

Ec320 Problem Set No. 1

1. Country A currently has a GDP of \$3 billion, a population of 2 million, and its per capita income is growing at the rate of 3% per annum, while population is growing at 1% per annum.

- (a) What is its current per capita income?
- (b) What will its per capita income be in 5 years? In 10 years?
- (c) In approximately how many years will its per capita income double?
- (d) If the per capita income were to double in 10 years instead, what would its annual growth rate have to be?
- (e) At the current growth rate, what will the country's GDP be in 5 years? In 10 years?

2. Continuing with the same Country A as in Problem 1 above, you are given the following additional information: its capital stock is currently \$6 billion, and depreciates at the rate of 10% per year. Using the Harrod-Domar theory, can you work out what the country's current savings rate must be? If for some reason the savings rate were to be halved, what would happen to the growth rate of per capita income?

3. Now (again continuing the same country A) suppose you learn that the incremental capital output ratio (ICOR) will not be constant for ever: it will be at its current level until the country reaches a per capita income of \$2000, but will rise thereafter as diminishing returns to capital sets in. Over the range of per capita income from \$2000 until \$3000, the ICOR will be 10% higher than the current level (but constant within that per capita income range). From \$3000 until \$4000, it will be another 10% higher, and so on: for every \$1000 increase in per capita income range it jumps up by an additional 10%. See the attached Figure for the production function which relates the output per worker to the capital per worker.

- (a) What will the growth rate of per capita income be when it lies in the range \$2000–3000? In the range \$3000–4000? In the range \$4000–5000? Assume the same savings rate as the one you calculated in problem 2 above.
- (b) What will be the eventual growth rate of per capita income be in the long run?
- (c) What will the level of per capita income be (approximately) in the long run?

