REPLACING THE THEORY OF EFFICIENT MARKETS---IMPLICATIONS FOR THEORY AND PRACTICE

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Plan of the talk

- Momentum, reversal and value.
  Prominent market anomalies.

- An institutional theory.
  Rational explanation of the anomalies.

- Practical applications of the theory.
  Efficient portfolio management in an inefficient market.
Momentum, Reversal and Value

- **Momentum**: Tendency of recent performance to continue in the near future.
- **Reversal**: Tendency of performance over a longer history to revert.
- **Value** (closely related to reversal): Ratio of prices to fundamentals predicts inversely future performance.
- Prominent market anomalies!
Value

Source: Dimson, Marsh and Staunton, Global Investment Returns Sourcebook, Credit Suisse Research Institute, 2011
Momentum

Source: Dimson, Marsh and Staunton, Global Investment Returns Sourcebook, Credit Suisse Research Institute, 2011
Sharpe Ratios

- **Momentum**
  - 70% for individual stocks (average of US, UK, Japan, Continental Europe).
  - 34% for country-level indices.

- **Value**
  - 36% for individual stocks (average of US, UK, Japan, Continental Europe).
  - 34% for country-level indices.

Explanations

- Momentum and reversal are hard to explain within standard Finance models.
- Two leading approaches:
  - Behavioural Finance.
  - Market frictions.
Momentum and reversal can arise if investors react incorrectly to information signals.

Example:
- Investors are too optimistic about some assets (overpricing them) and too pessimistic about others (underpricing them) → Reversal.
- Optimism/pessimism builds gradually → Momentum.
Market Frictions

- Key friction: Delegation and agency.
  - Momentum and reversal result from flows between investment funds.
  - Fund managers and investors are rational.
Basic Intuition

Suppose that a negative shock hits an asset’s fundamentals.

→ Funds holding asset realize poor returns.
→ Funds experience outflows.
→ Funds sell asset.
→ If outflows are gradual, asset price declines gradually ⇒ **Momentum.**
→ Asset price below fundamental value ⇒ **Reversal.**
A Case Study: The Tech Bubble

Value was doing OK, but growth much better.
→ Outflows from value funds into growth funds.
→ Gradual decline in value and further rise in growth.
The Bird-in-the Hand Effect

Q: Why do investors absorb outflows, buying assets whose price is expected to drop?
   - Why isn’t the effect of gradual flows fully anticipated into current prices?

A: Investors prefer one bird in the hand.
   - Expectation of outflows renders assets undervalued.
   - Buy now: Lock in attractive long-run return. (One bird in the hand)
   - Buy after outflows occur: Earn higher return on average, but risk that undervaluation disappears. (Two birds in the bush)
A Simple Example

- **Buy now:** Expected return = 8
- **Buy after outflows occur:** Expected return = 20 or 0.
Supporting Evidence

  - Predict fund flows based on past returns.
  - Impute flows in or out of individual stocks.
  - Use stock-level flows to predict returns.
Supporting Evidence (cont’d)

- Fund flows explain a good part of stock-level momentum, especially for large stocks and recent data.

<table>
<thead>
<tr>
<th>Panel B: Subsamples Based on Time Periods and Firm Size</th>
<th>k=6 (80-93)</th>
<th>k=6 (94-06)</th>
<th>k=6 (Small Cap)</th>
<th>k=6 (Large Cap)</th>
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<tbody>
<tr>
<td>Intercept</td>
<td>0.072</td>
<td>0.065</td>
<td><strong>0.119</strong></td>
<td><strong>0.653</strong></td>
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<tr>
<td></td>
<td>(1.37)</td>
<td>(1.29)</td>
<td>(2.54)</td>
<td>(1.65)</td>
</tr>
<tr>
<td>$E[FIPP(t-k, t)]$</td>
<td>0.106</td>
<td></td>
<td><strong>0.203</strong></td>
<td><strong>0.158</strong></td>
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<tr>
<td></td>
<td>(1.80)</td>
<td></td>
<td>(3.44)</td>
<td>(3.50)</td>
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<tr>
<td>$\text{ret}(t)$</td>
<td>-0.022</td>
<td>-0.027</td>
<td>-0.022</td>
<td>-0.029</td>
</tr>
<tr>
<td></td>
<td>(-1.10)</td>
<td>(-1.43)</td>
<td>(-1.07)</td>
<td>(-1.60)</td>
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<tr>
<td>$\text{ret}(t-k, t-1)$</td>
<td><strong>0.032</strong></td>
<td><strong>0.027</strong></td>
<td><strong>0.023</strong></td>
<td>0.014</td>
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<tr>
<td></td>
<td>(2.77)</td>
<td>(2.75)</td>
<td>(2.44)</td>
<td>(1.92)</td>
</tr>
<tr>
<td>$\text{ret}(t-36, t-k-1)$</td>
<td>-0.003</td>
<td>-0.003</td>
<td><strong>-0.006</strong></td>
<td><strong>-0.006</strong></td>
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<tr>
<td></td>
<td>(-1.83)</td>
<td>(-1.83)</td>
<td>(-4.13)</td>
<td>(-4.11)</td>
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<td>$R^2$</td>
<td>7.76%</td>
<td>8.44%</td>
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<tr>
<td>No Obs</td>
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<td>150322</td>
<td>150322</td>
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</table>
Model
Dynamics

Following poor returns by active fund:

- Gradual outflows from active fund.

- Stocks that active fund overweights:
  - Immediate price drop.
  - Drop in expected return in short run $\Rightarrow$ Momentum.
  - Rise in expected return in long run $\Rightarrow$ Reversal.

- Stocks that active fund underweights:
  - Opposite effects.
Additional Implications

- Fund flows generate **comovement**.
  - Following outflows from some funds, all assets held by the funds drop in price.

- Fund flows generate **lead-lag effects** (i.e., cross-asset predictability).
  - Price drop of one asset predicts that other assets held by the same funds will drop in the short run and rise in the long-run.
Additional Implications (cont’d)

- Momentum, reversal and comovement are larger for assets with high *idiosyncratic risk*.
  - Trading against mispricings in those assets subjects fund managers to high risk of underperforming their benchmark.

- Predictability of returns based on earnings:
  - **Post-earnings drift** (earnings surprises predict short-run return movements in same direction).
  - **Value** stocks have high expected returns and low and **declining** earnings.
Portfolio Management

- **Momentum, reversal and value:**
  - Well-documented empirically.
  - Form basis for most active investment strategies.

- **However:**
  - Investment strategies are mainly data-driven, without underlying conceptual framework.

- ➡️ A theory can add value!
Some Investment Questions

- How to best implement momentum and value?
  - Raw vs. risk-adjusted returns.
  - Measure of fundamentals.

- How to best combine momentum and value?

- How does optimal strategy depend on investor’s horizon?
Our theory provides a framework to answer those questions.

- Calibration of the model.
- Use model as “test bed” to evaluate a number of investment strategies.
- Analytical formulas for Sharpe ratios (SR).
Calibration and SR

- Calibrate using evidence on mutual-fund returns and flows.
  - Key parameters:
    - Response of flows to performance.
    - Price impact of flows.
  - Two types of SR:
    - Static (short-horizon investor).
      - Standard in empirical studies.
    - Dynamic (long-horizon investor).
Construction of Momentum and Value

- **Momentum:**
  - High weight for assets with high cumulative returns over a lookback window.

- **Value:**
  - High weight for assets with high future earnings forecasts relative to price.
Static SR of Momentum

- Maximum SR = 40%, for lookback window of 4 months.
- For comparison: Market index has SR = 30%.
Static SR of Value

- Two versions of a value strategy, using different forecasts for future earnings.
  - Accurate vs. crude forecast.
- Both achieve SR = 26%.
  - Crude forecast does not hurt!
    - Forecast error raises weight of assets for which market expects low earnings.
    - Declining earnings are associated with high expected returns.
Comments

- SRs somewhat lower than empirical evidence (e.g., AMP 2009).
  - Momentum: 40% vs 70%/34%.
  - Value: 26% vs 36%/34%.
  - Calibration considers only subset of flows.

- Momentum dominates value.
  - Consistent with empirical evidence.

- Value less sensitive to implementation than momentum.
Combining Momentum and Value

- Negative correlation between momentum and value.
  - Consistent with empirical evidence.
- Diversification benefits from combining the two strategies.
  - SR of optimal combination = 48%.
- Optimal combination can be further improved!
  - Overall optimal SR = 61%.
  - Use information on fund flows.
Lagged Value

- Value strategy using lagged signal.
- Higher SR than with current signal:
  - Maximum for 1 year, and equal to 35%.
- Has element of momentum.
- When combined with momentum, SR same as with current signal.
Dynamic SR

- Exceeds static SR if autocovariance of returns is negative.
  - Long-run risk is smaller than sum of short-run risks.
- What is autocovariance for momentum and value strategies?
Autocovariance

- Momentum has small short-run momentum.
  - Weights change rapidly $\Rightarrow$ Inherit only part of asset return momentum.

- Value has short-run momentum and long-run reversal.
  - Weights change slowly $\Rightarrow$ Inherit both momentum and reversal.
Dynamic SR

- Long-run risk of momentum is sum of short-run risks.
  - Series of uncorrelated bets.
- Long-run risk of value is smaller than sum of short-run risks.
  - Expected return becomes higher following poor performance.
- Value overtakes momentum for long investment horizons.
Conclusion

- Momentum, reversal and value can result from flows between investment funds.
- Analytical framework for studying efficient portfolio management in an inefficient market.
  - Good to combine momentum and value. Even better to use information on fund flows.
  - Long-run investors should raise their weight on value and lower that on momentum.
Further Reading

- **Papers:**
    - [http://personal.lse.ac.uk/vayanos/WPapers/ITMR.pdf](http://personal.lse.ac.uk/vayanos/WPapers/ITMR.pdf)
    - [http://personal.lse.ac.uk/vayanos/WPapers/TAMVS.pdf](http://personal.lse.ac.uk/vayanos/WPapers/TAMVS.pdf)

- **VoxEU Columns:**