ECON2113 Macroeconomics

Chapter 11 Exercises

Solutions

1.

a. Each point on the IS-curve represents an equilibrium in the expenditure sector. (Note that this is a closed economy, that is, NX = 0). The IS-curve can be derived by setting actual income equal to intended spending, or

$$Y = C + I + G = (0.8)[1 - (0.25)]Y + 900 - 50i + 800 = 1{,}700 + (0.6)Y - 50i \quad ==>$$

$$(0.4)Y = 1{,}700 - 50i ==> Y = (2.5)(1{,}700 - 50i)$$

$$==> \quad \mathbf{Y = 4{,}250 - 125i}. \quad \textbf{IS-curve}$$

b. The IS-curve shows all combinations of the interest rate and the output level such that the expenditure sector (the goods market) is in equilibrium, that is, actual output equals intended spending. A decrease in the interest rate stimulates investment spending, making intended spending greater than actual output. The resulting unintended inventory decrease leads firms to increase their production until actual output is again equal to intended spending. This means that the IS-curve is downward sloping.

c. Each point on the LM-curve represents an equilibrium in the money sector. Therefore the LM-curve can be derived by setting real money supply equal to real money demand, that is,

$$M/P = L \quad ==> \quad 500 = (0.25)Y - 62.5i \quad ==> Y = 4(500 + 62.5i)$$

$$==> \quad \mathbf{Y = 2{,}000 + 250i.} \quad \textbf{LM-curve}$$

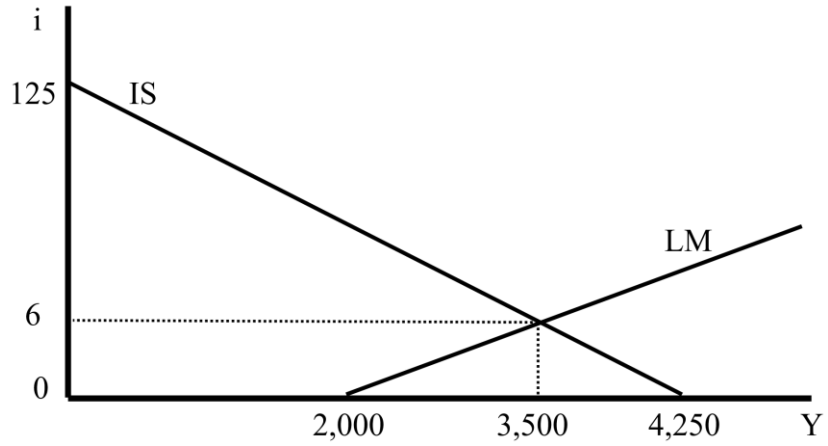
d. The LM-curve shows all combinations of the interest rate and level of output such that the money sector is in equilibrium, that is, the demand for real money balances is equal to the supply of real money balances. An increase in income will increase the demand for real money balances. Given a fixed real money supply, this will lead to an increase in interest rates, which will then reduce the quantity of real money balances demanded until the money sector is again in equilibrium. In other words, the LM-curve is upward sloping.

e. The equilibrium levels of income and the interest rate are determined by the intersection of the IS-curve with the LM-curve. At this point, the expenditure sector and the money sector are both in equilibrium simultaneously.

From IS = LM ==> 4,250 - 125i = 2,000 + 250i ==> 2,250 = 375i ==> **i = 6**

==> Y = 4,250 - 125*6 = 4,250 - 750 ==> **Y = 3,500**

Check: Y = 2,000 + 250*6 = 2,000 + 1,500 = 3,500



2.

a. As we have seen in **1.a.**, the value of the expenditure multiplier is $\alpha = 2.5$. This multiplier is derived in the same way as in Chapter 10. But now intended spending also depends on the interest rate, so we no longer have $Y = \alpha A_o$, but rather

$$Y = \alpha(A_o - bi) = (1/[1 - c + ct])(A_o - bi) \Rightarrow Y = (2.5)(1{,}700 - 50i) = 4{,}250 - 125i.$$

b. In the IS-LM model, an increase in government purchases (G) will have a smaller effect on output than in the model of the expenditure sector used in Chapter 10, in which interest rates are assumed to be fixed. This can be demonstrated most easily with a numerical example. If government purchases are increased by $\Delta G = 300$, the IS-curve shifts parallel to the right by

$$\Delta IS = (2.5)(300) = 750.$$

Therefore, the equation of the new IS-curve is: Y = 5,000 - 125i.

From IS' = LM ==> 5,000 - 125i = 2,000 + 250i ==> 375i = 3,000 ==> **i = 8**

==> Y = 2,000 + 250*8 ==> **Y = 4,000** **==>** **ΔY = 500**

When interest rates are assumed to be fixed, the size of the expenditure multiplier is $\alpha = 2.5$, that is, $(\Delta Y)/(\Delta G) = 750/300 = 2.5$. However, when interest rates are allowed to vary, the size of the multiplier is reduced to $\alpha_1 = (\Delta Y)/(\Delta G) = 500/300 = 5/3 = 1.67$.

c. An increase in government purchases by $\Delta G = 300$ causes a change in the interest rate from $i_o = 6$ to $i_1 = 8$, that is, by 2 percentage points. Therefore government spending has to change by $\Delta G = 150$ to increase the interest rate by one percentage point.

d. The simple multiplier $\alpha = 2.5$ in **2.a.** shows the magnitude of the horizontal shift in the IS-curve, given a change in autonomous spending by one unit. But an increase in income increases money demand and this leads to an increase in the interest rate. The higher interest rate crowds out some investment spending and this has a dampening effect on the level of output. The multiplier effect in **2.b.** is therefore smaller than the multiplier effect in **2.a.**, and has been reduced to $\alpha_1 = 1.67$.

3.

a. A decrease in the demand for money will lower the interest rate and increase the level of output demanded, that is, it will shift the LM-curve to the right. As a result, the AD-curve will also shift to the right. In the Keynesian case, the price level is assumed to be fixed, that is, the AS-curve is horizontal. In this case, the increase in the output level in the AD-AS diagram is equivalent to the increase in the output level in the IS-LM diagram, since there is no price adjustment. In other words, the real balance effect does not come into play since the price level does not change.

b. A decrease in the demand for money will lower the interest rate and increase the level of output demanded, that is, it will shift the LM-curve to the right. As a result, the AD-curve will also shift to the right. In the classical case, the level of output will not change, since the AS-curve is vertical. In this case, the shift in the AD-curve will simply be reflected in a price increase, but the level of output will remain unchanged. The real balance effect causes the LM-curve to shift back to its original level, since the price increase causes a decrease in real money balances.