal of Economics* 116, no. 1 (February 2001): 261–92.
- “Are Investors Reluctant to Realize Their Losses?” *Journal of Finance* 53, no. 5 (October 1998): 1775–98.

Read

- Kahneman, Daniel, and Dan Lovallo. “Timid Choices and Bold Forecasts: A Cognitive Perspective on Risk Taking.” *Management Science* 39, no. 1 (1993): i–133.
- Thaler, Richard. “Mental Accounting and Consumer Choice.” *Marketing Science* 4, no. 3 (Summer 1985): 199–214.

Neither of these papers is focused on investments, but both greatly influenced how I understand investor decision making.

IMPORTANT INVESTMENT LESSONS LEARNED

Markets need heterogeneity.

IMPORTANT INVESTMENT EXPECTATIONS OF THE FUTURE

We need to change the defined contribution pension model.

ANY PROFESSIONAL REGRETS

That I never published my paper that explored the asset pricing implications of behavioral

biases by developing an object-oriented simulation of the stock market with individual and institutional investors (see following discussion).

SUMMARY

I thought I would get a PhD in psychology. But, one morning, Danny Kahneman suggested I study finance instead. I had never taken an economics course. Nevertheless, I took Danny's advice. My goal in finance was to show that investors do not behave the way many financial economists had assumed but that they behave the way Kahneman and other psychologists had demonstrated people behave. I was able to obtain trading records for thousands of individual investors and found, as expected, that people are influenced by the same biases and emotions when investing as in the rest of life. Limited attention, overconfidence, fear of regret, and a poor grasp of probability lead to suboptimal investing.

Together with my coauthors—Brad Barber, in particular—and other people working in this area, I showed that individual investors trade too much—that is, on average, trading reduces their returns, they hold onto losing investments and sell winners (the disposition effect), they chase returns, they ignore fees (particularly fees that are not prominently displayed), they tend to buy stocks that catch their attention (leading to price increases followed by reversals), and they tend to buy and to sell the same stocks as each other at the same time. Men trade more actively than women, and do so to their detriment. Investors learn from their mistakes but do so very slowly. And investors trade more actively when they are excited, which can contribute to speculative bubbles.

The most important investment lesson I learned during my career is we need investor

heterogeneity to stabilize markets. The crash of 1987 was caused by portfolio insurance—a creation of my PhD advisers Mark Rubinstein and Hayne Leland. Institutional investors automated selling as the market fell. The more the market fell, the more they sold, and the more the market fell. Had one or two investors followed this strategy, they would have limited their losses—by implementing a dynamic put option strategy—but they would not have crashed the market. But too many investors doing the same thing at the same time was more than the market could handle. A decade or so later, retail investors got excited about buying “.com” stocks. The more they bought, the more the stock prices rose, and the more they bought.

Initially, I thought that too many investors doing the same thing at the same time was only a problem when this resulted in a positive feedback loop: Blindly selling losers or buying winners without regard to fundamentals. But then I realized that even investors focused on fundamentals can disrupt markets if they all make the same mistake—or if they use too much leverage.

Shortly after getting my PhD, I received a National Science Foundation career grant. Part of my grant proposal was to develop an object-oriented simulation of the stock market with individual and institutional investors. My goal was to explore the asset pricing implications of behavioral biases. The individual investors in my simulation chased returns, held onto their losers, and traded too much. The institutional investors received noisy signals about the true underlying values of stocks, values which followed log-normal diffusion processes. I decided that half of the institutional investors would have long only unlevered portfolios (mutual funds) and half would be able to take short positions and use leverage (hedge funds).

The simulation ran smoothly for several virtual years and then, inevitably, crashed. At first, I thought that I'd made a coding error. But as I dug into the simulated data, I realized that these crashes were, indeed, inevitable. Sooner or later a situation would develop in which the hedge funds held highly leveraged positions in the same stock. A stock that was—according to their signals—undervalued. Often that signal had a positive error component and was followed by a negative move in the underlying value process. And every so often, the price drop was enough to leave the hedge funds over leveraged. The computer program issued the equivalent of a margin call requiring the hedge funds to cut back their leverage. The funds sold whichever stocks had the highest price/value ratio. As they sold one stock the price would drop, and then they would start selling other positions. The problem was that these funds were virtually identical—so they all sold the same stocks at the same time. The more they sold, the more the price dropped, and the more margin calls they received. Individual investors didn't step in and buy because my individual investors were programmed to react to price moves—buying winners more often than losers—and not to valuations. Long-only institutional investors couldn't save the day because they were fully invested and weren't allowed to take on leverage.

I was able to fix most of the crashes by creating a bailout fund. The hedge funds would

get an infusion of cash if the market dropped enough. They could use this cash to recalculate their leverage and were subsequently required to slowly pay the cash loan back. But even the bailout fund occasionally failed.

I presented my results at a Q Group meeting and asked for suggestions. Harry Markowitz nailed the problem. He told me that what I needed was more heterogeneous investors. He was right. When everyone does the same thing at the same time, even small errors can become big problems. For example, like the hedge funds in my simulation, the hedge fund Long-Term Capital Management was brought down by a combination of too much leverage and too many other hedge funds following very similar strategies.

I don't know what the future will bring. I hope that there will be changes in how we fund retirements in the United States. Defined contribution retirement accounts make too many demands on and put too much risk on workersavers. While we can nudge people toward adequate savings rates and sensible asset allocations, some will save too little and others will invest unwisely. Financial advice can help, but the cost of advice cuts deeply into compounded returns. Furthermore, even those who follow savings and investment guidelines face market risk that they can't control and longevity risk that many refuse to hedge.

2017–WILLIAM BERNSTEIN

Cofounder, Efficient Frontier Advisors



PROUDEST PROFESSIONAL ACCOMPLISHMENTS

- Author of *A Splendid Exchange: How Trade Shaped the World* (New York: Atlantic Monthly Press, 2008), short listed for 2008 *Financial Times*/Goldman Sachs Best Business Book Award.
- Author of *The Birth of Plenty: How the Prosperity of the Modern World Was Created* (New York: McGraw-Hill, Inc., 2004).

INFLUENTIAL INVESTMENT PUBLICATIONS

Written

- Bernstein, William J., and Robert D. Arnott. “Earnings Growth: The Two Percent Solution.” *Financial Analysts Journal* 59, no. 5 (2003): 47–55.
- Bernstein, William J. “The Paradox of Wealth.” *Financial Analysts Journal* 69, no. 5 (2013): 18–25.
- Bernstein, William J. “Corporate Finance and Original Sin.” *Financial Analysts Journal* 62, no. 3 (2013): 20–23.

Read

- Schmelzing, Paul. “Eight Centuries of Global Real Interest Rates, R-G, and the ‘Suprasecular’ Decline, 1311–2018.” Staff Working Paper no. 845. London: Bank of England, 2021.
- Rees, Laurence. *Auschwitz: A New History*. New York: PublicAffairs, 2006.
- Schleifer, Andrei, and Robert W. Vishny. “The Limits of Arbitrage.” *Journal of Finance* 51, no. 1 (March 1997): 35–55.

IMPORTANT INVESTMENT LESSONS LEARNED

From Philip Tetlock’s *Expert Political Judgment: First, forecast, never predict. Second, we’re all lousy forecasters. Especially me.*

IMPORTANT INVESTMENT EXPECTATIONS FOR THE FUTURE

The optimists are not likely to triumph this time around.

ANY PROFESSIONAL REGRETS

Finance and economics weren't cool enough for me when I was young, so I didn't bother to learn anything about them back then.

SUMMARY

"None of us is as smart as all of us," read the anonymous quote on the wall of James Vertin's San Francisco Wells Fargo office, which saw often-contentious meetings with Bill Fouse and John "Mac" McQuown that attended the birth of the world's first index fund, a \$6 million slice of Samsonite Luggage's pension assets. Within a few short years that baton would pass to Jack Bogle at Vanguard, whose First Index Investment Trust (later the 500 Index Fund) eventually brought the benefits of passive investing to the wider world.

My own contributions to professional finance, on the other hand, are nearly nonexistent, and my modest ones to personal finance merely involve spreading the gospel of Vertin, Fouse, McQuown, and Bogle to the general public by way of personal finance books and magazine articles.

I do have a few thoughts about professional finance, though, prime among which is "the paradox of wealth"—that is, the counterintuitive inverse relationship between societal wealth/well-being and investment returns.

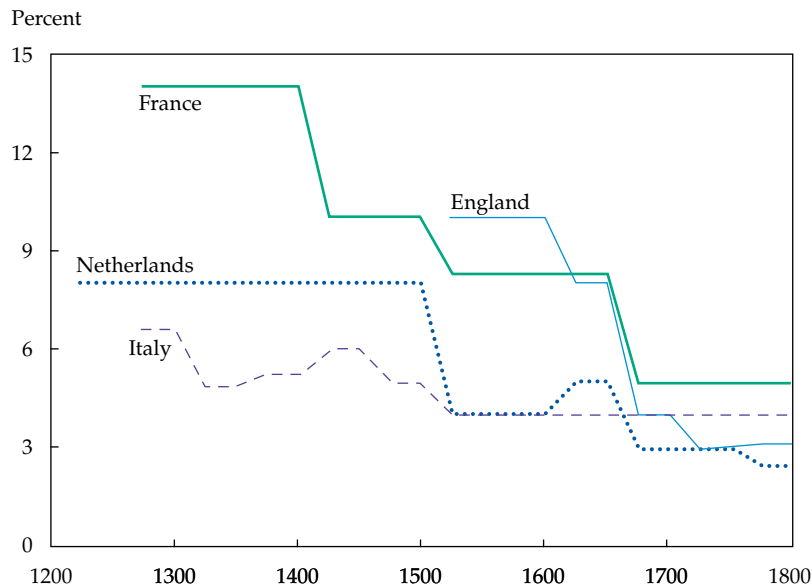
Start with the manifest economic and human blessings of the modern world: the advances in public health and medical care that transformed survival to old age from a chancy concatenation of good luck to a near certainty in today's wealthy nations; communications and transport technology that have made the world a smaller, more secure, and comprehensible place; and the

developed world's impressive provision of food and shelter, which seems fantastical by the standards of even a century ago.

Measuring the 20- to 40-fold rise in per capita GDP over the past two centuries does these wonders scant justice, since this metric fails to completely capture the actual improvement in living standards. How, after all, does one value the ability to fly several thousand miles in less than a day in near complete safety, or the near total freedom from dread bacterial diseases, which as late as the 20th century struck down millions in the prime of life, let alone nearly free intercontinental video calling, the universal availability of authoritative knowledge bases, or even something as banal as the minuscule cost of lighting a room? None of these godsend appear clearly in conventional GDP accounting.

Something else, however, almost completely ignored until very recently, has accompanied this impressive improvement in the status of humankind: the precipitous fall in expected investment returns. Classical scholars have long known, for example, that loans in the ancient world carried very high interest rates, typically 20 percent in silver and 33 percent in grain. Further back, aboriginal agriculturalists likely repaid loans of grain or calves twice over the growing and calving seasons, for an annualized "investment return" of 100 percent. One cannot ascribe these high rates of return to commensurate risk; the legal institutions of many ancient societies functioned well over centuries, and the modern lender can only wonder at the strength of collateral demanded of ancient loans, which could include the enslavement of both the borrower and their family.

Consider the premodern trace of prime rates offered to the most creditworthy borrowers, in western Europe, shown in **Figure 2**:

FIGURE 2. INTEREST RATES IN EUROPE, 1200–1800

Source: Homer and Sylla (2005).

A mental regression line drawn through the above plot predicts the present-day zero return. More recently, Bank of England economist Paul Schmelzing has confirmed this picture with a far more detailed collation of Western interest rates, both monetary and in-kind; his granular data and number crunching yield a zero real-return intercept variously between 2038 and 2084.²²

These two phenomena—increasing societal wealth and decreasing returns—are joined at the hip. Falling returns are the natural outcome of ever-increasing prosperity, driven by three separate mechanisms: the gradual shift of the supply/demand equilibrium for capital in favor

of its consumers, the decreasing impatience for consumption attendant to increasing lifespans, and the dramatic fall in intermediation costs.

First, consider the shift of the supply/demand equilibrium for capital. A simple thought experiment suffices: Imagine a subsistence agricultural society, which by definition requires nearly 100 percent of its productive capacity to feed its population, so there's almost no excess capital (in this case, plant products and farm animals). (A rough-and-ready estimate of the wealth of any nation can be had by looking at its urbanization ratio: a society in which 90 percent of the population lives on the farm is almost certainly impoverished, and one in which 90 percent of the population lives in cities will always be wealthy. So much for the romanticization of rural life.)

But even our imaginary subsistence society still needs capital for seed grain, calves to breed, and

²²Schmelzing, Paul. "Eight Centuries of Global Real Interest Rates, R-G, and the 'Suprasecular' Decline, 1311-2018." Staff Working Paper no. 845. London: Bank of England, 2021. See especially Figure XV on page 48. Also see Homer, Sidney, and Richard Sylla. *A History of Interest Rates*, 4th ed. Hoboken, NJ: John Wiley & Sons, 2005.

farm implements and structures. Thus, the lucky or successful farmer with grain or animals to spare can demand the earth for them; by extension, as societies become wealthier and accumulated spare investment capital not essential for survival, this extreme supply/demand balance inevitably shifts away from the suppliers of capital in favor of its consumers. (The relationship between societal wealth and investment returns, of course, is not a one-way street; cheap capital, along with robust institutions and scientific rationalism, drive technological innovation and, with it, economic growth.)

Second, impatience for consumption, as brilliantly formulated by Irving Fisher, has decreased with increasing lifespans, and so lowers the return demanded by lenders. Until the advent of aggressive public health measures in the 19th century, all but the smallest of towns were pestilential cesspools where even the healthiest were at risk for deadly enteric and pulmonary diseases; someone whose life could be terminated at any moment demands a higher return on their capital than someone likely to survive several more decades. At the extreme, Dr. Johnson's proverbial convict who is to be hung in a fortnight must demand a stratospheric interest rate!

Moreover, the modern employment life cycle requires the accumulation of the large amounts of capital necessary to sustain a retirement that may last as long as the working career itself, further driving the markets for capital in favor of its consumers.

Finally, intermediation costs have almost monotonously fallen over the past half millennium. In the ancient world, all capital transactions were personal, and centralized financial markets, let alone today's anonymous ones, were nonexistent. (The supposed market for shares in Roman tax-farming companies, for example,

in the Temple of Castor was almost certainly mythical.) Beginning around the 13th century, the nascent Italian republics issued loans that began trading in decentralized secondary markets, particularly the famous Venetian *prestiti*, and in 1602 the Dutch East India Company established the Amsterdam Stock Exchange as a centralized trading venue for its shares.

Still, until May Day (May 1, 1975), when the NYSE abolished fixed pricing, brokers saddled individual investors with crippling fees for trading and even for dividend distribution; the London Exchange followed a decade later with the Big Bang. Before then, the individual who supposedly invested efficiently in the broad stock market was the finance equivalent of the Loch Ness monster.

Accordingly, I offer two pieces of advice to those beginning their finance careers. First, be cautious about extrapolating pre-May Day/Big Bang returns into an environment awash with spare capital. When even the smallest players can acquire nearly the entire universe of the world's equity float for a few basis points per year, equity prices will be driven up and expected returns driven down. (This admonition is easier to believe now that the real risk-free return, as evidenced by the short TIPS, is nudging -2 percent).

Second, internalize the disappointment of low expected returns as the price paid for living in the safest and most prosperous era in the human adventure. No sane person, after all, would find adequate compensation for the 18th century's punishing living conditions in high single-digit real bond returns, let alone the hell of medieval or ancient life in double-digit real returns.

In other words, rejoice in your material existence and make sure both you and your clients save your shekels, because low future returns mandate that you're all going to need to.

2018—WILLIAM N. GOETZMANN

Edwin J. Beinecke Professor of Finance and Management Studies

Faculty Director, International Center for Finance,
Yale School of Management



PROUDEST PROFESSIONAL ACCOMPLISHMENTS

- Faculty director of the International Center for Finance at the Yale School of Management for 20 years, which collected long-term databases of securities markets for London, New York, Saint-Petersburg, and Shanghai and distributed them freely for research.
- Author and coeditor of books that influence the views of nonacademics on the social value of finance and gratified that many of my research papers have been regarded as useful by professional colleagues.
- Proud of my contributions to innovative instructional methods, and that many of my students have gone on to successful and meaningful careers as investment managers.

INFLUENTIAL INVESTMENT PUBLICATIONS

Written

- Frehen, R. G., W. N. Goetzmann, and K. G. Rouwenhorst. “New Evidence on the

First Financial Bubble.” *Journal of Financial Economics* 108, no. 3 (2013): 585–607.

- Gatev, E., W. N. Goetzmann, and K. G. Rouwenhorst. “Pairs Trading: Performance of a Relative-Value Arbitrage Rule.” *Review of Financial Studies* 19, no. 3 (2006): 797–827.
- Goetzmann, W., J. Ingersoll, M. Spiegel, and I. Welch. “Portfolio Performance Manipulation and Manipulation-proof Performance Measures.” *Review of Financial Studies* 20, no. 5 (2007): 1503–46.

Read

- Ibbotson, R.G., and R. A. Sinquefeld. “Stocks, Bonds, Bills, and Inflation: Simulations of the Future (1976–2000).” *Journal of Business* 49, no. 3 (1976): 313–38.
- Chen, N. E., R. Roll, and S. A. Ross. “Economic Forces and the Stock Market.” *Journal of Business* 59, no. 3 (July 1986): 383–403.
- Brown, S. J., and J. B. Warner. “Using daily stock returns: The case of event studies.” *Journal of Financial Economics* 14, no. 1 (1985): 3–31.

IMPORTANT INVESTMENT LESSONS LEARNED

History is an important reference for informed investment decision making; however, it can also be misinterpreted when its biases are not understood.

IMPORTANT INVESTMENT EXPECTATIONS OF THE FUTURE

In the future I hope that low-cost diversified investment products will be globally more accessible. I believe it is the means by which households, big and small, can share in global growth.

ANY PROFESSIONAL REGRETS

None whatsoever.

SUMMARY

History Matters

I've been interested in history my entire career, and particularly curious about the uses and abuses of historical data for investment decision making. Historical data in investment management is ubiquitous. We input historical data into our optimizers, risk models, and growth forecasts. When markets crash we scour history for similar episodes and study them for hints on how to predict the next one.

Long-term market data is particularly valuable because over the very long term, across many different global markets, a huge variety of conditions have prevailed and the record of market performance can show us how investments

behave under these circumstances. History provides a record of markets that started and failed as well as those that succeeded and survived. We have learned an enormous amount by gathering and studying data on the world's capital markets, and this provides extremely useful information about the future risk and return of investment.

Studying long-term financial data is more like archaeology than history. Historians have the luxury of rich archival records, but archaeologists make do with the few artifacts that survived deep time. Financial market historians must draw inferences from incomplete or puzzling price records generated by traders decades or centuries ago. Our data are almost always missing the living context of how trades were conceived, executed, and recorded. Over the years, my coauthors and I have explored the effect of data survival on such things as estimates of the equity risk premium, beliefs about emerging markets, and expectations about housing as an asset.²³

Ex Post Selection and Manager Performance

In the investment industry, *ex post* data conditioning can make a difference in manager selection and measures of manager skill. My coauthors and I showed how survival bias applies especially to fund managers who took risks and won versus those who took risks and disappeared. The returns of the unlucky

²³See Jorion, P., and W. N. Goetzmann. "Global Stock Markets in the Twentieth Century." *Journal of Finance* 54, no. 3 (1999): 953–80; Goetzmann, W. N., and P. Jorion. "Re-emerging Markets." *Journal of Financial and Quantitative Analysis* 34, no. 1 (1999): 1–32; and Goetzmann, W. N., L. Peng, and J. Yen. "The Subprime Crisis and House Price Appreciation." *Journal of Real Estate Finance and Economics* 44, no. 1–2 (2012): 36–66.

managers—and their investors—are no longer in your historical sample. Lucky gamblers can thus *appear* to be skillful.²⁴

Knowing how important historical performance data is to investors, even managers with no skill can game the collective databases. For example, in one of our studies, using data from a leading hedge fund data vendor, we found that hedge fund managers who beat the pack in the first half of the year reduced risk in the second half. In another study, we found a wide range of “information-less” strategies could generate high *ex post* historical performance metrics.²⁵ In short, even the *anticipated* use of comparative performance history can affect manager behavior.

Mitigation

As a quantitative researcher, the lesson I’ve learned is to ask why the data exist, and what similar data might have not survived. The deeper you dive in your quest to increase the size of your sample, and decrease the standard error of your estimates, the larger the potential problems of selection bias loom. For example, investors are typically interested in investment managers whose past returns are good. We found that due diligence reports on hedge fund managers are more likely to be commissioned—and therefore exist—when past returns are high, and after investment, returns on average revert to the mean.²⁶ The past can’t be expected to repeat when you condition on exceptional performance.

²⁴ Ibid.

²⁵Goetzmann, W., J. Ingersoll, M. Spiegel, and I. Welch. “Portfolio Performance Manipulation and Manipulation-proof Performance Measures.” *Review of Financial Studies* 20, no. 5 (2007): 1503–46.

²⁶Brown, S., W. Goetzmann, B. Liang, and C. Schwarz. “Trust and Delegation.” *Journal of Financial Economics* 103, no. 2 (2012): 221–34.

When historical data are subject to *ex post* conditioning, like survival, or filtering on size, liquidity, or any one of a number of features that make collection and calculation convenient, it can result in unusual biases in all sorts of statistical tests.²⁷ For example, it is tempting to believe that market prices bounce back after crashes—or that dividend yields revert back to average. However, this can only happen if the company or the market survives.²⁸

There are a few basic approaches to dealing with these biases. None are perfect, but some can help. From the perspective of investment practice, when you are considering a new asset class—like cryptocurrency—ask yourself why it has come to your attention. When constructing a database to study the risk and return characteristics, avoid backfilling. Collect data you know were available in real time. Do not ignore or omit problematic, messy, or incomplete records. These may contain useful information about market failure.

There are also econometric techniques to correct for selection and survival bias.²⁹ Even simple adjustments can mitigate certain survivorship problems. For example, volatility is a potential predictor of extreme negative returns and disappearance. The Sharpe ratio scales

²⁷Brown, S. J., W. N. Goetzmann, and S. A. Ross. “Survival.” *Journal of Finance* 50, no. 3 (1995): 853–73.

²⁸Goetzmann, W. N., and D. Kim. “Negative Bubbles: What Happens After a Crash.” *European Financial Management* 24, no. 2 (2018): 171–91; Goetzmann, W. N., and P. Jorion. “A Longer Look at Dividend Yields.” *Journal of Business* 68, no. 4 (1995): 483–508.

²⁹See Heckman, J. J. “The Common Structure of Statistical Models of Truncation, Sample Selection and Limited Dependent Variables and a Simple Estimator for Such Models.” *Annals of Economic and Social Measurement* 5, no. 4 (1976): 475–92. And an application in Brown, S., W. Goetzmann, B. Liang, and C. Schwarz. “Trust and Delegation.” *Journal of Financial Economics* 103, no. 2 (2012): 221–34.

excess return by standard deviation, which has the effect of making it more robust to survival bias.³⁰

Extremely Interesting Events

Because my professional career spans more than three decades, I've seen plenty of crashes. Financial historians become instantly popular when these events occur. People want to know how the current experience compares to famous events of the past: the crash of 1973, the Great Crash of 1929, the panic of 1907, and so forth. This selective focus on crashes gets in the way of a reasoned use of historical data.

Investors also worry a lot about bubbles. In a rapidly rising market, fears of a crash loom large. To see how frequent bubbles really were, I once identified all the times in global equity markets when the index level boomed—that is, doubled in real terms in a given year. I then counted the times this boom was followed by a crash of 50 percent or more over the next year and over the next 5-year period. Bubbles by various definitions are really rare. Crashes are not particularly likely after a boom. Markets that doubled were just as likely to double in the following year as to halve in value. For longer term investors, the 5-year results are even more reassuring.³¹

Humans seem to react much more to catastrophes than to good news.³² Perhaps this is a natural survival instinct. Crises threaten

existence; windfalls do not. My coauthors and I have studied a very long-term investor survey conducted by Robert Shiller. It began, in fact, as a way to understand investor thinking after the 1987 crash. One question asks about the probability of a crash in the Dow Jones Index occurring in the next 6 months—on the scale of the crashes of 1929 or 1987. Perhaps primed by reference to history, individual investors, on average, seem to believe that a huge crash had a 20 percent chance of occurring in the next 6 months. It is equivalent to believing a 100-year flood happens every 20 years. A selective focus on historical disasters ignores all the other valuable historical information in the interim and may distort our perspectives on investment risk.

Most Important Investment Expectation for the Future

I hope the barriers to investor diversification will continue to fall and opportunities for widespread participation in global growth will increase. I first learned about the capital asset pricing model (CAPM) as an abstract theory. I've since come to think of it as a social goal: universal, equitable participation in global economic growth. Common ownership of the world wealth portfolio aligns interests and equalizes access.

The constant innovation in the financial sector has certainly advanced this process. At their best, new financial products are mechanisms to access more of the world wealth portfolio for investors. The lessons of the past can be extremely useful guides for contemplating the positive and negative potential effects of new financial tools and markets.

³⁰Brown, S. J., W. Goetzmann, R. G. Ibbotson, and S. A. Ross. "Survivorship Bias in Performance Studies." *Review of Financial Studies* 5, no. 4 (1992): 553–80.

³¹To account for survival bias, I used a follow-forward database of global capital equity markets that included multiple failed markets and did not backfill markets.

³²Goetzmann, W. N., D. Kim, and R. J. Shiller. "Crash Beliefs from Investor Surveys." NBER Working Paper Series No. 22143. Cambridge, MA: National Bureau of Economic Research, 2016.

2020—MAUREEN O'HARA

Robert W. Purcell Professor of Finance, Cornell University



PROFESSIONAL ACCOMPLISHMENTS

- Author of *Market Microstructure Theory* (Hoboken, NJ: Blackwell, 1995)
- Developer of PIN and VPIN models
- President of the American Finance Association

INFLUENTIAL INVESTMENT PUBLICATIONS

Written

- *Market Microstructure Theory*. Hoboken, NJ: Blackwell, 1995.
- “Price, Trade Size, and Information in Securities Markets” (with D. Easley). *Journal of Financial Economics* 19, no. 1 (September 1987): 69–90.
- “One Day in the Life of a Very Common Stock” (with D. Easley and N. Kiefer). *Review of Financial Studies* 10, no. 3 (Fall 1997): 805–35.
- “Is Information Risk a Determinant of Asset Prices?” (with D. Easley and S. Hvidjkaer). *Journal of Finance* 57, no. 5 (2002): 2185–223. Winner of the Smith-Breedon Award.

- “Presidential Address: Liquidity and Price Discovery.” *Journal of Finance* 58, no. 4 (2003): 1335–54. Winner of Smith-Breedon Award.
- “Flow Toxicity and Liquidity in a High Frequency World” (with D. Easley and M. Lopez de Prado). *Review of Financial Studies* 25, no. 5 (May 2012): 1457–93.
- “Footprints on a Blockchain: Information Leakage in Distributed Ledgers” (with R. Aune, A. Krellenstein, and O. Slama). *Journal of Trading* 12, no. 2 (Summer 2017): 5–13. Winner of the Peter L. Bernstein Award.

Read

- Bagehot, W. “The Only Game in Town.” *Financial Analysts Journal* 27, no. 2 (1971): 12–14, 22.
- Almgren, R., and N. Chriss. “Optimal Execution of Portfolio Transactions.” *Journal of Risk* 3, no. 2 (Winter 2000): 5–39.

IMPORTANT INVESTMENT LESSONS LEARNED

Market structures change, but they still have to provide liquidity and price discovery—and the details of market design matter.

IMPORTANT INVESTMENT EXPECTATIONS FOR THE FUTURE

Changes in fixed income trading, new ETF structures, and the evolution of cryptocurrency microstructures present huge opportunities for investment management.

ANY PROFESSIONAL REGRETS

None—I've loved being part of both the academic and—via boards—the practitioner sides of finance.

SUMMARY

I have spent my career working as a finance professor where my research has focused on market microstructure. My early book in this area (*Market Microstructure Theory*) defined market microstructure as the study of the process and outcomes of exchanging assets under explicit trading rules. I became interested in this area because so much of finance abstracts from the actual process by which asset prices are formed, focusing instead on the underlying properties of the assets themselves. Although this latter area is surely important for investment management, so, too, is the actual process of buying and selling those assets. This is because prices are not magically efficient but become so through the trading process. The trading process also affects the overall return to investments by affecting the costs of trading strategies.

My work, along with my coauthors and others working in the field, has helped clarify the nature of trading costs and the important role that information plays in price adjustment. The focus on microstructure shifted the traditional view of spreads (and trading costs) from

reflecting things like fixed operating costs of intermediaries or the market power of dealers to include the broader effects of losing to counterparties with better information. This insight, originally put forth by Jack Treynor (writing as Walter Bagehot in the *Financial Analysts Journal*) in “The Only Game in Town,” led to the development of a literature examining how trades can convey information and how the market can learn by watching these trades and other trading information such as trade size, volume, and trade imbalance. In turn, this learning leads to revised expectations of what the asset is worth—and so a road map for how market prices become efficient.

This focus on information in trading is central to microstructure research, and it has led to a wide range of applications for investment management. I became aware of this practical importance when I served for many years on the board of Investment Technologies Group (ITG), now a part of Virtu Financial. ITG operates trading platforms for institutional traders and developed one of the earliest crossing networks. Crossing networks match traders, often mutual fund portfolio managers, wishing to rebalance and so buy or sell a large quantity of a stock. Matching orders and crossing them at the midpoint of the spread reduces the trading costs for both parties. But it is crucially important that these matches involve so-called liquidity trading; if the counterparty is a hedge fund trading on information, then the other trader will lose due to subsequent adverse price movements. Designing the rules of the trading system to avoid such an outcome is important for the success of a crossing network.

More generally, any sort of market, platform, or trading strategy design must consider the impact of information-based trading on market outcomes. If a venue is viewed as too favorable

to informed traders, then uninformed traders (or, more to our subject, portfolio managers) should trade elsewhere. The same is true of a trading strategy; if the strategy is too predictable then the trader will be picked off by opportunistic traders anticipating their order flow. But how to measure such asymmetric information risk? And how to design trading strategies to avoid this? For that matter, how do you even know what your trading costs are?

These are all areas where microstructure research comes into play. Over the past several decades, I have seen dramatic changes in trading cost measurement, evolving from simple models comparing your costs to metrics like the volume weighted average price to more complex models capturing the complex intraday patterns of equity trading. Once you can measure trading costs, you can optimize them. Starting with Almgren and Chris (2000), there is now an extensive literature on how to trade. Indeed, virtually all institutional trading today involves trading algorithms designed to find the liquidity in the market and avoid trading when it will be costly. These models all exploit features of the microstructure.

Again, however, an important consideration in minimizing trading costs is to avoid being adversely selected. But how can you do so? I, along with David Easley and Nicholas Kiefer, designed models to estimate this risk. These early PIN, or probability of informed trade, models help explain the direct influence of informed trading on trading costs. A more recent evolution of such models is VPIN, the volume-synchronized probability of informed trade model I developed with David Easley and Marcos Lopez de Prado. This model is adapted to a high frequency world and is designed to detect intraday variability of order flow toxicity (the more modern name given to market

conditions that feature asymmetric information). Such measures proved helpful in anticipating the flash crash and also can be the basis of more complex, cost-reducing trading algorithms.

What should we expect going forward? Investment professionals are now well aware of the importance of trading algorithms and transaction cost analysis for their bottom line. And gone are the days where you simply send in a market order and forget it. But markets and trading systems continue to change, new products evolve, and the search for liquidity remains fundamental to investment performance. Let me close with three areas that I am currently researching and their implications for investment managers.

First, the trading of asset classes outside of equities is changing rapidly. Electronic trading of corporate bonds, for example, has gone from single digits to a substantial proportion of trading very rapidly. Dealers now face competition from new entrants like Jane Street who post bids and offers on these electronic platforms. But bigger changes may be coming. Changes to bank regulations intended to strengthen market stability have also reduced the trading capital available to dealers. Can the role of liquidity provider be done by others? Large institutional investors like insurance companies naturally hold corporate bonds—why not act as liquidity providers in electronic trading platforms? Moreover, with multiple venues now available, the rise of fixed income trading algorithms as well as transaction cost analysis is here. I believe fixed income trading will involve massive innovation over the next few years, leading to lower trading costs and higher returns to investment managers.

A second area is the growth of ETF-based investing. The evolution of ETFs from large

scale index products to today's myriad offerings is nowhere near its end. In some recent work, we have captured this active role of "passive investments" and discussed the implications for markets more generally. In my view, the ETF structure offers many benefits, and so it is not surprising to see new variants emerge that look more and more like active management products. The new so-called active ETFs featuring reduced visibility into holdings and daily changes in composition are one example.

Finally, there is the crypto world. Here the prospects are both exciting and puzzling. The former because it is not clear exactly what these products are worth, and the latter because the microstructure of how these products trade is sorely in need of change. I think understanding the limitations of this market structure is a necessary step, and one that will help clarify the role crypto assets can play going forward.

2021–ASWATH DAMODARAN

Professor of Finance, Stern School of Business,
New York University



PROUDEST PROFESSIONAL ACCOMPLISHMENTS

- Being a teacher. I classify everything that I have written under the heading of “the world will little note nor long remember” this, but I hope that with my teaching, I have changed people’s mindsets a little, and some of their lives, hopefully for the better.

INFLUENTIAL INVESTMENT PUBLICATIONS

Written

- *Narrative and Numbers: The Value of Stories in Business*. New York: Columbia Business School Publishing, 2017. This book forced me out of my comfort zone (numbers) and made me think about my weak side (story-telling). And it was so much fun to write.
- My blog posts. They are raw, poorly edited, and sometimes repetitive, but they are the most honest representation of how I feel and think about markets and companies, in the moment, and without the benefit of hindsight.

Read

- Fama, E. F. “Efficient Capital Markets: A Review of Theory and Empirical Evidence.” *Journal of Finance* 25, no. 2 (1970): 383–417.
- Ellis, Charley. *Winning the Loser’s Game*, 8th ed. New York: McGraw-Hill, 2021.
- Mauboussin, Michael. *More Than You Know: Finding Financial Wisdom in Unconventional Places*. New York: Columbia Business School Publishing, 2007.
- Kahneman, Daniel. *Thinking Fast and Slow*. New York: Farrar, Straus and Giroux, 2013.

IMPORTANT INVESTMENT LESSONS LEARNED

Value and price are different concepts, come from different processes, and can yield different numbers for the same asset at the same point in time.

IMPORTANT INVESTMENT EXPECTATIONS FOR THE FUTURE

No matter how prepared we are, the market will surprise us.

ANY PROFESSIONAL REGRETS

None. I am eternally grateful for being able to do something that I love to do (teaching) for a living.

SUMMARY

Price and Value: Navigating the Divide!

Price and value, two words we often use interchangeably, are determined by different forces, require different processes to estimate, and can not only yield different numbers for the same investment, but stay apart for long periods. I wish someone had told me that when I started my investment journey, because it would have saved me immense amounts of time and frustration along the way. I could blame academia, beguiled by beliefs about efficient markets, where price and value always converge, for the failing, but in the decades that I have spent

talking to practitioners, I have discovered that they are just as casual about using these terms.

The value of an asset is a function of three variables: the level of cash flows, the growth in these cash flows, and the risk that the expected cash flows will not be delivered. The price of an asset is determined by market demand and supply, and while fundamentals (cash flows, growth, and risk) play a role, mood, momentum, and other behavioral forces often matter far more (**Figure 3**).

In intrinsic valuation, we try to connect value to fundamentals, with discounted cash flow models representing their most comprehensive form. In pricing, we assess what market participants will pay for an item or asset by evaluating what they are paying for similar assets. Put simply, if you use a multiple and peer group pricing to attach a number to an asset or company, you are pricing a company, not valuing it.

If value comes from cash flows, growth, and risk, it stands to reason that while some investments (assets with cash flows, shares in a business,

FIGURE 3. VALUE VERSUS PRICE

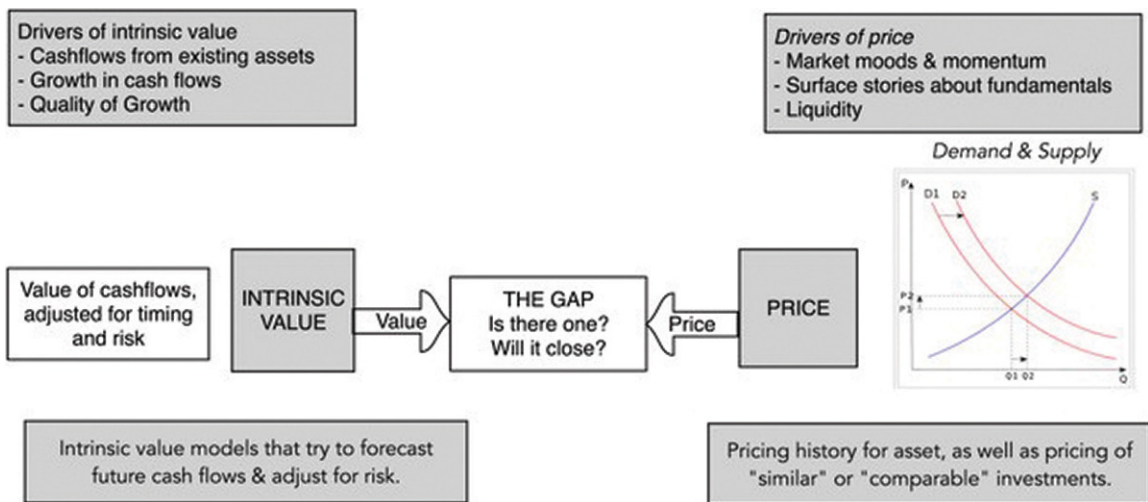


TABLE 1. ASSETS, COMMODITIES, CURRENCIES, AND COLLECTIBLES

	To Value	To Price
Assets	Can be valued based upon expected cash flows, with higher cash flows & lower risk = higher value	Can be priced against similar assets, after controlling for cash flows and risk
Commodity (oil, copper etc.)	Can be valued based upon utilitarian demand and supply, but with long lags in both	Can be priced against its own history (normalized price over time)
Currency (Fiat & crypto currencies)	Cannot be valued	Can be priced against other currencies, with greater acceptance & more stable purchasing power = higher price
Collectible (gold, fine art)	Cannot be valued	Can be priced based upon scarcity and desirability

bonds) can be both valued and priced, there are some that can only be priced (**Table 1**).

In particular, currencies and collectibles can only be priced, and anyone who claims to have valued Bitcoin, the US dollar, or gold is misunderstanding the essence of value.

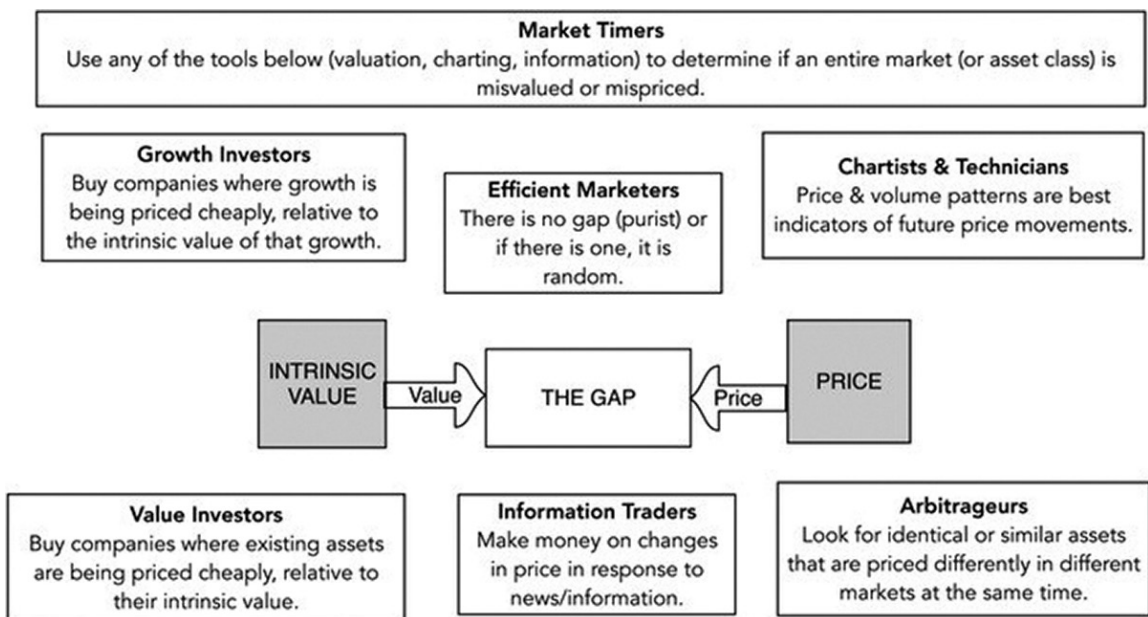
Almost every disagreement or difference in investing can be traced back to Figure 3, starting with the age-old debate about efficient markets. If you believe that markets are efficient, you are, in effect, arguing that there is either no gap between value and price, or that if there is a gap, it is random and cannot be uncovered by profit-seeking investors. You can divide those who believe that markets are not efficient into two groups: investors and traders. The former value companies, compare value to price, and buy (sell) those assets that trade at prices that are less (more) than value, and then hold on, hoping to make money on their convergence. Traders, on the other hand, make money off the pricing process, hoping to buy at a low price and sell at a higher one, and have little interest in fundamentals, making their money instead on assessing and riding momentum and its shifts. The strengths and personal characteristics that

you need to succeed at value investing are very different from the ones that you need to make money as a trader, and the two require very different tool kits (**Figure 4**). In fact, almost every strand of active investing, from market timing to growth investing to arbitrage trading, can be connected to the value/price contrast.

Unfortunately, it is those who are confused about the contrast between price and value who face the most danger in markets, as they bring the wrong tools to play the game. A trader who uses discounted cash flow models to make money is being delusional, as is a self-proclaimed value investor who uses charts and technical indicators to find stocks to buy.

My area of interest is valuation, and I find that many practitioners still do not understand the value/price divide, and the consequences are damaging. If you are estimating what you would pay for a stock, based upon price/earnings ratios and comparable companies, you have priced the company, not valued it. In the same vein, an analyst who does a discounted cash flow valuation, where the terminal value is estimated using a multiple (EV/EBITDA or EV/Invested Capital), is really doing a forward

FIGURE 4. INVESTMENT PHILOSOPHIES AND THE VALUE/PRICE DIVIDE



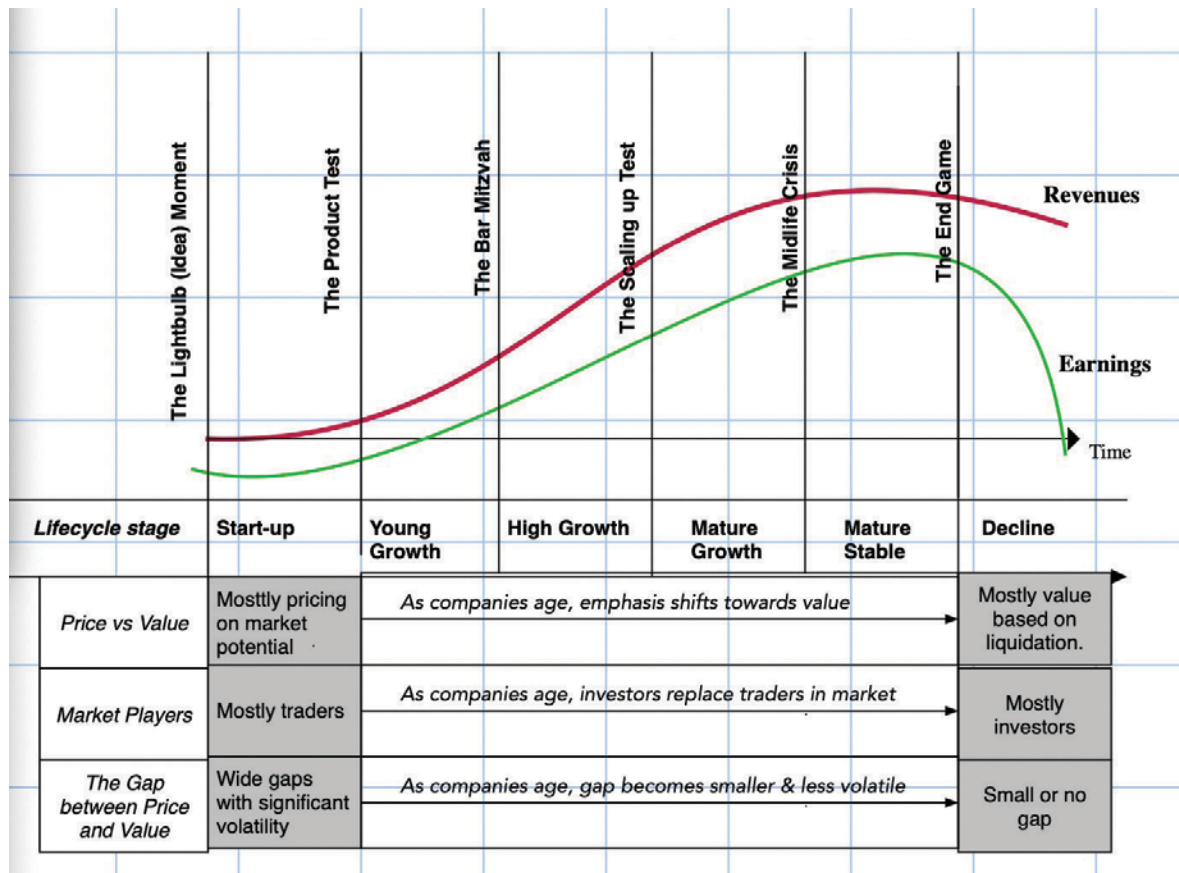
pricing, not a valuation, and should label it as such. I find fair value accounting to be an oxymoron, neither accounting nor value, but I have sympathy for accountants who have to estimate these “fair values,” since they face an impossible task. When the governing basis for fair value accounting, FAS 157 defines value as, “*the price that would be received to sell an asset or paid to transfer a liability in an orderly transaction between market participants at the measurement date,*” you have a pricing mission, not a value mission. Perhaps, it should be labeled “fair price accounting” and, rather than require accountants to back their numbers using discounted cash flow models, demand that they stick with pricing tools.

The companies that I most enjoy valuing are young companies, early in their life cycle, and analysts and investors tie themselves into knots because of their failure to understand the

difference between value and price, and how that contrast plays out across the corporate life cycle (Figure 5).

Put simply, uncertainty about the future is greatest at young companies, making valuation more challenging but not impossible. Most people, though, give up on valuation because of uncertainty, ceding the market for these companies almost entirely to traders, who play the pricing game. As companies get mature and there are more tangible numbers to measure growth and risk, you are more likely to see investors enter the game and traders exit. The consequence, then, is that the divergence between price and value is likely to be greatest at young companies and lessens as companies age. Since you make money off market mistakes (price being different from value), it is my view that the payoff to doing valuation is greatest early in the life cycle, when uncertainty about the future is greatest.

FIGURE 5. VALUE AND PRICE, ACROSS THE CORPORATE LIFE CYCLE



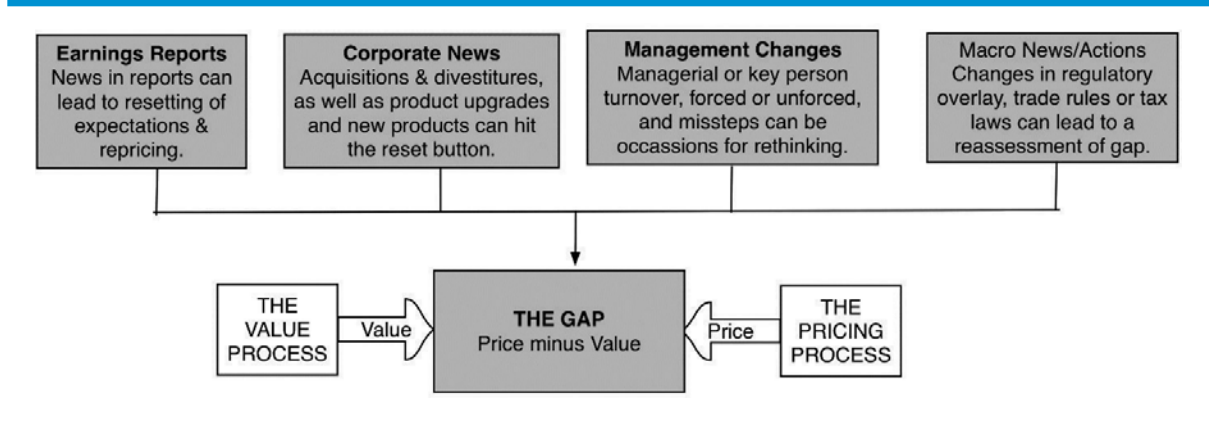
Finally, as I have discerned the difference between value and price, I have also come to recognize how much investing is an act of faith. I consider myself an investor who believes in value, although my definition of value may not pass muster among readers of Ben Graham. To act on my value judgments, I need faith in my own estimates of value and that the price and value will converge. The essence of faith is that you have to act without proof, and after 40 years of market experiences, I realize I will never have proof that the value that I attach to an asset or company is right, or a guarantee that the price

will adjust to value. Rather than trust that price and value will always converge, I have learned to look for my own catalysts (Figure 6).

Put simply, investment success requires not only good valuations and faith, but also efforts to find catalysts that trigger the convergence.

Having wrestled with the value/price divide now for three decades, I would be lying if I said that I have it figured out, but I do know that returning to that contrast has always helped me find my place back to investment understanding and serenity, whenever I am confused or adrift.

FIGURE 6. VALUE-PRICE GAP: CATALYSTS



1997—JACK TREYNOR IN MEMORIAM

President, Treynor Capital Management
Senior Fellow, Institute for Quantitative Research in Finance



Written in memoriam by Joanne M. Hill

MOST SIGNIFICANT PROFESSIONAL ACCOMPLISHMENTS

- Produced a legacy of lifelong contributions to the theory and practice of investment management that stand out even among the accomplished Vertin Award winners. His work in 1962 as a consultant for Arthur D. Little’s Operation Research Department and, during a sabbatical at MIT, quantified the role of risk in returns and discount rate and established himself as coinventor (with Sharpe, Lintner, and Mossin) of the CAPM.
- Published articles in the 1960s and 1970s, many with his mentee Fischer Black, that provided the framework and building blocks for what we now call quantitative investment management. Created the first framework for performance measurement incorporating risk, suggested an opportunity to modify risk based on investment views, and highlighted the role of market makers and setting the stage for the field of market microstructure.
- Served as editor of the *Financial Analysts Journal*, from 1969 to 1981, providing him a platform for publishing commentary on investment topics and also to foster what he described as “the ferment of research” in quantitative finance going on at the time.³³ As editor, he revamped the editorial board, solicited articles from presentations at CRSP conferences, and provided access to new approaches to portfolio management and security analysis at a time when institutional investment management was greatly expanding. Jack authored or coauthored 27 articles in the *Financial Analysts Journal* in a 50-year period, between 1968 and 2008.
- Earned the honor of being the most frequent presenter at the Q Group (Institute for Quantitative Finance)—over 30 times, between 1967 and 2015. Used Q Group’s semiannual conferences as a forum for sharing his insights and engaging with leading quantitative practitioners and academics in quantitative investing. The insights from

³³Treynor, Jack L. “Ideas for the People Who Make the Decisions.” *Financial Analysts Journal* 61, no. 4 (2005): 6–8.

these many presentations over the years, along with his service to Q Group, led the members to create an annual Jack Treynor Prize recognizing three superior academic working papers with potential applications in the fields of investment management and financial markets.

INFLUENTIAL INVESTMENT PUBLICATIONS

- Treynor, Jack L. “Toward a Theory of Market Value of Risky Assets.” Unpublished manuscript, 1962.
- Treynor, Jack L. “How to Rate Management of Investment Funds.” *Harvard Business Review* 43, no. 1 (1965): 63–75.
- Treynor, Jack L., and Kay Mazuy. “Can Mutual Funds Outguess the Market?” *Harvard Business Review* 44, no. 4 (1966): 131–6.
- Treynor, Jack L., William L. Priest, Jr., Lawrence Fisher, and Catherine Higgins. “Using Portfolio Composition to Estimate Risk.” *Financial Analysts Journal* 24, no. 5 (1968): 93–100.
- Treynor, Jack L., and Fischer Black. “How to use Security Analysis to Improve Portfolio Selection.” *Journal of Business* 46, no. 1 (1973): 66–86.
- Treynor, Jack L., and Fischer Black. “Portfolio Selection Using Special Information, under the assumptions of the Diagonal Model, with Mean-Variance Portfolio Objectives, and without Constraints.” In *Mathematical Methods in Investment and Finance 4*, edited by George P. Szego and Karl Shell, 367–384. Amsterdam: North-Holland, 1972.
- Treynor, Jack L., and Fischer Black. “Corporate Investment Decisions.” In *Modern Developments in Financial Management*, edited by Stewart C. Myers, 310–27. New York: Praeger, 1976.
- Treynor, Jack L. (as Walter Bagehot). “The Only Game in Town.” *Financial Analysts Journal* 27, no. 2 (1971): 12–14.
- Treynor, Jack L. *Treynor on Institutional Investing*. Hoboken, NJ: Wiley, 2007. (An anthology of Jack Treynor’s writings organized by topics: risk, performance measurement, micro- and macroeconomics, trading, accounting, investment value, active management, pensions.)

IMPORTANT INVESTMENT LESSONS LEARNED FROM THEIR WORK

Incorporating risk into discount rates, return expectations, performance measurement, along with implications for portfolio management, market making, and corporate and pension investment decision making.

IMPORTANT INVESTMENT EXPECTATIONS THEY HAD FOR THE FUTURE

For Jack’s last talk at Q Group in 2015 he looked to the future of investment research on the occasion of the dedication of the annual Jack Treynor Prize for outstanding academic working papers. He chose to comment on the current rapid pace of innovation in physical science fields like molecular biology, astronomy, physics, computer science, and communication technology that continue on today. He was

disappointed that this rate of discovery was not occurring at the same pace in the social sciences as it was in the early days of his career. For example, the application of operations research to finance in the 1950s and 1960s was as an example of this physical science research philosophy of discovery leaking over into the social science of economics. Jack gave us the challenge to pick up the pace of discovery and innovation in our field of the social sciences by focusing on more problem-solving research and relying more on practitioners to seek to be discoverers of the yet unknown truths in our field.

ANY PROFESSIONAL REGRETS

I think Jack would answer this by saying he wished he had more time to conduct problem-solving research in finance and economics and to engage with attendees at Q Group meetings on new research coming out of academia. He would also want to pursue his interest in model trains and the boogie-woogie piano music of his youth. He would likely say he never gave enough credit to his wife Betsy, a Smith college graduate in German literature, who helped him get his ideas and articles in print and who many of us enjoyed seeing at his side at conferences.

SUMMARY

It is no accident Jack was the second person (after William Sharpe) to be recognized with the Vertin Award. His work on developing the capital asset pricing model (CAPM) along with articles he authored in the 1960s and 1970s, many with his mentee Fischer Black, provided the framework and building blocks for what we today call quantitative investment management. As early as 1958, during a summer vacation from his consulting job at Arthur D. Little, Jack

started to produce extensive notes on the mathematics of incorporating risk into discount rates for capital projects and return expectations for investments. This led to a sabbatical at MIT where he studied economics and econometrics under Franco Modigliani and produced a paper drafted in 1960 and presented in 1962, which made him a coinventor (with Sharpe, Lintner, and Mossin) of the CAPM. Jack also created the first framework for performance measurement incorporating risk, featured in an article in the *Harvard Business Review* in 1965, “How to Rate Management of Investment Funds.” Former *Financial Analysts Journal* editor Stephen Brown, in his memorial to Jack in 2016, said that his insights in this article went even beyond the CAPM.³⁴ According to Brown, Jack not only talked about the importance of risk being measured “with respect to the choices made by diversified investor,” but also acknowledged that fund managers can adjust risk based on their investment views, setting the stage for what are now known as dynamic trading strategies.

As a graduate finance student in the mid-1970s, I was exposed to the brilliance of Jack Treynor’s numerous *Financial Analysts Journal* articles along with several articles coauthored with Fischer Black, including “How to Use Security Analysis to Improve Portfolio Selection,” in the *Journal of Business* in 1973. These articles, along with his editorial work for the *Financial Analysts Journal*, established him as one of the luminaries of the emerging field of finance—a new branch of economics that was drawing on operations research, mathematics, and statistics. The work of Jack and others during the 1960s and 1970s produced the CAPM, fundamental equity factors, Black Scholes valuation of contingent claims, index funds, and applications

³⁴Brown, Stephen J. “In Memoriam: Jack Treynor.” *Financial Analysts Journal* 72, no. 4 (2016): 5–6.

of optimization in portfolio management, leading to a revolution in thinking about investment and portfolio management.

Jack's role as editor of the *Financial Analysts Journal* in those key years from 1969 to 1981, according to Andrew Lo, placed him "in a position to shape the intellectual course of an industry. Using his editorship as a bully pulpit, Treynor promoted the new quantitative ideas in financial analysis over the objections of the old guard."³⁵ His editorial influence was significant, delivered through his regular editorial letters and published articles, many of which have become classics of investment management, including some written under the pseudonym Walter Bagehot. One of these was a 1971 four-page article, "The Only Game in Town," focusing on the role of market makers that anticipated the whole field of market microstructure literature, including models offered by Kyle and others in the mid-1980s.

Jack personally described his period as *Financial Analysts Journal* editor in a retrospective published to mark the 60th anniversary of the journal, "I liked the work. I liked the chance to do my own thing...It was a time when institutional money management—mutual funds and pension funds—was expanding rapidly."³⁶ He highlighted key articles by Modigliani and Miller, Markowitz, and Sharpe, and the establishment of the CRSP research center at the University of Chicago by Fischer and Lorie, which made data available to researchers during this period. This was a time when he could solicit articles from "people stirring up this ferment of research" to

provide "a natural pool for helping the *Financial Analysts Journal* spread ideas of modern finance to the practitioner community."³⁷

Although Jack Treynor is probably best known for his pioneering work on how discount rates and performance should depend on risk, he also subsequently made numerous other early contributions in the areas of performance evaluation, risk management, trading analytics, and inflation dynamics. Jack's frequent presentations at the Q Group (Institute for Quantitative Finance) were his way of sharing his thoughts with the institutional investment community, with leading academics assembled at Q Group sessions to present their working papers, along with other individuals recognized as senior fellows such as Harry Markowitz, William Sharpe, Merton Miller, Myron Scholes, Robert Merton, and Marty Leibowitz. The topics were varied, ranging from an early presentation in 1974, presciently entitled "The Coming Revolution in Investment Management," to others highlighting the important role of pension liabilities to corporations in 1975, and liquidity and asset prices in 1978. He also gave several talks on equity valuation, inflation, interest rates, municipal bonds, exchange rates, market bubbles, time diversification, as well as the value of control and brand franchise.

Along with his role as a Q Group senior fellow, Jack served for decades on the organization's research committee, whose main function was to review proposals for research grants from leading finance academics (he jokingly called me "boss" as its chair). This provided him a way of staying in touch with emerging research ideas from academia. In 2014, the Q Group decided to move from awarding research grants to giving a prize each year to recognize three outstanding academic working papers. There was

³⁵Lo, Andrew W. "Jack Treynor: An Appreciation." In *Portfolio Construction, Measurement and Efficiency, Essays in Honor of Jack Treynor*, edited by J. B. Guerard. New York: Springer, 2016.

³⁶Treynor, Jack L. "Ideas for the People Who Make the Decisions." *Financial Analysts Journal* 61, no. 4 (2005): 6–8.

³⁷Op. cit.

INVESTMENT LUMINARIES AND THEIR INSIGHTS

strong support for naming this prize after Jack, given his decades of contributions as a presenter and research committee member. Now the Q Group's annual Jack Treynor Prize recognizes three superior academic working papers with potential applications in the fields of investment management and financial markets.

Members of the Q Group looked forward twice a year to seeing Jack sitting in the front row in his "Q" outfit—tan shorts, yellow sweater, wool beanie—and also enjoyed spending time with his wife Betsy. He became part of the whole experience that made Q Group seminars special

to all of us, and we miss seeing him there and being inspired by his passion for new investment ideas and applications. So many of us in quantitative investments benefited over the decades from Jack's articles and insights and his editorial work at the *Financial Analysts Journal*. As the current chair of the Research Foundation and a new member of the board of governors of CFA Institute, I intend to honor Jack Treynor's legacy by encouraging the pace of innovation in support of problem-solving, quantitative research in finance, as he called for in his last opportunity to speak at Q Group.

2000—PETER BERNSTEIN IN MEMORIAM

Founder, Peter L. Bernstein, Inc.

Written in memoriam by Punita Kumar-Sinha, CFA



MOST SIGNIFICANT PROFESSIONAL ACCOMPLISHMENTS

- Brought academic theory and practical knowledge together for the investment management community in a way that no one else did. He was a master at simplifying complex ideas and rooting them in the history of economic thought. A historian by temperament, he made financial history come alive for generations of investors and showed how it can be used to improve investment decisions.
- Authored the classic books *Against the Gods: The Remarkable Story of Risk* and *Capital Ideas: The Improbable Origins of Modern Wall Street*. He also wrote journal articles and a biweekly newsletter for the investment profession. His passion for writing led him to be the founder (with Gilbert Kaplan) and first editor of the *Journal of Portfolio Management*. The journal brought together articles from academics, practitioners, investment management clients, and others such as bankers and regulators. In contrast to the academic

finance journals, which focus more on theory, the *Journal of Portfolio Management*, now nearly 50 years old, is eminently readable and lives on as one of Peter's chief legacies.

- Along with others, redefined investment risk to include interpretations beyond the variability or standard deviation of asset values, embracing concepts such as the probability and severity of possible losses. His book *Against the Gods* is a comprehensive history of risk and probability, from options traders in ancient Greece to modern chaos theory.

INFLUENTIAL INVESTMENT PUBLICATIONS

Written

- *Against the Gods: The Remarkable Story of Risk* (Hoboken, NJ: John Wiley & Sons, 1996). It won the Edwin G. Booz Prize for the most insightful and innovative management book of 1996. In 1998, it was awarded the Clarence Arthur Kulp/Elizur Wright Memorial Book Award from the American

Risk and Insurance Association (ARIA) as an outstanding original contribution to the literature of risk and insurance. The book has sold over 500,000 copies worldwide.

- *Capital Ideas: The Improbable Origins of Modern Wall Street* was published in 1992 by The Free Press in Vancouver, Canada, and Maxwell Macmillan International in New York, and has become a classic guide to modern portfolio theory along with its successors in quantitative thinking about investment management.
- *Capital Ideas Evolving*, the sequel to this seminal work, was published in May 2007 by John Wiley & Sons (Hoboken, NJ).
- *Streetwise: The Best of the Journal of Portfolio Management*, edited by Peter L. Bernstein and Frank J. Fabozzi, was published in 1997 by Princeton University Press (Princeton, NJ).
- *The Debt and the Deficit: False Alarms/Real Possibilities*, coauthored with Robert Heilbroner, author of the popular economics book *The Worldly Philosophers*. This book was written in the context of the 1988 US presidential election to discuss deficit spending and its advantages and disadvantages. It was published by W.W. Norton & Co. (New York) in 1989.
- “The New Religion of Risk Management.” *Harvard Business Review* (March–April 1996): 47–51.
- “What Risk Premium is ‘Normal’?” (with Robert D. Arnott). *Financial Analysts Journal* 58, no. 2 (March–April 2002): 64–85.

IMPORTANT INVESTMENT LESSONS LEARNED FROM THEIR WORK

- History is always and everywhere relevant to current investment decisions.
- The concept of risk includes the probability and severity of likely loss under different scenarios.
- The efficient market hypothesis is subject to challenge, and one must consider the likelihood that not all information is reflected in security prices.

IMPORTANT INVESTMENT EXPECTATIONS THEY HAD FOR THE FUTURE

Investors should abandon the belief that future events are due to chance (what the ancient Greeks called the whims of the gods) and embrace the notion that we are active, independent agents who can manage risks and define our own future.

ANY PROFESSIONAL REGRETS

Peter would have liked to live long enough to complete the book *The Moral Hazard Economy*, which he was working on when he died in 2009 at the age of 90.

SUMMARY

Peter Bernstein (January 22, 1919–June 5, 2009) was a legendary thought leader who shaped

INVESTMENT LUMINARIES AND THEIR INSIGHTS

the intellectual lives and practical actions of many illustrious investors. He was a financial historian, economist, writer, and educator, and was well known for popularizing and presenting investment economics to the finance community.

A graduate of Harvard College, where he received a bachelor's in economics and graduated *magna cum laude*, Bernstein had stints at the Federal Reserve Bank of New York, the US Office of Strategic Services, and then the Air Force during World War II. He also taught at Williams College before joining his family firm, Bernstein-Macaulay Inc., where he managed billions of dollars of individual and institutional portfolios. He sold his firm in 1967 after the assets under his management had grown more than tenfold. He then resigned in 1973 to launch Peter L. Bernstein, Inc., a consulting firm, and, a year later, founded and became the first editor of the *Journal of Portfolio Management*.

Bernstein also served for many years on the visiting committee to the economics department at Harvard University, as a trustee and member of the finance committee of the College Retirement Equities Fund (CREF), a financial adviser to Children's Television Workshop (*Sesame Street*), and as a trustee of the CFA Institute Investment Management Workshop. He also lectured worldwide on risk management, asset allocation, portfolio strategy, and financial history.

Bernstein sought to bring academics, practitioners, clients, and others onto a common platform for ideas and discussion through his "baby," the *Journal of Portfolio Management*. He wrote 10 books on economics and finance as well as countless articles in professional journals such as the *Harvard Business Review*, the *Financial Analysts Journal*, and, in the popular press,

New York Times, *Wall Street Journal*, *Worth* magazine, and Bloomberg, among others, and has contributed to collections of articles published by Perseus and FT Mastering, among others. His books include *Against the Gods: The Remarkable Story of Risk*; *Capital Ideas*; *A Primer on Money, Banking and Gold* (New York: Random House, 1965); *An Economist on Wall Street* (New York: Macmillan, 1970), and *The Price of Prosperity* (New York: Doubleday, 1962), in addition to two books on government finance coauthored with Robert Heilbroner.

Bernstein's other books are *The Power of Gold: The History of an Obsession*, published in the fall of 2000 by John Wiley & Sons (Hoboken, NJ), and *Wedding of the Waters: The Erie Canal and the Making of a Great Nation*, published in 2005 by W.W. Norton & Co. (New York). The latter book received a John Lyman Book Award (honorable mention) from the North American Society for Oceanic History, cementing Bernstein's reputation as a general (not specifically a financial) historian.

Peter Bernstein was the subject of a remarkable tribute in a special section of the *Journal of Portfolio Management*, Volume 35, written by luminaries including Frank Fabozzi (Peter's successor as editor of the journal); Nobel Prize winners Harry M. Markowitz, Robert C. Merton; Paul Samuelson, William Sharpe, and Myron Scholes; and Robert Arnott, Theodore Aronson, John (Jack) Bogle, Russell Fogler, Gary Gastineau, Bruce Jacobs, Kenneth Levy, Gilbert Kaplan, Mark Kritzman, Martin L. Leibowitz, Andrew Lo, Burton Malkiel, Laurence Siegel, Meir Statman, and Jack Treynor.

Arnott called him the "best writer in the field of finance," and Siegel, writing elsewhere, referred to him as "the philosopher-king of the investment profession." Jack Bogle wrote that "when

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we stand on the shoulders of Peter Bernstein, we stand on the shoulders of a true investment giant.” Andrew Lo said that “the investment industry owes him a huge debt of gratitude—not only for [the *Journal of Portfolio Management*], but also for his remarkably insightful newsletters and his direct contributions as CEO of Bernstein-Macaulay.” Harry Markowitz added: “For modern financial theory Peter Bernstein was like the Apostle Paul who spoke to the masses beyond the initiate. In addition to being the most articulate among us, our Peter was the kindest of men.”

Bernstein has been awarded many awards from CFA Institute including:

- The Award for Professional Excellence, AIMR’s highest award,
- The Graham and Dodd Award, given annually for the outstanding article in the *Financial Analysts Journal* for the previous year, and
- The James R. Vertin Award, recognizing individuals who have produced a body of research notable for its relevance and enduring value to investment professionals.

Peter was survived by his wife Barbara, who was his partner and best friend, and by his grandson, Peter Brodsky.

2002—WILLIAM FOUSE IN MEMORIAM

Cofounder, Mellon Capital Management

Written in memoriam by Wayne Wagner



MOST SIGNIFICANT PROFESSIONAL ACCOMPLISHMENTS

- At Wells Fargo Bank, Fouse was pivotal in getting institutional investors to buy the index fund as a superior solution for equity management over active management.
- After forming Mellon Capital Management, Fouse expanded the efficient market concept to a wide variety of timing, multi-market, and concept-rich applications with broad market appeal.

- *Asset Allocation Decisions in Portfolio Management* (with Kathleen A. Condon and Mark P. Kritzman). Charlottesville, VA: The Institute of Chartered Financial Analysts, 1982.
- “New Directions in Index-Based Management.” *Financial Analysts Journal* 54, no. 4 (1998): 18–20.
- “The Small Stocks Hoax.” *Financial Analysts Journal* 45, no. 4 (Jul.–Aug. 1989): 12–15.
- “Allocating Assets Across Country Markets.” *Journal of Portfolio Management* 18, no. 2 (Winter 1992): 20–27.

INFLUENTIAL INVESTMENT PUBLICATIONS

Written

- “Is Beta Phlogiston?” (with William W. Jahnke and Barr Rosenberg). *Financial Analysts Journal* 30, no. 1 (January-February 1974): 70–80.
- “Risk and Liquidity: The Keys to Stock Price Behavior.” *Financial Analysts Journal* 32, no. 3 (May–June 1976): 35–45.

IMPORTANT INVESTMENT LESSONS LEARNED FROM THEIR WORK

- The index fund is the most effectively diversified and cost-effective solution for institutional and individual equity portfolios.
- Modern capital market theory and traditional investment management practice can be combined into widely applicable solutions for institutional investors.

IMPORTANT INVESTMENT EXPECTATIONS THEY HAD FOR THE FUTURE

It would be easy to say that he changed the world of investing. He did. Yet he was a man just barely ahead of his time; the contributions he made were sitting there on the shelf, waiting for someone to carry them forward. He did.

ANY PROFESSIONAL REGRETS

I took Bill to lunch monthly until his passing. I never detected any regrets. He took charge of his whole life, and made it work for him. Who could ask for anything more?

SUMMARY

William F. “Bill” Fouse lived to see his ideas and commitment emerge to reshape the business of money management. This was quite an accomplishment for a small-town kid who earned his way through college playing clarinet and saxophone in jazz bands.

After graduating from the University of Kentucky with a degree in business administration, Fouse began his career in the Trust Department at Mellon Bank in Pittsburgh. Trust investment then, and particularly at Mellon Bank, was dominated by Graham and Dodd analyses of published income and asset statements. After becoming aware of the questionable performance of active portfolio management, Fouse began to wonder whether there might be a market for a portfolio that mimicked the entire stock market. This idea gained zero traction in the bank hierarchy, which accused him of “trying to turn this job into a science.”

After eighteen years at Mellon, it was time for him to leave, and he set his sights on San Francisco’s

Wells Fargo Bank. Wells Fargo’s robustly funded Management Science Department was heavily involved in trying to develop applications within the evolving “science” of modern portfolio theory (MPT), which received heavy input from “the Chicago boys,” including Merton Miller, Jim Lorie, Bill Sharpe, Gene Fama, and, most notably, Myron Scholes and Fischer Black.

In Denver, another University of Chicago graduate student was working for his father who ran the Samsonite Luggage Company. He became concerned that the pension portfolio lacked a consistent objective and application. He suggested that Wells Fargo was doing interesting work that might create something akin to a low-cost market representative portfolio.

On July 1, 1971, the first passive investment fund went live with \$6 million. The Management Science Department did the spadework, but the operations and marketing fell into the hands of Fouse. The era of the “index fund” was underway.

The investment world was shocked, and the reaction was intense and incensed. The index fund was widely mocked and dismissed as mediocre and “un-American.”

The negative publicity had a countervailing effect: it aroused curiosity and interest. Fouse geared up to take advantage of the increased attention. He became the pied piper of indexing, convincing large pension funds that they could achieve better performance at a much lower cost. Illinois Bell became the first convert when Fouse pointed out that their extensive stable of managers, when aggregated, approximated the total market—but with high costs leading to inferior total performance.

Fouse went on the road, giving speeches, writing papers, and meeting pension fund investors across the country. He convinced them of the science and the performance of indexing. Over

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a five-year period, Wells Fargo captured many more accounts and adherents. *Institutional Investor* magazine reported that Wells Fargo garnered more new accounts from the 350 largest pension funds than any other money manager.

As a bank, Wells Fargo could not offer a mutual fund because of the Glass Steagall Act, which separated banking from investment in 1932. Indexing was now big business, and Wells Fargo was the unquestioned leader, although it was limited to separated pension accounts.

The retail markets were unplowed fields. Many people believe that Jack Bogle at Vanguard Group created the first index fund. Bogle did bring index investing to the masses with the first *public* index mutual fund, but Fouse beat him to the market with an index fund service available only to institutional investors. Four years later, Bogle came to San Francisco to scope out how to operate an index fund within a mutual fund marketplace. Fouse and his associates filled him in on the details. Bogle ran with it.

Over time, the atmosphere at Wells Fargo changed: managing hundreds of billions of dollars required different skills than Fouse's evangelistic efforts. Competitors were rising, and index fund management was becoming a low-profit business. New leadership was inevitable, but Fouse chafed under it. It was time for new thinking, a new environment. It was time for Fouse to strike out on his own.

Fouse left Wells Fargo in 1983, setting up Mellon Capital Management and continuing his quest for innovative ways to manage money. He recycled his earlier thoughts about the dividend discount theories of John Burr Williams. He also thought that other products could be designed that met differing needs of different investors. He anticipated that capital market theory would lay the groundwork for innovations, such as "smart betas," algorithmic trading, and other

groundbreaking uses of data, technology, and behavioral finance.

In Fouse's words from an interview with the CFA Society of San Francisco:

I have to say that my proudest achievement is instigating the formation of a company called Mellon Capital Management. It has been a success in the marketplace, a success in its strategies, and a success for its people. There are also a few personal things I've done which are a source of pride for me:

- I was the first person who integrated the capital asset pricing model with the dividend discount model.
- I developed the first ex ante security market line, as opposed to an ex post one.
- I was also the first person to come up with an asset allocation model that was formal in nature, and which went on to be a success.
- I am also certainly proud of the fact that I was involved with indexing from ground zero.

Fouse's 1976 article "Risk and Liquidity, Keys to Stock Price Behavior" earned him the Graham and Dodd Award.

Fouse retired with his wife Linn in 2014 to his beautiful home in sunny San Rafael, California. He enjoyed big band music, good food, fine wines, and a daily Manhattan—always made with his favorite Whistle Pig bourbon. He lived long, and lived well, for 91 years. Who could ask for anything more?

2019—JOHN "JACK" BOGLE IN MEMORIAM

*Founder and Chief Executive, The Vanguard Group
Investor, author, and philanthropist; champion of
the individual investor; pioneer of the index funds*



Written in memoriam by Diane Nordin, CFA

SIGNIFICANT PROFESSIONAL ACCOMPLISHMENTS

- Founded the Vanguard Group in 1974 and led the mutual fund company as CEO—Vanguard is known for offering low-cost investment alternatives as a means to increase long term returns and pioneered no-load mutual funds
- Promoted the concept and practice of Index investing and in 1976 launched the Vanguard 500 fund as the first index fund marketed to retail investors
- Authored multiple best-selling books and was a prolific public speaker
- Named in 1999 by *Fortune* magazine as “one of the four investment giants in the twentieth century”

INFLUENTIAL INVESTMENT PUBLICATIONS

Written

- *Common Sense on Mutual Funds: New Imperatives for the Intelligent Investor*. Hoboken, NJ: Wiley, 2000.

- *The Little Book of Common-Sense Investing: The Only Way to Guarantee Your Fair Share of Stock Market Returns*. Hoboken, NJ: Wiley, 2007.
- *Enough: True Measures of Money, Business, and Life*. Hoboken, NJ: Wiley, 2010.
- *John Bogle on Investing: The First 50 Years*. Hoboken, NJ: Wiley, 2015.
- *Bogle on Mutual Funds: New Perspectives for the Intelligent Investor*. Hoboken, NJ: Wiley, 2015.

IMPORTANT INVESTMENT LESSONS LEARNED FROM THEIR WORK

Jack was an ardent proponent of long-term thinking, patient investment style, and prudent fund design. He believed chasing market returns with high turnover investment approaches wipes out most or all of the gains an investor would otherwise earn. He practiced what he preached with the Vanguard family of mutual funds focusing on no-load, low-cost, low-turn-over portfolios—many of which are passively managed.

Although the company is a well-known innovator, Vanguard Group was known to stick to a small number of simple and proven funds and resist jumping into trendy product offerings.

IMPORTANT INVESTMENT EXPECTATIONS THEY HAD FOR THE FUTURE

Jack's early vision (1970s) of the virtues of index investing was slow to catch on. He lived to see the philosophy and approach gain popularity and fierce fund family competition result in compressed fees. Jack predicted that few large players would dominate the space and the boom in passive investing could lead to concentrated and powerful blocks for corporate proxy voting, something which concerned him.

ANY PROFESSIONAL REGRETS

Jack Bogle was a generous philanthropist. He cofounded the John C. Bogle Center for

Financial Literacy in 2010. He was quoted in an interview that his greatest regret was that he didn't have more money to give away.

SUMMARY

In a 2007 interview with *Fortune* magazine, he mentioned he made his biggest mistake as a young executive. Prior to founding Vanguard, when Jack was head of Wellington Management Company, he promoted an unwise merger and as a result got fired as CEO. Importantly, while the merger had elements of poor judgment which he regretted, he said the difficult experience taught him many lessons. The silver lining was that if he had not been fired, he would not have gone on to launch Vanguard.

TESTIMONIALS: WHAT THE VERTIN AWARD RECIPIENTS' RESEARCH MEANS TO ME

Aaron Low, CFA

Vice Chair, CFA Institute Research Foundation

The accelerating metamorphosis from a physical to a digital world, especially in the business sphere, spells how we can imagine work and progress to change. And, with it, the players involved. A skilled worker no longer competes only with their peers in this new age. And in the age of the knowledge worker (as coined by Peter Drucker), research plays an important role. At its very foundation, research embodies the purist way to achieve new knowledge through diversified methods and methodologies. In many ways, the transformation of research into knowledge and wisdom for humans (what we focus on) is similar to, and no less important than, the processing of big data into information for machines (what computer science rages on). This sets the stage of how the knowledge worker can best function in an information age.

At the Research Foundation, we proudly recognize leading research excellence through our Vertin Award winners, including the many others who have contributed to the progress of the state of our knowledge in the investment research world. Making this a non-rivalrous and non-excludable public good for the benefit of society has allowed them to not only claim success but, more critically, achieve significance. And we are delighted to be able to celebrate their contributions in this publication.

We are indeed excited about the future of research. Understanding finance through the

fascinating kaleidoscopic lens of multiple disciplines allows us to craft amazing progress. Founded on the fundamentals of traditional accounting and business disciplines, finance and investments have benefitted from insights and research methodologies from the social sciences (behavioral finance), physics and mathematics (options pricing and financial engineering), statistics (mean variance asset valuation), computer science (digital assets and decentralized finance), economics (too many to mention), biological science (recurrent neural networks in deep learning), legal (ethical investing), and so on.

Just as how high frequency data in the days of the NYSE TORQ tic data spawned new ideas on market microstructure, we are seeing how alternate data are pushing boundaries in algo trading and how machine learning is increasingly available in retail brokerage accounts (IB Python) and not just restricted to institutional accounts (BQNT in Bloomberg). And in theoretical finance, the classic narrative of initial rejections by premier journals to the seminal research of Fischer Black and Myron Scholes on option pricing (using heavy nontraditional physics and mathematical models) reminds us of how far we have come in terms of embracing different approaches to orthodox thinking. It is this openness in the acceptance and infusion of different ideas from various disciplines that makes finance as exhilarating as it is frustrating.

One of the most controversial crossroads we currently encounter in research is perhaps the area of digital or crypto assets. It almost seems the camps are polarized on either side of the aisle. Traditional finance appears to have a difficult time blending digital technology into an asset that lends itself to conventional analysis, and policymakers have a harder time regulating it with the right touch. On the other side, technology enthusiasts plough away at developing new complex foundations in the digital financial structure, ever so sure that the crypto Temple Mount has come closest to a Holy Grail of digital finance. And surely the amount of research resources dedicated to the building of this digital asset space is nothing short of amazing. As researchers, we need more evidence to take a bolder stance. This is where more independent research would serve us well in better understanding this new world. And it is in examples like this that I believe the Research Foundation has a role to play in facilitating the appropriate inquiries that can better shed wisdom.

More importantly, in the area of environmental, social, and governance (ESG) investing, there is surely much work that can be done in forming new investment models and thinking that can harmonize real returns with sustainability metrics. In the words of Albert Szent-Györgyi, “Research is seeing what everybody else has seen and thinking what nobody else has thought.”

BILL FUNG, CHAIR, RESEARCH COMMITTEE, CFA INSTITUTE RESEARCH FOUNDATION

Around 1995 I was tasked with assessing the performance of a multiple strategy trading company. It was essentially a portfolio of dynamic, long/short, leveraged investment strategies

applied to a wide range of global assets. The questions were: is there alpha, and what are the risks? Those were the early days of hedge fund databases, and David Hsieh and I were fortunate to have access to beta versions of some of the datasets. In theory, the combination of long/short, leveraged strategies over multiple assets is infinite. My instinct from interviewing hedge fund managers and researching into fund prospectuses was that there was more similarity than there were differences. Empirically, hedge funds’ returns do cluster, and their characteristics can be captured by a small number of drivers. Independently, Stephen Brown and *Will Goetzmann* reported similar findings. It was encouraging that researchers of that caliber reached concurring conclusions.

Based on these findings, the challenge was to establish the key strategies that drove these performance clusters. The groundbreaking work of *William Sharpe* on fund managers’ styles provided the vital clue. Following his model, David and I were able to map these performance clusters to popular descriptions of hedge fund styles based on hedge fund managers’ returns. To complete the analysis, we needed to construct a tractable set of rule-based investment strategies whose returns mimic the performance of hedge fund managers’ styles. Here we appealed to the seminal work of Eugene Fama and *Kenneth R. French* on risk factors. Expanding on their model, we identified nonlinear factors that capture the performance characteristics of diversified hedge fund portfolios with surprisingly high explanatory power. These findings were encapsulated in a hedge fund factor model that we published in the *Financial Analysts Journal* in 2004.³⁸

The search for alpha, however, begins with identifying the most cost-efficient beta investment

³⁸See “Hedge Fund Benchmarks: A Risk-Based Approach” *Financial Analysts Journal* 60, no. 5 (Sep–Oct 2004): 65–80.

that serves as a baseline for placing capital at risk. Fashioned after the capital asset pricing model applied to publicly traded equities, *John Bogle's* successful delivery of index funds has benefited millions of investors for decades and most likely will for many more to come. Today, indexed equity products are synonymous with the beta in one of the iconic models of modern finance. In addition, their stellar performance echoes the “triumph of the optimists” who believed in markets and capitalism. Some years ago, I had the opportunity to communicate with the late James Vertin, one of the pioneers of index funds, on the type of achievements his award should honor. This communication led us to honor *Elroy Dimson's* contribution to the development of index fund products in capital markets internationally.

Looking back, it was a privilege to benefit from the foundational work of the industry's giants, and standing on their shoulders afforded me further insight into active, alpha-oriented strategies.

LOTTA MOBERG, VICE CHAIR, RESEARCH COMMITTEE, CFA INSTITUTE RESEARCH FOUNDATION

The Vertin Award winners constitute a list of some of the most influential contributors to understanding the field of finance, market, and investor behavior. Several of them have impacted me profoundly in my understanding on finance and economics. As a macro investor, I ponder the big questions about what moves markets in the long run and the impact on markets from economic growth, underlying earnings, and regulations.

Finance sometimes seems a stagnant field when it comes to answering the big questions about

how markets work. The capital asset pricing model (CAPM) was a milestone in thinking about market equilibrium. Vertin Award winner *Jack Treynor* deserves to be recognized as the person who first drafted up the model. We are still living in a world of great adherence to CAPM and the belief that most investors act similarly on similar information most of the time.

However, CAPM also suggests that we all make the same perfect optimizations, and all invest in the very same portfolios. Many of the great thinkers who earned the Vertin Award realized that this was not the case. We like to think that the world is nicely integrated when looking at our historical data but, as *Kenneth R. French* has shown, markets are littered with home bias, as though people believe that returns in their own country will always be higher than elsewhere.

Besides not allocating in line with some unified investable portfolio, investors also trade more and move prices around in ways not predicted by the standard models. *Robert Shiller* helped me see how markets do indeed not behave as the aggregate behavior of perfectly calculating uniform investors, and he also looked into the behaviors that drive this market structure. Beyond humanly emotional behaviors, I have strived to understand how imperfections of markets also stem from institutional context and regulation. As Vertin Award winner *Maureen O'Hara* showed, a regulation like the Volcker rule of 2010 can upset market structure by causing illiquidity in markets.

Another great eyeopener for me was *Andrew Lo's* hypothesis about adaptive markets, which allows us to envision market actors as species in the course of evolution. Those who survive, as Charles Darwin taught us, are not the strongest but those most adaptive to change. That is worth pondering for those making a living out of optimization models.

Fundamental macro investing is ultimately about understanding the economic drivers of returns. How does economic growth turn into earnings that turn into price increases, in turn? *Roger Ibbotson* has done great work on these questions, which has benefitted me greatly in my work of infusing valuation models with economic fundamentals and empirically sound assumptions.

It is not always easy to be an active asset allocator in a world in which more money keeps flowing into passive vehicles. On this point, *Peter Bernstein* has written thoughtfully about the opportunities of active investments. His words have allowed me to comprehend how active allocation can indeed be a winning proposition.

These Vertin Award winners have opened our eyes to some of the biggest questions in finance. I have benefitted greatly from standing on the shoulders of these giants of our industry and anticipate that I will benefit from their work for many years to come.

LAURENCE B. SIEGEL, GARY P. BRINSON DIRECTOR OF RESEARCH, CFA INSTITUTE RESEARCH FOUNDATION

Bill Sharpe casts a long shadow over the entire investment profession, and thus over my own work and my understanding of markets. What I call the fundamental theorem of investing is that all desirable portfolios consist of a mix of the riskless asset and a Markowitz-efficient portfolio of risky assets. This concept slightly predates Sharpe (it is due to Jim Tobin) but became much richer with Sharpe's insight that the risky portfolio should consist of a cap-weighted index fund of all of the assets in the risky opportunity set. This is the essence of

Sharpe's capital asset pricing model (CAPM), and all of modern finance springs from it.

Purists will argue that the CAPM is *less* than that; it is a descriptive model of the cross-section of expected returns—that is, the differential expected returns on assets with different betas. But it stretches very readily into a prescriptive model of how to construct portfolios. And our current obsession with index funds and asset mixes along the efficient frontier is a direct outgrowth of Sharpe's 60-year-old insight.

Roger Ibbotson gave me my first job, placing me on the steepest part of the learning curve at a young age. He was engaged in the odd-seeming, but—it turned out—universally useful, project of measuring the historical returns of every asset class in the world. Before Ibbotson and Sinquefeld, no one knew what the words *equity risk premium* meant, what that premium had been numerically or would be in the future, or how large the variation of realized returns around the expected return was likely to be. After their Stocks, Bonds, Bills, and Inflation (SBBI) dataset work (now a CFA Institute Research Foundation product), everyone did. My son discovered the SBBI poster on the wall of his high school's economics classroom; he was more than a bit surprised to find that the mysterious diagram on which my boss and I had worked for so long was part of his schoolwork.

Roger's interests have wandered all over the field of finance, including capital market history; the role of human capital, annuities, and life insurance in financial planning; the supply and demand for capital market returns; and the creation of a hedge fund based on his new popularity asset pricing model. The field is much richer for these contributions.

Peter Bernstein was the philosopher-king of the investment profession. Retired from actively

managing money at a relatively young age, Peter became a prolific author and pioneering journal editor whose mission was to bring the best thinking in academic and practitioner investment research to the forefront of investors' attention. He also became a personal mentor to me, propelling me from a data-oriented position at Ibbotson Associates to the direct management of assets at the Ford Foundation at a time when I most needed it. Peter's greatest contribution was his masterly suite of history books, the best of which are *Against the Gods* and *Capital Ideas*. He was also a uniquely entertaining and kind man, to whom everyone was a friend. I thank him from the bottom of my heart.

Marty Leibowitz created the modern science of fixed-income analysis and added greatly to our understanding of equities and asset-liability portfolios. But his influence on others is Marty's greatest achievement. A remarkable number of people call him their "rabbi"—both on the sell side when he was at Salomon Brothers and later Morgan Stanley and on the buy side at TIAA. That is the highest praise a mentor can receive. For decades, Marty has been a key leader of the Institute for Quantitative Research in Finance, known as the Q Group, where I've met and associated with many of the industry's leading lights, and he is always quick to share the limelight, gather a large lunch table of friends and acquaintances, and show the occasionally tough characters who populate the world of finance what it means to be a gentleman.

If Peter Bernstein was the investment profession's philosopher-king, Will Goetzmann is its Renaissance man. He's a finance professor; chronicler of ancient, medieval, and modern history; maker of films; designer of statistical learning tools ("Will Goetzmann's Learning

Curves"³⁹); analyst of hedge funds; student of the markets for art and real estate; and historian of the art of the American West and of the Viking period in Scandinavia ... shall I stop now? As someone said of Benjamin Franklin, few people have done so many things so well.

As I wrote in 2019 in a review of Goetzmann's fine book, *Money Changes Everything*, history matters because of the lessons it provides for our own time. Bubbles, crashes, frauds, and shattered dreams have marred the shiny edifice of financial technology and institutions since the beginning of recorded time. By learning about them we may be able to avoid or mitigate future disasters.

And Will Goetzmann is perhaps the best-positioned person in the world to provide those lessons.

LUIS GARCIA-FEIJOO, CFA, RESEARCH DIRECTOR, CFA INSTITUTE RESEARCH FOUNDATION

Recipients of the James R. Vertin Award have produced a body of research that has defined the theory and practice of modern finance. Along the way, they have had a remarkable impact on the education of CFA charterholders. This connection to the CFA Program is an important aspect worth highlighting. Jim Vertin himself was a charterholder and a very active volunteer for what is now known as CFA Institute.

When I went through the CFA Program, the CFA curriculum consisted of chapters and other readings selected from outside sources, frequently published books. One such book

³⁹See <https://viking.com.yale.edu/will-goetzmans-learning-curves/>.

was Frank Fabozzi's *Handbook of Fixed Income Securities*, an impressive book (both in content and weight) that taught me the logic, complexity, and deep practical relevance of fixed income. Over the years, I have heard from many charterholders words of pride, and gratefulness, from having learned fixed income from the *Handbook*.

Another book that made a big impact on my CFA Institute education was Aswath Damodaran's *Investment Valuation*. The book contains many specific examples that work effectively to teach a general lesson about the importance of assumptions in equity valuation (or any type of valuation). Additionally, the book explains in clear and simple terms the complicated and extensive relations among internal and external factors influencing valuations. Many charterholders recognize him as an extremely good communicator, uniquely gifted to teach valuation.

The CFA Program curriculum also included a few research articles from academic journals. I remember an article by Campbell Harvey on emerging markets, and specifically on the impact of financial liberalization on the cost of capital. I remember recognizing the value of a piece of research on international markets that was relevant in academic and practical terms, and that could be understood and appreciated by both experienced professionals and newbies to the CFA Program. Some of Harvey's research would fittingly become a Research Foundation monograph in the 1990s; and it has recently come back to the Research Foundation as the foundation for the *International Guide to the Cost of Capital*, summary edition.

The work of the recipients has also influenced the evolution of the CFA curriculum, as a reflection of changes in the industry extending or qualifying modern portfolio theory. For example, Robert Shiller and Terry Odean made it possible for professionals to critically question

the application of tools based on rational and efficient markets, and to look for alternative solutions based on what would later become behavioral finance. Maureen O'Hara brought to light and made rigorous sense of the infrastructure needed to support financial markets. From a different perspective, Kenneth R. French made size and style portfolios and factors available for everyone to use, allowing for the profession to advance, and for students to learn, in a more efficient fashion—smart betas were around the corner.

I am thankful to each and every one of the recipients because their work has helped me understand and appreciate the field of finance. And as a CFA charterholder, I am especially thankful to Jack Treynor for his influence on the *Financial Analysts Journal*, and, of course, to Jim Vertin.

NERINA VISSER, CFA, SOUTH AFRICA (CFA CHARTERHOLDER, RECEIVED 2003)

The list of Vertin Awards winners reads like the who's who of the investment industry and the reference list of a finance curriculum. As a more mature investment professional, who only came into the industry at the ripe age of 30, my first introduction to the finance and investment industry came through the theoretical learnings of these luminaries and others. Their impact came to life once I started to apply this in practice, build on it, evolve my own understanding, and use it to venture into uncharted territories.

My intersection with (some of) the individual winners of the Vertin Award is a specific reflection on the direction of my personal career—first as a quant, and later as an index pundit. Looking through the list of recipients evokes

memories of both theory and practice, and gives me cause for reflection and inspiration. The Sharpe ratio is right up there with Newton's laws and Einstein's theory of relativity—never in my wildest dreams did I think that the individual who lent his name to the infamous ratio was a living, breathing, and, dare I say, peer of mine. Thinking that prophets are seldom recognized and honored in their living years, I did not think that anyone with a financial and investment metric named after them could still be alive and continue to contribute to the body of knowledge. It was a lightbulb moment for me—and planted the seeds of possibility—when I realized that if William Sharpe (Sharpe ratio), and Kenneth R. French (Fama-French factors), and Roger Ibbotson (SBB database), Elroy Dimson (DMS dataset), and others like them could be recognized in their own lifetimes, and make a difference in the world around them in such a profound way, that perhaps I too could be a small cog in the giant wheel of global finance and investment that makes the world go around, and hopefully change it for the better.

Never could I imagine that I would get to meet some of these winners in person—Robert Shiller, Ronald Kahn, Aswath Damodaran—all courtesy of the CFA community and the incredible opportunities afforded to members to network and interact on a global and equal footing. But by far the most important one for me was John C. Bogle. Meeting him in person at the annual CFA investment conference in Philadelphia in 2017 turned me into a teenage groupie—I was simply in awe of him—his simplicity, his authenticity, his integrity, his humility. As we say in Africa, Viva Jack Bogle Viva! (*Loosely translated to: long live Jack Bogle!*)

But I am also old enough not to be embarrassed to admit that not all the names on the list jumped out at me from the memories of

either my education journey or my investment career. Marty Leibowitz. Andrew Lo. Keith Ambachtsheer. Terry Odean. Will Goetzmann. This list points to the topics where my investment knowledge is clearly still short, even amateurish. Will I ever reach the mile-deep learner level or even applied learner level on these? Unlikely. But the lifelong learner in me will feed her curiosity monster by looking beyond the shoulders of these “new” giants on her awareness radar, and find new frontiers, if not for investing, then definitely for awareness, learning, and understanding.

And what about the noticeable exclusions? The potential list is endless, but at the risk of leaving out many infinitely worthy recipients, the most surprising exclusion for me, personally (thus biased due to my own focus and interest), would be Harry Markowitz—his seminal work on modern portfolio theory, basing portfolio selection on the efficient frontier model, was the basis for my own master's thesis. Further along the trajectory of my career after my academic introduction to the investment industry, I miss Charley Ellis from this list—for the sheer simplicity and honesty of his research, his practice, and his writings. Technically, and for their foundational work in the derivatives world (there goes the quant in me again), I search for Fischer Black and Myron Scholes on the list, and they're not there. And in acknowledgment of the critical roles that psychology and behavior play in investment success, Daniel Kahneman shines in his absence—although it is probably not too late.

But ultimately when I look to the future—not just of the global investment industry, but also to the next 25 winners of the Vertin Award until the golden jubilee—I would expect to see how the other half thinks, does, invests, writes. The other half, of course, as in women, but also, as in representatives beyond the United States and

other developed markets. As an emerging market investment practitioner, I usually come up short when I read articles, study research, evaluate models, and try to apply principles that are founded in deep, liquid markets with plenty of data. If we truly want a more inclusive global financial system, serving *all* the providers and users of global capital, we must apply our collective knowledge, skill, and insight to solve the complex problems that fall outside of the current scope covered by mostly developed market academics and practitioners. My head asks for future winners from China. My heart screams for Africa. Either way, the global investment world will be a better and more resilient place once we have these diverse investment perspectives incorporated in mainstream finance and investment approaches.

Standing on the shoulders of these giants—or at least, being elevated to above average heights by them—has allowed me to see much farther than I would otherwise have been able to. I dream of the day that the vision afforded to me and others by the future Vertin Awards winners will be that of an African landscape—land of opportunity and untapped resources, the breadbasket of the world, and the continent with the highest demographic dividend—and a foundation founded in the cradle of humankind, from which the wealth that is generated is truly applied for the ultimate benefit of society.

JAYESH BHANSALI,⁴⁰ CFA, UNITED STATES (CFA CHARTERHOLDER, RECEIVED IN SEPTEMBER 1999)

Vertin Award winners have deeply inspired and influenced my work over my three-decades-long

⁴⁰CIO and portfolio manager, IRIQIV, former lead PM, payout portfolio, head of quantitative fixed income

career as a portfolio manager and chief investment officer in the institutional asset management industry.

Alongside CFA Institute, Vertin Award winners have shaped the very foundations of our industry's investment frameworks and practices. Their wisdom and acumen and, therefore, contributions, have spanned a broad spectrum—from capital asset pricing to liability-driven strategic asset allocation, from atomistic portfolio construction and optimization to risk diversification/budgeting, and from behavioral finance to market macro- and microstructures.

My first important step towards honing my investment expertise was to invest my time and energy in acquiring the coveted CFA charter. While the charter helped build my foundational understanding, the work of luminaries, such as those done by Vertin Award winners, took my knowledge deeper and farther. As a seasoned practitioner across many asset classes and market cycles, I have come to appreciate that investing is both art and science. It is multifaceted and multidisciplinary. In essence, valuing any security (i.e., Fixed Income, Equity, or Alt.) should not be difficult. It entails three key assessments. First, what is the magnitude of the future cash flows; second, what are the timing of the cash flows; and last, but not least, how certain (risky) are those cash flows? But we as investment professionals know only too well that this is easier said than done.

The ability to draw on the expertise and experience of Vertin Award winners helped me become more well-rounded in my knowledge as well as its application. There are too many instances to name, where I drew on their expertise and experience. But I will highlight a salient few.

portfolio management and global derivatives at TIAA/Nuveen.

Early in my 23-years-long career at TIAA, I had the privilege of working for Vertin Award winner Marty Leibowitz when he served as the chief investment officer at TIAA-CREF. I recall a time when I was invited to speak at an institutional investor conference on liability driven investing (LDI). I had read Marty's copious work on the subject, which he had published several years prior on asset-liability management/surplus optimization.⁴¹ As I prepared for my talk, I realized that LDI was simply "old wine in a new bottle" as Marty's writings had revealed the groundbreaking paradigm well before LDI became a buzzword and mainstream business practice.

When I reached out to Marty to get his permission to use one his papers published during his days at Salomon Brothers in my presentation, he humorously agreed and quipped, "Jayesh, every time you use that paper, I will give you a penny for that..." Marty, you owe me a lot of pennies and I owe you a debt of gratitude for sharing so generously your findings and learnings that have served me and our industry so well, for so long. I feel both fortunate and humbled to have worked for Vertin Award winners like Marty. It is impressive and inspirational to see his dedication to our profession, even at the ripe age of 85!

Another Vertin Award winner, Peter Bernstein, influenced my thinking deeply in my role as PM (also the first line of defense in a Risk Management context) on multi-billion-dollar portfolios. I had been asked to present my views on "managing tail risk" at an investment committee meeting at TIAA. I started my presentation with the profound quote by the late Peter Bernstein, "Risk is a choice, rather than a fate." His seminal work and philosophy provide the edifice on which all tail risk management

strategies sit. I was able to build upon his framework and philosophy to educate the investment committee that even though tail risk in any portfolio is unavoidable and may be quantifiable, it does not make that risk toxic. Hedging all tail risk (at a fair equilibrium price) can prove very expensive and may be an imprudent approach as doing it indiscriminately one could lock in sub-par returns. Such counterintuitive concepts became easier to argue and apply due to the thought leadership provided by Vertin Award winners such as the late Peter Bernstein. The work of Vertin Award winners is not only groundbreaking in its time, but it has also stood the test of time as those ideas remain in vogue and in practice today, long after their chief protagonist is no longer amidst us.

Not only have I applied and benefitted from the work done by Vertin Award winners as a practitioner, I also teach their theories and frameworks as an adjunct professor of finance, teaching two graduate level courses—applied portfolio management and global risk management.

I believe the best way to pay tribute to the knowledge we inherited from them is to apply it in our own practice and to pass it on to the next generation of investment professionals and students. By doing so, we immortalize the rich legacy of research and writings produced by the finest minds our industry has to offer. I am grateful for the opportunity to learn and to be able to pay it forward. I humbly submit what Will Durant said so well: "We are all imperfect teachers, but we may be forgiven if we have advanced the matter a little and have done our best. We announce the prologue and retire; after us better players will come."

⁴¹Leibowitz, Martin, and Roy D. Henriksson. "Portfolio Optimization with a Surplus Framework." *Financial Analysts Journal* 44, no. 2 (March 1988): 43–51.

**CATALINA MAISONNAVE,
CFA, URUGUAY (CFA
CHARTERHOLDER, RECEIVED
2019), WITH BÁRBARA
MAINZER, CFA**

Finance is an industry in constant change. But there are certain things that remain unchanged. Among them, the lessons of those leaders in the investment field that shaped finance as we know it. Reviewing their timeless lessons is always enriching and inspiring.

And, in a world of constant change, we need to stay informed in order to make the best possible decisions. This document facilitates and promotes continuing education and professional excellence; it is a very valuable source of knowledge.

I have to admit that I do not recognize all the names of these great intellectuals, but I am very familiar with several of them who have influenced and continue to do so one way or another throughout my professional and intellectual career.

The first names that come to my mind are Ibbotson, Sharpe, Treynor, and French whose work I have studied during my career as an economist, as well as in the curriculum of the CFA Program. In addition, having worked in broker-dealers and wealth management firms for more than 10 years, several of the concepts—such as the Ibbotson–Chen and Fama–French models, Sharpe ratio, Treynor ratio—are tools that I apply when analyzing different financial assets or portfolios at work.

I also want to highlight the honor that it was for me to meet Aswath Damodaran in person in October 2018 and to find out that he is the 2021 winner of the Vertin Award. It is not common

to meet people of this caliber in my country, but through the CFA Society Uruguay in conjunction with the Universidad de Montevideo, it was possible. He held a seminar with high profile attendees (members of Uruguay’s financial community, including former ministers of economy, CEOs and CIOs of Uruguay pension funds, charterholders, among others) about corporate valuation, “Numbers and Narrative: Modeling, Story Telling and Investing,” during which I was able to witness firsthand one of the finest professors teaching about several of his asset valuation techniques, among other things, that I was able to put in practice later in my career.

I find the insight of these luminaries very useful. It provides valuable lessons especially for university students, candidates, and charterholders.

As a final comment, unsurprisingly, most award winners are male and mostly North Americans. It would be very nice to see a Latin American woman amongst the Vertin Award winners in the next 25 years.

**YIRAN SONG, CHINA (LEVEL III
CFA PROGRAM CANDIDATE),
WITH DAVID ZHANG**

As an analyst who did not graduate with a financial major, in conjunction with the CFA Program, the research led by the Vertin Award winners has helped me to establish a framework for further research on the economy and financial markets, systematically gain specialized knowledge, and precisely grasp the industry research trends on investment vehicles, asset valuation methods, portfolio management methods, and other aspects.

Vertin Award winners’ research bridges the academic research with practical implications in

the investment industry. Martin L. Leibowitz's research on asset allocation helped me to know how to make diversified investment in practice; the Sharpe and Treynor ratios showed me how to evaluate the performance properly. More importantly, cutting edge research—such as Maureen O'Hara's research on fintech and cryptocurrencies—broadened my horizons and enabled me to embrace new concepts in my investment decisions. It is worth noting that much of the research conducted by the Vertin Award winners led me to explore the financial industry, deepened my understanding of asset management, and established a solid foundation that enabled me to further develop as an investment professional in this exciting and fast growing market.

MICHEL BOUTROS, LEBANON (LEVEL III CFA PROGRAM CANDIDATE), WITH WILLIAM TOHME, CFA

As a Level III candidate from the Middle East, specifically from Lebanon, I recognize many of these names and the concepts they created from my time studying for the exam. Among many, people such as William Sharpe and Roger Ibbotson directly come to mind when one calculates the Sharpe ratio and the Ibbotson–Chen model, respectively, as they are frequently used either in the program or referenced during conversations with my peers. Other people that also come to mind are Kenneth R. French and Aswath Damodaran, as their concepts were vital during my experience in the CFA research challenge of 2019, during which, as university students, we had to value a company and present a professional equity report to a panel of diverse judges. For example, the Fama-French model that Kenneth R. French coengineered

was one of the techniques used as a pricing model for our valuation, alongside the ratings, interest coverage ratios, and default spread techniques of Aswath Damodaran, to arrive to the cost of debt of the company. In addition, due to my career and the social standings of my peers, I got to know about people such as Elroy Dimson through a webinar that he did with CFA Institute on financial history's lessons for present-day investors.

There are also many names that I do not recognize, but when I read their profiles, I realize their importance and impact on the financial field—such as Rex Sinquefeld who established the first commingled S&P index fund, Andrew W. Lo who was the originator of the adaptive markets hypothesis, and William N. Goetzmann who was the faculty director of the International Center for Finance at the Yale School of Management for 20 years, which collected long-term databases of securities markets for London, New York, Saint-Petersburg, and Shanghai, and distributed them freely for research. Moreover, I also enjoyed learning from the mistakes that the group listed as their most important lessons they learned, such as *“Managing investments is not like managing people. After you get your portfolio set up, it can run on autopilot for a while. There is no reason to constantly readjust unless you have a special edge, or you need to rebalance because the environment has dramatically changed. Instead, you can focus on long-term investment principles,”* by Roger Ibbotson. And these lessons helped in building their most important expectation for the future, such as, *“Rejoice in your material existence and make sure both you and your clients save your shekels, because low future returns mandate that you're all going to need to,”* by William Bernstein.

Finally, I noticed there were no real experts on Islamic finance in the group, although many

charterholders and industry experts have expressed their interest on the topic here in the Middle East as well as in the Asia Pacific and Australia region. I hope that maybe the next 25 years of Vertin Award winners will provide one.

URVASHI KHANDELWAL, INDIA⁴² (LEVEL II CFA PROGRAM CANDIDATE), WITH NIKIT TYAGI

As an aspiring finance professional and CFA Level II candidate from India, I have been following Aswath Damodaran through his website and YouTube channel for a long time. I have learned a lot about equity valuation and security analysis from his work and tried to use these concepts while creating my own portfolio. And how can an aspiring finance practitioner not know Prof Damodaran, right? To my own surprise, he is not the only renowned scholar I could relate to from the Vertin Awards winners list from CFA Institute. During my journey as a candidate of CFA exams, I came across the exceptional work of so many established authors and finance professionals whose work has shaped the future of finance, as we know it today. For instance, without John Bogle, index investing would not have been possible and personally it has helped me to invest in hundreds of stocks at low cost, which otherwise would have been incredibly hard to replicate at an individual level.

Whenever I try to make an investment decision, I often quote myself following lines from Peter L. Bernstein's book,⁴³ "The essence of risk management lies in maximizing the areas where we have some control over the outcome while

minimizing the areas where we have absolutely no control over the outcome and the linkage between effect and cause is hidden from us." Other names that come to mind are Kenneth R. French, for his three-factor model on asset pricing, and Richard C. Grinold for providing a quantitative framework for value addition through active management. I have covered these concepts in depth in the CFA curriculum.

I was really excited when I scrolled the list of Vertin Award winners and identified so many familiar names and their faces. But there were many winners I had not heard of, and when I read about their research work, I realized the impact of their work and contributions on the investment management industry. To quote a few examples, I engaged in a conversation with my colleague about the theories of Ronald N. Kahn and she had read his book, *The Future of Investment Management*, and gave descriptions of his seven insights into active management. I read about Frank J. Fabozzi, CFA, on the CFA Institute *Enterprising Investor* blog and observed how he has helped in the understanding of modern finance and his views on how conventional theories fail to explain actual market behavior. And finally, the extraordinary work of Nobel laureate Robert J. Shiller to conclude that markets are inefficient by predicting the stock prices over longer periods and did not reflect the expected dividends.

Finally, I couldn't help but notice that there is only one woman in this entire list. Being a woman myself, I would like to see more women contributing to the work in finance and getting recognized. Women like Maureen O'Hara are a beacon of light for many aspiring and young women professionals across the world, and especially in Asia, and I hope that in times to come more of us will be able to achieve excellence in the field of finance.

⁴²Participant in the Young Women in Investments (YWI) program and former intern at Edelweiss.

⁴³Bernstein, Peter L. *Against the Gods: The Remarkable Story of Risk*. Hoboken, NJ: Wiley, 1996.

GETTING THE MOST OUT OF THIS PUBLICATION

Bud Haslett, CFA, and Laura Jarrell

This publication is structured to provide the busy investment professional with the most efficient way to access the insights of the investment legends profiled in this book, as well as the testimonials on their work by investment professionals just like you. It is designed so that all five types of learners, identified in a recent CFA Institute/Kantar study, can quickly and effectively learn from these insights. Whether you have a few minutes or a few hours to review this book, you will surely be rewarded for your time and effort with many valuable insights into the investment profession.

ABOUT THE STUDY

CFA Institute commissioned Kantar, a data, insights, and consulting company, to conduct research to understand the learning behavior of CFA charterholders and identify distinct types of learners. In late 2019 the study surveyed 2,479 professionals in the CFA Institute global community and analyzed the results to arrive at five distinct learner types. CFA charterholders tend to be lifelong learners or applied learners.

This study also showed that the CFA charterholders typically spend a few hours a week learning, typically in small bursts and across a variety of formats. The motivations and preferences around learning vary by learner type.

Let's now examine how each type of learner can make the most efficient use of this publication, and you can decide for yourself the method of reading this book that works best for you.

- 1. Lifelong learners** like to discover different aspects of topics on their own and tend to jump right in when learning a new topic. They are motivated more by the enjoyment of learning than the functional outcomes. Learners like this can view the profiles one by one from the beginning and then use the appendices at the back to further investigate any specific areas they are particularly interested in and compare various responses in that area to better apply the insights learned from the experts.
- 2. Seasoned industry veterans** prefer a self-directed approach to learning and like to discover different aspects of a topic on their own. Learners like this can start at the appendices in the back of the publication and draw comparisons from various experts' responses. How do the most important things learned by the Vertin Award winners and the most important things they see for the future relate to your own thoughts on what you have learned and what might change in the future?
- 3. Clout chasers** look to maintain subject matter knowledge and skill sets as well as become and be seen as an expert in the industry. Learners like this can skim the full profile section and look over the appendices and decide which area is most important for keeping their knowledge and skill sets up to par. They can delve deeper in the content by reading the summaries and viewing the most important publications that were written and read by the Vertin Award recipients.

INVESTMENT LUMINARIES AND THEIR INSIGHTS

That way, they can learn more and develop their expertise in areas of interest.

4. **Mile-deep learners** prefer to go deep and master each topic and like to evaluate different ways to learn a topic before deciding how to approach it. The reading method for learners like this is perhaps reviewing the testimonies and why the research created by the Vertin Award recipients was important to those making the testimonies, and then deciding how they can best learn from the insights. A deep dive can be made by reviewing the referenced publications that are the Vertin Award winners' favorite and choosing those they find most valuable and then reading the complete publication.

5. **Applied learners** also tend to jump right into learning, like to learn by doing, and prefer to rely on experts to guide the learning approach. For those who favor this learning style, the experts among the Vertin Award recipients will guide the reader to start at the beginning of the profiles and review one by one. While reading, try to think of ways one can apply what the award winners are saying to their work and think of the benefits achieved by incorporating some of their thoughts into actions. That way, one is learning while actually doing.

So, no matter what type of learner you are, there are numerous insights that can be shared with you from the 25 years of Vertin Award recipients.

APPENDIX 1: INFLUENTIAL INVESTMENT PUBLICATIONS WRITTEN AND READ

“The more that you read, the more things you will know.

The more that you learn, the more places you’ll go.”

—Dr. Seuss

WILLIAM F. SHARPE

Written

- “Capital Asset Prices—A Theory of Market Equilibrium under Conditions of Risk.” *Journal of Finance* XIX, no. 3 (September 1964): 425–42.
- “Asset Allocation: Management Style and Performance Measurement.” *Journal of Portfolio Management* 18, no. 2 (Winter 1992): 7–19.
- “Efficient Retirement Financial Strategies” (with Jason S. Scott and John G. Watson). *Recalibrating Retirement Spending and Saving*, edited by John Ameriks and Olivia Mitchell. Oxford: Oxford University Press, 2008.

Read

- Markowitz, Harry. “Portfolio Selection.” *Journal of Finance* 7, no. 1 (March 1952): 77–91.
- Arrow, K. J. “Le rôle des valeurs boursières pour la répartition la meilleure des risques.” *Econometrie* 11 (1953): 41–47. Translation: “The Role of Securities in the

Optimal Allocation of Risk-bearing.” *Review of Economic Studies* 31, no. 2 (April 1964): 91–96.

MARTY LEIBOWITZ

Written

- *Inside the Yield Book*, 1st ed (with Sidney Homer). Hoboken, NJ: Prentice Hall, 1972—addressed some of the myths that were widespread in the bond market at the time.
- *Inside the Yield Book*, 3rd ed (with Stanley Kogelman and Anthony Bova). New York: Bloomberg Press, 2014—showed how common institutional and retail bond management practice of duration targeting leads to predictable yield-based realized returns—regardless of whether subsequent rates rose or fell.
- *The Endowment Model* (with Anthony Bova and Brett Hammond). Hoboken, NJ: Wiley, 2004—focused on the key role of equity beta in determining the risk characteristics of most diversified funds and pointed out how the stress beta effect in adverse markets could lead to portfolio declines that were far worse in the more diversified funds.
- Equity Duration Studies—addressed the challenges in applying the duration concept to equities: “Total Portfolio Duration,” *Financial Analysts Journal* (Sept/Oct 1986), applied the duration concept to the fund as a whole; “A Total Differential Approach to Equity Duration,” with Robert Arnott, Eric Sorensen,

and Nicolas Hansen, *Financial Analysts Journal* (Jan/Feb 1983)—how real rates and inflation can have very different effects on equity pricing; “Resolving the Equity Duration Paradox,” with Stanley Kogelman, *Financial Analysts Journal* (Jan/Feb. 1983)—ties real rate effects to associated prospects for earnings and price/earnings ratios.

- “Alpha Hunters and Beta Grazers.” *Financial Analysts Journal* (Sept/Oct. 2005)—the title tells most of the story.

Read

- Williams, John Burr. *The Theory of Investment Value*. Cambridge, MA: Harvard University Press, 1938.
- Sharpe, William F., and Lawrence G. Tint. “Liabilities—A New Approach.” *Journal of Portfolio Management* 16, no. 2 (Winter 1990): 5–10.
- Treynor, Jack. “Toward a Theory of Market Value of Risky Assets.” Unpublished manuscript (Fall 1962).

ROGER IBBOTSON

Written

- *2021 SBBI Yearbook: Stocks, Bonds, Bills, and Inflation*. New York: Duff & Phelps, 2021. Previous editions published by CFA Institute Research Foundation (1977, 1979, 1982, 1989); Ibbotson Associates (1983–2006); Morningstar, Inc. (2007–2015); and Duff & Phelps (2016–2020).
- *Lifetime Financial Advice: Human Capital, Asset Allocation, and Insurance* (with Peng Chen, Moshe Milevksy, and Kevin Zhu). Charlottesville, VA: CFA Institute Research Foundation, 2007.

- *Popularity: A Bridge between Classical and Behavioral Finance* (with Thomas Idzorek, Paul D. Kaplan, and James X. Xiong). Charlottesville, VA: CFA Institute Research Foundation, 2018.

Much of my career has been studying the demand and supply of capital market returns, starting with two *Financial Analysts Journal* articles:

- “The Demand for Capital Market Returns: A New Equilibrium Theory” (with Laurence B. Siegel and Jeffrey J. Diermeier). *Financial Analysts Journal* 40, no. 1 (January/February 1984): 22–33.
- “The Supply of Capital Market Returns” (with Jeffrey J. Diermeier and Laurence B. Siegel). *Financial Analysts Journal* 40, no. 2 (March/April 1984): 74–80.

Read

All of the work listed here not only guided my thinking, but the authors deservedly won Nobel Prizes.

- Harry Markowitz’s 1952 paper providing the mathematics of diversification and efficient frontiers.
- Two Miller and Modigliani papers on capital structure and dividend policy.
- Eugene Fama’s 1970 paper defining efficient capital markets.
- The Black and Scholes 1973 options paper.

REX SINQUEFIELD

Written

- *Stocks, Bonds, Bills, and Inflation: Historical Returns and Simulations of the Future* (with

Roger Ibbotson). Charlottesville, VA: CFA Institute Research Foundation, 1976–1989.

Read

- Fama, Eugene. “The Information in the Term Structure.” *Journal of Financial Economics* 13, no. 4 (December 1984): 509–28.
- Fama, Eugene, and Kenneth R. French. “The Cross-Section of Expected Stock Returns.” *Journal of Finance* 47, no. 2 (June 1992): 427–65.

EDWIN ELTON

Written

- “Marginal Stockholder Tax Rates and the Clientele Effect.” *Review of Economics and Statistics* 52, no. 1 (February 1970): 68–74.
- The simple rules articles such as “Simple Criteria for Optimal Portfolio Selection.” *Journal of Finance* 33, no. 1 (March 1978): 296–302.
- “Efficiency with Costly Information: A Reinterpretation of Evidence from Managed Portfolios.” *Review of Financial Studies* 6, no. 1 (January 1993): 1–22.
- “Explaining the Rate Spread on Corporate Bonds.” *Journal of Finance* 56, no. 1 (February 2001): 247–77.

Read

- Everything written by Harry Markowitz or Bill Sharpe.

MARTIN GRUBER

Written

- “Marginal Stockholder Tax Rates and the Clientele Effect.” *Review of Economics and Statistics* 52, no. 1 (February 1970): 68–74.
- “Simple Criteria for Optimal Portfolio Selection.” *Journal of Finance* 33, no. 1 (March 1978): 296–302.
- “Another Puzzle: The Growth in Actively Managed Mutual Funds.” *Journal of Finance* 51, no. 3 (July 1996): 783–810.
- “Why Do Closed End Bond Funds Exist?” *Journal of Financial and Quantitative Analysis* 48, no. 2 (April 2013): 405–25.
- “Target Date Funds: Characteristics and Performance.” *Review of Asset Pricing Studies* 5, no. 2 (December 2015): 254–72.
- “Review of the Performance Measurement of Long-Term Mutual Funds.” *Financial Analysts Journal* 76, no. 3 (2020): 22–37.

Read

The following two books, along with conversations with both authors, formed the foundation of all I have accomplished in the field of financial economics:

- Markowitz, Harry. *Portfolio Selection: Efficient Diversification of Investment*. Hoboken, NJ: John Wiley & Sons, 1959.
- Sharpe, William. *Portfolio Theory and Capital Markets*. New York: McGraw-Hill, 1970.

ANDREW W. LO

Written

- Lo, Andrew W., and A. Craig MacKinlay. “Stock Market Prices Do Not Follow Random Walks: Evidence from a Simple Specification Test.” *Review of Financial Studies* 1, no. 1 (1988): 41–66.
- Campbell, John Y., Andrew W. Lo, and A. Craig MacKinlay. *The Econometrics of Financial Markets*. Princeton, NJ: Princeton University Press, 1997.
- Lo, Andrew W. *Adaptive Markets: Financial Evolution at the Speed of Thought*. Princeton, NJ: Princeton University Press, 2017.

Read

- Merton, Robert C. *15.415 Lecture Notes, Spring 1981*. Cambridge, MA: MIT Sloan School of Management, 1981.
- Merton, Robert C. *Continuous Time Finance*. London, UK: Blackwell, 1992.
- Wilson, Edward O. *Sociobiology: A New Synthesis*. Cambridge, MA: Harvard University Press, 1975.

CLIFFORD S. ASNESS

Written

- “Value and Momentum Everywhere” (with Toby Moskowitz and Lasse Pedersen). *Journal of Finance* 68, no. 3 (June 2013): 929–85, in which we finally synthesized 20 years of work on these two bad boys.
- “Rubble Logic: What Did We Learn from the Great Stock Market Bubble?” *Financial Analysts Journal* 61, 6 (2005): 36–54, in

which I reviewed the lessons learned from the great late 1990s’ market and technology stock bubble. I may be pushing it calling this one “most influential,” but I’m also tactically including its forerunner “Bubble Logic,” a 40+-page book draft I wrote during the height of the mania that I never finished (the bubble started coming down while I was still adding to it!). Together, I think they qualify.

- “Fight the Fed Model.” *Journal of Portfolio Management* 30, no. 1 (Fall 2003): 11–24, where I took on the venerable idea that low interest rates justify very high stock prices. It’s an argument still raging today.
- “Do Hedge Funds Hedge?” (with Bob Krail and John Liew). *Journal of Portfolio Management* 28, no. 1 (Fall 2001): 6–19, in which we showed that they did indeed hedge, but not as much as you’d think, and less than you’d find when just looking at monthly returns (which often aren’t fully marked to market). This reliance on, and often understatement of, market beta risk makes hedge fund returns less attractive than simpler analysis may show.
- “Pulling the Goalie: Hockey and Investment Implications” (with Aaron Brown), in which we applied simple dynamic optimization to one of the world’s most important and vexing problems. With the solving of Fermat’s last theorem there’s still the continuum hypothesis, dealing with global warming, unifying relativistic gravity with quantum mechanics, and the question of when a losing hockey team should pull their goaltender for an extra skater. Seriously, I love this article, but it’s a little sobering that in a working lifetime of writing on finance and investing by far my most downloaded article (and the only one that got me on Malcolm Gladwell’s podcast) was on hockey!

Read

- I read Eugene Fama’s *Foundations of Finance* (New York: Basic Books, 1976) three times cover-to-cover over 3 years as his student, and then teaching assistant for 2 years after that. It seared many vital concepts and important habits (rigor! respect the data! data is a plural!) into my still-forming brain.
- Fama and French’s 1992 and 1993 publications on the cross section of expected returns. People are still fighting about them (including me where I take issue with the size effect and think value should be measured a bit differently), but these are the articles that were most formative for the field we’re in today. And, as always, they’re a model of clear writing impressing with their economic arguments and data not their deft use of Ito’s lemma.
- Anything by Jack Bogle. Jack wasn’t as rigorous as many of us “quants.” But he had the habit of usually being right, and always being the most honest man in the room. The man could also write.

CAMPBELL R. HARVEY

Written

- “Presidential Address: The Scientific Outlook in Financial Economics.” *Journal of Finance* 72, no. 4 (August 2017): 1399–440.
- “The Economic Implications of Corporate Financial Reporting” (with John Graham and Shiva Rajgopal). *Journal of Accounting and Economics* 40, no. 1–3 (December 2005): 3–73.
- “The Strategic and Tactical Value of Commodity Futures” (with Claude Erb).

Financial Analysts Journal 62, no. 2 (2006): 69–97.

Read

- Russell, Bertrand. *The Scientific Outlook*. London: George Allen and Unwin Ltd., 1931.
- Markowitz, Harry. “Portfolio Selection.” *Journal of Finance* 7, no. 1 (1952): 77–91.
- Nakamoto, Satoshi. “Bitcoin: A Peer-to-Peer Electronic Cash System.” 2008, <https://bitcoin.org/bitcoin.pdf>.

KEITH AMBACHTSHEER

Written

- “Can Active Management Add Value?” (with James Farrell). *Financial Analysts Journal* 35, no.6 (Nov–Dec 1979): 39–47.
- “Pension Fund Asset Allocation: In Defense of a 60–40 Equity-Debt Asset Mix.” *Financial Analysts Journal* 43, no. 5 (Sep–Oct 1987): 14–24.
- *The Future of Pension Management: Integrating Design, Governance, and Investing*. Hoboken, NJ: Wiley, 2016.

Read

- Hodges, Stewart, and Richard Brealey. “Portfolio Selection in a Dynamic and Uncertain World.” *Financial Analysts Journal* 29, no. 2 (Mar–Apr 1973): 58–69.
- Keynes, John Maynard. “The State of Long-Term Expectation.” In *The General Theory of Employment, Interest, and Money*, 147–64. New York: MacMillan & Co, 1936.

- Peter Drucker. *The Unseen Revolution*. New York: Harper and Row, 1976.

ROBERT J. SHILLER

Written

- Nobel Prize Lecture, “Speculative Asset Prices.” Stockholm University, December 8, 2013.
- Presidential Address, American Economic Association, “Narrative Economics” (2017), later turned into a book with the same title (Princeton, NJ: Princeton University Press, 2019), argues that a major cause of uncertainty in markets is the epidemic-like transmission among the general public of motivating narratives—stories with human interest that change our thinking patterns.
- “Do Stock Prices Move Too Much to Be Justified by Subsequent Changes in Dividends?” *American Economic Review* 71, no. 3 (June 1981): 421–36, an article that is still controversial, but I believe really does suggest other ways of thinking about market fluctuations. Also, “The Use of Volatility Measures in Assessing Market Efficiency.” *Journal of Finance* 36, no. 2 (May 1981): 291–304.
- “The Efficiency of the Market for Single Family Homes” (with Karl E. Case). *American Economic Review* 79, no. 1 (March 1989): 125–37. We should have said *inefficiency*. This was the debut of the Case-Shiller Home Price Indices.
- “Arithmetic Repeat Sales Price Estimators.” *Journal of Housing Economics* 1, no. 1 (March 1991): 110–26—describes home price index construction methodology closer to value-weighted stock price indices.
- My former student Allan Weiss joined us in 1991 to found Case Shiller Weiss, Inc., and used our indices to offer the first online estimates of individual home value. The firm is now part of CoreLogic, Inc.
- With George Akerlof, *Animal Spirits: How Human Psychology Drives the Economy, and Why It Matters for Global Capitalism*. Princeton, NJ: Princeton University Press, 2009.
- With George Akerlof, *Phishing for Phools: The Economics of Manipulation and Deception*. Princeton, NJ: Princeton University Press, 2016.
- “A 30-Year Perspective on Property Derivatives: What Can Be Done to Tame Property Price Risk?” (with Frank J. Fabozzi and Radu Tunaru). *Journal of Economic Perspectives* 34, no. 4 (Fall 2020): 121–45. Fabozzi, another winner of the Vertin Award, and Tunaru and I have written four articles on how institutional change can help households manage real estate risk.

Read

- Smith, Adam. *The Theory of Moral Sentiments*. London: George Bell and Sons, 1759—about the human nature that underlies the success of market economies, predecessor to his more famous *The Wealth of Nations*. London: W. Strahan and T. Cadell, 1776.
- Wilson, E. O. *Consilience: The Unity of Knowledge*. New York: Vintage Books, 1998. Wilson, a biologist, argues that we professionals all must be amateur enthusiasts for other disciplines, as the diversified inspiration from outside is essential to our success as innovators. My psychologist wife

Virginia Shiller, who has been an intellectual resource for me, and I together expanded on his theme in “Economists as Worldly Philosophers.” *American Economic Review* 101, no. 3 (May 2011): 171–75.

- Markowitz, Harry. “Portfolio Selection.” *Journal of Finance* 7, no. 1 (March 1952): 77–91, wherein Markowitz was stepping out of the world of finance, as it then was conceived, to establish a new paradigm.

ROGER G. CLARKE

WRITTEN

- Clarke, R., H. de Silva, and S. Thorley. “Portfolio Constraints and the Fundamental Law of Active Management.” *Financial Analysts Journal* 58, no. 5 (September/October 2002): 48–66.
- Clarke, R., H. de Silva, and S. Sapra. “Toward More Information-Efficient Portfolios: Relaxing the Long-Only Constraint.” *Journal of Portfolio Management* 31, no. 1 (Fall 2004): 54–63.
- Clarke, R., H. de Silva, and S. Thorley. “Fundamentals of Efficient Factor Investing.” *Financial Analysts Journal* 72, no. 6 (November/December 2016): 9–6.
- Clarke, R., H. de Silva, and S. Thorley. “Risk Parity, Maximum Diversification and Minimum Variance: An Analytic Perspective.” *Journal of Portfolio Management* 43, no. 4 (Spring 2013): 39–53.

Read

- Sharpe, William. “Capital Asset Prices: A Theory of Market Equilibrium under

Conditions of Risk.” *Journal of Finance* 19, no. 3 (September 1964): 425–42.

- Markowitz, Harry. “Portfolio Selection.” *Journal of Finance* 7, no. 1 (March 1952): 77–91.
- Haugen, Robert, and A. James Heins. “Risk and the Rate of Return on Financial Assets: Some Old Wine in New Bottles.” *Journal of Financial and Quantitative Analysis* 10, no. 5 (December 1975): 775–84.
- Grinold, Richard. “The Fundamental Law of Active Management.” *Journal of Portfolio Management* 15, no. 3 (Spring 1989): 30–38.

ELROY DIMSON

Written

- “Risk Measurement When Shares Are Subject to Infrequent Trading.” *Journal of Financial Economics* 7, no. 2 (1979): 197–226.
- Dimson, Elroy, Oğuzhan Karakaş, and Xi Li. “Active Ownership.” *Review of Financial Studies* 28, no. 12 (December 2015): 3225–68.

Read

- Fama, Eugene. “Efficient Capital Markets: A Review of Theory and Empirical Work.” *Journal of Finance* 25, no. 2 (1970): 383–417.
- Treynor, Jack, and Fischer Black. “How to Use Security Analysis to Improve Portfolio Selection.” *Journal of Business* 46, no. 1 (1973): 66–86.
- Roll, Richard, and Stephen Ross. “An Empirical Investigation of the Arbitrage

Pricing Theory.” *Journal of Finance* 35, no. 5 (1980): 1073–103.

RICHARD GRINOLD

Written

- “The Fundamental Law of Active Management.” *Journal of Portfolio Management* 15, no. 3 (Spring 1989): 30–38.
- “Alpha is Volatility Times IC Times Score.” *Journal of Portfolio Management* 20, no. 4 (Summer 1994): 9–16.
- *Active Portfolio Management* (with Ronald Kahn). New York: McGraw-Hill, 2000.
- “Dynamic Portfolio Analysis.” *Journal of Portfolio Management* 34, no. 1 (Fall 2007): 12–26.

Read

- Sharpe, William F. “The Arithmetic of Active Management.” *Financial Analysts Journal* 47, no. 1. (Jan/Feb 1991): 7–9.
- Arrow, Kenneth J. *Essays in the Theory of Risk Bearing*. Chicago: Markham Publishing, 1971.
- Cox, John C., and Mark Rubinstein. *Options Markets*. Hoboken, NJ: Prentice Hall, 1985.

RONALD N. KAHN

Written

- “The Efficiency Gains of Long–Short Investing” (with Richard Grinold). *Financial Analysts Journal* 77, no. 4 (September/October 2000): 40–53.

- “Does Historical Performance Predict Future Performance?” (with Andrew Rudd). *Financial Analysts Journal* 51, no. 6 (November/December 1995): 43–52.

- “Five Myths About Fees” (with Matthew Scanlan and Laurence Siegel). *Journal of Portfolio Management* 32, no. 3 (Spring 2006): 56–64. Winner of the 2007 Bernstein Fabozzi/Jacobs Levy award for best article.

- “The Asset Manager’s Dilemma: How Smart Beta is Disrupting the Investment Management Industry” (with Michael Lemmon). *Financial Analysts Journal* 72, no. 1 (January/February 2016): 15–20.

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- Grossman, Sanford J., and Joseph E. Stiglitz. “On the Impossibility of Informationally Efficient Markets.” *American Economic Review* 70, no. 3 (June 1980): 393–408.

- McLean, R. David, and Jeffrey Pontiff. “Does Academic Research Destroy Stock Market Predictability?” *Journal of Finance* 71, no. 1 (February 2016): 5–32.

- Christensen, Clayton. *The Innovator’s Dilemma: When New Technologies Cause Great Firms to Fail*. Boston, MA: Harvard Business School Press, 1997.

KENNETH R. FRENCH

Written

- Fama, Eugene F., and Kenneth R. French. “The Cross-Section of Expected Stock

Returns.” *Journal of Finance* 47, no. 2 (June 1992): 427–65.

- Fama, Eugene F., and Kenneth R. French. “Common Risk Factors in the Returns on Stocks and Bonds.” *Journal of Financial Economics* 33, no. 1 (February 1993): 3–56.
- Fama, Eugene F., and Kenneth R. French. “A Five Factor Asset Pricing Model.” *Journal of Financial Economics* 116, no. 1. (April 2015): 1–22.

Read

- Black, Fischer, and Myron Scholes. “The Pricing of Options and Corporate Liabilities.” *Journal of Political Economy* 81, no. 3 (May–June 1973): 637–54.
- Fama, Eugene F. “Efficient Capital Markets: A Review of Theory and Empirical Work.” *Journal of Finance* 25, no. 2 (May 1970): 383–417.
- Merton, Robert C. “The Intertemporal Capital Asset Pricing Model.” *Econometrica* 41, no. 5 (September 1973): 867–87.
- Shleifer, Andrei, and Robert W. Vishny. “The Limits of Arbitrage.” *Journal of Finance* 52, no. 1 (March 1997): 33–55.

FRANK FABOZZI, CFA

Written

- Fabozzi, Frank J., Robert Shiller, and Radu Tunaru. “Real Estate Derivatives: What Can Be Done to Tame Property Price Risk.” *Journal of Economic Perspectives* 34, no. 4 (2020): 121–45.
- Engle, Robert, Sergio M. Focardi, and Frank J. Fabozzi. “Issues in Applying Financial

Econometrics to Factor-Based Modeling in Investment Management.” *Journal of Portfolio Management* 42, no. 5 (2017): 94–106.

- Fabozzi, Frank J., Francis Gupta, and Harry M. Markowitz. “The Legacy of Modern Portfolio Theory.” *Journal of Investing* 11, no. 3 (Fall 2002): 7–22.
- Fabozzi, Frank J., and Jack C. Francis. “Mutual Fund Systematic Risk for Bull and Bear Markets: An Empirical Examination.” *Journal of Finance* 34, no. 2 (1979): 1243–50.

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- Lo, Andrew W. “The Adaptive Markets Hypothesis: Market Efficiency from an Evolutionary Perspective.” *Journal of Portfolio Management* 34, no. 5 (2004): 15–29.
- Fagnan, David E., Jose Maria Fernandez, Andrew W. Lo, and Roger M. Stein. “Can Financial Engineering Cure Cancer.” *American Economic Review* 103, no. 3 (2013): 406–11.
- Jarrow, Robert A. “Active Portfolio Management and Positive Alphas: Fact or Fantasy?” *Journal of Portfolio Management* 36, no. 4 (2010): 17–22.
- Simonian, Joseph. “Geopolitical Risk in Investment Research: Allies, Adversaries, and Algorithms.” *Journal of Portfolio Management* 47, no. 9 (2021): 92–109.

TERRANCE ODEAN

Written

- “All that Glitters: The Effect of Attention and News on the Buying Behavior of Individual and Institutional Investors” (with Brad

Barber). *Review of Financial Studies* 21, no. 2 (2007): 785–818.

- “Boys Will Be Boys: Gender, Overconfidence, and Common Stock Investment” (with Brad Barber). *Quarterly Journal of Economics* 116, no. 1 (February 2001): 261–92.
- “Are Investors Reluctant to Realize Their Losses?” *Journal of Finance* 53, no. 5 (October 1998): 1775–98.

Read

- Kahneman, Daniel, and Dan Lovallo. “Timid Choices and Bold Forecasts: A Cognitive Perspective on Risk Taking.” *Management Science* 39, no. 1 (1993): i–133.
- Thaler, Richard. “Mental Accounting and Consumer Choice.” *Marketing Science* 4, no. 3 (Summer 1985): 199–214.

WILLIAM BERNSTEIN

Written

- Bernstein, William J., and Robert D. Arnott. “Earnings Growth: The Two Percent Solution.” *Financial Analysts Journal* 59, no. 5 (2003): 47–55.
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- Bernstein, William J. “Corporate Finance and Original Sin.” *Financial Analysts Journal* 62, no. 3 (2013): 20–23.

Read

- Schmelzing, Paul. “Eight Centuries of Global Real Interest Rates, R-G, and the ‘Suprasecular’ Decline, 1311–2018.” Staff

Working Paper no. 845. London, Bank of England, 2021.

- Rees, Laurence. *Auschwitz: A New History*. New York: PublicAffairs, 2006.
- Schleifer, Andrei, and Robert W. Vishny. “The Limits of Arbitrage.” *Journal of Finance* 51, no. 1 (March 1997): 35–55.

WILLIAM N. GOETZMANN

Written

- Frehen, R. G., W. N. Goetzmann, and K. G. Rouwenhorst. “New Evidence on the First Financial Bubble.” *Journal of Financial Economics* 108, no. 3 (2013): 585–607.
- Gatev, E., W. N. Goetzmann, and K. G. Rouwenhorst. “Pairs Trading: Performance of a Relative-Value Arbitrage Rule.” *Review of Financial Studies* 19, no. 3 (2006): 797–827.
- Goetzmann, W., J. Ingersoll, M. Spiegel, and I. Welch. “Portfolio Performance Manipulation and Manipulation-proof Performance Measures.” *Review of Financial Studies* 20, no. 5 (2007): 1503–46.

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- Ibbotson, R.G., and R. A. Sinquefeld. “Stocks, Bonds, Bills, and Inflation: Simulations of the Future (1976–2000).” *Journal of Business* 49, no. 3 (1976): 313–38.
- Chen, N. F., R. Roll, and S. A. Ross. “Economic Forces and the Stock Market.” *Journal of Business* 59, no. 3 (July 1986): 383–403.
- Brown, S. J., and J. B. Warner. “Using daily stock returns: The case of event studies.” *Journal of Financial Economics* 14, no. 1 (1985): 3–31.

MAUREEN O'HARA

Written

- *Market Microstructure Theory*. Hoboken, NJ: Blackwell, 1995.
- “Price, Trade Size, and Information in Securities Markets” (with D. Easley). *Journal of Financial Economics* 19, no. 1 (September 1987): 69–90.
- “One Day in the Life of a Very Common Stock” (with D. Easley and N. Kiefer). *Review of Financial Studies* 10, no. 3 (Fall 1997): 805–35.
- “Is Information Risk a Determinant of Asset Prices?” (with D. Easley and S. Hvidjkaer). *Journal of Finance* 57, no. 5 (2002): 2185–223. Winner of the Smith-Breeden Award.
- “Presidential Address: Liquidity and Price Discovery.” *Journal of Finance* 58, no. 4 (2003): 1335–54. Winner of Smith-Breeden Award.
- “Flow Toxicity and Liquidity in a High Frequency World” (with D. Easley and M. Lopez de Prado). *Review of Financial Studies* 25, no. 5 (May 2012): 1457–93.
- “Footprints on a Blockchain: Information Leakage in Distributed Ledgers,” (with R. Aune, A. Krellenstein, and O. Slama). *Journal of Trading* 12, no. 2 (Summer 2017): 5–13. Winner of the Peter L. Bernstein Award.

Read

- Bagehot, W. “The Only Game in Town.” *Financial Analysts Journal* 27, no. 2 (1971): 12–14, 22.

- Almgren, R., and N. Chriss. “Optimal Execution of Portfolio Transactions.” *Journal of Risk* 3, no. 2 (Winter 2000): 5–39.

ASWATH DAMODARAN

Written

- *Narrative and Numbers: The Value of Stories in Business*. New York: Columbia Business School Publishing, 2017. This book forced me out of my comfort zone (numbers) and made me think about my weak side (story-telling). And it was so much fun to write.
- My blog posts. They are raw, poorly edited, and sometimes repetitive, but they are the most honest representation of how I feel and think about markets and companies, in the moment, and without the benefit of hindsight.

Read

- Fama, E. F. “Efficient Capital Markets: A Review of Theory and Empirical Evidence.” *Journal of Finance* 25, no. 2 (1970): 383–417.
- Ellis, Charley. *Winning the Loser’s Game*, 8th ed. New York: McGraw-Hill, 2021.
- Mauboussin, Michael. *More Than You Know: Finding Financial Wisdom in Unconventional Places*. New York: Columbia Business School Publishing, 2007.
- Kahneman, Daniel. *Thinking Fast and Slow*. New York: Farrar, Straus and Giroux, 2013.

IN MEMORIAM: INFLUENTIAL INVESTMENT PUBLICATIONS

Jack Treynor

- Treynor, Jack L. “Toward a Theory of Market Value of Risky Assets.” Unpublished manuscript, 1962.
- Treynor, Jack L. “How to Rate Management of Investment Funds.” *Harvard Business Review* 43, no. 1 (1965): 63–75.
- Treynor, Jack L., and Kay Mazuy. “Can Mutual Funds Outguess the Market?” *Harvard Business Review* 44, no. 4 (1966): 131–6.
- Treynor, Jack L., William L. Priest, Jr., Lawrence Fisher, and Catherine Higgins. “Using Portfolio Composition to Estimate Risk.” *Financial Analysts Journal* 24, no. 5 (1968): 93–100.
- Treynor, Jack L., and Fischer Black. “How to use Security Analysis to Improve Portfolio Selection.” *Journal of Business* 46, no. 1 (1973): 66–86.
- Treynor, Jack L., and Fischer Black. “Portfolio Selection Using Special Information, under the assumptions of the Diagonal Model, with Mean-Variance Portfolio Objectives, and without Constraints.” In *Mathematical Methods in Investment and Finance 4*, edited by George P. Szego and Karl Shell, 367–384. Amsterdam: North-Holland, 1972.
- Treynor, Jack L., and Fischer Black. “Corporate Investment Decisions.” In *Modern Developments in Financial Management*, edited by Stewart C. Myers, 310–27. New York: Praeger, 1976.
- Treynor, Jack L. (as Walter Bagehot). “The Only Game in Town.” *Financial Analysts Journal* 27, no. 2 (1971): 12–14.
- Treynor, Jack L. *Treynor on Institutional Investing*. Hoboken, NJ: Wiley, 2007. (An anthology of Jack Treynor’s writings organized by topics: risk, performance measurement, micro- and macroeconomics, trading, accounting, investment value, active management, pensions.)

Peter Bernstein

- *Against the Gods: The Remarkable Story of Risk* (Hoboken, NJ: John Wiley & Sons, 1996). It won the Edwin G. Booz Prize for the most insightful and innovative management book of 1996. In 1998, it was awarded the Clarence Arthur Kulp/Elizur Wright Memorial Book Award from the American Risk and Insurance Association (ARIA) as an outstanding original contribution to the literature of risk and insurance. The book has sold over 500,000 copies worldwide.
- *Capital Ideas: The Improbable Origins of Modern Wall Street* was published in 1992 by The Free Press in Vancouver, Canada, and Maxwell Macmillan International in New York, and has become a classic guide to modern portfolio theory along with its successors in quantitative thinking about investment management.
- *Capital Ideas Evolving*, the sequel to this seminal work, was published in May 2007 by John Wiley & Sons (Hoboken, NJ).
- *Streetwise: The Best of the Journal of Portfolio Management*, edited by Peter L. Bernstein and Frank J. Fabozzi, was published in 1997 by Princeton University Press (Princeton, NJ).

INVESTMENT LUMINARIES AND THEIR INSIGHTS

- *The Debt and the Deficit: False Alarms/Real Possibilities*, coauthored with Robert Heilbroner, author of the popular economics book *The Worldly Philosophers*. This book was written in the context of the 1988 US presidential election to discuss deficit spending and its advantages and disadvantages. It was published by W.W. Norton & Co. (New York) in 1989.
- “The New Religion of Risk Management.” *Harvard Business Review* (March–April 1996): 47–51.
- “What Risk Premium is ‘Normal’?” (with Robert D. Arnott). *Financial Analysts Journal* 58, no. 2 (March–April 2002): 64–85.
- “New Directions in Index-Based Management.” *Financial Analysts Journal* 54, no. 4 (1998): 18–20.
- “The Small Stocks Hoax.” *Financial Analysts Journal* 45, no. 4 (Jul.–Aug. 1989): 12–15.
- “Allocating Assets Across Country Markets.” *Journal of Portfolio Management* 18, no. 2 (Winter 1992): 20–27.

William Fouse

- “Is Beta Phlogiston?” (with William W. Jahnke and Barr Rosenberg). *Financial Analysts Journal* 30, no. 1 (January–February 1974): 70–80.
- “Risk and Liquidity: The Keys to Stock Price Behavior.” *Financial Analysts Journal* 32, no. 3 (May–June 1976): 35–45.
- *Asset Allocation Decisions in Portfolio Management* (with Kathleen A. Condon and Mark P. Kritzman). Charlottesville, VA: The Institute of Chartered Financial Analysts, 1982.

John "Jack" Bogle

- *Common Sense on Mutual Funds: New Imperatives for the Intelligent Investor*. Hoboken, NJ: Wiley, 2000.
- *The Little Book of Common-Sense Investing: The Only Way to Guarantee Your Fair Share of Stock Market Returns*. Hoboken, NJ: Wiley, 2007.
- *Enough: True Measures of Money, Business, and Life*. Hoboken, NJ: Wiley, 2010.
- *John Bogle on Investing: The First 50 Years*. Hoboken, NJ: Wiley, 2015.
- *Bogle on Mutual Funds: New Perspectives for the Intelligent Investor*. Hoboken, NJ: Wiley, 2015.

APPENDIX 2: IMPORTANT INVESTMENT LESSONS LEARNED

“It’s what you learn after you know it all that counts.”

—*Harry S. Truman*

WILLIAM F. SHARPE

The importance of diversification in investment management.

MARTY LEIBOWITZ

The market is always changing in fundamental ways, and it writes its own story on the other side of our models!

ROGER IBBOTSON

Managing investments is not like managing people. After you get your portfolio set up, it can run on autopilot for a while. There is no reason to constantly readjust unless you have a special edge or you need to rebalance because the environment has dramatically changed. Instead, you can focus on long-term investment principles.

REX SINQUEFIELD

Market prices are correct, and if you let markets function, they will bring about the best allocation of resources for everything.

EDWIN ELTON

The most important lesson I’ve learned is the importance of having your research grounded in an understanding of how markets and

institutions work, including factors such as taxes and transaction costs.

MARTIN GRUBER

Finance has been and will continue to be a wonderful field of study.

ANDREW W. LO

(1) Markets can stay irrational longer than you can stay solvent; (2) in the long run, we’re all dead, but make sure the short run doesn’t kill you first; and (3) it’s amazing how much more you can accomplish if it doesn’t matter who gets the credit.

CLIFFORD S. ASNESS

Finding an investment strategy you believe in for the long term turned out to be the easy part. Sticking with it through its ups and downs turned out to be the hard (but doable) part.

CAMPBELL R. HARVEY

The importance of economic incentives in shaping research.

KEITH AMBACHTSHEER

Integrating the wisdom of John Maynard Keynes, who pointed to the fundamental dichotomy between short-term “beauty contest” trading and long-term “wealth-creating” investing, and of Peter Drucker, who asserted that effective investment organizations understand

the difference between the two and choose the latter.

ROBERT J. SHILLER

As Adam Smith recounted in 1759, we can normally rely on others because of a desire among normal adults for praiseworthiness, not just a desire for comforts or a desire to be praised. One must judge the character of investment advisers to see if they express this normal sentiment. As Akerlof and I wrote in *Phishing for Phools*, there are so many opportunities for manipulation and deception in business that we must rely on this better side of human nature.

ROGER G. CLARKE

Asking the question, “What do I believe in strongly enough that I am willing to risk the investment assets of the organization based on those beliefs?” in relation to:

1. Uncertainty and investor decision making
2. The real economy
3. Capital markets
4. Risk management

ELROY DIMSON

I learned the value of blending theory with practice. Almost all my research has been informed by practical experience, and my investment experience has contributed to and had synergies with my research.

RICHARD GRINOLD

Alpha is like a mushroom: when exposed to the light, it withers.

RONALD N. KAHN

We build quantitative investment models designed to work on average over time. Consistent investment success, however, requires us to navigate through unexpected and unprecedented environments. Investment success requires a healthy appreciation of markets and a deep understanding of when each model will and will not work.

KENNETH R. FRENCH

The high volatility of realized equity returns obscures their information about expected returns. As a result, 5, 10, even 20 years of past returns may say little about the cross-section of future returns. A good strategy for investors is to presume that patterns in past equity returns are just noise and to require a compelling model and robust evidence to reject that hypothesis.

FRANK FABOZZI, CFA

“The more I learn, the more I realize how much I don’t know.” —Albert Einstein

TERRANCE ODEAN

Markets need heterogeneity.

WILLIAM BERNSTEIN

From Philip Tetlock’s *Expert Political Judgment*: First, forecast, never predict. Second, we’re all lousy forecasters. Especially me.

WILLIAM N. GOETZMANN

History is an important reference for informed investment decision making; however, it can also be misinterpreted when its biases are not understood.

MAUREEN O'HARA

Market structures change, but they still have to provide liquidity and price discovery—and the details of market design matter.

ASWATH DAMODARAN

Value and price are different concepts, come from different processes, and can yield different numbers for the same asset at the same point in time.

IN MEMORIAM: IMPORTANT INVESTMENT LESSONS LEARNED FROM THEIR WORK

Jack Treynor

Incorporating risk into discount rates, return expectations, performance measurement, along with implications for portfolio management, market making, and corporate and pension investment decision making.

Peter Bernstein

- History is always and everywhere relevant to current investment decisions.
- The concept of risk includes the probability and severity of likely loss under different scenarios.

- The efficient market hypothesis is subject to challenge, and one must consider the likelihood that not all information is reflected in security prices.

William Fouse

- The index fund is the most effectively diversified and cost-effective solution for institutional and individual equity portfolios.
- Modern capital market theory and traditional investment management practice can be combined into widely applicable solutions for institutional investors.

John "Jack" Bogle

Jack was an ardent proponent of long-term thinking, patient investment style, and prudent fund design. He believed chasing market returns with high turnover investment approaches wipes out most or all of the gains an investor would otherwise earn. He practiced what he preached with the Vanguard family of mutual funds focusing on no-load, low-cost, low-turnover portfolios—many of which are passively managed.

Although the company is a well-known innovator, Vanguard Group was known to stick to a small number of simple and proven funds and resist jumping into trendy product offerings

APPENDIX 3: IMPORTANT INVESTMENT EXPECTATIONS FOR THE FUTURE

“Past is experience, present is experiment and future is expectation.

Use your experience in your experiments to achieve your expectations.”

—*Unknown*

WILLIAM F. SHARPE

Growing importance of life cycle investing.

MARTY LEIBOWITZ

As the market becomes both more efficient and, at the same time, more complex, the gap between alpha hunters and beta grazers will grow ever wider.

ROGER IBBOTSON

My forecasting is long term. My original forecasts came from SBBI where I used historical risk premiums overlayed on the current yield curves to simulate stock, bond, and inflation returns probabilistically, a quarter century ahead. These turned out to be a remarkably accurate forecast of the year 2000. I still recommend similar methods today, but I also use demand methods (based upon risk and popularity) and supply methods (based upon gross domestic product, earnings, dividend, etc. growth) to forecast expected returns in capital markets.

REX SINQUEFIELD

You are not going to beat the market; instead, let the market work for you.

EDWIN ELTON

None.

MARTIN GRUBER

We continuously uncover new problems. We arrive at better solutions to old problems, but none of the solutions are perfect, and there is always more work to do.

ANDREW W. LO

Markets will become far more adaptive in the future, and technological innovations will play a bigger role in creating new opportunities as well as new challenges.

CLIFFORD S. ASNESS

Lower long-term returns on traditional stocks and bonds than we've grown used to. Higher long-term returns on out-of-favor simple strategies like international diversification and a value tilt.

CAMPBELL R. HARVEY

My new book, *DeFi and the Future of Finance* (with Ashwin Ramachandran and Joey Santoro; Hoboken, NJ: Wiley, 2021), sketches a vision of finance in the future where the traditional banks, brokers, and insurance companies are replaced by decentralized algorithms.

KEITH AMBACHTSHEER

Continued acceleration in the transitions to long-term sustainable investment practices by effective investment organizations.

ROBERT J. SHILLER

At this point in history, August 2021, I see an unusually left-skewed probability distribution of future real returns in the United States and some other countries for all three major asset classes: stocks, bonds, and real estate.

ROGER G. CLARKE

The impact of the substantial monetary liquidity and fiscal spending on the level of financial system stability, inflation, and economic activity.

ELROY DIMSON

Given the importance of ESG issues, responsible investing is here to stay. However, superficial box-ticking approaches to ESG are a fad, and I anticipate major advances in this area.

RICHARD GRINOLD

There is a lot of room to improve the service and reduce the cost of retail and institutional investment management.

RONALD N. KAHN

The current explosive growth in unstructured data and associated analytics is the biggest opportunity for active management in at least the past decade.

KENNETH R. FRENCH

Financial markets will remain volatile, with lots of unexpected challenges and opportunities, and the turbulence will continue to provide great new topics for researchers like me.

FRANK FABOZZI, CFA

To be successful as an investment professional, one must constantly learn and adapt to change.

TERRANCE ODEAN

We need to change the defined contribution pension model.

WILLIAM BERNSTEIN

The optimists are not likely to triumph this time around.

WILLIAM N. GOETZMANN

In the future I hope that low-cost diversified investment products will be globally more accessible. I believe it is the means by which households, big and small, can share in global growth.

MAUREEN O'HARA

Changes in fixed income trading, new ETF structures, and the evolution of cryptocurrency microstructures present huge opportunities for investment management.

ASWATH DAMODARAN

No matter how prepared we are, the market will surprise us.

IN MEMORIAM: IMPORTANT INVESTMENT EXPECTATIONS THEY HAD FOR THE FUTURE

Jack Treynor

For Jack's last talk at Q Group in 2015 he looked to the future of investment research on the occasion of the dedication of the annual Jack Treynor Prize for outstanding academic working papers. He chose to comment on the current rapid pace of innovation in physical science fields like molecular biology, astronomy, physics, computer science, and communication technology that continue on today. He was disappointed that this rate of discovery was not occurring at the same pace in the social sciences as it was in the early days of his career. For example, the application of operations research to finance in the 1950s and 1960s was as an example of this physical science research philosophy of discovery leaking over into the social science of economics. Jack gave us the challenge to pick up the pace of discovery and innovation in our field of the social sciences by focusing on more problem-solving research and relying more on practitioners to seek to be discoverers of the yet unknown truths in our field.

Peter Bernstein

Investors should abandon the belief that future events are due to chance (what the ancient Greeks called the whims of the gods) and embrace the notion that we are active, independent agents who can manage risks and define our own future.

William Fouse

It would be easy to say that he changed the world of investing. He did. Yet he was a man just barely ahead of his time; the contributions he made were sitting there on the shelf, waiting for someone to carry them forward. He did.

John "Jack" Bogle

Jack's early vision (1970s) of the virtues of index investing was slow to catch on. He lived to see the philosophy and approach gain popularity and fierce fund family competition result in compressed fees. Jack predicted that few large players would dominate the space and the boom in passive investing could lead to concentrated and powerful blocks for corporate proxy voting, something which concerned him.

APPENDIX 4: ANY PROFESSIONAL REGRETS

“Regrets, I’ve had a few but then again too few to mention.

And more, much more than this, I did it my way.”

—*Frank Sinatra*

WILLIAM F. SHARPE

None of any consequence.

MARTY LEIBOWITZ

A twice-married friend of mine once said, “I wished I had married my second wife—first!” After having written a number of articles on a given topic, I often wished that I had written my last paper—first! (But, of course, that probably would not have been possible...)

ROGER IBBOTSON

I have had many ups and downs (early failed jobs, missed promotions, rejected articles, negative profit years, etc.) in my career. I often joke that I am an example of the “reverse” Peter Principle, since each setback has caused me to reposition my activities, in each case moving me to a higher level. I might have regretted the setbacks at the time, but not in retrospect.

REX SINQUEFIELD

No regrets.

EDWIN ELTON

No regrets.

MARTIN GRUBER

No, at 84 years old, I realize that I wouldn’t have done anything differently than I did.

ANDREW W. LO

I wish I had started collaborating on joint research projects with more academic and industry colleagues much sooner. I learn so much from each of my collaborators, we make progress so much more quickly, and it’s also a lot more fun than working solo.

CLIFFORD S. ASNESS

I regret that I never had a disagreement I shied away from if I thought I was right, but rather always went at it full steam. Yes, I’m repeating myself, and yes you can be most proud and most regretful of the same thing. Sometimes doing what you’re proud of has consequences!

Also, that I don’t think I’m ever going to really know how Jim Simons did it.

CAMPBELL R. HARVEY

Spending only 3 years at the University of Chicago during my doctoral studies. There was much more to learn.

KEITH AMBACHTSHEER

The two visionaries who inspired me most are economist John Maynard Keynes and management philosopher Peter Drucker. I had a live visit with Drucker in July 2005, when he was 96 years old. He died in November of that year. Sadly, I missed Keynes who died at the much younger age of 63 in 1946. I was only 4 years old at the time.

ROBERT J. SHILLER

I only wish I had savored great moments in my professional life more and allowed more time to develop relationships with students and fellow professionals when there was plenty of time. I would also quote the immortal words of ancient poet Horace, *carpe diem*!

ROGER G. CLARKE

No regrets.

ELROY DIMSON

Other than doctoral candidates, I have only ever taught students with work experience—MBAs, executives, businesspeople—but never an undergraduate. Was that a regrettable error?

RICHARD GRINOLD

I had an inkling that the quant meltdown of August 2007 was a possibility, but I did not act as strongly as I should have.

RONALD N. KAHN

Only that I didn't come across the wonderful world of quantitative investing earlier.

KENNETH R. FRENCH

I have many regrets, but none that others would find interesting.

FRANK FABOZZI, CFA

As Frank Sinatra sang in *My Way*, "Regrets, I've had a few; but then again, too few to mention." But here is one I have. I met Peter Bernstein, economist, financial historian, founder of the *Journal of Portfolio Management*, and *New York Times* best-selling author. Peter passed away in June 2009. While we worked closely on the journal since 1984, we discussed several possible joint writing book projects. Because of other commitments, we were never able to get beyond a discussion of a topic for a book and the failure to have the opportunity to write a book with him is what I regret.

TERRANCE ODEAN

That I never published my paper that explored the asset pricing implications of behavioral biases by developing an object-oriented simulation of the stock market with individual and institutional investors (see following discussion).

WILLIAM BERNSTEIN

Finance and economics weren't cool enough for me when I was young, so I didn't bother to learn anything about them back then.

WILLIAM N. GOETZMANN

None whatsoever.

MAUREEN O'HARA

None—I've loved being part of both the academic and—via boards—the practitioner sides of finance.

ASWATH DAMODARAN

None. I am eternally grateful for being able to do something that I love to do (teaching) for a living.

IN MEMORIAM

Jack Treynor

I think Jack would answer this by saying he wished he had more time to conduct problem-solving research in finance and economics and to engage with attendees at Q Group meetings on new research coming out of academia. He would also want to pursue his interest in model trains and the boogie-woogie piano music of his youth. He would likely say he never gave enough credit to his wife Betsy, a

Smith college graduate in German literature, who helped him get his ideas and articles in print and who many of us enjoyed seeing at his side at conferences.

Peter Bernstein

Peter would have liked to live long enough to complete the book *The Moral Hazard Economy*, which he was working on when he died in 2009 at the age of 90.

William Fouse

I took Bill to lunch monthly until his passing. I never detected any regrets. He took charge of his whole life, and made it work for him. Who could ask for anything more?

John "Jack" Bogle

Jack Bogle was a generous philanthropist. He cofounded the John C. Bogle Center for Financial Literacy in 2010. He was quoted in an interview that his greatest regret was that he didn't have more money to give away.

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