

1. Consider two economies, Speedia and Slowenia, each starts with a real GDP per person of \$5000 in 2000. Real GDP per person grows 3% per year in Speedia and 1% per year in Slowenia. **Guess** how many times more output Speedia would have than Slowenia in the year 2050. Now use a calculator to find out exactly. Now a third country called Wealthica has the real GDP per person of \$10,000 and its growth rate is 1% per year. Which country is the richest in real GDP per person in 2050? (**Food for thought:** Thai GDP per person is around USD 4,600-5,000)
2. Country A has a production function $Y = K^{0.3}L^{0.7}$ while Country B has a production function of $Y = K^{0.3}L^{0.8}$.
 - a. If both economies suddenly have twice as much capital and labor than before, how many more units of output will each country receive?
 - b. War destroys 50% of capital and labor in both countries, what happen to outputs in each country?
 - c. Write the two production functions in the compact per-worker form. Can both be done? Why or Why not?
 - d. Country A has a saving rate of 0.4, depreciation rate of 0.1, and the population growth rate of 0.02. Find the steady-state values for capital-labor ratio, output per worker, and consumption per worker for Country A.
 - e. **[Challenging]** What is the golden-rule level of capital-labor ratio for Country A? What is the saving rate necessary for Country A to attain the golden rule k as the steady-state.
3. According to the Solow model, how would each of the following affect consumption per worker in the *long run* (that is, in the steady state)? Make sure you briefly explain or demonstrate your answers.
 - a. The destruction of a portion of the nation's capital stock in a war.
 - b. A permanent increase in the rate of immigration (which raises the overall population growth rate).
 - c. A permanent increase in energy prices.
 - d. A temporary rise in saving rate.
 - e. A permanent increase in the labor force with population growth rate unchanged.
4. An economy is in a steady with no productivity change. Because of the acid rain, the rate of capital depreciation rises permanently.
 - a. According to Solow model, what are the effects on steady-state capital per worker, output per worker, consumption per worker, and the long-run growth rate of capital stock?
 - b. In an endogenous AK growth model, what are the effects on the growth rates of output, capital, and consumption of an increase in the depreciation rate of capital?