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Asset Pricing with Consumption Frictions

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ROLE OF (CONSUMPTION/INVESTMENT) FRICTIONS

Simple macro-finance models predict asset prices that are too smooth and quantities that are too volatile.

- production (Q-theory) $\Longrightarrow$ introduce investment adjustment costs
- intermediation (financial constraints) $\Longrightarrow$ restrict ability to refinance
- consumption (marginal utility) $\Longrightarrow$ introduce 'consumption frictions'

The purpose of these consumption frictions is to make the SDF of the effective marginal investor

- **volatile**, in order to amplify risk premia
- **not very predictable**, to stabilize risk-free rates
- vis-à-vis a **non-volatile aggregate consumption growth rate**

What are the microfoundations for these frictions?

HABITS

Habit formation provide a way how to 'lever' marginal utility of consumption.

- habit is a smoothed average of past consumption
- consumption fluctuations relative to the habit level are much more volatile
- Campbell and Cochrane (1999) design the habit process to make interest rates constant (see also Wachter (2006))

This paper aims at providing a deeper model of habits (consumption commitments), while preserving tractability.

Aggregate endowment

$$dy_t/y_t = \mu dt + \sigma dB_t$$

Markets: claim S_t on y_t, infinitesimal risk-free asset

Preferences

$$V(c_A, c_F) = E\left[\int_0^\infty e^{-\delta t}\left\{w\left(u\left(c_{F,t}\right)dt - \alpha du_t^+ - \beta du_t^-\right) + (1-w)\,u\left(c_{A,t}\right)dt\right\}\right]$$

Individual decision problem

$$\max_{c_A, c_F, N^S, N^B} V(c_A, c_F)$$

$$\text{s.t. } dW_t = N_t^S\left(y_t dt + dS_t\right) + n_t^B dR_{f,t} - \left(c_{A,t} + c_{F,t}\right)dt,\ W_0 = S_0$$

MODEL SOLUTION

Solution features an inaction region $(\underline{c}, \bar{c})$ for $c_{F,t}/y_t$ on which $c_{F,t}$ is constant.

- given linear technology between frictional (F) and adjustable (A) goods, the SDF is determined by the marginal utility of $c_{A,t}$.
- $c_{F,t}$ serves as a way to lever $c_{A,t}$ $\implies$ increased volatility increases risk premia

Boundaries need to be treated carefully.

- singular action in adjusting F leads to 'infinite' expected growth rate over an infinitesimal time period.
- infinitesimal interest rates are infinite during these periods.

In the model, $\mathcal{A}_t = c_{A,t}/y_t$ is stationary, so long-term pricing must be the same whether we use $u'(c_{A,t})$ or $u'(y_t)$ as an input to the SDF.

- Hansen and Scheinkman (2009) decomposition

$$\frac{S_{t+T}}{S_t} = \underbrace{e^{\rho T}}_{\text{trend}} \underbrace{\frac{\psi(\mathcal{A}_{t+T})}{\psi(\mathcal{A}_t)} M\left(\frac{y_{t+T}}{y_t}\right)}_{\substack{\text{stationary} \quad \text{martingale}}}$$

- stationary part irrelevant for long-term pricing

$$\frac{1}{T}\log E_t\left[\frac{S_{t+T}}{S_t}\frac{y_{t+T}}{y_t}\right] \approx \frac{1}{T}\log E_t\left[e^{\rho T} M\left(\frac{y_{t+T}}{y_t}\right)\frac{y_{t+T}}{y_t}\right]$$

Recursive utility can change this (example from Borovička, Hansen and Scheinkman (2016))

- stationary consumption (say $\mathcal{A}_t$) generates a martingale in the Epstein and Zin (1989) SDF with $IES = 1$

$$\frac{S_{t+1}}{S_t} = e^{\rho}\left(\frac{\mathcal{A}_{t+1}}{\mathcal{A}_t}\right)^{-1} \underbrace{\frac{V(\mathcal{A}_{t+1})}{E_t[V(\mathcal{A}_t)]}}_{\text{martingale}}$$

CALIBRATION

Key reason for deeper microfoundations is to provide new calibration targets.

- ideally, we should calibrate to micro-level features of consumption
- for example, CEX consumption data

Paper balances tractability and micro-level features.

- utility cost specification preserves homotheticity, $c_{F,t}/y_t$ a single state variable
- at the same time, utility costs cannot be directly measured, unlike other frictions, say, menu costs

TASKS AND CHALLENGES FOR CONSUMPTION MEASUREMENT

1) Identification of *A* and *F* consumption

- introspection of consumption categories or a formal way of identifying the two consumption types
- sometimes authors conflate *F* consumption and total consumption (e.g., applying excess smoothness or income shock sensitivity findings to *F* consumption instead of aggregate)

2) Level of aggregation at which adjustment costs play a role

- inaction region for 'consumption commitments are plausible, but perhaps at the level of individual goods, not the agent's whole *F* bundle

3) Time aggregation

- consumption bursts at boundaries are infinitesimal, but consumption data is monthly at best.

SOME MORE THOUGHTS

4) The economy in the current paper is efficient, no role for policy.

- Authors mention interest rate behavior during Asian financial crisis but the mechanism was quite different.
- Perhaps the utility cost have a broader interpretation but then we need to rethink the microfoundation.

5) comparison with disaster risk models

- adjustments to consumption levels at the boundaries are still infinitesimal, perhaps a model with fixed (not flow) adjustment costs?

6) Model with more types of agents and shocks incredibly hard to solve.

- how can we embed such an (s, S)-type model into a more general environment?

7) It would be very useful to plot moments at a meaningful level of time-aggregation as a function of the state

- 3M consumption growth rate and volatility, 3M interest rate, price-dividend ratio, ..., together with the stationary distribution

SUMMARY

Elegant paper, with attention to detail.

- model is clearly and carefully executed
- smart choices preserve tractability

Paper would benefit from more focus on its specific advantages.

- perhaps this model is not sufficiently tractable to be incorporated in full macro-finance dynamics
- but its detailed comparison with data can teach us about ways how to calibrate reduced-form parameters in more tractable models, like habit models