Advanced Macroeconomics

Instructed by Xu & Yi

Final Exam (Open-Book)

Undergraduate Program in Economics, HUST

Sunday, May/17/2020

Name: ______________________ **Student ID:**______________________

1. ($20' \times 5 = 100$ points)

(a) Recall the Inada conditions in chapter 1:

$$\lim_{k \to 0} f'(k) = \infty \ , \ \lim_{k \to \infty} f'(k) = 0. \tag{1}$$

It is said that if any of the two conditions above gets violated, there may not exist a *unique* steady state in the Solow model. Prove it either mathematically or using figure illustrations.

(b) Recall the Euler equation (2.21) in your textbook:

$$\frac{\dot{C}(t)}{C(t)} = \frac{r(t) - \rho}{\theta}. \tag{2}$$

It is said that the equation above is not really talking about the growth rate of consumption, but rather deals with the growth rate of *marginal utility.* Is this statement true or false? Explain your answer.

(c) Recall equation (3.41) in your textbook:

$$\pi(t) = \frac{1 - \phi}{\phi} \frac{\bar{L} - L_A}{\rho + BL_A} \frac{w(t)}{A(t)} \tag{3}$$

There is a typo（印刷错误）in the equation above. Find and correct it.

(d) Why are "natural experiment" scenarios important and useful in studying cross-country income differences?

(e) Recall equation (5.26) in your textbook:

$$\frac{c_t}{1-\ell_t} = \frac{w_t}{b}. \tag{4}$$

The equation above is derived from the instantaneous utility function

$$u(c_t,\, 1-\ell_t) = \ln c_t + b\ln(1-\ell_t).$$

Now suppose the instantaneous utility function becomes

$$u(c_t, 1-\ell_t) = \frac{[c_t^{\rho}(1-\ell_t)^{1-\rho}]^{1-\gamma} - 1}{1-\gamma}, \tag{5}$$

where $\rho \in (0,1), \gamma > 0$. How should equation (4) be rewritten accordingly?