ECON-UA-12-SECTION-002
INTERMEDIATE MACROECONOMICS
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NEW YORK UNIVERSITY
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Supplemental Problem Set 2
Complete before June 12 (but do not turn in)

Prepare answers to the following for Wednesday class. Supplemental problem sets resemble exam questions. Answers will be posted on NYU Classes on June 12 after class.

A. Questions from Chapter 9:

1. Chapter 9 Problem #1c (where g = 0.02 means g_E = 0.02 or 2% a year).
   a. In addition for each country calculate the steady state growth rate of - Output, output per worker and output per effective worker.
2. Chapter 9 Problem #3
3. Chapter 9 Problem #4 (in part b use the fact that for us $MPK = \frac{\partial Y}{\partial K}$)

B. Questions from Chapter 9: Economic Growth II; Technological Change

4. In Romer's learning-by-doing model, describe using mathematics, graphs and words how an increase in the saving rate effects output per worker and the growth of output per worker.
5. Consider Solow's model where Total Factor Productivity (TFP) is the measure of technology. Suppose real GDP and capital both grow 3.6% per year. Further suppose population, the labor force and employment all grow at rate n which is 1.0% per year. Finally, we know the capital share of output in the US is 1/3.
   a. Using Solow's growth-accounting equation calculate the growth of TFP per year.
   b. Calculate the annual growth rate of output per worker.
   c. What fraction of real GDP growth can be attributed to each of the following: technological change, capital accumulation (net investment) and labor input growth.
   d. What fraction of the growth rate of output per worker can be attributed to technological change?
6. Use the following economic data to determine whether the economy is at the golden rule:

   Fact A. The US the capital share of output = 1/3
   Fact B. The capital-output ratio in the US is = 2.5
   Fact C. Depreciation is 10% of GDP in the US Fact D.
   US output growth in the steady state = 3%

C. Problems and Applications from Chapter 3 in Mankiw

7. Chapter 3 Problem #2
8. Chapter 3 Problem #4
9. Chapter 3 Problem #5

D. Additional Problems on the Long Run

10. Suppose China has two goods sectors: a home goods sector and an export goods sector. Labor is mobile across sectors. Domestic Chinese capital is employed only in the home goods sector; foreign capital is used only in the export sector; capital cannot move across sectors. In the 1990s China opened up to foreign capital, which increased foreign capital inflows into China that went to the export goods sector alone. Describe the effects on the real wage, the real rental price paid to capital and total output in both sectors in the long run.