

## CAPITAL IDEAS: OUT OF THIS WORLD OR IN THE THICK OF IT?<sup>1</sup>

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Who are the successors today to Markowitz, Tobin, Sharpe, Treynor, Samuelson, Fama, Modigliani-Miller, Black-Scholes-Merton, and Treynor?<sup>2</sup> A dozen names have revolutionized the world of finance and investing!

I shall begin my answer to the question in my title with some history. We cannot understand the present state of financial theory and practice without some perspective on what the investment and academic worlds were like in the 1980s and early 1990s. Then we can explore the meaning of the answer and suggest what it portends for the future of finance.

But first I cannot resist a brief digression to pose a different question: Is Modern Portfolio Theory path dependent? Is it a unique series of events tied to one another? For example, if Harry Markowitz had written his thesis about something far away from finance (he was interested in operations research), and if James Tobin, who was really a macroeconomist, hadn't been caught up by this thing, would there have been Modigliani and Miller, and if Modigliani remained a macro economist and Miller stayed at the Treasury instead of going to Carnegie, would there be a Fama and a Sharpe? And if there had been no Fama and Sharpe, would there be a Black-Scholes? In fact, how would the whole thing have worked itself out - would we have

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<sup>1</sup> I am deeply indebted to Peter Dougherty, Director of Princeton University Press, for his valuable contribution to this paper.

<sup>2</sup> Without Treynor there might never have been a Fischer Black among us.

any of these ideas to think about? I leave the answer to that question to you.

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Now to the history of my involvement in all this. Some time in 1989, I received a phone call from an editor at the Free Press named Peter Dougherty. Six of the famous scholars I mentioned above have worked at one time or another with Peter, but I had never heard of him. He suggested I should write my memoirs and he would like to meet me. It was a big moment in my life: Peter was not only my editor on *Capital Ideas* but also on the three books I have written since then, making profound contributions to all of them.

I told Peter I had no interest in writing my memoirs, but I had a different inspiration. There was a tiny group of scholars who had developed a radically new body of thought about finance, the result of work they had carried out in the ivory towers, a distance from New York City and the turmoil and excitement of the financial markets. Their achievement was a huge intellectual leap, a story that had to be told. Although these ideas had been developed between 1952 and 1972, they were only beginning to seep into the real world of investing. Furthermore, all these men were still alive, so I could capture the story by talking with them instead of burrowing around in some musty library. It was a rare and thrilling moment. And so *Capital Ideas* was born.

I began the interviewing with Samuelson because we had been friends since my college days, although I was also acquainted with Tobin, Treynor, and Black. Many years earlier, I had encountered Franco Modigliani as kind of a wild man graduate student around the New School in New York, where I was teaching introductory economics in the evening.

The day Barbara and I spent with Samuelson was unforgettable. He traced the historical roots of these ideas at length for us, back through Bachelier, Cowles, Working, and Kendall, and then he provided an extended elaboration of his own efforts in this area. We saw Bob Merton the following morning and were off and running. I must add, especially before this audience, I shall be forever grateful to every one of these men for the way they put themselves out for me. For some odd reason, I found M&M the most difficult to grasp, and I shall never forget Merton Miller's endless patience and irrepressible good humor in leading me out of the woods.

In addition to describing the theoretical side of what was then called Modern Portfolio Management, I wanted the book to include some practical applications to make these Capital Ideas credible to the wider audience I hoped to reach. That was no simple task. Much of the theory was unpalatable to an investing world where people saw no hurdle in beating the market and were focused on making money. Risk was an incidental matter. Barton Biggs had only recently described the whole business as "baloney." And in *A Random Walk Down Wall Street*, Burt

Malkiel has recalled that the reception of efficient market theory “was greeted in some Wall Street quarters with as much enthusiasm as Saddam Hussein addressing a meeting of B’nai Brith.”<sup>3</sup> After a good deal of scrounging around, I could come up with only three actual, hands-on cases of putting the MPT to work. There was nobody else I could find at that moment.

The first practical example was Wells Fargo Bank, where many of the creators of Capital Ideas were helping out as consultants. But Wells Fargo was struggling to find customers for their index funds and risk-controlled asset management – and they made no money at it for a matter of years. I will always remember Jim Vertin telling me about “pushin’ that rock uphill.” But, as I asserted in the *Capital Ideas*, “It was they who truly brought the gown to town.”

The second case study was Barr Rosenberg. Barr, then still an academic, was developing what was probably the first viable variation on the theme of CAPM in the form of factor analysis, but he was also carrying out hugely popular seminars at Pebble Beach to indoctrinate practitioners in the intricacies of market efficiency, mean/variance, CAPM, and the theory of options pricing. Without Barr’s powerful effort, the whole process of making Capital Ideas both comprehensible and acceptable to professional investors would surely have been more protracted. Barr deserves far more credit than he has received for these accomplishments.

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<sup>3</sup> Burt informs me the ninth edition of *A Random Walk Down Wall Street* shifts the metaphor to “with as much enthusiasm as Jeff Skilling addressing the Better Business Bureau.”

I had friends who went back to those seminars repeatedly, and swore by Barr, and his colleague Andrew Rudd as well.

Portfolio insurance was the third example of applying theory to practice. Hayne Leland had concocted this product when he went on a search for what he boldly described to me as “the ultimate invention” - a real-life version of Merton’s replicating portfolio for a put option on the market. Despite all the brouhaha about the role of portfolio insurance in the crash of 1987, Leland’s ultimate invention had a deeper significance: it pointed the way to preparation for unpredictable situations. Just incidentally, in relation to how transactions costs on October 19 nearly buried portfolio insurance, Bob Merton has pointed out to me the wonderful paradox that there would be no Black-Scholes-Merton without transactions costs. Transactions costs make the replicating portfolio impractical and options irreplaceable.

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I may be belaboring the obvious to this audience, but risk management was at the heart of all three of these applications, Wells Fargo, Barr Rosenberg, and portfolio insurance. But risk management has always been at the heart of the theory of finance. *Nothing more deeply divides Capital Ideas from the world before 1952.* When, as a practicing investment counselor, I had my first lunch with Bill Sharpe in the late 1960s and he asked me whether we beat the market, I was shocked anyone could even ask such a question. But later on, Bill Sharpe said that

“Markowitz came along, and there was light!” and how right he was! [Burton, 1998] The reluctance to recognize the dominance of risk in portfolio management unquestionably explains why practical applications of Capital Ideas were so hard to find back then. Today, many individual investors are still reluctant to recognize the interactions between risk and return, but most institutional investors have accepted it.

Now I pose a question that looks obvious but is not. Why is risk management at the heart of the theory of finance? Is it just because decisions in finance are always confronted by uncertainty? That is no answer. All decisions about anything are confronted by uncertainty. The true answer to this question is more illuminating.

In all of human history until at least the eighteenth century, the economic system was rooted in agriculture, where the weather is the primary uncertainty. Nobody can do anything about the weather. Consequently, people depended on prayer and incantation, in one form or another, as the only available form of risk management. What other approach could you take when everything seemed to be God’s will or the will of the Fates?

But free financial markets exist only in capitalism, and capitalism is a dynamic, complex, rough-and-tumble system, in which there are always winners and losers – and we do not know in advance who is going to be which. Capitalism is about a battle with our fellow human beings, not a battle against the elements.

Thus, uncertainty under capitalism arrives from the decisions of human beings interacting with one another. What will the customers do? What will the suppliers do? What will the bankers do? What will our employees do? What will the accountants, the lawyers, and the government do? What will foreigners do? Unlike an agricultural economy, capitalism is a giant form of game theory in which none of us can arrive at a decision without considering the responses of the other players. All the variation, all the volatility, all the surprises are the outcome of human decisions made by people making assumptions about the next move to be made by other people.

When we consider Capital Ideas as described in theory – mean/variance, market efficiency, CAPM, and option-pricing theory – the players seem to be making their decisions in quiet isolation, away from the turmoil I have just described. Look deeper, however, and you will find what John von Neumann so aptly described as “combat and competition,” that giant game of us-versus-them, swaying and rocking in the marketplace just below the surface. Combat and competition explain why risk management is at the heart of the theory of finance.

An important corollary follows. Communication is a critical element in the game I have been describing. The more rapid and sophisticated the system of communication becomes, the more intense the game becomes, and then there is feedback from the game to the system of communication. As this process proceeds, the game itself becomes even more complex.

Beating the market becomes increasingly difficult. And the need becomes progressively urgent to develop institutional frameworks that can help bind the system together to prevent it from descending into chaos.<sup>4</sup>

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When we fast-forward to 2006, the scene from the original *Capital Ideas* has turned upside-down. In the first version of *Capital Ideas*, there was a lot theory but little in the way of applications in practice. In working on my new book about *Capital Ideas*, I could not find a single new theory to compare in importance with those I explored over fifteen years ago. Even potential competitors like Arbitrage Pricing Theory or chaos theory have faded into the background.

On the other hand, practical applications derived from these theories are everywhere, from sophisticated applications of mean/variance to techniques designed to separate beta risks from alpha risks – to say nothing of the bewildering complexity of new products in the derivatives markets and the dominance of those markets over many aspects of investment decision-making. Market efficiency may still be a debatable topic, but indexing and variations on that theme remain popular, and we have no indication the market is getting any easier to beat. As an aside, I might add that professional investors are not the only people putting *Capital Ideas* into practice – the four Nobel Prize winners who are among

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<sup>4</sup> Talk about chaos. A Wall Street Journal article of July 27, 2006 reported that Marshall Wace, an investment advisory, has developed a computer model that received 500,000 trading ideas from 246 securities firms in 2005, including 2200 individuals at those firms.

us today are all actively engaged in day-to-day applications of these theories.

Why did this total reversal between the roles of theory and practice come about over the past fifteen years? The answer comes on two levels – developments in the financial markets and developments in technology.

Changes in the world of finance over recent decades have been pervasive, rapid, and bewildering. These changes have ranged from the black years of the inflationary 1970s to the great bull market that got under way in the early 1980s, and from the small bubble that led to the crash of October 1987 to the soaring high-tech bubble leading to the crash of 2000. There have been profound revolutions in communication and in globalization, with new financial instruments and new participants on the world scene unimaginable to investors of the 1970s or 1980s.

Once we introduce hungry investment bankers, institutional investors fighting for performance numbers, fiercely competitive portfolio managers, and individual investors struggling with 401(k) decisions, we will also introduce frictions, the burdens of transactions costs, agency problems, and a plethora behavioral quirks. Then investors cease to be the homogeneous crowd we met in *Capital Ideas*. These conditions demand financial innovation and institutional change.

Although hungry investment bankers and optimistic investors have always been with us, technological change in both communication and data management over the past fifteen years has been breath-taking. As a

result, Capital Ideas are being reshaped by researchers and practitioners through an intricate combination of advanced technology and an endlessly varying institutional environment.

Before the development of the PC and the software that drives its magical powers, developing practical applications of a quantitative theory was too complicated and too cumbersome except for a privileged few. No doubt this helps explain why I had such difficulty finding practical applications when I was writing *Capital Ideas* during 1990-1991. The whole revolution in investing would never have come about without the aid of the desktop computer, both for modeling purposes and for the manipulation of masses of data for testing and designing models. And as we have become more nimble in managing data, the providers of financial information have obliged by inflating the supply of information at a pace too rapid to measure.

This dynamic between technology and institutional change explains why the perception and uses of Capital Ideas today differ from the ideas developed in the ivory tower from 1958 to 1972. We should keep in mind that the creators of Capital Ideas presented us with a static, institution-free environment, full of faceless people, each of whom trades as an individual and who, inevitably, will end up holding identical portfolios of risky assets. This abstraction from the intricacies of reality is appropriate in a frictionless, perfect market environment. Today's hectic rate of financial innovation in products, strategies, and concepts stems from the

encounter between the theory of finance and the institutional context, an environment in sharp contrast to the world of the early 1990s, when I could find no more than three practical implementations of theory.

The question of whether these theories are “realistic” is no longer pertinent. Perhaps their most remarkable feature is the indomitable power of their influence on investment decisions even though the theories failed to survive a battery of empirical testing. The situation is identical to what Louis Menand, the Pulitzer Prize-winning professor of English and American literature and language, had to say about Freud’s *Civilization and its Discontents*, “The grounds have entirely eroded for whatever authority it once enjoyed as an ultimate account of the way things are, but we can no longer understand the way things are without taking it into account.” [Warsh, 2006, p. 376.]

The real world is making active use of Capital Ideas, in a wide varieties of settings. They are being reshaped by researchers and practitioners through a multifarious combination of advanced technology and an institutional environment constantly changing to meet new demands. This dynamic between technology and institutional change is the primary explanation of how the perception and uses of Capital Ideas today differ from the ideas developed in the ivory tower from 1958 to 1972. As Bob Merton put it to me when I interviewed him for the new book:

I always wanted to implement things I believe in, such as working with the theories of finance, but now, thanks to

technology, we have a whole new paradigm. No, a *richer* paradigm. The answers given by Capital Ideas are still valid – it's not like they got it wrong and now we have a revolution. My point is understanding institutions and how they make implementation of these ideas possible....

I look at myself as a plumber. I want to have available all the tools – government private sector, family institutions. We need them all. The choice of tools depends on the job.... *The beauty is in developing new theoretical concepts and then seeing them implemented to have an impact on real-world practice.*

Why do we have the institutions we have and why do we organize as we have organized? Merton's central argument, derived from sociological analysis, is that institutions are endogenous – developed within the system in response to needs, to anomalies, and to dysfunctional aberrations. As he described it, "I can design an insurance company, but can I make money? Not if it is inappropriate for the needs of the markets. That is what I mean by endogenous development."

Most individuals have too little money to achieve efficient diversification or to pay the fees demanded by high-powered investment management firms. So they pool their assets in mutual funds which enjoy the economies of scale. That way, they achieve much greater diversification than they can manage on their own, while their costs in terms of fees and transactions costs are lower (even if higher than they should be in many instances).<sup>5</sup> In the same fashion, a defined-benefit pension plan relieves the individual employees of the tasks and risks of financing their retirement and reduces the cost of investing their

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<sup>5</sup> People who are quick to criticize mutual fund performance fail to keep in mind that their individual shareholders would probably do far worse on their own.

retirement funds – an advantage the defined contribution plans cannot offer.

This continuous process of institutional creativity is what leads to change and dynamics. The result is a world strikingly different from the world of Capital Ideas, where no changes ever occur in the institutional structure. In that world, each day's system looks just like the previous day's – assets get priced, portfolios get formed, risks get hedged, and then nothing happens.

Merton's case is most vivid when we look at the problems of financing retirement. Retirement always has existed in one way or another, for all people everywhere, but how people have institutionally provided for that eventuality has varied widely over time and in different countries around the world. The tasks of taking care of retired people do not change, but the institutions carrying out those functions do change in response to advancing technology, varying cultural conditions, and a dynamic view of the future – in Merton's words, “a rich set for us to think about.”

Thus, institutions evolve because they are an answer to something. As Merton sees it, “You can move from the unrealistic world of theory in which everybody agrees about asset prices and risks to the real world in which everybody agrees to use institutions.” Money market funds now compete with banks and thrifts for household savings. Securitization of auto loans and credit-card receivables has intensified competition among

financial institutions as sources for these purposes. High yield bonds have liberated many companies from the icy grip of their commercial bankers. In national mortgage markets, many institutions have developed into major alternatives to thrifts as a source for residential mortgages. All these institutional innovations, along with many others, have improved the lot of consumers and business firms by reducing the costs of the services they require.

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Here is a particularly odd paradox between theoretical concepts and real-world practice. The Capital Asset Pricing Model has turned into the most fascinating and perhaps the most influential of all the theoretical developments described in *Capital Ideas*. Yet repeated empirical tests of the original Sharpe-Treynor-Lintner-Mossin CAPM, dating all the way back to the 1960s, have failed to demonstrate that the theoretical model works in practice.

At the conclusion of an extended paper on the status of CAPM, published in 2004, Eugene Fama of Chicago and Kenneth French of Dartmouth, described the status of CAPM in these words:

The attraction of the CAPM is its powerfully simple logic and intuitively pleasing predictions about how to measure risk and about the relation between expected return and risk. Unfortunately, perhaps because of its simplicity, the empirical record of the model is poor - poor enough to invalidate the way it is used in applications....The CAPM, like Markowitz's portfolio model on which it is built, is...a theoretical tour de force. We continue to teach the CAPM as an introduction to the fundamentals of portfolio theory and asset pricing...[b]ut we also warn students that, despite its seductive simplicity, the CAPM's

empirical problems probably invalidate its use in applications....  
[Fama and French, 2004]

In addition, Harry Markowitz has recently expressed misgivings about the underlying assumptions of the model. First, CAPM assumes investors can borrow infinite amounts of money at the risk-free rate – and without any regard to their existing resources, which are obviously a matter of high importance to any lender. Second, investors can sell short without limit and use the proceeds to take on long positions - which means any investor can deposit \$1,000 with a broker, sell short \$1,000,000 worth of one security and buy long \$1,001,000 of another security. [Markowitz, 2005] Remove these assumptions, and CAPM crumbles.

But now, keeping in mind that Jack Treynor was one of the creators of Capital Asset Pricing Model and that Fischer Black was madly in love with it, consider the following quotation from a famous paper Black and Treynor wrote in 1973, “How to Use Security Analysis to Improve Portfolio Selection”:

Optimal selection in the active portfolio depends only on appraisal risk and appraisal premiums and not at all on market risk or market premium; nor on investor objectives as regards the relative importance to him of expected return versus risk; nor on the investment manager’s expectations regarding the general market. Two managers with radically different expectations regarding the general market but the same specific information regarding individual securities will select active portfolio with the same relative proportions.

A startling insight from CAPM! Alpha management must be independent of beta management! Alpha can be portable! The hottest game on Wall Street! Bob Jones, Managing Director at Goldman Sachs Asset

Management, described portable alpha in the spring of 2006 as “That’s become the new mantra.”<sup>6</sup>

Portable alpha did not appear out of nowhere, and it would never have come into being without the institutions of broad and liquid markets for the derivatives that make the whole miracle possible. Pimco’s StocksPLUS dates back to the 1980s, along with some early efforts about the same time by Joanne Hill at Goldman Sachs, Jacobs Levy, Martingale Asset Management, Numeric Investors, and Amoco’s pension officer Marvin Damsma.<sup>7</sup>

The big push for portable alpha has developed only in recent years, in response to institutional efforts to earn extra returns in a period commonly viewed as offering low expected returns. The sell-side has been responsive to this demand by supplying techniques to follow the Black-Treynor dictum that, “Optimal selection in the active portfolio depends *only* on appraisal risk and appraisal premiums.” [italics added]. Thus, this tremendous development is a product of the sophisticated institutional environment of today, based unwittingly on a theoretical concept from the distant past.

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Before proceeding to confront what the skeptics about Capital Ideas have to say, I offer two contemporary examples to illustrate how deeply

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<sup>6</sup> *Pensions & Investments*, April 2, 2006, p. 20.

<sup>7</sup> The inspiration for StocksPLUS came from a passing remark to Bill Gross by Myron Scholes, then a Pimco director. Scholes was so impressed with Pimco’s many talents in bond management he suggested to Gross that the Pimco team should be able to transfer those talents to areas beyond plain-vanilla fixed-income management.

these theoretical concepts have penetrated into the most sophisticated realms of portfolio management. There are others I could cite, such as Barclays Global Investors, the heir to the Wells Fargo Investment Advisors featured in *Capital Ideas*, or Marty Leibowitz's creative redesign for applying beta and alpha to portfolio structure without in any way altering their fundamental roles. The point I am trying to make will be clear enough. In every way, these examples derive from Bill Sharpe's view of what makes good theory:

The optimal situation involves theory that proceeds from sensible assumptions, is carefully and logically constructed, and is broadly consistent with the data. You want to avoid empirical results that have no basis in theory and blindly say, "It seems to have worked in the past, so it will work in the future." [Burton, 1998]

The first case is about the Yale endowment fund and its chief investment officer, David Swensen. Yale's endowment needs no introduction, for Swensen's consistency in outperforming its peers is common knowledge.

Swensen has described his approach in his book, *Pioneering Investment Management*, "Active management strategies demand uninstitutional behavior from institutions, creating a paradox that few can unravel. Establishing and maintaining an unconventional investment profile requires acceptance of uncomfortably idiosyncratic portfolios, which frequently appear downright imprudent in the eyes of conventional wisdom." (Swensen 2000, page 7)

Does this statement mean Swensen rejects the teaching of finance theory? By no means. Swensen's drive for uninstitutional behavior derives from his deep respect for market efficiency, in the sense that the prices of most publicly-traded securities rapidly reflect current information. If the markets are efficient, then equities and equity-like investments should be priced to provide higher expected returns than fixed-income investments over the long run because equities are riskier than bonds. But in the dominant allocation to equities and equity-like assets, market efficiency also means Yale should seek to favor assets other than publicly-traded securities, in areas where competent investment managers could be identified.

Along the way, Swensen has been faithful to one of Harry Markowitz's favorite observations about asset allocation: "It's not the variance you have to worry about, it's the covariance." Diversification is an obsession with Swensen. He described the process to me in these words:

Mean/variance was a powerful influence in causing us to move away from the standard institutional portfolio. You never get a recommendation of 65% equities from mean/variance – it's always telling you to move toward diversifying asset classes that promise equity-like returns. These kinds of results led us to emphasize private equity and venture capital, real estate, hedge funds offering long-short strategies or absolute returns, and investments in raw materials like timber. By the time we had cut back on the assets trading in public markets to make room for these new areas, our portfolio looked entirely different from other university endowment portfolios.

In short, Swensen considers Capital Ideas to be the indispensable structure for investors – even uninstitutionally minded investors - confronting the uncertainties and promises in the world of finance. “The basic framework is far superior to anything else that’s out there,” he told me. “In short, it is incredibly valuable.”

The second example is the asset management group of Goldman Sachs, which still manages money in the shadow of Fischer Black, who moved there from MIT in 1984. Shortly after his arrival in New York, Black expressed one of his most enduring observations: “The market appears a lot more efficient on the banks of the Charles River than it does on the banks of the Hudson.”

As I need not elaborate, Black’s obsession with equilibrium colored everything he thought and everything he did. Goldman Sachs was not a likely place to welcome that kind of approach. Yet Black’s stubborn attachment to equilibrium together with his ingenious mind led Goldman Sachs slowly but surely in the direction of blending equilibrium with their traditional approach to asset management.

Bob Litterman, one of the senior managers in this area, described to me how Black’s view on market efficiency continues to be a critical element in all asset management under Litterman’s responsibility:

It is guys like us, highly disciplined and creative portfolio managers, who cause the markets to move toward efficiency... .[T]hey are becoming more efficient all the time, and fast. The world is going quant, and there are no secrets.... [W]e’re pushing the world toward equilibrium, where risks and expected returns line up and making money from active management becomes

more and more difficult. If you don't have equilibrium, you're floating in space. We are never going to reach equilibrium, but *equilibrium is the center of gravity*. The market is doing its job.”

This statement is more than just philosophical rambling. Based on a famous paper Litterman co-authored with Black in 1992 [Black and Litterman, 1992], Goldman Sachs today performs the remarkable feat of combining in an optimizer the notion of equilibrium expected returns and a wide variety of active management strategies. This achievement is the equivalent of putting a Yankee fan and a Red Sox fan in the same room without any arguments starting up between them.

In an unconstrained context, the optimizer now recommends an optimal portfolio containing some capital in the market portfolio and some in portfolios representing the views of active managers. Litterman has described the process as follows:

The investor focuses on one or more views, each of which is an expectation of the return on a portfolio of his or her choosing... .We refer to each of these portfolios as a ‘view portfolio.’ [Then] the investor is asked to specify not only a return expectation for each of the view portfolios, but also a degree of confidence, which is a standard deviation around the expectation....[Then] the optimal portfolio is a weighted combination of the market capitalization equilibrium portfolio and the view portfolios....The sizes of the tilts toward the view portfolio are a function of both the magnitude and the confidence expressed in the expected returns embedded in the investor-specified views.”<sup>8</sup> [Litterman, 2003]

“No one trusted their optimizers,” Litterman commented, “but we found out how to do that.”

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<sup>8</sup> The chapter that includes this paragraph has useful examples of the Black-Litterman approach.

So much for important victories. As with all great revolutions, time has brought about periods of disillusion with Capital Ideas and efforts to mount a counter-revolution. The overarching assumption of investor rationality in every one of these theories was admittedly an unrealistic one, but its fault lines are all too visible in markets given to high volatility, to bubbles and crashes, to concentration on short-term developments, and to distortions in asset valuations.

Plenty of skeptics about the relevance of Capital Ideas are at work, in a far more serious vein than Barton Biggs's characterization of this body of thought as "baloney." The criticisms fall into two major groups – micro and macro. Behavioral Finance is the best-known version of the micro critique, although this field has produced its share of macro comment as well. The best known critics from the macro side are Robert Shiller and Benoit Mandelbrot. I shall deal with each separately.

Some scholars have been tempted to brush off Behavioral Finance as worthless. "What can the poor kids do?" observed Merton Miller in an interview with Donald MacKenzie of the University of Edinburgh. "The field of finance is kind of a mature field now." [MacKenzie, 2006, p 367.] When I interviewed Paul Samuelson for my new book and asked him about Behavioral Finance, he wryly defined it to me as "the study of people not doing the most rational thing as judged by assistant professors of finance." Yet in fact Samuelson was into Behavioral Finance long before Kahneman and Twersky. In his classic paper published in 1937, "A Note on the

Measurement of Utility,” [Samuelson, 1937] Samuelson argued that people are not time consistent. Aware of that weak point, they often try to control themselves with decisions designed to bind their future, such as the “behavior of men who make irrevocable trusts, in taking out life insurance as a compulsory savings measure, etc.”

Eugene Fama has been almost as light-hearted as Merton Miller on the subject of Behavioral Finance:

Consistent with the market efficiency hypothesis that anomalies are chance results, apparent overreaction of stock prices to information is about as common as underreaction. And post-event continuation of pre-event abnormal returns is just about as frequent as post-event reversal. Most important, the long-term anomalies are fragile....The evidence does not suggest that market efficiency should be abandoned. [Fama, 1998]

Behavioral Finance is too serious an area of study to deserve that kind of treatment.

I begin this discussion of Behavioral Finance by stepping back into history again for a moment. Alfred Marshall, the great Victorian economist, opened his *Principles of Economics* with these words:

Economics...examines that part of individual and social action which is most closely connected with the attainment and with the use of the material requisites of wellbeing. Thus it is on the one side a study of wealth; and, on the other, and more important side, a part of the study of man.

Marshall’s *Principles* set the whole tone of economics for the next half century. Yet Marshall made the study of man *secondary* to the study of wealth, despite his noble words in the opening quotation shown above. Man (and woman, too) in classical economics is an automaton capable of objective reasoning under all conditions. Furthermore, disagreement

about the future – a fundamental feature of the study of man – has no place in this particular study of wealth.

The bundle of ideas, models, concepts, and systems that compose the theoretical structure of modern finance – what I describe as Capital Ideas – owe almost everything to Marshall’s *Principles*. The entire underlying structure of Capital Ideas rests on one overriding assumption: investors have no difficulty in making optimal choices in the bewildering jumble of facts, rumors, discontinuities, vagueness, and black uncertainty that make up the real world around us.

When we put the issue in this fashion, we circumvent the debate over investor rationality. Daniel Kahneman himself is emphatic on this issue. As he put the point to me, “The failure in the rational [i.e. Marshall’s] model is...in the human brain it requires. Who could design a brain that could perform in the way this model mandates? Every single one of us would have to know and *understand* everything, completely, and at once.” He has expressed this position more precisely in writing:

I am now quick to reject any description of our work as demonstrating human irrationality. When the occasion arises, I carefully explain that research on heuristics and biases only refutes an unrealistic conception of rationality, which identifies it as comprehensive coherence.... In my current view, the study of judgment biases requires attention to the interplay between intuitive and reflective thinking, which sometimes allows biased judgments and sometimes overrides or corrects them. [Kahneman, 2002]

An equally insightful view of this matter may be found in important work by Mordecai Kurz of Stanford University. [Kurz, 1994 and 1997].<sup>9</sup>

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<sup>9</sup> For a particularly clear and user friendly discussion on the principal ideas involved, see H.W. Brock, “Reconceptualizing ‘Market Risk’ From Scratch”, appearing in *Canadian Investment Review Magazine*, August 2006. For the relevance of Kurz’s work to “adding

Kurz's Theory of Rational Beliefs is in the spirit of Daniel Kahneman's observation about the human brain the rational model requires.

According to Kurz, investors are rational in the sense that most of them think about the systematic tradeoffs between risk and return just as the theory of efficient markets or the Capital Asset Pricing Model says they do. Yet these investors face an impossible task. The world never stands still, and the information on hand is too complex to master. We suffer from non-stationarity. If the world were stationary, everybody would get everything right. In a non-stationary world, everybody gets it wrong – or gets it right only as a matter of luck. Error and surprise are inevitable when investors have no good way of estimating the probabilities of future events. Their beliefs may be rational, but no matter.

Nevertheless, when many investors are using the same kinds of rules of thumb and arrive at similar kinds of belief about the future, asset prices are almost always wrong in the sense that the return investors anticipate is chronically too high or too low relative to the risks involved. The villain, however, is not in the intellectual and emotional structures of human beings trying to peer into the future. Rather, it is in the nature of the world, and the collisions between what people expect and what actually evolves. This is a world in which the notion of equilibrium will be of

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alpha," see "The Logical Justification for 'Active' Investment Management", H.W. Brock, appearing in *Institutional Investor: Thoughts on the Bottom Line*, Edited by Barclay Douglas, John Wiley and Sons, NY 2006 (forthcoming).

interest to professors but has little meaning to the turmoil of the marketplace.

Not everyone has taken such a sympathetic view to the problems of investors in making decisions under uncertainty. Twenty years ago, before the behavioral quirks of investors had been set forth at such length by others, Fischer Black, one of the greatest proponents of Capital Ideas and market efficiency, devoted his presidential address to the American Finance Association in 1986 to what he described as “Noise.” [Black, 1986] In this presentation, Black contrasted noise with information: noise arises as people buy and sell on what they believe is information but is really rumor, badly analyzed information, or hunch. “Noise is what makes our observations imperfect,” Black complains, because noise “creeps in at every step” and drives asset prices away from intrinsic values.

Occasionally, we can hardly believe people will be so foolish. It is surely noise when a company named Computer Literacy, Inc. changes its name to fatbrain.com and its price rises 30% in a day, as actually happened in the midst of the high tech bubble. [Rau et al., 2001]

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With many vivid examples, Behavioral Finance has demonstrated that consistently correct decision-making under uncertainty is an impossible task. But behavioral Finance also has made another significant contribution of great importance. This second contribution has received no notice from either scholars or practitioners, and was surely not

intended by the proponents of this field of study. I think it is a matter of highest importance. Steve Ross, perhaps more than anyone else, sensed what I am referring to when he said, "*Neoclassical theory is a theory of sharks, not a theory of rational homo economicus.*" [italics added] [Ross, 2002]

We usually identify Behavioral Finance as a body of research aiming to describe how behavioral quirks produce widespread mispricing in the markets and therefore negate the notion of an efficient market. Fama, in opposition to Behavioral Finance, believes, "The evidence does not suggest that market efficiency should be abandoned,"

I suggest Fama has stated the issue in reverse. Thanks to Behavioral Finance, the reality of market efficiency *should be more readily accepted.*

Consider what is really happening. The scholars turning out these papers on Behavioral Finance are identifying sources of alpha – opportunities that alert money managers will try to exploit. In the process, the scholars of Behavioral Finance are providing a vital service for the rest of us, and especially for the sharks: these scholars are making the markets *more* efficient than markets would have been otherwise. As I cited Bob Litterman above, "[W]e're pushing the world toward equilibrium, where risks and expected returns line up and making money from active management becomes more and more difficult." I doubt whether Litterman could have made that statement if none of us had ever heard of Behavioral Finance.

Work stemming from Bob Merton and his sometime co-author Zvi Bodie reflect a hopeful view of Behavioral Finance consistent with this assertion. Merton is convinced that innovations developed by profit-seeking institutions, like mutual funds and insurance companies, can mitigate and even overcome the behavioral anomalies and market inefficiencies created by individual investors in the real world. In economics, it is the lowest-cost producers that determine market prices. Institutional innovation and competition are forces for the reduction of transactions costs and the allocational effects of behavioral dysfunctions. As these forces come increasingly into play, they predict, “The prediction of the neoclassical model [Capital Ideas] will be approximately valid for asset prices and resource allocation.” [Merton and Bodie, 2005]

A similar view has been set forth by Andrew Lo. As Lo perceives market behavior, the anomalies uncovered in the field of Behavioral Finance are interesting, but in the end he finds the behavioral approach frustrating as well. These findings are only “a collection of anomalies, not a real theory. *You need a theory to beat a theory*,” he pointed out to me. [italics added] A more sophisticated view is essential, one focusing on the nature of the individuals and groups who compose the market.

According to Lo, when you search for an explanation of efficient market dynamics, you see the resemblance to the forces of biology and evolution – intense competition among players who are constantly changing with the passage of time. “We are all creatures of our

upbringing, and those preferences shape the interactions across markets – bonds, stocks, options – as well as across cultures – Chinese, Swedes, Americans.” Investors are not the automatons of the efficient market. They differ in countless ways from one another and across time.

The key question is what shapes the change, what drives the dynamics. Lo’s short answer is a view of history derived from Charles Darwin’s theories of evolution and the biological process of natural selection. In *The Origin of Species*, Darwin demonstrates how, in order to survive, species adapt their biology as their environment shifts. The process has a trial-and-error quality about it. Those species who can adapt win out and are the survivors. Those who fail to adapt fall by the wayside and ultimately disappear from view. As a result, all the species on earth are constantly changing and will continue to change into the indefinite future.

Lo finds a parallel process of evolution and change at work in the capital markets. He calls this notion the Adaptive Market Hypothesis [Lo, 2004]. Although the similarity between the origin of species and the capital markets is striking, there is also a fundamental difference between evolution in nature and evolution in institutions invented by humans.

Evolution has a quality of inevitability – species will change and develop as a result of forces beyond their control. But humans are a separate set among species. Unlike natural phenomena, the development of human institutions is contingent on the goals or purposes that

motivated their establishment in the first place. Many institutions are not somebody's brainstorm making an instantaneous appearance on the scene. Rather, institutions are a result of trial-and-error, where perfection is impossible but something less than perfect can often suffice. Institutions change as a result of purposeful decisions by the human beings who make use of them, but institutions also change in response to the forces of evolution.<sup>10</sup>

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The macro attack on the Efficient Market Hypothesis by Mandelbrot and Shiller focuses on volatility in the markets that far exceeds volatility in the underlying fundamentals. Boom and bust are not in the lexicon of Capital Ideas, but boom and bust are integral in the history of capital markets from the very beginning. [Shiller, 1989, 2000, and Mandelbrot, 2004]

The theory of finance as we have addressed it here has no defense against this attack. The facts are there for all to see. In its essence, then, even though the theory of finance has produced valuable insights into how markets work – many of which stem from the Efficient Market Hypothesis and the Capital Asset Pricing Model – it has nothing to offer on excess volatility. Even Paul Samuelson has had to come to grips with this shortcoming. As far back as 1998, Samuelson observed that markets may be macro inefficient even though he believes they are micro efficient:

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<sup>10</sup> For an extended and illuminating explanation of the difference between natural and contingent forms of evolution, see Herbert Simon, *The Sciences of the Artificial*, Cambridge, MA: MIT Press, 1969.

Modern markets show considerable micro efficiency (for the reason that the minority who spot minor aberrations from micro theory can make money from those occurrences and, in doing so, they tend to wipe out any persistent inefficiencies). In no contradiction to the previous sentence, I had hypothesized considerable macro inefficiency, in the sense of long waves in the time series of aggregate indexes of security prices below and above various definitions of fundamental values. [quoted in Shiller, 2000, p. 243.]

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Now, how do we answer the question in my title? Are Capital Ideas out of this world or in the thick of it? I do not believe there is any doubt about the answer. Capital Ideas are very much in the thick of this world.

Mean/variance optimization is an everyday event at institutions seeking the most appropriate and effective asset allocation structure. The words “beta” and “alpha” are part of common conversation among institutional investors as well the underlying format for a rising proportion of active investment strategies. The role of derivatives needs no elaboration – although it is of interest for this group that high-powered academics like Bob Merton and Bob Shiller have created new kinds of derivatives. Merton has invented a look-back option for investors who are frozen from decision-making by fear of regret, while Robert Shiller has created derivatives to protect homeowners from price declines in their neighborhoods.

Modigliani-Miller have received too little attention in this paper, but they may have inadvertently had the greatest influence of them all. Modigliani-Miller’s perception of the stock price as the dominant

determinant of whether a corporation is earning its cost of capital was in many ways the driving force of the great bubble of the 1990s and the source of the scandals of corporate accounting that emerged in its wake. M&M's shadow continues to haunt the current Wall Street scene.

With the passage of time, I expect Capital Ideas to become increasingly involved in the capital markets and investment management, in new ways as yet unknown. The driving force for this process will come from institutional change, as Lo has hypothesized. Or, perhaps more aggressively, from Steve Ross's sharks.

Yet, to me, the theoretical innovations at the heart of all of these developments remain most powerful part of the story. Innovation is always exciting, but influential innovations in theory in any field are rare. Theoretical innovations in finance *did not even exist* before 1952. They ceased after 1972. That little group of a dozen men have left us a heritage whose value we cannot even begin to calibrate. I borrow Isaac Newton's immortal words: "If I have seen farther, it is by standing on the shoulders of giants."

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