

**Econ 522: Intermediate Macroeconomics, Spring 2018**  
Chapter 3 Practice Problem Set

1. Explain what determines the amount of output an economy produces?
2. Explain the rule that competitive, profit-maximizing firms follow when deciding how much capital and labor to hire.
3. *Returns to Scale.* Do the following production functions exhibit increasing, constant, or decreasing returns to scale?
  - (a)  $F(K, L) = K^{1/2}L^{1/2}$
  - (b)  $F(K, L) = K^{1/2} + L^{1/2}$
  - (c)  $F(K, L) = \frac{K^2}{L}$
4. *Diminishing Returns.* Which of the following production functions have diminishing marginal returns to labor?
  - (a)  $F(K, L) = 2K + 15L$
  - (b)  $F(K, L) = \sqrt{KL}$
  - (c)  $F(K, L) = 2\sqrt{K} + 15\sqrt{L}$
5. Using the chapter 3 model of production, predict the impact on the real wage and the real rental price of capital of each of the following events, and explain the underlying logic leading to that prediction:
  - (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.
  - (d) High inflation doubles the prices of all factors and outputs in the economy.
6. Suppose the production for a nation is  $Y = K^{0.5}L^{0.5}$  where  $K$  is the amount of capital and  $L$  is the amount of labor. If the economy begins with 100 units of capital and 100 units of labor, find numerical answers to each of the following questions:
  - (a) How much output does the economy produce?
  - (b) What are the wage rate and rental price of capital?
  - (c) What share of output does labor receive?
  - (d) If a plague kills exactly half of the population, what is the new level of output?
  - (e) What is the new wage and rental price of capital?
  - (f) What share of output does labor receive now?
7. Explain what determines consumption and investment?
8. Explain the difference between government purchases and transfer payments. Give two examples of each.

9. What adjusts to make demand for the economy's output of goods and services equal the supply?
10. Explain what happens to consumption, investment, and the interest rate when the government increases taxes.
11. If the government raises taxes by \$100 billion and the marginal propensity to consume is 0.6, what happens to the following? (Do they increase or decrease, and by what amounts?)
- (a) Public saving
  - (b) Private saving
  - (c) National saving
  - (d) Investment
12. Consider an economy described by the following equations:

$$Y = C + I + G$$

$$Y = 5,000$$

$$G = 1,000$$

$$T = 1,000$$

$$C = 250 + 0.75(Y - T)$$

$$I = 1,000 - 50r$$

- (a) Compute private saving, public saving, and national saving.
  - (b) Find the equilibrium interest rate.
  - (c) If the government increases  $G$  to 1,250, what are the new levels of private saving, public saving, and national saving?
  - (d) Find the equilibrium interest rate.
13. Suppose the government increases taxes and government purchases by equal amounts. What happens to the interest rate and investment in response to this balanced-budget change? Explain how your answer depends on the marginal propensity to consume.