DEG
DEPARTAMENTO
DE ENGENHARIA E GESTÃO
TÉCNICO LISBOA

Introductory Economics

Introdução à Economia

Problems

2021/2022

3rd Quarter (P3)

2. GDP and economic growth, innovation and technological progress

2. PIB e crescimento económico, inovação e progresso tecnológico

Margarida Catalão Lopes (mcatalao@tecnico.ulisboa.pt)
Inês Carrilho Nunes (ines.c.nunes@tecnico.ulisboa.pt)

2.1. Which of the following statements is correct regarding measuring GDP? (Adapted from CORE, The Economy)

a. GDP can be measured either as the total spending on domestically produced goods and services, the total value added in domestic production, or the sum of all incomes received from domestic production.
b. Information about exports but not imports is necessary to calculate GDP.
c. Government production is not included in the GDP.
d. The value-added of government production is computed using the price that public goods and services are sold at in the market.

2.2. Which of the following would increase GDP? (Adapted from CORE, The Economy)

a. A decline in imports, holding all other components of GDP constant.
b. An increase in remittances paid to domestic residents by relatives living abroad.
c. An increase in government spending.
d. A decline in exports.

2.3. Explain why an economy's income must equal its expenditure. (Adapted from Mankiw, Principles of Economics).

2.4. A farmer sells wheat to a baker for €2. The baker uses this wheat to make bread, which is sold for €3. What is the total contribution of these transactions to GDP? (Adapted from Mankiw, Principles of Economics)

2.5. Why is it desirable for a country to have a large GDP? Give an example of something that would raise GDP and yet be undesirable. (Adapted from Mankiw, Principles of Economics)

2.6. What does the level of a nation's GDP measure? What does the growth rate of GDP measure? Would you rather live in a nation with a high level of GDP and a low growth rate, or in a nation with a low level of GDP and a high growth rate? (Adapted from Mankiw, Principles of Economics)

2.7. Technological progress increases your hourly productivity. This means that by working the same number of hours you could thus produce and consume more, or you can produce and consume the same amount of goods while working fewer hours and enjoying more free time. The economist Olivier Blanchard argues that the difference in output per capita between the US and France is partially due to the fact that relative to those in the US, the

French have used some of the increase in productivity to enjoy more free time rather than raise consumption. (Adapted from CORE, The Economy)

a. Think about two countries, one that has lower GDP per capita due to fewer hours worked, and another that has higher GDP per capita due to more hours worked (such as France and the US). Assuming that overall life satisfaction consists only of free time and consumption, in which country would you expect overall life satisfaction to be higher, and why? Clearly state any assumptions you make about the preferences of residents in each country.
b. Considering only working hours and GDP per capita, which country (France or the US) would you prefer to live in, and why? How would your answer change if you considered other factors as well?

2.8. The following Figure shows an economy's production function before and after technological progress. Based on this information, which of the following statements is correct? (Adapted from CORE, The Economy)

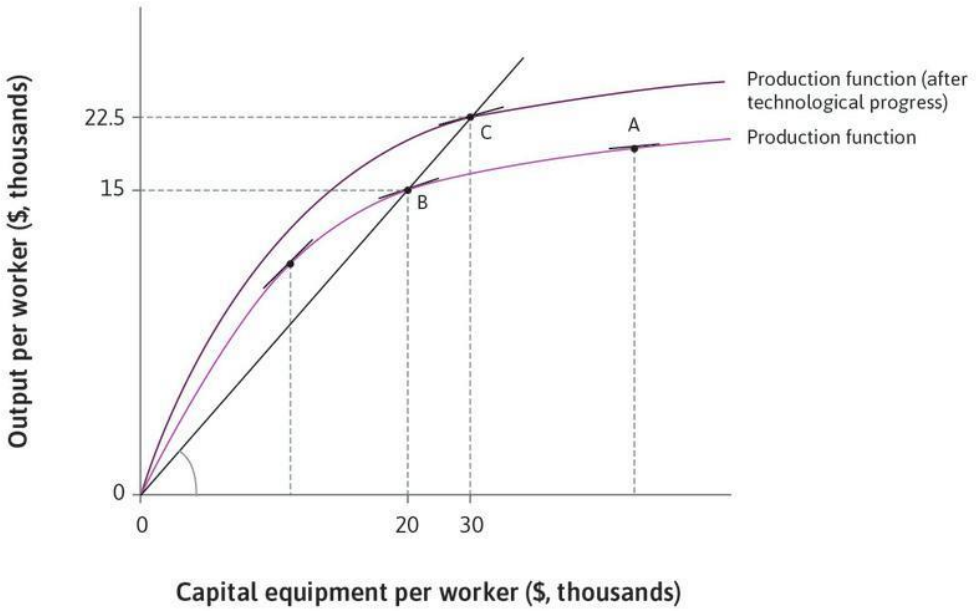

Figure 1

a. The average product of capital at B is $\frac{20{,}000}{15{,}000} = 1.33.$
b. The marginal product of capital at C is $\frac{(22{,}500-15{,}000)}{(30{,}000-20{,}000)} = 0.75.$
c. The concavity of the production function indicates a diminishing marginal product of capital.
d. As a result of technological progress, the marginal product of capital rises but the average product of capital remains constant, for a given level of capital per worker.

2.9. Which of the following statements regarding innovation is correct? (Adapted from CORE, The Economy)

a. An innovation is the development of new methods of production and new products. The spread of these is not innovation.
b. A product innovation is when a firm produces a good or service at a lower cost than its competitors.
c. A process innovation is when a firm produces a new good at a cost that will attract buyers.
d. Innovation comprises both invention and diffusion.