Discussion of Caballero & Simsek: "A Monetary Policy Asset Pricing Model"

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Motivation

Long-standing question: link between mon. policy, asset prices and real economy.

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This paper: a bit of the three.

> *In our model,* **monetary policy influences macroeconomic activity by changing aggregate asset prices** *(financial conditions). Thus, an optimizing Fed adjusts its policy tools to* **target the aggregate asset price per potential output that delivers future macroeconomic balance** *under its beliefs ("pystar")*

The Paper

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Solved **non-linearly in closed-form**: asset prices include a risk-premium.

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My focus: rigid prices and homogeneous beliefs.

Outline of discussion

I briefly discuss three topics:

1. The Model(s) - Bernanke & Gertler revisited
2. Beyond log utility: A "general" result
3. Financial wealth effects and "pystar" v.s. "rstar"

Benchmark Model - Households

I will include demand shock into households' preferences: $E_0 \left[\sum_{t=0}^{\infty} e^{-\left(\rho t + \sum_{s=0}^{t-1} \delta_s\right)} \log C_t \right]$

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$$C_t = \chi_t\left(D_t + K_t\right)$$

where $\chi_t \equiv \frac{1-\beta e^{\frac{1}{2}\sigma_\delta^2}}{1-\beta\left(e^{\frac{1}{2}\sigma_\delta^2}-e^{-\delta_t}\right)}$.

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In equilibrium:

$$Y_t = \frac{1-\beta e^{\frac{1}{2}\sigma_\delta^2}}{\beta\alpha} P_t e^{\delta_t} \quad \text{or} \quad P_t = \frac{\beta}{1-\beta e^{\frac{1}{2}\sigma_\delta^2}} \alpha Y_t e^{-\delta_t}$$

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Then, Fed should target p_t^* defined as

$$p_t^* = y_t^* - \hat{m} - \delta_t \quad \text{or} \quad (py)_t^* \equiv p_t^* - y_t^* = -\hat{m} - \delta_t$$

Benchmark Model - Market

Manager's objective:

$$\max_{\omega_t} E_t^M \left[\log\left(C_{t+1}\right)\right]$$

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Monetary rule? Targeting $\tilde{y}_t \equiv y_t - y_t^* = 0$ delivers FB. No deviation from BG.

Model with Lags

Suppose

$$C_t = \chi_t D_t + \eta (1 - \chi_t) C_{t-1} + (1 - \eta)(1 - \zeta) \chi_t K_{t-1} + (1 - \eta) \zeta \chi_t K_t$$

Paper: $\zeta = 0$

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Short comment:

- Impossibility of FB depends on C_t independent of K_t.
- Suppose $\zeta \in (0,1)$. In equilibrium:

$$P_t^* = \frac{\alpha}{(1-\eta)\zeta} \frac{1-\chi_t}{\chi_t} \left(Y_t^* - \eta Y_{t-1}^* \right) - \frac{1-\zeta}{\zeta} P_{t-1}^*$$

Undesirable? E.g., volatile asset prices generate financial stability risks.

Back to $\zeta = 0$. Imposing market clearing and log-linearizing:

$$y_t = (1-\eta)\hat{m} + \eta y_{t-1} + (1-\eta)\, p_{t-1} + \hat{\delta}_t$$

where $\hat{\delta}_t = (1-\eta)\,\delta_t$.

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If $\eta > 0$

$$(py)_t^* = -\frac{\eta}{1-\eta}\tilde{y}_t - \frac{1}{1-\eta}E_t^F\left[\left(\hat{\delta}_{t+1} - z_{t+1}\right)\right] - \hat{m}$$

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> *With inertia, in a demand recession the* **Fed realizes that the current weakness in economic activity will persist into the future**. *Therefore, the* **Fed overshoots asset prices upward to neutralize the future effects of current weakness**. *Conversely, in a demand boom, the Fed overshoots asset prices downward to neutralize the future effects of strong spending in the current period.* **The overshooting mechanism creates a seeming disconnect between the performance of the economy and the financial markets**, *but this disconnect is useful in closing the output gap.*

Monetary rule? Targeting $E_t^F[\tilde{y}_{t+1}] = 0$ delivers (constrained) optimal allocation. No deviation from BG.

- One can argue that targeting asset prices "easier" than *expected* output gap.
- **Alternative:** C_t depends on P_t but Fed doesn't like too much asset price volatility.

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Recap: Under optimal policy, asset prices reflect macro needs:

1. excess volatility to offset demand shocks
2. stabilize "financial" shocks (cash-flow news)
3. with implementation lags, disconnect between contemporaneous output gap and asset prices

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Many expressions special to log utility. Robustness?

Beyond log utility: A “general” result

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Households' problem:

$$\max E_0 \sum_{t=0}^{\infty} e^{-\rho t - \sum_{s=0}^{t-1} \delta_s} \frac{C_t^{1-\frac{1}{\sigma}}}{1-\frac{1}{\sigma}}$$

subject to

$$C_t + e^{-\varepsilon_t} B_{t+1} + P_t S_{t+1} \leq R_{t-1}^f B_t + (\alpha Y_t + P_t) S_t$$

Log-linearizing optimality conditions:, we get

$$c_t = E_t c_{t+1} - \sigma \left(i_t - \delta_t + \varepsilon_t - \rho \right) \implies r_t^* = \underbrace{\rho}_{\text{discount factor}} + \underbrace{\delta_t}_{\text{demand shock}} - \underbrace{\varepsilon_t}_{\text{risk premium shock}}$$

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Intertemporal budget constraint:

$$E_0 \sum_{t=0}^{\infty} \prod_{s=0}^{t-1} \frac{e^{-\varepsilon_s}}{R_s^f} C_t \leq \alpha Y_0 + P_0$$

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Log-linearizing:

$$E_0 \sum_{t=0}^{\infty} \beta^t c_t - \frac{\beta}{1-\beta} E_0 \sum_{s=0}^{\infty} \beta^s \left(i_s + \varepsilon_s - \rho \right) \leq \alpha y_0 + \frac{P}{Y} p_0$$

Recall Euler: $c_t = E_t c_{t+1} - \sigma \left(i_t - \delta_t + \varepsilon_t - \rho \right)$. Then

$$c_0 = (1-\beta) E_0 \sum_{t=0}^{\infty} \beta^t c_{t+1} - \sigma E_0 \sum_{t=0}^{\infty} \beta^t \left(i_t + \varepsilon_t - \rho \right) + \sigma \delta_0$$

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Plugging into IBC:

$$c_0 = (1-\beta) \left(\alpha y_0 + \frac{P}{Y} p_0 \right) + \sigma \beta \delta_0 - (\sigma - 1) \beta E_0 \sum_{s=0}^{\infty} \beta^s (i_s + \varepsilon_s - \rho)$$

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It is not just a consequence of log preferences! But if $\sigma \neq 1$, $\{i_t\}_{t=0}^{\infty}$ has independent effect.

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Still, optimal policy rule can target $y_t = y \ \forall t$. No deviation from BG.

Financial wealth effect & "pystar" v.s. "rstar"

Remark 1 *("pystar" vs "rstar"). The Fed's target aggregate asset price per potential output, "pystar," resembles the "rstar" in the textbook New Keynesian model – the interest rate that closes the output gaps. In our model, [...],* **monetary policy works through aggregate asset prices rather than through the short-term interest rate – the latter is simply the Fed's policy tool to achieve its target asset price**. *Therefore, our model makes more precise predictions for "pystar" than it does for "rstar" [...].*

Question: Is there a "financial wealth effect"? Is there a difference between "pystar" and "rstar"?

Simple two-period model

Household's problem:

$$\max \mathbb{E}_0 \left[\log C_0 + \beta \log C_1\right]$$

subject to

$$C_0 + B_0 \leq \alpha Y_0 S_0 + P_0 \left(S_0 - S_1\right), \quad \text{and} \quad C_1 \leq \alpha \tilde{Y}_1 S_1 + R_0^f B_0$$

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In equilibrium, P_0 disappears from budget constraints.

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Let $M_{0,1} \equiv \beta \frac{u'(C_1)}{u'(C_0)}$. FOCs:

$$1 = \mathbb{E}_0 \left[M_{0,1} R_0^f\right]$$

$$P_0 = \mathbb{E}_0 \left[M_{0,1} \alpha \tilde{Y}_1\right]$$

Since $C_1 = \alpha \tilde{Y}_1$ given, we have

$$u'(\alpha Y_0) = \beta R_0^f \mathbb{E}_0 \left[u'\left(\alpha \tilde{Y}_1\right) \right]$$

$$u'(\alpha Y_0) = \frac{\beta \mathbb{E}_0 \left[u'\left(\alpha \tilde{Y}_1\right) \alpha \tilde{Y}_1 \right]}{P_0}$$

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Interpretations:

- *py-star* view

$$Y_0^* = \frac{1}{\alpha\beta} P_0^*$$

Target P_0^*

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- *r-star* view:

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Still, objective is to stabilize output gap.

What if firms were private?

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Same equilibrium, no stock price but "shadow stock price:"

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We can write an intertemporal BC:

$$C_0 + \mathbb{E}_0\left[M_{0,1} C_1\right] \leq \alpha Y_0 + \mathbb{E}_0\left[M_{0,1}\alpha Y_1\right]$$

Self-promotion: Caramp & Silva (2023).

Conclusion

Very interesting ~~paper~~ agenda!

Understanding role of asset prices important independently of ultimately interpretation – proximate vs fundamental cause.

Message: Under optimal policy, asset prices might not reflect current or even future conditions but Fed's objectives.

Implementation lags and "opinionated" markets seem first-order problem for policymakers – I'd love to make a contribution to this literature!