SUMMARY

1. Money is held because of its liquidity. When considered in real terms, aggregate money demand is not a demand for a certain number of currency units but is instead a demand for a certain amount of purchasing power. Aggregate real money demand depends negatively on the opportunity cost of holding money (measured by the domestic interest rate) and positively on the volume of transactions in the economy (measured by real GNP).

2. The money market is in equilibrium when the real money supply equals aggregate real money demand. With the price level and real output given, a rise in the money supply lowers the interest rate and a fall in the money supply raises the interest rate. A rise in real output raises the interest rate, given the price level, while a fall in real output has the opposite effect.

3. By lowering the domestic interest rate, an increase in the money supply causes the domestic currency to depreciate in the foreign exchange market (even when expectations of future exchange rates do not change). Similarly, a fall in the domestic money supply causes the domestic currency to appreciate against foreign currencies.

4. The assumption that the price level is given in the short run is a good approximation to reality in countries with moderate inflation, but it is a misleading assumption over the long run. Permanent changes in the money supply push the long-run equilibrium price level proportionally in the same direction but do not influence the long-run values of output, the interest rate, or any relative prices. One important money price whose long-run equilibrium level rises in proportion to a permanent money supply increase is the exchange rate, the domestic currency price of foreign currency.

5. An increase in the money supply can cause the exchange rate to overshoot its long-run level in the short run. If output is given, a permanent money supply increase, for example, causes a more-than-proportional short-run depreciation of the currency, followed by an appreciation of the currency to its long-run exchange rate. Exchange rate overshooting, which heightens the volatility of exchange rates, is a direct result of sluggish short-run price level adjustment and the interest parity condition.

KEY TERMS

aggregate money demand, p. 358 inflation, p. 372 money supply, p. 356
deflation, p. 372 long run, p. 363 price level, p. 358
exchange rate overshooting, long-run equilibrium, p. 377 p. 368 short run, p. 363

PROBLEMS

1. Suppose there is a reduction in aggregate real money demand, that is, a negative shift in the aggregate real money demand function. Trace the short-run and long-run effects on the exchange rate, interest rate, and price level.

2. How would you expect a fall in a country’s population to alter its aggregate money demand function? Would it matter if the fall in population were due to a fall in the number of households or to a fall in the size of the average household?

3. The velocity of money, \( V \), is defined as the ratio of real GNP to real money holdings, \( V = Y/(M/P) \) in this chapter’s notation. Use equation (15-4) to derive an expression for velocity and explain how velocity varies with changes in \( R \) and in \( Y \). (Hint: The
effect of output changes on $V$ depends on the elasticity of aggregate money demand with respect to real output, which economists believe to be less than unity.) What is the relationship between velocity and the exchange rate?

4. What is the short-run effect on the exchange rate of an increase in domestic real GNP, given expectations about future exchange rates?

5. Does our discussion of money’s usefulness as a medium of exchange and unit of account suggest reasons why some currencies become vehicle currencies for foreign exchange transactions? (The concept of a vehicle currency was discussed in Chapter 14.)

6. If a currency reform has no effects on the economy’s real variables, why do governments typically institute currency reforms in connection with broader programs aimed at halting runaway inflation? (There are many instances in addition to the Turkish case mentioned in the text. Other examples include Israel’s switch from the pound to the shekel, Argentina’s switches from the peso to the austral and back to the peso, and Brazil’s switches from the cruzeiro to the cruzado, from the cruzado to the cruzeiro, from the cruzeiro to the cruzeiro real, and from the cruzeiro real to the real, the current currency, which was introduced in 1994.)

7. Imagine that the central bank of an economy with unemployment doubles its money supply. In the long run, full employment is restored and output returns to its full-employment level. On the (admittedly unlikely) assumption that the interest rate before the money supply increase equals the long-run interest rate, is the long-run increase in the price level more than proportional or less than proportional to the money supply change? What if (as is more likely) the interest rate is initially below its long-run level?

8. Between 1984 and 1985, the money supply in the United States increased to $641.0 billion from $570.3 billion, while that of Brazil increased to 106.1 billion cruzados from 24.4 billion. Over the same period, the U.S. consumer price index rose to 100 from a level of 96.6, while the corresponding index for Brazil rose to 100 from a level of only 31. Calculate the 1984–1985 rates of money supply growth and inflation for the United States and Brazil, respectively. Assuming that other factors affecting the money markets did not change too dramatically, how do these numbers match up with the predictions of this chapter’s model? How would you explain the apparently different responses of U.S. compared with Brazilian prices?

9. Continuing with the preceding question, note that the monetary value of output in 1985 was $4,010 billion in the United States and 1,418 billion cruzados in Brazil. Refer back to question 3 and calculate velocity for the two countries in 1985. Why do you think velocity was so much higher in Brazil?

10. In our discussion of short-run exchange rate overshooting, we assumed that real output was given. Assume instead that an increase in the money supply raises real output in the short run (an assumption that will be justified in Chapter 17). How does this affect the extent to which the exchange rate overshoots when the money supply first increases? Is it likely that the exchange rate undershoots? (Hint: In Figure 15-12a, allow the aggregate real money demand schedule to shift in response to the increase in output.)

11. Figure 14-2 shows that Japan’s short-term interest rates have had periods during which they are near or equal to zero. Is the fact that the yen interest rates shown never drop below zero a coincidence, or can you think of some reason why interest rates might be bounded below by zero?

12. How might a zero interest rate complicate the task of monetary policy? (Hint: At a zero rate of interest, there is no advantage in switching from money to bonds.)

13. As we observed in this chapter, central banks, rather than purposefully setting the level of the money supply, usually set a target level for a short-term interest rate by standing ready to lend or borrow whatever money people wish to hold at that interest rate. (When people need more money for a reason other than a change in
the interest rate, the money supply therefore expands, and it contracts when they wish to hold less.)

**a.** Describe the problems that might arise if a central bank sets monetary policy by holding the market interest rate constant. (First, consider the flexible-price case, and ask yourself if you can find a unique equilibrium price level when the central bank simply gives people all the money they wish to hold at the pegged interest rate. Then consider the sticky-price case.)

**b.** Does the situation change if the central bank raises the interest rate when prices are high, according to a formula such as \( R - R_0 = a(P - P_0) \), where \( a \) is a positive constant and \( P_0 \) a target price level?

**c.** Suppose the central bank’s policy rule is \( R - R_0 = a(P - P_0) + u \), where \( u \) is a random movement in the policy interest rate. In the overshooting model shown in Figure 15-12, describe how the economy would adjust to a permanent one-time unexpected fall in the random factor \( u \), and say why. You can interpret the fall in \( u \) as an interest rate cut by the central bank, and therefore as an expansionary monetary action. Compare your story with the one depicted in Figure 15-13.

**FURTHER READINGS**


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