

Chapter 16

Output and the Exchange Rate in the Short Run

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■ Key Themes

In Chapters 13 and 14, we focused on exchange rate determination taking output as given. In this chapter we develop a macroeconomic model that allows us to solve for output and the exchange rate through the interplay of an aggregate demand schedule and an asset market equilibrium schedule. This model enables us to determine the effects of a number of factors, most importantly monetary and fiscal policies, on both the level of output and the exchange rate. The chapter also discusses different effects of temporary and permanent policies. The chapter concludes by addressing the J-curve response of the current account to currency depreciation and exchange rate pass-through, that is the response of import prices to exchange rate movements.

The evolution of the model begins by developing an output market schedule. In a Keynesian-cross diagram (see any introductory macroeconomics text), the aggregate demand function shifts up with a depreciation of the nominal exchange rate since this causes exports to rise and imports to fall, given foreign and domestic prices, fiscal policy, and investment levels. When we translate this into a diagram with the exchange rate on the vertical axis and output on the horizontal axis, we obtain a positively sloped output-market equilibrium (*DD*) schedule. The asset-market equilibrium (*AA*) schedule, which completes the model, has a negative slope. The derivation of this schedule follows from the analysis of previous chapters. If you have already taken intermediate macroeconomics, you may have noted that the intuition behind the slope of the *AA* curve is identical to that of the *LM* schedule with the additional relationship of interest parity providing the link between the closed-economy *LM* schedule and the open-economy *AA* schedule. As with the *LM* curve, higher income increases money demand and raises the home-currency interest rate (given real balances). In an open economy, higher interest rates require currency appreciation to satisfy interest parity (for a given future expected exchange rate). An online appendix discusses the relationship between the *IS-LM* model and the analysis in this chapter.

Expectations about how long certain policies will be in place are important in understanding the effects of these policies. The *DD-AA* model enables us to understand how the effects of temporary policies differ from those of permanent policies. Temporary policies have no effect on the expected future exchange rate while permanent policies shift the expected future exchange rate in line with the effects identified in Chapter 15. Temporary policies only have short-run effects, since the policies are reversed (by definition) before the long run arrives. Permanent policies, on the other hand, have both short-run and long-run effects. In the long run, prices change in response to monetary factors to clear markets.

Both temporary and permanent increases in money supply expand output in the short run through exchange rate depreciation. The long-run analysis of a permanent monetary change once again shows how the overshooting result can occur. Temporary expansionary fiscal policy raises output in the short run and causes the exchange rate to appreciate. Permanent fiscal expansion, however, has no effect on output even in the short run. The reason for this is that, given the assumptions of the model, the currency appreciation in response to permanent fiscal expansion completely “crowds out” exports. In terms of the mechanics of the model, the outward shift of the DD curve due to the fiscal expansion is just offset by an inward shift of the AA curve due to an appreciation of the expected exchange rate.

The chapter concludes with some discussion of real-world modifications of the basic model. Recently, we have seen evidence that argues against a tight, unvarying relationship between movements in the nominal exchange rate and shifts in competitiveness and thus between nominal exchange rate movements and movements in the trade balance. Instead, we have seen that exchange rate pass-through is less than complete and thus nominal exchange rate movements are not translated one-for-one into changes in the real exchange rate. Also, the current account may worsen immediately after currency depreciation. This J-curve effect occurs because of time lags in deliveries and because of different demand effects in the short run as compared to the long run. The chapter contains a discussion of the way in which the analysis of the model would be affected by the inclusion of incomplete exchange rate pass-through and time-varying elasticities. Appendix 2 provides further information on trade elasticities with a presentation of the Marshall-Lerner conditions and a reporting of estimates of the impact, short-run and long-run elasticities of demand for international trade in manufactured goods for a number of countries.

■ Key Terms

Define the following key terms:

1. Monetary Policy _____

2. Fiscal Policy _____

3. J-Curve _____

4. Exchange Rate pass-Through _____

_____.

5. Marshall-Lerner Condition _____

_____.

■ **Review Problems**

1. a. Discuss how a temporary increase in output in a foreign economy affects the *DD* schedule.

_____.

b. Discuss how a temporary rise in the foreign interest rate affects the *AA* schedule.

_____.

c. The response of the interest rate and output for a closed economy to a fiscal expansion is:

_____.

The response to a monetary expansion is:

_____.

- d. Compare the effects of a foreign fiscal expansion to a foreign monetary expansion. (*Hint:* You will need to use your results from Parts (a), (b), and (c). Do not worry about additional feedback effects from the domestic economy to the foreign economy.) In comparing these results, we find:

2. a. Suppose the following headline appears in today's newspaper: "Congress and President Agree to Tax Cut Next Year." What would you expect the effect of this headline to be on output and the exchange rate today?

Output: _____.

Exchange Rate: _____.

- b. Suppose this headline appears in today's newspaper instead: "Federal Reserve Announces It Will Raise Money Supply Next Year." What would you expect the effect of this headline to be on output and the exchange rate today?

Output: _____.

Exchange Rate: _____.

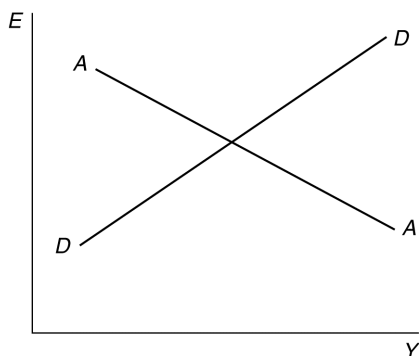
- c. Suppose both of these headlines appear in today's newspaper. Would you still necessarily expect to find an effect on output and the exchange rate?

3. Consider the following comment:

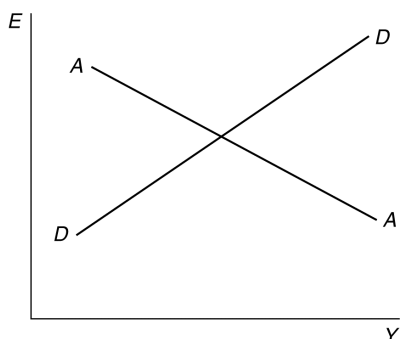
"The current account depends upon income and the real exchange rate. If income rises, consumption of imports is high, and the current account worsens. Thus, if monetary policy is the only tool that authorities can respond with quickly, a worsening of the current account due to a rise in income (for example, because of a temporary tax cut) requires a monetary contraction to moderate the rise in income and stop the deterioration of the current account."

- a. Use the *DD-AA* diagram on the next page to analyze the effects of a temporary tax cut on income and the current account.

- b. Do you find that the current account worsens and that income rises, as suggested in the comment?



- c. Now consider a monetary contraction. Use the following *DD-AA* diagram to show its effects on income and the current account.



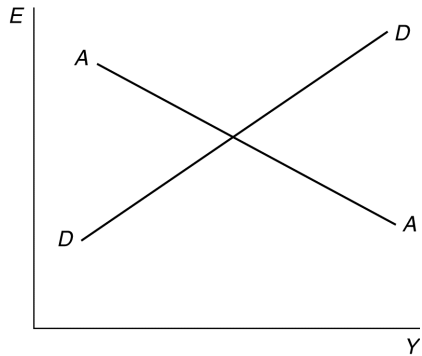
- d. Does this monetary policy response moderate the rise in income? Does it reverse the deterioration of the current account?

4. Many countries impose taxes or controls on holding foreign assets. One way to model this is to modify the interest parity equation by including a tax term. Since the after-tax return to foreign bonds is reduced by the tax, the domestic interest rate need not be as high as it would be if there were not a tax. The interest parity relationship would thus be modified as follows;

$$R = R^* + (E^e - E)/E - T.$$

- a. How does this modification in the interest parity relationship alter the *DD-AA* diagram?

- b. Show the effects of a temporary increase in T , the tax on foreign assets, in the following diagram.



5. We have been assuming that the expected exchange rate equals the rate predicted by the analysis in Chapter 15. Suppose instead that people always expect the exchange rate in the future to equal its value today.

- a. Draw the $DD-AA$ diagram under this assumption.



- b. Compare the effects of a temporary increase in the money supply on the exchange rate and output under these two different assumptions about E^e .



- c. On the axes provided below, compare the effects of a temporary increase in the government spending on the exchange rate and output under these two different assumptions about E^e .



6. Firms may increase their prices when faced with an increase in demand for their goods. An increase in demand in an economy may be due to either a fiscal or a monetary expansion. Discuss how the pass-through relationship which links changes in exchange rates to changes in prices depends upon the source of the movement of the exchange rate when prices respond to demand. (*Hint: Consider the way in which exchange rates and output move together when there is a fiscal expansion as compared to when there is a monetary expansion.*)

■ **Answers to Odd-Numbered 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.

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.)

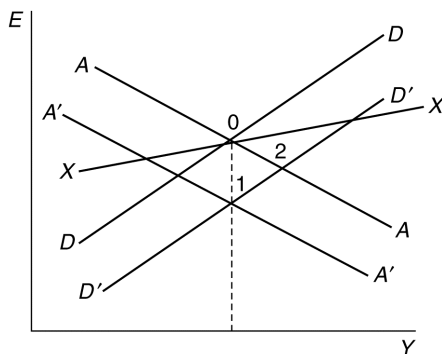


Figure 16-1

5. Figure 16-1 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.
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 16-2, 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.

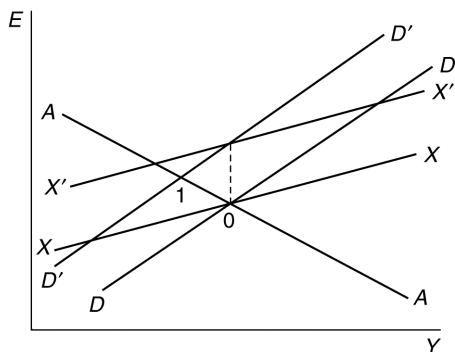


Figure 16-2

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 16-5. The effects of a temporary fiscal expansion, depicted as a shift in the output market curve to $D'D'$, would not be altered since it would still expand output and appreciate the currency in this case (the equilibrium point moves from 0 to 1).

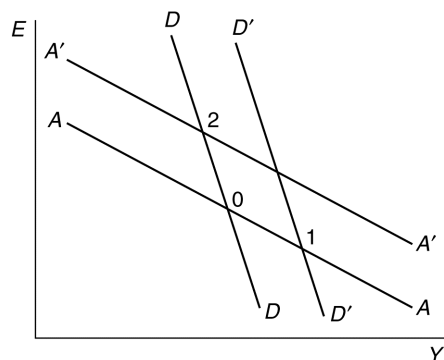


Figure 16-5

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).

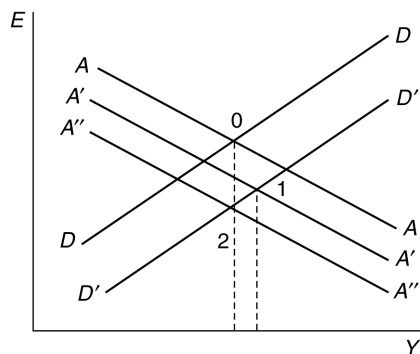


Figure 16-6

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 real balances. As shown in Figure 16-6, the shift in the output market curve from DD to $D'D'$ 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.

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 since 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 towards Y^f by a positive permanent fiscal shock. If Y does rise permanently, we would expect a permanent drop in the price level (since 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 which 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 .
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 since 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 since 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 .
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.

