HIGHER-ORDER INCOME RISK OVER THE BUSINESS CYCLE

Christopher Busch\textsuperscript{a}    Alexander Ludwig\textsuperscript{b}

\textsuperscript{a}Universitat Autònoma de Barcelona, MOVE, Barcelona GSE

\textsuperscript{b}Goethe University Frankfurt, CEPR

CBMMW, Oct 8, 2020
Motivation

- **Idiosyncratic income risk** important:
  - Welfare
  - Individual choices and macro aggregates
  - Design of tax and transfer policies
  - ...

- Modelling benchmark: shocks with Normal distributions

- Recent **empirical work**: deviations from ‘Normality’

⇒ Question: does this matter?
This paper

1. Characterize idiosyncratic income risk over business cycle

2. Show higher-order risk matters for:
   
   - Welfare: losses for strong risk attitudes
   - Costs of cycles: higher for strong risk attitudes
   - Self-insurance: worse even though more precautionary savings
Approach

1. PSID: Household income risk over business cycle
   - Residual income (pre- and post-government)
   - Parametric approach: GMM estimation

2. Macroeconomic implications
   - Life-cycle model, exogenous income

3. Intermediate steps
   - Intuition with simple model
   - Transparent shock discretization method (moment-based)
Summary of Empirical Findings

- GMM estimator of $2^{nd}–4^{th}$ moments of transitory and (cyclical) persistent component of income process

- US (PSID) household income:
  - Variance of persistent shocks countercyclical
  - Skewness of persistent shocks procyclical
  - Highly leptokurtic shocks

- Role of government taxes and transfers?
  - Dampen shocks
  - Reduce left-skewness of persistent shocks
  - Increase kurtosis of persistent shocks
2nd Moment Shock: Symmetric Risk?

\[ y_{t+1} - y_t \]

![Density vs. Expansion](image)
2nd Moment Shock: Symmetric Risk?

The figure shows the density of \( y_{t+1} - y_t \) for expansion and recession periods. The graph compares the distribution of income changes during expansion (blue) and recession (red) phases of the business cycle.
3rd Moment Shock: Asymmetric Risk?
3rd Moment Shock: Asymmetric Risk?

Busch & Ludwig (U Autònoma de Barcelona & Goethe U): Higher-Order Income Risk over the Business Cycle
Overview of Quantitative Model

- J-period lived households
- Working and retirement phase, retirement at age $j_r$
- Endowments:
  - Exogenous: estimated income process; discretized
  - Different scenarios of shock distributions
  - Zero borrowing constraint
- Across Scenarios: Pension budget clears
- Preferences: Epstein-Zin-Weil: RA $\theta$ and IES $\gamma$
  - Risk attitudes matter for effect
  - Here: $\theta$ pins those down
Summary of Macroeconomic Implications

Left-skewed and Leptokurtic Distribution vs. Normal Distribution

- (Cyclical) higher-order risk welfare implications:
  - $\theta = 1$: welfare gain of approx. 0.4%
  - $\theta = 4$: welfare losses of approx. 12.5%

- Quantitatively relevant for welfare costs of business cycles:
  - For $\theta = 1$, welfare cost of fluctuations lower by 0.2%
  - For $\theta = 4$, welfare cost of fluctuations larger by 6.4%

- Worse consumption insurance
  - More savings out of positive shocks
  - Negative shocks pass through more
  - Give higher “insurance coefficient” (a la Blundell, Pistaferri & Preston 2008) → Careful in interpreting coefficient!

- Robust to GE, CRRA