Solutions to the Exercises of Chapter 2: An Open Endowment Economy

Exercise 2.1 (Consumption Innovations)

In the economy with AR(1) endowment shocks studied in section 2.2, we found that

$$E_t c_{t+1} = c_t$$

which means that

$$c_{t+1} = c_t + \mu_{t+1},$$

where μ_{t+1} is a white noise process that is unforecastable given information available in t. Derive the innovation μ_{t+1} as a function of r, ρ, and ϵ_{t+1}.

Answer:

$$\mu_{t+1} = \frac{r}{1+r}\rho\epsilon_{t+1}$$

Exercise 2.2 (An Economy with Endogenous Labor Supply)

Consider a small open economy populated by a large number of households with preferences described by the utility function

$$E_0 \sum_{t=0}^{\infty} \beta^t U(c_t, h_t),$$

where U is a period utility function given by

$$U(c_t, h_t) = -\frac{1}{2}\left[(\bar{c} - c_t)^2 + h_t^2\right],$$

where $\bar{c} > 0$ is a satiation point.

The household's budget constraint is given by

$$d_t = (1+r)d_{t-1} + c_t - y_t,$$

where d_t denotes real debt acquired in period t and due in period $t+1$, and $r > 0$ denotes the world interest rate.