Macroeconomics 1
(A European Perspective)

Week 6

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Group Discussion

Main readings

Blanchard, O., Amighini, A., Giavazzi, F. (2021). Macroeconomics: A European Perspective, 4th edition. Pearson: New York.

Group discussion: Set A

- Suppose that, in the USA, annual per capita consumption for one bundle of food is US$27,000 and that for a new set of furniture is $10,800. The Americans buy a new set of furniture once every two years.
- In Turkey however the annual per capita consumption for food is TRY162,000 (Turkish lira) for the same bundle of food and that for a new set of furniture is TRY720,000, that is replaced once every ten years. The qualities of food and furniture are the same in both countries.
    1. With the exchange rate of TRY18/USD, what is per capita consumption in Turkey relative to per capita consumption in the United States?
    2. Using purchasing power parity (PPP) estimates, what is per capita consumption in Turkey relative to per capita consumption in the United States?
    3. What would happen if now Turkish replace the furniture with the new one every five years?

Group discussion: Set B

1. Assume that government does not save and the rate of saving is $0 \leq s \leq 1$. Show the relation between output and investment.
2. The rate of depreciation is given by $0 \leq \delta \leq 1$. Show that the change in the capital stock per worker is a function of saving per worker and depreciation.
3. What is steady-state equilibrium? How do we determine the point of steady state?

Group discussion: Set C

- Suppose the production function is given by

$$Y = 0.5\sqrt{K}\sqrt{N}$$

1. Derive the steady-state levels of output per worker and capital per worker in terms of the saving rate, s, and the depreciation rate, δ.
2. Derive the equation for steady-state output per worker and steady-state consumption per worker in terms of s and δ.
3. Suppose that $\delta = 0.05$. With your favourite spreadsheet software, compute steady-state output per worker and steady-state consumption per worker when $s = 0.2$; $s = 1$. Explain the intuition behind your results.

Group discussion: Set D

What is happening to economic growth in the Netherlands?

https://www.ft.com/content/4c56c9b2-f4ad-4956-9216-655acebd845d

Quick Quiz

Quick quiz

https://app.wooclap.com/ZHDNIX

OR

Open wooclap.com and enter the event code ZHDNIX

Problem Set

Problem set

1. The Solow growth model. Have a careful look at figure 13.2, the graphical presentation of the Solow growth model with technical progress.
   (a) Compare figure 13.2 and figure 12.4: what does effective worker mean?
   (b) Explain the required investment curve.
   (c) What would happen to output and the steady state if A increases.
   (d) Compare figure 13.4 with figure 12.5. Explain the value for the slope of the growth rate function.

Problem set

2. Suppose that the economys production function is:

$$Y = \sqrt{K}\sqrt{AN},$$

with the saving rate, s, equal to 16%, and the rate of depreciation, δ, equal to 10%. Suppose further that the number of workers grows at 2% per year and that the rate of technological progress is 4% per year.

   (a) Find the steady-state values of the variables below:
      i. The capital stock per effective worker.
      ii. Output per effective worker.
      iii. The growth rate of output per effective worker.
      iv. The growth rate of output per worker.
      v. The growth rate of output.
   (b) Suppose that the rate of technological progress doubles to 8% per year. Recompute the answers to part (a). Explain.
   (c) Now suppose that the rate of technological progress is still equal to 4% per year, but the number of workers now grows at 6% per year. Recompute the answers to part (a). Are people better off in part (a)

Problem set

3. Discuss the potential role of each of the factors listed in parts (a) through (g) on the steady-state level of output per worker. In each case, indicate whether the effect is through A, through K, through H, or through some combination of A, K, and H. A is the level of technology, K is the level of capital stock, and H is the level of the human capital stock.
   (a) Geographic location.
   (b) Education.
   (c) Protection of property rights.
   (d) Openness to trade.
   (e) Low tax rates.
   (f) Good public infrastructure.
   (g) Low population growth.

Sample Exam Questions

Try-out

1. Limburg Empire has the following production function:

$$Y = K^{0.5}(LE)^{0.5},$$

where Y is output, K is capital stock, L is the number of workers, E is the worker-augmented technological progress, and hence LE is the number of effective workers.

Assuming the Empire has no functioning ministries and is a closed economy, answer the following questions:

   (a) Show that the production function has the properties of a constant return to scale. Write down the production function in the form of output per effective workers and show that it has the property of diminishing returns.

   (b) The Brabant Empire has exactly the same production function as the Limburgs. Currently the amount of capital stock per effective worker in Limburg is higher than in Brabant, ceteris paribus. What is your prediction about the economic growth rate in A compared to B? Explain your answer.

Try-out

(c) Assuming in Limburg, the saving rate (s) is 0.32, depreciation rate (δ) is 0.03, population growth (n) is 0.03 and the rate of labor augmenting technological progress (g) is 0.02. Calculate the steady-state levels of capital accumulation, output, investment, and consumption per effective worker.

(d) Is the current steady state level of capital accumulation also the golden-rule level of capital accumulation? Explain your answer.

Try-out

2. The country of Prosperous has the following production function:

$$Y = 2K^{0.5}(AN)^{0.5},$$

with Y output, K capital stock, A technology level, and N labour. Given information: saving rate (s): 20%, depreciation rate (δ): 10%, labour growth rate (n): 2%, and rate of technological progress (g): 8%

   (a) Transform the production function into the relation between output per effective worker (Y/AN) and capital per effective worker (K/AN). Does the function exhibit diminishing return?

   (b) Calculate the steady-state levels of (i) capital accumulation per effective worker, (ii) output per effective worker, (iii) consumption per effective worker, (iv) investment per effective worker!

   (c) Illustrate graphically the above steady-state conditions!

Try-out

(d) Calculate the growth rate of the following variables when the economy achieves its steady state:

i. Output per effective worker (Y/AN)
ii. Output per worker (Y/N)
iii. Output (Y)

(e) If the country of Prosperous aims to achieve the optimal level of steady state consumption, what would you advise the government of the Prosperous to do regarding the country saving rate? Explain!

Questions?