ECONOMICS 7344, Spring 2009
Bent E. Sørensen
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Midterm Exam 2, April 6—5 questions. All sub-questions carry equal weight except where otherwise indicated.

1. (24%) Consider the AR model

$$y_t \ = 100 \ + \ u_t \ + \ 0.2u_{t-1} \ + \ .4u_{t-2} \ .$$

Assume the PIH holds and y_t is stationary.
a) If $u_0 = 100$ what is ΔC_0?

b) If $u_0 = 100, u_{-1} = 90$, and $u_{-2} = 90$ what is $E_0 y_1$ and $E_0 y_2$?

c) Under the assumptions of question b, what $E_0 c_1 - E_{-1} c_1$?

2. (15%) a) Following the derivations we did in class (similar to those in the book), derive the relation that illustrates the equity premium puzzle.
b) Discuss the equity premium puzzle (you can get the points for this question without having done part a, but you need to be precise).

3. (21%) A consumer lives for 3 periods and earns 10$, period 1 and nothing in period 2. The consumer maximizes

$$U(C_1) + \frac{1}{1.1} E_1 U(C_2) + \frac{1}{1.21} E_1 U(C_3) \ ,$$

where

$$U(C) = \log C \ .$$

The consumer can freely borrow and lend at a known interest rate. The rate of interest is 10 percent.
a) Find the level of consumption in each period.
Assume now that the rate of interest changes from 10 percent to 21 percent.
b) Find the of consumption in each period.
c) Explain intuitively why the level of consumption changes as it does (you need to use the terms "income effect" and "substitution effect").

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4. (20%) Consider the Consumption CAPM-model.
a) Assume the world only have two outcomes ("states of the world"). Let X be an asset whose payout PO_X is 100 if "shine" a situation where consumption growth is 4 percent. "Shine" has probability 0.5. If "rain" the pay-out to the asset is 200 and consumption growth is 0, "rain" also has probability 0.5. Assume that the safe rate of interest is 1 percent.
a) What is the expected return ($\mathrm{E}R_X$) to an investment in X?
b) What are the possible returns R_X and their probabilities (in other words, what is the distribution of R_X).

5. (20%) Consider the CAPM-model.
a) Let X be an asset whose payout PO_X is 200 with probability 0.6 and 0 with probability 0.4. Assume that PO_X has a covariance with the market return (measured in percent) of 10 and that the variance of the market return is 20 (measured in percent). The expected rate of return of the market is 4 percent. Assume that the safe rate of interest is 2 percent.
a) What is the expected return ($\mathrm{E}R_X$) to an investment in X?
b) What is the price of asset X in the initial period?
Now assume that Y is an asset whose payout PO_Y is 400 with probability 0.6 and 0 with probability 0.4. Assume that PO_X has a covariance with the market return (measured in percent) of 20.
c) What is the expected return ($\mathrm{E}R_Y$). (Hint: you can provide the answer easily, if you consider the relation between the payout to X and the payout to Y.)