An asset pricing model

Urban Jermann (1998) "Asset pricing in production economies" *Journal of Monetary Economics*, *41*, 257–275.

- real business cycle model
- consumption habits
- investment adjustment costs
- compares return on several securities
- log–linearizes RBC model + log normal formulas for asset pricing

Firms

The representative firm maximizes its value:

$$\mathcal{E}_t \sum_{k=0}^{\infty} \beta^k \frac{\mu_{t+k}}{\mu_t} D_{t+k}$$

with

$$\begin{aligned}
Y_t &= A_t K_{t-1}^{\alpha} \left(X_t N_t\right)^{1-\alpha} \\
D_t &= Y_t - W_t Nt - I_t \\
K_t &= (1-\delta) K_{t-1} + \left(\frac{a_1}{1-\frac{1}{\xi}} \left(\frac{I_t}{K_{t-1}} \right)^{1-\frac{1}{\xi}} + a_2 \right) K_{t-1} \\
\log A_t &= \rho \log A_{t-1} + e_t \\
X_t &= (1+g) X_{t-1}
\end{aligned}$$

Households

The representative households maximizes current value of future utility:

$$\mathcal{E}_t \sum_{k=0}^{\infty} \beta^k \frac{\left(C_{t+k} - \chi C_{t+k-1}\right)^{1-\tau}}{1-\tau}$$

subject to the following budget constraint:

$$W_t N_t + D_t = C_t$$

and with $N_t = 1$. Good market equilibrium imposes

$$Y_t = C_t + I_t$$

Interest rate

Risk free interest rate:

$$r_f = \frac{1}{\mathcal{E}_t\left\{\beta g^{-\tau}\frac{\mu_{t+1}}{\mu_t}\right\}}$$

where μ_t is the utility of a marginal unit of consumption in period t.

$$\mu_t = \left(c_t - \chi c_{t-1}/g\right)^{-\tau} - \chi\beta\left(g c_{t+1} - \chi c_t\right)^{-\tau}$$

Rate of return

Rate of return of firms

$$
\begin{aligned}
r_t &= \mathcal{E}_t\left\{a_1\left(g\frac{i_t}{k_{t-1}}\right)^{-\frac{1}{\xi}}\left(\alpha z_{t+1}g^{1-\alpha}k_t^{\alpha-1}\right.\right. \\
&\left.\left.+\frac{1-\delta+\frac{a_1}{1-\frac{1}{\xi}}\left(g\frac{i_{t+1}}{k_t}\right)^{1-\frac{1}{\xi}}+a_2}{a_1\left(g\frac{i_{t+1}}{k_t}\right)^{-\frac{1}{\xi}}}-g\frac{i_{t+1}}{k_t}\right)\right\}
\end{aligned}
$$