

# Which idiosyncratic risk matters for business cycles?

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# Idiosyncratic Risk in Macroeconomic Models

- Idiosyncratic risk lies at the core of stochastic heterogeneity in macroeconomic models: agents are ex ante identical but become heterogeneous after being hit by uninsurable idiosyncratic shocks.
- Intuitively, idiosyncratic risk captures several dimensions of the individual risk faced by households: unemployment, sickness, climate hazard...
- In HANK models, idiosyncratic risk serves as a practical mechanism for generating a realistic wealth distribution.
- However, does idiosyncratic risk act as an independent driver of business cycles, or is it merely a device to induce agent heterogeneity?

# The Research Question

- Beyond its role in shaping inequality across agents, idiosyncratic risk generates precautionary savings in incomplete-markets models.
- Through precautionary savings, idiosyncratic risk can therefore affect aggregate demand, even when agents are not financially constrained.
- A standard result in the literature is that procyclical risk dampens aggregate fluctuations, whereas countercyclical risk amplifies them (Acharya and Dogra, 2020; Bilbiie, 2025).
- This paper aims to quantify this channel and to assess the importance of precautionary savings induced by idiosyncratic risk for business-cycle dynamics.

# Idiosyncratic Risk in HANK Models

There are three main approaches to modeling idiosyncratic risk in HANK models:

- Idiosyncratic shocks to individual labor productivity are the primary source of heterogeneity in “canonical” HANK models.
- Unemployment risk in HANK&SaM models.
- The risk of becoming hand-to-mouth, as in Bilbiie (2025).

# Which Idiosyncratic Risk?

Choosing a particular form of idiosyncratic risk is not innocuous, as it shapes the resulting precautionary savings. For instance:

- In HANK&SaM models, precautionary savings are tied to fluctuations in unemployment risk.
- In the model of Bilbiie (2025), precautionary savings depend on the marginal-utility gap between savers and hand-to-mouth agents and therefore also on redistribution policies.

For the purpose of this paper, the model is designed to be agnostic about the underlying source of idiosyncratic risk, capturing only its cyclical properties.

This paper contributes to the growing literature examining the ability of HANK models to replicate macroeconomic time series while simultaneously matching data on inequality, individual risk, and MPCs.

- Standard HANK models: Auclert et al. (2020) and Bayer et al. (2024).
- HANK&SaM models: Challe et al. (2017) and Cho (2023).
- Standard or augmented TANK models: Albonico et al. (2024) and Bilbiie et al. (2023).

This paper is also closely related to Berger et al. (2023), who estimate the effects of idiosyncratic risk on business cycles using a wedge-accounting approach.

- Estimate a medium-scale HANK model in which the effects of idiosyncratic risk on precautionary savings can be isolated and quantified.
- The model builds on Acharya and Dogra (2020) and features an environment in which only the precautionary saving motive is operative (i.e., no borrowing constraints). Two assumptions are central to this HANK economy:
  - 1 CARA preferences instead of CRRA.
  - 2 Normally distributed idiosyncratic shocks.
- Together, these assumptions allow for the derivation of a closed-form solution for the aggregate Euler equation:

$$C c_t = C \mathbb{E}_t c_{t+1} - \frac{1}{\gamma} \tilde{r}_t - \underbrace{(\gamma \mu^2 \tilde{\sigma}^2 \mathbb{E}_t \hat{\mu}_{t+1} + \varphi \gamma \mu^2 \tilde{\sigma}^2 Y \mathbb{E}_t y_{t+1})}_{\text{Wedge}}$$

and for the aggregate MPC,  $\hat{\mu}_t$ :

$$\hat{\mu}_t = \frac{1}{R} (\tilde{r}_t + \mathbb{E}_t \hat{\mu}_{t+1})$$

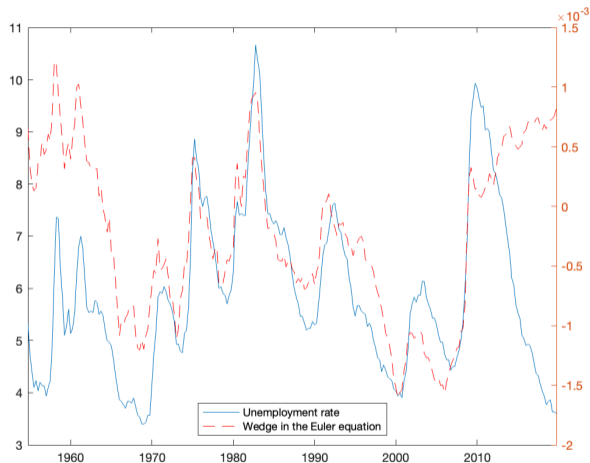
# Data and Estimation Procedure

- The data and estimation procedure follow standard practice in the DSGE literature.
- The model is estimated using quarterly U.S. data on GDP, consumption, investment, hourly compensation, the federal funds rate, hours worked, and inflation measured by the GDP deflator.
- The sample spans from 1954 to 2019 (i.e., up to the onset of the COVID-19 pandemic). The dataset is the same as in Bayer et al. (2024), facilitating direct comparison with their results.
- The model is estimated using Bayesian methods and includes seven aggregate shocks: TFP, price and wage markups, investment technology, monetary policy, government expenditures, and a risk-premium shock.

- The estimation results point to strongly countercyclical idiosyncratic risk.
- Despite not targeting any measure of individual risk, the estimated wedge displays realistic dynamics over the past decades.
- The heterogeneous-agent model outperforms its representative-agent counterpart by a sizable margin, suggesting that idiosyncratic risk matters at the aggregate level.
- The model also outperforms a TANK model, indicating that the precautionary saving motive is at least as important as high MPCs for business-cycle dynamics.
- Moreover, the model achieves a better data fit than the HANK model of Bayer et al. (2024).
- Precautionary savings play a crucial role for supply shocks: the strong attenuation of investment responses leads to a corresponding attenuation of output responses relative to the representative-agent benchmark.

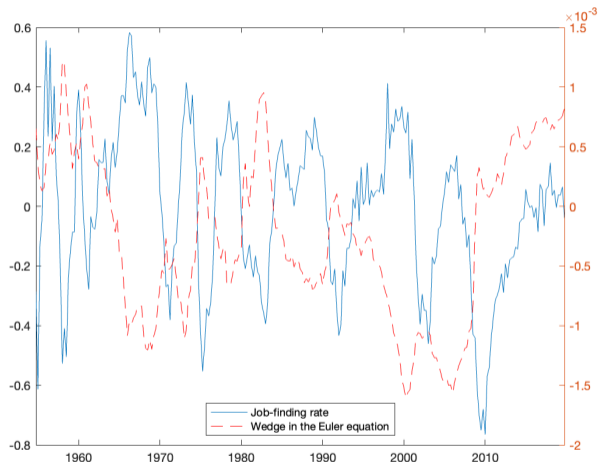
# Graphs

# The estimated wedge and the unemployment rate



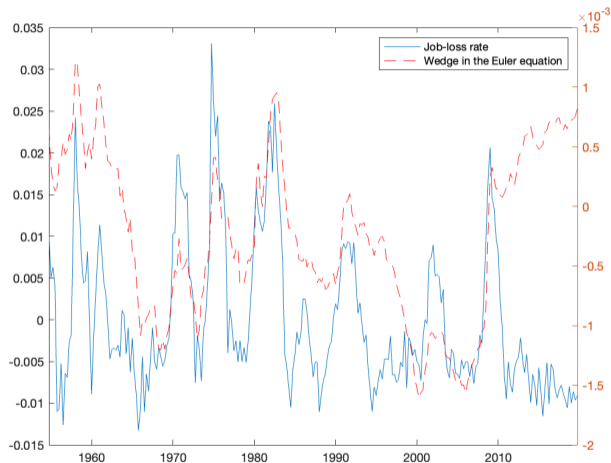
The correlation is 0.4. From 1968 to 2013, it is 0.86.

# The estimated wedge and the job-finding rate



The correlation is  $-0.39$ . From 1968 to 2013, it is  $-0.54$ .

# The estimated wedge and the job-loss rate



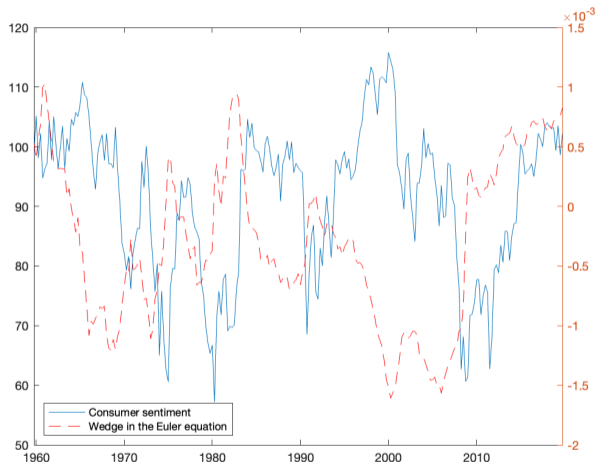
The correlation is 0.24. From 1968 to 2013, it is 0.51.

# The estimated wedge and income idiosyncratic risk (Bayer et al., 2019)



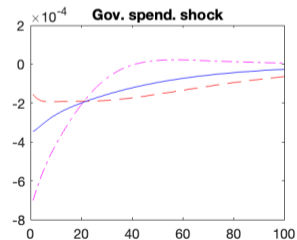
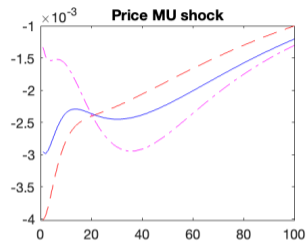
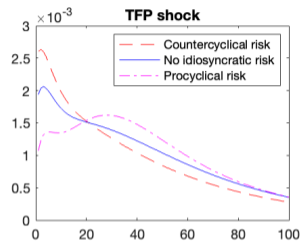
The dataset spans from 1983 to 2013. The correlation is 0.28.

# The estimated wedge and consumer sentiment

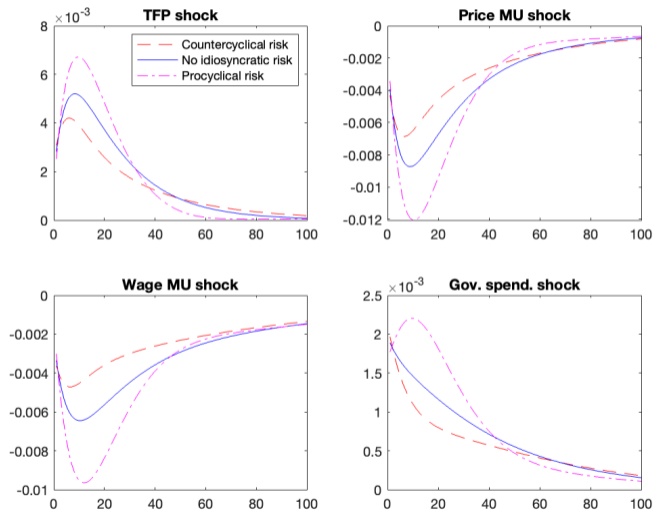


The dataset spans from 1959Q4 to 2019Q4. The correlation is  $-0.23$ .

# Estimated response functions of consumption



# Estimated response functions of output



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