

**ECONOMICS 7344 – MACROECONOMIC THEORY II, part b, Spring  
2018**

Homework 2. March 21, due Wednesday March 28.

1. (20% of 2010 Final) Assume that an agent's wage income follows the AR(1) process

$$y_t = 300 + 0.5y_{t-1} + e_t \quad (*)$$

where  $e_t$  is white noise with variance 3.

Assume the agent's wage was 100\$ period 0.

- a) What is the agent's expected wages in period  $t$  (for any  $t > 0$ )?
- b) If the rate of interest is 10 percent and the PIH holds, what is the agent's level of consumption in period 0 assuming that his or her assets at the beginning of period 0 was 1000\$.

2. (15% of the January 2014 core exam) Assume that a representative agent's income follows a stationary AR(1) model with mean 0 and assume the PIH holds. Further assume that the agent's consumption satisfies

$$\Delta c_t = 0.2y_t - 0.12y_{t-1} .$$

- a) What is coefficients in the AR(1) model for income?
- b) What is the rate of interest?

3. (13% of the January 2015 exam) Assume that income follows the ARMA(1,1) process

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

where  $e_t$  is white noise and  $y_{-1} = 1, e_{-1} = 0$ , and  $e_0 = 3$ .

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. Assume the agents initial assets (in period  $-1$ ) are 1000 dollars.

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 1000 dollars. What is the level of consumption in period 0?