Economic Dynamics

Makeup Midterm Examination

February 15, 2011

General instructions and marking policy

Several problems in Economic Dynamics are presented below. **You may answer in Japanese or English.** However, if you choose to use Japanese please take great care in writing kanji. Avoid using abbreviated kanji; the only one I know is the 3-stroke mongamae.

Use of notes, textbooks, dictionaries, and so on is prohibited. All calculations are simple, so the use of calculators is also prohibited.

Except for calculations, most of the problems can be completely answered within 3 lines. Many questions can be answered within 2 or 3 words. Below each problem ample space is provided. Please write your answers there. Graph paper is provided for graph problems. Please use it. In calculations, in addition to the result itself, please also write any equations used.

Problems

1. Explain what is meant by *convergence* in growth theory. Compare recent economic performance of Japan, South Korea, and North Korea as an examples of convergence or failure to converge.

2. The saving rate is *made constant* in Solow's growth model.

   (a) What assumption about the economy is implied by this?

   (b) This assumption is *false* in the real economy. Explain why.

   (c) Why do you think Solow made this assumption anyway?

3. Give the definition of *steady state* in dynamics. What is the equation defining steady state in the fishery model?

4. A company is growing trees to sell as materials to make wood products. The longer a tree grows, the more wood it contains, and the more revenue it brings. The company must decide when to cut and sell each tree. Is this a dynamic problem? Explain why or why not.

5. What is a *scarce resource* in microeconomics? Be sure to define both "scarce" and "resource."

6. What is the difference between *steady state* and an *equilibrium*? (Keep your answer as simple as possible.)

7. Assume constant savings rate of s in the Solow growth model, and a TFP growth rate of 2%. After 2 years of steady state balanced growth, what is the per capita consumption?

8. Fill in the following table for backward induction. The starting balance is 0, the target balance at the end of three years is 15000. Utility is logarithmic ($u(C) = \ln C$). The discount factor is $\delta = 1$ in all periods. *You do not need to evaluate the utility function; leave it in the form "*$\ln 10000$*" when consumption is 10000, for example. Remember that the logarithmic utility function tries to make consumption equal in each period, if possible.*

Year (t)	**1**	**2**	**3**
Income (Y)	20000	20000	20000
Saving ($S = s_t^*(X_{t-1})$)			
Consumption (C)			
Current utility ($u(C)$)			
Ending balance (X)			15000
Future value ($V_t = V_t^*(X_{t-1})$)			
Optimal saving ($s_t^*(X_{t-1})$)			
Value function ($V_t^*(X_{t-1})$)			