Economics 102
Summer 2015
Homework #4
Due Monday, July 13, 2015

Directions: The homework will be collected in a box **before** the lecture. Please place your name on top of the homework (legibly). Make sure you write your name as it appears on your ID so that you can receive the correct grade. Late homework will not be accepted so make plans ahead of time. **Please show your work.** Good luck!

Please realize that you are essentially creating "your brand" when you submit this homework. Do you want your homework to convey that you are competent, careful, and professional? Or, do you want to convey the image that you are careless, sloppy, and less than professional. For the rest of your life you will be creating your brand: please think about what you are saying about yourself when you do any work for someone else!

1. Consider the aggregate production function for Tortulia:

$$Y = 4K^{1/2}L^{1/2}$$

where Y is real GDP, K is units of capital, and L is units of labor. Labor and capital are the only inputs used in Tortulia to produce real GDP. Initially K is equal to 81 units. Use this information and Excel to answer this set of questions.

a. Fill in the following table (you will need to expand it from the truncated form provided here). Round all your answers to the nearest hundredth.

L	K	Y	Marginal Product of Labor (MPl)	Labor Productivity (Y/L)
0	81		---	---
1	81			
2	81			
.	.			
.	.			
.	.			
100	81			

b. Use Excel to graph the relationship between L and Y: measure L on the horizontal axis and Y on the vertical axis.

c. From your table in (a) and your graph in (b) you should be able to see that the marginal product of labor decreases as the level of labor usage increases in Tortulia, holding the level of capital constant. Explain the intuition for why this is true.

d. In your table as the value of labor gets bigger, what happened to labor productivity? After describing what happened to labor productivity as labor increases, provide a reason for why labor productivity exhibits this pattern.

e. Suppose the amount of capital in Tortulia decreases to 64 units due to a hurricane that blows across the country destroying much of the capital that Tortulia initially had. In words describe how this change in capital will cause the aggregate production function to change.

f. Given the change in capital described in (e), fill in the following table (you will need to expand it from the truncated form provided here).

L'	K'	Y'
0	64	
1	64	
2	64	
.	.	
.	.	
.	.	
100	64	

g. Use Excel to graph the original aggregate production function and the new aggregate production function in a graph with L on the horizontal axis and Y on the vertical axis. Does the graph support your prediction in (e)?

2. Use the graph below of an economy's aggregate production function to answer the following set of questions. Assume that capital and the level of technology is held constant in the graph.
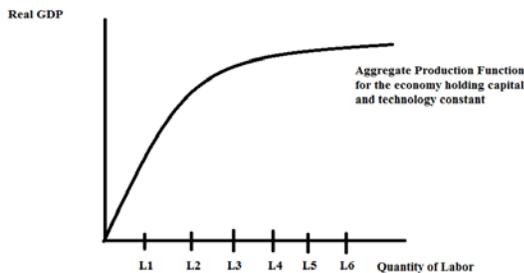
a. Suppose that labor usage in the economy is L2. Determine the level of real GDP, Y2, and also illustrate on a graph of this economy's aggregate production this level of output, this level of labor usage, and the economy's labor productivity when it hires this level of labor.

b. Suppose that the full employment level of output for this economy is L3 units of labor. But, suppose this economy is currently only employing L2 units of labor. Using the provided graph analyze the amount of real GDP this economy is giving up during this time period given this scenario. Illustrate this using the graph, but also provide a numeric answer (note: this will be written in terms of Y values and not number values).

c. Suppose that the economy is currently hiring L4 units of labor. Identify the level of real GDP the economy is producing given this information: call this level of output Y4. Then in the same graph illustrate what happens to this economy if a hurricane blows through and destroys a significant fraction of the capital stock. Assume that the economy is still hiring L4 units of labor. Identify this new post-hurricane level of output in your graph as Y5. Given this scenario what happens to labor productivity? Describe the impact on labor productivity and also illustrate this in your graph.

3. Consider the loanable funds market. Suppose that this market is initially in equilibrium, then analyze the impact on the quantity of loanable funds available for investment in this market and the interest rate for these loanable funds for each of the following scenarios.
a. Assume that the government has increased the size of its deficit relative to the initial level of the deficit.

b. Assume that the government increases its tax collections while reducing its government expenditures.

c. Assume that the initially the economy had a trade balance but now the economy runs a large trade surplus.

d. Assume the government runs a budget surplus and at the same time the economy has a trade deficit. Does the way you analyze this scenario alter your analysis? Be specific in your answer.

e. Assume that private savings increases at every interest rate and at the same time the government moves from a balanced budget to a budget deficit (model this budget deficit on the demand side of the model).

4. Suppose that the loanable funds market in an economy is initially described by the following equations where i is the interest rate and Q is the quantity of loanable funds measured in millions of dollars:
    Demand for loanable funds: $i = 8 - 0.8Q$
    Supply of loanable funds: $i = 2 + 0.8Q$
Furthermore assume that this economy's government is currently running a balanced budget.
a. Given the above information, calculate the equilibrium quantity of loanable funds and the equilibrium price in this market. Show your work.

b. Draw a graph representing the loanable funds market given the above information. Measure the interest rate on the vertical axis and the quantity of loanable funds in millions of dollars on the horizontal axis. Label all curves. Identify the equilibrium quantity of loanable funds and the equilibrium interest rate in this market.

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Suppose that the government passes a budget that results in this government running a $1 million budget deficit.

c. Given this budget deficit and modeling this budget deficit on the demand for loanable funds side of the market, describe verbally how this budget deficit will impact the demand for loanable funds curve. Predict what will happen to the interest rate in this market and to the level of investment in this economy given this government deficit and holding everything else constant.

d. Find the new equilibrium interest rate in the loanable funds market given this government deficit and modeling the deficit on the demand side of the market. Then, calculate the change in the level of investment in this economy due to this government budget deficit. Show your work.

e. Draw a graph representing the loanable funds market given the above information and the deficit the government is running. Model the government deficit on the demand for loanable funds side of the market. Measure the interest rate on the vertical axis and the quantity of loanable funds in millions of dollars on the horizontal axis. Label all curves. Identify the equilibrium quantity of loanable funds and the equilibrium interest rate in this market.

f. Let's redo the analysis of this government budget deficit, but this time, we will model it on the supply side of the loanable funds market. Given this budget deficit and modeling this budget deficit on the supply of loanable funds side of the market, describe verbally how this budget deficit will impact the supply of loanable funds curve. Predict what will happen to the interest rate in this market and to the level of investment in this economy given this government deficit and holding everything else constant.

g. Find the new equilibrium interest rate in the loanable funds market given this government deficit and modeling the deficit on the supply side of the market. Then, calculate the change in the level of investment in this economy due to this government budget deficit. Show your work.

h. Draw a graph representing the loanable funds market given the above information and the deficit the government is running. Model the government deficit on the supply of loanable funds side of the market. Measure the interest rate on the vertical axis and the quantity of loanable funds in millions of dollars on the horizontal axis. Label all curves. Identify the equilibrium quantity of loanable funds and the equilibrium interest rate in this market.

5. Suppose you are given the following information about an economy where all numbers are in millions of dollars:

Y (or GDP)	50	100	200	400	600	Ye =
Taxes, T		40				
Disposable Income, Y - T						
Consumer Spending, C		60		285		
Investment Spending, I			100			
Government Spending, G					50	
Net Exports, (X – M)	60					
Aggregate Expenditure, AE						
Direction of Change in Inventories						
Direction of Change in Production						

In this economy assume that taxes, investment spending, government spending, and net exports are all exogenously (autonomously) determined and that they do not change no matter what happens to GDP.

a. Given the above information, calculate the marginal propensity to consume, MPC, for this economy. Show how you got your answer. Put the values you found while calculating this value into the appropriate place in the provided table.

b. Once you have the MPC from (a), find the consumption equation including the value of autonomous consumption. Show how you found this equation. Once you have the consumption function fill in the values for the consumer spending row in your table. Fill in any other values you can now that you have your consumption function. Note: in the last column of the table we will be eventually finding the equilibrium level of output for this economy. Fill in what is happening to the direction of change in inventories and the direction of change in production as well (these answers will be "no change", "increase", or "decrease").

c. Calculate the equilibrium level of GDP for this economy. Show your work and complete the missing values in the last column of your table.

6. Suppose you are using a Keynesian model to analyze an economy and you are given the following information about this economy.

   Aggregate Expenditure = C + I + G + (X - M)
   C = consumption spending = 20 + .5(Y - T)
   T = autonomous taxes = $10 million
   I = investment spending = $100 million
   G = government spending = $20 million
   (X - M) = net exports = $10 million
   Yfe = Full employment GDP = $320 million
   P = aggregate price level = is constant and does not change

a. Given this information, is the government of this economy running a balanced budget, a budget surplus, or a budget deficit? Explain your answer.

b. Given this information, describe this country's trade balance. Explain your answer.

c. Given this information, determine the current equilibrium level of GDP, Y, for this economy. Show how you found your answer.

d. Describe this economy's performance relative to Yfe. In your description be sure to describe the level of production relative to the full employment level of production as well as describing the unemployment situation relative to the natural rate of unemployment. Then, provide a graph illustrating Ye, Yfe, and the aggregate expenditure function. Your graph should also include the 45 degree reference line. Make sure your graph is completely and carefully labeled.

e. Suppose you are an economic advisor to the President of this country and she wants to see the economy operating at full employment. She asks you how large the stimulus package would need to be in order to get this economy to full employment if the only thing that changes is the level of government spending. Provide her with the answer and show her how you got this answer. Once you calculate the value, then provide a proof that this is actually the correct value. Also, provide the President with a new figure for the government budget balance once this spending change is implemented.

f. Suppose you are an economic advisor to the President of this country and she wants to see the economy operating at full employment. She asks you how large the stimulus package would need to be in order to get this economy to full employment if the only thing that changes is the level of autonomous taxes. Provide her with the answer and show her how you got this answer. Once you calculate the value, then provide a proof that this is actually the correct value. Also, provide the President with a new figure for the government budget balance once this tax change is implemented.

g. Suppose you are an economic advisor to the President of this country and she wants to see the economy operating at full employment. But, she is also working with a Legislature that insists that any increase in government spending must be accompanied by an equal increase in autonomous taxes (this is like a balanced budget amendment). She asks you how large the stimulus package would need to be in order to get this economy to full

employment given this requirement that any increase in G be balanced by an equivalent increase in T. Provide her with the answer and show her how you got this answer. Once you calculate the value, then provide a proof that this is actually the correct value. Also, provide the President with a new figure for the government budget balance once this stimulus policy is implemented.

h. Given the three stimulus programs discussed in (e), (f), and (g), if getting the economy back to the full employment level of GDP at lowest cost to the government (and hence, the taxpayer) is the goal, which program is the best choice? Explain your answer.