COMMENT TO ANGELETOS, HUO, AND SASTRY’S “IMPERFECT MACROECONOMIC EXPECTATIONS: THEORY AND EVIDENCE”

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3rd of April, 2020
NBER Macroeconomics Annual
NBER, Cambridge via zoom
COMMENT TO ANGELETOS, HUO, AND SASTRY’S “IMPERFECT MACROECONOMIC EXPECTATIONS: THEOREY AND EVIDENCE”

YES, BUT, WE DISAGREE

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Twenty years of progress in modeling expectations

- **Models**: dispersed private info and higher order beliefs, inattention, sticky info, least-squares learning, memory, over-extrapolation, cognitive discounting, …
- **Empirics**: aggregate time-series, survey evidence, disagreement within survey, disagreement across surveys, info treatments, markets vs people, horizons, …

Current state: wilderness of alternatives

- Two conflicting facts: under-reaction versus over-reaction
- Missing a CRRA, or a Cobb-Douglas, or a Calvo.
Yes: a parsimonious model

Underlying process

\[ z_t = R(L) \epsilon_t \]

Perceived process

Bayesian beliefs with noisy signals

Equilibrium
Yes: a new regression

Survey data to build

\[ Error_{i,t} = z_{t+1} - E_{i,t}[z_{t+1}] \]

Regression

Intuition \hspace{1em} (on the conflicting fact: under-react versus over-react)

• If average over agents, get \( \kappa > 0 \) the “stickiness of expectations”.
• If forget the average, get \( \chi < 0 \) the over-reaction or over-representativeness.
• Together: \textit{time-series versus cross-sectional variation}!
Yes: new empirical pattern

- Forecast crosses outcome from below
- Errors first +, then -.

Caveats:
1) not precisely estimated
2) interpretation

\[ \mathbb{E}_t \left[ \frac{\partial}{\partial \varepsilon_t} \hat{E}_{i,t+h}(\varepsilon_{t+h+4}) \right] \neq \frac{\partial}{\partial \varepsilon_t} \mathbb{E}_{i,t}(\varepsilon_{t+h+4}) \]
Yes, **but** , we disagree
But

Needed features to fit the inflation data

• With an exogenous autoregressive model, find:
  1. Slow learning: \( \tau \) is small
  2. Over-extrapolation:

Intuition for why using the exogenous AR model:

• From regression estimates:
• From the crossing fact: expectations on average first under react because of learning, but then overreact because of over-extrapolation
But, can see persistence from horizon

In their model, outcomes versus expectation

\[ E_{i,t}(z_{t+1}) = \rho E_{i,t}(z_t) \]

Long-horizon expectations:

- Redo regression using 5-year-ahead expectations from same survey
- Still support for over-extrapolation:
But, look further

\[ \pi_t = \pi^P_t + \pi^T_t \]
\[ \pi^P_t = \pi^P_{t-1} + u^P_t \]
\[ \pi^T_t = u^T_t \]

\[ \Rightarrow \pi_t = \pi_{t-1} + \varepsilon_t - \theta \varepsilon_{t-1} \]

Long-horizon outcome reveals persistent RW

Long-horizon expectation mistake transitory WN

People under-extrapolate
Yes, but, **we disagree**
Disagreement in the literature

Important part of the expectations literature of the last twenty years

- Disagreement, Communication, and Transparency
- In theory: strategic complementarities, inattention models. In policy: policy statements, changes in regime. In data: look at second moment of surveys

From that literature learned that:

- Shocks raise disagreement temporarily
- Policy communication lowers disagreement that results from the shock
- Regime changes that raise transparency can permanently lower disagreement
- So, need model where disagreement is endogenous
Disagreement in the current model

Equations:

\[ V_t = \int \left( E_{i,t}(z_{t+1}) - \int E_{i,t}(z_{t+1}) di \right)^2 di \]

No shocks, so stay forever in steady state

- Disagreement is constant: does not depend on \( \varepsilon_t \).
- Communication makes no difference: does not depend on \( r \).
- Transparency regime switch: raises disagreement as blow-up differences, lower \( \lambda \).
Disagree constructively

Modified model (still very parsimonious)

• Fraction $\theta$ knows current state, makes unbiased forecasts of future:

$$\mathbb{E}_t^I (z_{t+1}) = \rho z_t$$

• Fraction $1 - \theta$ looks just like the Angeletos-Huo-Sastry agents

• Added one parameter (had subtracted one earlier)

• In literature this is: neoclassical model; canonical imperfect information model

Law of motion for disagreement:
Disagree constructively

Law of motion for disagreement:

\[(1 - \hat{\lambda})^2 V_t = \theta (1 - \theta) \hat{\lambda}^2 r^2 \varepsilon^2_t + (1 - \theta)(\hat{\rho} - \hat{\lambda})^2\]

Predictions:

- Disagreement varies over time and is affected by shocks: it follows an AR(2) after a shock \(\varepsilon_t\).
- Policy communication lowers disagreement: lower \(r\) lowers disagreement on impact and in the steady state.
- Transparency regime switch: lower \(\lambda\) but higher \(\theta\) will lower disagreement.
Conclusion

YES, BUT, WE DISAGREE