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Remembering Fischer Black.

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REMEMBERING FISCHER BLACK

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Fischer Black died of cancer on August 30, 1995, at the age of fifty-seven. Extensive obituaries appeared in the *New York Times*, *The Economist*, and other major publications, as the world recognized the passing of one of the major figures in modern finance.

Fischer Black is best known for his role in developing the celebrated Black-Scholes option pricing model. Those in the finance profession are familiar with many more of his numerous professional contributions, including classic papers on portfolio theory, testing the Capital Asset Pricing Model, commodity options and other derivatives, portfolio insurance, interest rate movements, business cycle and monetary theory, financial markets, and institutions, among others. An excellent review of his research contributions, written by Robert Merton and Myron Scholes, will appear in the December 1995 *Journal of Finance*.

For those who knew Fischer Black personally, however, no recounting of career milestones, papers published, or honors received begins to capture the essence of this truly remarkable man; much of his influence on the finance profession came not just from what he wrote, but from his character and personality. In preparing this article, I contacted many people who were close to Fischer at various points in his career to ask for their personal reminiscences of him. The following reflects their comments.

Fischer Black received his Ph.D. in applied mathematics from Harvard in 1964. He had been an undergraduate physics major. Nevertheless, he began his professional career as a management consultant, first at Bolt Beranek & Newman for a year, and then at Arthur D. Little (ADL). He founded his own consulting firm, Associates in Finance, in 1969.

Fischer was consumed with intellectual curiosity about many fields, a trait that marked his career from the beginning. As an undergraduate, he

apparently took courses primarily because they interested him, ending up as a physics major almost by accident. He took no economics or finance courses in school, and only began to read avidly in those areas after joining ADL. An early influence encouraging his interest in finance was Jack Treynor, an ADL colleague and a brilliant and unconventional thinker in his own right.

When Treynor left ADL, Fischer took over several of his cases, some of which involved financial issues, including how to evaluate the performance of an investment portfolio. In an early example of Fischer's lifelong habit of reaching out to anyone he knew was working on an interesting problem, he telephoned Michael Jensen, at that time a Ph.D. student at the University of Chicago. Fischer had heard Jensen was working on performance evaluation using a brand new approach: the Capital Asset Pricing Model. This first contact led to a meeting, the meeting to a joint project and consulting arrangement, and ultimately to fundamental academic research on the CAPM. Another valuable outcome of Black and Jensen's friendship was Fischer's meeting Myron Scholes, a graduate school classmate of Jensen's. Jensen suggested to Myron that he look up "this interesting fellow," Fischer Black, when he arrived at his new academic job as an assistant professor at M.I.T.

Fischer became immersed in modern finance theory and economics. In addition to long discussions with Jensen and Scholes, he became a regular participant in the finance seminar at M.I.T. and also attended conferences sponsored by Wells Fargo, where he met Merton Miller and Eugene Fama. On their side, Scholes and Black were instrumental in persuading Wells Fargo to set up the first index fund. During this period, Fischer worked on the Treynor-Black model for integrating active and passive portfo-

lio management, worked with Jensen and Scholes on their classic paper testing the CAPM, published papers on the design of an automated stock exchange, developed a model of capital asset pricing with no riskless asset, and published papers on banking, monetary theory, and the performance of ValueLine stock rankings. He also began working with Scholes and later Robert Merton on the problem of valuing options. Although he was not an academic at the time, Black had clearly become "a member of the club," and was contributing significantly to the development of modern financial theory.

In 1971, although he had no degree in finance, had never taken a course in finance or economics, and had never held an academic appointment, Black was offered the Ford Foundation Visiting Professorship at the University of Chicago. The next year, he was given a permanent position as a tenured full professor. He was reportedly a great favorite with the Ph.D. students, although a little strange in the classroom.

It was at Chicago that he began to develop his "50 questions" approach to teaching finance, which became his hallmark when he moved to M.I.T. a few years later.

Fischer was apparently not that interested in "walking students through the basics" in a core finance course. But students found his elective course, "Problems in Finance," a unique and valuable experience, although a little unsettling at the outset. The course had no textbook, no syllabus, and only a few readings. At the start of the semester, Black would hand out a list of questions, some fundamental, some tricky and convoluted, and thereafter each class would consist of his posing a few of the selections from the list, followed by a thorough class discussion. Typically at first, the students would not know what to do, and would wait for Fischer to supply the answers. But there would simply be silence. Only when the students had conducted a full discussion would he offer his own thoughts.

It is not uncommon in any course, but especially one like this, for students to feel tremendous pressure, fearing the potential for humiliation at the hands of a brilliant professor. Black's course was quite the opposite: Students were obliged to speak out and put their ideas on the line, but he was always gentle and "paternalistic," never embarrassing anyone regard-

less of what was said. The course is said to have been very enjoyable, with a lot of laughter. One ex-student said that one of the images he has is of Fischer at the blackboard, giggling with delight as he revealed the secret to one of his particularly tricky questions.

In 1984, to the surprise of most of the finance profession, but not of his closest friends, Fischer left M.I.T. for Wall Street, to work at Goldman Sachs. He was always fascinated by both theory and practice, and so became one of the first, and surely the foremost, "rocket scientist" to abandon the ivory tower for the real world.

At Goldman, Fischer continued to do much what he had always done. He worked on problems that interested him and offered insightful thoughts on anything that anyone brought to him — and there was a great deal going on in such rapidly developing areas as derivatives. He also continued his regular practice of devoting one full day a week to pure research. He never felt constrained by his formal job description, working on whatever came to hand, while being formally part of, at different times, the equities area, Goldman Sachs Asset Management, and the fixed-income department. For example, as a member of the equities area, he helped develop the Black-Derman-Toy model for interest rate movements. He also apparently made a considerable amount of money for the firm by uncovering a systematic mispricing in the ValueLine stock index futures contract.

Referring to the move to Wall Street, one of his academic colleagues commented that Fischer was "a very serious intellectual, but not an academic," and "he was not the kind of person to be a career business school professor." On the other hand, in the eyes of his Goldman Sachs colleagues, he was hardly a typical investment banker, either. Yet he was made a partner at Goldman in nearly record time. One story goes that when the senior partners asked around to see how much of a contribution Fischer was making, they discovered that he had helped people from all over the firm with ideas he had given them. He remained at Goldman Sachs until he died, "doing pretty much what he had always done," and continually remarking how strange it was that people were willing to pay him for doing exactly what he wanted to do anyway.

Throughout his career, Fischer Black embodied the ideals of the true scholar. He loved his field and was fascinated by ideas, not only his own but those of everyone who worked in his area. He held a deep devotion to the pursuit of truth, and was always willing to think in unconventional ways and to stand against the weight of popular opinion in defense of what he thought was correct, with total intellectual honesty and integrity. Of course, we all know how a true scholar should behave, but most of us find it very difficult to put the precepts into practice as Fischer did.

He was not “a political person,” (almost the opposite at times), and “refused to be swayed by sheer political power.” “Nobody had any bargaining power with Fischer,” one person told me. What he thought was important was “to build the most truthful model you could, even if you couldn’t solve it analytically or accurately.” He “reinvigorated your sense that it was important to do the right thing and concentrate on quality even if people around you sometimes didn’t appreciate it.”

One of Fischer’s most striking character traits was that he never seemed to have his ego tied up with his ideas. Of course, a good scientist is supposed to be totally objective and guided only by a dispassionate search for the truth, but somehow, in practice, nearly everyone ends up feeling a little more than the theoretically optimal attachment to their own personal theories. Attacks on someone’s academic ideas easily become personalized, and may even lead to long-term enmity among allegedly dispassionate scientists. Objective discussion of one’s ideas is often hardest for the most brilliant thinkers, who can tend to become impatient at criticism by lesser minds. On occasion, fear of the loss of face that admission of error would entail can cause even great thinkers to cling to positions long after they have been proven wrong.

Fischer always seemed to be above such personal concerns. He cared only about getting at the truth. His positions were thoroughly grounded in logic, and were put forward forcefully and with tenacity, but he never took disagreement or even direct attacks personally. He was “unbelievably cool under pressure.” In the face of what a critic might consider a devastating assault, Fischer would simply take out his yellow pad and note down the criticism, so that he

could think about it carefully later. He was not daunted even when most of his audience thought he was wrong. On the other hand, he was always willing to admit being in error when it could be demonstrated to him convincingly. When this happened, he would abandon his position without a backward glance, and then mention his critic by name in his next article for having pointed out the mistake.

Because everyone knows the dangers of open criticism (both giving it and receiving it), it is common to adopt a variety of defensive strategies. Students hesitate to criticize their professors directly, and junior professors are afraid of offending their senior colleagues, who themselves are careful about what they say to the really big names in the field. Referee reports for academic journals, where open and direct criticism is required, are always anonymous, to encourage honesty and reduce the referee’s natural concerns about subsequent bad feelings — even retribution — in case of a negative evaluation. To defend against possible personal criticism of one’s published research, journal articles are typically full of circumlocutions, caveats, and hedged statements: “Given the limitations of the methodology and the many possible problems with the data, it would appear that our tentative hypothesis is not rejected by the above analysis. On the other hand, these conclusions could change if...” and so on.

Fischer Black took the complete opposite approach. He said what he thought as clearly as he could, without fear and without hedging. One old friend of Fischer’s summed up his style with the following quotation: “Truth is more readily approached through error than through confusion,” adding that “Fischer would very much prefer to be absolutely clear and wrong, than muddled.” He signed his “anonymous” referee reports, and had no compunction about telling an author (even unsolicited) that, “I disagree with almost everything in this paper,” always assuming that it would not be taken personally, but rather, as he intended, in the spirit of a shared intellectual pursuit of the truth. Incredibly, people did take Fischer’s comments that way. They were disappointed, naturally, if he did not like their work, and they might not agree with him, but they accepted that he was speaking his mind with absolute intellectual honesty and integrity. He did not make enemies.

In his writing, Fischer always favored direct declarative sentences that left no doubt about what he meant and what he thought. To pick an example among many from his 1985 Presidential Address to the American Finance Association, entitled simply, "Noise," he said, "The idea that dividends convey information beyond that conveyed by the firm's financial statements and public announcements stretches the imagination." In a single sentence he wipes out an entire area of active academic research, on dividend signaling, following up with a characteristically unconventional solution, "I think we must assume that investors care about dividends directly. We must put dividends into the utility function."

Also characteristically, he says in the introduction, "While I have made extensive use of the work of others, I recognize that most researchers in these fields will regard many of my conclusions as wrong, or untestable, or unsupported by existing evidence." After freely acknowledging that he can't think of any way to prove his assertions empirically, but listing a number of areas where he predicts that understanding the critical importance of "noise" would one day cause currently accepted doctrine to be overturned, he adds, tongue-in-cheek, "If my conclusions are not accepted, I will blame it on noise."

You could like what he said or not, you could agree or disagree, but you knew that he had not fudged his conclusions to please his audience. Almost the opposite, in fact; Fischer did not mind "making waves," and seemed to enjoy espousing positions, logically arrived at, that the mainstream would regard as outrageous. He was perfectly capable of telling pension managers attending a Goldman Sachs conference that he thought broker-dealers (such as Goldman) would have no role in the financial markets of the future (because they would be replaced by an automated trading system), and then turning around to scandalize a room full of finance professors by arguing that academics should only be paid for teaching and should receive no financial compensation for doing research (because they like research and will do it anyway).

The same intellectual courage was apparent in everything Fischer did. Several people told of how, as a young professor, he debated his unconventional ideas about monetary theory long and hard with

Milton Friedman at the University of Chicago one year, and then did the same the next year with Franco Modigliani at M.I.T. Already renowned figures in the area of monetary economics — each would soon win a Nobel prize — both men were also well-known as brilliant, intellectually aggressive, and truly formidable arguers, but Fischer took them on, unconcerned about "losing" the debate.

He was eager to learn from anyone, without envy or arrogance, whether it was a Nobel laureate or a first year student, and no one's thoughts or criticisms were rejected out of hand. Indeed, if someone raised a difficult question or point, he would often just stop and think about it in silence, whether it was in a private conversation, during a seminar, or while standing in front of a class. One of Fischer's best-known personal habits was constantly jotting notes to himself about ideas that came up in conversations. Many awed Ph.D. students, meeting him for the first time, were astonished when he would quietly take out a piece of paper and begin taking notes on what they were saying to him. He always claimed that he needed to write things down because his memory was so poor, but no one who knew him ever saw any evidence of that. He probably wanted to take notes because he was trying to keep track of so many more ideas than most people.

The most striking illustration of Fischer's interest in the ideas of anyone and everyone was his habit of reading every paper that came his way. It is a fact of life in the academic world that one regularly receives bales of working papers and manuscripts from colleagues, friends, acquaintances, and total strangers; also articles to referee, journals to read, binders containing a dozen or more papers to be presented at a conference, and much more. The more prominent and active a person is, the larger the volume becomes. Most well-known senior faculty have great stacks of as-yet-unread (and probably never-to-be-read) papers.

But, somehow, Fischer read it all. And then he contacted the authors immediately with comments. Former colleagues recall answering the telephone late at night to hear Fischer, often without any preamble, launch into something like, "On page 32 of your latest working paper you make a fundamental error when you say..." But Fischer didn't just give comments on papers by his friends. Many distinctly un-

prominent people had the experience of sending him a working paper out of the blue, and shortly afterward answering the phone to hear a soft voice: "This is Fischer Black speaking. I was reading your paper and I wondered if you had thought about..." One measure of his influence is the fact that from 1985 to 1994, he is thanked for his comments by the authors of no fewer than forty-five papers in the *Journal of Finance*, the *Review of Financial Studies* (beginning in 1988), and the *Journal of Financial Economics*.

One of the most remarkable things along this line is the fact that, when Fischer attended a finance conference, he would read all the papers being presented, *in advance*, so he could prepare questions to ask the authors. Recently, when the Financial Economics Network was established to distribute abstracts of working papers and forthcoming articles on the Internet, Fischer became an avid reader, often sending his comments to authors by E-mail (unsolicited, of course). In fact, during the last year or so, Fischer became a great user of E-mail, sending out quantities of messages and responding to incoming ones within hours until just a few weeks before his death.

When he became sick, he was intellectually honest, as in all things. He didn't hide his condition, and would respond frankly in an objective and somewhat detached way if people asked about his health. He never complained.

About six weeks before he died, Fischer was informed of several things being done to honor him. First, M.I.T. is establishing a Fischer Black Chair for a distinguished visiting scholar in finance. This chair, to be held specifically by a visiting professor, will encourage a broad flow of ideas from a sequence of chairholders, making it an especially appropriate memorial for Fischer. The American Finance Association is also setting up a Fischer Black Prize for scholarship in finance, to be awarded once every two years. Like the Clark Medal in economics, this prize will be one the highest honors possible in the field of finance. The University of Chicago is establishing fellowships in his name for Ph.D. students in finance. Finally, M.I.T. Press is planning to publish the collected works of Fischer Black, with commentaries by

major figures in the field. When he was informed of these memorials, he was very touched, and also, characteristically, a little surprised that people should make so much of his work.

I will close with a personal reminiscence that, to me, captures a little of what Fischer Black really was like. I was one of a group of fairly junior faculty at a dinner party that Fischer attended. The furnishings of the house (this being California) included a rather strange device called a "back swing," whose purpose was to allow the user to hang upside down like a bat, which was supposed to be good for the back. While we all stood around urging each other to try the back swing, much the way a group of ten-year-old boys might dare one another to eat a worm, none of us had the slightest intention of placing ourselves in such a ridiculous position. But Fischer, without a trace of self-consciousness, wanted to try it. To our astonishment, he eagerly clamped his feet into the contraption, and soon all 6 feet 5 inches of him was hanging upside down. After a minute he got out of it, picked up all the things that had fallen out of his pockets, and announced that he thought maybe it really would make one's back feel good.

In exactly the same way, throughout his career, Fischer was always curious about new ideas and was perfectly willing, without any self-consciousness or concern for public opinion, to turn the conventional wisdom in finance upside down, and even argue that it was a better way to think about things. In the words of one old friend, "Fischer never caved in to thinking about the world in the standard way." He was an extreme outlier in our profession. And, as any statistician knows, it is from the outliers that one can learn the most.

We will miss Fischer Black.

ENDNOTE

I would like to thank the many people who shared their recollections and thoughts about Fischer Black with me in the course of preparing this article. To encourage them to speak freely, we have not published the names of those whose comments are quoted.