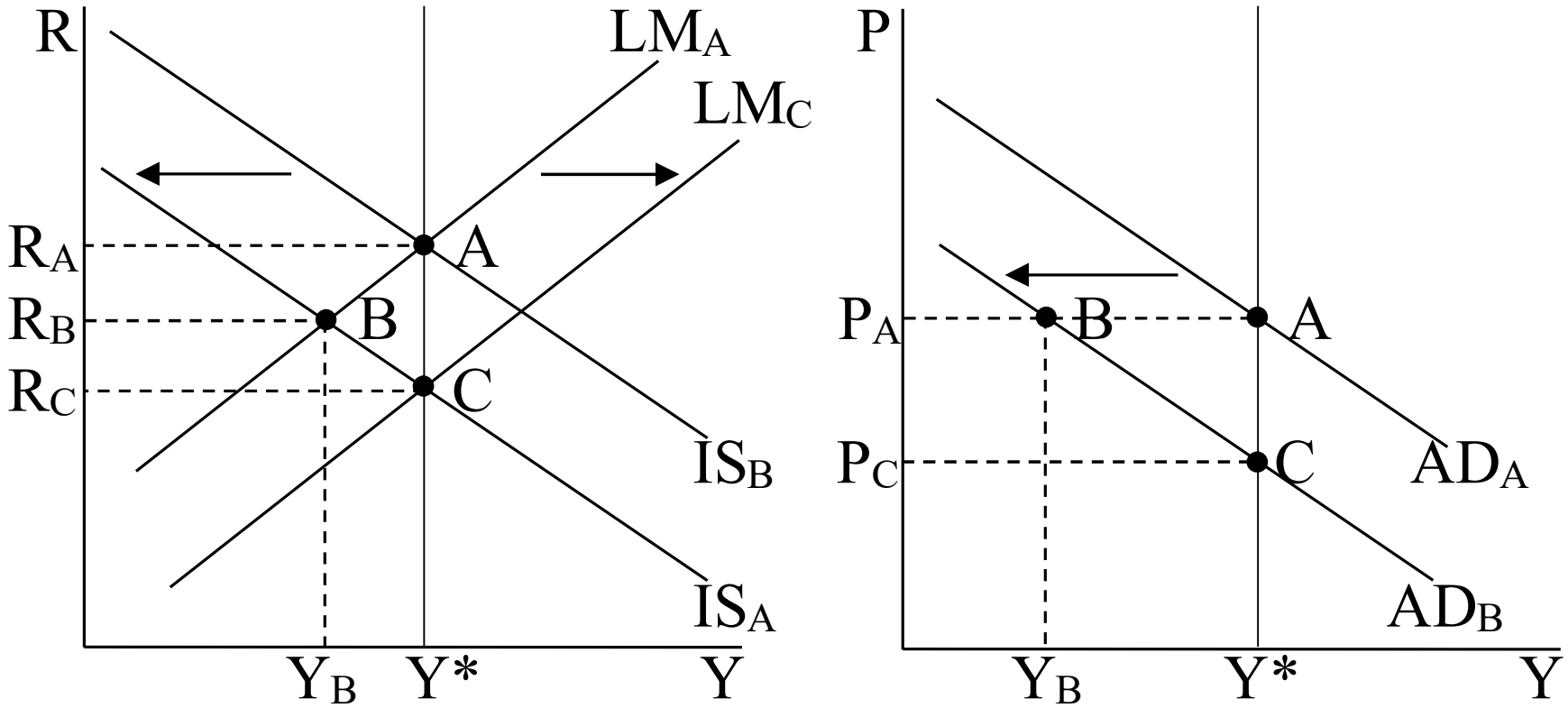
Answers to Preparation Questions for Final

1. *Autonomous Imports*: *Suppose the economy is initially at potential output. What are the short-run and long-run impacts of an increase in autonomous imports on output, the interest rate, the price level, the nominal exchange rate, and the real exchange rate? Briefly explain your answer. Use an IS/LM graph and an aggregate demand graph to support that answer.*

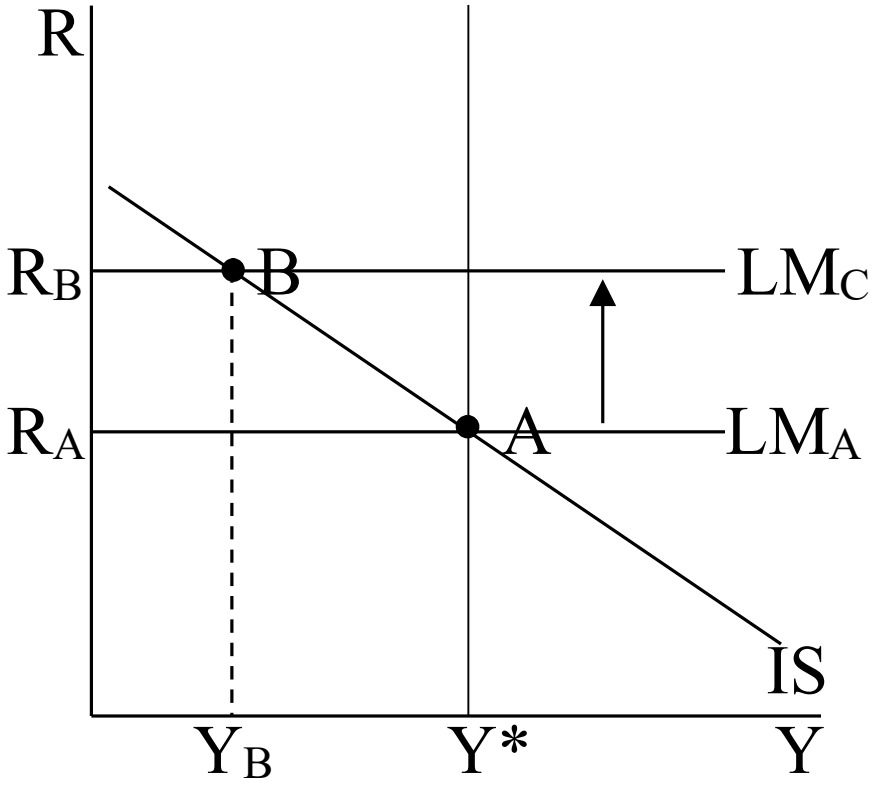
   In the short run, a rise in g_{IM} (i.e., X – IM falls) means consumers are buying more foreign goods, which causes Y to decline to Y_B and the IS to shift to the left. That lower level of output reduces money demand which causes R to fall. The lower R decreases demand for U.S. assets, which leads to a decline in E_R. Since P and P_W remain unchanged, E declines and the AD curve shifts leftward [$g_{IM}\uparrow \rightarrow Y\downarrow \rightarrow M_D\downarrow \rightarrow R\downarrow \rightarrow E_R\downarrow \rightarrow E\downarrow$]. In the long run, P falls from P_A to P_C, which causes M_D and R to fall. The lower R further decreases demand for U.S. assets, which leads to

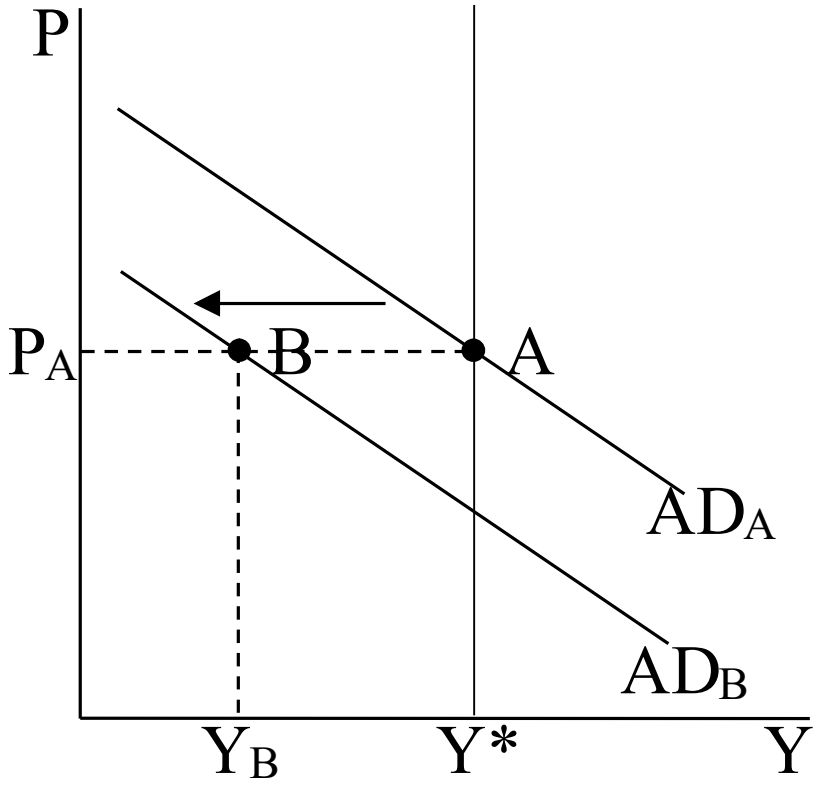
a further decline in E_R. A lower R and E_R combined to push up I and moderate the decline in (X – IM), which causes Y to return to Y*. Since both P and E_R decline, we cannot determine if E rises or falls. Therefore, in the long run, a rise in g_{IM} leads to a decline in R, E_R, and P, no change in Y, and an uncertain change in E. [$Y < Y^* \rightarrow P\downarrow \rightarrow M_D\downarrow \rightarrow R\downarrow \rightarrow I\uparrow$ & $(X–IM)\uparrow \rightarrow Y\uparrow$] & [$R\downarrow \rightarrow E_R\downarrow$]



2. *Monetary Policy and a Real Exchange Rate Target*: *Suppose the central bank's objective is to target the real exchange rate. What is the short-run impact of an increase in the world interest rate on output, the domestic interest rate, the price level, the nominal exchange rate, and the real exchange rate? Briefly explain your answer. You can assume that economy is initially at potential output. Use an IS/LM graph and an aggregate demand graph to support that answer.*

An increase in the R_W causes the central bank to raise R by decreasing M^S in order to keep E_R constant. The higher R causes I and (X – IM) to decline which pushes down Y. Since this change occurs in the short run, P is unchanged and so is E because E_R does not change.





3. *Nominal and Real Exchange Rates*: *Let the following equations describe an open economy:*

$$Y = C + I + G + (X - IM)$$
$$C = 26 + 0.92 \times (1 - t) \times Y$$
$$I = 760 - 2{,}000 \times R$$
$$(X - IM) = 2{,}050 - 2{,}000 \times E_R - 0.07 \times (1 - t) \times Y$$
$$E_R = 0.8 + 4 \times R$$
$$M^S = (Y - 20{,}000 \times R) \times P$$

where Y is actual output, C is consumption, I is investment, G is government spending, (X – IM) is net exports, t is the proportional income tax rate, R is the interest rate, E_R is the real exchange rate, M^S is the money supply, and P is the domestic price level. Furthermore, government spending is 800, the money supply is 15,200, the proportional income tax rate is 20%, the domestic price level is 4, and the rest-of-the-world price level is 8.

a. *Calculate the equilibrium values of output and the interest rate.*

The equation for the IS curve is

$$Y = C + I + G + (X - IM)$$

$$Y = 26+0.92\times(1-0.2)\times Y+760-2{,}000\times R+800+2{,}050-2{,}000\times(0.8+4\times R)-0.07\times(1-0.2)\times Y$$

$$Y = 3{,}636 + 0.85\times0.8\times Y - 2{,}000\times R - 1{,}600 - 8{,}000\times R$$

$$Y = 2{,}036 + 0.68Y - 10{,}000\times R$$

$$10{,}000\times R = 2{,}036 - 0.32\times Y$$

The equation for the LM curve is

$$M^S = (Y - 20{,}000\times R)\times P$$

$$15{,}200 = (Y - 20{,}000\times R)\times 4$$

$$3{,}800 = Y - 20{,}000\times R$$

$$20{,}000\times R = Y - 3{,}800$$

Multiply the IS curve equation by two and then combine with the LM curve equation by eliminating 20,000×R

$$4{,}072 - 0.64 \times Y = Y - 3{,}800$$
$$1.64 \times Y = 7{,}872$$
$$Y = 5{,}180/1.48$$
$$Y = 4{,}800$$

Substituting Y =4,800 into the LM curve (or IS curve), we get the value for R

$$R = (4{,}800 - 3{,}800)/20{,}000$$
$$R = 0.05 = 5\%$$

b. *Determine the equilibrium nominal and real exchange rates.*

The real exchange rate is determined by using the fact that R = 0.05 and the equation

$$E_R = 0.8 + 4 \times R$$
$$E_R = 0.8 + 4 \times 0.05$$
$$E_R = 0.8 + 0.2$$
$$E_R = 1$$

The nominal exchange rate is determined by using the fact that $E_R = 1$, $P = 4$, $P_W = 8$ and the equation

$$E_R = E \times P / P_W$$
$$1 = E \times 4 / 8$$
$$E = 2$$

4. *Government Deficit/Debt*: *Suppose the debt (D) is 12,000, the nominal interest rate (R) is 0.04, government spending is 520, actual output (Y) is 4,800, potential output (Y*) is 5,000, transfer payments (F) equal 300 – 0.2×(Y – Y*), and taxes (T) equal 0.25×Y.*

   a. *Find the size of the actual budget deficit.*

Note: $T = 0.25 \times Y$, $Y = 4{,}800$, $Y^* = 5{,}000$, $G = 520$, $R = 0.04$, $D = 12{,}000$, and $F = 300 - 0.2 \times (Y - Y^*)$.

$$\text{Actual BD} = G + F + R \times D - T$$
$$\text{Actual BD} = 520 + 300 - 0.2 \times (Y - Y^*) + 0.04 \times 12{,}000 - 0.25 \times Y$$
$$\text{Actual BD} = 820 - 0.2 \times (4{,}800 - 5{,}000) + 480 - 0.25 \times 4{,}800$$
$$\text{Actual BD} = 1{,}300 - 0.2 \times (-200) - 1{,}200$$
$$\text{Actual BD} = 100 + 40$$
$$\text{Actual BD} = 140$$

b. *Determine the size of the cyclical budget deficit.*

Structural BD is the budget deficit when Y = Y*

$$\text{Structural BD} = G + F + R \times D - T$$
$$\text{Structural BD} = 520 + 300 - 0.2 \times (Y^* - Y^*) + 0.04 \times 12{,}000 - 0.25 \times Y^*$$
$$\text{Structural BD} = 820 + 480 - 0.25 \times 5{,}000$$
$$\text{Structural BD} = 1{,}300 - 1{,}250$$
$$\text{Structural BD} = 50$$

$$\text{Actual BD} = \text{Structural BD} + \text{Cyclical BD}$$
$$140 = 50 + \text{Cyclical BD}$$
$$\text{Cyclical BD} = 90$$

c. *Calculate next period's government debt.*

$$D_{+1} = \text{Actual BD} + D$$
$$D_{+1} = 140 + 12{,}000$$
$$D_{+1} = 12{,}140$$

5. *Government Spending and Automatic Stabilizers*: *Let the following equations describe a simple economy without a foreign sector:*

$$Y = C + I + G$$
$$C = 205 + 0.92 \times (1 - t) \times Y$$
$$I = 760 - 8{,}000 \times R$$
$$G = 430 - 0.1 \times (Y - Y^*)$$
$$M^S = (Y - 16{,}000 \times R) \times P$$

where Y is actual output, Y is potential output, C is consumption, I is investment, G is government spending, t is the proportional income tax rate, R is the interest rate, M^S is the money supply, and P is the price level. Furthermore, potential output is 4,000, the money supply is 6,950, the proportional income tax rate is 25%, and the price level is 2.5.*

a. *Calculate the equilibrium values of output and the interest rate.*

The equation for the IS curve is

$$Y = C + I + G$$

$$Y = 205 + 0.92\times(1 - 0.25)\times Y + 760 - 8{,}000\times R + 430 - 0.1\times(Y - 4{,}000)$$

$$Y = 1{,}395 + 0.69\times Y - 8{,}000\times R - 0.1\times Y + 400$$

$$Y = 1{,}795 + 0.59Y - 8{,}000\times R$$

$$8{,}000\times R = 1{,}795 - 0.41\times Y$$

The equation for the LM curve is

$$M^S = (Y - 16{,}000\times R)\times P$$

$$6{,}950 = (Y - 16{,}000\times R)\times 2.5$$

$$2{,}780 = Y - 16{,}000\times R$$

$$16{,}000\times R = Y - 2{,}780$$

Multiply the IS curve equation by two and then combine with the LM curve equation by eliminating 16,000×R

$$3{,}590 - 0.82 \times Y = Y - 2{,}780$$
$$1.82 \times Y = 6{,}370$$
$$Y = 5{,}180/1.48$$
$$Y = 3{,}500$$

Substituting Y =3,500 into the LM curve (or IS curve), we get the value for R

$$R = (3{,}500 - 2{,}780)/18{,}000$$
$$R = 0.045 = 4.5\%$$

b. *Determine the equilibrium level of government spending.*

The level of government spending is determined by using the fact that Y = 3,500 and the equation

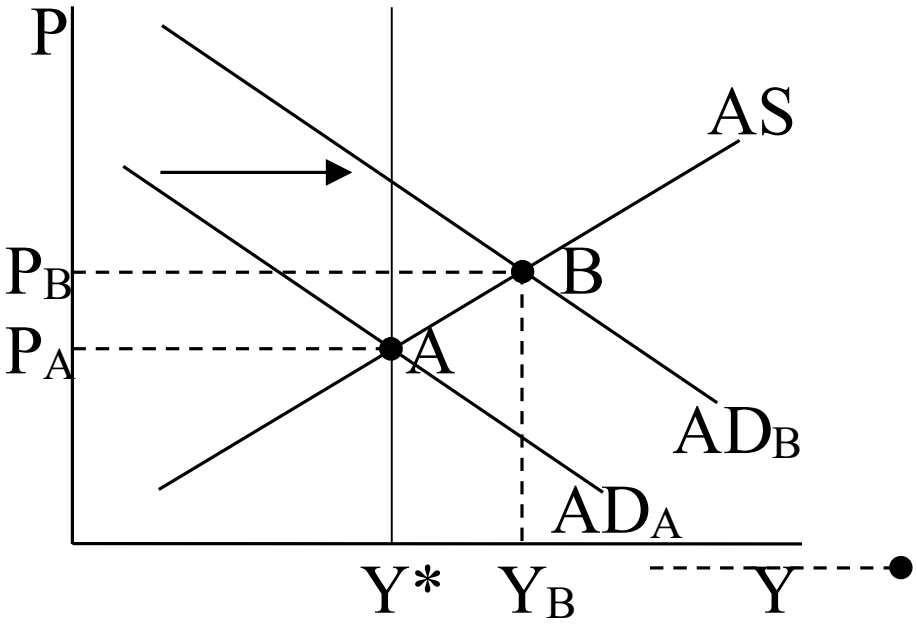
$$G = 430 - 0.1 \times (Y - Y^*)$$
$$G = 430 - 0.1 \times (3{,}500 - 4{,}000)$$
$$G = 430 + 0.1 \times 500$$
$$G = 480$$

c. *Briefly describe how automatic stabilizers (i.e., – 0.1 ×(Y – Y*)) impact the slope of the IS curve.*

Automatic stabilizers cause government spending to rise when output falls and government spending to fall when output rises. The result is the IS curve becomes steeper with automatic stabilizers.

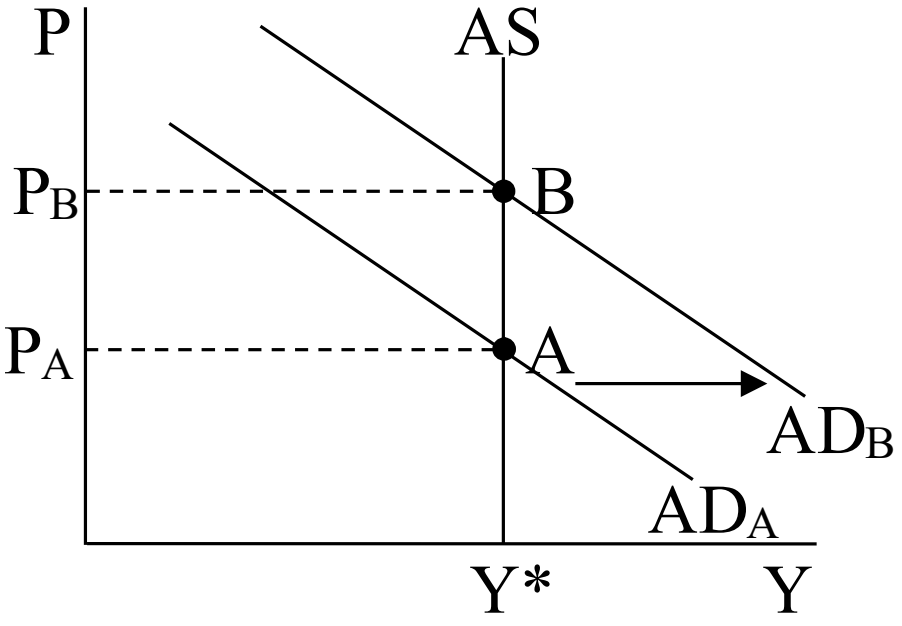
6. *Anticipated vs. Unanticipated Money Supply Increase*: *Suppose prices are flexible but firms have imperfect information on the aggregate price level. If the economy is initially at potential output, what is the short-run impact of an unanticipated money supply increase on aggregate output and the aggregate price level? How does your answer change if the money supply increase is anticipated? Use aggregate demand/aggregate supply graphs to support your answer.*

Unanticipated
Money Supply Increase



Output increases
Price level increases

Anticipated
Money Supply Increase



Output is unchanged
Price level increases

7. *Sticky Wages/Wage Setting*: *Answer parts a – b below.*

   a. *Briefly explain how stickiness in wage setting will cause prices to be sticky.*

      Wage stickiness causes a firm's marginal cost to be sticky. Since firms set their price to a constant markup over marginal cost, stickiness in the marginal costs leads to prices being sticky.

   b. *Which of the following will likely lead to a higher wage rate in contract negotiations: a higher unemployment rate or a higher expected inflation rate? Briefly explain your answer.*

      A higher unemployment rate causes employers to have a better negotiating position, which leads to a lower wage. A higher expected inflation rate raises labor demand and reduces labor supply which together push up the wage.