



**EC 205 Macroeconomics I**

Fall 2023

**Problem Session 3**

**1.** Use the neoclassical theory of distribution to predict the impact on the real wage and the real rental price of capital of each of the following events:

- a. A wave of immigration increases the labor force.
- b. An earthquake destroys some of the capital stock.
- c. A technological advance improves the production function.

**2.** Suppose that Congress passes legislation making it more difficult for firms to fire workers. (An example is a law requiring severance pay for fired workers.) If this legislation reduces the rate of job separation without affecting the rate of job finding, how would the natural rate of unemployment change? Do you think it is plausible that the legislation would not affect the rate of job finding? Why or why not?

**3.** Consider an economy with the following Cobb–Douglas production function:

$$Y = K^{1/3}\gamma^{2/3}$$

The economy has 1,000 units of capital and a labor force of 1,000 workers.

- a. Derive the equation describing labor demand in this economy as a function of the real wage and the capital stock.
- b. If the real wage can adjust to equilibrate labor supply and labor demand, what is the real wage? In this equilibrium, what are employment, output, and the total amount earned by workers?

c. Now suppose that Congress, concerned about the welfare of the working class, passes a law requiring firms to pay workers a real wage of one unit of output. How does this wage compare to the equilibrium wage?

d. Congress cannot dictate how many workers firms hire at the mandated wage. Given this fact, what are the effects of this law? Specifically, what happens to employment, output, and the total amount earned by workers?

e. Will Congress succeed in its goal of helping the working class? Explain.

f. Do you think that this analysis provides a good way of thinking about a minimum- wage law? Why or why not?

**4.** In this chapter we saw that the steady-state rate of unemployment is  $U/L = s/(s + f)$ . Suppose that the unemployment rate does not begin at this level. Show that unemployment will evolve over time and reach this steady state. (Hint: Express the change in the number of unemployed as a function of  $s$ ,  $f$ , and  $U$ . Then show that if unemployment is above the natural rate, unemployment falls, and if unemployment is below the natural rate, unemployment rises.)