

# **BUSI 722**

Pre-Session Reading: Quantitative Signals for Stock Selection

---

Kerry Back

# The Goal

- Use data to generate **quantitative signals** that predict which stocks will outperform.
- Combine signals using machine learning, build portfolios, backtest, and evaluate performance.
- This course: use AI (Claude Code) to do all of the above.

# Predictors from Past Returns

- Jegadeesh & Titman (1993): buy stocks with high past 3–12 month returns, sell stocks with low past returns.
- One of the most robust anomalies in finance—documented across countries, asset classes, and time periods.
- Typical implementation: sort on cumulative return from  $t-12$  to  $t-2$  (skip the most recent month to avoid short-term reversal).

# Time-Series Momentum

- Moskowitz, Ooi & Pedersen (2012): go long assets with positive past 12-month returns, short those with negative past returns.
- Differs from cross-sectional momentum: each asset is compared to **its own past**, not to other assets.
- Works across equities, bonds, commodities, and currencies—related to trend-following strategies used by managed futures funds.

# Moving Averages

- SMA (simple moving average) and EMA (exponential moving average) smooth price series over a window.
- **200-day rule** (Faber 2007): buy when price is above its 200-day MA, sell when below. Brock, Lakonishok & LeBaron (1992) found strong support for MA rules in the DJIA.
- Zhu & Zhou (2009) provided theoretical justification: MAs optimally combine momentum signals at different horizons.

- Han, Zhou & Zhu (2016): combine short-, medium-, and long-term moving averages into a single trend signal.
- Earns large risk-adjusted returns that are not explained by standard factors.
- Performs well during crises when standard momentum crashes.

- **Short-term reversal:** last month's losers outperform next month (Lehmann 1990, Jegadeesh 1990). Driven by liquidity provision and overreaction.
- **Long-term reversal:** 3–5 year past winners underperform (DeBondt & Thaler 1985). Consistent with investor overreaction and mean reversion.
- Together with momentum, these define the **complete horizon structure** of return predictability:
  - 1 month: reversal
  - 2–12 months: momentum
  - 3–5 years: reversal



## 52-Week High

- George & Hwang (2004): nearness to 52-week high (current price / 52-week high) predicts future returns.
- Outperforms standard momentum as a predictor and profits do not reverse.
- Behavioral explanation: **anchoring bias**—investors use the 52-week high as a reference point and underreact when price approaches it.

## Other Technical Indicators

- **RSI** (Relative Strength Index): overbought above 70, oversold below 30. Mean-reversion signal.
- **MACD** (Moving Average Convergence Divergence): difference between short and long EMAs; signal line crossovers indicate trend changes.
- Widely used by practitioners, but limited top-journal academic support for out-of-sample profitability.

- **Low-volatility anomaly:** stocks with low historical volatility earn higher **risk-adjusted** returns than high-volatility stocks—contradicting the basic CAPM risk–return tradeoff.
- Ang, Hodrick, Xing & Zhang (2006) documented the effect for idiosyncratic volatility.
- Explanations: leverage constraints, lottery preferences, benchmarking by institutional investors.

# Predictors from Financial Statements

- **Book-to-market:** Fama & French (1992) documented that high B/M stocks (“value”) outperform low B/M stocks (“growth”).
- Other value ratios—earnings yield (Basu 1977) and cash flow yield (Lakonishok, Shleifer & Vishny 1994)—tell a similar story.
- Common theme: stocks with high ratios of fundamental value to market price tend to outperform.

- Novy-Marx (2013): gross profit / assets is a strong predictor of returns. ROE and operating margins also predict.
- More profitable firms earn higher returns, especially when combined with value.
- Fama & French (2015) added profitability and investment factors to their three-factor model.

- **Asset growth:** Cooper, Gulen & Schill (2008) showed firms that grow assets aggressively tend to **underperform**. High capital expenditure similarly predicts lower returns.
- This is the **investment anomaly**: empire-building firms destroy shareholder value.
- Consistent with overinvestment by managers or diminishing returns to capital.

- **Accruals anomaly** (Sloan 1996): firms with high accruals (earnings far above cash flow) underperform. Cash-based earnings are more persistent.
- **Quality Minus Junk** (Asness, Frazzini & Pedersen 2019): composite of profitability, growth, safety, and payout. Related signals include earnings stability, low leverage, and high payout ratios.
- Quality stocks earn higher returns despite being “safer”—another puzzle for standard asset pricing.



# Other Predictors

## Short Interest

- Heavily shorted stocks tend to underperform (Desai et al. 2002, Rapach, Ringgenberg & Zhou 2016). Aggregate short interest also forecasts market-level returns.
- Short interest reflects **informed pessimistic opinions**: short sellers face costs (borrowing fees, margin, unlimited loss potential), so they act only on strong convictions.
- Constraints on short selling limit the speed of price adjustment to negative information.

- Insider purchases predict positive future returns (Lakonishok & Lee 2001, Jeng, Metrick & Zeckhauser 2003). Sales are less informative—insiders sell for many reasons.
- Insiders have an **informational advantage** about their own firms' prospects.
- SEC filings (Form 4) make insider trades public, typically within two business days.

- **Post-earnings announcement drift (PEAD):** one of the oldest documented anomalies (Ball & Brown 1968, Bernard & Thomas 1989). Prices drift in the direction of the surprise for weeks or months.
- **Standardized unexpected earnings (SUE):**  $(\text{actual} - \text{expected}) / \text{standard deviation}$ . Higher SUE predicts higher future returns.
- Explanation: investors underreact to earnings news and update beliefs too slowly.

## Analyst Revisions

- Changes in analyst earnings estimates and price targets predict returns: upward revisions are followed by positive returns, downward by negative.
- Information from analyst revisions is incorporated into prices slowly, similar to PEAD.
- Analysts aggregate information from multiple sources, making revisions a useful summary signal.

## What We Will Use

- This course focuses on signals from **past returns** and **financial statements**, available in the Rice Business stock market database.
- We will construct signals like momentum, moving averages, book-to-market, profitability ratios, and more directly from the database.
- The methods we develop (sorting, Fama-MacBeth regression, machine learning, backtesting) apply equally to any signal source.