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ECONOMICS 7344—MACROECONOMIC THEORY II, part b, Spring 2020

Homework 3. April 1, due Thursday April 9.

1. (13% of the January 2015 exam) Assume that income follows the ARMA(1,1) process

$$y_t = 3 + \frac{1}{3}y_{t-1} + e_t + 2e_{t-1} \quad (*)$$

where e_t is white noise and $y_{-1} = 1, e_{-1} = 0$, and $e_0 = 4$.
Also assume that the rate of interest is $\frac{1}{3}$ (i.e., the net interest rate is 33.333 percent) and equal to the discount rate.
Further assuming that a given agent has quadratic preferences and can freely lend and borrow at the fixed interest rate.
A) (6%) What is the change in consumption from period –1 to period 0?
B) (7%) Assume the agents assets at the start of period 0 are 100 dollars. What is the level of consumption in period 0?

2. (20% of Midterm 1, 2016) Assume that a consumer has a utility function $U(C)$ where U is monotonically increasing and strictly concave. Assume that the consumer maximizes

$$\Sigma_{t=0}^{\infty}\beta^t\, U(C_t),$$

subject to a flow of known income y_t and initial wealth. Also assume that the interest rate is equal to the discount rate.
a) Show that consumption is constant over time.
b) Assume that $y_0 = 10$, $A_0 = 200$, and

$$y_t = 1.1\, y_{t-1}.$$

If the interest rate is 20% (implying that the discount factor $\beta = 1/1.2$), what is the level of consumption?

3. (20% of Midterm 1, 2016) a) Explain what is meant by "excess sensitivity of consumption."
b) Explain what is meant by "excess smoothness of consumption."
In either question, you have to be as explicit as was the coverage in class.

4. (20% of Midterm 2, 2016) This question is about the Campbell-Mankiw rule-of-thumb (rot) consumer model.

a) Write down the model and explain the content.
b) Assume that you have time series of data on (aggregate) income and consumption. Let y_t be income and c_t be consumption. Assume that income is well describe by a stationary AR(1) in differences and that the covariance between Δy_t and Δy_{t-1} is 0.5 while the variance of Δy_t is 1.0. Further assume that when you regress Δc_t on Δy_{t-1} you get a coefficient of 0.8.
Given these numbers, what is the estimated fraction of rot consumers in the Campbell-Mankiw model?