

Economics 102
Summer 2018
Homework #1
Due June 20, 2018

Directions: This homework will be collected in a box **before** the lecture. Please place your name on top of the stapled pages you submit. Make sure you write your name as it appears on your ID so that you can receive the correct grade. **Please show your work.** Good luck!

Please remember to

- Staple your work before submitting it.
- Do work that is at a professional level: you are creating your “brand” when you submit this work!
- Do not submit messy, illegible, sloppy work.

1. Consider the aggregate production function for Snead's Ferry:

$$Y = (4)K^{1/3}L^{2/3}$$

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 Snead's Ferry to produce real GDP. Initially K is equal to 64 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. In your answer you may present the table for L from 0 to 10 units and from 80 to 100 units (that is, you can omit part of the table in the homework you turn in).

L	K	Y	Marginal Product of Labor (MPI)	Labor Productivity (Y/L)
0	64		---	---
1	64			
2	64			
.	.			
.	.			
.	.			
100	64			

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

c. Describe verbally what happens to the marginal product of labor as the level of labor usage increases in Snead's Ferry. Explain the intuition for this change in the marginal product of labor.

d. As labor increases, what happens to labor productivity? Explain why labor productivity exhibits this pattern.

e. Suppose the amount of capital in Snead's Ferry decreases to 25 units due to the enactment of legislation by the government that discourages investment spending. 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	25	
1	25	
2	25	
.	.	
.	.	
.	.	
100	25	

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. You are given the following information about an economy. Use the Keynesian Model discussed in class to analyze this model. Y is real GDP, T is taxes, TR is transfers, C is consumption spending, G is government spending, I is investment spending, and X – IM is net foreign expenditure.

Y	T – TR	C	G	I	X - IM
0	10	15	20	5	-10
100	10	65	20	5	-10
200	10	115	20	5	-10
300	10	165	20	5	-10

a. Examine the data:

i. Describe this economy's budget balance.

ii. Describe this economy's trade situation.

b. Using the above information derive this economy's consumption function with respect to disposable income, $(Y - (T - TR))$. Then derive this economy's consumption function with respect to aggregate income, (real GDP or Y). Show all your work.

- c. Now that you have the consumption function, graph this country's consumption function, government spending, investment spending, net exports and aggregate expenditure in a graph with real GDP or Y measured on the horizontal axis, and aggregate expenditure measured on the vertical axis.
- d. Find the equilibrium level of output for this economy. Show your work. Then illustrate this equilibrium level of output for this economy with a Keynesian cross diagram. Make sure you label the axis and any lines that you have in the graph as well as the equilibrium level of output.
- e. Suppose that the full employment level of real GDP (Y_{fe}) is equal to 100. How much would government spending need to change by in order for this economy to reach Y_{fe} ? Show your work and then provide a check that illustrates that your answer is correct.
- f. Suppose that the full employment level of real GDP (Y_{fe}) is equal to 100. How much would net taxes need to change by in order for this economy to reach Y_{fe} ? Show your work and then provide a check that illustrates that your answer is correct.
- g. Suppose that the full employment level of real GDP (Y_{fe}) is equal to 100. Suppose the government is committed to a policy that holds the deficit constant at its current level. Given this assumption, how much would government spending and net taxes need to change by in order for this economy to reach Y_{fe} ? Show your work and then provide a check that illustrates that your answer is correct.

3. Suppose you are given the following information about an economy:

Required reserve ratio is 10%

Money Supply (Ms): $M_s = 52,000$

Money Demand (Md): $M_d = 56,000 - 1000r$ where r is the interest rate (When the interest rate is 3%, it means $r = 3$)

Investment Spending (I): $I = 340 - 10r$

Consumption Spending (C): $C = 2400 + 0.5(Y - (T - TR)) - 100P$ where P is the aggregate price level

Government Spending (G): $G = 500$

Net Exports (NX): $NX = X - IM = -100$

Autonomous Taxes (T): $T = 300$

Transfers (TR) = 100

AD: $Y = C + I + G + (X - IM)$

Long run Aggregate Supply (LRAS): $LRAS = Y_{fe} = 4,500$

Short run Aggregate Supply (SRAS): $Y = 500P - 1,000$

- a. Given the above information, what is the equilibrium interest rate in this economy?
- b. Given the above information, what is the level of investment spending in this economy?
- c. Given the above information, calculate an equation that expresses this economy's aggregate demand for goods and services.
- d. Find the short run equilibrium level of real GDP (Y) and the short run aggregate price level (P). Then draw a graph illustrating this short run equilibrium. In your graph include the LRAS curve as well. In your graph measure the aggregate price level on the vertical axis and real GDP on the horizontal axis.
- e. The government now sets a goal of using monetary policy to reach full employment. Can the government reach this goal using only monetary policy? In your answer remember that it is not possible to have the nominal interest rate go below 0% (the "Zero Lower Bound").
HINT: Holding everything else constant, what is the highest level of real GDP in the short run this economy can attain if the government engages in activist monetary policy?
- f. The government now sets a goal of using fiscal policy (assume the government is not using any monetary policy) to reach full employment. Can the government reach this goal using only fiscal policy? To make this as simple as possible, assume that the fiscal policy is a change in the level of government spending holding everything else constant? Calculate what the new level of government spending would need to be if this economy was to reach full employment using fiscal policy only. Show your work. Hint: do NOT use the multiplier here since you will get the wrong answer!