

# Problem Set 2 – Solutions

## Chapter 8

2. In each of the following situations, what type of unemployment is Melanie facing?
- a. After completing a complex programming project, Melanie is laid off. Her prospects for a new job requiring similar skills are good, and she has signed up with a programmer placement service. She has passed up offers for low-paying jobs.
  - b. When Melanie and her co-workers refused to accept pay cuts, her employer outsourced their programming tasks to workers in another country. This phenomenon is occurring throughout the programming industry.
  - c. Due to the current slump, Melanie has been laid off from her programming job. Her employer promises to rehire her when business picks up.

### Solution

2. a. Melanie is frictionally unemployed because she is refusing offers for low-paying jobs in favor of engaging in a job search for a higher-paying job.
- b. Melanie is structurally unemployed because she is demanding a higher wage than the current equilibrium wage in her industry. In this case, the equilibrium wage has been lowered by the outsourcing of work to another country.
- c. Melanie is cyclically unemployed because her bout of unemployment is tied to the business cycle. It is likely she will be reemployed once the economy picks up.
7. How will the following changes affect the natural rate of unemployment?
- a. The government reduces the time during which an unemployed worker can receive unemployment benefits.
  - b. More teenagers focus on their studies and do not look for jobs until after college.
  - c. Greater access to the internet leads both potential employers and potential employees to use the internet to list and find jobs.
  - d. Union membership declines.

### Solution

7. a. If the government reduces the time during which an unemployed worker can obtain benefits, workers will be less willing to spend time searching for a job. This will reduce the amount of frictional unemployment and lower the natural rate of unemployment.

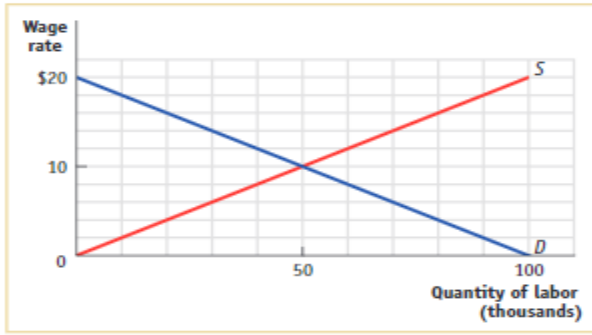
- b.** Since teenagers have a higher rate of frictional unemployment, this will lower the overall amount of frictional unemployment and lower the natural rate of unemployment.
  - c.** Greater access to the internet would facilitate job searches, reducing frictional unemployment and lowering the natural rate of unemployment.
  - d.** Since strong unions negotiate wages above the equilibrium level, they are a source of structural unemployment. A decline in union membership will reduce structural unemployment and, with it, the natural rate of unemployment.
- 9.** In the following examples, is inflation creating winners and losers at no net cost to the economy or is inflation imposing a net cost on the economy? If a net cost is being imposed, which type of cost is involved?
- a.** When inflation is expected to be high, workers get paid more frequently and make more trips to the bank.
  - b.** Lanwei is reimbursed by her company for her work-related travel expenses. Sometimes, however, the company takes a long time to reimburse her. So when inflation is high, she is less willing to travel for her job.
  - c.** Hector has a mortgage with a fixed nominal interest rate of 6% that he took out five years ago. Over the years, the inflation rate has crept up unexpectedly to its present level of 7%.
  - d.** In response to unexpectedly high inflation, the manager of Cozy Cottages of Cape Cod must reprint and resend expensive color brochures correcting the price of rentals this season.

### **Solution**

- 9. a.** This is an example of the effect of shoe-leather costs, a net cost of inflation to the economy. Workers spend valuable resources going to the bank more frequently, firms spend valuable resources (such as bookkeepers' time) in paying workers more frequently, and banks spend more resources in processing the greater volume of transactions.
- b.** This is an example of unit-of-account costs. A dollar when Lanwei spends it on a work-related expense is worth more than a dollar she receives much later in reimbursement from her company. Because she is less willing to travel for her job, there is a net cost to the economy of her forgone output.
- c.** This is an example of inflation creating winners and losers. As the inflation rate creeps up unexpectedly, the real value of the funds that Hector pays to the mortgage company falls. So Hector is better off as inflation increases, and the lender of his mortgage is worse off. At present, the real interest rate on his mortgage is negative:  $6\% - 7\% = -1\%$ . So he is now financing his house virtually cost-free.
- d.** This is an example of menu costs, a net cost of inflation to the economy. The manager of Cozy Cottages of Cape Cod must reprint and resend expensive color brochures because it is necessary to raise the price of rentals due to unexpectedly high inflation.

## WORK IT OUT

14. There is only one labor market in Profunctia. All workers have the same skills, and all firms hire workers with these skills. Use the accompanying diagram, which shows the supply of and demand for labor, to answer the following questions. Illustrate each answer with a diagram.



- What is the equilibrium wage rate in Profunctia? At this wage rate, what are the level of employment, the size of the labor force, and the unemployment rate?
- If the government of Profunctia sets a minimum wage equal to \$12, what will be the level of employment, the size of the labor force, and the unemployment rate?
- If unions bargain with the firms in Profunctia and set a wage rate equal to \$14, what will be the level of employment, the size of the labor force, and the unemployment rate?
- If the concern for retaining workers and encouraging high-quality work leads firms to set a wage rate equal to \$16, what will be the level of employment, the size of the labor force, and the unemployment rate?

## Solution

14. **a.** The equilibrium wage rate is \$10. At this wage rate, there will be 50,000 employed workers, no unemployed workers, a labor force of 50,000, and an unemployment rate of 0%.
- b.** If the government of Profunctia sets a minimum wage equal to \$12, then 60,000 workers (the size of the labor force) will be looking for work but only 40,000 will find jobs. There will be 20,000 unemployed workers, and the unemployment rate will be 33.3%  $((20,000/60,000) \times 100)$ .
- c.** If unions bargain with the firms in Profunctia and set a wage rate equal to \$14, then 70,000 workers (the size of the labor force) will be looking for work but only 30,000 will find jobs. There will be 40,000 unemployed workers, and the unemployment rate will be 57.1%  $((40,000/70,000) \times 100)$ .
- d.** If the concern for retaining workers and encouraging high-quality work leads firms to set a wage rate of \$16, then 80,000 workers (the size of the labor force) will be looking for work but only 20,000 will find jobs. There will be 60,000 unemployed workers, and the unemployment rate will be 75%  $((60,000/80,000) \times 100)$ .

## Chapter 9

1. The following table shows the average annual growth rate in real GDP per capita for Argentina, Ghana, and South Korea using data from the World Bank, World Development Indicators, for the past few decades.

Years	Average annual growth rate of real GDP per capita		
	Argentina	Ghana	South Korea
1970–1980	1.04	-2.54	7.45
1980–1990	-2.29	-0.51	8.73
1990–2000	2.74	1.81	6.14
2000–2010	2.42	3.03	4.12
2010–2020	-1.76	3.56	2.11

- a. For each 10-year period and for each country, use the Rule of 70 where possible to calculate how long it would take for that country's real GDP per capita to double.
- b. Suppose that the average annual growth rate that each country achieved over the period 2010–2020 continues indefinitely into the future. Starting from 2018, use the Rule of 70 to calculate, where possible, the year in which a country will have doubled its real GDP per capita.

### Solution

1. a. The accompanying table shows the number of years it would take for real GDP per capita to double according to the Rule of 70 using the average annual growth rate in real GDP per capita per decade in each country. Values corresponding to years with negative growth rates are left uncalculated because we cannot apply the Rule of 70 to a negative growth rate.

Years	Years for real GDP per capita to double according to the Rule of 70		
	Argentina	Ghana	South Korea
1970–1980	67.1	--	9.4
1980–1990	--	--	8.0
1990–2000	25.5	38.6	11.4
2000–2010	29.0	23.1	17.0
2010–2020	--	19.7	33.1

- b. If each country continues to grow as it did from 2010–2020, real GDP per capita will have doubled in Ghana by 2041 and in South Korea by 2054. Argentina has averaged negative growth and the Rule of 70 will not apply.

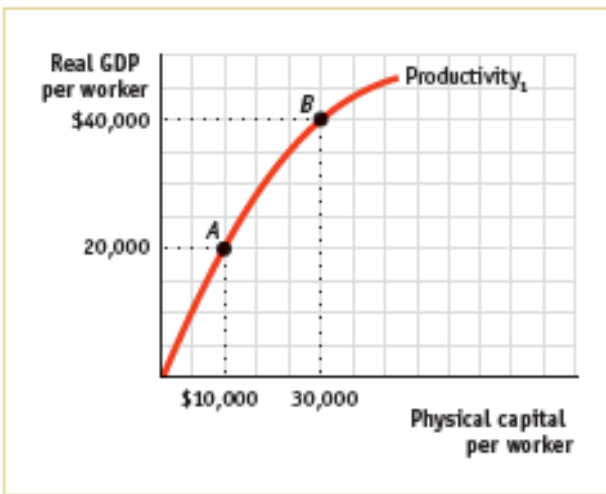
3. What roles do physical capital, human capital, technology, and natural resources play in influencing long-run economic growth of aggregate output per capita?

**Solution**

3. Physical capital, human capital, technology, and natural resources play important roles in influencing long-run growth in real GDP per capita. Increases in both physical capital and human capital help a given labor force to produce more over time. Although economic studies have suggested that increases in human capital may explain increases in productivity better than do increases in physical capital per worker, technological progress is probably the most important driver of productivity growth. Although natural resources played a prominent role historically in determining productivity, today they play a less important role in increasing productivity than do increases in human or physical capital in most countries.

**WORK IT OUT**

10. You are hired as an economic consultant to the countries of Albernia and Britannia. Each country’s current relationship between physical capital per worker and output per worker is given by the curve labeled “Productivity<sub>1</sub>” in the accompanying diagram. Albernia is at point *A* and Britannia is at point *B*.



- a. In the relationship depicted by the curve Productivity<sub>1</sub>, what factors are held fixed? Do these countries experience diminishing returns to physical capital per worker?
- b. Assuming that the amount of human capital per worker and the technology are held fixed in each country, can you recommend a policy to generate a doubling of real GDP per capita in Albernia?
- c. How would your policy recommendation change if the amount of human capital per worker could be changed? Assume that an increase in human capital doubles the output per worker when physical capital per worker equals \$10,000. Draw a curve on the diagram that represents this policy for Albernia.

**Solution**

10. a. The curve reflecting the relationship between physical capital per worker and output per worker is drawn holding human capital per worker and technology fixed. Both Albertainia and Britannia experience diminishing returns to physical capital since, in both countries, equal successive increases in physical capital per worker -- holding human capital per worker and technology constant -- will result in smaller and smaller increases in real GDP per worker.
- b. Albertainia should increase its physical capital per worker to \$30,000.
- c. An increase in human capital per worker shifts the curve Productivity<sub>1</sub> to Productivity<sub>2</sub> and Albertainia doubles real GDP per worker without a change in physical capital per worker. On the accompanying diagram, Albertainia would move from point A to point C. So your policy recommendation should be to increase the amount of human capital per worker.

