PS 5 Solutions

Chapter 21

14. (a) This is a movement along the *IS* curve, and so does not shift the *IS* curve. (b) This results in a decrease in equilibrium output at any given interest rate, which shifts the *IS* curve to the left. (c) Equilibrium output decreases at any given interest rate, which shifts the *IS* curve to the left. (d) Equilibrium output decreases at any given interest rate, which shifts the *IS* curve to the left. (e) Equilibrium output decreases at any given interest rate, which shifts the *IS* curve to the left. (f) Equilibrium output increases at any given interest rate, which shifts the *IS* curve to the right. (g) Equilibrium output increases at any given interest rate, which shifts the *IS* curve to the right.

15. False. Although the *IS* curved shifted to the left during the period of the financial crisis, this is because of external factors which caused a sharp decline in consumption and investment, such as financial frictions, and sharp decreases in autonomous consumption and investment. If the stimulus package had not been in place, the *IS* curve would have shifted much farther to the left.

17. (a) A more expensive dollar will result in fewer U.S. exports and more U.S. imports (everything else the same), therefore decreasing net exports. Graphically, this shifts the *IS* curve to the left, decreasing aggregate output at every interest rate. (b) Usually the increase in stock prices is interpreted as having a positive effect on autonomous planned investment, as investors become more confident about the future prospects of the economy. Therefore, we should expect autonomous planned investment to increase and the *IS* curve to shift to the right. (c) This is an example in which it is quite difficult to measure the net effect of these events. Depending on the relative magnitude of the shifts, the *IS* curve might end up shifting to the left, to the right, or not shifting at all. This problem arises because these events have opposite effects on the *IS* curve.

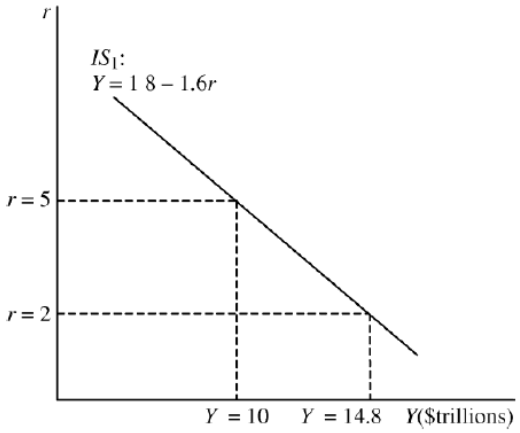
18.

Income Y	Disposable Income Y_D	Consumption C
0	–200	120
100	–100	210
200	0	300
300	100	390
400	200	480
500	300	570
600	400	660

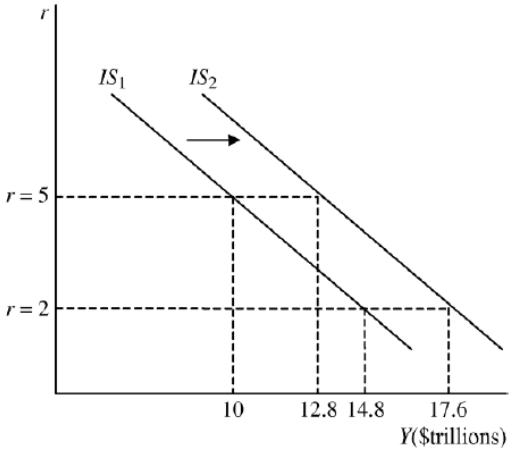
19. If an increase of \$1,000 in disposable income leads to an increase of \$750 in consumption expenditure, then $mpc = 0.75$. Using this implies that $C = 1{,}625 + 0.75 \times 11{,}500 = 10{,}250$. Consumption expenditure is therefore \$10,250 billion.

21. Equilibrium output of 2,000 occurs when $Y = Y^{ad}$ and the aggregate demand function $Y^{ad} = C + I + G + NX = 500 + 0.75Y$. Solving for Y implies $0.25Y = 500$, or $Y = 2000$. If government spending rises by 100, equilibrium output will rise by 400 to 2,400.

24. (a) $C = 3.25 + 0.75(Y - 3) = 1 + 0.75Y$. $I = 1.3 - 0.3(r + 1) = 1 - 0.3r$. $NX = -1 - 0.1r$. (b) The IS curve can be found by setting $Y = Y^{ad}$ and solving: $Y = 1 + 0.75Y + 1 - 0.3r + 3.5 - 1 - 0.1r$. This implies $0.25Y = 4.5 - 0.4r$, or $Y = 18 - 1.6r$. (c) At $r = 2$, equilibrium output is $Y = 18 - 1.6(2) = \$14.8$ trillion; At $r = 5$, equilibrium output is $Y = 18 - 1.6(5) = \$10$ trillion. (d)



(e) An increase of government spending of \$0.7 trillion will lead to an $0.7/(1 - 0.75) = \$2.8$ trillion increase in equilibrium output at any given interest rate. Thus, the IS curve will shift horizontally to the right by \$2.8 trillion.



25. (a) Using equation (12) in the chapter, the IS curve is given as $Y = 35.5 - 2.5r$. (b) At an interest rate of $r = 4$, output is $Y = 35.5 - 2.5(4) = 25.5$. (c) The IS curve is now $Y = 30.25 - 2.5r$; at an interest rate of 4, equilibrium output is now $Y = 20.25$. In order to maintain the output level from part (b), the Federal Reserve would have to set the interest rates such that $25.5 = 30.25 - 2.5r$, implying the interest rate setting of $r = 1.9$ to offset the increase in $\overline{f}$ of 3. Thus, the Federal Reserve will reduce r from $r = 4$ to $r = 1.9$. (d) With the increase in $\overline{f}$ and the reduction in $\overline{I}$, the IS curve is now $Y = 28.25 - 2.5r$. At the current interest rate of $r = 1.9$, output is $Y = 28.25 - 2.5(1.9) = \$23.5$ trillion, which is less than the level of output before the crisis, which does not stabilize output. In order to keep output at \$25.5 trillion, monetary policymakers can set the interest rate such that $25.5 = 28.25 - 2.5r$, or $r = 1.1$. Alternatively, fiscal policymakers could increase government spending by \$0.4 trillion, or reduce taxes by \$0.5 trillion (while keeping the interest rate at $r = 1.9$). All three of these policies separately would maintain output at $Y = \$25.5$ trillion.

Chapter 22

10. False. Since λ is independent of the autonomous component of monetary policy $\overline{r}$, any change in $\overline{r}$ will affect the real interest rate the same regardless of the value of λ. Thus, for a given IS curve, any change in autonomous monetary policy will have the same impact on output, independent of the value for λ.

11. Monetary policy would be less effective in changing output, since net exports represent a reinforcing channel, in addition to investment, through which interest rate changes can affect output.

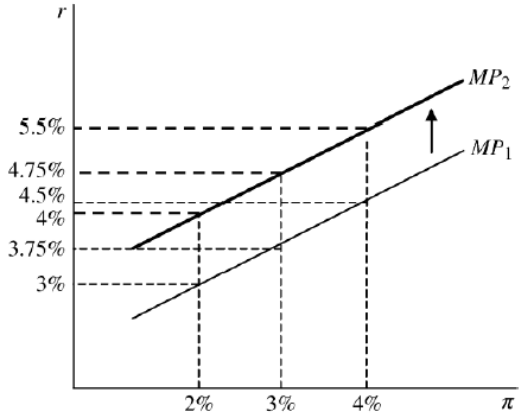
13. (a) The *IS* curve shifts to the right; the *MP* curve does not shift; the *AD* curve shifts to the right. (b) The increase in taxes shifts the *IS* curve to the left, and the easing of monetary policy moves the economy along the *IS* curve; the tax change does not affect the *MP* curve, but the monetary policy change shifts the *MP* curve down; the monetary policy easing shifts the *AD* curve to the right, while the tax increase shifts the *AD* curve to the left; the net effect on the *AD* curve cannot be determined without knowing the relative shifts due to the tax and monetary easing effects. (c) An increase in the current inflation rate represents a movement along the *MP* curve, which increases the real interest rate; the increase in the real interest rate due to the higher inflation represents a movement along the *IS* curve to lower output (but does not shift the *IS* curve); the increase in inflation represents a movement along the *AD* curve, reducing output and does not shift the *AD* curve. (d) A decrease in autonomous consumption shifts the *IS* curve to the left; the *MP* curve does not shift; the *AD* curve shifts to the left. (e) Autonomous investment increases, which shifts the *IS* curve to the right; the *MP* curve does not shift; the *AD* curve shifts to the right. (f) This represents an increase in λ, which does not affect the *IS* curve; the *MP* curve becomes steeper; the slope of the *AD* curve becomes flatter.

14. An increase in U.S. net exports directly affects the *IS* curve, since planned expenditure increases at every real interest rate. Assuming the goods market is in equilibrium, aggregate output increases, shifting the *IS* curve to the right. The monetary policy curve does not shift, since net exports are not a determinant of the monetary policy curve. The monetary policy curve represents the monetary authorities' willingness to set a given real interest rate in the short run according to current inflation rates. Given the same monetary policy curve and a new *IS* curve, the aggregate demand curve shifts to the right. This means that aggregate output increases at every inflation rate.

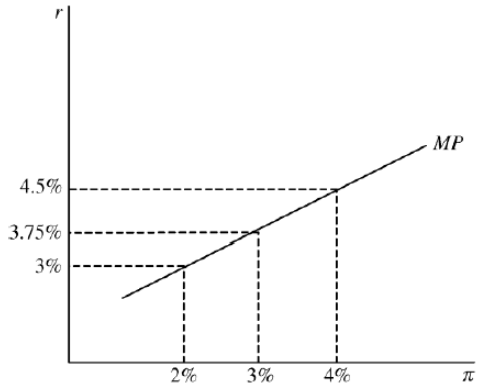
15. The aggregate demand curve shifts because a change in "animal spirits" causes autonomous consumer expenditure or planned investment spending to change, which then causes the quantity of aggregate output demanded to change at any given inflation rate.

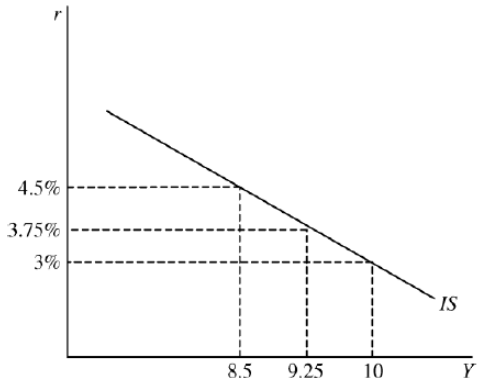
18. False. If the Fed changes interest rates by exactly the amount of the change in $\overline{f}$, this will mitigate the adverse effects of financial frictions on investment. However, the decrease in the real interest rate will increase net exports, so that aggregate output will increase. Thus, to offset the increase in financial frictions, the Fed would need to reduce the real interest rate by a little bit less than the change in $\overline{f}$ to keep output constant.

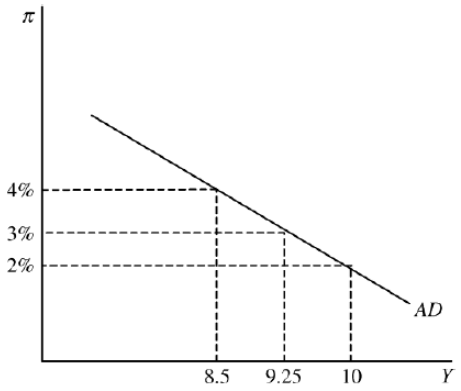
19. (a) When the inflation rate is 2%, 3%, and 4%, the real interest rate is 3%, 3.75%, and 4.5%, respectively. (b) See graph in (d) below. (c) Since $\overline{r}$ increases, this represents an autonomous tightening of policy. (d) When the inflation rate is 2%, 3%, and 4%, the real interest rate is 4%, 4.75%, and 5.5%. The graph is below.



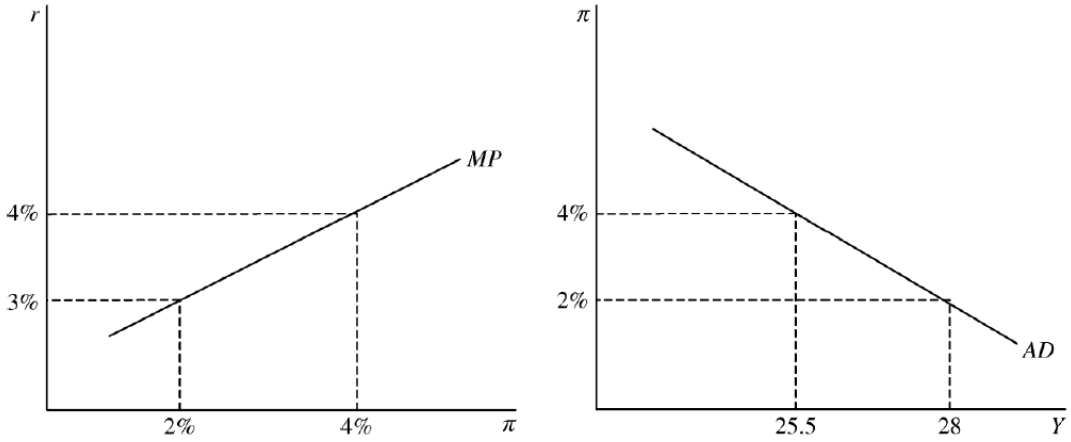
21. (a) $Y = 11.5 - 0.75\pi$. (b) When the inflation rate is 2%, 3%, and 4%, the real interest rate is 3%, 3.75%, and 4.5%, respectively. Aggregate output is 10, 9.25, and 8.5, respectively. (c) Graphs are below.







22. (a) The *MP* curve is given as $r = 2 + 0.5\pi$. The *AD* curve is given as $Y = 30.5 - 1.25\pi$. (b) When $\pi = 2$ and $\pi = 4$, the real interest rate is $r = 3\%$ and 4%. Aggregate output is 28 and 25.5, respectively. (c) Graphs are shown below.



23. (a) The *MP* curve is given as $r = 1 + \pi$. The *AD* curve is given as $Y = 16.4 - 1.6\pi$. (b) $r = 2$; $Y = 14.8$; $C = 12.1$; $I = 0.4$; $NX = -1.2$. (c) The real interest rate increases to $r = 3$. $Y = 13.2$; $C = 10.9$; $I = 0.1$; $NX = -1.3$. (d) The Fed may believe that the economy will strengthen in the future or there is a risk that inflation will rise in the future, so they increased $\bar{r}$.

24. The *MP* curve is given as $r = 1 + \pi$. The *AD* curve is given as $Y = 16.4 - 1.6\pi$. (b) $r = 3$; $Y = \$13.2$ trillion. (c) When government spending increases by \$0.5 trillion, output will increase by \$2 trillion to $Y = \$15.2$ trillion. (d) In order to keep output constant at $Y = \$13.2$ trillion, the Fed will have to increase the real interest rate to $r = 4.25$.

25. (a) $Y = 16 - 2\pi$. At $\pi = 0$, $\pi = 4$, and $\pi = 8$, output is given as $Y = 16$, $Y = 8$, and $Y = 0$, respectively. Graph is shown below. (b) $Y = 16 - 4\pi$. Graph is shown below, with graph from part (a). As the central bank cares more about inflation (i.e., has more distaste for inflation), λ increases and the slope of the *AD* curve becomes flatter.