

SGPE Summer School

Macro Problem Set 1

Introduction & National Income
Mankiw, Ch 1-3

30th July 2013

Multiple Choice Questions

For each question choose **one** of the four answers.

1. If real GDP is growing rapidly, which of the following is most likely to occur?
 - (a) a recession
 - (b) a depression
 - (c) higher unemployment
 - (d) inflation

2. The variable that is likely to be exogenous in a model that explains production in a small firm within a large industry is the:
 - (a) amount of output produced by the firm
 - (b) price of the firm's inputs
 - (c) number of workers hired by the firm
 - (d) amount of machinery employed by the firm

3. During periods of inflation:
 - (a) nominal GDP rises at the same rate as real GDP
 - (b) nominal GDP rises at a faster rate than real GDP
 - (c) nominal GDP rises at a slower rate than real GDP
 - (d) one cannot infer anything about the relative rates of growth of nominal and real GDP.

4. The GDP deflator is defined as:
 - (a) nominal GDP/real GDP

- (b) nominal GDP x real GDP
 - (c) nominal GDP - real GDP
 - (d) nominal GDP + real GDP
5. The largest component of GDP in the United States is typically:
- (a) consumption
 - (b) investment
 - (c) government purchases
 - (d) net exports
6. If a UK citizen is employed by a UK company in France, the income that she earns is:
- (a) part of UK GDP and France's GNP
 - (b) part of UK GDP and France's GDP
 - (c) part of UK GNP and France's GNP
 - (d) part of UK GNP and France's GDP
7. If the GDP deflator grows by 4 percent from one year to the next and real GDP grows by 3 percent, then nominal GDP will:
- (a) rise by approximately 1 percent
 - (b) fall by approximately 1 percent
 - (c) rise by approximately 7 percent
 - (d) rise, but by somewhere between 1 percent and 7 percent, depending on the initial level of GDP.
8. The variable that is held constant for a given production function is the:
- (a) amount of labour input
 - (b) amount of output
 - (c) amount of capital input
 - (d) production technology
9. Constant returns to scale occurs when:
- (a) output doubles when the amounts of all factor inputs double
 - (b) output remains constant over time
 - (c) the marginal productivity of labour equals the marginal productivity of capital
 - (d) the marginal products of capital and labour do not change

10. A profit-maximising firm will hire labour up to the point where:
- (a) the marginal product of labour equals the marginal product of capital
 - (b) the marginal product of labour equals the real wage
 - (c) marginal revenue equals zero
 - (d) the real wage equals the real rental price of capital
11. The FALSE statement below is:
- (a) the extra revenue a firm gets from an extra unit of capital equals the marginal product of capital times the price of output
 - (b) the extra revenue a firm gets from an extra unit of labour equals the marginal product of labour times the wage
 - (c) a perfectly competitive firm's labour demand curve is the MPL schedule
 - (d) constant returns to scale and profit maximisation together imply that economic profit is zero
12. According to Euler's theorem, the sum of all factor payments will equal total output if each factor of production is paid its marginal product and if:
- (a) the production function has constant returns to scale
 - (b) the production function displays diminishing marginal productivity
 - (c) the amounts of capital and labour employed are equal
 - (d) accounting profits equal zero
13. Which of the following transactions is viewed as investment in the national income accounts?
- (a) you buy 100 shares of stock in Apple Computer Corporation
 - (b) you buy an Apple iMac computer to help your children do their homework
 - (c) Richard, a carpenter, builds himself a log cabin
 - (d) your family buys a newly constructed home
14. The interest rate on a loan depends on:
- (a) the term of the loan
 - (b) the riskiness of the loan
 - (c) the tax treatment of the loan
 - (d) All of the answers are correct

15. With total output fixed and national saving unrelated to the interest rate, an increase in government purchases increases:
- (a) national saving
 - (b) public saving
 - (c) the equilibrium interest rate
 - (d) private saving
16. If national saving is positively related to the interest rate, a technological advance that increases investment demand will:
- (a) have no effect on the amount of national saving
 - (b) shift the investment demand curve to the left
 - (c) increase both investment and the equilibrium interest rate
 - (d) have no effect on consumption
17. Public saving is equal to:
- (a) taxes plus government transfers minus government purchases
 - (b) taxes minus government transfers minus government purchases
 - (c) taxes plus government transfers plus government purchases
 - (d) the government budget deficit
18. If the nominal interest rate is 8 percent and prices are rising at 5 percent per year, the real interest rate is:
- (a) 8 percent
 - (b) 3 percent
 - (c) 13 percent
 - (d) -3 percent
19. If consumption $C = 100 + 0.8(Y - T)$, disposable income equals 1,000, and $Y = 2,000$, then the marginal propensity to consume is:
- (a) 0.5
 - (b) 900
 - (c) 0.8
 - (d) 0.9
20. All the following are characteristic of the Cobb-Douglas production function EXCEPT:
- (a) constant returns to scale
 - (b) diminishing marginal productivity of labour
 - (c) constant marginal productivity of capital
 - (d) a constant ratio of labour income to capital income

Problems

Question 1

A farmer grows a bushel of wheat and sells it to a miller for \$1.00. The miller turns the wheat into flour and then sells the flour to a baker for \$3.00. The baker uses the flour to make bread and sells the bread to an engineer for \$6.00. The engineer eats the bread.

- (a) What is the value added by each person?
- (b) What is GDP?

Question 2

If a 10 percent increase in both capital and labor causes output to increase by less than 10 percent, the production function is said to exhibit decreasing returns to scale. If it causes output to increase by more than 10 percent, the production function is said to exhibit increasing returns to scale. Why might a production function exhibit decreasing or increasing returns to scale?

Question 3

Consider a Cobb–Douglas production function with three inputs. K is capital (the number of machines), L is labor (the number of workers), and H is human capital (the number of college degrees among the workers). The production function is

$$Y = K^{1/3}L^{1/3}H^{1/3}.$$

- (a) Derive an expression for the marginal product of labor. How does an increase in the amount of human capital affect the marginal product of labor? Can you give some intuition why this might be the case?
- (b) Derive an expression for the marginal product of human capital. How does an increase in the amount of human capital affect the marginal product of human capital?
- (c) What is the income share paid to labor? What is the income share paid to human capital? In the national income accounts of this economy, what share of total income do you think workers would appear to receive? (Hint: Consider where the return to human capital shows up.)
- (d) An unskilled worker earns the marginal product of labor, whereas a skilled worker earns the marginal product of labor plus the marginal product of human capital. Using your answers to parts (a) and (b), find the ratio of the skilled wage to the unskilled wage. How does an increase in the amount of human capital affect this ratio? Explain.

- (e) Some people advocate government funding of college scholarships as a way of creating a more egalitarian society. Others argue that scholarships help only those who are able to go to college. Do your answers to the preceding questions shed light on this debate?

Question 4

Suppose that the government increases taxes and government purchases by equal amounts.

- (a) What happens to the interest rate and investment in response to this balanced-budget change? Explain your answer using equations and graphs.
- (b) How does your answer depend on the marginal propensity to consume?

Question 5

Macroeconomic data do not show a strong correlation between investment and interest rates. Let's examine why this might be so. Use the model we studied in which the interest rate adjusts to equilibrate the supply of loanable funds (which is upward sloping) and the demand for loanable funds (which is downward sloping).

- (a) Suppose the demand for loanable funds was stable but the supply fluctuated from year to year. What might cause these fluctuations in supply? In this case, what correlation between investment and interest rates would you find?
- (b) Suppose the supply of loanable funds was stable but the demand fluctuated from year to year. What might cause these fluctuations in demand? In this case, what correlation between investment and interest rates would you find now?
- (c) Suppose that both supply and demand in this market fluctuated over time. If you were to construct a scatterplot of investment and the interest rate, what would you find?
- (d) Which of the above three cases seems most empirically realistic to you?

Bonus Question

If consumption depended on the interest rate, how would that affect the conclusions reached in the neoclassical model of national income from chapter 3 about the effects of fiscal policy? Illustrate your response graphically.