Multi-Factor Equity Scoring Framework

A Comprehensive Approach to Equity Valuation and Risk Assessment

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Executive Summary

This white paper presents a systematic multi-factor scoring framework designed to evaluate equity securities across six fundamental dimensions. Our methodology combines traditional financial metrics with modern portfolio theory principles to generate composite scores that facilitate investment decision-making and risk management.

Methodology Overview

The framework evaluates equities through six distinct pillars, each capturing different aspects of company performance and market behavior. Scores are calculated using quantile-based ranking within regional peer groups, ensuring cross-sectional comparability while accounting for market-specific characteristics.

Pillar 1: Value Assessment

Academic Rationale: The value pillar is grounded in the efficient market hypothesis anomaly first documented by Graham and Dodd[1], who demonstrated that securities trading below intrinsic value tend to generate superior returns. Fama and French[2] formalized this as the "value premium," showing that high book-to-market stocks systematically outperform growth stocks. Rosenberg et al.[9] further established that multiple valuation metrics provide more robust signals than single measures.

Our value pillar incorporates classical valuation metrics including price-to-earnings (P/E), price-to-book (P/B), price-to-sales (P/S), price-to-free-cash-flow (P/FCF), and enterprise value-to-EBITDA ratios, capturing different aspects of relative cheapness.

Key Metrics: P/E, P/B, P/S, P/FCF, EV/EBITDA

Pillar 2: Growth Trajectory

Academic Rationale: Growth investing theory suggests that companies with superior growth prospects should command premium valuations. However, Lakonishok et al.[3] demonstrated that investors systematically overestimate growth persistence, creating opportunities for disciplined growth assessment. Chan et al.[10] showed that historical growth rates, while imperfect predictors, contain valuable information about future performance when analyzed across multiple timeframes.

Growth assessment examines historical revenue, operating cash flow, and net income growth rates across multiple time horizons (3, 5, and 10 years), capturing both earnings sustainability and business model scalability.

Key Metrics: Revenue growth per share, Operating CF growth per share, Net income growth per share

Pillar 3: Quality Indicators

Academic Rationale: Quality investing emerged from research demonstrating that high-quality companies exhibit more stable earnings and superior risk-adjusted returns. Piotroski[4] established that fundamental strength indicators significantly improve value strategy performance. Sloan[11] showed that earnings quality metrics predict future performance, while Penman[12] demonstrated that return on equity and capital efficiency drive long-term value creation.

Quality assessment focuses on profitability margins, returns on assets and equity, and capital structure efficiency, identifying companies with sustainable competitive advantages and sound financial management.

Key Metrics: Gross/Operating/Net margins, ROA, ROE, Debt ratios, FCF conversion

Pillar 4: Momentum Factors

Academic Rationale: Momentum effects were first systematically documented by Jegadeesh and Titman[6], who showed that stocks with strong recent performance continue to outperform over 3-12 month horizons. This contradicts weak-form market efficiency and reflects behavioral biases including underreaction to news and herding behavior. Asness et al.[13] demonstrated that momentum effects exist across asset classes and geographic regions, while Frazzini et al.[14] showed the importance of beta adjustment in momentum strategies.

Momentum evaluation captures both absolute and beta-adjusted price momentum, accounting for systematic risk exposure while exploiting persistent price trends.

Key Metrics: 12-month price momentum, Beta-adjusted momentum

Pillar 5: Volatility Profile

Academic Rationale: The low-volatility anomaly, documented by Haugen and Heins[15], contradicts CAPM predictions by showing that low-volatility stocks generate higher risk-adjusted returns. Ang et al.[16] demonstrated that idiosyncratic volatility negatively predicts returns, while Baker et al.[17] showed that volatility-based strategies exploit systematic behavioral biases including lottery preferences and leverage constraints.

Volatility assessment measures price stability across multiple timeframes, identifying stocks with superior risk-adjusted return potential and lower downside risk.

Key Metrics: Rolling volatility measures across multiple timeframes

Pillar 6: Dividend Yield

Academic Rationale: Dividend research by Litzenberger and Ramaswamy[18] established that dividend yield predicts returns due to tax effects and signaling theory. Fama and French[19] showed that dividend-

paying stocks exhibit different risk characteristics, while Pontiff and Woodgate[20] demonstrated that dividend strategies provide downside protection and inflation hedging. The dividend discount model foundation by Williams[21] establishes dividends as a fundamental driver of equity value.

Dividend assessment evaluates current yield and historical sustainability, capturing both income generation potential and management quality signaling.

Key Metrics: Current dividend yield, 5-year average dividend yield

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Scoring Methodology

Quantile-Based Ranking: Each metric is ranked within its regional peer group using 11-quantile buckets, providing granular differentiation while maintaining statistical robustness.

Regional Normalization: Scores are calculated within geographic regions to account for market-specific valuation differences and accounting standards.

Composite Construction: Individual pillar scores are computed as equally-weighted averages of constituent metrics, with the final Lazy Score representing the mean of all six pillars.

Missing Data Treatment: Missing values are replaced with regional means to maintain analytical integrity while preserving sample size.

Academic Foundation

The framework synthesizes decades of financial research:

- **Factor Models**: Builds upon Fama-French multi-factor models for systematic risk assessment
- **Behavioral Finance**: Incorporates momentum and contrarian strategies supported by empirical evidence
- **Corporate Finance**: Integrates modern theories of capital structure and dividend policy
- **Portfolio Theory**: Applies risk-return optimization principles in score construction

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Implementation & Applications

The scoring system operates on a systematic basis, processing fundamental data, market prices, and financial statements to generate updated scores. Applications include:

- **Portfolio Construction**: Systematic security selection and weighting
- **Risk Management**: Multi-dimensional risk assessment and monitoring
- **Performance Attribution**: Understanding return drivers across factor dimensions
- **Screening & Research**: Identifying investment opportunities and risks

References

[1] Graham, B., & Dodd, D. (1934). *Security Analysis*. McGraw-Hill. [2] Fama, E. F., & French, K. R. (1993). Common risk factors in the returns on stocks and bonds. *Journal of Financial Economics*, 33(1), 3-56. [3] Lakonishok, J., Shleifer, A., & Vishny, R. W. (1994). Contrarian investment, extrapolation, and risk. *Journal of Finance*, 49(5), 1541-1578. [4] Piotroski, J. D. (2000). Value investing: The use of historical financial statement information to separate winners from losers. *Journal of Accounting Research*, 38, 1-41. [5] Modigliani, F., & Miller, M. H. (1958). The cost of capital, corporation finance and the theory of investment. *American Economic Review*, 48(3), 261-297. [6] Jegadeesh, N., & Titman, S. (1993). Returns to buying winners and selling losers. *Journal of Finance*, 48(1), 65-91. [7] Markowitz, H. (1952). Portfolio selection. *Journal of Finance*, 7(1), 77-91. [8] Miller, M. H., & Modigliani, F. (1961). Dividend policy, growth, and the valuation of shares. *Journal of Business*, 34(4), 411-433. [9] Rosenberg, B., Reid, K., & Lanstein, R. (1985). Persuasive evidence of market inefficiency. *Journal of Portfolio Management*, 11(3), 9-16. [10] Chan, L. K., Lakonishok, J., & Sougiannis, T. (2001). The stock market valuation of research and development expenditures. *Journal of Finance*, 56(6), 2431-2456. [11] Sloan, R. G. (1996). Do stock prices fully reflect information in accruals and cash flows about future earnings? *Accounting Review*, 71(3), 289-315. [12] Penman, S. H. (1991). An evaluation of accounting rate-of-return. *Journal of Accounting, Auditing & Finance*, 6(2), 233-255. [13] Asness, C. S., Moskowitz, T. J., & Pedersen, L. H. (2013). Value and momentum everywhere. *Journal of Finance*, 68(3), 929-985. [14] Frazzini, A., Israel, R., & Moskowitz, T. J. (2012). Trading costs of asset pricing anomalies. *NBER Working Paper*, 18335. [15] Haugen, R. A., & Heins, A. J. (1975). Risk and the rate of return on financial assets. *Journal of Financial and Quantitative Analysis*, 10(5), 775-784. [16] Ang, A., Hodrick, R. J., Xing, Y., & Zhang, X. (2006). The cross-section of volatility and expected returns. *Journal of Finance*, 61(1), 259-299. [17] Baker, M., Bradley, B., & Wurgler, J. (2011). Benchmarks as limits to arbitrage. *Journal of Financial Economics*, 102(1), 1-12. [18] Litzenberger, R., & Ramaswamy, K. (1979). The effect of personal taxes and dividends on capital asset prices. *Journal of Financial Economics*, 7(2), 163-195. [19] Fama, E. F., & French, K. R. (1988). Dividend yields and expected stock returns. *Journal of Financial Economics*, 22(1), 3-25. [20] Pontiff, J., & Woodgate, A. (2008). Share issuance and cross-sectional returns. *Journal of Finance*, 63(2), 921-945. [21] Williams, J. B. (1938). *The Theory of Investment Value*. Harvard University Press.

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