

**Advanced Macroeconomics**  
**Instructed by Xu & Yi**  
**Final Exam (Open-Book)**  
**Undergraduate Program in Economics, HUST**  
**Tuesday, June/26/2018**

**Name:** \_\_\_\_\_ **Student ID:** \_\_\_\_\_

1. ( $20' + 20' + 10' = 50$  points) Consider the Euler equation with uncertainty in your textbook:

$$\frac{1}{c_t} = e^{-\rho} E_t \left[ \frac{1}{c_{t+1}} (1 + r_{t+1}) \right]. \quad (5.23)$$

- (a) Recall the economic intuition leading us to the equation: Suppose sequence  $\{c_t, \ell_t\}_{t=0}^{\infty}$  solves the representative household's problem, if we change the sequence a little by transferring a very small amount of consumption between periods  $t$  and  $t + 1$  while making sure the budget constraint still hold (bindingly), the household should be indifferent between the sequence just created and the previous one. Apply the same intuition to the household's choice on the substitution between  $\ell_t$  and  $\ell_{t+1}$ , and construct a labor Euler equation.
- (b) It is mentioned in class that the labor Euler equation above could also be deduced by combining the consumption Euler equation (5.23) and the consumption-labor substitution equation (5.26). Prove it.
- (c) Now consider the following representation of the Euler equation:

$$\frac{1}{c_t} = e^{-\rho} \left\{ E_t \left[ \frac{1}{c_{t+1}} \right] E_t[1 + r_{t+1}] + \text{Cov} \left( \frac{1}{c_{t+1}}, 1 + r_{t+1} \right) \right\}. \quad (5.24)$$

It is often noticed that, procyclic (顺周期的) assets, such as stocks, tend to have higher expected returns than anticyclic (逆周期的) assets, such as insurances. How is this phenomenon related to the equation above?

**2.** ( $25' \times 2 = 50$  points) Consider the model depicted in Section 6.1 of your textbook.

Suppose now holding money seems more attractive: The central bank makes sure that, for each dollar held in period  $t$ , it becomes  $(1 + \xi)$  dollars in period  $t + 1$  (the central bank does make sure that  $\xi < i_t$  for any possible nominal interest rate level  $i_t$ ). Other parts of the model remain the same as in your textbook.

(a) Rewrite the wealth evolution equation (6.5).

(b) Rewrite the LM curves (6.9) and (6.10).