Distorted Beliefs and Asset Prices

Bretscher, Malkhozov, Tamoni, Yang (2025)

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- **Campbell & Shiller (1988):** Expected cash flows or expected returns

$$\log\left(P_t / D_t\right) \approx \text{Constant} + \underbrace{\sum_{h=0}^{\infty} \rho^h \mathbb{E}_t\left[\Delta d_{t+1+h}\right]}_{\text{Expected Cash Flows}} - \underbrace{\sum_{h=0}^{\infty} \rho^h \mathbb{E}_t\left[r_{t+1+h}\right]}_{\text{Expected Returns}} \tag{1}$$

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- In principle, can measure subjective expectations with surveys, professional forecasts, etc.
- Empirically: Subjective cash-flow expectations explain more price variation than objective expectations
  - E.g. Delao & Myers (2021, 2023); Bordalo, et al. (2024)

This paper: Combine (1) and (2) to Measure Bias

In long-run: bias in cash flow expectations = bias in return expectations

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Empirical implementation: VAR to forecast innovations in analyst cash flow expectations

- I/B/E/S analyst EPS expectations (1 and 2 years) & LTG expectations (3-5 years)
- Use VAR to forecast innovations
  - Predictors: Excess S&P 500 returns, log P/D, term spread, small-stock value spread, default spread

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Main results: Bias helps explain expected returns

- Time series: Bias explains 41% of time series variation in long-run expected returns
- Cross section: Bias is priced; can improve performance of ICAPM
- **Interpretation:** Distorted investor beliefs impact objective expected returns

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1. Interpretation of results

- **Authors' interpretation:** Distorted investor beliefs impact objective expected return
- **Alternative interpretation:** Investor beliefs are not biased, only analyst beliefs
- **Suggestion:** Authors' methodology enables measurement of **investor** bias without investor cash flow expectations
  - Using data on investor expected returns & long-run equivalence of bias in cash flow and return expectations
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2. Exploring the cross section

- Look at portfolios ICAPM fails to price: High expected returns but low cash flow betas
- Do those portfolios systematically have high bias betas?
- **ICAPM under subjective beliefs could be unifying model for cross section**

Two Interpretations

Interpretation #1: Biased Investor Beliefs Impact Prices

Two periods

- One risky asset that pays terminal dividend in period 2

$$D = \overline{D} + \epsilon, \epsilon \sim N\left(0, \sigma^2\right)$$

- Fixed supply of one share
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$$\max_Q Q\mathbb{E}^I\left[D - P\right] - \frac{\gamma}{2} Q^2 \mathbb{V}^I\left[D - P\right]$$

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Representative analyst with same biased cash flow expectations as investor

$$\mathbb{E}^I[D] = \mathbb{E}^A[D] = \overline{D} + \underbrace{b}_{\text{Bias (Predictable Forecast Error)}}$$

- Common assumption in literature: Analyst expectations are good proxy for those of investors

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Bias in investor/analyst expectations distorts price & objective expected return

$$P = \overline{D} + b - \gamma\sigma^2 \rightarrow \mathbb{E}^{Objective}\left[D - P\right] = \gamma\sigma^2 - b$$

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Now assume investor has FIRE

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Analyst has biased cash flow expectations because attempts to learn from price

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- **Empirically:** Prices do impact analyst cash flow expectations (Chaudhry, 2025)

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- **Does investor bias align with analyst bias? Or is there meaningful (potentially time-varying) heterogeneity?**
  - Important contribution to literature either way

Exploring the Cross Section

Can Bias Help Explain Anomaly Returns?

Assume interpretation #1

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Paper derives 3-factor ICAPM

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Empirically: Bias factor helps explain cross section of expected returns

- 3-factor $R^2 = 35\% > 3\% =$ 2-factor R^2

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Suggestion: Explore implications for particular anomalies

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- Momentum: Recent winners have lower cash flow betas than recent losers (Campbell, et al (2018))
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  - Investors demand high compensation because misperceive objective expected return risk as cash flow risk

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Upshot: An ICAPM under subjective beliefs could be unifying model for cross section

- At least qualitatively

Minor Comments

How do results vary with set of VAR variables?

- Adding more variables may uncover more predictability in innovations to subjective cash flow expectations...
- ...and so may reveal a greater role for bias in explaining price variation

Shock to long-run subjective cash flow expectation series contains predictable component

- On page 18
- Total log annual change in EPS contains predictable and unpredictable components
- Presence of predictable components would (wrongly) show up as bias
  - $\varepsilon^{\mathbb{S}}_{d,t}$ will have be predictable even if innovations to analyst forecasts are not
- Perhaps try residualizing with respect to common predictors

Could be useful to validate long-run expected return series against analyst price targets

- VAR uses analyst cash flow expectations
- SVIX, Livingston survey, etc. reflect subjective expected returns of non-analysts
  - These agents may have different cash flow expectations than analysts
  - So VAR-based subjective expected returns may not align
- VAR-based subjective expected returns should align with analyst subjective expected returns (price targets)
- Could even use price targets as additional VAR variable to explore dynamics of subjective expected returns
  - I.e. Explore properties of short-term vs. long-term components of $\mathcal{F}^{\mathbb{S}}_{r,t}$

Conclusion

Very interesting paper

New methodology can shed new light on subjective beliefs & asset prices

Main comments

- Use methodology on alternative data to rule out alternative interpretations
- Dig deeper into cross section