Macroeconomics 31-234

Spring 2016

Problem Set 2 Due Wednesday, February 10th

- 1. The following questions pertain to the production function as discussed in class.
 - a. Draw a clear and neatly defined diagram of the production function relating economic activity to employment. Provide an economic explanation of the shape of the curve(s).
 - With each addition to the labor force, or *N*, output, or *Y*, increases respectively. However, the graph levels out after a certain point due to the *marginal product of labor concept*, which implies that with each *extra form of output*, it results in *less labor*.
 - b. List the endogenous and exogenous variables in this model.
 - Variables in this model contain both endogenous and exogenous variables.
 Endogenous variables in this model are represented by labor, N, and output, Y. On the other hand, exogenous variables are technology, or A, and capital or K.
- 2. A technological breakthrough increases a country's multifactor productivity A by 10%.
 - a. Show how this development affects the graphs of the production function relating output to capital and the production function relating output to labor.
 - b. Show that a 10% increase in the Sp increases the MPK and the MPL by 10% at any level of capital and labor. (Here is whit: What happens of ΔY for any increase in capital, or ΔK , or for any increase in labor, or ΔL) $MPK = \frac{\Delta Y}{\Delta K} = \frac{Y_2 - P}{K_2 - K_1}$, G worth $\frac{1.1Y_2 - 1.1Y_2}{K_2 - K_1} = 1.1 \left[\frac{Y_2 - Y_1}{K_2 - K_1} \right]$
 - c. Is it possible for a beneficial supply shock to leave the MPK and the MPL unaffected? Why or why not?
 - It is not possible because the entire production function in this case would have to shift upwards, but it would not be able to change slopes, meaning the graph would begin at a certain set level of production with 0 workers instead of at the normal level of 0 output with 0 workers.
- 3. How would each of the following affect the current level of full-employment output? Be sure to fully explain your answer.
 - a. A large number of immigrants enter the country.
 - b. Energy supplies become depleted.
 - c. New teaching techniques in the classroom improve the performance of all high school seniors.
 - d. A new law requires some forms of capital the government considers unsafe to be dismantled.
- 4. An economy has the following production function:

$$Y = 0.2(K + \sqrt{N})$$

Where k=100 and N=100 in the current period.