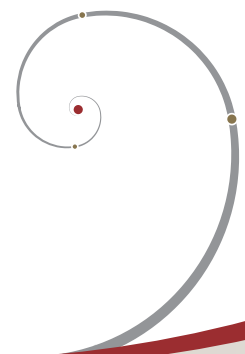


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**Investment  
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**From Concept to Function: Converting  
Market Theories into Practical  
Investment Tools, Discussion with  
Barr Rosenberg, PhD**



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**F**ounder of the eponymous Barr Rosenberg Associates (Barra), which has been called the first truly quantitative investment consulting firm, Barr Rosenberg was a pioneer in exploring the relationship among beta, common factors in security returns, and investment fundamentals. As well as gaining widespread acceptance for beta as the measure of risk for stocks, Dr. Rosenberg also is credited with transforming the concepts of academics such as Harry Markowitz and William Sharpe into tools that paved the way for practices used by today's investment consultants, including the concepts of risk budgeting and portable alpha. In addition to Barra, as his original firm now is called, Dr. Rosenberg founded Rosenberg Institutional Equity Management, now known as AXA Rosenberg, where he serves as chairman and director of the firm's research efforts.

Dr. Rosenberg, an acknowledged expert in the modeling of complex processes with substantial elements of risk, describes himself as "actively interested in human decision making in the face of risk, that is, how knowledge can be developed out of uncertainty, how decisions should be made in uncertain and risky situations, how people actually behave in these circumstances, and how they can be trained or otherwise influenced to act more wisely." Today he focuses that interest largely on the human aspects of capital markets, including the dynamics of expectations and investor sentiment.

In September 2005, Dr. Rosenberg talked with members of the *Journal of Investment Consulting's* Editorial Advisory Board about his early work in performance attribution and risk modeling, the development and role of manager style, and ways in which consultants can help investors become better-educated decision makers. Participating in the discussion were Edward D. Baker III, the *Journal's* editor-in-chief, of Alliance Capital Ltd., London and San Francisco; Matthew Morey of Pace University, New York City; and Meir Statman of Santa Clara University. This interview is the fourth in the Masters Series, which presents topical discussions with experts and visionaries in finance, economics, and investments.

## FROM CONCEPT TO FUNCTION: CONVERTING MARKET THEORIES INTO PRACTICAL INVESTMENT TOOLS

# A DISCUSSION WITH BARR ROSENBERG, Ph.D.

**ED BAKER:** Barr, it's a pleasure to have the chance to talk with you and hear your thoughts and observations as part of the Masters Series. Let's start by asking you to tell us about your views on performance attribution and about your contributions in this area, which are significant.

**BARR ROSENBERG:** Early on my personal research interests grew to emphasize studying the relationship between economic fundamentals and stock prices, which included tracking the factors that influence per-

formance, that is, performance attribution and the factors that influence value. I first saw the idea of performance attribution mentioned in some of Eugene Fama's work more than thirty years ago. That was a powerful idea, and I tried to make it functional and practical with a performance model—that is, performance attribution based upon a risk model—so that the risk model and performance attribution were two aspects of the same view of the world. The thrust of both was to associate investment returns with investment fundamentals; the

goal was to model expected returns, variances, and covariances in this manner. In other words, to represent the mean-variance world in terms of the influence of fundamentals. For risk modeling, that meant a description of the variance-covariance matrix of all asset returns depending on parameters that were observable—fundamentals of the company as well as market data.

The capital asset pricing model (CAPM) shows that in an idealized world the pricing of risk obeys a simple rule: The value of a stock adjusts so that it offers an excess return proportional to its contribution to the systematic risk of the market portfolio, which in turn is proportional to its beta. Thus each stock's return compensates the average investor for the stock's contribution to the riskiness of the average portfolio. If we think about the logic underlying the CAPM, we can imagine several reasons why elements of returns might be priced differently. Some of these reasons have to do with taxes, that is, different tax rates on different elements of returns. Some have to do with portfolio risk as experienced by clientele of investors. Some have to do with perceived risk, that is, just the gut feeling on the part of the investor that might be more behavioral than concrete. Finally, some of the reasons have to do with a stock's covariances with other assets that are not capital market assets, such as residential real estate or career income. We have no compelling theory for exactly what such pricing might be, but we can draw inferences from the capital market itself and its ability to diversify risks and reach market clearing prices: whatever investors think is important is what's most likely to be priced. That's the first point: Use as parameters in a risk model the things that investors view as important. That could be industrial sector or company size or dividend yield—all of these had traditionally been used in the 1930s and 1940s to aid diversification or define investment strategies.

The second point is that, to make a model useful for investors, it must be operationalized in terms of constructs that they understand. If you're going to use beta, which is a historical return measure, you have to explain how beta is calculated and what it means, and the same goes for a prediction for beta based upon fundamentals. So, in the beginning, I thought it made sense to base the modeling efforts on characteristics that were recognized by security analysts and portfolio managers

in the market, and that's what we tried to do at Barra. In effect, we ended up decomposing returns in terms of company exposures to fundamentally based factors. This approach to modeling beta also worked well in terms of explaining a significant portion of portfolio returns, and it turned out that we actually could identify manager styles in terms of exposure to those constructs. We called these exposures risk indexes.

Of course, style is as important today as it was then in terms of helping to explain the diversity of portfolio returns; a high proportion of the cross-sectional variability of portfolio returns can be explained based upon what you could call the "style" or "habitat" of the manager.

**MEIR STATMAN:** How would you place that within the development of the CAPM from the very beginning, when you had the market factor only, then the three-factor model, then four factors, through the addition of the fifth factor? Do you regard your models as precursors of what is happening today?

**BARR ROSENBERG:** Let's try approaching that question a little differently. There are two problems: actually predicting investment risks and helping investors to think about those risks in terms of factors of return and stock's exposures to those factors. The CAPM involves betas. Betas serve both of these purposes; when well-predicted they are a key element of predicting a stock's contribution to the risk of any portfolio, and they also are the measure of exposure to the largest risk factor in the market, the up and down movements of the market as a whole.

When it comes to predicting betas, which measure stocks' covariances with the market, since the market is made up of stocks, these betas depend upon all of the covariances among the stocks in the market. Some other pricing model, such as a three-factor model, also would depend upon the covariances among individual stocks, but in a different way.

Any model that predicts the variances and covariances of stocks will give you an implementation of whatever asset pricing model you may have, and a better model of covariances will improve the performance of any valid pricing model. So whether it is a single-factor market model or a three-, four-, or five-factor model, predicting the variance-covariance of the individual

stocks in the market is the key to successful implementation. Accepting that challenge in a general sense, Barra's work was quite advanced. In regard to accurately describing the variance-covariance matrix, the three-factor model would be a step backward, and a fairly large one, relative to the Barra model that came before and originally contained thirty-nine factors.

However, I don't mean that as a criticism of the three-factor model's usefulness for thinking about factors of risk. Investors also need to think about risk, and covariance matrices are strongly counterintuitive. A parsimonious model with just a few intuitively appealing factors may better fit the needs of many investors, even though it would be inadequate from the point of view of predicting portfolio risk. In summary, some approaches are more accurate in terms of actually characterizing individual assets and portfolios, and some are more intuitive in terms of thinking about the market.

**MEIR STATMAN:** It seems to me that we are moving toward the characteristics-type model you've discussed. If we look at price-book ratio or size, these are characteristics of companies, and the idea is that somehow they are related to returns. It goes back to what you said earlier, that is, pricing is going to reflect what investors think is important and, of course, the supply side, or what can be provided. This is why I think of what you've done—a characteristics model—really as an asset pricing model, and the alpha that comes out of it as a proper alpha that is based on that model.

**BARR ROSENBERG:** In a way I agree with you. The model predicts systematic risk as well as other common factors of risk and reflects the kind of constructs that investors use to assess risk. Any way to improve portfolio return without increasing expected systematic risk offers a way for an investor to improve the expected reward-risk tradeoff of a diversified portfolio, which is the intuitive meaning of alpha. Barra's vision was to make the best predictive model of risk, and define alpha ex ante relative to that prediction. After all, investment decisions impact *future* returns, so an investor needs a predictive alpha to build a portfolio. On the other hand, if you're defining alpha in terms of a residual return that by its nature represents a market inefficiency, then it does

make sense to display it ex post by simply regressing the series of returns, whatever they are, on whatever market indexes that you think might be relevant. That ex post approach does not require a predictive model. Further, the indexes that you choose to use for the ex post approach should be investable, that is, they should represent investment returns that were available to investors when the investments were made. This can be accomplished by using benchmarks that corresponded to market indexes that can be invested in through index funds or derivative securities. Then you have a pretty strong ex post case. For retrospective analysis, therefore, one can use benchmarks and calculate risk-adjusted returns relative to the benchmark using the market index as the only risk adjuster. I think that's the way we've moved in the industry, that is, to compare portfolio return to the appropriate benchmark and then, hopefully, risk-adjust the returns relative to the excess return on the market. But to return to the question that you raised, this is an ex post approach to defining alpha that would not have been available for decision making along the way. The investment manager requires an ex ante predictive framework to support decision making, and that is what Barra undertook to provide.

**MEIR STATMAN:** You've called them risk factors, but it seems to me that the factors you've talked about cannot be accurately described as risk factors. They might be preferences, but not risk factors. Eventually it becomes rather difficult to tell whether an excess return indicates a true alpha or an illusionary alpha caused by a faulty asset pricing model.

**BARR ROSENBERG:** That's true. A well-known construct such as dividend yield or book-to-price ratio or market capitalization has multiple roles: It directly predicts covariances and so defines a risk factor; it influences investors' expectations about risk and reward, and through that influence gains further power in predicting risk and reward; and it plays a richer role in investors' thinking that cannot be mapped into the mean-variance world, something more subtle that could be called preference or taste. In theory, if we could model everything perfectly, we could define an alpha ex ante, but that still would not capture the sub-

tleties of investors' preferences, and the market might move away on its own and make the model obsolete. I like to develop models and support decision making, so that was the way that I oriented the performance attribution approach at Barra. The industry's preference for benchmarks or, as we originally conceived them at Barra, "normal portfolios" can be explained by the fact that when the benchmark is defined ex ante the benchmark approach is model-free. In terms of implementing performance measurement, freedom from a model is not a small thing—it's a major advantage.

**MEIR STATMAN:** Going back to asset pricing models for a moment, I understand that you have a special interest in socially responsible investing. One thing that fascinates me about socially responsible investing is that here is a characteristic that can be reasonably described as one that does not reflect risk or expected returns and yet some investors care about it.

**BARR ROSENBERG:** Yes, exactly as you say. Socially responsible investing reflects a polarity: investors disapproving of corporate activities that are not socially constructive and withholding support for those corporations in the hope of redirecting or obstructing their actions, even if from a pure profit perspective the corporation may be acting appropriately. This brings a political dimension into the market: One investor's social responsibility is another consumer's obstacle, and as in the electoral process, a balance is reached between the opposing sides. Within the market the votes are proportional to portfolio value. The yeas, the nays, and the indifferent determine the balance by voting their shares. This is very like preferences.

**MEIR STATMAN:** Do you think preferences other than those that relate to risk have a role in asset pricing models?

**BARR ROSENBERG:** I think it's straightforward if you look at the asset pricing model in the context of diverse clienteles, as John Lintner did in his pioneering articles.<sup>1</sup> It's transparent that tax differences will create different investing clienteles, and the market clearing conditions that characterize the CAPM will apply to a weighted average of their experienced returns. That's very intu-

itive, and an easy place to start in terms of looking at how investors could have different experiences of returns. Looking at how the corporation earns its profits, which leads to socially targeted investing, certainly can define a clientele.

At Barra, we did some calculations quantifying how much security prices would move if investor groups, such as foundations, were to entirely disinvest themselves of some "socially challenged" companies. From a CAPM perspective, the price adjustment is determined by the increase in otherwise diversifiable risk that the remainder of the market would have to bear in taking on larger weights in these companies by absorbing the divested shares. This is very interesting theoretically. Barra's concern, and our concern at AXA Rosenberg, was to be able to support the decisions or the investment strategies of preference-driven investors.

**MATT MOREY:** Taking a look at the future for a moment, what do you think risk analysis, management, and performance attribution will look like in the years ahead?

**BARR ROSENBERG:** To begin with, emphasizing a systematic approach, you need portfolio optimization, and so your risk model must be simple enough to make computing the optimal portfolio feasible. That was a real constraint when Barra began back in 1975, and we designed a model that was implementable at that time. Obviously, now one could step back and use some more straightforward criterion for excellence, continuing to add details until estimation problems offset any further improvements. Therefore, one might expect that risk models would get more complex and multilayered in using different kinds of information. AXA Rosenberg is currently following that path. However, although the best model might be complex, investors themselves tend to like to simplify. That's the reason you see a three-factor model in so many articles suitable for graduate students and the reason we have a small number of dimensions distilled by the consultants looking at portfolio composition and in services like Morningstar. If you were to think just about that, it's almost a little like handicapping races, in that people approach the situation in different ways. So I believe the future is diversity, rather than some single highest standard.

**MATT MOREY:** Your firm has been cited as one of the leaders in using computers and various advances in computing, such as faster speeds, to develop better models and so forth. Do you think the evolution of improvements in computers will result in significant breakthroughs in finance much beyond what we've seen already?

**BARR ROSENBERG:** Looking at the question in terms of derivative securities, it seems that new securities are invented just about as fast as computing power increases to accommodate them. So it's almost a self-fulfilling hypothesis that further innovations will occur in that area. However, in terms of what I'm interested in personally—that is, linking fundamentals to stock prices—beyond a certain point the problem is finite, so it's the thinking, or the thoroughness with detail, that counts. In that area, I think we're really there in terms of benefits from raw computer power; I'm not sure we can do much more. It's very different from physical systems, where an underlying regularity is guaranteed, and you know that an order of magnitude improvement in computational power will lead to models that more accurately mirror that regularity. Human systems are not like that; they are not stationary by nature. It's much harder to be confident that the computer ever will be able to replace the human mind in the realm of capital markets.

**ED BAKER:** One area that could be viewed as a breakthrough is the value-at-risk approach to looking at overall portfolio risk. That resulted in part from innovation on the technology side. Do you see that area evolving much beyond where it is now?

**BARR ROSENBERG:** I don't think I'm really qualified to answer that question. In my mind, it's a behavioral matter, not a theoretical issue. So if people want to see things in different pictures, perhaps they can.

**ED BAKER:** In terms of manager styles, I think it's interesting that the models you developed at Barra were not really designed to be characteristic of manager styles, yet they turned out to be so. Those models served as the first formal way of looking at style, and normal portfolios followed on the heels of that. Could you comment on how you think the style issue might evolve over time?

**BARR ROSENBERG:** Style depends first of all on there being a range of different investor styles—in other words, different investor classes that have diverse styles. Style has to do with the buying and selling of the money managers, the market itself, and the diversity of products. The choice between value and growth seems to be a matter of investment manager temperament, and the choice between large and small a matter of many things, for example, a firm's research style, and so forth. The world is driven ultimately by consumers, but I'm not sure something new—say, for example, household robots—would ever give rise to new styles. The market now has a specialization in technology that was not there historically, and that's arisen because of the supply side. So robots might be something that would have an impact on both the supply and demand side. I'm just groping here.

**MEIR STATMAN:** You mentioned temperament. Do you think some investment managers by temperament are more suited to the value side and others to the growth side of managing money?

**BARR ROSENBERG:** Absolutely—in terms of qualitative managers, in terms of research style, in terms of their instincts for the long term. As you know, the discounted future dividend streams of stocks have such very long durations that instinct has to play a major role in valuation.

**MEIR STATMAN:** So there are two considerations: investor preferences for value or growth stocks and manager preferences for value or growth stocks. Is that correct?

**BARR ROSENBERG:** Yes, very much so.

**MEIR STATMAN:** Do you think that people who look for bargains when they choose consumer goods, such as clothing, also gravitate toward value investing?

**BARR ROSENBERG:** It also could be someone who buys antiques. In general, it seems that value investors tend toward patience, and growth investors have an instinct for the power of innovation. So growth investors work with rates of change, while value investors work with the convergence tendencies in the market.

**MATT MOREY:** Since you have so much experience in the consulting area, are there some general insights you'd like to share with consultants about what can be done to improve the consulting process—in dealing with clients, and so forth?

**BARR ROSENBERG:** I'd like to combine the answer to that question with some thoughts on behavioral finance. When we think about modeling, we can make a distinction between descriptive and normative models and, in the motivations for modeling, between creating superior investment strategies and simply describing the market, independent of whether the description might lead to profit-making opportunities. I became interested in capital markets rather than other economic processes because the stock market is approximately a taste-free world; in other words, the ideal investor simply would look for superior returns. It was much more interesting to model that world than a world in which preferences or taste played a large role. Behavioral finance is the healthy antidote to that view by saying, "No, actually, it's not a taste-free world." So I appreciate behavioral finance from that standpoint. Going further, one of the motivations of researchers in behavioral finance is to develop alpha—I think a lot of the literature is energized by that. By nature, such research is self-disfulfilling. Once it works, and investors are making money exploiting it, the opportunity will be exhausted and the original pattern will have disappeared as a result. Such research makes the market more efficient—and that's good—but as academic work, it shouldn't have a long life: If the inefficiency that has been discovered persists, it either means that the opportunity never existed in the first place or that no one has believed in the article enough to act upon it. The point I'm trying to make is that from a normative orientation, academics and consultants who wish to perform a useful function built upon the

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insights of behavioral finance perhaps should educate people to be taste-free investors instead of looking for strategies that offer superior returns.

**MEIR STATMAN:** So you would say that one should buy a car regardless of what it looks like—just make a choice on the basis of the quality of the engine and reliability?

**BARR ROSENBERG:** No, I wouldn't say that because people have a right to buy the car they want.

**MEIR STATMAN:** Then why doesn't that apply to stocks as well?

**BARR ROSENBERG:** Because if your goal is, as it is with most investors, to invest in order to be able to consume later, then money is money.

**MEIR STATMAN:** But why should we stop at money rather than what money is used for, whether social responsibility, status, hope, or security?

**BARR ROSENBERG:** Thinking about this from the perspective of a money manager, it makes good sense to offer a socially responsible strategy and to help clients to customize their own strategies. I agree that ill-gotten gains are not comparable to well-earned ones, and everyone should have the right to choose. In the other areas of taste though, I'm afraid that the clients may be making unwise decisions. For instance it is not generally true that a portfolio concentrated in secure companies offers more security than a widely diversified portfolio of comparable risk. When you're doing your best to give your investors as much money as possible later on, adjusted for risk, you will be a taste-free investor as a money manager, and if you're a consultant to investors, it's suitable to educate them to the benefits of trying to maximize risk-adjusted expected returns.

**MATT MOREY:** How would you suggest consultants go about better educating investors in this taste-free world? Do you have specific suggestions on advice that consultants can provide to help investors come over to that way of thinking?

**MEIR STATMAN:** Specifically, let's say a client comes to a consultant and says, for example, "I don't want to touch tobacco stocks." What is the proper way to handle that? Do you say, "Well, you're going to have a less-diversified portfolio and perhaps lower expected returns"? Are you going to try to dissuade an investor? How do you approach a preference like that?

**BARR ROSENBERG:** To answer Meir's question first, as long as the percentage of stocks in the market that you are avoiding is a small share of market capitalization, the only price will be that you will have some limitations in terms of money managers with whom you can invest. It's not clear that you'll necessarily have the full range or that you'll get the best performance. In terms of the diversification benefit, there's no cost from leaving out 3 percent or 5 percent of the market as a whole. The cost is trivial, so the consultant can tell the client, "Do what you want, sir, and more power to you." However, if you as a consultant have access to a manager with superior performance who happens not to offer what you normally recommend to other clients, whether it be alpha or index funds, and so in your own view the client will suffer reduced performance by losing access to those opportunities, you should quantify the cost, realizing that this is an ethical issue as well as a financial one.

Getting back to the more general question, it seems entirely appropriate to try to educate people. If you as a consultant want to try to improve your clients' investment returns, you should gently touch on the classic bad habits that investors have, and the ones that are counterintuitive in particular. For example, you could tell your clients that unless they have a special edge in terms of information or analysis, it's probably better not to invest in any industry in which they work because by doing so they put all their eggs in one basket. That advice alone would have saved a huge amount of financial pain for investors in the San Francisco area during

the technology bubble. I tried to lightly offer that advice, and generally I was chewed out in a friendly way for having the temerity to suggest that the rally was not going to go on forever. No one listened, but I didn't lose any friends. Maybe I should have risked losing a few friends in the short run and tried harder to get them to take my advice. But then again, people have a right to do their own thing. That provides an example of avoiding putting all your eggs in one basket.

Perhaps a more positive illustration that explains asset-liability matching is to advise clients that if they are going to retire elsewhere, they should buy early. The cost of retiring somewhere other than the place you are currently residing is a major uncertainty in your life cycle of consumption, and the only good way to hedge it is to have an investment in that physical location where you are going to retire. I used to tease General Motors by saying that, since a high percentage of their employees were likely to retire to Florida, to fund their employees' expenses in retirement the pension fund might prudently be overweighted in Florida real estate. Those are intuitive arguments people can understand. Going beyond that, a consultant obviously can educate a client in the dangers of using past performance as a basis for expensive decisions, and help clients to recognize that the most expensive decision typically is the turnover decision. The consultant can help the client consider whether a turnover is worth all the money involved, especially if the issue is style-related underperformance. Over time, as their own life experience deepens, consultants can begin to find many ways to give good advice.

**MEIR STATMAN:** Let me attach another question to that: Do you have a sense that consultants or investors spend too much time and effort trying to gain this edge of picking the "right" manager or beating the market and that, in the end, they end up losers? That is, would we all as a group be better off if there was more emphasis on designing portfolios for retirement or other financial goals, and less emphasis on trying to beat the market?

**BARR ROSENBERG:** Of course, if you carry that to the extreme, the market will go away.



**MEIR STATMAN:** No, I didn't mean to the extreme. But are we beyond the optimal point?

**BARR ROSENBERG:** Well, are we beyond the optimal point of going to casinos?

**MEIR STATMAN:** Doesn't that really go back to the issue of taste?

**BARR ROSENBERG:** I think of it in terms of entertainment and learning. It seems to me that if the people who go to casinos were to spend the same amount of time and energy buying stocks, they would be better off, and the economy would be better off. The stock market provides a certain kind of entertainment—an engagement with seeking your future wealth—just like a casino, and engaging in the investment process teaches people about the economy. I'm in favor of people receiving counsel and taking what they consider to be sensible risks and then seeing how their decisions work out, just as we learn how to decide whether to carry an umbrella when we live where it rains. That sort of wisdom about risk is valuable for society, and I think that wisdom about the economy is indeed valuable. Thank goodness we have a very robust system of free enterprise, but I think if a vote were taken, the risks entailed by innovation might be voted out of existence. It seems to me that even though the economy is strong, the political setting is fragile because there is so little understanding of what makes the economy work. So my gut feeling, rather than a reasoned opinion, is that everyone should go out and try to make money in the stock market in a way that will make it a learning process rather than a wounding experience. A consultant can help a great deal.

**ED BAKER:** Do you think consultants, when they're working with their clients to set objectives, should work primarily with the classic mean-variance framework? Is that ultimately the correct framework, or should they begin with a more general utility framework that might involve a variety of other goals?

**BARR ROSENBERG:** First, you need to be very sensitive, obviously, to the life cycle of the clients because, if you

are encouraging them to think about their futures, you're carrying them through some emotionally painful possibilities, ultimately including death. However, because you're doing it within a sensible planning context, you are performing a service. Maybe the retirement planner—and the spiritual adviser and the insurance agent—are the ones who have a really good reason to get people to talk about death. Going beyond that, it seems to me that a scenario approach is a good one. Things have gone well in our economy for quite a long time, so scenarios such as depression, or runaway inflation, or a strong dollar versus a weak dollar all are interesting to discuss with your clients to remind them that these are still possibilities.

Obviously, you need to talk in the context of their overall portfolio of assets, rather than in terms of any one asset class. People often don't think about that, that is, they don't look at their house as being an investment asset. These are obvious points, but the main point I'm trying to raise is educating the clients about themselves, about their own situations—in ways they may not have thought of before, including their wishes to meet the needs of their dependents and protect them from risk—all of these things can fruitfully be discussed. Within that setting, consultants should have a responsibility to think on their own about the risk-reward trade-off for the clients, because not many people can work with—or have an intuition for—the mean-variance solution.

To respond directly to the first part of your question, Ed, I think that the point at which portfolio construction begins is when it makes good sense to use the mean-variance framework.

**MATT MOREY:** Since you are both an academic and a practitioner, what do you think academics are overlooking in terms of the study of finance?

**BARR ROSENBERG:** One aspect of this is detail. As a point of comparison, macroeconomics professors and classes are fairly closely aligned with macroeconomic practitioners in terms of detail. However, in stock selection and portfolio construction the level of detail is phenomenal and difficult to come to grips with, and I'm not sure that academics have a sense of the consequences of simplifying it away. In finance it's not easy to get down

to the level where many of the interesting problems exist to be studied.

**MEIR STATMAN:** Are you talking about the ability of an academic to build or to use a system like the Barra system?

**BARR ROSENBERG:** Let's talk about it this way: Engineering is the science of building buildings. We would think then that finance should be the science of building investments. To build buildings, you have to understand about earthquakes. To build investments, you have to understand about the economic determinants of payoff in portfolios. It seems to me, and I hadn't really thought about it until your question, that academic finance is very weak on the economic determinants of portfolio payoff. Traditionally, it may have been stronger than it is today.

**ED BAKER:** What about the issue that, in order to actually build a model or develop an analytical framework, you need assumptions that grossly simplify the human situation?

**BARR ROSENBERG:** Of course, every human being is different, but I think there are some underlying principles that one could come to grips with, and that's what behavioral finance is working toward—to come to grips with the issues that need to be addressed if investors are to be educated to achieve their goals more knowledgeably. Where the detail is overwhelming is in terms of microeconomics, that is, what causes a company or a real property to rise or fall in value? If you define finance as a field that does not concern itself with those fundamentals, then they will have no academic home, because economics in general does not concern itself very much with valuation, precisely because valuation depends upon taste. Then it becomes the real estate specialist, or the investment specialist, who is concerned with financial value rather than the academic discipline per se. I remember once at a Berkeley Program in Finance seminar, one of the academic speakers presented a talk on security analysis that interested me greatly. However, most of our colleagues present were unimpressed, and I think the problem was in the speaker's emphasis on the details of inference. That recollection may have prompted my earlier point about detail.

**MEIR STATMAN:** So it is still a matter of taste?

**BARR ROSENBERG:** Yes, we all are human. I'm wondering what functions we really can serve in education. Education is a natural function for a consultant, of course.

**ED BAKER:** Since you're such a massive user of data and have watched the evolution of data over time, what are your thoughts about the state of the world in terms of the information available, what we are lacking, and where we are going?

**BARR ROSENBERG:** Ordinarily one would expect that more and more data would become available over time, and generally that is true. Still, in the area of governments collecting data on business—for example, input-output matrices—there may have been some slippage. With accountants as data collectors, it's very interesting because there's a strong thrust for accountants to behave more like economists and mark things to market. Yet sometimes, because disclosure is inadequate, one actually can lose track of historical costs in the mark-to-market process, and when historical costs become difficult to reconstruct information is lost. Discretionary marking to market certainly makes comparability more difficult; during the transition after regulations change, some people report the old rules, some people report the new rules, and much of the information is relegated to the footnotes. In some ways, I think that if accountants were being accountants in the sense of adhering to historical cost, and someone else was marking to market, we would have the ideal world because that would mean we would have market prices for everything. Then you could just keep track of what had been spent and what things were worth. Implicit in what I'm saying is yes, the availability of data is increasing around the world, and the discipline in honest accounting is strengthening in most places, and that's good. However, it has definitely become more confusing for the average investor, and I think that's unfortunate. To illustrate, take, for example, good will. In the old days, if you had good will, it meant that if you paid more than historical costs, you probably had a good reason, and then you began to amortize the cost because you were not sure the reason would be a good reason forever. Now you may have to write the cost off right away, which

means the investment disappears, or you may have to write it off when the stock market goes down, which means it disappears merely because of stock market movements. Therefore, companies can have huge earnings losses when the stock market goes down, which tell you nothing about their underlying business.

**ED BAKER:** So the availability of data forces investors to make constant adjustments that are idiosyncratic to the situation?

**BARR ROSENBERG:** Correct. For an organization such as AXA Rosenberg, this is grist for our mill, so I'm not complaining. However, it does seem like an odd situation.

**MEIR STATMAN:** Is it analogous to many centuries ago, when physics and philosophy were one and the same? Now, of course, those are two very specialized areas. That is, is it just getting too complicated for the average investor, and so it really requires specialists?

**BARR ROSENBERG:** That's true, and the analogy is an interesting one. What happened with physics was that once we got subtle measurement tools such as calculus, physics went beyond the reach of the philosopher, unless he happened to be a mathematical philosopher. You certainly wouldn't say that was a negative. Cosmology now is a little like physics was then, in that intuition really counts. The big bang debate was really an intuitive debate, and Einstein's instincts about causation and existence were intuitive. Cosmology also is becoming more complicated, so here again is an analogy to investing. However, society is dynamic—it tends to like uncertainty. So I'm not sure that we will not constantly be making things too complicated for the last generation.

**MEIR STATMAN:** Too complicated because it is truly complicated or because we are complicating it unnecessarily?

**BARR ROSENBERG:** If you are learning something for the first time, you think about the nifty things you can do. So if you are making toys or computers for first-time learners, such as children, the old-timers are not necessarily going to gravitate to your new product because they already have learned something else. As a result, all

around the world, we have kids teaching adults. The next generation will have tools that will allow them to cope with the investment complexities we're talking about and new challenges will come.

**ED BAKER:** Then there are the "shocks to the system" phenomena, like the reaction to the Sarbanes-Oxley Act of 2002.

**BARR ROSENBERG:** That really was two shocks in one. At our firm, we could afford to respond, and I think it's been entirely good for us that we've been forced to do this, but it certainly has been hard work. I'm not sure what effect it has had on larger companies, but it must be even harder, especially in terms of huge costs. Because our firm deals only with information, we can just redesign ourselves in some sense. In theory, it's possible to meet any requirement; we just have to rethink things. It has to be much more difficult when you deal with physical systems.

**MEIR STATMAN:** Speaking of shocks, it seemed like the investment industry really was surprised by the backlash when the stock market bubble burst. Was that just because those in the industry were simply unaware of what was going on, whether it was the tax-planning schemes that now are exposed as being worthy of criminal prosecution or a variety of other improprieties? Are people so unaware of the links between politics and economics and finance that every generation finds itself shocked?

**BARR ROSENBERG:** People are tribal or gregarious animals, and they tend to believe what they hear around them. People also tend to extrapolate trends. Those two things we know are fundamental. Everyone wants to believe in a brave new world, so when the stock market goes up for enough years, then that becomes a solid fact in people's minds.

**MEIR STATMAN:** I'm not just talking about the bubble itself. I'm talking about the political process. For example, after the crash of 1929, hearings were held, the Securities and Exchange Commission was established, and there was a general backlash against business. You spoke about it earlier—that is, sometimes capitalism is

stronger than democracy, and sometimes democracy hits back with things like Sarbanes-Oxley. But it seems like people are shocked by it every time.

**BARR ROSENBERG:** I think it is shocking that there were senior officers of corporations who were not smarter, that I don't know how they could have confused themselves so much except through wishful thinking. Ethics you always can hope for, and in our society, you can punish people afterwards. But just the sheer amount of stupidity was amazing to me, and the fact that such people could get into such positions of power. If that's a feature of capitalism, I think that the problem is with the outside directors—that they don't have enough depth of information or common sense. That's not a finance or capital markets issue—it's simply that you would expect corporate leaders to have some common sense.

**ED BAKER:** You raise a good point about corporate governance, because we have had some failures on that front, and we do need to control capitalism because some entrepreneurs will do things that are dishonest.

**BARR ROSENBERG:** The dishonesty part—which everyone mentions in hindsight—is sometimes difficult to define at the time. Clearly there was outright fraud in some cases, but there have been other instances of unreasonable blame. Let's say there are two company managers who are hiding things from their investors. In one case, the company performs well afterward, and in the other case, the company does badly. The company that will be punished is the one that's doing badly, because that's the company that's going to be found out. Presumably the other manager was hiding something because he was confident that everything would be fine in a year, and he didn't want to discourage investors unnecessarily; that is dishonest but it's done all the time. If an athlete has a little injury, he doesn't trumpet the fact to the world because he believes it's going to get better. No one calls the athlete dishonest when he says later, "Well, it has been hurting for six weeks, but now it's really bad so I'm letting you know about it." What does concern me is that certain deceptive policies, which led to greater and greater danger and were hidden only

by further and further concealment, could have been pursued for so long without being found out.

**ED BAKER:** That they could be hidden for so long, yes.

**BARR ROSENBERG:** And that those responsible chose to hide them for so long. In other words, they could have chosen to reverse the scenario part-way along, but they did not.

**ED BAKER:** Well, we've covered a lot of ground and gotten a lot of answers. This has been very interesting, and we really appreciate your time, Barr. It's always a pleasure to talk with you.

**BARR ROSENBERG:** It's been my pleasure.

*Barr Rosenberg served as professor of finance, econometrics, and economics at the University of California at Berkeley's Haas School of Business from 1967 through 1982. In 1979, he founded the Berkeley Program in Finance. Between 1968 and 1974, Dr. Rosenberg also worked as a consultant in applied decision theory in finance, banking, and medicine. He is the founder of Barr Rosenberg Associates (1975), now known as Barra, and Rosenberg Institutional Equity Management (1985), based in Orinda, California, which joined AXA Investment Managers in 1999 to become the AXA Rosenberg Group. Dr. Rosenberg earned a B.A. in economics from the University of California at Berkeley in 1963; an M.Sc. from the London School of Economics as a Marshall Scholar in 1965; and a Ph.D. in economics from Harvard University in 1968. Among many other honors, Dr. Rosenberg was the 2005 recipient of the IMCA Matthew R. McArthur Award in recognition of his long-term commitment and contributions to the financial industry in general, to the investment consulting profession in particular, and to the art and science of investment and financial technology.*

## Endnote

1. See John Lintner, "The valuation of risk assets and the selection of risky investments in stock portfolios and capital budgets," *Review of Economics and Statistics* 47 (1965): 13–37 and John Lintner, "Security prices, risk, and maximal gains from diversification," *Journal of Finance*, 20 no. 4 (December 1965): 587–616.

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