**Economics 102**

**Spring 2013**

**Answers to Homework #6**

**Due: 5/06/13**

**Directions**: The homework will be collected in a box **before** the lecture. Please place your name, TA name and section number 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. Please remember the section number for the section **you are registered**, because you will need that number when you submit exams and homework. Late homework will not be accepted so make plans ahead of time. Please **show your work eligibly and neatly**; otherwise you will not receive full credit. Good luck!

1. Aggregate Demand and Aggregate Supply

For each of the following situations assume the economy is initially in long run equilibrium (label this point A in your graph) then draw the short-run impact of the described change and label the new short-run equilibrium as point B in your graph. Finally draw the new long run equilibrium situation after full adjustment to the described changes and label this long run equilibrium as point C in your graph. Your graph for each situation should contain the initial LRAS, AD and AS curves as well as the any new curves that occur in response to the described change. On the graph be sure to mark the actual path the economy follows as it moves along the AS and AD curves. Give a brief description in words of what happens in the short run and long run in each scenario.

a. Government spending grows substantially.



In the short run, the AD curve shifts to the right, causing a temporary increase in Y. P increases to P2.

In the long run, the AS curve shifts to the left, Y returns to Yfe, nominal wages rise, P is permanently higher at P3.

b. There is an enormous drought that affects crop yields throughout the country.



In the short run, AS shifts to the left, causing a temporary decrease in Y. P increases to P2.

In the long run, AS shifts to the right, Y returns to Yfe, and P returns to P1.

c. Consumer confidence falls dramatically.



In the short run, AD shifts to the left, causing a temporary decrease in output. P decreases to P2.

In the long run, AS shifts to the right. Y returns to Yfe, and the price level permanently decreases to P3.

d. The price of oil plummets due to a trade agreement.



In the short run, aggregate supply shifts to the right, causing a temporary increase in Y. P decreases to P2.

In the long run, aggregate supply shifts back to the left, nominal wages increase, causing Y to return to Yfe and Prices to return to P2.

2. Aggregate Expenditure

We have been given the following equations and information describing the (closed) economy of Macroland.

Money Market:

MD=15-200r

MS=5

Note that the interest rate, r , is written as a decimal (e.g., an interest rate of 1% would be written as 0.01 in the equation).

Goods Market:

C=50+.75(Y-T)-P

T=40

G=40

I=200-200r

Aggregate Demand / Aggregate Supply

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

AS: Y=4P

a. Find the equilibrium interest rate in the money market.

5=15-200r 🡪 r=.05 or 5%

b. Find the AE curve as a function of Y and P.

AE=C+I+G+(X-M)

=50+0.75(Y-40)-P+200-200(.05)+40

=250 +.75Y-P

c. Set AE=Y to find goods market equilibrium. Your answer should be an equation with Y as a function of P.

Y=250 + .75Y-P

.25Y=250-P

Y=1000-4P

d. Use the AD-AS model to find the equilibrium price level and output.

1000-4P=4P

P=125

Y=500

e. Suppose the Fed sells bonds. When measured in the same units as the money supply above, the Fed sells enough bonds that after the money multiplier process the money supply changes by 2 units. (Note: if the Fed is *selling* bonds, does the money supply increase or decrease?) What are the new equilibrium interest rate, price level, and output level? (Hint: follow the same steps as in parts a through d.)

First we find the money supply equilibrium:

Note that selling bonds decreases the money supply, so MS=3

3=15-200r 🡪 r=.06 or 6%

Next we find the new AE curve

AE=C+I+G+(X-M)

=50+0.75(Y-40)-P+200-200(.06)+40

AE=248 +.75Y-P

Now we set AE=Y:

Y=248 + .75Y-P

Y=992-4P

Now find AD-AS equilibrium:

992-4P=4P

P=124

Y=496

1. Money Market and the Quantity Theory of Money:

Suppose that demand for money in the country of Latvia depends on the interest rate r. Money demand in Latvia is represented by the function MD = 2500 + (25/r)$M^{d}=700+ \frac{10}{r}$. The current supply of money in Latvia is M=3500. Note that the interest rate, r , is written as a decimal (e.g., an interest rate of 1% would be written as 0.01 in the equation).

1. Suppose the money market in Latvia is in equilibrium. What is the initial equilibrium level of interest rate in Latvia?

To find the equilibrium interest rate set money demand equal to money supply and solve for r. Thus, 2500 + (25/r) = 3500 or r = .025 or the interest rate is equal to 2.5%.

1. Suppose that the central bank in Latvia determines that the equilibrium interest rate should be equal to 5%. What is the level of the money supply required for the interest rate to be at this level? Assume that the demand for money remains unchanged.

The interest rate can be found by setting the supply equal to demand and plugging in the desired interest rate: 2500 + (25/.05) = Ms . Now, solve for the money supply: Ms =3000.$700 +\frac{10}{0.02}=M^{s}=1200$.

1. Now, suppose that the current interest rate in Latvia is 2.5% and that the Fed has pursued monetary policy so that the supply of money is at the level that should result in an equilibrium interest rate of 5% (this is the level of money supply you determined in part (b) of this problem). At an interest rate of 2.5%, what is the amount of excess supply of money or excess demand for money? How will the market adjust back to the equilibrium? Describe this process making sure that you make reference to what is happening in the bond market.

At 2.5%, demand for money is equal to 3500 while the supply of money is equal to 3000: $M^{d}=700+ \frac{10}{10\%}=800$ so there is an excess demand of money of 500. When the interest rate is lower than the equilibrium interest rate level of 5%, this excess demand in the money market implies that there will be an excess supply in the bond market. Prices of bonds will thus go down, and then the interest rate will go up since the relationship between the price of bonds and the interest rate is an inverse relationship.

1. Given the initial money supply and the initial information, suppose that the government of Latvia wants to maintain an interest rate of 1%. What action would the government of Latvia need to take in order to ensure an interest rate of 1% in equilibrium?

We know that when the interest rate is 1% the demand for money is equal to 5000. In order to maintain an interest rate of 1%, the Fed will need to maintain a money supply that is equal to 5000. Since the initial money supply is equal to 3500, the Fed will need to increase the money supply by 1500 to have the interest rate equal 1%.

1. Keynesian Model

The economy is populated by three people: Moe, Larry, and Curly. The following table reports the level of expenditures for each of the people in this economy. Assume that there are no net taxes or government spending, no foreign sector, and that the level of business spending on investment is equal to zero in this economy. Note that the first column specifies the level of individual income.

|  |  |  |  |
| --- | --- | --- | --- |
| Level of Individual Income (Aggregate Income in this economy would be 3\*Individual Income for each level of income given in this table) | Moe’sSpending | Larry’s Spending | Curly’s Spending |
|  500 |  1000 |  1000 |  500 |
| 2000 |  1900 |  1600 |  2000 |

1. Calculate the aggregate consumption function for this economy.

Moe’s consumption function has a slope of .6 since [(Change in Expenditure)/(change in Income)] = 900/1500 = .6. Using the same formula we can see that the slope of the consumption function for Larry is .4 and the slope of the consumption function for Curly is 1. Then, we have to find autonomous consumption for each individual which is the level of consumption that individual has when their disposable income is equal to zero.

For Moe’s Consumption Moe = .6\*Income + Autonomous Consumption so 1000 = .6(500) + autonomous income and therefore autonomous consumption is equal to 700.

Larry’s consumption function is Consumption Larry = .4\*Income + Autonomous Consumption, so Larry’s autonomous Consumption is 800.

Finally, with the same calculations, you will find that Curly’s autonomous consumption is 0 since 500=1\*(500)+Autonomous consumption. This means Autonomous consumption = 0.

The total autonomous consumption is the sum over all three individuals or 800 + 700 + 0 which is equal to 1500.

From the table we can see that the level of income changes from 500 per person (or 1,500 aggregate income) to 2,000 per person (or 6,000 aggregate income) for a total change in aggregate income of 4,500. We can also calculate that total consumption spending is initially 2,500 when aggregate income is 1,500 while consumption spending is 5,500 when aggregate income is 6,000. We can use this information to compute the slope of the aggregate consumption function as (the change in aggregate income)/(change in aggregate consumption) or 3,000/4,500 which is equal to .667 (or 2/3). The aggregate consumption function is thus C = (2/3) Y + 1500.

1. Find the Aggregate Expenditure (AE) function for this economy. This AE equation should be written with respect to aggregate production (Y).

Since there is no government sector, no foreign sector, and business spending on investment is assumed to be equal to 0, this implies that the aggregate consumption function is also the aggregate expenditure function so AE = (2/3) Y + 1500.

1. What is the level of the income-expenditure equilibrium (assume that there is no government sector, no foreign sector, and that business spending on investment is equal to 0)? How much income will each Moe, Larry, and Curly have at equilibrium (assume they will share the aggregate income equally)?

We need to find the value such that using the aggregate consumption function found in the previous question: AE = (2/3) Y + 1500. Thus,  or Y = (2/3)Y + 1500 and Y is therefore equal to 4500.

Since they share the aggregate income equally, each of them will have an income of 1500.