Discussion: Habits and Leverage

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Background

- **External habit model:** Combell and Cochrane(1999), Menzly, Santos and Veronesi(2004) (MSV hereafter)
  - Key channel: time-varying discount rate

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  - Key channel: time-varying discount rate
- Success on explaining aggregate stock market
  - High equity premium, volatile stock return
  - Procyclical and persistent variations in price-dividend ratio
  - Return predictability
  - Match conventional moments on the consumption side.

This Paper

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- Implications:
  - Aggregation property: Maintain the success of MSV.
  - Main focus: Rich heterogeneity: trading, leverage, risk sharing, wealth distribution

Model Setup

- Investors have heterogenous wealth shares (w_i) and external habit preferences:

$$u\left(C_{i,t}, X_{i,t}, t\right) = e^{-\rho t} \log\left(C_{it} - \psi_{it} D_t\right)$$

- Agent-specific habit multiplier factor:

$$\psi_{it} = \frac{a_i Y_t + b_i}{Y_t}$$

- Exogenous process:
  - Endowment dynamics:

$$\frac{dD_t}{D_t} = \mu_D dt + \sigma_D\left(Y_t\right) dZ_t$$

  - The recession indicator, Y_t, follows:

$$dY_t = \kappa\left(\overline{Y} - Y_t\right) dt - \nu Y_t \left[\frac{dD_t}{D_t} - \mu_D dt\right]$$

Model Setup

- Effective risk aversion (RRA):

$$\begin{aligned} Curv_{it} &= -\frac{C_{it}u_{cc}\left(C_{it},X_{it},t\right)}{u_c\left(C_{it},X_{it},t\right)} \\ &= 1+\frac{a_i\left(Y_t-\lambda\right)+\lambda-1}{w_i\overline{Y}-a_i\left(\overline{Y}-\lambda\right)-\lambda+1} \end{aligned}$$

- Higher endowment share w_i, and/or lower habit sensitivity $a_i \Longrightarrow$ lower RRA, higher risk tolerance
- Agents have different sensitivity to changes in Y_t, through a_i

Model Setup

- Risk sharing rule:

$$\tau_{it} = C_{it} - w_i D_t = -\left(w_i - a_i\right)\left(1 - \frac{\overline{Y}}{Y_t}\right) D_t$$

- Low risk tolerance agents $\left(w_i - a_i < 0\right)$
  - receive transfer $\tau_{it} > 0$ in bad times $\left(Y_t > \overline{Y}\right)$;
  - provide transfer $\tau_{it} < 0$ in good times $\left(Y_t < \overline{Y}\right)$.
- High risk tolerance agents $\left(w_i - a_i > 0\right)$ insures low tolerance agents.
- Special case: if $\nu = 0$, then $\tau_{it} = 0$.
  - Habits are the key to deliver the time varying risk sharing.

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- **Leverage**:
  - Procyclical debt-to-output ratio, countercyclical debt-to-asset ratio
  - High aggregate leverage $\rightleftharpoons$ high pd, low $E_t(r)$, low $Vol_t(r)$, contemporaneous consumption boom and lower future consumption growth for levered agents.
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- **Endogenous wealth dynamics and wealth dispersion.**

Comments

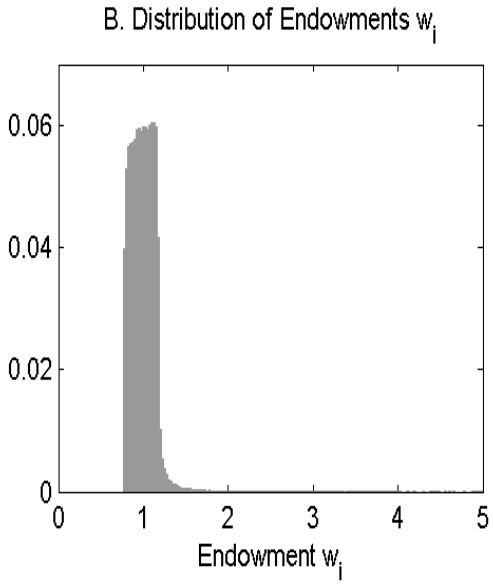
Roadmap

- Rich heterogeneity is the main contribution: trading, leverage and risk sharing among heterogenous agents.
- Main comments:
- Target the heterogeneity to the micro data
- Demonstrate quantitative importance of this frictionless channel.

Comment I

Wealth Distribution

- Unconditional distribution of wealth in the model (figure 2, panel B):

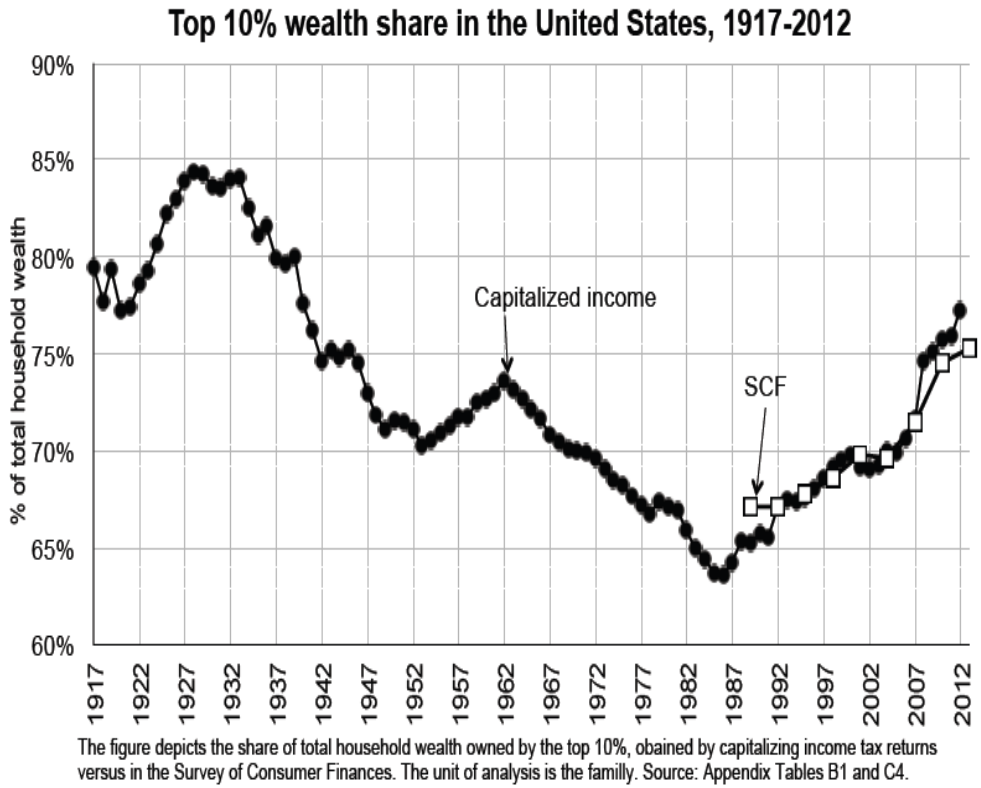


- Saez and Zucman (2015): About 72% of net household wealth are held by top 10% (Sample 2000-2012).
- The wealth inequality in the model seems **too small**.

Comment I

Wealth Distribution

- Saez and Zucman (2015): Figure 6, top 10% wealth share in U.S.
- Significant time-variation, low frequency secular trend



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Wealth Distribution

- In the model, the wealth share:

$$\frac{W_{it}}{\int_j W_{jt} dj} = a_i + (w_i - a_i) \frac{(\rho + k)\,\overline{Y}/Y_t}{\rho + k\overline{Y}/Y_t}$$

- At the steady state:

$$\frac{\overline{W}_i}{\int_j \overline{W}_j dj} = w_i$$

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- A procedure to identify the distribution of w_i and a_i
  - Choose w_i to match the unconditional wealth distribution
  - Choose a_i to match the time variations of the conditional distribution

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- In the model, wealth share only depends on single variable Y_t, difficult to match the low-frequency secular trend.

Comment I

Consumption Distribution

- Consumption rule:

$$s_{it} = \frac{C_{it}}{D_t} = a_i + (w_i - a_i) \frac{\overline{Y}}{Y_t}$$

- We could also identify the distribution of w_i and a_i through individual consumption data.

Comment II

Identity

- The paper considers the levered agents as the intermediary.
- Equivalently, the household sector is a hybrid of household and intermediary.
- But the model calibration suggests levered agents consistent of
  - very poor people with low habit sensitivity, low w_i and a_i
  - very wealthy people, high w_i
- Map the model to the real world:
  - Who are $w_i - a_i > 0$ agents?
  - Who are intermediary?

Comment III

Model Comparison and Policy Implications

- Li (2016): Lucas economy + financial intermediary (debt financing constraint)
- Augmented SDF to price the stock market:

$$\widetilde{M}_{t+1} = M_{t+1} \frac{(1-\lambda) + \lambda \mu_{t+1}}{\mu_t}$$

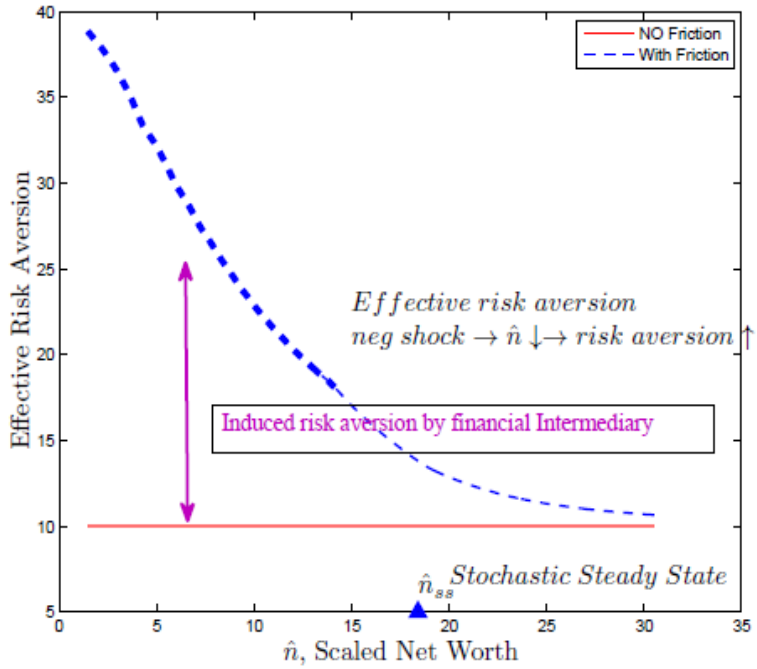
  - Marginal value of the net worth of the financial intermediary.

Comment III

Model Comparison and Policy Implications

- Effective risk aversion is countercyclical, dispite the economy is driven by i.i.d. homeskedastic consumption growth shock.

Figure 3 : Effective risk aversion as a Function of Scaled Net Worth, $\hat{n}$



Comment III

Model Comparison and Policy Implications

- Observational equivalence in various dimensions:

	This paper	F.I. Model
time-varying RRA	Yes	Yes
procyclical book lev.	Yes	Yes
counercyclical mkt. lev.	Yes	Yes
lev. risk is priced factor	Yes	Yes
return predictability	Yes	Yes
time-varying asset vol	Exogenous	Endogenous
persistent pd ratio	Yes	Yes

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Model Comparison and Policy Implications

- Quote "*Our point here is not to claim that these frictions [i.e. financial frictions] are not important but simply to offer an alternative explanation that is consistent with complete makets and that matches what we know from the asset pricing literature.*" [page 4 of the paper]

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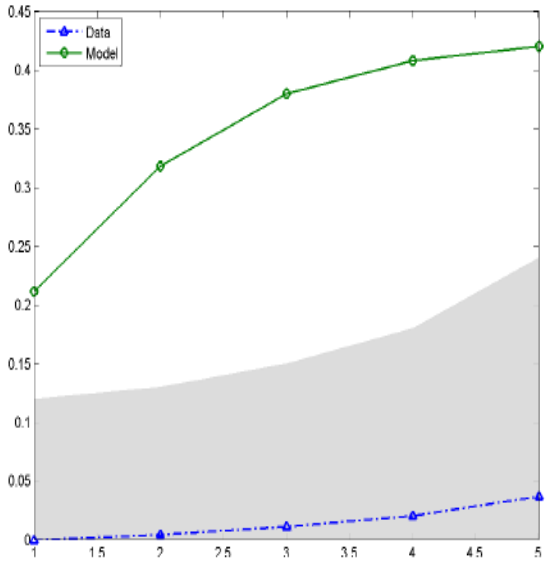
- But two models have **different policy implications** in financial crisis.
- Important to show quantitative relevance of this *frictionless* channel.
- Suggestions: target unique features in the heterogeneity to data.
  - Trading behaviors, wealth distribution, risk sharing and consumption distribution
  - Need more empirical work here.

Comment IV

Forward v.s. Backward Looking

- A general question for the external habit model.
- In habit model, asset pricing is backward looking.

Fig. 12: Price-dividend Ratio and Backward Consumption Growth



This figure plots the R^2 for regressing future log price-dividend ratio onto distributed lags of consumption growth:

$$p_{t+1} - d_{t+1} = \alpha_0 + \sum_{j=1}^{L} \alpha_j \Delta c_{t+1-j} + u_{t+1}$$

Conclusive Remarks

- A new workhorse model
  - Frictionless: complete market, no other frictions
  - Aggregation property and model tractability
  - Maintain the success of asset pricing on the aggregate
  - Rich heterogeneity: risk sharing, trade, leverage and wealth dynamics/dispersion

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  - Aggregation property and model tractability
  - Maintain the success of asset pricing on the aggregate
  - Rich heterogeneity: risk sharing, trade, leverage and wealth dynamics/dispersion
- Major comments:
  - Bring the heterogeneity to the micro level data
  - Establish the quantitative relevance of the model mechanism

Comment V

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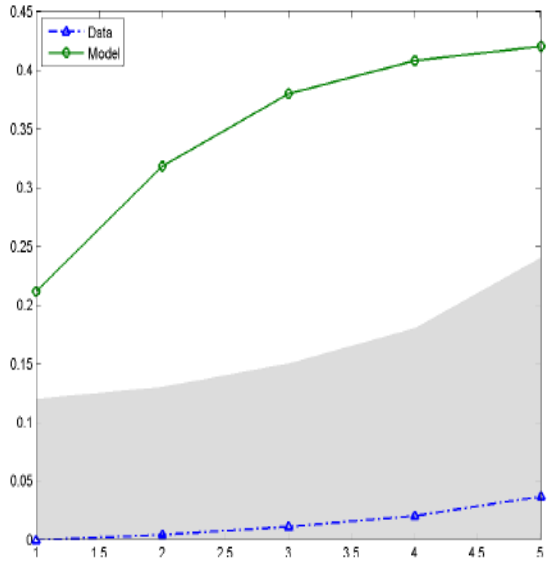

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