

PERSPECTIVES

An Experienced View on Markets and Investing

Eugene F. Fama and Robert Litterman

At the 65th CFA Institute Annual Conference in Chicago (held 6–9 May 2012), Robert Litterman interviewed Eugene F. Fama to elicit his views on financial markets and investing.

Litterman: You were at the center of the development of two very powerful ideas: market efficiency and equilibrium risk–return relations. Why are they such important concepts?

Fama: Market efficiency says that prices reflect all available information and thus provide accurate signals for allocating resources to their most productive uses. This is the fundamental principle of capitalism. To test market efficiency, however, we need a model that describes what the market is trying to do in setting prices. More specifically, we need to specify the equilibrium relation between risk and expected return that drives prices. The reverse is also true: Almost all asset pricing models assume that markets are efficient. So, while some researchers talk about testing asset pricing models and others talk about testing market efficiency, both involve jointly testing a proposition about equilibrium risk pricing and market efficiency. The two concepts can never be separated.

Litterman: In developing these ideas, was there a particular point at which “the light went on,” so to speak?

Fama: Yes. When I was an undergraduate, I worked for a stock market forecasting service. My job was to devise mechanical trading rules that worked. But the rules I devised worked only on past returns; they never worked when applied going forward or out of sample. After two years of graduate school, I started talking to Merton Miller, Lester Telser, and Benoît Mandelbrot—a frequent visitor at the University of Chicago. They were thrashing around the idea of what prices would look like if markets worked properly. That was my

path into research on market efficiency and equilibrium risk–return models.

As the market efficiency ideas took shape, it dawned on me that the reason the trading rules I’d developed earlier didn’t work out of sample was because price changes were random, which at that point was what people thought an efficient market meant. We know now it doesn’t. Market efficiency means that deviations from equilibrium expected returns are unpredictable based on currently available information. But equilibrium expected returns can vary through time in a predictable way, which means price changes need not be entirely random.

Litterman: You and I share one rather unique experience. Both of us have had an office next to Fischer Black’s office. Do you have any interesting memories that you might share?

Fama: We both would arrive at our offices very early in the morning. This was during the time the first tests of the capital asset pricing model (CAPM) were being done. Fischer, Myron Scholes, and Mike Jensen were suspicious of the latest test results because it looked like the standard errors of the measured premium for market beta were too low relative to what they knew to be the volatility of the stock returns. So Fischer devised this elegant technique for forming portfolios that would capture the premium and would allow for the cross-correlation of returns, which had been the major problem with the earlier tests of the model.¹ When he showed the technique to me, I said, “That’s great, Fischer. You just discovered regression.” He said, “No, no, I didn’t.” I said, “Yes, yes, you did.” “No, I didn’t.” “Yes, you did.” And on it went.

Finally, in response to this debate, I wrote what became Chapter 8 of my textbook² to essentially explain to him the portfolio interpretation of a regression that attempts to explain the cross-section of stock returns. The regression approach, which was first used in my 1973 *Journal of Political Economy*

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paper with Jim MacBeth,³ has since become a standard method for testing for factor return premiums—for instance, the premium associated with small-cap stocks.

Fischer was one of the rare people (Merton Miller was another) who could cause you to think entirely differently about something you've been working on. It's hard to think of anything more valuable when you're doing research. Your colleagues play a very important role in your research. You can't work in a vacuum or you waste a lot of valuable time. For example, I was in Belgium for two years working solo. When I returned, I showed Merton Miller my research produced over that two-year period, and he put aside most of it with the comment, "Garbage." He was right on every count.

Litterman: I had exactly the same experience with Fischer. Now, let's turn to more recent events. What do you think caused the global financial crisis?

Fama: I think the global crisis was first a problem of political pressure to encourage the financing of subprime mortgages. Then, a huge recession came along and the house of cards came tumbling down. It's hard to believe that without a pretty significant recession, the financial system would have come crashing down like it did. Subprime was basically a U.S. phenomenon, yet the crisis spread around the world. Financial institutions in other countries were certainly holding subprime debt, but in the past, financial institutions have gone bust because they made dumb decisions without triggering widespread crisis. I don't think the crisis was a problem with markets. The big recession was the trigger. The worst thing to come out of that experience, in my view, is the concept of "too big to fail."

Litterman: I totally agree. Can you elaborate on that?

Fama: Basically, the institutions that are considered to be too big to fail have their debt priced as if it's riskless, which gives them a low cost of capital and makes it very easy for them to expand and become an even bigger problem. Plus, everybody now accepts the assertion that they are too big to fail, which creates a terrible moral hazard for the management of these financial institutions. Business leaders won't consciously tank their companies, but too big to fail will push them toward taking more risk, whether they realize it or not. I don't think Dodd-Frank (the Dodd-Frank Wall Street Reform and Consumer Protection Act) cures that moral hazard problem. Even if lawmakers could devise the perfect regulation for such a cure, the chance that it will be implemented by the regulators in the way designed is pretty close to zero.

The simplest solution would be to raise the capital requirements of banks. A nice place to start would be a 25% equity capital ratio, and if that doesn't work, raise it more. The equity capital ratio needs to be high enough that a too-big-to-fail financial institution's debt is riskless, not because of what is essentially a government guarantee but because the equity ratio is very high.

Litterman: Do you think that the Volcker Rule (eliminating proprietary trading by commercial banks) will be successful?

Fama: I don't believe that the Volcker Rule will accomplish much. It wasn't just the commercial banks that were bailed out in 2008. The investment banks, where the majority of risky trading was taking place, were bailed out too. If the commercial banks are prohibited from proprietary trading, the investment banks will still be doing it, and as precedent has shown, they are considered too big to fail. So they would be bailed out if something were to go wrong. Nothing really changes with the Volcker Rule.

Litterman: Let me ask you about another issue. A large fraction of state and local pension plans are significantly underfunded. How did that happen?

Fama: Many plans are underfunded, of course, because the sponsors simply didn't put enough money into the plans. More important, the situation is much worse than they admit. The reality is that the liabilities they claim to have are about a third of the actual liabilities. They understate the current value of liabilities because the sponsor discounts the liability stream at the assumed expected return on the risky assets held by the fund. The sponsor should be discounting the liabilities at the expected return implied by the risk of the liabilities, not the expected return on the assets. The liabilities are basically indexed claims—like a TIPS (Treasury Inflation-Protected Security). Therefore, the appropriate discount rate on the high side should be about 2.5%, not the 7% or 8% that the plans are using now. Even using a 3% discount rate would at least double the value of liability compared with the declared liability.

So, what does this all this mean? The plan sponsors are betting that good returns on the risky assets they hold will bail them out. The problem is that over the lives of these plans, there will be multiple instances of bad markets, and the plans have to fulfill their pension obligations in bad markets as well as in good markets. That's where the risk bites. The state and local pension funds are basically giant hedge funds. If that makes you uncomfortable, it should.

Litterman: So, what's the solution?

Fama: One solution might be to finance defined benefit plans—as Fischer Black always contended—solely with debt in order to best match the liabilities and the assets.⁴ But that won't happen because the plans would have to lower their discount rates to reflect the current level of interest rates and then it would be obvious that the plans are so far underfunded that they are basically bust.

The crisis the country faces is that eventually a big state is going to go bust because of its pensions. State constitutions typically provide that the state first has to service its debt, then make its pension payments, and then pay for services. What we don't know is whether that order will be enforced. And ultimately, the busted state is going to be looking to the federal government for a bailout. Think Greece, but on a much bigger scale.

Litterman: You've just published research that shows that before costs, mutual fund managers systematically take alpha from other managers.

Fama: Yes, that's a concept I hope everybody understands. Active management in aggregate is a zero-sum game—before costs. Good (or more likely just lucky) active managers can win only at the expense of bad (or unlucky) active managers. This principle holds even at the level of individual stocks. Any time an active manager makes money by overweighting a stock, he wins because other active investors react by underweighting the stock. The two sides always net out—before the costs of active management. After costs, active management is a negative-sum game by the amount of the costs (fees and expenses) borne by investors.

My research with Ken French shows that, examined before costs, the return distribution for the universe of all mutual funds has a right tail and a left tail, both tails are about the same size, and the distribution is centered at zero. In other words, the before-cost return distribution looks just about as you would expect if on average active managers have no skill but there are both good and bad managers. After costs, only the top 3% of managers produce a return that indicates they have sufficient skill to just cover their costs, which means that going forward, and despite extraordinary past returns, even the top performers are expected to be only about as good as a low-cost passive index fund. The other 97% can be expected to do worse.

Litterman: So, what conclusions should we draw from this?

Fama: That an investor doesn't have a prayer of picking a manager that can deliver true alpha. Even over a 20-year period, the past performance of an actively managed fund has a ton of random noise that makes it difficult, if not impossible, to distinguish luck from skill.

Litterman: Let me ask you about the equity risk premium. Why has it been so high in the historical data?

Fama: In a paper Ken French and I wrote,⁵ we observed that P/Es (price-to-earnings ratios) have risen over the period covered by the CRSP files. P/Es can rise because expected future profitability has risen or the discount rate (i.e., the expected return on stocks) has fallen. Because we couldn't find any evidence that earnings growth is predictable except over very short horizons, we concluded that high P/Es must be due to a decline in discount rates. The decline in discount rates means that past average stock returns were higher than expected, but going forward, a lower discount rate means that expected returns on stocks are lower.

I think the right equity risk premium going forward is about 4%, but a number that high still bothers many economists. Macroeconomists have a problem with the observed equity premium because their consumption-based models predict that the premium should be between 0.5% and perhaps 1.5%. My question to them is, Who would hold stocks if the premium were only 1%? I don't know anybody who would.

Litterman: Does that mean that people are irrational?

Fama: No, I think it means that the economists have bad models. Their models apparently don't capture a risk in holding stocks that leads to high expected returns.

Litterman: What are the implications of the very low current real interest rates?

Fama: Investors around the world currently seem to have a strong preference for low-risk assets, and this drives down the real rate on such assets.

Litterman: Until 1992, when you and Ken French published your seminal paper on the cross-section of expected returns that challenged the veracity of the CAPM,⁶ you seemed to be a very staunch supporter of the CAPM. What changed your mind?

Fama: The CAPM had been around since the early 1960s, and tests of it started in the early 1970s. In the 1980s, research began to suggest that the CAPM had a problem explaining the returns on small stocks, low-P/E stocks, and high-dividend-to-price stocks. Each variable was examined in a separate paper, and with each new paper, the prevailing wisdom was that the newest failing was one problem for the CAPM but that in general it still performed pretty well. In our 1992 paper, we looked at all the variables together and concluded that the CAPM was fundamentally broken. I didn't expect the 1992 paper to be published because there was nothing new in it. Every result existed in the

literature. But just by putting all the pieces together, we were able to break new ground.

Litterman: It is probably the most cited paper in finance.

Fama: It is the most cited paper in finance over the last 20 years. After that, in 1993, we published another paper that introduced the so-called three-factor model. Here, we added to the CAPM market beta a size factor and a value-growth factor.⁷ This model is now widely used both in academic research and by practitioners.

Litterman: Do you view the value premium and the size premium as risk factors?

Fama: I do. They are both associated with covariation in returns that can't be diversified away. These sources of variance seem to have different prices than market variance has; otherwise, the CAPM would work. Because these factors are scaled price variables—such as the book-to-market, earnings-to-price, and dividend-to-price ratios—the implication is that the price contains information about expected return that isn't contained in the market beta. These ratios are a good way to identify variation in expected returns across stocks, even if we don't know the true sources of the variation.

Litterman: What about momentum? Isn't it pretty hard to argue that it's a risk factor?

Fama: There is covariance associated with momentum. But the real challenge from momentum is that if it represents time variation in the risks of stocks, it is discouraging because the turnover of momentum stocks is so high. Of all the potential embarrassments to market efficiency, momentum is the primary one.

Litterman: In the past, you've said that behavioral finance is *ex post* storytelling and doesn't generate new testable hypotheses. With the development of this literature, has your view changed about that?

Fama: I think the behavioral finance literature is very good at the micro level—individual behavior. But the jumps that are made from the micro level to the macro level—from the individual to markets—aren't validated in the data. For example, the behavioral view is that a value premium exists and it's irrational. If it's irrational, it should go away, but it doesn't seem to have gone away. Behavioral finance also claims to explain momentum and reversal. That's too flexible in my view. It's not a science. In Daniel Kahneman's book *Thinking, Fast and Slow*,⁸ he states that our brains have two sides: One is rational, and one is impulsive and irrational. What behavior can't be explained by that model?

Litterman: What's your view of the purported excess return of low-volatility stocks?

Fama: The excess return is really a result of low beta, not low volatility, and this potential source of return has been well known for 50 years. When the first tests of the CAPM were done, the problem always out front was that the market line, or the slope of the premium as a function of beta, was too low relative to what the model predicted. This meant that low-beta stocks had higher returns than predicted and high-beta stocks had lower returns than predicted.

Litterman: Wasn't one of Fischer Black's original ideas to exploit this anomaly?

Fama: Fischer's idea was that the problem in the original CAPM was that it assumed that borrowing and lending were at the risk-free rate. He said if that assumption were thrown out, then all we would know about the premium for market beta is that it's positive.

Litterman: If all investing were to be passive, what would make markets efficient?

Fama: In the extreme, all a market needs in order to be efficient is an epsilon (a tiny proportion) of wealth held by perfectly informed investors who trade actively and aggressively. If an efficient market needs more good active investors, it is to correct the mistakes of bad active investors. And this does not at all mean investors should be buying active management. Because of the large amounts of random noise in the returns of active managers, investors won't be able to tell the good (but unlucky) from the bad (but lucky) active managers. To the extent that they mistakenly give money to bad active managers, investors make markets less efficient. Perhaps most important, as Bill Sharpe warned us years ago (in the pages of the *FAJ*), it is a matter of arithmetic that investors who go with active management must on average lose by the amount of fees and expenses incurred.

Litterman: What do you think of the risk parity asset allocation strategy? A risk parity asset allocation strategy chooses weights in all asset classes in a portfolio so as to create the same level of volatility or risk in each. That portfolio can then be leveraged to equal the risk of, say, a 60/40 equity/bond allocation.

Fama: I don't think much of that approach. You never start with a proposition like that—equalizing risk of assets in a portfolio—as the way to solve the portfolio problem. A mean-variance investor aims to form asset allocations that minimize the variance of the return of the entire portfolio given the level of expected return, which almost surely does not imply levering risk up to equate volatility across all the asset classes in the portfolio. A risk parity portfolio almost surely represents a suboptimal solution to the portfolio optimization problem.

Litterman: What impact will the big expansion in the Federal Reserve's balance sheet have on the markets?

Fama: It has basically rendered the Fed powerless to control inflation. In 2008, when Lehman Brothers collapsed, the Fed wanted to get the markets moving and made massive purchases of securities. The corollary to that activity, however, is that reserves issued by the Fed and held by banks exploded. An explosion in reserves causes an explosion in the price level unless interest is paid on the reserves. So, the Fed started to pay interest on its reserves, which means that the central bank issued bonds to buy bonds. I think it's a largely neutral activity.

Before 2008, controlling inflation was a matter of controlling the monetary base (currency plus reserves). But when the central bank pays interest on its reserves, it is the currency supply that determines inflation. But banks can exchange currency for reserves on demand, which means the Fed cannot control the currency supply and inflation, or the price level, is out of its control. The Fed had the power to control inflation, but I don't think it does under the current scenario.

Litterman: How does that relate to the debt issues that the United States is facing?

Fama: The debt issues are entirely different. The debt issues are about how much we want to sacrifice the future for the present and whether we

get anything in the present for the future we're sacrificing. This has been the big debate between the Keynesians and the non-Keynesians since 2008.

Litterman: But isn't one way out of our debt problem to inflate it away?

Fama: Yes, that's one way to handle it, but it's far from a great solution. If the Fed were to stop paying interest on its reserves, we'd probably have a big inflation problem. The monetary base was about \$150 billion before the Fed stepped in in 2008. Currency plus required reserves are still in that neighborhood, but the Fed is holding \$2.5 trillion—trillion!—worth of debt financed almost entirely by excess reserves. The price level could expand by the ratio of those two numbers, and that translates into hyperinflation. Economies typically do not function well in hyperinflation. The real value of the government debt might disappear, but the economy is likely to disappear with it.

Litterman: What would your suggestion be for monetary or fiscal policy at this point?

Fama: Simple. Balance the budget. I heard a very prominent person say in private that we could balance the budget by going back to the level of government expenditures in 2007. The economy is currently about the size it was then. If you just rolled expenditures back to that point, I think it would come close to balancing the budget.

This article qualifies for 0.5 CE credit.

Notes

1. Fischer Black, Michael Jensen, and Myron Scholes, "The Capital Asset Pricing Model: Some Empirical Tests," in *Studies in the Theory of Capital Markets*, edited by Michael Jensen (New York: Praeger Publishers, 1972).
2. Eugene F. Fama, *Foundations of Finance: Portfolio Decisions and Securities Prices* (New York: Basic Books, 1976).
3. Eugene F. Fama and James D. MacBeth, "Risk, Return, and Equilibrium: Empirical Tests," *Journal of Political Economy*, vol. 81, no. 3 (May–June 1973):607–636.
4. Fischer Black, "The Plan Sponsor's Goal," *Financial Analysts Journal*, vol. 51, no. 4 (July / August 1995):6–7.
5. Eugene F. Fama and Kenneth R. French, "The Equity Premium," *Journal of Finance*, vol. 57, no. 2 (April 2002):637–659.
6. Eugene F. Fama and Kenneth R. French, "The Cross-Section of Expected Stock Returns," *Journal of Finance*, vol. 47, no. 2 (June 1992):427–465.
7. Eugene F. Fama and Kenneth R. French, "Common Risk Factors in the Returns on Stocks and Bonds," *Journal of Financial Economics*, vol. 33, no. 1 (February 1993):3–56.
8. Daniel Kahneman, *Thinking, Fast and Slow* (New York: Farrar, Straus and Giroux 2011).