Strategic Investment Management

Application of Factor Investing

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My Background

Focus on quantitative equity investment management and research.

- 1998 - 2003: PhD Finance, London Business School, London
- 2003 - 2008: Head of International Quantitative Equity Research, Goldman Sachs, New York
- 2008 - 2009: Strategist and Asset Manager, GSA Capital, London
- 2011 - now: Managing Partner & Co-CIO, Global Systematic Investors, London

Why Adopt a Factor Approach as an Investment Manager?

- As opposed to a **qualitative approach**, a **systematic or factor process** is mechanical once it has been built.
- **Judgment** involved when factor model is built, afterwards trading signals are followed mechanically.
- Main factor model advantage: ability to **backtest** an investment strategy.
- Check whether investment strategy would have generated positive returns in the past.
- There are **two main conditions** for a good factor:
  - The factor information used must be **relevant**
  - It must be **incorporated into security prices with a delay**.

Popularity of Factor Approach

Some of largest firms heavily use factor approach:

- **Smart Beta:** long-only, longer-term strategies
    - E.g. Blackrock, State Street
- **Quant hedge funds:** market-neutral long/short, shorter-term strategies
    - E.g. Citadel, Millenium, Bridgewater, Renaissance Technology
- **Risk model providers:** factor approach used to compute covariance matrix
    - E.g. MSCI, Bloomberg

Implementing a Factor Strategy: Backtesting

- Backtests are a powerful tool, but they need to be used with caution.
- **Final objective: Find an investment strategy that will perform well in the future.**
- The past is only relevant if it is **indicative of the future**.
- Blindly following backtests can be **dangerous**!
- Any new investment idea (factor) needs to make **economic sense**.
- Otherwise, factor may have worked **purely due to chance**

Backtesting Factors - Why is it important?

- The idea is to use **historical data** and **simulate live trading** over the past to examine how a factor portfolio would have performed.

- Often **factor ideas** can be found in academic or practitioner studies that present backtest results already.

- Important to **independently verify** the results because

  - Studies may use a different investment universe
  - Most studies ignore trading costs
  - Authors usually have an incentive to overstate their results
  - Factors might not be robust
  - Factors might not be realistically implementable
  - Several factors should be used in combination to diversify risk
  - Out-of-sample testing is important

Replicating Factors/Anomalies - Hou, Xue and Zhang (2022)

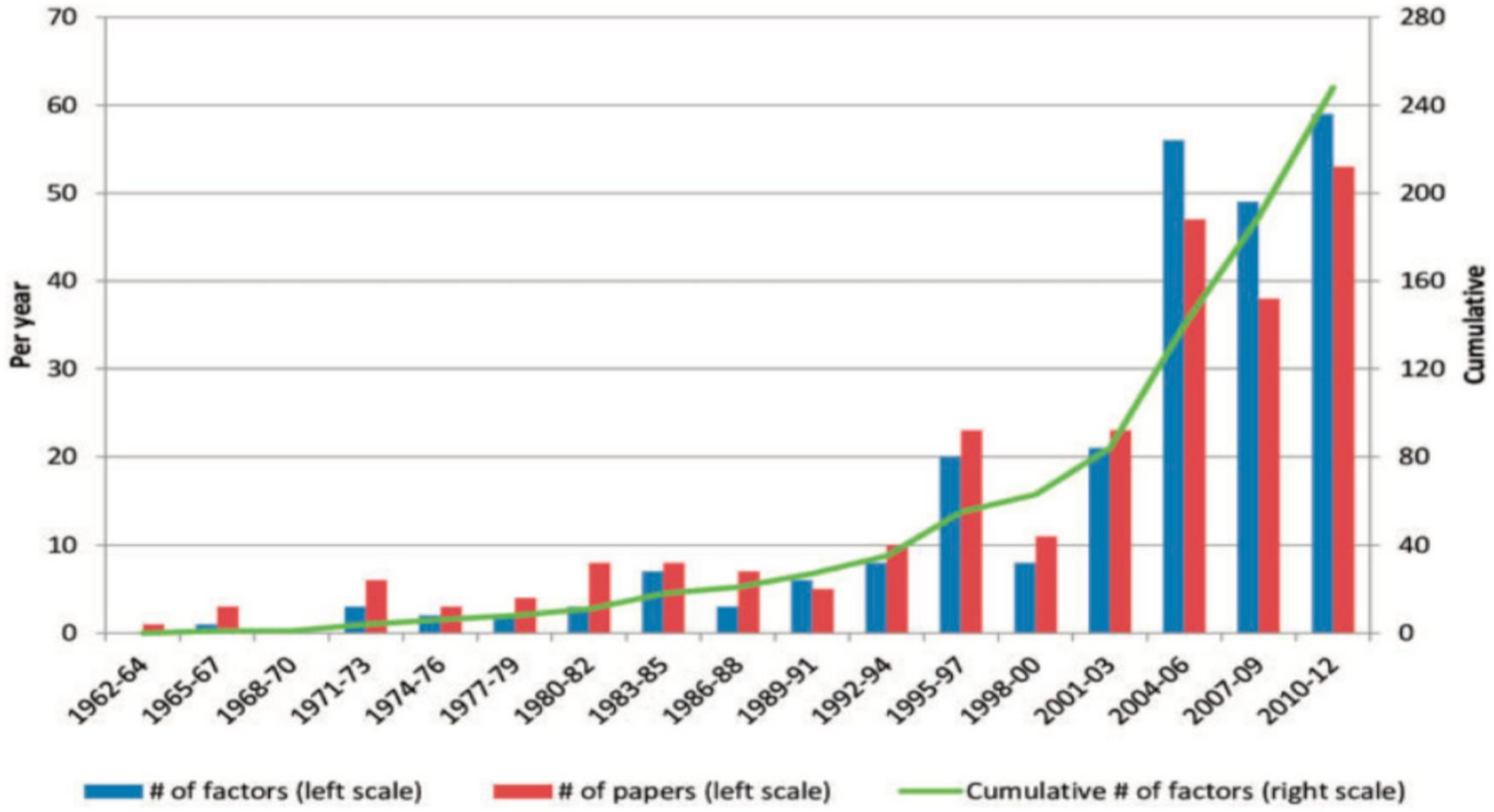
- Hou, Xue and Zhang (HXZ) examine **447 factor ideas** in the literature.
- They replicate all these factor ideas in a **realistic environment**
- Most of them (64%) **not statistically significant** at the 5% significance level.
- Imposing a more realistic t-statistic makes 85% of factor ideas insignificant.
- Even significant factor ideas of **much lower magnitude** than reported.

Replicating Factors/Anomalies – Why do things go wrong?

- Academic studies place too much weight on **illiquid small / micro-cap companies**
- Incentive to **“mine” the data** to find significant results and to **overstate results**
- Standard t-statistic cutoff of 2 does not take into account how many factors have been tried.
- **Need to adjust the t-statistic** or come up with some other better statistic.
- My experience: **fewer than 5% of published factors** tested are valuable & novel

Backtests – Harvey, Liu & Zhou (2015)

Factors and Publications → strong factor proliferation

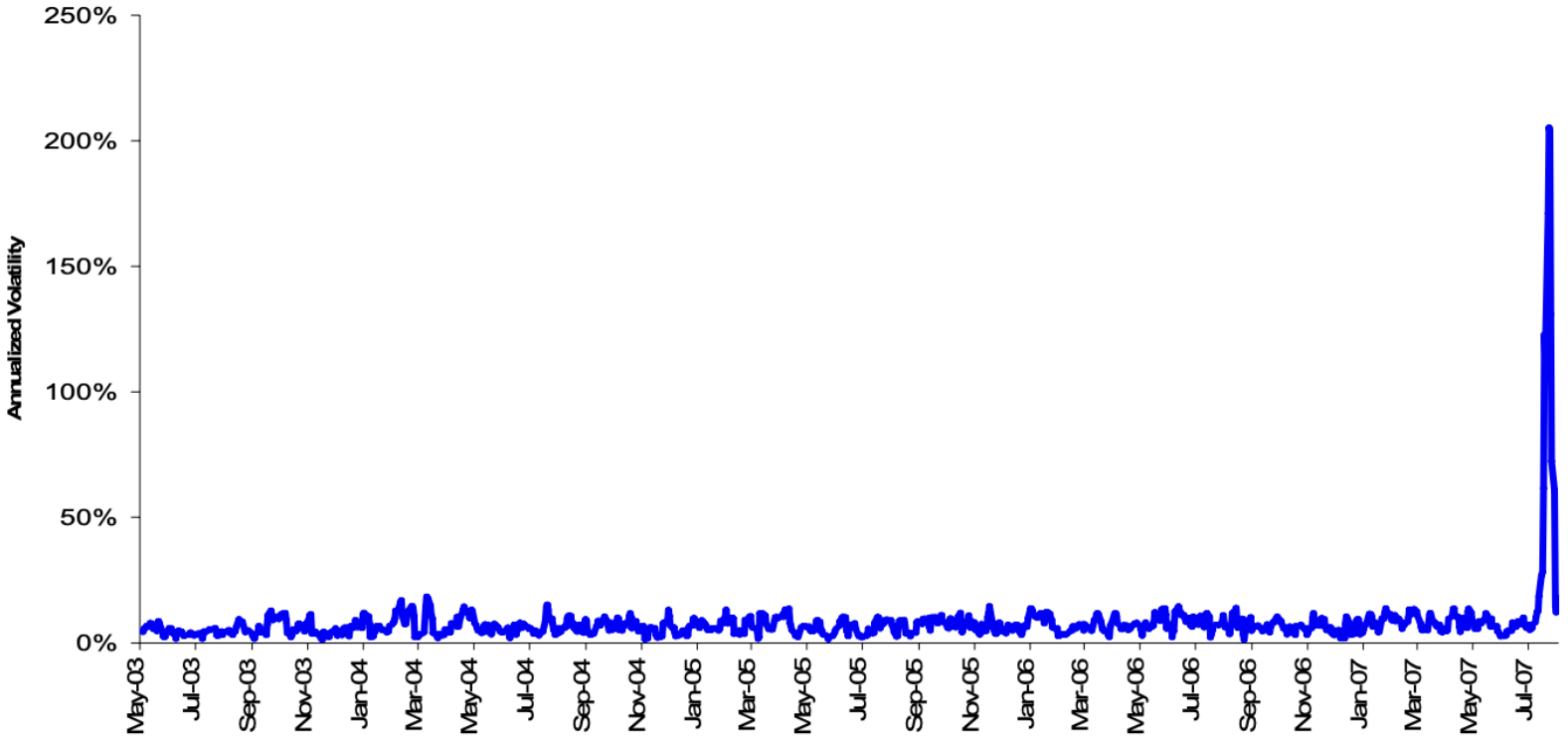


Factor Valuation / Crowding

- Most factors are now **commonly known**, e.g. value, size, profitability, low beta.
- The question is whether that fact diminishes their **efficacy**
- If factor **information is priced** in, then perhaps no scope for outperformance
- However: factors are based on **behavioral** and **risk** characteristics
- Unlikely that these characteristics **suddenly go away**
- There is no straightforward arbitrage mechanism
- Extreme **factor crowding** may happen, e.g. quant liquidity crunch August 2007

My Experience with Quant Liquidity Crunch August 2007

GSAM Global Equity Opportunity Fund Rolling 5-day Annualised Volatility

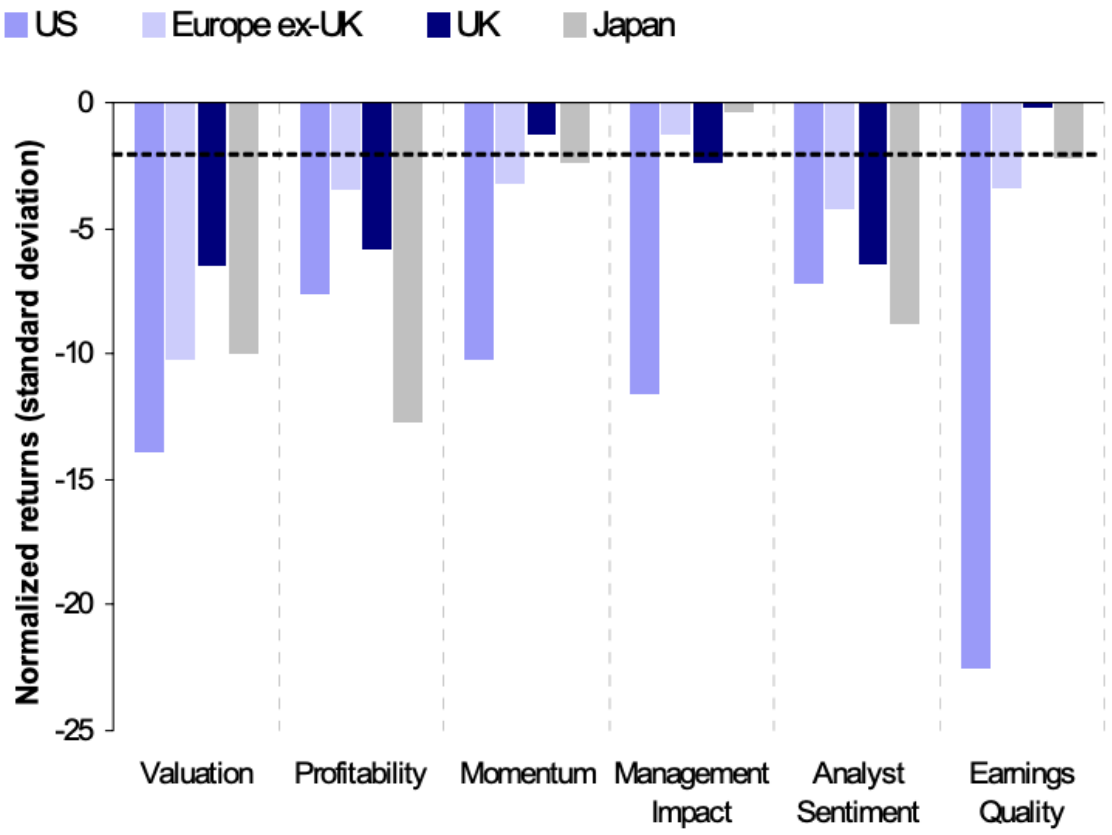


Risk suddenly skyrocketed!

Source: GSAM.

My Experience with Quant Liquidity Crunch August 2007

GSAM Factor Performance (August 1-10th, 2007)



All factors in all regions had very negative returns at the same time

Source: GSAM.

Factor Valuation / Crowding

- **Popularity:** different impact on different kinds of factors, e.g. contrarian (say value) vs. trend-following factors (say momentum)

- Factor **usage / crowding** is related to factor **cheapness / expensiveness**

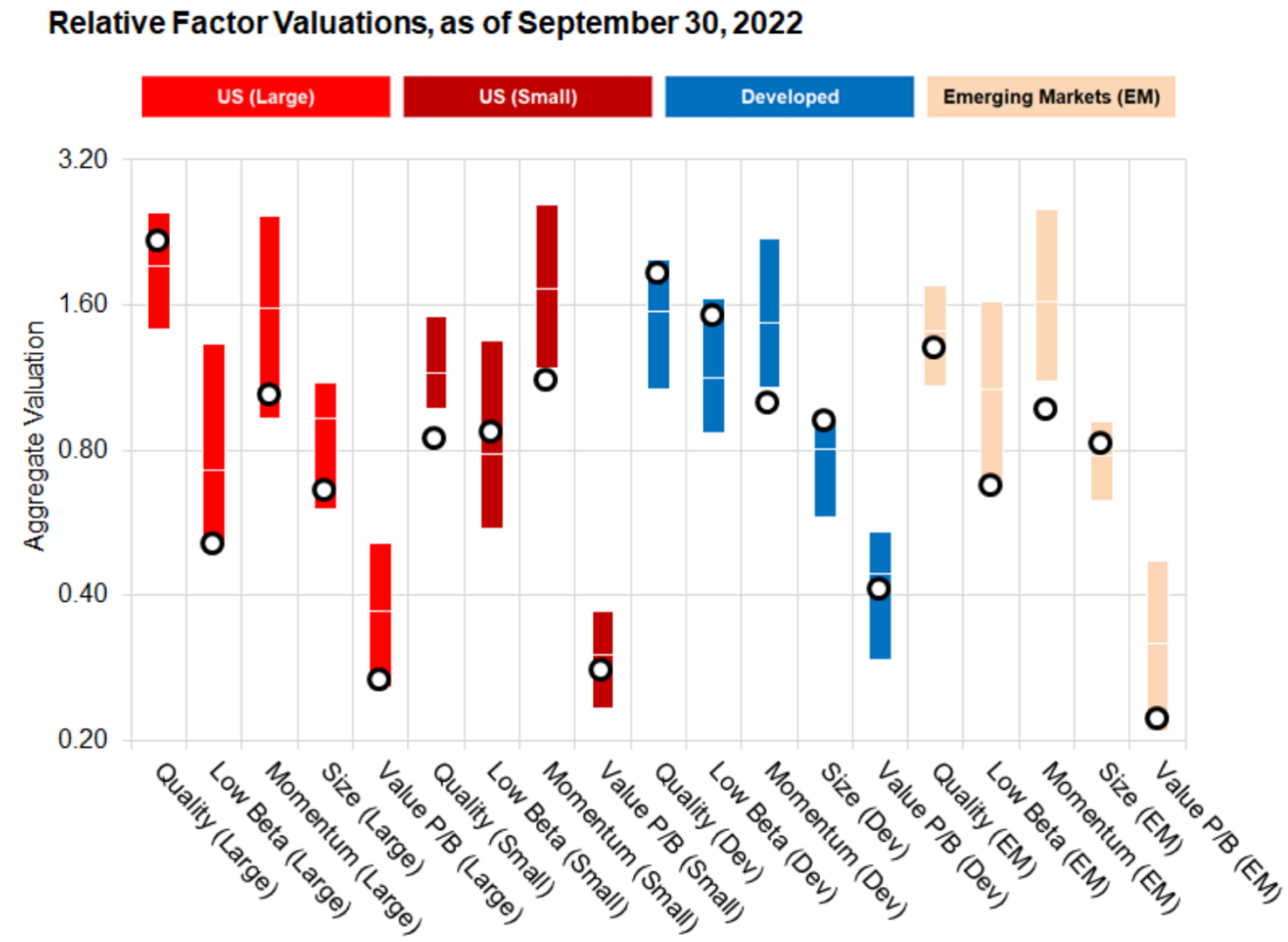
- E.g. if high profitability stocks are valued highly relative to their fundamentals, this indicates that the profitability factor is rather expensive / crowded

- Factor crowdedness / expensiveness may impact **future performance & risk**

- Examine stocks that are attractive according to a factor and check:

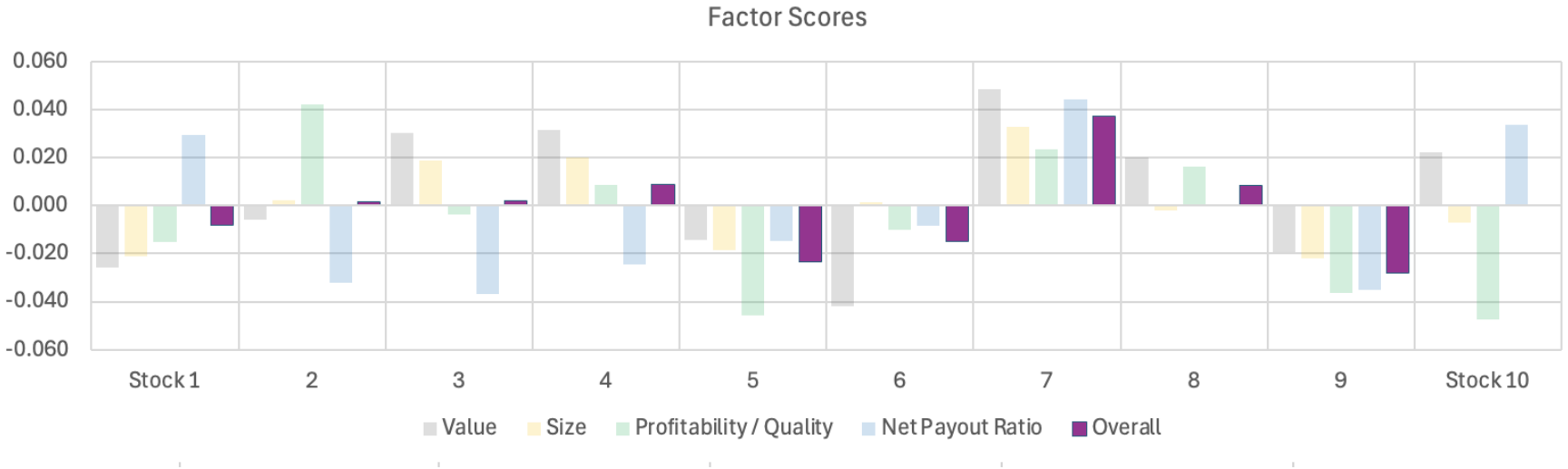
    - **Valuations / value spread** (e.g. Cohen, Polk, Vuolteenaho (2003))
    - **Co-movement** (Lou & Polk (2022))

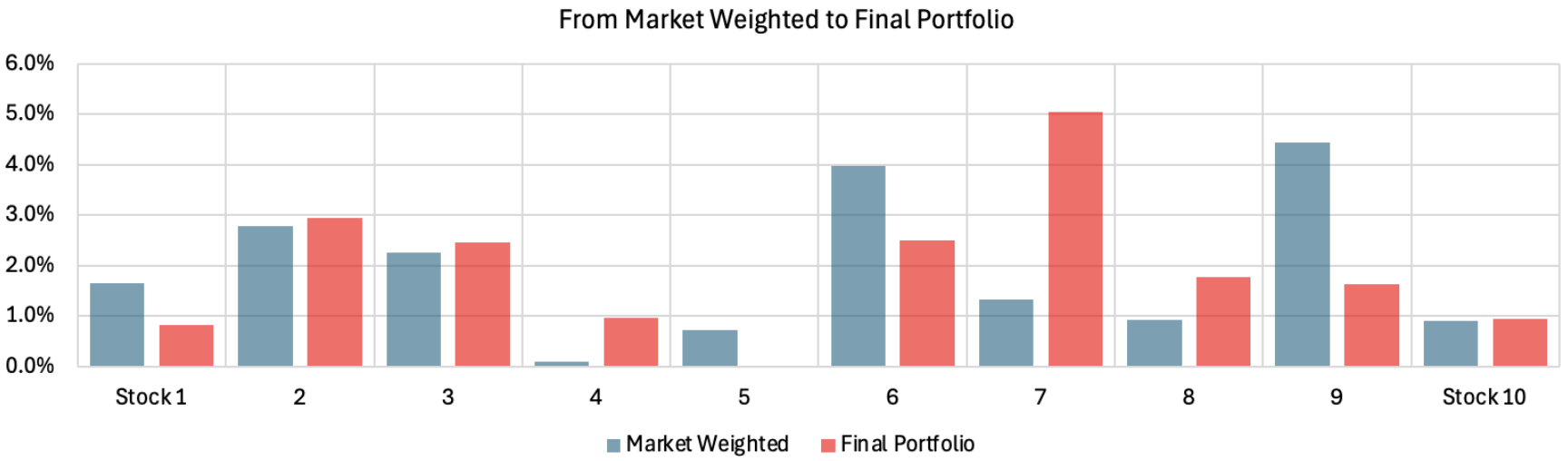
Factor Valuation / Crowding



Source: Research Affiliates.

Our Investment Process – Factor Combination





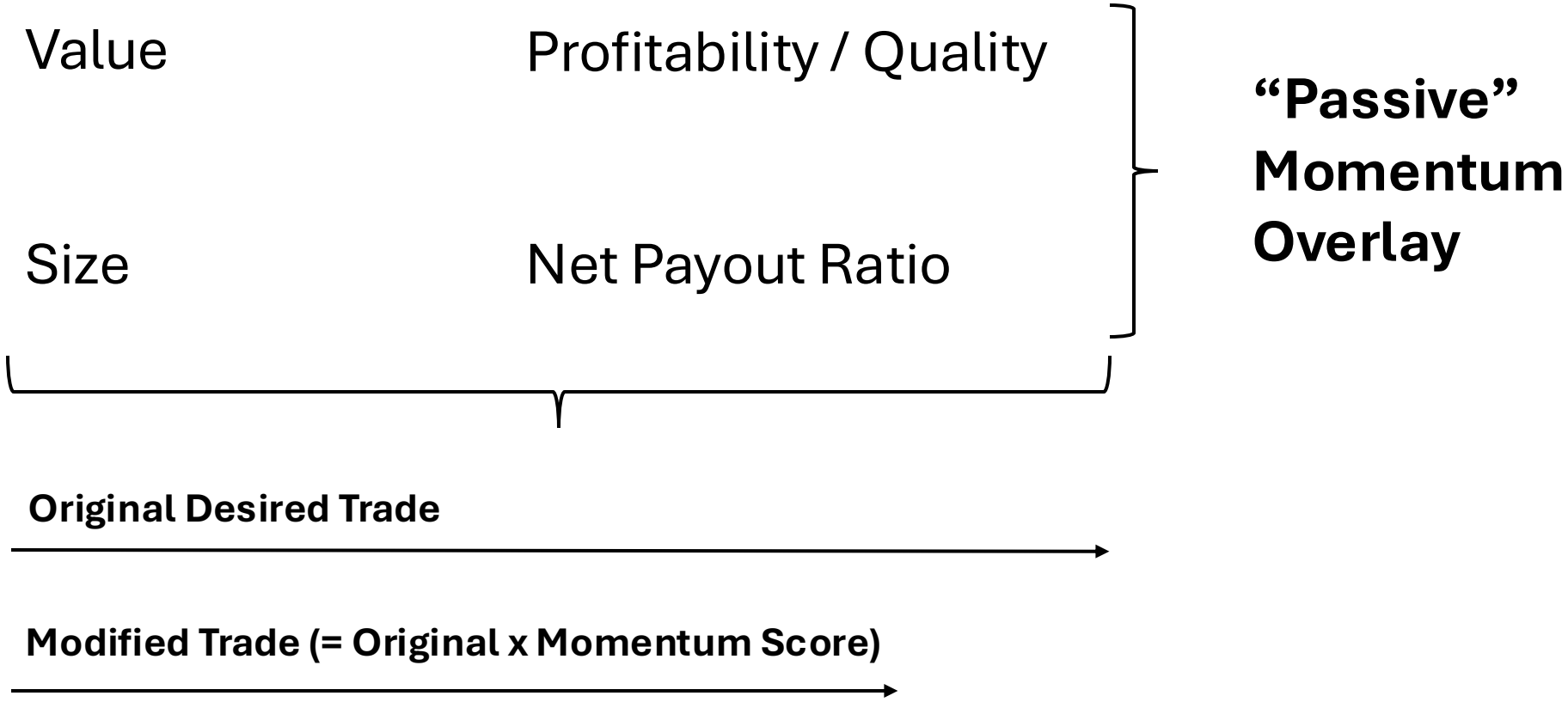
Factor scores →

Aggregate score →

Market Weights →

Final Portfolio

Our Investment Process – Factor Combination + ”Passive” Momentum



Higher Turnover Factors – Cross-Sectional Momentum

- Momentum focuses on **relative performance of securities** in the cross-section.
- First mentioned by Jegadeesh and Titman (1993) but has been used by practitioners for a long time.
- Momentum effect probably occurs due to the fact that information about underlying assets is incorporated into their prices slowly → creates **trends**
- **One of the most profitable investment strategies** globally but can have large sudden drawdowns.
- The momentum effect exists in various asset classes, not just equities.

Higher Turnover Factors - Cross-Sectional Momentum

Cumulative Momentum Returns - 1972 - 2024

- Strong performance
- However, high portfolio turnover → costly to trade.

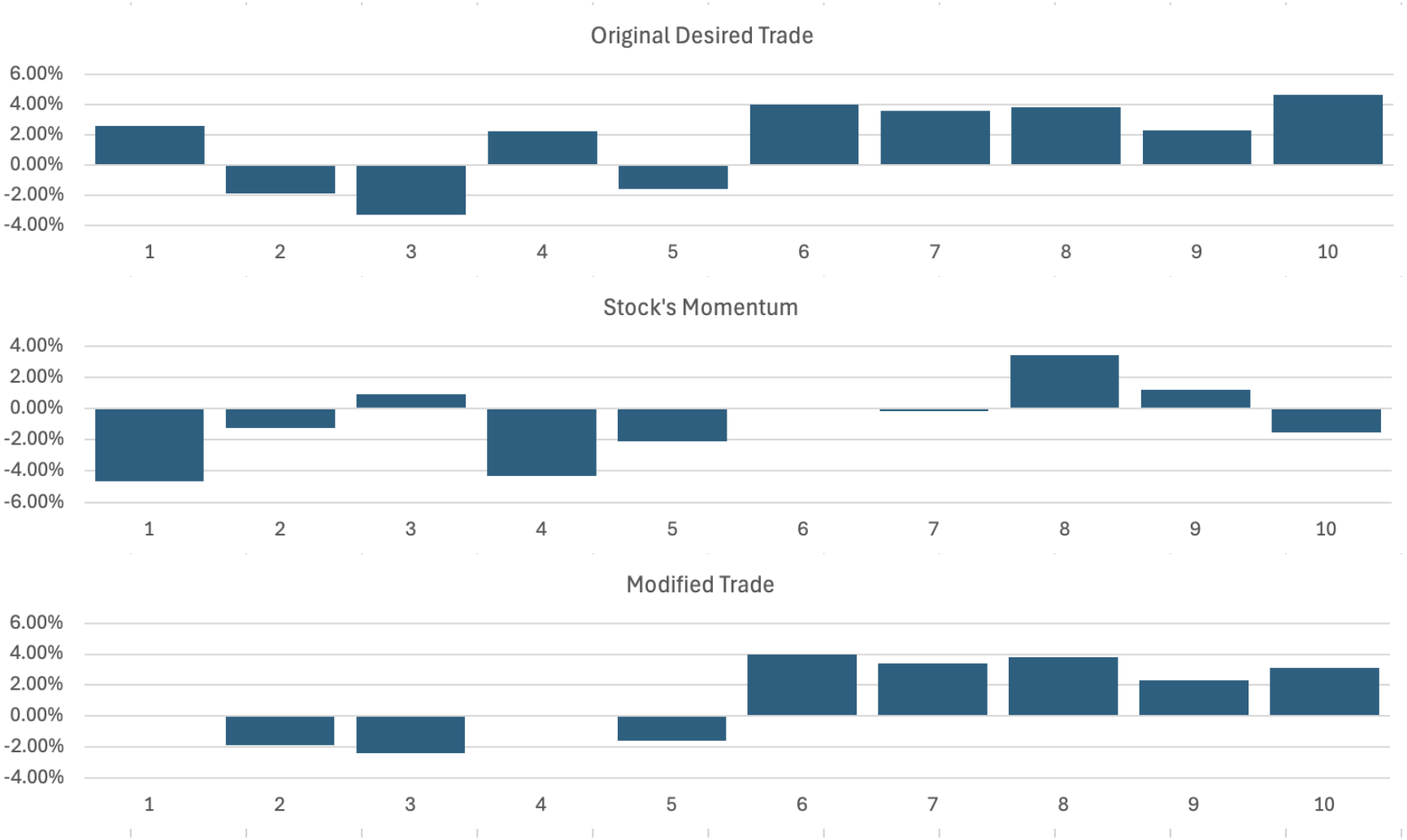
Value & Momentum – Global Developed Cumulative Factor Returns (1972 – 2024)

Factors diversify each other nicely!

Incorporating High-Turnover Factors

- Some factors' turnover is too high for a long-term, long-only investment process
- Should those factors be ignored?
- Israelov & Katz (2011): high-turnover factors can be used in a "passive" or **turnover-reducing manner** in a long-term investment process
- "Passive" factor overlay: scale back your desired trades if they contradict high-turnover factors
- Hence, high-turnover factors are only employed whenever they **reduce the desired portfolio turnover**
- Costless way of capturing information contained in these factors

Incorporating ”Passive” Momentum – 10 Stock Example



Summary and Conclusion

Factors based on **risk or behavioral** characteristics → unlikely to go away

Proliferation of factors: > 400 different factors have been “discovered” over time

Focus on robustness: sensible economic rationale and robust empirics.

Factor **popularity** / **valuations**: impact on future expected factor returns & risk

Application of multi-factor model: diversification benefits & efficiency gain from combining factors

Higher turnover factors can be captured in a **turnover-reducing** manner.

What does the **future** hold for a factor approach?

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