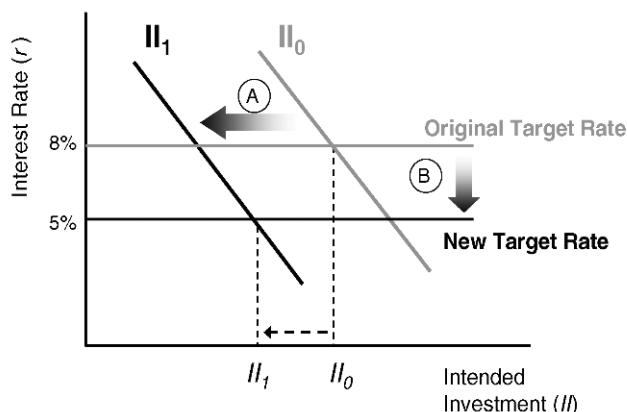


Figure 11.8 **Expansionary Monetary Policy in an Environment of Pessimism**

If investors become pessimistic (shift A), the level of intended investment can still fall, even though Fed actions lower the interest rate (shift B).

the securities they held rapidly lost value. Fearing recession, the Fed took steps to make more money available. (See News in Context.)

Discussion Questions

1. What sorts of interest rates do you deal with in your own life? Do you think Fed policies affect their levels?
2. Is it always true that an increase in the money supply leads to an increase in investment and aggregate demand? Why, or why not?

5. THE THEORY OF MONEY, PRICES, AND INFLATION

Throughout the preceding section, we have largely assumed that we are in an economy in which inflation is low and steady, the banking system is stable, and the main thing the Fed has to worry about is helping to stabilize the levels of investment, aggregate demand, and output. Now let's switch to the opposite extreme. Suppose the central bank's main worry is controlling inflation. For understanding this case, a different approach will be helpful.

5.1 THE QUANTITY EQUATION

Some very different theories of money from that which we've discussed up to now are based on the **quantity equation**:

$$M \times V = P \times Y$$

In this equation, Y is, as usual, real output or GDP. P indicates the price level as measured by, for example, the GDP deflator. The multiplication of these two variables means that the right hand side of the equation represents *nominal output*. On the left-hand side, M measures the level of money balances, such as the M1 measure discussed above. V , the only really new variable here, represents the velocity of money.

quantity equation: $M \times V = P \times Y$, where M is the money supply, V is the velocity of money, P is the price level and Y is real output

NEWS IN CONTEXT:**Fearing Broader Slump, Fed Cuts Key Interest Rate**

The Federal Reserve cut its benchmark short-term interest rate yesterday [Dec. 11, 2007] by a quarter of a percentage point, to 4.25 percent, and suggested that it would lower rates again if the credit crisis continued to damage not just housing, but the rest of the economy as well. In an unusual move, which followed a sharp drop in the stock market after the midafternoon announcement, Fed officials put out word that they might take other steps before year-end to inject money into the banking system.

Since the credit crisis erupted in August, the Fed has shaved a full percentage point from the federal funds rate, which is what banks pay to borrow from each other overnight. Rates on car loans, mortgages, and consumer credit often rise and fall with that rate, and the hope is that with lower borrowing costs, lending will pick up again and spending will rise, preventing the economy from sliding into a recession. The bottleneck is the credit squeeze—the reluctance of banks and other financial institutions to lend because of fear that they will not be repaid, given the defaults and foreclosures spreading in the mortgage market.

In their statement after the meeting, Ben S. Bernanke, the Fed chairman, and his colleagues sidestepped a trap they had fallen into the last time they gathered, on Oct. 31, when they left the impression they were done with their rate cuts. But the economy weakened during November, various indicators suggested, and big financial institutions disclosed new multibillion-dollar write-downs on their portfolios of subprime mortgages. Bernanke finally signaled, in a speech on Nov. 29, that the Fed would cut rates again, after all, at yesterday's meeting.

Source: Louis Uchitelle, *New York Times* News Service, December 12, 2007

What did the Fed hope to prevent, by taking the action described above? What term would an economist use to describe this type of policy?

The **velocity of money** is the number of times a dollar has to change hands in a year, in order to support the level of output and exchange represented by nominal GDP. Since nominal GDP and M1 are observable, velocity can be calculated as the ratio of the two,

$$V = \frac{P \times Y}{M}$$

For the quantity equation to become the basis for a *theory*, rather than merely represent definitions of variables, an assumption needs to be made about velocity. Two theories we will discuss below—classical and monetarist—assume that velocity is constant—changing very little, if at all, with changing conditions in the economy. If this is true, then the level of the money supply and the level of nominal GDP should be tightly related. We will denote this assumption that velocity is constant by putting a bar over the top of V . The **quantity theory of money**, then, is characterized by the relation,

$$M \times \bar{V} = P \times Y$$

where $\bar{V}$ is read “V-bar.” More Keynesian-oriented theories, on the other hand, while they may make use of the quantity *equation*, do not assume that velocity is constant. They are not based on the quantity *theory*.

velocity of money: the number of times a dollar would have to change hands during a year to support nominal GDP, calculated as $V = (P \times Y)/M$

quantity theory of money: the theory that money supply is directly related to nominal GDP, according to the equation $M \times \bar{V} = P \times Y$

5.2 CLASSICAL MONETARY THEORY

Classical monetary theory is based on the quantity theory of money, plus the assumption that output is always constant at its full-employment level. That is,

$$M \times \bar{V} = P \times Y^*$$

where Y^* , as usual, denotes full-employment output. In this case—in contrast to the aggregate demand model described in the previous section—changes in the money supply can have *no* effect on the level of output. The inability of changes in the money supply to affect real output is called **monetary neutrality**. The only variable on the left side that is not constant is the money supply, while the only variable on the right side that is not constant is the price level. Thus, all that a change in the money supply can do is change prices. Rather than an increase in the money supply increasing output, in this model the only thing an increase in the money supply does is cause inflation.

monetary neutrality: the idea that changes in the money supply may affect only prices, while leaving output unchanged

Classical economists, then, tend to see no need for discretionary monetary policy. In the case of a non-growing economy classical theory would prescribe a stable money supply level in order to avoid unnecessary changes in the price level. In a growing economy, classical theory says that the money supply should grow at the same rate as real GDP in order to keep prices stable.* If we assume that the rate of real GDP growth is fairly constant, then money supply should just grow at a fixed percentage rate per year. A central bank that does this is said to be following a **money supply rule**.

money supply rule: committing to letting the money supply grow at a fixed percentage rate per year

5.3 MONETARISM

Another famous theory based on the quantity equation is **monetarism**, propounded by Milton Friedman and Anna Jacobson Schwartz in their book, *A Monetary History of the United States, 1867–1960*, published in 1963. While Keynes had argued that insufficient investment and aggregate demand caused the Great Depression, Friedman and Schwartz argued that it was caused by a drastic contraction in the money supply.

* In keeping with the general no-growth assumption of Part Three of this book, we concentrate on the quantity theory written in terms of levels of money supply, prices, and GDP. In growth terms, it can be written as $m = \pi + y$ where m is the growth rate of money, π is the inflation rate, and y is the growth rate of GDP.

monetarism: a theory associated with Milton Friedman, which claims that macroeconomic objectives are best met by having the money supply grow at a steady rate

Friedman had earlier propounded the quantity theory of money, and has become known for his saying that “inflation is always and everywhere a monetary phenomenon.” But unlike the pure classical theorists, he thought that *bad* monetary policy could have, at least temporarily, *bad* effects on the real economy. During the early years of the Great Depression, he and Schwartz pointed out, both the money supply and the level of nominal GDP fell sharply. This empirical observation can be seen as consistent with the quantity theory of money:

$$\begin{array}{ccc} M \times \bar{V} & = & P \times Y \\ \downarrow & \text{no} & \downarrow \\ & \text{change} & \end{array}$$

They argued that the contraction in the money supply *caused* the reductions in both the price level and real GDP—an assertion that remains controversial. Because of his belief in the potential for bad monetary policy to cause harm, Friedman was one of the most vocal proponents of the idea that central banks should simply follow a money supply rule.

5.4 MONEY AND HYPERINFLATION

The quantity equation can also be used to shed light on the problem of very high inflation, described early in this chapter. Suppose that the level of output in an economy is stagnant or staggering. Suppose that the central bank is causing the money supply to grow very quickly. If people come to expect high inflation, money may tend to become a “hot potato”—people want to hold it for as short a time as possible, since it loses value so quickly. They will try to turn money into non-inflating assets—real estate, hard currency, jewelry, or barterable goods—as quickly as they can. This means that the velocity of money also rises. A situation of hyperinflation in a stagnant economy can be illustrated as:

$$\begin{array}{ccc} M \times V & = & P \times \bar{Y} \\ \uparrow & \uparrow & \uparrow \\ & & \text{no} \\ & & \text{change} \end{array}$$

where the bar over Y indicates that output is stuck at a level below full employment. With output stagnant, and both money supply and velocity rising, inflation must result.

While we imagined a printing press in the government’s basement in our earlier story about hyperinflation, a sophisticated economy can also essentially “run the printing presses” if the agency that issues government debt and the central bank work together. For example, suppose the United States Treasury issues new debt, and the Fed immediately buys the same amount of new debt and injects new money into the economy. The effect is the same as if the Fed had just printed new currency, except that the increase in bank reserves is in the form of “a stroke of the pen” instead of freshly printed paper. This is called **monetizing the deficit**. In the United States, however, the Fed does not automatically buy new government debt. It may, as an accommodating move, monetize some deficit spending by the government in order to help the economy out of a recession, but it is not obliged to do so.

monetizing the deficit: when a central bank buys government debt as it is issued (equivalent to “running the printing presses”)

Even in less extreme cases, loose money can lead to inflation. For example, suppose the economy is functioning relatively normally but output has reached its full-employment level

(Y^*). If monetary policy continues to be expansionary, inflation is likely to result. (This will be discussed more in Chapter 12.)

5.5 IMPORTING INFLATION

Inflation can also be triggered by international economic developments. An increase in the price of imports can lead to upward pressure on prices. This might occur because of a devaluation or depreciation of the domestic currency (as will be discussed further in Chapter 13). In that case, more dollars are required to buy foreign currency, making foreign goods more expensive in general. Or it may be that only the price of some particular imported goods rise—as in the important case of the oil price shocks of the 1970s. This can be portrayed in the quantity equation as:

$$M \times V = \underset{\uparrow}{P} \times Y$$

What happens to the other variables in the quantity equation depends on the reactions of actors in the economy. Changes in the relative prices of goods can generally be expected to cause some disruptions in production. If the Fed takes a strictly anti-inflationary stance, it could make such adjustments especially difficult. Keeping the *average* price level steady in the presence of imported inflation would mean that the prices of non-imported goods and services would have to go *down*. Since wages and prices tend to be “sticky” downward (as discussed in Chapter 7), a strict anti-inflationary stance may contribute to a deeper recession. On the other hand, monetary policy that is accommodating—that is, that tends to be relatively loose, increasing the money supply in order to facilitate relative price adjustments—may lead to somewhat increased upward pressure on prices, but less downward pressure on output.

If the dollar increases in value, or the prices of important imports fall, of course, then this chain of causality works in the opposite direction. Downward pressure on prices, as well as upward pressure, can originate in the foreign sector.

Discussion Questions

1. What is the difference between the quantity *theory* of money and the quantity *equation*?
2. Have there been any reports in the news lately about inflation and its causes? If so, can you tell from news reports whether the cause is a quickly growing money supply, a peak in the business cycle, “imported” inflation, or some combination (or yet some other phenomenon)?

6. COMPLICATIONS AND POLICY CONTROVERSIES

In the real world, central banks generally have to be concerned both about output and inflation, as well as banking regulation and stability, all at the same time. When the goals include *both* stabilization of prices and of output, how does this complicate the analysis, and what does this mean for policy?

6.1 THE FED’S DILEMMA

The Fed can use expansionary monetary policy—policies that increase the money supply, lower interest rates, stimulate investment, and thus increase aggregate demand—to try to get the