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Discussion Session 4 (Chapter 5)

PART A: LONG QUESTIONS

ESSAY QUESTIONS

Q 1. Consider an economy described by the following set of equations

- $C = c_0 + c_1(Y - T) - c_2i$
- $I = b_0 + b_1Y - b_2i$
- $\frac{M^d}{P} = C$
- $G = G_0$
- $T = T_0$
- $M^s = M_0$

All the parameters ($b_0, b_1, b_2, c_0, c_1, c_2$) in this model are strictly positive and $b_1 + c_1 < 1$. Also, $P=1$ and it will NOT change.

Note that money demand here depends on consumption, not output.

Solution:

a. Find out the goods market equilibrium. Derive the IS curve.

$$c_0 + c_1(Y - T_0) - c_2i + b_0 + b_1Y - b_2i + G_0 = Y$$

or

$$Y = \frac{1}{1 - c_1 - b_1} [(c_0 + b_0 - c_1T_0 + G_0) - (c_2 + b_2)i].$$

b. Find out the financial market equilibrium and derive the LM curve. Draw both curves on the same graph. Call the equilibrium output Y_0 and the equilibrium interest rate i_0 .

$$c_0 + c_1(Y - T_0) - c_2i = M_0$$

or

$$Y = \frac{1}{c_1} [c_2i + M_0 - c_0 + c_1T_0].$$

Notice that the IS and the LM curves are straight lines here.

- c. Assume that now there is a sudden drop in business confidence, modeled by an increase in b_2 . The new level is b_2' , with $b_2' > b_2$. show graphically how the IS – LM curves move.

IS curve shifts down (with a less negative slope), the LM curve is unchanged.

- d. Now suppose that the government want to counter – balance the drop in business confidence using government spending as a policy instrument. Should it increase or decrease G_0 ? Compute the level of government spending that completely offsets the drop in business confidence.

From the IS equation, one can offset a change in b_2 by increasing government spending by $(b_2' - b_2) i_0$. Graphically, this allows the IS curve to pass through the original equilibrium point (Y_0, i_0) . The IS curve still has a less steep curve compared to point 2.

- e. Suppose that the U.S. Congress does not allow the government to use fiscal tools. The Central Bank then decides to use monetary policy to restore the original equilibrium output Y_0 . Should it increase or decrease M_0 ? Draw the IS – LM curves.

The central bank wants to move the LM curve rightward. The way to do so is to increase M_0 .

If you want to check out the math (not required), here's what you can do.

Equilibrium (Y_0, i_0) is defined by

$$\begin{aligned} Y_0 &= \frac{1}{1 - c_1 - b_1} [(c_0 + b_0 - c_1 T_0 + G_0) - (c_2 + b_2) i_0] \\ Y_0 &= \frac{1}{c_1} [c_2 i_0 + M_0 - c_0 + c_1 T_0] \end{aligned}$$

The new equilibrium is given by

$$\begin{aligned} Y_0' &= \frac{1}{1 - c_1 - b_1} [(c_0 + b_0 - c_1 T_0 + G_0) - (c_2 + b_2') i_0'] \\ Y_0' &= \frac{1}{c_1} [c_2 i_0' + M_0' - c_0 + c_1 T_0] \end{aligned}$$

But notice that $Y_0 = Y_0'$, taking difference of the two pairs of equations

$$\begin{aligned} 0 &= (c_2 + b_2) i_0 - (c_2 + b_2') i_0', \\ 0 &= c_2 (i_0 - i_0') + M_0 - M_0'. \end{aligned}$$

Solving for $M_0' - M_0$:

$$M_0' - M_0 = \frac{c_2}{c_2 + b_2'} (b_2' - b_2) i_0 > 0.$$

Therefore, the Central Bank should increase the money supply, which

results in a outward shift of the LM curve.

And here is a third way of getting to the same conclusion. Intuitively, since the output has been contracted following the lowered business confidence, the CB should use an expansionary monetary policy, which means it should increase the money supply.

- f. Suppose the government now cares about the composition of output as well as its level. Like before, it wants to restore the output level to Y_0^* . Can the government be indifferent between fiscal and monetary policy? Explain.

The government is not indifferent between the two policies if it cares about the composition of output. If the government cares about investment level and wants to restore the investment level partly, increasing G is not the optimal choice for the government as it is negatively related to the interest rate. Increasing G increases aggregate demand and thus, shifts the IS curve up. A higher equilibrium interest rate depresses investment more. In this case, the government prefers to employ monetary expansion, which increases output and decreases interest rate, raising investment. In the monetary expansion case, which brings the output at its original level, investment and consumption increases together, thus investment level will be partly restored.

- Q 2. Suppose the public holds no currency, the ratio of reserves to deposits is 0.2, and the demand for money is given by

$$M^d = \$Y(0.2 - 0.8i)$$

Initially, the monetary base is \$100 billion and nominal income is \$5000 billion.

Solution:

- a. What is the value of the money supply?

If the public holds no currency the money multiplier is simply given by $\rho = \frac{1}{r} = 5$. For high powered money of \$100 billion this implies $M^1 = \rho \cdot M^h = \$500$ billion.

- b. Determine the equilibrium interest rate.

For money market to be in equilibrium demand for money has to equal supply of money:

$$SM^1 = SM^d = \$Y(0.2 - 0.8i).$$

so that

$$500 = 5000(0.2 - 0.8i) \Rightarrow i = \frac{10}{8} \left(-\frac{500}{5000} + \frac{2}{10} \right) = \frac{1}{8} \left(-\frac{500}{500} + \frac{2}{1} \right) = \frac{1}{8}$$

In equilibrium the interest rate will be 12.5%.

- c. Determine the impact on the interest rate if the central bank increases the monetary base to \$150 billion.

The money multiplier is not changed and remains at $p = 5$. Therefore we now have $M1 = 5 \cdot 150 = 750$. The new equilibrium interest rate has to satisfy:

$$i = \frac{1}{8} \left(-\frac{750}{500} + \frac{2}{1} \right) = \frac{1}{8} \cdot \frac{1}{2} = \frac{1}{16} = 6.25\%.$$

- d. With the original money supply, determine the impact on the interest rate if nominal income increases from \$5000 billion to \$6250 billion.

$$i = \frac{10}{8} \left(-\frac{500}{6250} + \frac{2}{10} \right) = \frac{1}{8} \left(-\frac{500}{625} + \frac{2}{1} \right) = \frac{1}{8} \cdot \frac{6}{5} = 15\%.$$

In equilibrium the interest rate will be 15%.

- e. Assume now that the public wants to hold currency. In particular, assume that the ratio of deposits to currency is 0.43. Determine the value of the money supply when the monetary base is \$100 billion. What is the value of the multiplier now?

$$\text{Money Multiplier} = \frac{1}{r_{rr}(1-c) + c} = \frac{1}{0.2(1-0.43)+0.43} = 1.84$$

$$M_s = \text{Money multiplier} \cdot \text{High powered money}$$

$$M_s = 100 \times 1.84 = 184$$

PART B: SHORT QUESTIONS

TRUE/FALSE/UNCERTAIN (Explain it.)

1. Financing expansionary fiscal policy by increasing the deficit does not generally affect interest rates.

Answer: FALSE

Explanation: Financing a deficit normally raises interest rates because the government must issue additional bonds to finance the deficit. Higher interest rates have offsetting effects because they reduce business investment

2. Crowding out is the offsetting effect on private expenditures caused by the government's sale of bonds to finance expansionary fiscal policy.

Answer: TRUE

Explanation: Crowding out refers to the increase in interest rates and subsequent reduction in private investment that result from expansionary fiscal policy.

3. An open market purchase by the central bank reduces investment.

False. The open market purchase increases the money supply and decreases the interest rate. This eventually causes an increase in investment

PART B - MULTIPLE CHOICE

Choose the one alternative that best completes the statement or answers the question.

- 1) Suppose the economy is currently operating on both the LM curve and the IS curve. Which of the following is true for this economy?

A) financial markets are in equilibrium.
B) production equals demand.
C) the quantity supplied of bonds equals the quantity demanded of bonds.
D) the money supply equals money demand.
E) all of the above.

- 2) In late 2007 and early 2008, the U.S. Federal Reserve pursued expansionary monetary policy. Which of the following will occur as a result of this monetary policy action?

A) the LM curve shifts down.
B) the LM curve shifts up.
C) the IS curve shifts leftward as the interest rate increases.
D) the IS curve shifts rightward as the interest rate falls.
E) none of the above.

- 3) Suppose fiscal policy makers implement a policy to reduce the size of a budget deficit. Based on the IS-LM model, we know with certainty that the following will occur as a result of this fiscal policy action.

A) investment spending may increase, decrease, or not change.
B) investment spending will decrease.
C) there will be no change in investment spending.
D) investment spending will increase.
E) none of the above.

- 4) The concept of fiscal policy refers to the:

A) running of a deficit or surplus to affect the level of output in the economy.
B) changing of interest rates to affect the level of output in the economy.
C) management of exchange rates to affect the trade deficit in the economy.
D) setting of wage policies by institutions to affect spending in the economy.

- 5) A reasonable dynamic assumption for the IS-LM model is that

A) the economy is always on the LM curve, but moves only slowly to the IS curve.
B) the economy is always on both the IS and LM curves.
C) adjustment to the new IS-LM equilibrium is instantaneous after an LM shift, but not after an IS shift.
D) the economy is always on the IS curve, but moves only slowly to the LM curve.
E) the money market is quick to adjust, but the bond market adjusts more slowly.

- 6) An increase in the money supply will cause an increase in which of the following variables?
- A) investment.
 - B) output.
 - C) consumption.
 - D) all of the above.**
 - E) none of the above.
- 7) Based on our understanding of the IS-LM model that takes into account dynamics, we know that a reduction in government spending will cause:
- A) an immediate reduction in i and no initial change in Y
 - B) a gradual reduction in i and an immediate reduction in Y
 - C) an immediate drop in Y and immediate increase in i
 - D) a gradual reduction in i and gradual reduction in Y**
- 8) Suppose the demand for money is NOT very sensitive to the interest rate. Given this information, we know that:
- A) the IS curve should be relatively flat.
 - B) the LM curve should be relatively steep.**
 - C) neither the IS nor the LM curve will be affected.
 - D) the LM curve should be relatively flat.
 - E) the IS curve should be relatively steep.
- 9) Suppose there is a simultaneous Fed sale of bonds and increase in consumer confidence. We know with certainty that these two simultaneous events will cause:
- A) an increase in output (Y)
 - B) an increase in the interest rate (i)**
 - C) a reduction in i
 - D) a reduction in Y
- 10) An increase in the reserve deposit ratio, θ , will most likely have which of the following effects?
- A) a downward shift in the LM curve
 - B) a rightward shift in the IS curve
 - C) a leftward shift in the IS curve
 - D) an upward shift in the LM curve**
- 11) A reduction in the aggregate price level, P , will most likely have which of the following effects?
- A) a leftward shift in the IS curve
 - B) an upward shift in the LM curve
 - C) a downward shift in the LM curve**

D) a rightward shift in the IS curve

12) Based on our understanding of the IS-LM model that takes into account dynamics, we know that a reduction in the money supply will cause:

A) an immediate drop in Y and immediate increase in i

B) a gradual increase in i and gradual reduction in Y

C) an immediate increase in i and no initial change in Y

D) none of the above

13) For this question, assume that individuals hold currency (i.e., $c > 0$). The money multiplier is equal to

A) $1/c$

B) $1/\theta$

C) 1

D) $1/(c+\theta(1-c))$

14) Suppose the required reserve ratio is 0.15. Total bank deposits are \$100 million and the bank holds \$20 million in reserves. How much more money can the bank create if it does not hold excess reserves?

A) \$33 million

B) \$66 million

C) \$100 million

D) \$133 million

15) If private investment is relatively sensitive to interest rates, then a fiscal expansion financed by government bond sales will:

A) have no effect on output.

B) raise output by a relatively small amount.

C) raise output by a relatively large amount.

D) have an ambiguous effect on output.

Explanation: If business investment is sensitive to interest rates, then the increase in interest rates resulting from deficit financing (the sale of government bonds) will affect investment greatly, leading to significant crowding out. Thus, while the expansionary policy was designed to significantly drive up output, crowding out largely minimizes its effectiveness.