MIDTERM 1

Basic Solow Model (without technological change and without population growth).

(I) Answer the following questions.
(1) (4 pts) State the assumptions that the model makes regarding the production function and consumption. Use a diagram to show consumption per worker as a function of capital per worker.
(2) (4 pts) Write down the equation for the change in the level of capital per worker. Use a diagram to identify the steady state level of capital per worker.
(3) Suppose an economy is at its steady state and in period 100 a natural disaster destroys half of its capital stock. Answer the following questions:
   (i) (4 pts) What happens to the level of output per worker that period (period 100)? Of consumption per worker? Justify.
   (ii) (6 pts) Is output per worker growing or shrinking in periods 100, 102, 103? Justify.
   (iii) (4 pts) What happens to the steady state level of output per worker? Justify
   (iv) (4 pts) What happens to the growth rate of consumption per worker at the steady state? Justify

(II) Explain carefully the effect of a decrease in the depreciation rate on the following (use a diagram):
(1) (4 pts) capital per worker at the steady state
(2) (4 pts) growth rate of output per worker at the steady state

(III) (8 pts) Use a diagram to show that increases in the savings rate can result in lower consumption per worker at the steady state.

Solow Model with population growth (without technological change)

(IV) Explain carefully the effect of an increase in the rate of population growth on the following (use a diagram):
(1) (5 pts) capital per worker and output per worker at the steady state
(2) (6 pts) growth rate of output per worker at the steady state

Solow Model with labor augmenting technological change (without population growth)

(V) Consider the model developed in class where there is labor augmenting technological change (i.e. the “efficiency” of the labor force (E) is growing at a constant rate g). Explain carefully the effect of a decrease in the savings rate on the following (use a diagram):
(1) (5 pts) capital per worker and output per worker at the steady state
(2) (6 pts) growth rate of output per worker at the steady state
(VI) Growth Accounting/ Catching up

(1) (6 pts) What is growth accounting? What is total factor productivity (TFP) growth and why is it called the Solow residual?

Consider the data presented by Young for Singapore and Hong Kong (Handout 5) to answer questions (2), (3) and (4). Notice that “Average Capital share” is what we call ".

(2) (6 pts) Calculate Hong Kong’s TFP growth for the 1961-66 period using the information provided.
(3) (4 pts) Calculate the contribution of inputs to Hong Kong’s growth in the period 1961-66.
(4) (6 pts) Use the data on Singapore to argue whether Singapore was catching up or falling behind during the 1980-85 period (assume that during that period the TFP growth of the technological leader was positive).

Income Inequality

(VII) (6 pts)
A research paper compares the income distributions of two countries. The authors calculate the Gini coefficients for each country. They are 0.36 and 0.57.

Use the table below to identify which Gini coefficient corresponds to Country 1 and which one to Country 2. Justify.

<table>
<thead>
<tr>
<th>Year</th>
<th>Lowest 20%</th>
<th>Next 20%</th>
<th>Next 20%</th>
<th>Next 20%</th>
<th>Highest 20%</th>
</tr>
</thead>
<tbody>
<tr>
<td>Country 1</td>
<td>5.7</td>
<td>11.2</td>
<td>15.4</td>
<td>22.4</td>
<td>45.3</td>
</tr>
<tr>
<td>Country 2</td>
<td>2.4</td>
<td>5.7</td>
<td>10.7</td>
<td>18.6</td>
<td>62.6</td>
</tr>
</tbody>
</table>

High Performing Asian Economies

(VII) (8 pts) Briefly explain two characteristics of the HPAE’s.