

Problem Set 1: Economics 404W

Due Tuesday, February, 7

Prof. Tybout

Answer each of the following questions. For questions 1-3, you are welcome to consult with me, but not with classmates. For question 4, you may consult with classmates who are specializing in your country. (Refer to the list of country assignments that is linked to the on-line syllabus.) For credit, you must show your work.

- 1) In Indonesia during the 1970s, the incremental capital-output ratio, θ_K , averaged 2.5.
 - a) Using the Harrod-Domar growth equation, and assuming that the capital stock depreciates at the rate $\delta = 0.10$ what savings rate would have been required for Indonesia to achieve an output growth rate of 8 percent per annum? _____
 - b) GDP did grow by about 8 percent during the 1970s in Indonesia, but the gross domestic savings rate was (by the end of the 1970s) around 0.20. Assuming that the Harrod-Domar model was a good description of the Indonesian economy during that period, what rate of depreciation must be assumed to reconcile these figures? _____ Does this figure strike you as plausible? Briefly comment.

2) Consider an economy in which the labor force grows by 2.7 percent per annum (i.e., $\Delta L/L = 0.027$), while the capital stocks grows by 4 percent per annum (i.e., $\Delta K/K = 0.04$). Suppose 55 percent of national income goes to labor and 45 percent to capital.

a) What is the rate of growth in the capital-labor ratio, $\Delta k/k$ (i.e., the rate of capital deepening)? _____

b) If the economy experienced no growth in factor productivity, no improvements in factor quality, and no change in the labor force participation rate, how fast would per capita income have grown? _____

c) The country's actual growth rate in per capita income was 5 percent per annum, and the country's labor participate rate grew at 1 percent per annum, what was the rate of growth in factor productivity? (You may assume that there was no change in the quality of the factor inputs.) _____

- 3) Suppose the production function for a particular economy is: $Y = A\sqrt{KL}$, so that output per worker is $y = Y/L = A\sqrt{K/L} = A\sqrt{k}$. Also, suppose the Solow model correctly characterizes growth in this economy.
- a) If the savings rate is $s = .20$, the rate of population growth is $n = .03$, the depreciation rate of the capital stock is $\delta = .07$, and the efficiency level remains constant at $A = 1$, what is the long run equilibrium capital per worker? _____ What is the associated level of GDP per worker? _____ .
- b) Draw a graph to depict the equilibrium you solved for in part (a) above.
- c) Now suppose that the efficiency level grows over time at the rate $\Delta A/A = .02$. Explain as precisely as possible how this changes the long run behavior of the economy. Include a description of the implications for output per worker and the capital-labor ratio.

- 4) State the country that you have chosen to specialize in, and characterize that country's recent performance in terms of the following variables. For each variable, be explicit about your data source and the time period it describes. For this portion of the homework assignment (and this portion *only*) you may consult with other students in the class who are specializing in the same country.

Hint: Use the links provided under "resources for country reports" on the class web page.

- a) Country _____
- b) Per capita GDP _____ Time period _____ Source _____
- c) Growth rate, per capita GDP _____ Time period _____ Source _____
- d) Population growth rate _____ Time period _____ Source _____
- e) % Population urbanized _____ Time period _____ Source _____
- f) % Population in poverty _____ Time period _____ Source _____
- g) Extent of income inequality _____ Inequality measure used _____
Time period _____ Source _____