

Chapter 6 : IS-LM

Homework After midterm #1.

NOTE THAT EXAM QUESTIONS WILL INCLUDE ONLY ESSAY QUESTION. PLEASE ATTACH A SEPARATE SHEET IF THE SPACE PROVIDED IS NOT ENOUGH.

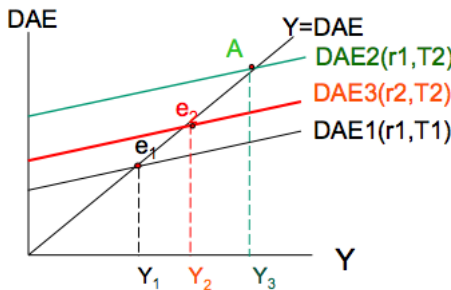
Question 1: The Early 1980's The early 1980s were an exciting time for the macroeconomy. President Reagan was attempting a tax cut revolution while the Federal Reserve, under Chairman Paul Volcker, was attempting to control inflation.

a. President Reagan's tax policies were a crucial part of his economic plan. The most important policy tool was a massive tax cut (30 percent in three years). Use an IS-LM diagram to show how tax cuts would affect the economy. Assume that monetary policy does not change in this question.

b. Now say that President Reagan's fiscal policies were expansionary while Volcker's monetary policy was contractionary. How would these two contemporaneous policies be represented in a single IS-LM diagram? Write a few sentences to explain your diagram. Can you say anything definitive about how output and interest rates would change?

- **Answer a.** Effect of a tax cut.

- DAE

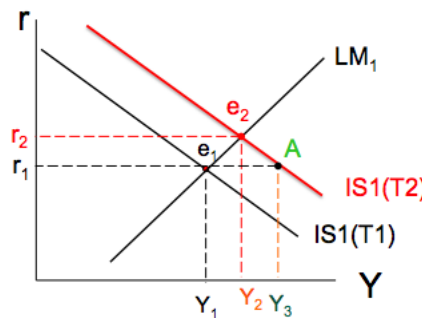


- Tax cut : $T2 < T1$
- Expansionary Fiscal policy ; DAE shifts upward

[DAE increases for all levels of output, Y.]

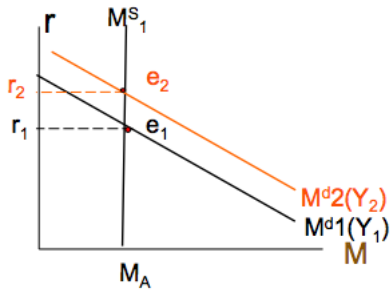
output **increases** for all levels of r

- ISLM



- IS curve shifts to the **right**

- Money Market



- Output increases from Y_1 to Y_2
- Money demand shifts to the **right**.
[Money Demand increases for all levels of interest rate, r .]

Expansionary Fiscal Policy

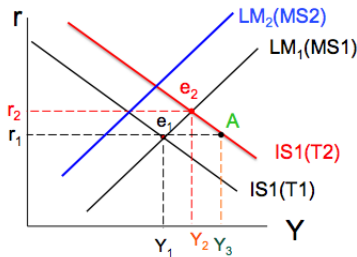
1. $Tax \downarrow \Rightarrow DAE \uparrow \Rightarrow Y$ **increases** from $..Y_1..$ to $..Y_3..$.
2. $Y \uparrow \Rightarrow M^d \uparrow \Rightarrow ..r.. \uparrow \Rightarrow I \downarrow \Rightarrow DAE \downarrow \Rightarrow Y \downarrow$ from $..Y_3..$ to $..Y_2..$.

For the case $G \uparrow$; $G \uparrow \Rightarrow r \uparrow \Rightarrow I \downarrow$ is called “**crowding out effect**”

[The second effect here is called “crowding out effect”. Government decreases the tax while government expenditure remains constant. The government, therefore, has to finance its expenditure by issuing more bonds. This drives up interest rate in financial market which in turn reduces private investment.]

- **Answer b.** Effect of a tax cut and Contractionary Monetary Policy.

- ISLM



- Tax cut, IS curve shifts to the **..right..**
- Contractionary monetary policy, $MS \downarrow \Rightarrow r \uparrow$ for all levels of $..Y.. \Rightarrow$ LM curve shifts to the **..left..**
- Effect of tax cut and contractionary policy on r :

1. tax cut IS **..(shifts to the right)..** $\rightarrow r \uparrow \dots$
2. contractionary monetary policy (**LM shifts to the left**) $\Rightarrow r \uparrow$.

* Hence, interest rate increases for certain.

- Effect of tax cut and contractionary policy on Y :

1. tax cut IS **...(shifts to the right)...** $\rightarrow Y \uparrow$.
2. contractionary monetary policy **..(LM shifts to the left)** $\Rightarrow Y \downarrow$.

*Total effect on Y depends on the relative magnitude of the shift.

- Total effect on Y depends on the relative magnitude of the shift.

1. $\Delta IS > \Delta LM \Rightarrow r \uparrow, Y \uparrow$
2. $\Delta IS < \Delta LM \Rightarrow r \uparrow, Y \downarrow$
3. $\Delta IS = \Delta LM \Rightarrow r \uparrow, Y \text{ constant}$

- 1. $Tax \downarrow \Rightarrow DAE \uparrow \Rightarrow Y \uparrow$...

2. $Y \uparrow \Rightarrow M^d \uparrow \Rightarrow r \uparrow \Rightarrow I \downarrow \Rightarrow DAE \downarrow \Rightarrow Y \downarrow$: crowding out effect

- 3. $MS \downarrow \Rightarrow r \uparrow \Rightarrow I \downarrow \Rightarrow Y \downarrow$

- Total effect = effect 1 + effect 2 (crowding out effect) + effect 3 (contractionary monetary policy).'

$$\text{total effect} = \underbrace{[\text{effect 1} + \text{effect 2}]}_{\text{[positive + negative]}} + \text{effect 3} \quad : \text{ on output (Y)}$$

- $$\begin{array}{l} \text{[positive]} + \text{[negative]} \\ \text{[effect of Tax Cut]} + \text{[Effect of Contractionary Monetary Policy]} \end{array}$$

- When we have the **tax cut policy** together with **contractionary monetary policy**, contractionary monetary policy causes investment to decrease further (effect 3). It hence reduces the effect of the tax cut policy on output. [equilibrium output is less than the new equilibrium output in question (a)]

- The total effect depends on the relative size of the policy.

- If the effect of contractionary monetary policy is the dominant effect, output **decreases**.
- If the effect of the tax cut policy is the dominant effect, output **increases**.
- If the effect of the tax cut policy is equal to the effect of contractionary monetary policy, output **constant**.
- interest rate **increases** for certain.

Question 2: Japan in the 1990s The 1990s were characterized as the “lost decade” for Japan. Growth in per-capita GDP was very low as the economy stagnated. As usual, economists debated at length whether Japan should try to use monetary or fiscal policy to solve its problems. The IS-LM model played a key role in these debates. Remember that the Japanese economy is in a pretty deep recession. This question is about trying to understand which policy the government should use to try to pull Japan out of a recession. Should it be expansionary or contractionary? More crucially, should the government use monetary policy or fiscal policy?

a. To start thinking about which policy the government should follow, let’s first think about the situation in Japan and what the LM curve looks like for Japan. Interest rates were extremely low in Japan at this time. When interest rates get close to zero, the demand for money is extremely high (say close to infinity). In this case, what does the LM curve look like? (Note that nominal interest rates cannot be lower than zero, so the LM curve cannot cross the horizontal axis of the IS-LM diagram). Draw a picture of what the LM curve may look like for Japan.

b. Now, let’s think about the IS-LM equilibrium in Japan. Which part of this LM curve do you think the Japanese economy is in equilibrium at? Indicate this on your graph and draw in the IS curve now to give you an equilibrium at that point.

c. To decide whether it should use monetary or fiscal policy, let’s think about what happens to the LM curve when there is an injection of liquidity into the system, i.e. the government uses expansionary monetary policy. How does the LM curve shift and how does this affect output and interest rates? Therefore, how effective a tool is monetary policy for pulling the economy out of the recession in Japan?

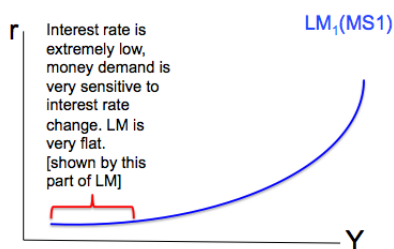
d. Given where Japan is, is fiscal policy more or less effective than the usual case (i.e. the standard case we have talked through in class)? Can you show this with an IS-LM diagram? Compare the Japan case to the usual case using an IS-LM diagram for each.

e. How do these findings inform the choice of policy for Japan in the 1990s?

• **ANSWER (a).**

- When interest rate is extremely low in Japan, money demand is very sensitive to interest rate change. $\epsilon_r^{M^d}$ is high. LM curve is flat. [A candidate may draw a **horizontal LM curve or a very flat LM curve.**]

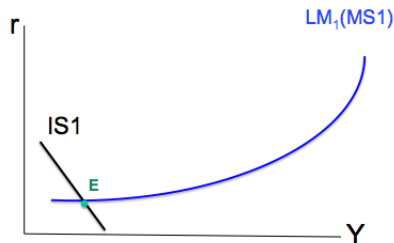
• LM



- **ANSWER (b).**

- Part of LM curve the Japanese economy is in equilibrium at is where interest rate is low and the LM curve is flat.

- ISLM



- Equilibrium is at point E.
- Interest rate is very low and output is also very low.

** [r is low and Y is low. “Growth in per capital GDP was very low as the economy is stagnated.” - Think about the case where expansionary monetary policy have been used to stimulate economy for long time. Interest rate decreased and it is at very low level. Output cannot increase much in the long-run. GDP growth would be low and the economy is stagnated. At this stage, further increase in money supply could not bring interest rate down by much. Interest rate cannot go below zero. LM is very flat. Note that this question requires ISLM analysis (assume price is constant). Therefore, there is no need to draw ADAS curve. The main idea is to analyze the relationship between effectiveness of policy and the slope of LM curve.] **

- **ANSWER (c).** If Japanese government inject more liquidity into the economy - increase money supply, LM curve shift to the right. LM curve is flat.
- $MS \uparrow \Leftarrow MS = M^d(Y, r)$: given Y , r has to decrease so that $M^d \uparrow$ to match with Money Supply. $\varepsilon_r^{M^d}$ is high. r does not have to decrease much. Since interest rate is now very close to zero and interest rate cannot be negative, interest rate cannot decrease much. Monetary Policy is ineffective.

$$MS \uparrow \Rightarrow \underbrace{r \downarrow \text{ (a little)}}_{MS \uparrow} \Rightarrow I \uparrow \text{ (a little)} \Rightarrow DAE \uparrow \text{ (a little)} \Rightarrow Y \uparrow \text{ (a little)}$$

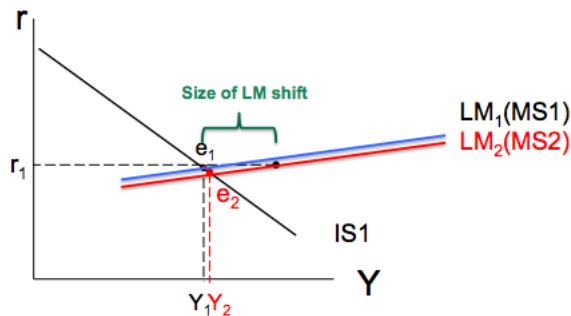
$$\uparrow$$

$$MS = M^d(Y, r)$$

$\varepsilon_r^{M^d}$ is high

$r \downarrow$ a little

- ISLM



- the flatter the LM, the ..less.. effectiveness monetary policy is.

[A candidate may compare the two cases; LM steep/ LM flat.]

- **ANSWER** (d). LM curve is flat, fiscal policy is more effective than usual.

- $MS \uparrow \Leftarrow MS = M^d(Y, r)$: given Y , r has to decrease so that $M^d \uparrow$ to match with Money Supply. $\varepsilon_r^{M^d}$ is high. r does not have to decrease much. Monetary Policy is ineffective.

1. $G \uparrow \Rightarrow DAE \uparrow$ (for all r) $\Rightarrow Y \uparrow$

2. $Y \uparrow \Rightarrow$ Money Demand $\uparrow \Rightarrow r \uparrow$ a little $\Rightarrow I \downarrow$ a little $\Rightarrow Y \downarrow$ a little

since

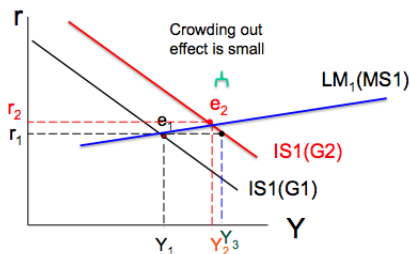
$$\begin{aligned} \varepsilon_r^{M^d} \text{ is high} \\ MS = M^d(Y, r) \\ M^s \text{ constant} \\ Y \uparrow \Rightarrow M^d \uparrow \end{aligned}$$

$r \uparrow$ a little
is enough for
 M^d to decrease
to match with M^s

- 2nd effect is crowding out effect. Crowding out effect is small.

- Hence Fiscal Policy is effective.

– ISLM



– the flatter the LM, the ...more..
effectiveness fiscal policy is.

- For the case that **LM is horizontal**, interest rate remain constant, and hence **crowding out effect is zero**.

– ISLM

