■ **Answers to Textbook Problems**

1. A decline in investment demand decreases the level of aggregate demand for any level of the exchange rate. Thus, a decline in investment demand causes the *DD* curve to shift to the left.

2. A tariff is a tax on the consumption of imports. The demand for domestic goods, and thus the level of aggregate demand, will be higher for any level of the exchange rate. This is depicted in Figure 17(6)-1 (below) as a rightward shift in the output market schedule from *DD* to *D′D′*. If the tariff is temporary, this is the only effect, and output will rise even though the exchange rate appreciates as the economy
moves from points 0 to 1. If the tariff is permanent, however, the long-run expected exchange rate appreciates, so the asset market schedule shifts to *A′A′*. The appreciation of the currency is sharper in this case. If output is initially at full employment, then there is no change in output due to a permanent tariff.
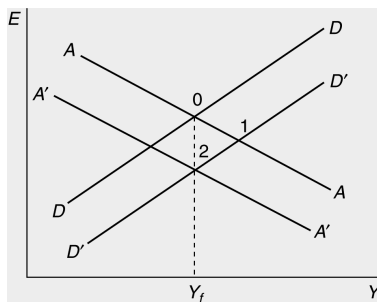

Figure 17(6)-1

3. A temporary fiscal policy shift affects employment and output, even if the government maintains a balanced budget. An intuitive explanation for this relies upon the different propensities to consume of the government and of taxpayers. If the government spends $1 more and finances this spending by taxing the public $1 more, aggregate demand will have risen because the government spends the entire $1, while the public reduces its spending by less than $1 (choosing to reduce its saving as well as its consumption). The ultimate effect on aggregate demand is even larger than this first round difference between government and public spending propensities, since the first round generates subsequent spending. (Of course, currency appreciation still prevents permanent fiscal shifts from affecting output in our model.)

4. A permanent fall in private aggregate demand causes the *DD* curve to shift inward and to the left and, because the expected future exchange rate depreciates, the *AA* curve shifts outward and to the right. These two shifts result in no effect on output, however, for the same reason that a permanent fiscal expansion has no effect on output. The net effect is a depreciation in the nominal exchange rate and, because prices will not change, a corresponding real exchange rate depreciation. A macroeconomic policy response to this event would not be warranted.

5. Figure 17(6)-2 (below) can be used to show that any permanent fiscal expansion worsens the current account. In this diagram, the schedule *XX* represents combinations of the exchange rate and income for which the current account is in balance. Points above and to the left of *XX* represent current account surplus, and points below and to the right represent current account deficit. A permanent fiscal expansion shifts the *DD* curve to *D'D'* and, because of the effect on the long-run exchange rate, the *AA* curve shifts to *A'A'*. The equilibrium point moves from 0, where the current account is in balance, to 1, where there is a current account deficit. If, instead, there was a temporary fiscal expansion of the same size, the *AA* curve would not shift and the new equilibrium would be at point 2 where there is a current account deficit, although it is smaller than the current account deficit at point 1. Thus, a temporary increase in government spending causes the current account to decline by less than a permanent increase because there is no change in expectations with a temporary shock and thus the *AA* curve does not move.
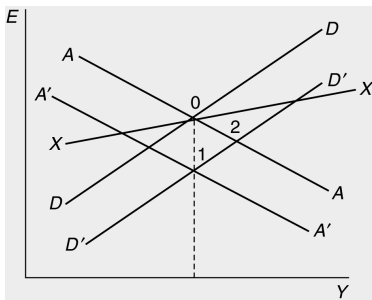

Figure 17(6)-2

6. A temporary tax cut shifts the *DD* curve to the right and, in the absence of monetization, has no effect on the *AA* curve. In Figure 17(6)-3, this is depicted as a shift in the *DD* curve to *D'D'*, with the equilibrium moving from points 0 to 1. If the deficit is financed by future monetization, the resulting expected long-run nominal depreciation of the currency causes the *AA* curve to shift to the right to *A'A'*, which gives us the equilibrium point 2. The net effect on the exchange rate is ambiguous, but output certainly increases more than in the case of a pure fiscal shift.
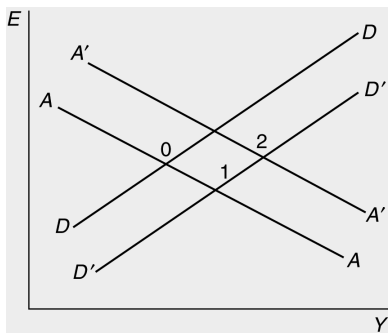

Figure 17(6)-3

7. A currency depreciation accompanied by a deterioration in the current account balance could be caused by factors other than a J-curve. For example, a fall in foreign demand for domestic products worsens the current account and also lowers aggregate demand, depreciating the currency. In terms of Figure 17(6)-4, *DD* and *XX* undergo equal vertical shifts, to $D'D'$ and $X'X'$, respectively, resulting in a current account deficit as the equilibrium moves from points 0 to 1. To detect a J-curve, one might check whether the prices of imports in terms of domestic goods rise when the currency is depreciating, offsetting a decline in import volume and a rise in export volume.
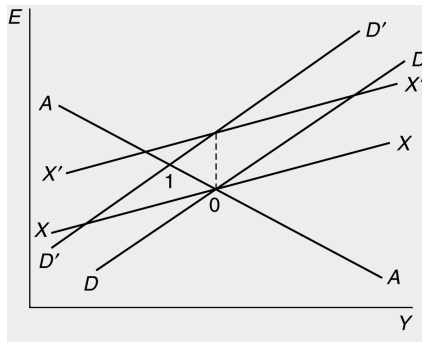

Figure 17(6)-4

8. The expansionary money supply announcement causes a depreciation in the expected long-run exchange rate and shifts the *AA* curve to the right. This leads to an immediate increase in output and a currency depreciation. The effects of the anticipated policy action thus precede the policy's actual implementation.

9. The *DD* curve might be negatively sloped in the very short run if there is a J-curve, though the absolute value of its slope would probably exceed that of *AA*. This is depicted in Figure 17(6)-5. The effects of a temporary fiscal expansion, depicted as a shift in the output market curve to $D'D'$, would not be altered because it would still expand output and appreciate the currency in this case (the equilibrium points move from 0 to 1).
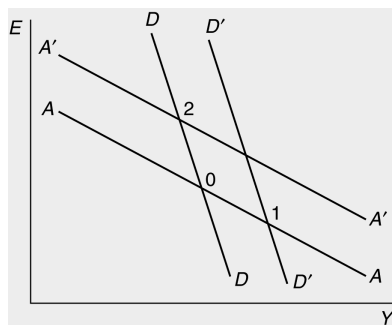

Figure 17(6)-5

Monetary expansion, however, while depreciating the currency, would reduce output in the very short run. This is shown by a shift in the *AA* curve to $A'A'$ and a movement in the equilibrium point from 0 to 2. Only after some time would the expansionary effect of monetary policy take hold (assuming the domestic price level did not react too quickly).

10. The derivation of the Marshall-Lerner condition uses the assumption of a balanced current account to substitute EX for $(q \cdot EX^*)$. We cannot make this substitution when the current account is not initially zero. Instead, we define the variable $z = (q \cdot EX^*)/EX$. This variable is the ratio of imports to exports, denominated in common units. When there is a current account surplus, z will be less than 1, and when there is a current account deficit, z will exceed 1. It is possible to take total derivatives of each side of the equation $CA = EX - q EX^*$ and derive a general Marshall-Lerner condition as $n + z n^* > z$, where n and n^* are as defined in Appendix 2. The balanced current account ($z = 1$) Marshall-Lerner condition is a special case of this general condition. A depreciation is less likely to improve the current account the larger its initial deficit when n^* is less than 1. Conversely, a depreciation is more likely to cause an improvement in the current account the larger its initial surplus, again for values of n^* less than 1.

11. If imports constitute part of the CPI, then a fall in import prices due to an appreciation of the currency will cause the overall price level to decline. The fall in the price level raises the real money supply. As shown in Figure 17(6)-6, the permanent fiscal expansion will shift the output market curve from DD to $D'D'$ and is matched by an inward shift of the asset market equilibrium curve. If import prices are not in the CPI and the currency appreciation does not affect the price level, the asset market curve shifts to $A''A''$, and there is no effect on output, even in the short run. If, however, the overall price level falls due to the appreciation, the shift in the asset market curve is smaller, to $A'A'$, and the initial equilibrium point, point 1, has higher output than the original equilibrium at point 0. Over time, prices rise when output exceeds its long-run level, causing a shift in the asset market equilibrium curve from $A'A'$ to $A''A''$, which returns output to its long-run level.
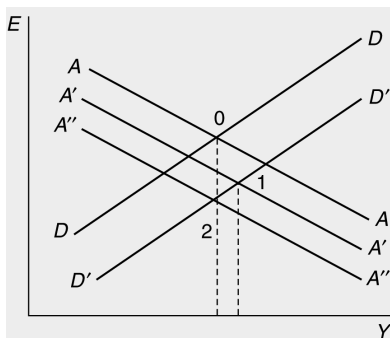

Figure 17(6)-6

12. An increase in the risk premium shifts the asset market curve out and to the right, all else being equal. A permanent increase in government spending shifts the asset market curve in and to the right because it causes the expected future exchange rate to appreciate. A permanent rise in government spending also causes the goods market curve to shift down and to the right because it raises aggregate demand. In the case where there is no risk premium, the new intersection of the DD and AA curves after a permanent increase in government spending is at the full-employment level of output because this is the only level consistent with no change in the long-run price level. In the case discussed in this question, however, the nominal interest rate rises with the increase in the risk premium. Therefore, output must also be higher than the original level of full-employment output; as compared to the case in the text, the AA curve does not shift by as much, so output rises.

13. Suppose output is initially at full employment. A permanent change in fiscal policy will cause both the *AA* and *DD* curves to shift such that there is no effect on output. Now consider the case where the economy is not initially at full employment. A permanent change in fiscal policy shifts the *AA* curve because of its effect on the long-run exchange rate and shifts the *DD* curve because of its effect on expenditures. There is no reason, however, for output to remain constant in this case because its initial value is not equal to its long-run level, and thus an argument like the one in the text that shows the neutrality of permanent fiscal policy on output does not carry through. In fact, we might expect that an economy that begins in a recession (below Y^f) would be stimulated back toward Y^f by a positive permanent fiscal shock. If *Y* does rise permanently, we would expect a permanent drop in the price level (because *M* is constant). This fall in *P* in the long run would move *AA* and *DD* both out. We could also consider the fact that in the case where we begin at full employment and there is no impact on *Y*, *AA* was shifting back due to the real appreciation necessitated by the increase in demand for home products (as a result of the increase in *G*). If there is a permanent increase in *Y*, there has also been a relative supply increase that can offset the relative demand increase and weaken the need for a real appreciation. Because of this, *AA* would shift back by less. We do not know the exact effect without knowing how far the lines originally move (the size of the shock), but we do know that without the restriction that *Y* is unchanged in the long run, the argument in the text collapses, and we can have both short-run and long-run effects on *Y*.

14. We are given that the central bank in the economy can keep both interest rates and exchange rates fixed. Thus, we need to only consider the goods side of the economy. The goods market equilibrium is $Y = (1 - s)Y + I + G + aE - mY$. Collecting terms and solving for *Y* yields:

$$Y = (I + G + aE)/(s + m)$$

Thus, a 1 unit increase in government spending will cause output to increase by $1/(s + m)$. Recall that *s* is the marginal propensity to save and *m* is the marginal propensity to import. As both of these marginal propensities increase, the multiplier effect of government spending will decrease. This makes intuitive sense as the impact of government spending will be diluted if some of that spending is saved (*s*) and if some of that spending leaves the country through imports (*m*).

15. The text shows output cannot rise following a permanent fiscal expansion if output is initially at its long-run level. Using a similar argument, we can show that output cannot fall from its initial long-run level following a permanent fiscal expansion. A permanent fiscal expansion cannot have an effect on the long-run price level because there is no effect on the money supply or the long-run values of the domestic interest rate and output. When output is initially at its long-run level, *R* equals R^*, *Y* equals Y^f, and real balances are unchanged in the short run. If output did fall, there would be excess money supply and the domestic interest rate would have to fall, but this would imply an expected appreciation of the currency because the interest differential $(R - R^*)$ would then be negative. This, however, could only occur if the currency appreciates in real terms as output rises and the economy returns to long-run equilibrium. This appreciation, however, would cause further unemployment, and output would not rise and return back to Y^f. As with the example in the text, this contradiction is only resolved if output remains at Y^f.

16. It is difficult to see how government spending can rise permanently without increasing taxes or how taxes can be cut permanently without cutting spending. Thus, a truly permanent fiscal expansion is difficult to envision. The one possible scenario is if the government realized it was on a path to permanent surpluses and it could cut taxes without risking long-run imbalances. Because rational agents are aware the government has a long-run budget constraint, they may assume that any fiscal policy is actually temporary. This would mean that a "permanent" shock would look just like a temporary one. This is quite similar to the discussion of problem 14 in this chapter.

17. High inflation economies should have higher pass-through as price setters are used to making adjustments faster (menu costs fall over time as people learn how to change prices faster). Thus, a depreciation in a high-inflation economy may see a rapid response of changing prices, but firms in a low-inflation environment may be loathe to increase prices for fear of losing business, given that their customers are not accustomed to price changes. In addition, a depreciation by a high-inflation economy may be more likely to have been caused by an increase in the money supply, which would lead to price increases on its own anyway, so the pass-through would appear higher.

18. A "buy American" provision would have resulted in a larger rightward shift in the *DD* curve than an unconstrained increase in government spending because there will be a greater demand for U.S. output than if some imported goods could have been purchased with the stimulus funds. However, if this increase in government spending is permanent, then the net effect on output would be the same regardless of the provision. A permanent increase in government spending will appreciate the expected future value of the dollar, leading to a leftward shift in the *AA* curve. The larger the fiscal stimulus (rightward shift in *DD*), the larger the offsetting leftward shift in the *AA* curve. Thus, the "buy American" provision would not have had any larger effect on output than unconstrained fiscal policy if the increase in government spending was permanent. If the increase in spending was temporary, a "buy American" provision could have had a larger effect in the short run, but would have led to a larger increase in prices in the long run, leaving the net long-run effect the same.

19. Many answers are possible.

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