Discussion of: Empirical and Policy Performance of a Forward-Looking Monetary Model

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Summary and Conclusions

- This is a well-motivated and ambitious paper

- Re-estimates a rather complex model - 16 parameters govern the endogenous dynamics and 16 the exogenous dynamics

- Deduces optimal policies and "simple" policies that work well among different parameter configurations

- Substantive warning about relying too heavily on producing the optimal rule for one parameter configuration

- Analysis is done with sufficient clarity to make focused criticism easy - this is a virtue

Investment and Asset Pricing

Following Christiano and Eichenbaum, the model features higher-order adjustment costs in investment.

Contributes two equations to the model.

Primitives

- Production

$$F(K_t, N_t, \eta_t)$$

- Capital evolution

$$K_{t+1} = G(I_t, I_{t-1}, K_t, \epsilon_t)$$

Carry along two objects. Stochastic discount factor $M_{t+1,t}$ and a co-state λ_t.

Constructed equations

Construct an equation for optimal investment, and an evolution equation for the co-state variable.

- Investment equation - P_t price of new investment goods

$$
\begin{aligned}
P_t &= \lambda_t G_1(I_t, I_{t-1}, K_t, \epsilon_t) \\
&+ E\left[M_{t+1,t}\lambda_{t+1}G_2(I_{t+1}, I_t, K_{t+1}, \eta_{t+1})|\mathcal{I}_t\right]
\end{aligned}
$$

- Co-state evolution

$$
\begin{aligned}
\lambda_t &= E\left[M_{t+1,t}F_k(K_{t+1}, N_{t+1}, \eta_{t+1})|\mathcal{I}_t\right] \\
&+ E\left[M_{t+1,t}\lambda_{t+1}G_k(I_{t+1}, I_t, K_{t+1}, \eta_{t+1})|\mathcal{I}_t\right]
\end{aligned}
$$

- Firm value - value the bundle (K_t, I_{t-1}). Exploit constant returns to scale to construct this.

Return to capital

Construct:

$$R_{t+1} = \frac{F_{k,t+1} + \lambda_{t+1} G_{k,t+1}}{\lambda_t}$$

From co-state evolution, we get the "pricing" equation:

$$E\left(M_{t+1,t} R_{t+1} | \mathcal{I}_t\right) = 1$$

Not the return to the firm. Value the bundle (K_t, I_{t-1}).

In this paper, nominal risk-free rate adjusted for expected inflation and an equity premium shock enter the co-state equation.

What is the model-based return to equity? What is the role of risk-adjustment? What is the equity premium shock?

Parameter Restrictions

- Use Bayesian language with reference to priors.
- Inputs are ranges of parameter values from other studies
- uniform prior within the range
- Comparison to Smets and Wouters via priors

Sources of Prior Information

1. Data from US used as input. Should parameters stay constant across locations?

2. Point estimate bounds sometimes used from other studies - how do these bound priors? Can the parameter values be transported?

3. At least one source comes from same data.

No direct use of micro-economic data and no direct attempt to use secular movements in the time series.

Why is this Bayesian Estimation?

- Find posterior mode of a high-dimensional function - maximum-likelihood estimate - no attempt to compute posterior pobabilities

- Bounds on parameter space no an immediate problem for a Bayesian approach, should prior mass be placed at some of the boundary?

- Looks like maximum likelihood estimation without inference.

Comparison to Previous Study

- Important comparison is to Smets and Wouters - Is there a local maximum near the Smets-Wouters estimates? How much deterioration is there in the likelihood?

- Identification - noted that $\bar{\pi}_t$ and η_t^R enter additively - Onatski-Williams estimates zero out η_t^R. Identification expected to be fragile. What drives the Onatski-Williams to one parameter configuration? Many others that are observationally similar.

- - Importance difference is the *equity - premium* shock. Achieves an *ad hoc* upper bound that is ten times that of Smets and Wouters. Would apparently go higher if it could. Variance decomposition?

Identification?

- Guess - shock processes are mutually independent - cross covariance is captured by the endogenous dynamics.

- Can something more formal be said?

Welfare Comparisons

Onatski and Williams argue that the differences between simple policies and optimal policies to be small using the relative movements in the objective function.

I am not sure what small means.