Asset Pricing Anomalies and the Fama-French Factor Model: Evidence and Debates

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ABSTRACT

The Capital Asset Pricing Model (CAPM), developed independently by Sharpe (1964), Lintner (1965), and Mossin (1966), predicted that expected stock returns should be fully explained by a single risk factor—systematic market risk (beta). Decades of empirical tests have uncovered numerous 'anomalies'—patterns in stock returns that are inconsistent with CAPM predictions—including the size effect (small-cap stocks earn higher returns than predicted), the value effect (high book-to-market stocks earn higher returns), momentum (past winners continue to outperform), profitability, and investment effects. Fama and French's factor models—from the three-factor model (1993) through the five-factor model (2015)—have attempted to capture these patterns within a rational risk-based framework, while behavioral finance scholars argue that anomalies reflect investor irrationality exploitable only with difficulty due to limits to arbitrage. This paper reviews the principal asset pricing anomalies, evaluates competing rational and behavioral explanations, and examines post-publication anomaly decay as a test of market efficiency.

Keywords: Asset Pricing; CAPM; Fama-French; Anomalies; Factor Models; Momentum; Value Premium; Market Efficiency; Behavioral Finance

1. INTRODUCTION

The Capital Asset Pricing Model, independently formalized by Sharpe (1964) in the Journal of Finance (19(3): 425-442) and Lintner (1965), provided the first theoretical link between an asset's expected return and its systematic risk in a market equilibrium. The CAPM's central prediction—that the cross-section of expected returns is fully explained by each asset's beta (covariance with the market portfolio divided by market variance)—was elegantly simple and provided the foundation for modern portfolio management, corporate capital budgeting (WACC), and performance evaluation. Empirical tests by Black, Jensen, and Scholes (1972) and Fama and MacBeth (1973) initially provided support for the CAPM's beta-return relationship. However, subsequent research revealed systematic patterns in stock returns that beta could not explain.

Banz (1981) in the Journal of Financial Economics (9(1): 3-18) documented the size effect: stocks of small firms earned significantly higher returns than CAPM predictions, even after controlling for beta. Stattman (1980) and Rosenberg, Reid, and Lanstein (1985) documented the value effect: stocks with high book-to-market equity ratios (value stocks) outperformed those with low ratios (growth stocks). Jegadeesh and Titman (1993) in the Journal of Finance documented momentum: stocks that performed well over the prior 3-12 months continued to outperform over the subsequent 3-12 months. These anomalies—along with profitability (Novy-Marx, 2013) and investment (Titman, Wei, and Xie, 2004)—presented a fundamental challenge to the CAPM and motivated the development of multi-factor models.

2. FAMA-FRENCH FACTOR MODELS

2.1 Three-Factor Model

Fama and French (1993) in the Journal of Financial Economics (33(1): 3-56) proposed augmenting the CAPM with two additional risk factors: SMB (Small Minus Big—the return differential between small-cap and large-cap stocks) and HML (High Minus Low—the return differential between high and low book-to-market stocks). Their three-factor model explained a substantially larger fraction of the cross-sectional variation in average stock returns than the CAPM alone, and the size and value premiums were interpreted as compensation for systematic risk factors related to financial distress and earnings uncertainty. The model became the dominant empirical asset pricing benchmark for over two decades.

2.2 Five-Factor Model

Fama and French (2015) in the Journal of Financial Economics (116(1): 1-22) extended the three-factor model with two additional factors: RMW (Robust Minus Weak—the return differential between high and low profitability stocks) and CMA (Conservative Minus Aggressive—the return differential between low and high investment stocks). The five-factor model captured profitability and investment anomalies documented in the intervening literature. However, the model was criticized for redundancy and for failing to capture momentum—one of the most robust anomalies in the literature—which Fama and French excluded on the grounds that momentum was not well-explained by any rational risk story they found convincing.

3. PRINCIPAL ANOMALIES

Table 1. Principal asset pricing anomalies, estimated premiums, and competing explanations.

Anomaly	Average Annual Premium	Rational Explanation	Behavioral Explanation
Value (HML)	~4-5% (U.S., 1963-2020)	Distress risk; earnings uncertainty	Overreaction; extrapolation of growth rates
Size (SMB)	~2-3% (U.S.); smaller internationally	Liquidity risk; economic risk	Neglected firm effect; limits to arbitrage
Momentum	~8-10% (1-year, excluding reversal month)	Risk-based explanations weak	Underreaction; herding; slow information diffusion
Profitability (RMW)	~3-4%	Milevsky & Zhang (2018): human capital risk	Investors underestimate earnings persistence
Investment (CMA)	~3%	Investment-cash flow correlation; q-theory	Empire-building; overinvestment

4. POST-PUBLICATION ANOMALY DECAY

McLean and Pontiff (2016) in the Journal of Finance (71(1): 5-45) provide compelling evidence that anomalies weaken after their academic publication. Studying 97 anomalies, they find that average anomaly returns decline by approximately 26% after working paper publication and by 58% after journal publication, consistent with rational arbitrageurs learning about mispricing from academic research and trading it away. This evidence suggests that at least some documented anomalies reflect genuine mispricing that is correctable through arbitrage—supporting behavioral interpretations—while also confirming that anomaly trading eventually reduces the opportunity, consistent with long-run market efficiency.

5. CONCLUSION

The asset pricing anomaly literature has fundamentally challenged CAPM-based market efficiency while stimulating the development of multi-factor models that attempt to capture systematic risk dimensions beyond market beta. The debate between rational risk-factor interpretations (anomalies are compensation for undiversifiable risk) and behavioral mispricing interpretations (anomalies reflect investor irrationality that is costly to arbitrage away) remains unresolved and may be unresolvable without a complete theory of risk. Post-publication anomaly decay provides evidence for market learning and partial efficiency while revealing that transaction costs and limits to arbitrage keep many anomalies in equilibrium. Future research should examine whether machine learning-identified return predictors constitute genuine risk factors or overfit in-sample patterns that do not persist.

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