Department of Economics **Boğaziçi University**

EC 205 Macroeconomics I
Fall 2022

Problem Session 2

1.

Y	L	MPL
0	0	0
13	1	?
?	2	11
33	3	?
40	4	?
?	5	5
48	6	3
49	7	?

a) Graph the production function.
b) Graph the labor demand curve
c) Suppose L= 5 when W/P= 9. Should the employer hire more labor?
d) Suppose a wave of immigration increases the labor force. Predict the impact on real wage.
e) Suppose a technological advance improves the production function. Show the impact of this change on the real wages.
f) Suppose high inflation triples the output prices, how do real wages change in the short run?

2. Assume that the production function is given by $Y = AK^{0.75}L^{0.25}$, where *Y* is GDP, *K* is capital stock, and *L* is labor. The parameter *A* is equal to 2. Assume also that capital is 10,000, labor is 81, and both capital and labor are paid their marginal products. Finally, assume that average price level in the economy P is $1.

a) What is *Y*, the long-run output of this economy?
b) What is the real wage of labor?
c) What is the real rental price of capital (i.e. the amount of output paid per unit of capital)?
d) What is the total income of labor owners, and what is the total income of capital owners? What fraction of total output do these numbers translate to?

Assume that, for this economy, consumption (C) is given by the equation $C = 900 + 0.6(Y-T)$. Investment (I) is given by the equation $I = 950 - 1000r$, where r is the real interest rate in percent. Taxes (T) are *1500* and government spending (G) is *1650*.

e) What are the equilibrium values of *C*, *I*, and *r*?
f) What are the values of private saving, public saving, and national saving?

g) Now assume there is a technological innovation that makes business want to invest more. It raises the investment equation to $I = 1200 - 1000r$. What are the new equilibrium values of C, I, and r?
h) What are the new values of private saving, public saving, and national saving?

3. Which of the following functions satisfy constant returns to scale property? Which of these functions display diminishing marginal products in capital and in labor? Show all your work.

a) $F(K, L) = K^{0.50}L^{0.50}$
b) $F(K, L) = AK^{\beta} L^{1-\beta}$
c) $F(K, L) = L$
d) $F(K, L) = K^{0.50}L^{0.50} + L$

4. Suppose a government decides to reduce government spending (G) and (lumpsum) income taxes (T) by the same amount. Using the long-run model of the economy developed in Chapter 3, graphically illustrate the impact of the equal reductions in government spending and taxes. Be sure to label:

i. the taxes
ii. the curves
iii. the initial equilibrium values
iv. the direction curves shift
v. the terminal equilibrium values.

Hint: Remember that marginal propensity to consume (MPC) has to be strictly less than one.

b. State in words what happens to:

i. the real interest rate
ii. national saving
iii. investment
iv. consumption
v. output.