

Fama, Eugene F. (born 1939)

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Abstract

Eugene Fama is known as the father of empirical finance. Over an unusually active career that spans more than five decades, Fama has produced pioneering research on efficient capital markets, asset pricing models, as well as the behavior of interest rates, exchange rates, futures prices, and inflation rates. He has also produced important papers on capital structure and payout policy. His theoretical work on agency problems and banking is path breaking and influential. In addition, Fama's influence on finance through the doctoral students he has supervised and his diligent work as a professional colleague is widely recognized and appreciated.

Keywords

Agency costs; American Finance Association; anomaly; capital structure; capital asset pricing model; Dimensional Fund Advisors; dividend policy; dividend yields; efficient capital markets; exchange rates; Fama-French three factor model; financial markets; governance, inflation rates; interest rates; small firm effect; stock returns; University of Chicago, value effect.

JEL classifications

G11, G12, G14, G15, G21, G31, G32, G34, G35, E31, E43, E44, C31, C46, B31

Article

Eugene Fama began his doctoral studies at the University of Chicago in the early 1960s when finance was first becoming the subject of scientific inquiry. The existence of computing technology and the creation of new financial databases at that time allowed Fama, his co-authors, and his students to make a quantum leap forward in the types of questions that could be studied and the kinds of evidence that could be produced. The synergy between the new possibilities of studying financial data and the ideas that were being produced by the pioneers of financial economics at Chicago and M.I.T. at that time led to an explosion of theories and evidence that remain the foundation for what financial economists know and study to this day. Eugene Fama led the vanguard that made finance one of the most productive and influential fields of economics.

Born on February 1, 1939 in Boston, Massachusetts, Fama graduated from Tufts University in 1960 with numerous academic and athletic awards, including honors in Romance

Languages. He then entered the doctoral program of the Graduate School of Business of the University of Chicago, receiving his MBA in 1963 and his Ph.D. in 1964. His doctoral dissertation, *The Behavior of Stock Prices*, supervised by Merton Miller and Harry Roberts, was published in the *Journal of Business* in 1965 and is frequently cited fifty years later.

Fama joined the faculty of the GSB at Chicago and began a career of teaching and research that has spanned more than 50 years at the date of this article. He was appointed as a chaired professor in 1973 and is now the Robert R. McCormick Distinguished Service Professor of Finance.

During his career he has been honored in many ways. He is the recipient of the 2013 Nobel Prize in Economic Sciences, along with Lars Hansen and Robert Shiller. He received the Belgian National Science Prize (1982), honorary doctor of laws degrees from the University of Rochester (1987), DePaul University (1989), Catholic University of Leuven (1995), and Tufts University (2002). He has been elected as a Fellow of the American Finance Association (the first elected, in 2001), the Econometric Society, and the American Academy of Arts and Sciences. He was the first recipient of the Deutsche Bank Prize in Financial Economics (2005), the first recipient of the Morgan Stanley American Finance Association Award for Excellence in Finance (2007), and the first recipient of the Onassis Prize in finance (2009). Many of his papers have won awards for being among the best in publications such as the *Journal of Finance* and the *Journal of Financial Economics*. He is one of the most cited authors across all fields of economics.

Efficient Capital Markets

Fama essentially invented the concept of efficient capital markets in his early work on the time series behavior of stock prices. He extended it, in collaboration with Larry Fisher, Mike Jensen and Dick Roll, in a study of stock splits that pioneered the technique of “event studies.” They found that once information about the existence of a stock split becomes known to the public, there are no abnormal returns available by either buying or selling a stock that is splitting. Event studies have been used in many fields of applied economics and have become an integral part of securities law through the concept of “reliance” and “fraud on the market.”

Three subsequent papers, Fama (1970, 1991, 1998), and chapter 5 of his 1976 book, *Foundations of Finance*, articulate the important idea that all tests of market efficiency are dependent on some assumption about “equilibrium expected returns.” In other words, to test whether a security or trading strategy earns “abnormal returns,” it is first necessary to specify a model for “normal returns.” Thus, while the earliest tests of market efficiency were based on things like serial correlations of stock returns, modern tests of market efficiency are based on much more sophisticated benchmarks that allow for cross-sectional and time series variation in asset returns that are assumed to represent differences in risks, liquidity, or some other economic factor that would explain these differences. Thus, when tests find that some trading strategy cannot be explained by the maintained asset pricing model, it is referred to as an “anomaly,” that

is something awaiting further explanation. An anomaly may represent true abnormal returns, essentially a money-making opportunity, or it may merely represent an incomplete model of the risk of that particular asset or class of assets. Anomalies represent opportunities for further exploration, not a definitive proof of market inefficiency.

Asset Pricing

At the same time that Fama was formulating the idea of the efficient markets hypothesis, Sharpe (1964), Lintner (1965), and Mossin (1966) were developing the capital asset pricing model (CAPM) based on Markowitz' (1952, 1959) model for portfolio selection. Fama (1968) clarified this model and showed that the apparent differences between the Sharpe and Lintner models were not real.

Fama and MacBeth (1973) and Black, Jensen, and Scholes (1972) performed early tests of the CAPM. These papers developed the empirical tools that have been used since that time to test more sophisticated models of assets pricing that allow for multiple sources of risk. For example, the technique of estimating cross-sectional regressions of portfolio returns on estimates of portfolio risk in each month and then using the monthly time series of these estimates to estimate the average risk premium and the standard error of the estimate has been widely used and is commonly called the "Fama-MacBeth" technique.

Fama next turned to studying the relation between nominal interest rates and the inflation rates of consumption goods' prices. His 1975 paper in the *American Economic Review* used the simple predictive regression of inflation rates on the interest rate for that month to study the joint hypothesis of efficient markets for Treasury bills and an expected real return to bills that is constant over time. For the 1953-71 sample period he studied, this simple model works well. An implication of this simple model is that realized real returns to Treasury bills are serially uncorrelated, even though serial correlations of nominal interest rates and inflation rates are substantially non-zero.

Fama and Schwert (1977) took the results of Fama (1975) and studied the relation between various classes of assets, including stocks, bond, Treasury bill, real estate, and human capital with the expected and unexpected components of inflation. A surprising finding that was an early part of the literature on time-varying expected stock returns was that expected stock returns were negatively related to nominal interest rates. This also meant the excess returns of stocks relative to Treasury bills were even more negatively related to nominal interest rates. Fama and French (1988) extend the idea that expected returns to stocks vary over time using aggregate dividend yields as a predictor variable. The literature on time-varying expected returns to assets has exploded after these early contributions.

Fama and French (1992, 1993) began a new approach to the empirical modeling of expected stock returns using firm size and book-to-market or "value" factors in addition to the return to a market portfolio of stocks. The "Fama-French three factor model," became the benchmark that others in both academia and Wall Street used to measure expected stock returns. The size factor builds on earlier work by Rolf Banz (1981) in his dissertation that was supervised

by Fama. In subsequent work Davis, Fama and French (2000) show that the three factor model works well in U.S. data before 1962 and Fama and French (1998) show that it works well in equity markets outside the U.S.

While the academic impact of the Fama-French model is substantial as reflected in thousands of citations to their papers, it is perhaps even more impressive that their work has had a large impact on professional practice. For example, the firm Dimensional Fund Advisors (DFA), for which Fama has been a Board member since its founding and at times was its Director of Research, has grown to have more than \$380 billion dollars under management largely following strategies motivated by the Fama-French model. David Booth, one of the co-founders of DFA and a student of Fama, gave a naming gift to the Chicago Business School in honor of the contributions that Fama made to the success of DFA.

Recently, Fama and French (2015) have extended their research to include two additional factors that reflect evidence produced by others that the three-factor model can be improved. The new factors reflect the profitability of the firm and the rate of investment. They find that, in general, smaller firms earn higher average returns, value firms (high B/M) earn higher average returns than growth firms (low B/M), firms that are more profitable earn higher average returns, and firms that invest less earn higher average returns.

Interest Rates, Exchange Rates, and Futures Prices

Fama developed a method to analyze the term structure of interest rates and exchange rates that is based on the following decomposition:

$$\text{Forward Rate}_t - \text{Spot Rate}_t = \text{Premium}_t + [E(\text{Spot Rate}_{t+1}) - \text{Spot Rate}_t].$$

If Premium_t is constant over time, the current spread between the spot rate and the forward rate is just a forecast of the future spot rate. Based on extensive empirical analysis, he concludes that most of the variation in forward rates relative to spot rates is due to variation in premiums, so that forward rates alone are poor forecasts of future spot rates. He also finds that premiums and expected changes in spot rates are negatively correlated, although the reason for this negative correlation remains a puzzle.

Fama (1984a) and Fama and Bliss (1987) apply this analysis to the term structure of interest rates. Fama (1984b) studies forward exchange rates and Fama and French (1987) study the structure of futures prices using this approach. Even today, this approach to studying the structure of future or forward interest rates or exchange rates remains standard in the literature.

Another recent innovation in the exchange rate literature is to use factors, similar to Fama and French (1989, 1993), to help explain average currency returns (e.g., Lustig, Roussanov, and Verdelhan (2011)).

Agency Theory

Stimulated by the Jensen and Meckling (1976) paper on agency problems, Fama (1980) explores the role that competition from internal and external managerial labor markets can play to mitigate or control agency problems within firms. He then collaborated with Mike Jensen on papers (1983a, 1983b) that extend the Jensen-Meckling analysis to a variety of settings including not-for-profit organizations, professional partnerships, and others. All of these papers have been cited thousands of times and thus influenced many subsequent papers.

Corporate Finance and Banking

At various times during his career Fama has delved into a variety of standard topics in the corporate finance literature, including cash management models, studies of capital structure and of dividend policy. He also wrote fundamental papers on the differences between commercial banks and other kinds of financial institutions, and the implications of that for monetary policy. The Fama and Miller (1972) book is a concise and complete exposition of the Modigliani-Miller irrelevance propositions about capital structure and dividend policy. For many people, this set of papers would represent a very successful career, but for Fama these papers were an interesting subplot in his research portfolio.

Fama's Students

Fama's earliest Ph.D. students at Chicago were a group that became the pioneers of finance and accounting. Michael Jensen, Myron Scholes, Richard Roll, Ross Watts, William Beaver, and Ray Ball were all supervised by Fama and have subsequently produced research that has been cited tens of thousands of times by other authors. Later generations of students included Campbell Harvey, Brad Barber, Francis Longstaff, Robert Stambaugh, and many others (including the author of this essay). In total, Fama served on dissertation committees of more than 100 doctoral students at the University of Chicago Business School and Economics Department. Those students have written papers that have been cited more than 585,000 times on Google Scholar (Schwert and Stulz (2014) provide detailed information).

The Legacy

Eugene Fama, along with Merton Miller, built a very strong finance group at the University of Chicago through their intellectual leadership. Fama's devotion to intellectual honesty and the importance of careful data analysis, along with his commitment to provide comments and guidance to colleagues, set an important tone for the entire group. Similarly, his approach to research and writing are much appreciated by colleagues across the finance profession. His energy and enthusiasm for his research remains strong more than fifty years after he began his career. Fama (2011) and Fama (2014) provide more detailed and personal insights into his research career.

See Also

- **Efficient Market Hypothesis**
- **Stock Price Predictability**
- **Financial Market Anomalies**
- **Capital Asset Pricing Model**
- **Term Structure of Interest Rates**
- **Corporate Governance**
- **Banking Industry**
- **Miller, Merton**
- **Scholes, Myron**

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