

Suggested problems on economic growth

These are taken from the Mankiw text. Think of them as non-required homework problems covering Chapters 8 and 9.

2. In the discussion of German and Japanese post-war growth, the text describes what happens when part of the capital stock is destroyed in a war. By contrast, suppose that a war does not affect the capital stock directly, but that casualties reduce the labour force.
 - a. What is the immediate impact on total output and on output per person?
 - b. Assuming that the saving rate is unchanged and that the economy was in a steady state before the war, what happens subsequently to output per worker in the post-war economy? Is the growth rate of output per worker after the war smaller or greater than normal?
4. Two countries, Richland and Poorland, are described by the Solow growth model. They have the same Cobb–Douglas production function, $F(K, L) = A K^\alpha L^{1-\alpha}$, but with different quantities of capital and labour. Richland saves 32 per cent of its income, while Poorland saves 10 per cent. Richland has population growth of 1 per cent per year, while Poorland has population growth of 3 per cent. (The numbers in this problem are chosen to be approximately realistic descriptions of rich and poor nations.) Both nations have technological progress at a rate of 2 per cent per year and depreciation at a rate of 5 per cent per year.
 - a. What is the per worker production function $f(k)$?
 - b. Solve for the ratio of Richland's steady-state income per worker to Poorland's. (*Hint:* The parameter α will play a role in your answer.)
 - c. If the Cobb–Douglas parameter α takes the conventional value of about $1/3$, how much higher should income per worker be in Richland compared to Poorland?
 - d. Income per worker in Richland is actually 16 times income per worker in Poorland. Can you explain this fact by changing the value of the parameter α ? What must it be? Can you think of any way of justifying such a value for this parameter? How else might you explain the large difference in income between Richland and Poorland?
5. The amount of education the typical person receives varies substantially among countries. Suppose you were to compare a country with a highly educated labour force and a country with a less educated labour force. Assume that education affects only the level of the efficiency of labour. Also assume that the countries are otherwise the same: they have the same saving rate, the same depreciation rate, the same population growth rate and the same rate of technological progress. Both countries are described by the Solow model and are in their steady states. What would you predict for the following variables?
 - a. The rate of growth of total income.
 - b. The level of income per worker.
 - c. The real rental price of capital.
 - d. The real wage.

Sample exam questions

These are questions I have used on exams in a comparable course. They are provided so give you an idea of the style of questions you can expect on the exam. A one-hour exam would typically have 5-6 such questions.

1. The following questions relate to long-run steady-state paths of Alopecia and Baldova, whose economies operate according to (1) the Solow model, (2) the quantity theory of money, and (3) relative purchasing power parity.

a. If money growth is the same in the two countries, but real growth is larger in Alopecia than in Baldova, what can we say about the steady-state inflation rates in the two countries? Why?

b. If the two countries have the same rate of technological progress, production function, and saving rate, but Alopecia has lower population growth than Baldova, what can we say about the steady-state growth rates of per-capita GDP in Alopecia and Baldova? Why?

c. If Alopecia has a higher money growth rate than Baldova but real growth is the same in the two countries, then what can we say about the steady-state behavior of Alopecia's nominal exchange rate? Why?

2. The drop in housing prices in the United States in 2008–2011 reduced the ability of homeowners to sell their houses and move from one location to another. How might this reduced mobility affect the equilibrium (natural) rate of unemployment in the United States and why? (Hint: Think about how mobility affects the efficiency of job search and matching.)

3. Suppose that per-capita income in the Czech Republic is now 20% higher than in Slovakia because the Czech Republic has more capital per worker, but that both countries have identical parameters (*i.e.*, saving rates, production function, etc.).

a. If the two countries behave according to the Solow model, will per-capita income in Slovakia eventually catch up to the Czech Republic? Explain, using a diagram or equation if appropriate.

b. If the two countries behave according to the simple endogenous growth model of the textbook chapter, will per-capita income in Slovakia eventually catch up to the Czech Republic? Explain, using a diagram or equation if appropriate.

4. Suppose that Amanda will live two periods, has access to perfect capital markets in which the real interest rate is 10%, and has period-one income (in terms of goods) of 500 and period-two income of 1000. What is the slope of her lifetime budget constraint (with period-two consumption on the vertical axis)? At what value does the budget constraint intersect the vertical axis?

5. Evaluate and explain the following statement: "If the Fed pays interest on banks' reserves held on deposit at the Fed (as it began doing a few years ago), this will cause banks to hold more reserves and, with the monetary base held constant, lower the money supply."