

# LIMITED MEMORY, TIME-VARYING EXPECTATIONS, AND ASSET PRICING

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Discussion By:

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October 5th, 2022

BSE PHD WORKSHOP ON EXPECTATIONS IN MACROECONOMICS

## BIG PICTURE

- Aggregate asset pricing facts to explain:
  - ① high equity premium
  - ② time-varying equity premium
  - ③ low correlation between dividend growth and returns
  
- With rational expectations, only two ways to go:
  - ① change the price of risk
    - habits (e.g. Campbell-Cochrane)
    - anxiety about the future (e.g. Epstein-Zin)
    - frictions to break EE (e.g. He-Krishnamurthy)
  - ② change quantity of risk
    - persistent shocks to fundamentals (e.g. Bansal-Yaron)
    - aggregate rare disasters (e.g. Barro, Gabaix)
    - idiosyncratic rare disasters (e.g. Constantinides-Duffie, Schmidt)

## SUMMARY

This paper

- ✓ New fact: time-variation in expectation formation process
- ✓ New explanation: limited memory + drifting belief parameters

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## My comments

- ① Interpretation of evidence on time-varying expectation formation
- ② Avoid being a “new explanation for old facts” paper
- ③ Flesh-out the implications of subjective beliefs about endogenous objects

## COMMENT #1: TIME-VARYING EXPECTATION FORMATION PROCESS

$$\hat{E}_t r_{it+1} = \beta_0 + \beta_t pd_t + \epsilon_{it}, \quad \beta_t = \beta_{t-1} + \nu_t$$

- Paper uses Kalman filter to estimate  $\beta_t$  and rejects  $\beta_t = \beta$
- Question: how should I interpret this?
  - what if investors extrapolate fundamentals in a state-dependent way (e.g. diagnostic expectations)?
  - what if investors ignore  $pd_t$  and extrapolate past returns (Nagel-Xu), but correlation b/t  $pd_t$  and returns varies (Goyal-Welch)?
  - could this be heterogeneous **fixed** expectations with wealth weights shifting?
- Suggestions:
  - ① simulate data from canonical expectations models and show they can't generate this
  - ② do same exercise with forecasts of fundamentals and show they don't behave like this
  - ③ do same exercise with objective expectations and compare differences

## COMMENT #2: DON'T BE “NEW EXPLANATION FOR OLD FACTS”

$$M_{t+1} = \beta^{\frac{1-\gamma}{1-\rho}} \left( \frac{c_{t+1}}{c_t} \right)^{-\gamma} \left( \frac{WC_{t+1} + 1}{WC_t} \right)^{\frac{\rho-\gamma}{1-\rho}} .$$

- Persistent shocks carry a high price of risk in EZ world (final term)
- (Extremely) pessimistic reading of the paper:
  - You combined a persistent shock + EZ preferences to explain asset prices. What's new?
- **I do not think this!** But worried someone skimming the paper would..
- Suggestions:
  - ① emphasize **new** fact(s) only your model explains (other than “endogeneous” volatility)
  - ② estimate the belief process parameters separately using **expectations data**

## COMMENT #3: BELIEFS ABOUT ENDOGENOUS OBJECTS

- Technical contribution: model non-RE beliefs about **prices**
  - most existing papers use non-RE beliefs about fundamentals, which is much easier
  - (side comment: emphasize this more!)
- Question: how important endogenous vs. exogenous subjective beliefs for results?
  - in the context of credit pricing, Greenwood et al. (2019) suggest it matters a lot!
- Suggestions:
  - ① compare your results to a model with time-varying beliefs about fundamentals
  - ② calculate implied beliefs about fundamentals from model and compare to data