Macroeconomics B
Problem set 2

This problem set will be collected at the beginning of the next class and marked. If you cannot make it to class you are advised to hand your solutions in before the deadline. No solution will be accepted after the deadline.

Assume throughout that consumers have infinite lives, maximiser a quadratic utility, discount the future at the subjective rate β and can freely borrow and lend at a constant riskless interest rate r, with $\beta(1+r) = 1$.

1. Suppose labour income follows the stochastic process

$$y_t = \bar{y} + \varepsilon_t - \delta\varepsilon_{t-1}, \tag{3}$$

with ε_t white noise.

Set up and solve the recursive problem to derive: (a) the consumption function; (b) the change in consumption in response to an innovation in labour income; (c) the saving function.

2. Suppose labour income follows the stochastic process

$$\Delta y_t = \lambda\Delta y_{t-1} + \varepsilon_t, \tag{4}$$

or, equivalently,

$$y_t = (1 + \lambda)y_{t-1} - \lambda y_{t-2} + \varepsilon_t \tag{5}$$

with $0 \leq \lambda < 1$ and ε_t white noise. (Hint: equation (5) is more useful to solve for the consumption function, while equation (4) is useful to obtain the response of saving to Δy_t.)

Set up and solve the recursive problem to derive the consumption and saving functions. Compare the response of saving to an income-growth innovation ε_t: (a) when $\lambda = 0$; (b) when λ tends to 1. Discuss the economics intuition in terms of saving-for-a-rainy-day.