EE320 – Effectiveness of Fiscal and Monetary Policy (IS-LM Model)

IS-LM Model – Closed Economy without Tax

Given the following model:

(i) Commodity Market:

$$Y = C + I + G_0$$

$$C = a + bY\ , \qquad 0 < b < 1$$

$$I = I_0 - ir, \qquad i > 0$$

Equilibrium condition: Y = AE ➔ $Y = \frac{a+I_0+G_0}{1-b} - \frac{i}{1-b}r$ -- (1)

Alternatively, $r = \frac{a+I_0+G_0}{i} - \frac{1-b}{i}Y$.

(ii) Money Market:

$$M^s = M_o$$

$$M^d = kY - hr, \qquad k > 0,\ h > 0$$

Equilibrium condition: $M^s = M^d$ ➔ $Y = \frac{M_0}{k} + \frac{h}{k}r$ -- (2)

Alternatively, $r = \frac{k}{h}Y - \frac{M_0}{h}$.

Equilibria in both markets imply that:

$$Y^* = \frac{(a+I_0+G_0)h+iM_0}{ik+h[1-b(1-t)]}$$

and

$$r^* = \frac{(a+I_0+G_0)k-[1-b(1-t)]M_0}{ik+h[1-b(1-t)]}\ .$$

Effectiveness of Fiscal and Monetary Policies

Key ideas:

- We look at policy effectiveness in terms of its influence on output (Y).
- Which policy is more effective depends on their relative slopes.
    - Monetary policy is more effective when the IS curve is relatively flatter.
    - Fiscal policy is more effective when the LM curve is relatively flatter.

Next, we will consider each policy in details.

I. Effectiveness of Monetary Policy

Let's consider the expansionary monetary policy (LM shifts right).

Step 1: Increasing money supply ➔ r decreases

Step 2: r decreases ➔ Investment (I) increases

Step 3: I increases ➔ AE increases ➔ Y* increases.

Situations when expansionary monetary policy is LESS effective.

1. *When the LM curve is relatively flat.*

Recall that $M^d = kY - hr$: the slope of money demand (*Md*) curve depends on h.

- If h is large, the *Md* curve is flat (ie. *Md* is relatively elastic). So, the slope of the LM curve depends on h, which tells how money demand is responsive to change in r.
- When h is large, the LM curve is flat, since $r = \frac{k}{h}Y - \frac{M_0}{h}$.
- In this case, when *Ms* increases, r changes very little (or does not change at all if *Md* is perfectly elastic).
- *I* and *AE* change very little since Δr is small.

- Thus, ΔY* is small; i.e. increasing *Ms* has a small effect on Y*.
- In the extreme case where LM curve is horizontal, the monetary policy will not be effective.

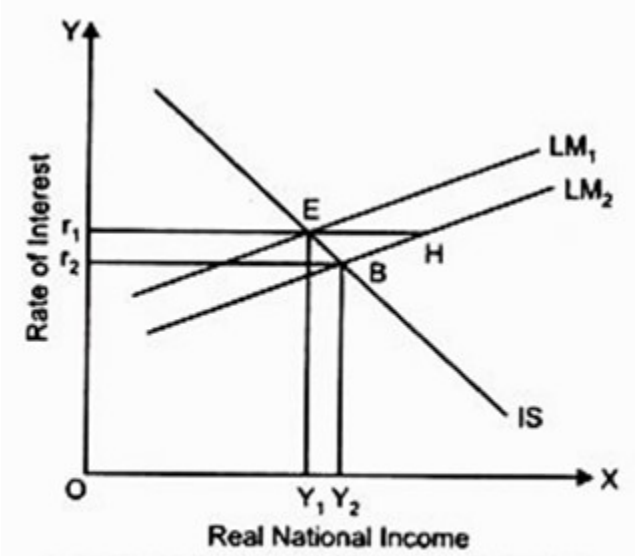

Fig. 20.10: *Flat LM Curve implies that monetary policy is not much effective*

2. *When the IS curve is relatively steep*.

Recall: $I = I_0 - ir$. So, *i* tells how investment responds to change in interest rate.

- When *i* is small, *r* has a small effect on investment.
- If *i* is small (i.e.), the IS curve is steep. [since $r = \frac{a+I_0+G_0}{i} - \frac{1-b}{i}Y$].
- In this case, a reduction in r due to an increase in Ms results in a small increase in I.
- Hence, the aggregate output will change only a little - the monetary policy will be less effective.
- In the extreme case where the IS curve is vertical, there will be no change in Y* as a result of increasing Ms.

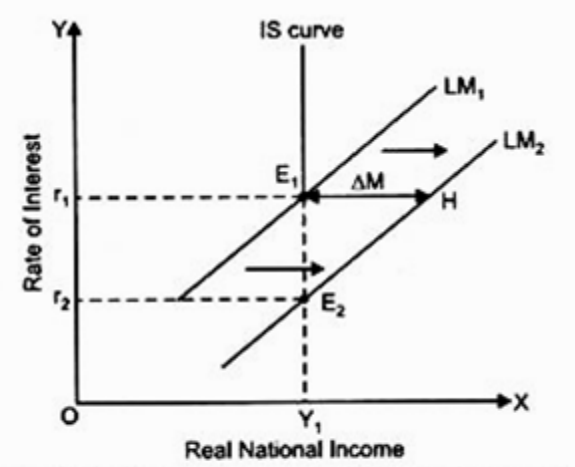

Fig. 20.11. *Zero interest responsiveness of investment spending (i.e.,vertical IS curve) implies expansionary monetary policy is ineffective in raising national income.*

II. Fiscal Policy

Let's consider the expansionary fiscal policy (IS shifts right).

Step 1: Increasing government spending (G) ➔ Y increases

Step 2: Y increases ➔ Money demand (Md) increases (Md=kY-hr).

Step 3: Md increases ➔ r increases

Step 4: r increases ➔ I decreases ➔ Y decreases (crowding-out effect)

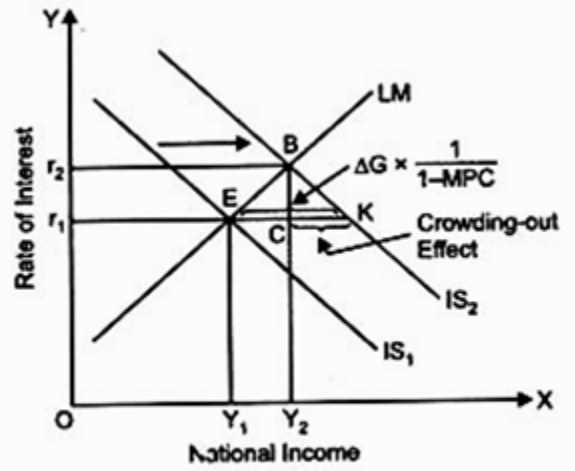

Fig. 20.6. *Expansionary Fiscal Policy : Impact of Increase in Government Expenditure on Interest Rate and Income*

Situations when expansionary fiscal policy is LESS effective.

1. *When the LM curve is relatively steep.*

- In step 3, we look at how r responds to change in Md, which increases as a result of increasing Y (due to G increase).
- When *h* is small, *r* is less responsive to change in Md (since $M^d = kY - hr$).
- If *h* is small, the LM curve is steep when (since $r = \frac{k}{h}Y - \frac{M_0}{h}$).
- In this case, as Y increases (as result of increasing G), *r* must increase by a large amount in order to bring back Md to the starting level.
- As a result of a large increase in *r*, *I* decreases by a large amount. That is, there's a large crowding-out effect.
- Hence, overall Y* will increase by a small amount due to a large crowding-out effect. That is, the fiscal policy is less effective.
- In the extreme case where LM curve is vertical, the change in r as a result of G increase will completely wipe out the expansionary effect.

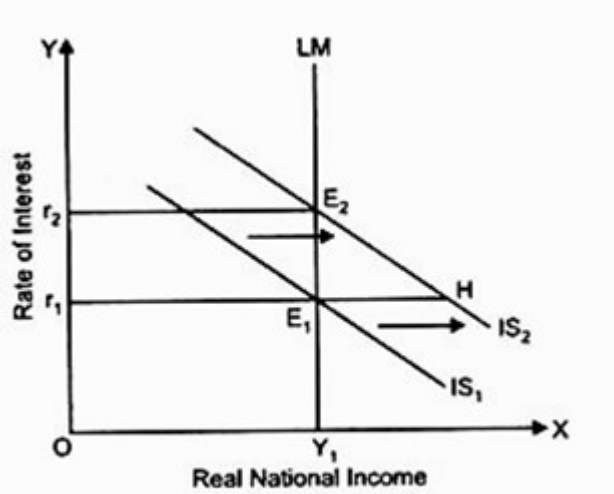

Fig. 20.14. *Full Crowding-Out of Fiscal Stimulus: The Classical Case*

2. *When the IS curve is relatively flat.*

- In step 4, we look at how investment responds to change in interest rate, *r*.
- If *i* is large (r has a big effect on I), the IS curve is flat, since $r = \frac{a+I_0+G_0}{i} - \frac{1-b}{i}Y$.
- With expansionary fiscal policy, *r* increases (steps 1-3).
- From, $I = I_0 - ir,$ when *i* is large, investment would decrease by a large amount for a given increase in *r*.
- In this case, there's a large crowding-out effect. Hence, the fiscal policy is less effective.

Picture source: http://www.economicsdiscussion.net/is-lm-curve-model/effectiveness-of-monetary-policy-and-fiscal-policy/10548.