VANDERBILT UNIVERSITY
OWEN GRADUATE SCHOOL OF MANAGEMENT

FMRC
Financial Markets Research Center

# NEW FRONTIERS IN FINANCE

## THE CONFERENCE IN REVIEW | MAY 2, 2014 | NASHVILLE

### FROM THE DIRECTOR

This past spring, a distinguished group of more than 60 researchers representing 29 universities came to Vanderbilt from around the world to honor Professor Emeritus Hans R. Stoll as part of the Financial Markets Research Center's annual conference.

Hans's enduring research legacy in market microstructure helped set the tone for this year's gathering, which looked to New Frontiers in academic finance and included presentations from Nobel laureates Gene Fama and Myron Scholes.

Enclosed you will find a recap of some of the exciting research in finance that was presented at this year's spring conference. I invite you to learn more about Vanderbilt's distinguished Financial Markets Research Center and its mission to help foster innovative and exciting new paths of discovery in this important field. www.vanderbiltfmrc.org

With compliments,

**Robert E. Whaley**
*Valere Blair Potter Professor of Finance*
*Director of Financial Markets Research Center*

When **Hans R. Stoll** launched the Financial Markets Research Center's first annual conference in the spring of 1988, he did so in the spirit of wanting to more fully understand the previous year's sudden stock market crash. Bringing together leading academic figures, top government regulators, and industry executives to Vanderbilt University for that first conference, Stoll began a rich tradition of assembling thought leaders to explore some of the most pressing topics in finance. It's a tradition that continues to endure 26 years later.

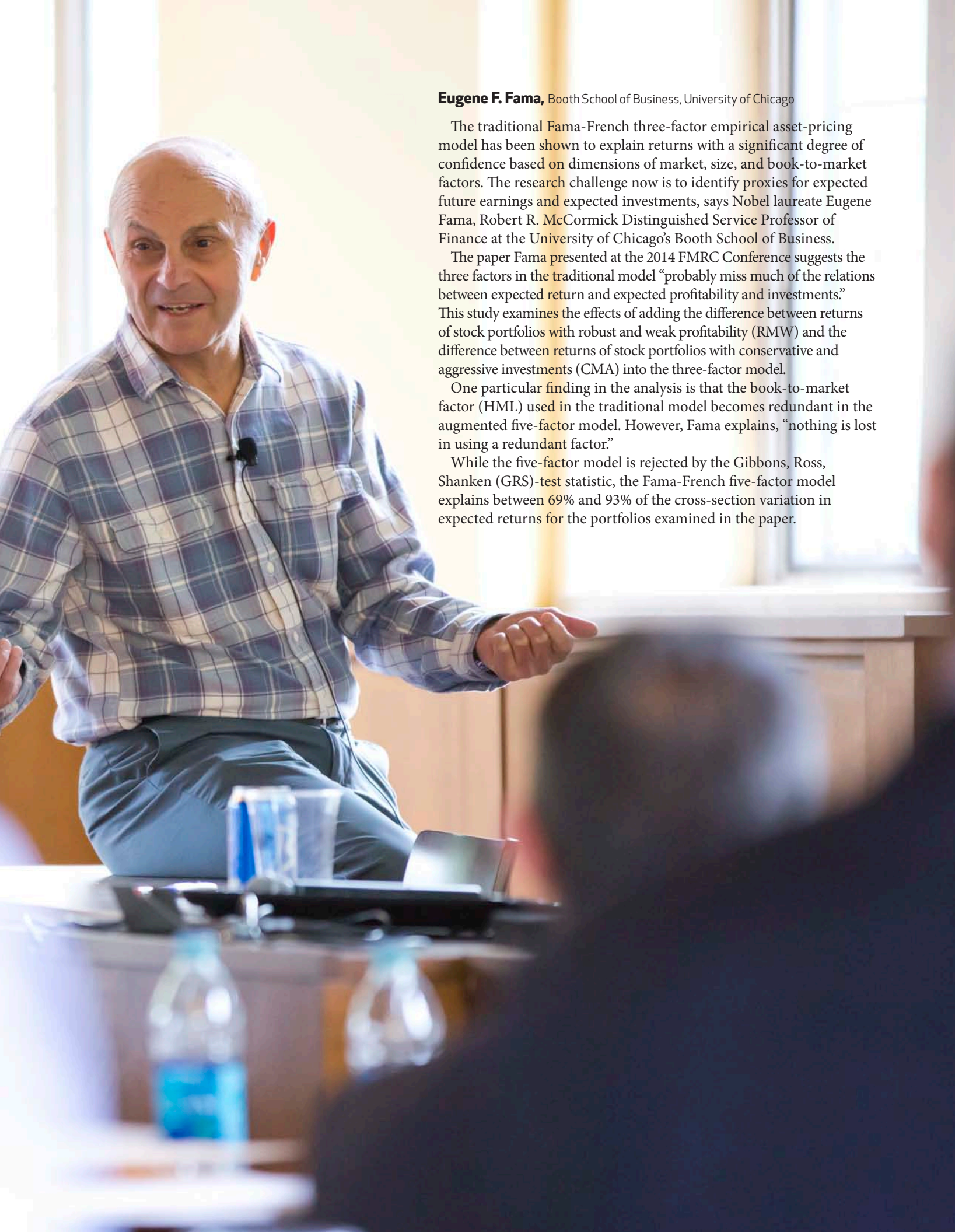
Over the years, Vanderbilt's annual FMRC Conference has hosted some of the financial world's most respected thinkers, including former Fed Chairmen **Paul Volcker** and **Alan Greenspan**; Nobel laureates **Eugene Fama, Robert Merton, Merton Miller, Robert Shiller,** and **Myron Scholes**; and industry leaders like **Leo Melamed**, Chairman Emeritus of CME Group, **William Brodsky**, longtime Chairman and CEO of the Chicago Board Options Exchange (CBOE), and **Thomas Peterffy**, founder of Interactive Brokers.

Participants have been drawn to the event by Vanderbilt's distinguished finance faculty. In addition to Stoll, Owen Graduate School of Management professors include **Bill Christie**, whose paper on Nasdaq broker collusion led to sweeping reforms that remain in place today; **Craig Lewis**, who most recently served as Chief Economist of the SEC; and VIX creator **Robert Whaley**, who has long been co-director of Vanderbilt's FMRC.

This year's conference — the first under the sole leadership of Whaley — explored new frontiers in academic finance. Several of the luminaries who worked alongside Stoll at the University of Chicago in the 1960s (the dawn of modern finance) presented their latest work at this year's FMRC gathering, helping chart the future of finance, and the FMRC.

# Augmenting the Fama-French Three-Factor Model





**Eugene F. Fama,** Booth School of Business, University of Chicago

The traditional Fama-French three-factor empirical asset-pricing model has been shown to explain returns with a significant degree of confidence based on dimensions of market, size, and book-to-market factors. The research challenge now is to identify proxies for expected future earnings and expected investments, says Nobel laureate Eugene Fama, Robert R. McCormick Distinguished Service Professor of Finance at the University of Chicago's Booth School of Business.

The paper Fama presented at the 2014 FMRC Conference suggests the three factors in the traditional model "probably miss much of the relations between expected return and expected profitability and investments." This study examines the effects of adding the difference between returns of stock portfolios with robust and weak profitability (RMW) and the difference between returns of stock portfolios with conservative and aggressive investments (CMA) into the three-factor model.

One particular finding in the analysis is that the book-to-market factor (HML) used in the traditional model becomes redundant in the augmented five-factor model. However, Fama explains, "nothing is lost in using a redundant factor."

While the five-factor model is rejected by the Gibbons, Ross, Shanken (GRS)-test statistic, the Fama-French five-factor model explains between 69% and 93% of the cross-section variation in expected returns for the portfolios examined in the paper.

# High-Frequency Activity Doesn't Increase Quote Volatility, Just Changes It

**Joel Hasbrouck,** Stern School of Business, New York University

The phrase "high-frequency trading," a catchall typically used to cover all high-frequency market activity, has received a great deal of attention recently. But lost in that noise is the fact that high frequency price quotes, not just executions, also play a significant role in the trading process, says Joel Hasbrouck, the Kenneth G. Langone Professor of Business Administration and Professor of Finance at New York University's Stern School of Business.

The average volatility of price quotes has not changed much in the period from 2001 to 2011, according to the paper Hasbrouck presented at the FMRC Conference. What has changed is the nature of quote volatility.

Looking at 2011 quote data in intervals of less than one second, Hasbrouck finds levels of volatility "well in excess" of what would be expected with random-walk volatility over longer intervals. However, using a statistical model to estimate sub-one-second quote data back to 2001, the study finds a similar level of short-term quote volatility in earlier years.

"In the earlier years, the volatility apparently arises from spikes in bids and offers that are neither clearly erroneous nor reliably valid," he writes in the paper. "In later years the volatility is more attributable to oscillatory low-amplitude changes: rapid movements not substantially larger than the spread." The highest quote volatility was found during the period between 2004 and 2006, as part of the phase-in of electronic trading.

# The Search for Meaning in Contingent Claims Trading Activity

**Richard Roll,** Anderson School of Management, UCLA

Financial economists have made significant progress in pricing derivatives tied to assets such as the cash S&P 500 index. However, much less work has been done on what differing trade volumes in these contingent claims (options, legacy and E-mini futures contracts, and ETFs) may mean. For example, how correlated is trading volume across contingent claims? Do they all experience the same level of volatility? Can trading activity in some contingent claims forecast macroeconomic conditions better than others?

To begin to answer some of those questions, Richard Roll, Distinguished Professor of Finance and the Joel Fried Chair in Applied Finance at UCLA's Anderson School of Management, presented an empirical exploration of the joint time-series dynamics between these derivatives and their underlying assets at the 2014 FMRC Conference.

The paper Roll presented draws on data from more than 3,000 trading days and finds evidence that contingent claims volume predicts changes in the short interest rate and term spread.

"There also is evidence that options volume predicts absolute returns around major macroeconomic announcements," Roll and his co-authors wrote. However, the cash index did not predict similar returns. "This pattern is consistent with informed traders flocking to derivatives owing to their lower trading costs and enhanced leverage."

# Liquidity Constraints Lead Sophisticated Investors to Overprice Securities

**Myron S. Scholes,** Graduate School of Business, Stanford University

In their search for an explanation of why stock returns differ so much from what the Sharpe-Lintner Capital Asset Pricing Model (CAPM) would suggest, researchers have posited explanations ranging from hidden risk factors to a "limits of arbitrage" argument. Of particular note is the phenomenon whereby safer, low-volatility stocks far outperform high-volatility stocks, not just in times of crisis, but over the long-term as well, contrary to expectations.

Nobel laureate Myron Scholes, Frank E. Buck Professor of Finance, Emeritus, at Stanford's Graduate School of Business, offered an alternative explanation to this "volatility" anomaly in his FMRC paper presentation. It's not irrational noise traders, or hidden risk factors that are responsible for mispricing high-volatility stocks, Scholes says, but rather, professional investors who face tracking-error and liquidity constraints.

"In our equilibrium model, investors bid up the prices of higher-volatility stocks to control tracking error while holding alpha-generating portfolios or holding liquid assets to meet contingencies," Scholes and his co-authors wrote. "In our model, many sophisticated investors cause the apparent mispricing that would be absent in an unconstrained world."

# Short-Selling Constraints Limit Correction of Overpriced Assets

**Robert F. Stambaugh,** The Wharton School, University of Pennsylvania

Idiosyncratic volatility — risk that does not stem from the market — has traditionally been found to have either no relation, or a positive relation, to a stock's expected returns. In more recent studies, however, researchers are increasingly finding a negative relation between idiosyncratic volatility and expected returns. Why? In his FMRC presentation, Robert F. Stambaugh, Professor of Finance at the University of Pennsylvania's Wharton School and a Research Associate at the National Bureau of Economic Research (NBER), argued that short-selling constraints are driving this volatility effect conundrum.

In the paper Stambaugh presented, he explains that there are two concepts at play. One, arbitrage risk — marked by idiosyncratic volatility — tends to deter investors from correcting over- or underpriced assets in the market. Another concept, arbitrage asymmetry, holds that investors have a greater ability and/or willingness to take long positions versus short ones.

The combination of these two forces results in a stronger reluctance among investors to short a stock they see as overpriced. The same is not true with assets viewed as underpriced because of greater investor willingness to purchase a long position. "As a result, the negative [idiosyncratic volatility] effect among overpriced stocks is stronger than the positive [idiosyncratic volatility] effect among underpriced stocks."

To test the concept, Stambaugh and his co-authors used a composite measure based on 11 return anomalies to gauge relative mispricing. As expected, the study found a "significant positive [idiosyncratic volatility] effect among the most underpriced stocks but a stronger negative effect among the most overpriced ones, consistent with arbitrage asymmetry." The team also found similar results using investor sentiment as a proxy for market-wide mispricing.

# Many Financial Research "Discoveries" Are Probably Wrong

**Campbell R. Harvey,** Fuqua School of Business, Duke University

In scientific fields like medicine and astrophysics, researchers tend to have a high statistical bar (t-ratio) to clear for a new finding to be considered statistically significant. In medicine, the benchmark t-ratio tends to hover around 3.3 or higher; in astrophysics, to confirm the discovery of the Higgs-Boson "God particle" required a t-ratio of five.

However, in most finance and economics research, the standard benchmark t-ratio is around 2.0, says Campbell Harvey, Professor of Finance at Duke University's Fuqua School of Business and a Research Associate at the National Bureau of Economic Research (NBER).

In his FMRC presentation, Harvey, who served as the editor of the Journal of Finance from 2006-2012, argued that the current statistical significance cutoff in finance research is too low.

In a working paper presented at the conference, Harvey and his co-authors draw on multiple testing frameworks that are being used in statistics literature. They also devise a new statistical model tailored to the type of (non time-series) data used to test for the significance of asset-pricing factors. As a result of these adjustments, the paper argues that newly discovered asset-pricing factors in finance research should have a t-ratio that exceeds 3.0. A lower threshold would be acceptable for factors developed from first principles, as opposed to purely empirical exercises.

"It is a serious mistake to use the usual statistical significance cutoffs (e.g., a t-ratio exceeding 2.0) in asset pricing tests," Harvey and his co-authors write. "We argue that a newly discovered factor today should have a t-ratio that exceeds 3.0 … Many published factors fail to exceed our recommended cutoff."

**THE CHICAGO FOUR**
Borrowing the title of Dean Acheson's famous book "Present at the Creation," Vanderbilt Finance Professor Hans R. Stoll says he was privileged to be among the towering figures at the University of Chicago in the 1960s who ushered in the current era of modern finance. From left to right, Eugene Fama, Myron Scholes, Hans Stoll, Richard Roll.

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