

Econ 807: Macroeconomic Theory and Policy
Assignment 8: Asset Pricing Theory

Due Date: Wednesday, March 5, 2003.

1. Consider an economy consisting of a representative individual with preferences defined over time and state-contingent consumption:

$$U = u(c_1) + \beta E u(c_2).$$

The individual's (nonstorable) endowment in each period can take one of two values $\{y_L, y_H\}$, with $y_L < y_H$. Let $\theta = \Pr[y_2 = y_i \mid y_1 = y_i]$ for $i = L, H$. The joint probability density function over sequences of output is given by:

Outcome	Probability
y_L, y_L	$\frac{1}{2}\theta$
y_H, y_L	$\frac{1}{2}(1 - \theta)$
y_L, y_H	$\frac{1}{2}(1 - \theta)$
y_H, y_H	$\frac{1}{2}\theta$

- (a) Find the unconditional expectation of y_2 (i.e., $E[y_2]$).
 - (b) Assume that $\theta > 1/2$. Find the conditional expectations $E[y_2 \mid y_i]$ for $i = L, H$ and show that $E[y_2 \mid y_H] > E[y_2] > E[y_2 \mid y_L]$. Explain.
 - (c) Find the equilibrium price of a risk-free bond as a function of y_1 . How do bond prices vary with y_1 ? In answering this question, consider two extreme values for θ ; i.e., $\theta = 1/2$ and $\theta = 1.0$. Show that in the former case, bond prices are procyclical but that in the latter case they are acyclical. Explain.
2. For the economy described above, let $u(c) = \ln c$, $\beta = 0.90$, $\{y_L, y_H\} = \{4, 5\}$ and $\theta = 0.80$.
 - (a) Price the Arrow-Debreu basis securities as functions of y_1 .
 - (b) Compute the expected return on equity and the risk-free interest rate condition on y_1 .
 - (c) How does the risk-premium vary with y_1 ? Explain.