Investor psychology and asset pricing: Doubts


“Stanley Zin raises an important concern [...] behavioral models leave room for multiple degrees of freedom in the utility function. Taken to an extreme, this approach could reduce structural modeling to a tautological, data-fitting exercise. One might argue that psychological evidence itself restricts the parameters. There may be truth to this argument, but the wealth of (sometimes) contradictory psychological evidence [...] leaves it open to doubt.”
Tversky and Kahneman: value function and probability weights

Figure 1. The left panel plots the value function proposed by Tversky and Kahneman (1992) as part of their cumulative prospect theory, namely $v(x) = x^\alpha$ for $x \geq 0$ and $v(x) = -\lambda(-x)^\alpha$ for $x < 0$, for $\alpha = 0.5$ and $\lambda = 2.5$. The right panel plots the probability weighting function they propose, namely $w(P) = P^\delta / (P^\delta + (1 - P)^\delta)^{1/\delta}$, for three different values of $\delta$. The dashed line corresponds to $\delta = 0.4$, the solid line to $\delta = 0.65$, and the dotted line to $\delta = 1$.

**Main results**

- High $TK \approx$ high average past returns, high positive extreme returns, absence of negative extreme returns
- Prediction: high $TK = $ high System-1 investor demand $= $ low future return
- Findings consistent with this prediction
- Impressive: Similar results in most countries in a large international sample
- Stronger for smaller, volatile, low priced, illiquid stocks
- Some overlap with one-month reversal and long-term reversal effect
Connecting beliefs about gains and losses with historical realizations

Role of last (few) month(s) returns

Return comovement of stocks with similar TK

Experimental applications of prospect theory: Gain/loss distribution known

Earlier applications of prospect theory in asset pricing: Rational expectations, i.e., agent knows objective distribution (incl. its parameters) – tension with idea of “heuristics” in decision making

This paper: “System 1” thinking – people infer future distribution from historical data summary

My interpretation: Reflects investors (boundedly rational) attempts at learning from past data – not necessarily “System 1”
Connecting beliefs with historical realizations

\[ t = 0 \quad t = -5 \text{yrs} \]

Stefan Nagel  Discussion of First Impressions

Connecting beliefs with historical realizations

\[ t = 0 \quad t = -5 \text{yrs} \]
Connecting beliefs with historical realizations

- Consider weighting function with parameter(s) $\theta$
  - Window length in current framework (5 years)
  - Alternative weighting schemes: e.g. exponentially decaying weights
- It would be useful to pin down $\theta$ by fitting to retail portfolio holdings microdata: Let $y_{it}$ be portfolio weight of stock $i$. Estimate $\theta$ by fitting

$$y_{it} = a + bTK_{it}(\theta) + e_{it}$$

(1)

- In this way, $\theta$ is not a free parameter anymore in the asset pricing analysis
- Could do similar analysis at the aggregate stock market level
  - Use $TK(\theta)$ to explain household portfolio equity share and estimate $\theta$, similar to Malmendier and Nagel (2011)
  - Use $TK(\theta)$ to predict stock market returns

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Role of last (few) month(s) returns

Puzzling: Last month return seems to matter a lot, even though $TK$, based on 5-year rolling windows, should be very persistent.

| Sub-periods         | TK      |  |                |                |
|---------------------|---------|  |                |                |
| 1931/07-1963/06     | 1.252   | 0.459 | (4.346)        | (1.89)         |
| 1963/07-2010/12     | 1.211   | 0.634 | (5.34)         | (2.81)         |
| Skip one month      | 0.779   | 0.299 | (4.58)         | (1.86)         |
Role of last (few) month(s) returns

- How can highly persistent predictor produce (partly) short-run predictability?
- Example: Suppose returns follow an MA(1) process

\[ r_{t+1} = e_{t+1} - \rho e_t \]  \hspace{1cm} (2)

- Consider simplified example with historical means instead of TK:

\[ \text{Cov} \left( r_{t+1}, \frac{1}{k} \sum_{i=0}^{k-1} e_{t-i} \right) < 0 \]  \hspace{1cm} (3)

while

\[ \text{Cov} \left( r_{t+2}, \frac{1}{k} \sum_{i=0}^{k-1} e_{t-i} \right) = 0 \]  \hspace{1cm} (4)

- Gets back to weighting issue: Perhaps last few months carry higher weight in people’s minds?
• TK long-short portfolio is quite volatile with moderate Sharpe Ratio (ann. 0.60), comparable to value premium

• This volatility limits “arbitrage”: Tilting portfolio away from High-\(TK\) towards low-\(TK\) is risky.

• Source of volatility: Somehow, correlated stocks must end up in same portfolio
  • High \(TK\) = stocks that went up during the same 5-yr time period \(\rightarrow\) similar common factor loadings
  • But tail observations matter a lot for \(TK\), not obvious why stock with extremely positive return in, say, month t-1 is correlated with one that had extreme positive return in, say, month t-12