Comments on Adam, Marcet & Nicolini

Seppo Honkapohja

Asset Pricing: The Basic Model

- Lucas tree model in levels: a representative consumer solves

$$E_t^* \sum_{s=0}^{\infty} \beta^s \frac{C_{t+s}^{1-\gamma} - 1}{1-\gamma} \text{ subject to}$$

$$P_s S_s + C_s \;=\; (P_s + D_s) S_{s-1},$$

where C_s, S_s are consumption and stock holding at the end of period t. The market-clearing conditions are $S_s = 1$, $C_s = D_s$.

If agents know the dividend process, asset pricing satisfies

$$P_t = E_t^* \left(\beta \left(\frac{D_{t+1}}{D_t} \right)^{-\gamma} (P_{t+1} + D_{t+1}) \right).$$

- Assuming $\log(D_t)$ is $AR(1)$, we get a log-linearized model (or an exact model in the risk-neutral case):

$$\begin{aligned} p_t &= \beta E_t^* y_{pt+1} + \phi d_t \\ d_t &= \rho d_{t-1} + \varepsilon_{t+1}. \end{aligned}$$

where y_t is the asset price (or its log), d_t is the dividend (or its log) and ε_{t+1} is iid. (Here $\phi = (1 - \beta - \gamma)\rho + \gamma$.)

- The **fundamental solution** is given by

$$\bar{p}_t = \sum_{j=0}^{\infty} \beta^j E_t \phi d_{t+j}.$$

  ($\bar{p}_t$ is also MSV solution.) All other solutions are called **bubbles**. These are stationary if $|\beta| < 1$.
  The MSV solution can also be written as

$$p_t = \bar{\phi} d_{t-1} + \eta_t.$$

- E-stability holds.

- Garceles-Poveda and Giannitsarou (2007): learning helps only a little in resolving asset price puzzles:
  - Equity premium
  - Predictability of asset returns
  - High autocorrelation of the price-dividend ratio
  - Stock returns are about three times as volatile as dividend growth
  - Volatility clustering and occasional crashes.

Stock Prices with Dividend Growth

- Dividends evolve as

$$\frac{D_t}{D_{t-1}} = a\varepsilon_t,$$

where $\log(\varepsilon_t) \sim N(-\frac{s^2}{2}, s^2)$ is iid and $a > 1$.

- Agents have to forecast next period price and dividend.

- With iso-elastic utility, the basic AMN equation is

$$P_t = \beta E_t^* \left(\left(\frac{D_{t+1}}{D_t} \right)^\gamma P_{t+1} \right) + \beta E_t^* \left(\frac{D_{t+1}^\sigma}{D_t^{\sigma-1}} \right)$$

  and agents forecast as

$$E_t^* \left(\left(\frac{D_{t+1}}{D_t} \right)^\gamma P_{t+1} \right) = \delta_t P_t,$$

  so δ_t denotes risk-adjusted stock price growth. They may also need to forecast $E_t^* \left(\frac{D_{t+1}^\sigma}{D_t^{\sigma-1}} \right)$.

- The AMN analysis is very neat and delivers useful results. Likely to generate a lot of interest.

Comment/Question

- What if agents forecasts price-dividend ratio, which is closer to Mehra-Prescott? (see Honkapohja & Mitra 2005)

- Go back to basic equation:

$$P_t = E_t^* \left(\beta \left(\frac{D_{t+1}}{D_t} \right)^{-\gamma} (P_{t+1} + D_{t+1}) \right).$$

  Write this as

$$\frac{P_t}{D_t} = E_t^* \left[\beta \left(a\varepsilon_t \right)^{1-\gamma} \left(\frac{P_{t+1}}{D_{t+1}} + 1 \right) \right].$$

  The model has a multiplicative iid shock but is linear in P/D.

- One could do learning in this nonlinear model. E-stability condition would seem to be $\beta E\left(a\varepsilon_t\right)^{1-\gamma} < 1$.

- I do not know the value of this quantity. Under the calibration $\beta a < 1$ but close to 1. What is the value of $E(\varepsilon)^{1-\gamma}$?

- In any case, my guess is that $\beta E\left(a\varepsilon_t\right)^{1-\gamma}$ is close to 1, so we have a figure like the following. There is likely to be quite a bit of volatility under learning.

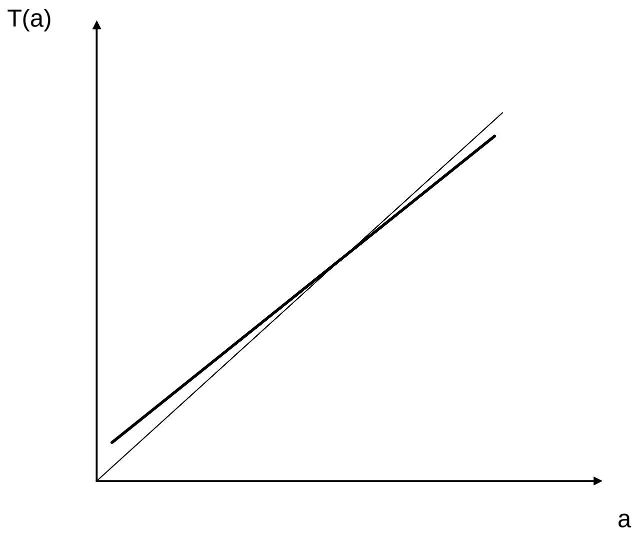

Figure 1:

Misc. comment

- Rational expectations present-value models can run into difficulties if agents are learning.
- Consider the AMN formulation, which is standard. Suppose agents are Bayesian econometricians and try to estimate the parameters of the distribution of the dividend growth.
- Pesaran, Pettenuzo and Timmermann (Er Reviews, 2007) show that Bayesian subjective present value can easily be infinite.
  - Weitzman, AER 2007 is a related paper.
- How do we think of asset pricing if present values are infinite?