Theme 4
Macroeconomic General Equilibrium

MGE refers to simultaneous equilibrium in product and money markets.

For product market equilibrium, we need:

$Y = C + I$ or $I = S$ (assuming $G = X = M = 0$)

For money market equilibrium, we need:

$M_d = M_s$ (or $L = M$) L=liquidity

This framework is called the IS-LM model.

Let,

$I = I(i)$
$C = C(Y)$
$M_d = M_t + M_{sp} = kY + L(i)$
$M_s = M$

what is k?
Mt- transactory demand
Msp- speculative demand

Therefore, for product and money market equilibrium,

$Y = C(Y) + I(i)$ and $M = kY + L(i)$

For simultaneous equilibrium, we need:

$C(Y) + I(i) = kY + L(i)$

Solving for Y and i will give values where both, product and money markets, are in equilibrium simultaneously.

Figure 1 below shows the derivation of the IS curve graphically. Given different rates of interest, points on the IS curve give us levels of Y such that, I = S, i.e. product market equilibrium. Note that at point A-below the IS curve (point B-above the IS curve), $I > S$ ($I < S$).

Figure 2 below shows the derivation of the LM curve graphically. Given different rates of interest, points on the LM curve give us levels of Y such that, $M_d = M_s$, i.e. money market equilibrium. Note that at point C-right of LM curve (point D-left of LM curve), $M_s < M_d$ ($M_s > M_d$).

Finally Figure 3 shows us that it is only at point E that both, product and money markets are in equilibrium, **simultaneously**. Suppose, however, the economy is at point J (i.e. on the IS curve, but not on the LM curve). Therefore, since J is left of LM curve, $M_s > M_d$. People buy bonds, i falls. As i falls, I increases, Y increases. The process, will continue till we reach E.

Figure 4 and 5 shows the impact of shifts in the I-schedule on the IS curve and that of changes in M_s on the LM curve. Figure 6 and 7 shows how these impact the equilibrium levels of i and Y.

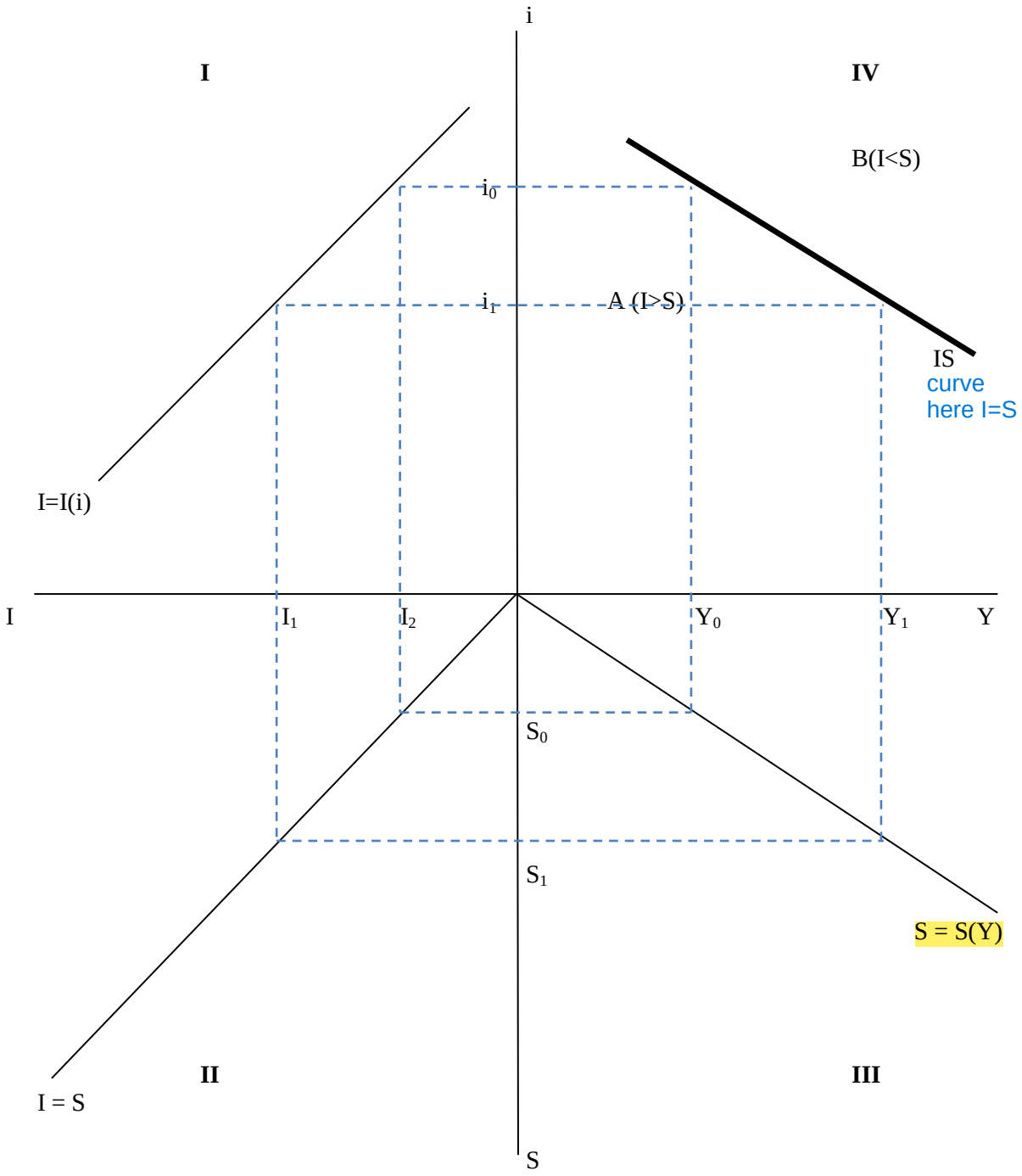

i
I
IV
B(I<S)
i0
i1
A (I>S)
IS
curve
here I=S
I=I(i)
I
I1
I2
Y0
Y1
Y
S0
S1
S = S(Y)
II
III
I = S
S

Figure 1

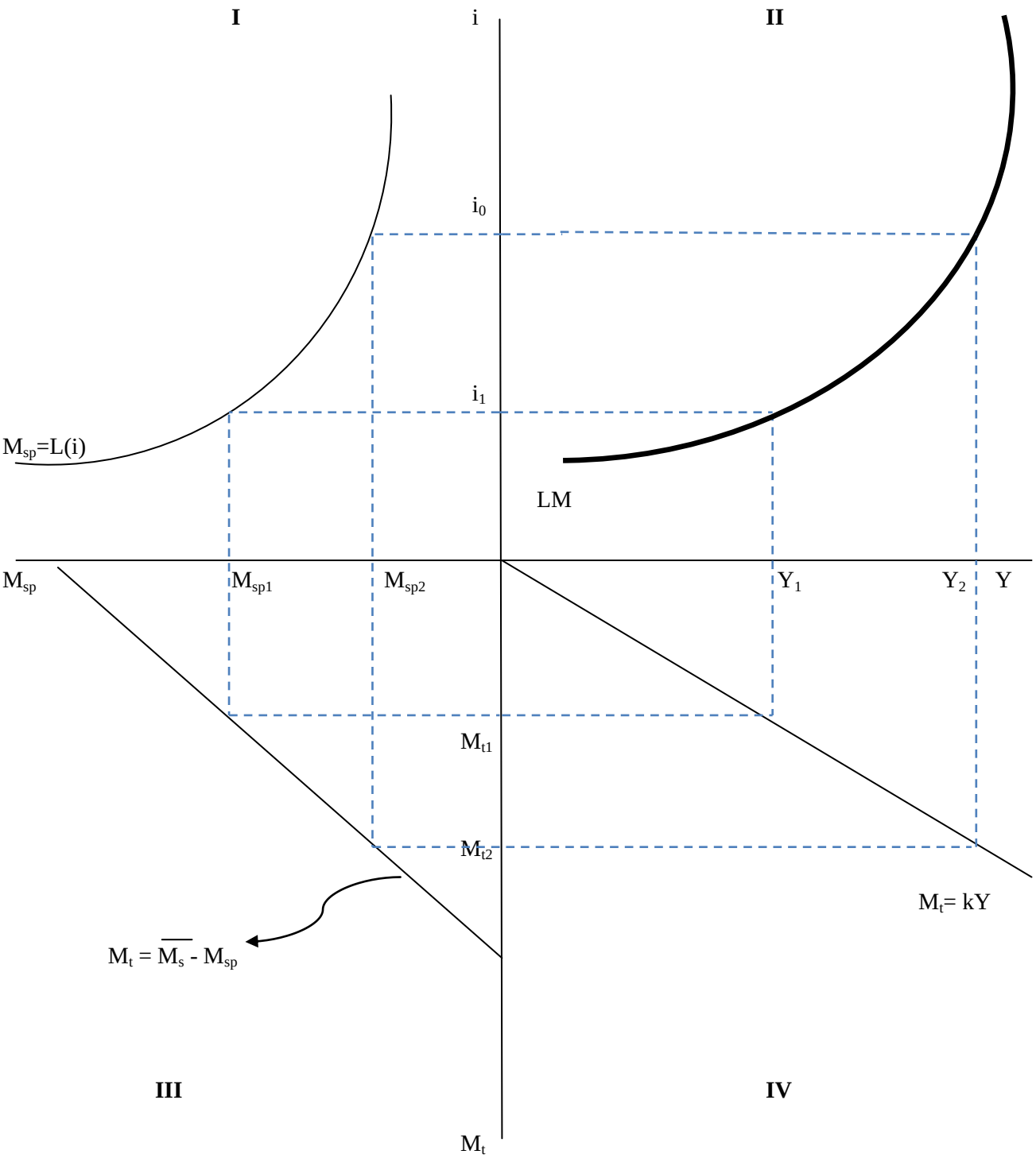
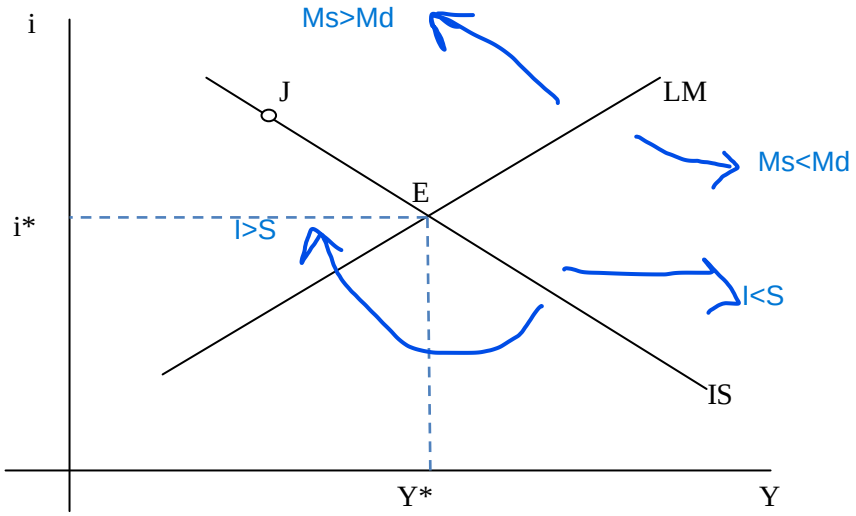

I
i
II
i_0
i_1
M_{sp}=L(i)
LM
M_{sp}
M_{sp1}
M_{sp2}
Y_1
Y_2
Y
M_{t1}
M_{t2}
M_t= kY
$M_t = \overline{M_s} - M_{sp}$
III
IV
M_t

Figure 2



At J, $M_s > M_d$ … people buy bonds … increase P_B … fall in c/P_B ….fall in i …. E

Figure 3

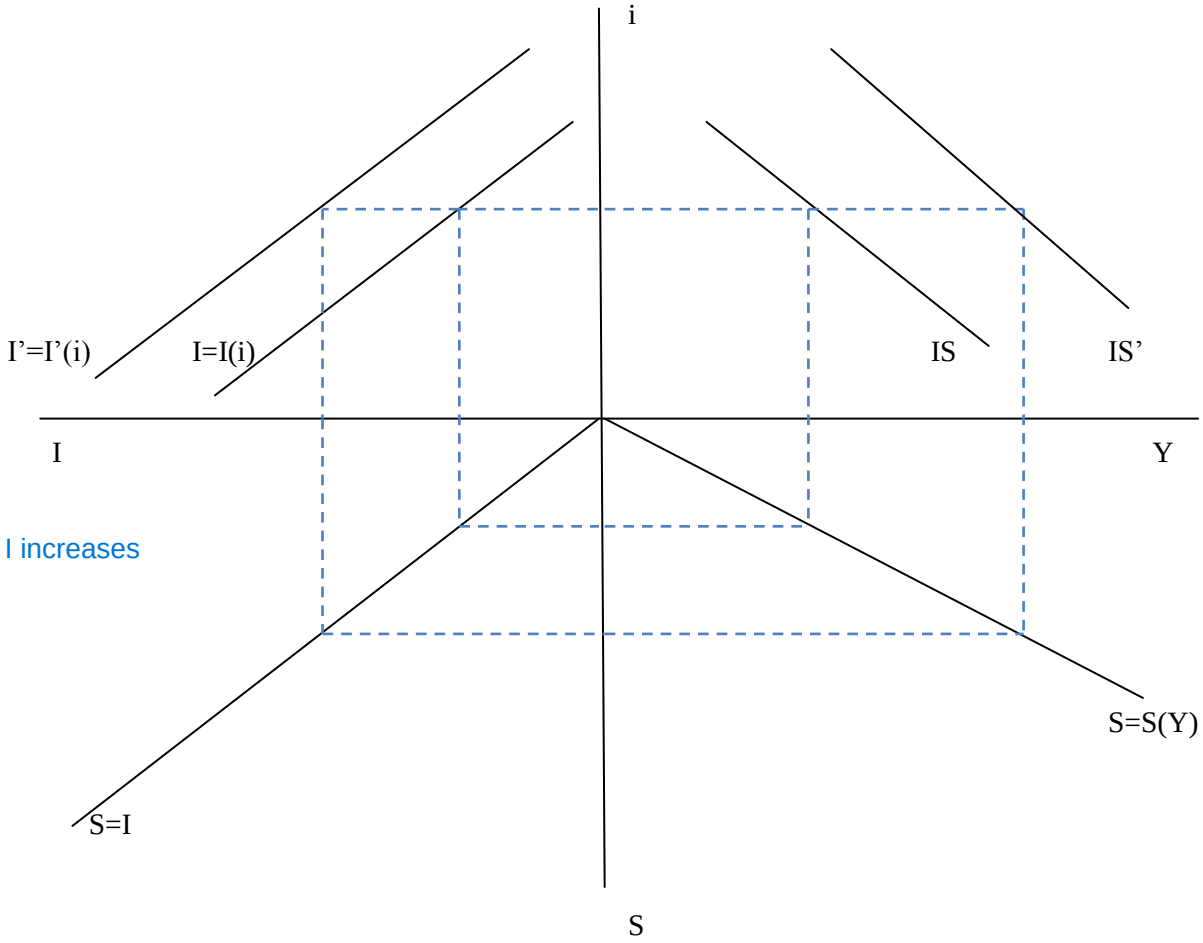


Figure 4

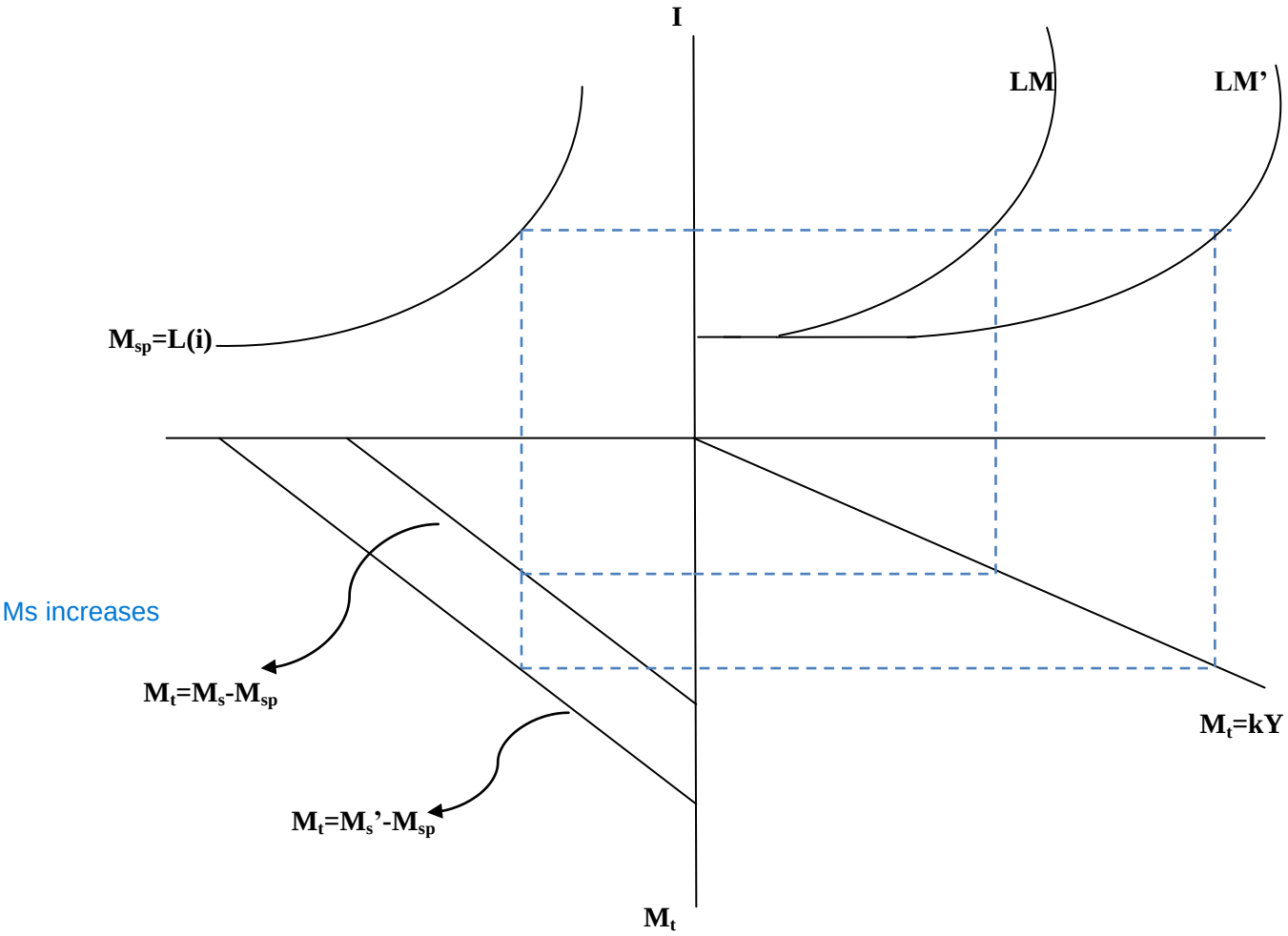


Figure 5

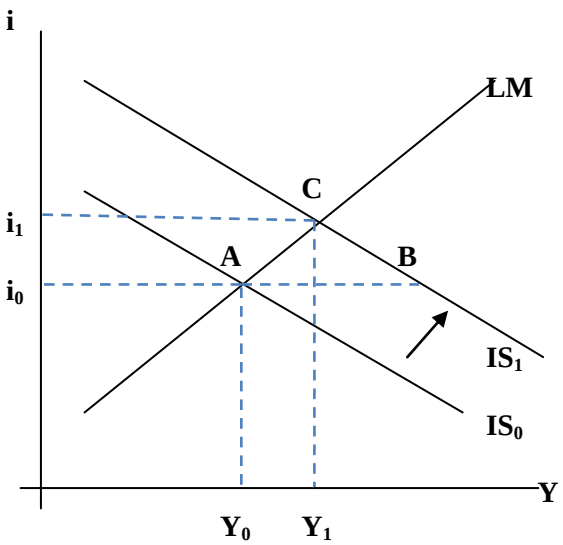


Figure 6

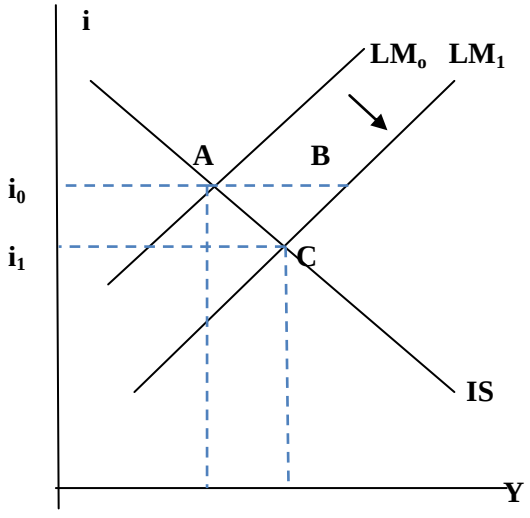


Figure 7

Algebra of the IS-LM model

In the product market, we have C = C(Y) = 10 + 0.5Y and I = I(i) = 200 – 2000i

Then,

$Y = C + I = 10 + 0.5Y + 200 – 2000i$

Therefore,

$Y = 420 – 4000i$ …… (1)

In the money market we have $M_t = kY = 0.5Y$ and $M_{sp} = L(i) = 150 – 1500i$. If $M_s = 150$, then

$150 = 0.5Y + 150 – 1500i$ or $Y = 3000i$ …….. (2)

Solving, (1) and (2) simultaneously gives us

$420 – 4200i = 3000i$

Therefore,

$i^* = 0.06$ $Y^* = 180$

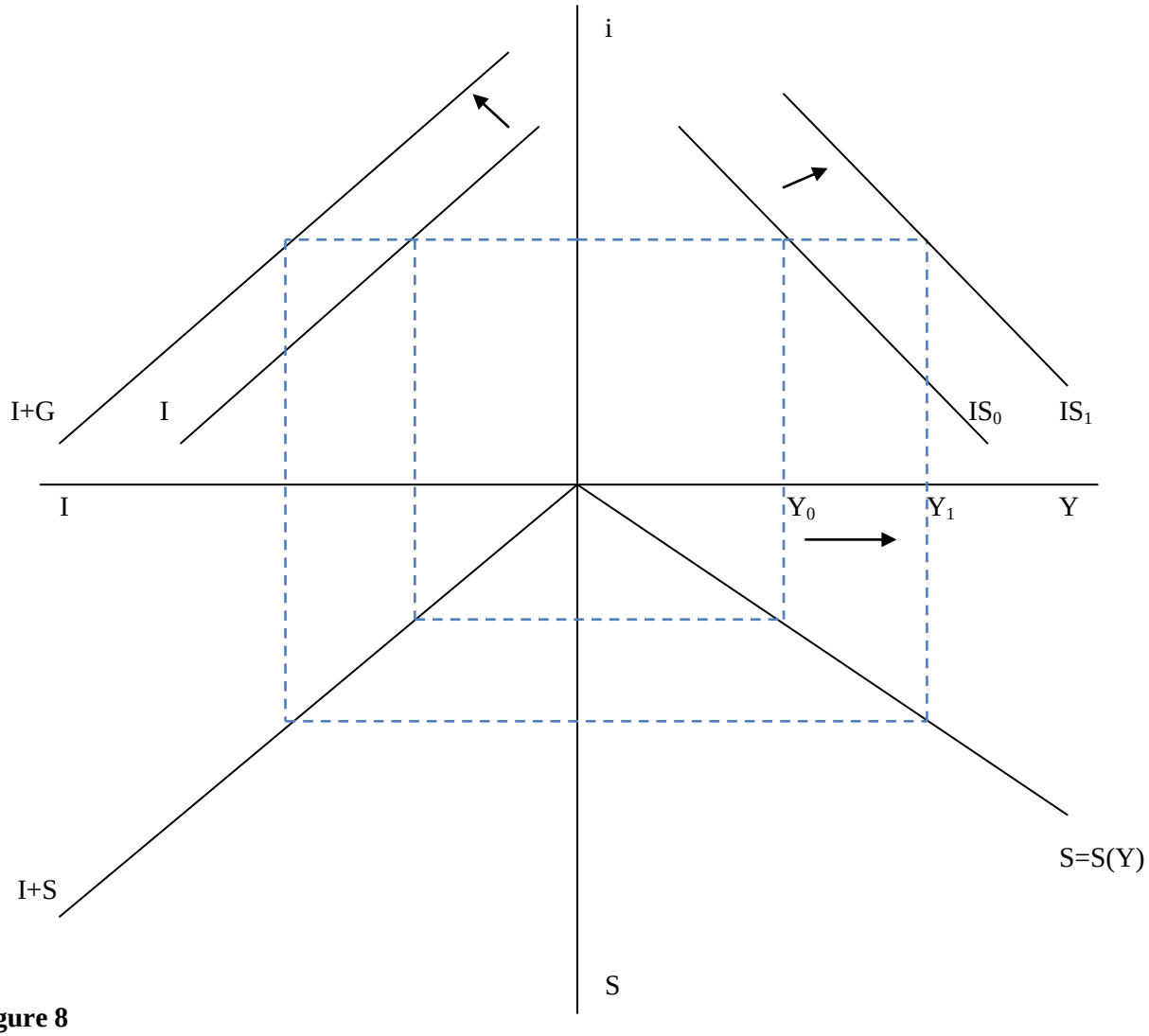


Figure 8

Fiscal Policy

We can study the impact of government spending (G) on equilibrium level of Y and i. In the product market, with G, we must have I + G = S for equilibrium. Figure 8 shows what happens to the IS curve when we increase or introduce G.

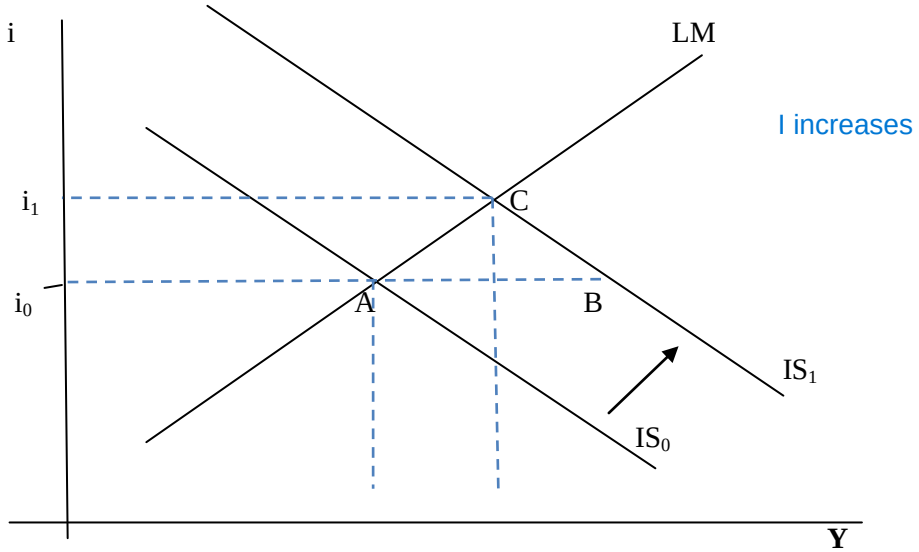


Figure 9

Figure 9 shows the impact of the shift in IS curve on the final equilibrium levels of Y and i. Note that there is a partial crowding out effect of the multiplier because we now have final not as much as full shift in the IS curve. This is because i increases and partially crowds out final investment. With the shift in IS curve, we are at point Q which is to the right of the LM curve. Therefore, $M_d > M_s$. People sell bonds, p_B fall and interest rates rise. As i increases, I falls and Y falls.

Note in the above diagram: at point B, $M_d > M_s$ … sell bonds … fall in P_B … increase i … fall in I