Financial Markets and Aggregate Demand

Additional Homework Problems

ECON 3133

Dr. Keen

1.

a. Using the money demand/money supply equation (the LM curve equation), solve for R as a function of Y. (note: $M^S = 900$ and $P = 1$.)

$$M^S = (0.1583\times Y - 1{,}000\times R)\times P$$
$$900 = (0.1583\times Y - 1{,}000\times R)\times 1$$
$$R = 0.1583/1{,}000\times Y - 900/1{,}000$$

Next, substitute the consumption function, investment function, and the net exports function into the income identity to get the equation for the IS curve. (note: $G = 1{,}200$)

$$Y = 220 + 0.63\times Y + 1{,}000 - 2{,}000\times R + 1{,}200 + 525 - 0.1\times Y - 500\times R$$
$$Y = 2{,}945 + 0.53\times Y - 2{,}500\times R$$

Next, substitute R from the LM curve equation into the IS curve equation.

$$Y = 2{,}945 + 0.53\times Y - 2{,}500\times(0.1583/1{,}000\times Y - 900/1{,}000)$$
$$Y = 2{,}945 + 0.53\times Y - 2.5\times(0.1583\times Y - 900)$$
$$Y = 2{,}945 + 0.53\times Y - 0.39575\times Y + 2250$$
$$Y = 5{,}195 + 0.13425\times Y$$
$$Y - 0.13425\times Y = 5{,}195$$
$$0.86575\times Y = 5{,}195$$
$$Y = 5{,}195/0.86575$$
$$Y = 5{,}195/0.86575$$
$$Y^{**} \approx 6000.$$

b. LM: $R = 0.1583/1{,}000\times Y - 900/1{,}000 \approx 0.05$ or 5%.
IS: $R = 2{,}945/2{,}500 - (0.47/2{,}500)\times Y = 0.05$ or 5%.
The answers agree because aggregate demand embodies the intersection of IS and LM curves.

c. $C = 220 + 0.63\times Y = 4{,}000$.
$I = 1{,}000 - 2{,}000\times R = 900$.
$(X - IM) = 525 - 0.1\times Y - 500\times R = 525 - 0.1\times(6{,}000) - 500\times(0.05) = -100$.

d. $C + I + G + (X - IM) = Y$
$4{,}000 + 900 + 1{,}200 - 100 = 6{,}000$.

e. $\Delta Y = 116 \rightarrow Y = 6{,}116 \rightarrow R = 6.8\% \rightarrow I = 864$, $X - IM = -121$.
The crowding out of investment is 36; the crowding out of net exports is 21.

2.

a. $S_G = t\times Y - G = 0.3\times 6{,}000 - 1{,}200 = 1{,}800 - 1{,}200 = 600$.
$S_P = Y^d - C = (1 - t)\times Y - C = 0.7\times 6{,}000 - 4{,}000 = 4{,}200 - 4{,}000 = 200$.
$S_w = -(X - IM) = 100$.
$I = S_P + S_G + S_w = 200 + 600 + 100 = 900$.

b. Now Y = 6,116. $S_G + S_P + S_w = 535 + 208 + 121 = 864 = I$.
Government savings falls by less than the increase in government spending, private and rest-of-world saving increase, and investment falls.

c. Higher government spending pushes up output, which causes private savings to rise. The higher government spending also pushes down government savings. Since this decline dominates the increase in private savings, government budget deficits absorb the increase in private savings.

3.

a. Starting with the goods market, we substitute the consumption function [$C = 90 + 0.9 \times Y$] and the investment function [$I = 900 - 900 \times R$] into the income identity [$Y = C + I$] to get the IS curve equation.

$$Y = 90 + 0.9 \times Y + 900 - 900 \times R.$$
$$Y - 0.9 \times Y = 990 - 900 \times R.$$
$$0.1 \times Y = 990 - 900 \times R.$$
$$900 \times R = 990 - 0.1 \times Y.$$
$$R = 990/900 - (0.1/900) \times Y.$$
$$R = 1.1 - (1/9{,}000) \times Y$$

To derive the LM curve equation, solve the money market equation [$M^S = (0.9 \times Y - 900 \times R) \times P$] for R.

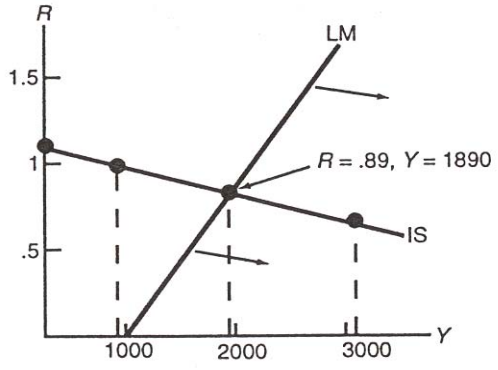
$$M^S = (0.9 \times Y - 900 \times R) \times P$$
$$M^S/P = 0.9 \times Y - 900 \times R$$
$$900 \times R = 0.9 \times Y - M^S/P$$
$$R = (0.9/900) \times Y - (1/900) \times M^S/P$$
$$R = 0.001 \times Y - (1/900) \times M^S/P$$

To find the equilibrium values of Y and R, substitute the money supply value (900) and the price level value (1) into the LM curve and then set the equations for the IS and LM curve equal to each other

$$1.1 - (1/9{,}000) \times Y = 0.001 \times Y - (1/900) \times 900/1$$
$$9{,}000 \times [1.1 - (1/9{,}000) \times Y] = 9{,}000 \times [0.001 \times Y - 1]$$
$$9{,}900 - Y = 9 \times Y - 9{,}000$$
$$9{,}900 - Y = 9 \times Y - 9{,}000$$
$$1{,}8900 = 10 \times Y$$
$$Y = 1{,}890$$

To solve for R, substitute Y into the equation for the IS curve (you can also substitute Y into the equation for the LM curve).

$$R = 1.1 - (1/9{,}000) \times 1{,}890$$
$$R = 1.1 - 1{,}890/9{,}000$$
$$R = 1.1 - 0.21$$
$$R = 0.89$$

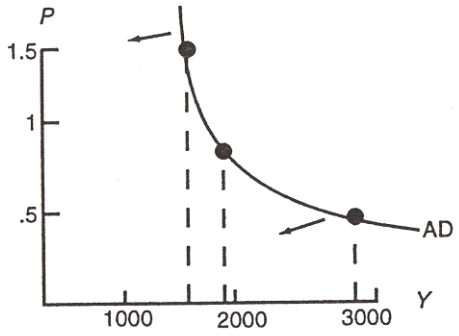


If money supply increases, the LM curve shifts out and to the right.

b. To get the equation for the AD curve, equate the equation for the IS curve [R = 1.1 – (1/9,000)×Y] and the equation for LM curve [R = – (1/900)×M^S/P + 0.001×Y] and then solve for Y:

$$
\begin{gathered}
-(1/9{,}000)\times Y = -(1/900)\times M^S/P + 0.001\times Y \\
9{,}000\times[1.1 - (1/9{,}000)\times Y] = 9{,}000\times[-(1/900)\times M^S/P + 0.001\times Y] \\
9{,}900 - Y = -10\times M^S/P + 9\times Y \\
9{,}900 + 10\times M^S/P = 10\times Y \\
Y = 990 + M^S/P
\end{gathered}
$$

Therefore, a decrease in the money supply will cause the aggregate demand curve to shift inward and to the left.



c. Take the aggregate demand curve equation from part b and substitute in the value for the money supply (900). We then solve for P.

$$
\begin{gathered}
Y = 990 + M^S/P \\
Y = 990 + 900/P \\
Y\times P = 990\times P + 900 \\
Y\times P - 990\times P = 900 \\
(Y - 990)\times P = 900 \\
P = 900/(Y - 990).
\end{gathered}
$$

4.

a)

(i) If investment demand is insensitive to the interest rate (i.e., d is small), then as the interest rate falls, investment increases slightly. Thus, output only has to rise by a small amount in order to keep output equal to aggregate expenditures.

(ii) If money demand is insensitive to income (i.e., k is small), then an increase in the interest rate, will require a larger rise in income in order to keep money demand equal to money supply.

(iii) If money demand is very sensitive to the interest rate (i.e., h is large), then a rise in the interest rate causes a large decline in money demand. To keep money demand equal to money supply, income will have to increase significantly.

(iv) A fall in the interest rate causes investment and net exports to rise. The change in investment and exports is multiplied by the spending multiplier to calculate the change in output. When the marginal propensity to consume is high, the spending multiplier is large. As a result, output increases substantially in response to an interest rate decline when the marginal propensity to consume is large.

b.

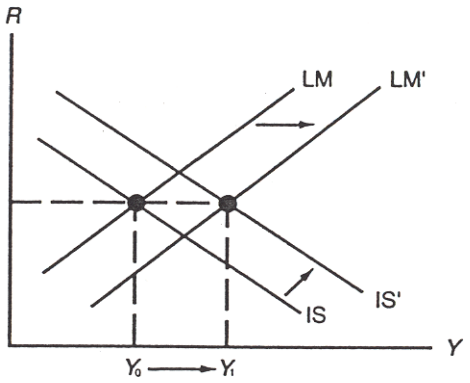
(i) A fall in d increases the slope of the IS curve.

(ii) A fall in k reduces the slope of the LM curve.

(iii) An increase in h reduces the slope of the LM curve.

(iv) An increase in b reduces the slope of the IS curve.

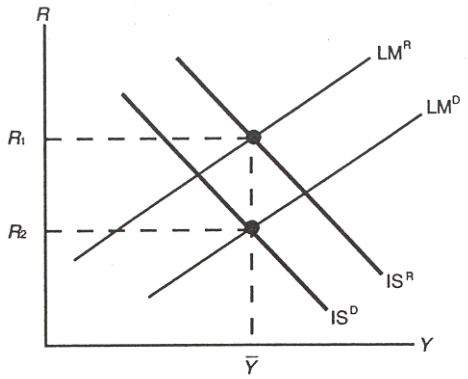
5. In order to increase output while holding R constant, we must follow an expansionary fiscal policy (increasing government expenditure and/or reducing taxation) and monetary policy (increasing money supply).



To keep output constant and reduce the interest rate, we need an expansionary monetary policy and a contractionary fiscal policy.

6.

a.



b. Consumption and private saving are higher in the Republican administration, while investment, net exports, and government saving are higher in the Democratic administration.

c. Democratic administration (since foreign saving declines).