Discussion of

Michael Gallmeyer, et al

“Term Premium Dynamics and the Taylor Rule"

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OBJECTIVE

Build a model consistent with the real consumption process that matches

A. The real term structure, in particular

1. The (upward) slope of the real yield curve

B. The nominal term structure, in particular

1. The (upward) slope of the nominal yield curve

2. The relative variances of long and short rates

STRATEGY

A. Construct an endowment economy with "state-dependent preferences"

B. Use a Taylor rule with persistent shocks

A. REAL TERM STRUCTURE

Endowment

$$\Delta c_{t+1} = (1-\phi_c)\theta_c + \phi_c \Delta c_t + \sigma_c \varepsilon_{c,t+1}$$

where $\Delta c_{t+1} \equiv \ln \frac{C_{t+1}}{Ct}$, and $\phi_c > 0 \quad (\approx .4146)$, $\varepsilon_{c,t+1} \sim NID(0,1)$

Preferences

$$E_0 \sum_{t=0}^{\infty} e^{-\delta t} \frac{C_t^{1-\gamma}}{1-\gamma} Q_t$$

where the preference shock evolves according to

$$\Delta q_{t+1} = a_t + (\eta_c \Delta c_t + \eta_v v_t)\Delta c_{t+1}$$

- a_t is chosen so that $E_t(Q_{t+1}/Q_t) = 1$,
- $v_{t+1} = \phi_v v_t + \sigma_v \varepsilon_{v,t+1}$
- $\varepsilon_{v,t+1} \sim NID(0,1)$ and $\{\varepsilon_{c,t+1}\} \perp \{\varepsilon_{v,t+1}\}$.

(Real) Stochastic Discount Factor

$$M_{t+1} = e^{-\delta}\left(\frac{C_{t+1}}{C_t}\right)^{-\gamma}\left(\frac{Q_{t+1}}{Q_t}\right)$$

$\therefore$ Q_t is a martingale and $\frac{Q_{t+1}}{Q_t}$ is a R-N derivative.

Taking logs

$$\begin{aligned} -\ln M_{t+1} &= \delta + \gamma\Delta c_{t+1} - \Delta q_{t+1} \\ &= (\delta - a_t) + (\gamma - \eta_c\Delta c_t - \eta_v v_t)\Delta c_{t+1} \end{aligned}$$

$\therefore$ we have an affine TS Model with $s_t = (\Delta c_t, v_t)$

- With these preferences, we can act as if the discount rate and coefficient of risk aversion are changing with the state. When $\eta_c < 0,$ risk aversion is countercyclical (high risk aversion in recessions/(period with low Δc_t)

Remarks about the real side of the model:

1. Nonstandard preferences are controversial.

Blanchard "The state of macro" (NBER WP 14259, Aug 2008)

> Attempts to explain these facts through exotic preferences...while maintaining the assumption of perfectly competitive markets and flexible prices, have proven unconvincing at best. This has led even the most obstinate new-classicals to explore the possibility that nominal rigidities matter.

Stigler and Becker "De Gustibus Non Est Disputandum" (AER, Mar 1977)

> We have surveyed four classes of phenomena widely believed to be inconsistent with the stability of tastes...
>
> Of course, this short list of categories is far from comprehensive: for example, we have not entered into the literature of risk aversion and risk preference, one of the richest sources of *ad hoc* assumptions concerning tastes.

2. How do the estimates in Figure 2

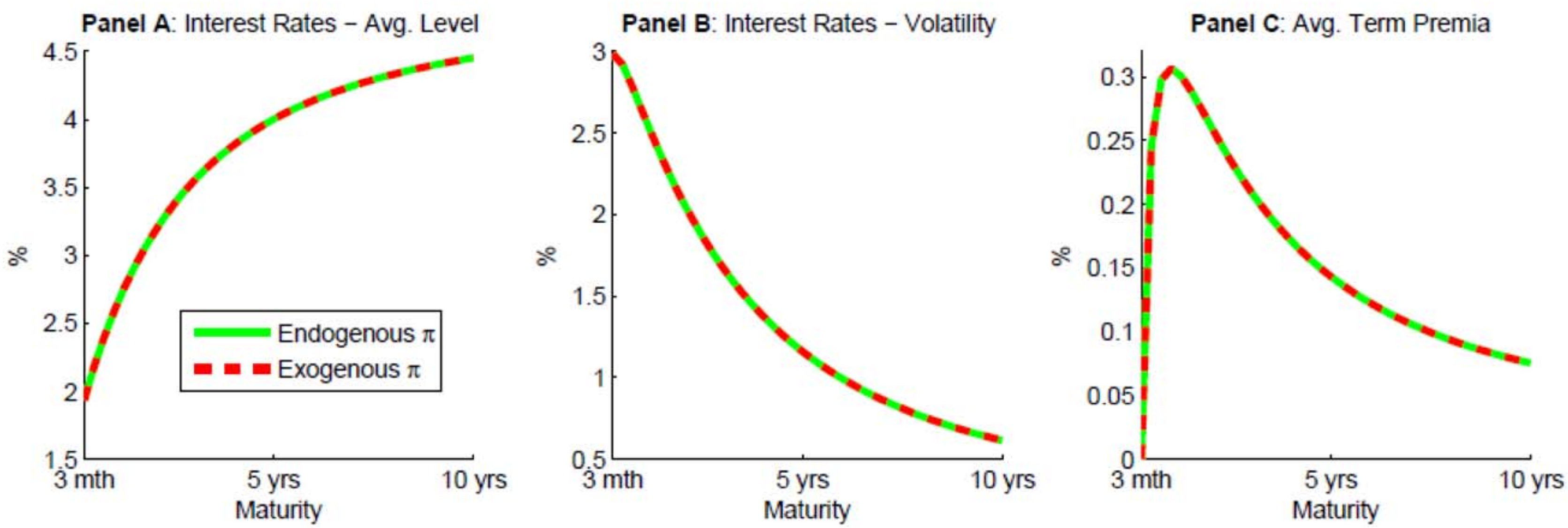

Figure 2: Real Interest Rate Properties - Exogenous and Endogenous Inflation

about the slope of the yield curve and the volatility of real long yields relative to short line up with TIPS?

3. Is the difficulty in explaining the upward sloping real yield curve with standard preferences just the equity premium puzzle (Xi'an Yang's UofT thesis)

4. Does the conditional mean of the SDF vary about the same as its conditional standard deviation (i.e., is $M_{t,t+1} \approx f(s_t)g(s_{t+1})$?)

5. Can you make Q a preference shifter for E-Z preferences so that time preference, risk aversion, and intertemporal substitution are state dependent?

Nominal Stochastic Discount Factor

$$M_{t+1}^{\$} = e^{-\delta}\left(\frac{C_{t+1}}{C_t}\right)^{-\gamma}\left(\frac{Q_{t+1}}{Q_t}\right)\left(\frac{P_{t+1}}{P_t}\right)^{-1}$$

α. Exogenous Inflation

$$\pi_{t+1} = (1-\phi_\pi)\theta_\pi + \phi_\pi \pi_t + \sigma_\pi \varepsilon_{\pi,t+1}$$

where $\varepsilon_{\pi,t+1} \sim NID(0,1)$ and ind. of all other shocks in the model.

This leads to an affine TS model with $s_t = (\Delta c_t, v_t, \pi_t)$

β. "Taylor Rule"

$$i_t = \overline{i} + i_c \Delta c_t + i_\pi \pi_t + u_t$$

$$u_{t+1} = \phi_u u_t + \sigma_u \varepsilon_{u,t+1}$$

where $\varepsilon_{u,t+1} \sim NID(0,1)$ and ind. of all other shocks in the model.

This leads to an affine TS model with $s_t = (\Delta c_t, v_t, u_t)$

- The Taylor rule leads to an inflation process of the form

$$\pi_t = \overline{\pi} + \pi_c \Delta c_t + \pi_v v_t + \pi_u u_t$$

Therefore, first differencing and using the equations of motion above

$$\Delta\pi_{t+1} = \lambda_0 + \lambda_1 \Delta c_t + \lambda_2 v_t + \lambda_3 u_t + \xi_t$$

where ξ_t is the sum of 3 MA(1) processes.

- Eliminating, say v_t, using the first equation, we get

$$\Delta\pi_{t+1} = \kappa_0 + \kappa_1 \pi_t + \kappa_2 \Delta c_t + \kappa_3 u_t + \xi_t$$

which we can compare with the exogenous inflation process

$$\Delta\pi_{t+1} = (1 - \phi_\pi)\theta_\pi + (\phi_\pi - 1)\pi_t + \sigma_\pi \varepsilon_{\pi,t+1}$$

Findings:

- Endogenous inflation process fits the data very well and provides a big improvement over the exogenous inflation process

- ***A policy experiment that increases the response of the spot rate to the rate of inflation helps explain the observed changes in the TS post-Volker

Remarks:

1. How am I supposed to think about the exogenous inflation process? Should it reflect what would happen in the absence of an interest rate targeting monetary policy rule? But what is that? Commodity money?

2. If we think of it as commodity money, then exogenous inflation process should have a positive correlation with economic activity (see Hume?). Does it make any sense to have an exogenous inflation process that doesn't respond to the real economy in some way?

3. It would help to sort this out so we could decide on the relative importance of the monetary authority (u_t) or the links between inflation and real economic activity that are driving the findings.

4. What is u_t and why is it so persistent $(\phi_u = .9982)$?

5. Upward sloping nominal term structure and volatile long rates were around before the Fed. I suspect that these facts are robust to monetary framework. If so, how important is the interest rate targeting framework?