29

Monetary Policy in Canada

LEARNING OBJECTIVES

In this chapter you will learn

1. why the Bank of Canada chooses to directly target interest rates rather than the money supply.
2. how changes in the Bank of Canada's target for the overnight interest rate affect longer-term interest rates.
3. why many central banks have adopted formal inflation targets.
4. how the Bank of Canada's policy of inflation targeting helps to stabilize the economy.
5. why monetary policy affects real GDP and the price level only after long time lags.
6. about the main economic challenges that the Bank of Canada has faced over the past three decades.

In the previous two chapters we encountered many details about money and why it is so important for the economy. In Chapter 27 we saw how commercial banks, through their activities of accepting deposits and extending loans, create deposit money. These bank deposits, together with the currency in circulation, make up the nation's money supply. In Chapter 28 we examined the variables that influence households' and firms' money demand. We then put money demand together with money supply to examine how interest rates are determined in the short run in monetary equilibrium. Finally, we examined the monetary transmission mechanism—the chain of cause-and-effect events describing how changes in money demand or supply lead to changes in interest rates, aggregate demand, real GDP, and the price level.

Chapters 27 and 28 presented a general view of the role of money in the economy. What is still missing is a detailed account of how the Bank of Canada conducts its monetary policy. We begin this chapter by describing some technical details about how the Bank influences the monetary equilibrium and thereby sets in motion the monetary transmission mechanism. We then discuss the Bank's current system of inflation targeting and how this system helps to stabilize the economy. Finally, we discuss some limitations for monetary policy and some of the Bank's major challenges over the past 30 years.

29.1 How the Bank of Canada Implements Monetary Policy

The monetary transmission mechanism describes how changes in the demand for or supply of money cause changes in the interest rate, which then lead to changes in aggregate demand, real GDP, and the price level. But how does the Bank of Canada influence the money market and thereby implement its monetary policy?

As we saw in Chapter 27, the money supply is the sum of currency in circulation and total bank deposits, and commercial banks play a key role in influencing the level of these deposits. As a result, the Bank of Canada cannot directly *set* the money supply. As we will soon see, the Bank of Canada is also unable to directly *set* interest rates. In what follows, therefore, we speak of the Bank "targeting" the money supply or interest rates rather than "setting" them directly.

Money Supply Versus the Interest Rate

In general, any central bank has two alternative approaches for implementing its monetary policy—it can choose to target the money supply or it can choose to target the interest rate. These two approaches are illustrated in Figure 29-1, which shows money demand, money supply, and the equilibrium interest rate. But for any given M_D curve, the central bank must choose one approach or the other; it cannot target *both* the money supply and the interest rate independently. If it chooses to target the money supply, monetary equilibrium will determine the interest rate. Alternatively, if the central bank targets the interest rate, the money supply must adjust to accommodate the movement along the M_D curve.

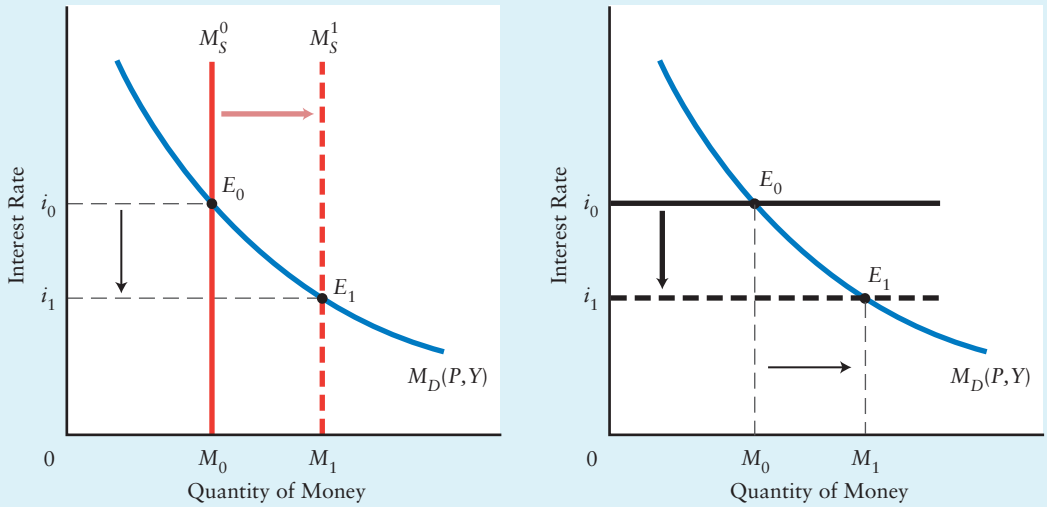
In principle, monetary policy can be implemented either by targeting the money supply or by targeting the interest rate. But for a given M_D curve, both cannot be targeted independently.

Practise with Study Guide Chapter 29, Exercises 1 and 2.

Part (i) of Figure 29-1 shows how the Bank of Canada could attempt to shift the M_S curve directly, by changing the amount of currency in circulation in the economy. It could do this by buying or selling government securities in the financial markets—transactions called *open-market operations*. For example, by using currency to buy $100 000 of government bonds from a willing seller, the Bank of Canada would increase the amount of cash reserves in the banking system by $100 000. As we saw in Chapter 27, commercial banks would then be able to lend out these new reserves and would thereby increase the amount of deposit money in the economy. The combined effect of the new reserves and the new deposit money would be an increase in the money supply, a shift of the M_S curve to the right. For a given M_D curve, this increase in money supply would lead to a reduction in the equilibrium interest rate and, through the various parts of the transmission mechanism, to an eventual increase in aggregate demand.

The Bank of Canada does not implement its monetary policy in this way, for three reasons. First, while the Bank of Canada *can* control the amount of cash reserves in the banking system (through its open-market operations) it *cannot* control the process of deposit expansion carried out by the commercial banks. And since the money supply is the sum of currency and deposits, it follows that the Bank can influence the money

FIGURE 29-1 Two Approaches to the Implementation of Monetary Policy



Monetary policy can be implemented either by targeting the money supply directly or by targeting the interest rate directly—but not both. In part (i), the Bank of Canada could attempt to shift the M_S curve directly and thereby change the equilibrium interest rate. But because the Bank cannot directly control the money supply, and because the slope and position of the M_D curve are uncertain, this is an ineffective way to conduct monetary policy. The Bank's chosen method is illustrated in part (ii), whereby it targets the interest rate directly. It then accommodates the resulting change in money demand through its open-market operations.

supply but cannot *control* it. For example, if the Bank increased the amount of cash reserves in the system, the commercial banks might choose not to expand their lending, and as a result the overall increase in the money supply would be far smaller than the Bank initially intended.

The second reason the Bank does not try to target the money supply directly is the uncertainty regarding the slope of the M_D curve. Even if the Bank had perfect control over the money supply (which it does not), it would be unsure about the change in the interest rate that would result from any given change in the supply of money. Since it is the change in the interest rate that ultimately determines the subsequent changes in aggregate demand, this uncertainty would make the conduct of monetary policy very difficult.

Finally, in addition to being uncertain about the *slope* of the M_D curve, the Bank is also unable to predict accurately the *position* of the M_D curve at any given time. Changes in both real GDP and the price level cause changes in money demand that the Bank can only approximate. Even more difficult to predict are the changes in money demand that occur as a result of innovations in the financial sector. During the late 1970s and early 1980s, for example, the creation of new types of bank deposits led to unprecedented and unpredicted changes in money demand, as people transferred funds between bank accounts of different types. Unpredictable changes in the demand for money make a monetary policy based on the direct control of the money supply difficult to implement.

In summary, the disadvantages of conducting monetary policy by targeting the money supply are as follows:

1. The Bank of Canada cannot control the process of deposit creation.
2. There is uncertainty regarding the slope of the M_D curve.
3. There is uncertainty regarding the position of the M_D curve.

If the Bank of Canada chose to target the money supply, it would have little control over the resulting interest rate. It therefore chooses *not* to implement its monetary policy in this way.

The alternative approach to implementing monetary policy is to target the interest rate directly. This is the approach used by most central banks, including the Bank of Canada. As part (ii) of Figure 29-1 shows, if the Bank can directly change the interest rate, the result will be a change in the quantity of money demanded. In order for this new interest rate to be consistent with monetary equilibrium, the Bank must *accommodate* the change in the amount of money demanded—that is, it must alter the supply of money in order to satisfy the change in desired money holdings by firms and households (we will see shortly how this occurs).

Why does the Bank of Canada choose to implement its monetary policy in this manner? Let's consider the advantages. First, while the Bank cannot control the money supply for the reasons we have just discussed, it *is* able to almost completely control a particular market interest rate. (We will see shortly which rate it targets and how it does so.) Second, the Bank's uncertainty about the slope and position of the M_D curve is not a problem when the Bank chooses instead to target the interest rate directly. If the Bank ascertains that a lower interest rate is necessary in order to achieve its policy objectives, it can act directly to reduce the interest rate. Any uncertainty about the M_D curve then implies uncertainty about the ultimate change in the quantity of money, but it is the interest rate that matters, through the transmission mechanism, for determining the level of aggregate demand.

Finally, the Bank can more easily *communicate* its policy actions to the public by targeting the interest rate than by targeting the level of reserves in the banking system. Changes in the interest rate are more meaningful to firms and households than changes in the level of reserves or the money supply. For example, if we hear that mortgage-lending rates at commercial banks have just decreased by one percentage point, most people can readily assess what this means for their plans to buy a new house financed by a mortgage. In contrast, if we were to hear that the level of reserves in the banking system had just increased by $1 billion, it would not be clear to most people what this means, or that it would have any effect on interest rates, or by how much. Even the Bank itself might be uncertain about the magnitude of these effects.

In summary, these are the advantages of conducting monetary policy by targeting the interest rate:

1. The Bank of Canada is able to control a particular market interest rate.
2. Uncertainty about the slope and position of the M_D curve does not prevent the Bank of Canada from establishing its desired interest rate.
3. The Bank of Canada can easily communicate an interest-rate change to the public.

The Bank of Canada and the Overnight Interest Rate

Practise with Study Guide Chapter 29, Exercises 3 and 4.

We have just explained why the Bank of Canada chooses to implement its monetary policy by targeting the interest rate rather than by trying to influence the money supply directly. But *how* does the Bank do this, and *which* interest rate (among many) does it target?

As we discussed in Chapter 28, there are many interest rates in the Canadian economy. Commercial banks pay different rates to depositors on each of several different types of bank deposits. They also lend at different rates for different kinds of loans—home mortgages, small business loans, personal lines of credit, and car loans, to name just a few. In addition, government securities trade at different yields (interest rates) depending on the term to maturity. Economists refer to the overall pattern of interest rates corresponding to government securities of different maturities as the *term structure of interest rates*. Because bondholders generally require a higher rate of return in order to lend their funds for a longer period of time, yields on government securities generally increase as the term to maturity increases. At any given time, the yield on 90-day Treasury bills is usually less than that on 5-year government bonds, which in turn is less than the yield on 30-year bonds. Furthermore, because these various assets are viewed as close substitutes by bondholders, the different rates tend to rise and fall together.

overnight interest rate The interest rate that commercial banks charge one another for overnight loans.

The interest rate corresponding to the shortest period of borrowing or lending is called the **overnight interest rate**, which is the interest rate that commercial banks charge one another for overnight loans. Banks that need cash because they have run short of reserves can borrow in the *overnight market* from banks that have excess reserves available. The overnight interest rate is a market-determined interest rate that fluctuates daily as the cash requirements of commercial banks change.

The Bank of Canada exercises considerable influence over the overnight interest rate. As this rate rises or falls, the other interest rates in the economy—from short-term lines of credit to longer-term home mortgages and government securities—tend to rise or fall as well. Thus, by influencing the overnight interest rate, the Bank of Canada also influences the longer-term interest rates that are more relevant for determining aggregate consumption and investment expenditure.

How does the Bank of Canada influence the overnight interest rate? The Bank's tool for conducting its monetary policy—what economists sometimes call the Bank's *policy instrument*—is a *target* that it sets for the overnight interest rate. This target is the midpoint of a 0.5 percentage point range within which the Bank would like to see the actual overnight interest rate. The Bank announces its target for the overnight interest rate eight times per year at pre-specified dates called *fixed announcement dates,* or FADs.

bank rate The interest rate the Bank of Canada charges commercial banks for loans.

When the Bank sets its target for the overnight rate, it also sets two other rates: one at the top and one at the bottom of the 0.5 percentage point range. At the upper rate, called the **bank rate**, the Bank of Canada stands ready to lend to commercial banks any amount of cash they desire. At the lower rate, the Bank stands ready to accept any deposits from commercial banks and to pay them this interest rate. By changing its target for the overnight rate, and by changing the other two rates in lock-step, the Bank of Canada can more or less control the actual overnight interest rate. The 0.5 percentage point range is often referred to as the Bank's *target range* for the overnight interest rate.[1]

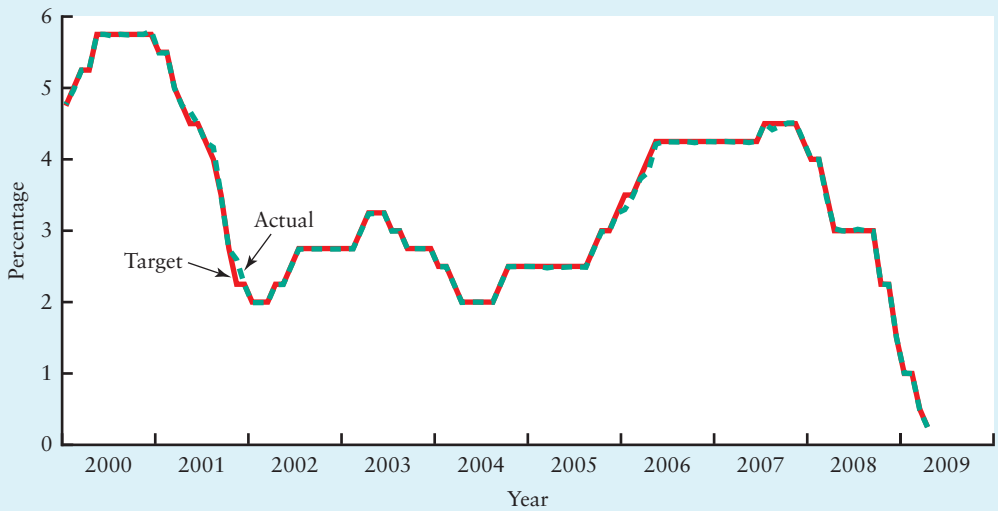
[1] In the spring of 2009, the Bank of Canada reduced its target for the overnight rate to 0.25 percent (and reduced the bank rate to 0.5 percent). It also decided at that time to pay commercial banks 0.25 percent on any deposits they held at the Bank of Canada (rather than reducing this rate to zero). As a result, the Bank's target range temporarily narrowed from 0.5 to 0.25 percentage points.

Consider an example that illustrates the Bank's control over the overnight interest rate. We begin by assuming that the Bank's announced target for the overnight interest rate is 4 percent. The Bank is then willing to lend to commercial banks at the bank rate, 4.25 percent. The Bank is also willing to pay 3.75 percent on any deposits it receives from commercial banks. In this case, what will be the *actual* overnight interest rate? Without knowing more details about commercial banks' demands and supplies for overnight funds, we cannot know exactly what the rate will be, but we can be sure that it will be within the Bank's target range—that is, *between* 3.75 percent and 4.25 percent. It will not be above 4.25 percent because any borrower would rather borrow from the Bank of Canada at 4.25 percent than at a higher rate from any commercial lender. Similarly, it will not be below 3.75 percent because any lender would rather lend to the Bank of Canada at 3.75 percent than accept a lower rate from any commercial borrower. Thus, the Bank can ensure that the actual overnight interest rate remains within its target range.

The Bank's policy instrument is its target for the overnight interest rate. By raising or lowering its target rate, the Bank affects the actual overnight interest rate. Changes in the overnight rate then lead to changes in other, longer-term, interest rates.

Figure 29-2 shows the path of the actual overnight interest rate and the Bank's target rate since 2000. It is almost impossible to tell the difference between the two lines

FIGURE 29-2 The Overnight Interest Rate: Target and Actual



By setting a target for the overnight interest rate, the Bank of Canada exercises considerable influence over the actual overnight interest rate. By establishing an upper lending rate (the bank rate) and a lower borrowing rate, the Bank can ensure that the actual overnight interest rate remains within the Bank's target range. Since 2000, there have been only small differences between the actual overnight interest rate, the dashed green line, and the Bank's target for the overnight rate, the solid red line.

(*Source:* All data are from the Bank of Canada: www.bankofcanada.ca. Overnight interest rate: Series V122514. Bank rate: Series V122530. The Bank's target rate is the bank rate minus 0.25 percentage points.)

in the figure, which shows the considerable influence that the Bank of Canada's actions have on the actual overnight interest rate.

For the reasons just discussed, the Bank of Canada's approach to monetary policy involves setting the target for the overnight interest rate rather than trying to directly influence the money supply. At least, this is the Bank's approach during *normal* times. As explained in *Applying Economic Concepts 29-1*, however, the unusual events during the financial crisis of 2007–2008 led the Bank to implement "unconventional" policies in which at times the focus was more on changes in the money supply than on changes in interest rates. Once the crisis passed, the Bank returned to its normal procedures as described here.

The Money Supply Is Endogenous

When the Bank of Canada changes its target for the overnight rate, the change in the actual overnight rate happens almost instantly. Changes in other market interest rates, from home mortgage rates and the prime interest rate to the yields on short- and long-term government securities, also happen very quickly, usually within a day or two. As these rates adjust, firms and households begin to adjust their borrowing behaviour, but these changes take considerably longer to occur. For example, if the Bank of Canada lowered its target for the overnight rate by 25 basis points (0.25 percentage points), commercial banks might follow immediately by reducing the rate on home mortgages. But individuals will not respond to this rate reduction by immediately increasing their demand for home mortgages. Usually such changes take a while to occur, as borrowers think carefully about how interest-rate changes affect their own economic situations, the affordability of a possible house purchase, or, in the case of firms, the profitability of a potential investment.

As the demand for new loans gradually adjusts to changes in interest rates, commercial banks often find themselves in need of more cash reserves with which to make new loans. When this occurs, banks can sell some of their government securities to the Bank of Canada for cash and then use this cash to extend new loans. By buying government securities with cash in such an **open-market operation**, the Bank of Canada increases the amount of currency in circulation in the economy. This new currency arrives at the commercial banks as cash reserves, which can then be loaned out to firms or households. As we saw in Chapter 27, this process of making loans results in an expansion in deposit money and thus an expansion of the money supply.

open-market operation
The purchase and sale of government securities on the open market by the central bank.

Through its open-market operations, the Bank of Canada changes the amount of currency in circulation. But the Bank does not initiate these transactions; it conducts them to accommodate the changing demand for currency by the commercial banks.

Economists often say that the amount of currency in circulation (and also the money supply) is *endogenous*. It is not directly controlled by the Bank of Canada, but instead is determined by the economic decisions of households, firms, and commercial banks. The Bank of Canada is *passive* in its decisions regarding the money supply; it conducts its open-market operations to accommodate the changing demand for currency coming from the commercial banks. *Applying Economic Concepts 29-2* discusses in more detail how the Bank of Canada conducts open-market operations in response to this changing demand.

APPLYING ECONOMIC CONCEPTS 29-1

"Unconventional" Monetary Policy During the 2007–2008 Financial Crisis

The Bank of Canada normally conducts its monetary policy by setting its target for the overnight interest rate. By offering to lend to commercial banks at an interest rate 1/4 of a percentage point above this target, and to accept deposits and pay an interest rate 1/4 of a percentage point below the target, the Bank is able to keep the overnight interest rate within a narrow range. This control gives it significant influence on longer-term interest rates and thus on aggregate demand.

Note that the Bank is usually able to control the overnight interest rate in this manner without *actually* extending loans to or accepting deposits from commercial banks. The mere knowledge on the part of commercial banks that the Bank of Canada is *prepared* to take these actions is enough to keep the actual overnight interest rate close to the target. With the onset of the financial crisis of 2007–2008, however, the Bank needed to take some "unconventional" actions.

The financial crisis originated with the collapse of prices in the U.S. housing market and the associated increase in the number of homeowners who then "walked away" from their homes because the value of their property was less than the amount they owed on their mortgages. For the banks and other financial institutions that had purchased billions of dollars worth of mortgage-backed securities, the collapse in the value of homes and mortgages implied a collapse in the value of their assets; these losses were large enough in some cases to cause the failures of some large U.S. and U.K. commercial and investment banks in 2008. These failures, in turn, led to significant disruptions in global credit markets as commercial banks and other financial institutions came to fear "counterparty risk"—they were reluctant to extend even short-term loans to one another out of fear that the borrower (the counterparty) would go bankrupt before repaying the loan. But with the flow of credit interrupted in this manner, there was a genuine risk that the level of economic activity would soon be affected.

In this setting, the Bank of Canada significantly reduced its target for the overnight interest rate, as is evident in Figure 29-2. In addition, it took "unconventional" actions, designed to restore the flow of credit in the economy. The Bank eased the terms by which it extended loans to financial institutions, both by broadening the class of assets it was prepared to hold as collateral and by extending the length of the loans. By doing so, the Bank was able to increase liquidity in the financial sector and thus increase interbank lending. The Bank's actions appeared to be effective and well timed. As the financial crisis progressed, it became clearer that Canadian banks and financial institutions were less exposed to the mortgage-backed securities that had created such havoc in the U.S. and U.K. financial sectors. With this knowledge, the fear of counterparty risk in the Canadian financial sector gradually declined and the credit markets gradually returned to normal. But the Bank's actions, taken early and amid a time of great confusion, helped to keep financial markets operating relatively smoothly and thus helped to sustain the flow of credit.

Despite similar actions being taken in central banks in other countries, the scale of the global financial crisis led to a global recession. The decline in global economic activity led to a steep decline in demand for Canada's exports. By the spring of 2009, Canada was in a deep recession and the Bank of Canada was considering some further unconventional policy actions. This time, however, the situation was quite different from that in 2008. Having reduced its target for the overnight interest rate to 0.25 percent from 4.5 percent in mid-2007, the Bank could no longer reduce it further. What could the Bank then do if the depth of the recession suggested a need for even more expansionary monetary policy?

The Bank indicated that it was prepared, if necessary, to embark on policies of "quantitative easing" or "credit easing." Quantitative easing would involve the Bank directly purchasing longer-term government securities and doing so with newly created money, thereby directly increasing the money supply. This would be nothing more than an open-market purchase of bonds, as we describe in *Applying Economic Concepts 29-2* on page 736. Credit easing would involve the Bank directly purchasing private-sector securities and would be intended to help restore the flow of credit to selected segments of the financial markets.

As of early 2010, however, the Bank of Canada had not yet embarked on policies of either quantitative or credit easing. But both remain as possible "unconventional" policy actions when the Bank desires an expansionary monetary policy but when the target for the overnight rate cannot be lowered further.

APPLYING ECONOMIC CONCEPTS 29-2

What Determines the Amount of Currency in Circulation?

The Bank of Canada uses its *policy instrument*—its target for the overnight interest rate—to influence the money market and implement its monetary policy. A reduction in the Bank's target for the overnight rate will reduce market interest rates and lead to a greater demand for borrowing and hence spending by firms and households. In contrast, an increase in the Bank's target for the overnight rate will tend to raise market interest rates and reduce the demand for borrowing and spending by firms and households.

In response to these changes in the demand for loans, commercial banks may find themselves either with too few cash reserves with which to make new loans or with too many cash reserves for the amount of loans they want to make. What happens in each case?

If Banks Need More Cash

Suppose that at the current market interest rates and level of economic activity, commercial banks are facing a growing demand for loans. If banks have excess reserves, these loans can be made easily. But once banks reach their target reserve ratio, they will be unable to extend new loans without increasing their cash reserves. Banks can increase their cash reserves by selling some of their government bonds to the Bank of Canada. In this case, the Bank of Canada is *purchasing* government bonds from the commercial banks. This transaction is called an *open-market purchase.*

Suppose a commercial bank wants to sell a $10 000 bond to the Bank of Canada. As the accompanying balance sheets show, this transaction does not change the total assets or liabilities for the commercial bank, although it changes the *form* of its assets. With more cash reserves (and fewer bonds), the commercial bank can now make more loans. For the Bank of Canada, however, there *is* a change in the level of assets and liabilities. Its holdings of bonds (assets) have increased and the amount of currency in circulation (liabilities) has also increased. Open-market purchases by the Bank of Canada are the means by which the amount of currency in the economy increases.

If Banks Have Excess Reserves

Now suppose that at the current market interest rates and level of economic activity the commercial banks cannot find enough suitable borrowers to whom they can lend their excess cash reserves. The commercial banks can reduce their excess cash reserves by using the cash to purchase government bonds from the Bank of Canada. In this case, the Bank of Canada is *selling* government bonds to the commercial banks. This transaction is called an *open-market sale.*

The changes are the opposite of those shown in the accompanying balance sheets. The commercial bank now has less cash and more (interest-earning) bonds, but its total assets and liabilities are unchanged. The Bank of Canada now has fewer bonds and there is also less currency in circulation in the economy.

An Open-Market Purchase of Bonds from a Commercial Bank

Commercial Bank Balance Sheet

Assets		Liabilities
Bonds	− $10 000	No change
Cash Reserves	+ $10 000	

Bank of Canada Balance Sheet

Assets		Liabilities	
Bonds	+ $10 000	Currency in Circulation	+ $10 000

Currency in a Growing Economy

If you look at the Bank of Canada's balance sheets (like the one we showed in Chapter 27) over several years, you will notice that the amount of currency in circulation rarely (if ever) falls. In an economy where real GDP is steadily growing, the demand for loans by firms and households is also usually growing, as is the demand for currency by commercial banks. In some years, the demand for currency is growing very quickly, in which case the Bank of Canada has many open-market purchases. In other years, the demand for currency grows only slowly, in which case the Bank has fewer (or smaller) open-market purchases. In a typical year, however, the amount of currency in circulation increases by about 5 percent, which in 2009 represented about $3 billion. Thus, in a typical week, the Bank of Canada purchases about $55 million of government bonds in the open market.

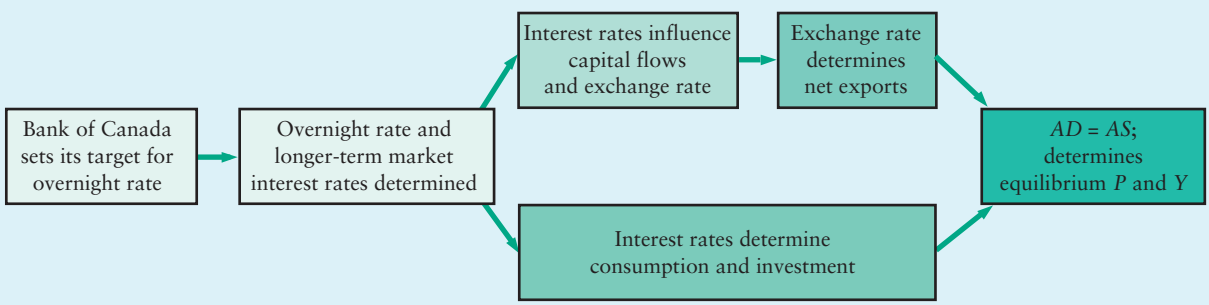
Expansionary and Contractionary Monetary Policies

We can now clarify the meaning of a *contractionary* or an *expansionary* monetary policy. As we saw earlier, unpredictable shifts in the money demand curve imply that there is no clear relationship between changes in the interest rate and changes in the quantity of money in circulation. And since what matters for the monetary transmission mechanism is the change in interest rates, economists label a monetary-policy action as being expansionary or contractionary depending on how the policy affects interest rates, rather than on how it affects the overall amount of money.

If the Bank of Canada wants to stimulate the level (or growth rate) of aggregate demand, it will reduce its target for the overnight interest rate, and the effect will soon be felt on longer-term market interest rates. Reducing the interest rate is an *expansionary* monetary policy because it leads to an expansion of aggregate demand. If the Bank instead wants to reduce aggregate demand (or its growth rate), it will increase its target for the overnight interest rate, and longer-term market interest rates will soon rise as a result. Increasing the interest rate is a *contractionary* monetary policy because it leads to a contraction (or slowing) of aggregate demand.

As the longer-term market interest rates change, the various steps in the monetary transmission mechanism come into play. As we saw in Chapter 28, in an open economy like Canada's there are two separate channels in this transmission mechanism. First, desired investment and consumption expenditure will begin to change. At the same time, international capital flows in response to changes in interest rates will cause the exchange rate to change, which, in turn, causes net exports to change. Taken together, the total changes in aggregate expenditure lead to shifts in the *AD* curve, which then lead to changes in real GDP and the price level. The monetary transmission mechanism is reviewed in Figure 29-3.

FIGURE 29-3 The Monetary Transmission Mechanism



Monetary policy influences aggregate demand through the monetary transmission mechanism. The Bank of Canada sets a target for the overnight interest rate, which influences other market interest rates as well. The change in interest rates leads, via the monetary transmission mechanism, to changes in desired aggregate expenditure. Aggregate demand and aggregate supply then determine the price level and the level of real GDP.

29.2 Inflation Targeting

In the previous section we examined the technical details of how the Bank of Canada implements its monetary policy. In this section we examine the Bank's policy objectives and how it conducts its monetary policy to achieve those objectives. Our emphasis is on the Bank's policy of *inflation targeting*.

Why Target Inflation?

During the last few decades of the twentieth century, central banks the world over came to accept two economic propositions. The first proposition is that high inflation is damaging to the economy and is costly for firms and individuals. Among other things, inflation reduces the real purchasing power of those people whose incomes are stated in nominal (dollar) terms and insufficiently *indexed* to adjust for changes in the price level. For example, seniors whose pension incomes are not indexed to inflation suffer a reduction in their real incomes whenever inflation occurs.

The *uncertainty* generated by inflation is also damaging to the economy. When inflation is high, it tends to be quite volatile, and this volatility makes it difficult to predict. As a result, periods of high inflation are often characterized as having much *unexpected* inflation. As we first discussed in Chapter 19, unexpected inflation leads to reallocations of real income between workers and firms and borrowers and lenders that may be viewed as undesirable. (Because many contracts are set in nominal terms over periods of several years, even *expected* inflation has this effect.)

Finally, high inflation undermines the ability of the price system to signal changes in relative scarcity through changes in relative prices. For example, if the prices of construction materials rise when inflation is high, consumers may be unable to discern whether the price is rising relative to other goods and services or whether it is rising only because of a widespread inflation. As a result, both producers and consumers will make mistakes regarding their own production and consumption decisions that they would not have made in the absence of high inflation.

High and uncertain inflation leads to arbitrary income redistributions and also undermines the efficiency of the price system.

The second proposition that came to be accepted by most central banks is that the effects of monetary policy are different in the short run and in the long run. While in the short run monetary policy can have a profound influence on real economic variables, such as real GDP, employment, and investment, its long-run impact appears to fall mostly on nominal variables, such as the price level and the inflation rate. Because of the economy's adjustment process that we examined in detail in Chapter 24, real GDP tends to return in the long run to its potential level, Y^*. As a result, monetary policy is unlikely to have a systematic and *sustained* influence on real economic variables. However, monetary policy does have a systematic and sustained influence on the rate of inflation.

A related proposition also came to be accepted by central banks. Various demand and supply shocks that are unrelated to monetary policy cause shifts in the *AD* and *AS* curves and thus cause temporary changes in the rate of inflation as the economy

responds to these shocks. But over time it became clear that *sustained* inflation was not caused by such shocks—instead, *sustained* inflation appeared to occur only in those situations in which monetary policy was allowing continual and rapid growth in the money supply. In other words, central banks came to recognize that *sustained* inflation was ultimately created by monetary policy.

Most economists and central bankers believe that monetary policy is the most important determinant of a country's long-run rate of inflation.

In summary, central banks have come to accept two propositions about inflation:

1. High inflation is costly for individuals and damaging to the economy.
2. Inflation is the only macroeconomic variable over which central banks have a systematic and sustained influence.

Given these two propositions, which over the years have been increasingly supported by both theoretical reasoning and empirical evidence, it is not surprising that central banks have come to focus their attentions on the reduction and control of inflation.

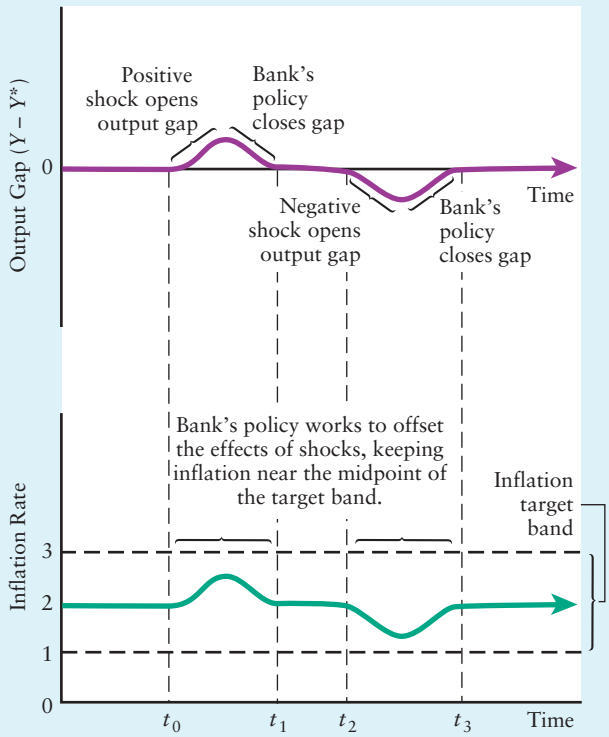
In the early 1990s, many central banks around the world—the Bank of Canada being among the first—adopted formal systems of *inflation targeting*. The Bank of Canada first adopted its formal inflation targets in 1991 when the annual rate of inflation was almost 6 percent. The targets were expressed as a 2-percentage-point band, in recognition of the fact that it is unrealistic to expect the Bank to keep the inflation rate at a single, precise value in the face of the many shocks that influence it in the short term. Beginning in 1992, the Bank of Canada's target range for inflation was 3–5 percent, with the range falling to 2–4 percent by 1993 and to 1–3 percent by the end of 1995. The Bank's formal inflation targets were renewed in 1996 and again in 2001 and 2006 (with the current targets in place until 2011). Today, the Bank of Canada conducts its monetary policy with the objective of keeping inflation at or near the 2-percent target. Figure 29-5 on page 742 shows the inflation rate and the 1–3 percent target range since 1992.

The overall success of inflation targeting, in Canada and elsewhere, has led many central banks to adopt formal inflation targets. New Zealand was the first adopter, in 1990, and Canada was second, in 1991. Formal inflation targets were adopted soon thereafter in Israel, the United Kingdom, Australia, Finland, Spain, and Sweden. Since the mid-1990s, the list has grown to include Chile, Brazil, Colombia, Mexico, the Czech Republic, Poland, South Africa, Thailand, and others. The U.S. Federal Reserve has *not* yet adopted a formal inflation target, although its current chairman, Ben Bernanke, has indicated that he would like the Federal Reserve to do so.

The Role of the Output Gap

The Bank of Canada recognizes that its monetary policy has real and important effects on the economy in the short run, even though its long-run influence is mainly limited to the price level and the inflation rate. The Bank also recognizes that the long-run effects of its policies follow only after the short-run effects on real GDP are experienced, after which the economy's adjustment process tends to return real GDP to the level of potential output. As a result, the Bank of Canada closely monitors the level of real GDP in the short run and also the gap between real GDP and Y^*—the output gap.

FIGURE 29-4 The Output Gap, Inflation, and Monetary Policy



The Bank of Canada closely monitors the output gap to determine the necessary policy for maintaining inflation near its target. The economy begins with no output gap and the inflation rate at 2 percent. At time t_0 a positive shock pushes real GDP above Y* and increases inflationary pressure. The Bank can then implement a contractionary monetary policy to close the output gap and reduce inflation back toward 2 percent. At time t_2 a negative shock reduces real GDP below Y^* and reduces inflationary pressure. The Bank can then implement an expansionary monetary policy to close the output gap and increase inflation back toward 2 percent.

To understand why the Bank closely monitors the output gap in the short run, consider Figure 29-4, which shows hypothetical time paths for the output gap ($Y - Y^*$) in part (i), and for the rate of inflation with the 1–3 percent target band in part (ii). Until time t_0, the economy is growing with Y equal to Y^* and inflation is more or less constant at the midpoint of the target band. At t_0, a positive shock pushes real GDP above Y^* and opens up an inflationary output gap. Labour and other factors of production are used intensively in order to increase output, and this generates excess demand in factor markets. Wages and other factor prices begin to rise, pushing up firms' costs and adding to the inflationary pressure. The rate of inflation begins to rise above the midpoint of the target band.

At this point, the Bank of Canada must make a decision. It can choose to leave its policy unchanged and let the economy's adjustment process operate. The *AS* curve will shift upward and eventually return real GDP to Y^* but only through more inflation. The other choice for the Bank is to attempt to close the output gap by "pulling" real GDP back toward Y^* with a contractionary monetary policy, shifting the *AD* curve to the left and bringing the rate of inflation back to its starting point near the midpoint of the target band.

The opposite situation can also occur, as shown in the figure at time t_2, when a negative shock pushes real GDP below Y^* and pushes inflation toward the bottom end of the target band. The Bank is again faced with a choice. It can do nothing and let real GDP return (perhaps slowly) to Y^*, but allow inflation to fall even further as the *AS* curve shifts down during the adjustment process. Or it can try to close the output gap by creating a monetary expansion to shift the *AD* curve to the right and "pull" real GDP back toward Y^*, raising the rate of inflation back toward the midpoint of the target band.

Output gaps create pressure for the rate of inflation to change. To keep the rate of inflation close to the 2-percent target, the Bank of Canada closely monitors real GDP in the short run and designs its policy to keep real GDP close to potential output.

Practise with Study Guide Chapter 29, Exercise 5.

Inflation Targeting as a Stabilizing Policy

Figure 29-4 also shows why an inflation-targeting policy helps to stabilize the economy. If the Bank of Canada is committed to keeping the rate of inflation near 2 percent, positive shocks to the economy that create an inflationary gap and threaten to increase the

rate of inflation will be met by a contractionary monetary policy. The Bank will increase interest rates and shift the *AD* curve to the left. This policy will reduce the size of the output gap and push the rate of inflation back down toward 2 percent. Similarly, if a negative shock to the economy creates a recessionary gap and threatens to reduce the rate of inflation, a central bank committed to its inflation targets will respond with an expansionary monetary policy. In this situation, the Bank of Canada will reduce interest rates and shift the *AD* curve to the right. This policy will reduce the size of the output gap and push the inflation rate back toward the 2-percent target.

Inflation targeting is a stabilizing policy. Positive shocks will be met with a contractionary monetary policy; negative shocks will be met with an expansionary monetary policy.

Some economists go so far as to refer to a policy of inflation targeting as an "automatic" stabilizer. But this is an exaggeration, as we can see by recalling our discussion in Chapter 24 of automatic *fiscal* stabilizers, caused by taxes and transfers that vary with the level of national income. The automatic fiscal stabilizers we discussed in Chapter 24 were truly "automatic" in the sense that no group of policymakers had to actively adjust policy—the stabilizers were built right into the tax-and-transfer system. With inflation targeting, however, there must be an active policy decision to keep inflation close to its target rate, and only then will the Bank's policy adjustments work to stabilize the economy following either positive or negative shocks. But as long as the Bank wants to maintain its inflation target, and have it perceived as being *credible,* then it is committed to carrying out such policy adjustments.

Inflation targets are not as "automatic" a stabilizer as the fiscal stabilizers built into the tax-and-transfer system. But if the central bank is committed to maintaining the credibility of its inflation target, its policy adjustments will act to stabilize the economy.

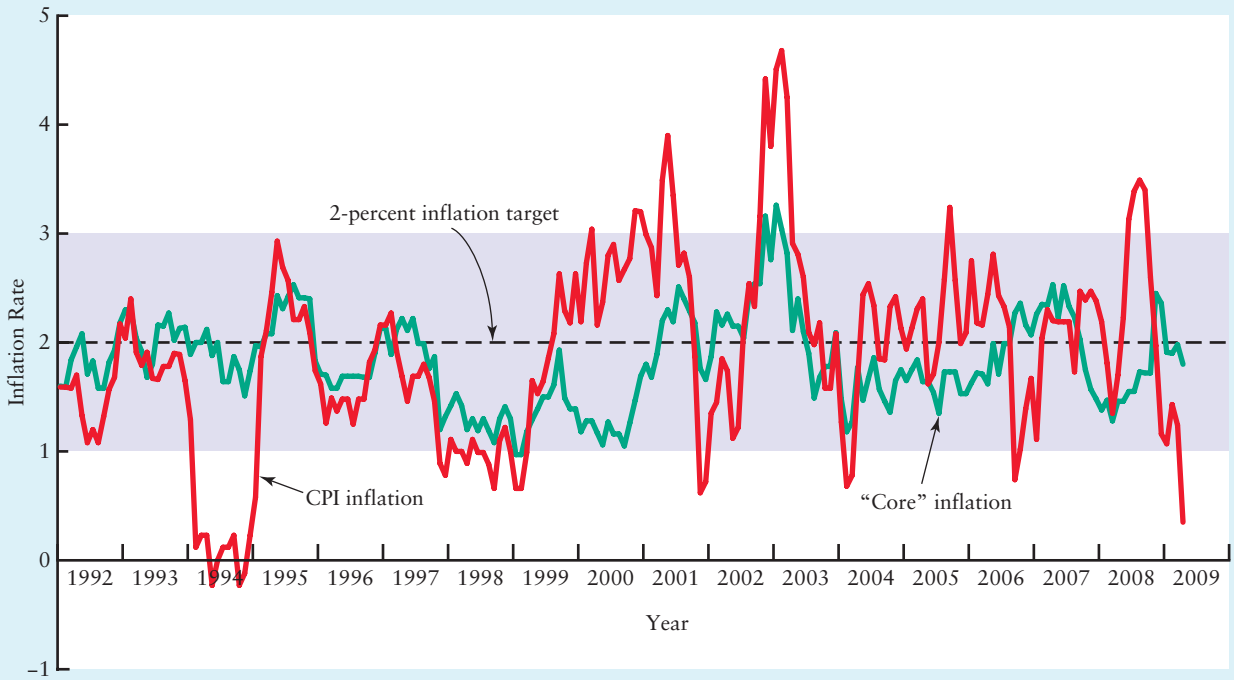
Complications in Inflation Targeting

So far, our discussion of inflation targeting makes the conduct of monetary policy seem straightforward. But there are several details that complicate the task considerably. In this section we discuss two complications for the conduct of monetary policy, and in the next section we address a more general difficulty.

Volatile Food and Energy Prices

Sometimes the rate of inflation increases for reasons unrelated to a change in the output gap. For example, many commodities whose prices are included in the Consumer Price Index (CPI) are internationally traded goods and their prices are determined in world markets. Oil is an obvious example, as are many fruits and vegetables. When these prices rise suddenly, perhaps because of political instability in the Middle East (oil) or because of poor crop conditions in tropical countries (fruits and vegetables), the measured rate of inflation of the Canadian CPI also rises. Yet these price increases have little or nothing to do with the size of the output gap in Canada and thus have little implication for what policy should be followed by the Bank of Canada. By focusing exclusively on the rate of inflation of the CPI, the Bank would be misled about the extent of inflationary pressures coming from excess demand in Canada.

FIGURE 29-5 Canadian CPI and Core Inflation, 1992–2009



The CPI inflation rate is more volatile than the "core" inflation rate. The core rate of inflation in Canada is the rate of change of a special price index constructed by removing food, energy, and the effects of indirect taxes from the overall Consumer Price Index. For both series shown here, the inflation rate is computed monthly but is the rate of change in the price index from 12 months earlier.

(*Source:* Based on authors' calculations using data from Statistics Canada, CANSIM database, Series V36397 and V735319.)

For this reason, the Bank of Canada pays attention to what is called the "core" rate of inflation. This is the rate of growth of a special price index, one that is constructed by extracting food, energy, and the effects of indirect taxes (such as the GST or excise taxes) from the Consumer Price Index. Figure 29-5 shows the paths of core and CPI inflation since 1992. As is clear from the figure, even though the two measures of inflation move broadly together, core inflation is much less volatile than is CPI inflation.

Because of the volatility of food and energy prices that is often unrelated to the level of the output gap in Canada, the Bank of Canada closely monitors the rate of "core" inflation even though its formal target of 2 percent applies to the rate of CPI inflation. Changes in core inflation are a better indicator of Canadian excess demand than are changes in CPI inflation.

Note the sharp divergence between the two inflation rates in 1994. At that time, there were substantial decreases in the excise taxes on cigarettes, and those tax reductions led to a sharp decline in the CPI inflation rate. But this decline in CPI inflation

was tax-created rather than caused by the opening of a recessionary output gap, and thus it would have been inappropriate for the Bank of Canada to respond to this decline in inflation by implementing an expansionary monetary policy. Instead, the Bank focused on the core inflation rate that excludes the effect of changes in indirect taxes. The core inflation rate in 1994 was relatively stable and close to the midpoint of the 1–3 percent target band, indicating no need for a change in monetary policy.

Note also the volatility of the CPI inflation rate during 2008. Energy and commodity prices had been rising for the previous few years, but they increased especially rapidly in the early part of 2008. This helped to push the CPI inflation rate above 3 percent. But then the worst part of the financial crisis occurred in the autumn of that year, energy and commodity prices plunged, and the CPI inflation rate fell quickly to below 1 percent. Meanwhile, the core rate of inflation was much less volatile and remained close to 2 percent.

The Exchange Rate and Monetary Policy Given the large amount of trade that Canadian firms and households do with the rest of the world, it is not surprising that the Bank of Canada pays close attention to movements in the exchange rate, the Canadian-dollar price of one unit of foreign currency. However, because changes in the exchange rate can have several different causes, care must be taken when drawing inferences about the desired change in monetary policy resulting from changes in the exchange rate. As we will see, there is no simple "rule of thumb" for how the Bank should react to a change in the exchange rate. Recall that the Bank's objective is to keep the inflation rate near the midpoint of the 1–3 percent target band, and it does this by responding to changes in the output gap so as to offset changes in emerging inflationary pressure. The Bank's appropriate policy response to a change in the exchange rate depends crucially on the *cause* of the change.

Many economic events can lead to changes in the exchange rate. The cause of any change must be known before the appropriate monetary policy response can be determined.

We consider two different examples. In the first, an appreciation of the Canadian dollar leads the Bank to tighten its monetary policy by raising its target for the overnight interest rate. In the second example, an appreciation of the Canadian dollar leads the Bank to loosen its monetary policy by reducing its target for the overnight interest rate. In both cases, the Bank's actions are consistent with its objective of keeping the inflation rate near the midpoint of the 1–3 percent target band.

For the first example, suppose that the economies of Canada's trading partners are booming and thus demanding more Canadian exports. Foreigners' heightened demand for Canadian goods creates an increase in demand for the Canadian dollar in foreign-exchange markets. The Canadian dollar therefore appreciates. But the increase in demand for Canadian goods has added directly to Canadian aggregate demand. If this shock persists, it will eventually add to domestic inflationary pressures. In this case, if the Bank notes the appreciation of the dollar (and correctly determines its cause), it can take action to offset the positive demand shock by tightening monetary policy by raising its target for the overnight interest rate.

The second example involves an increase in demand for Canadian *assets* rather than Canadian goods and has quite different implications from the first example. Suppose that investors, because of events happening elsewhere in the world, decide to liquidate some of their foreign assets and purchase more Canadian assets instead. In this case, the increase in demand for Canadian assets leads to an increase in demand for the

Canadian dollar in foreign-exchange markets. This causes an appreciation of the Canadian dollar. As the dollar appreciates, however, Canadian exports become more expensive to foreigners. There will be a reduction in Canadian net exports and thus a reduction in Canadian aggregate demand. If this shock persists, it will eventually reduce inflationary pressure in Canada. In this case, if the Bank notes the appreciation of the dollar (and correctly determines its cause), it can take action to offset the negative demand shock by loosening monetary policy by reducing its target for the overnight interest rate.

Notice in both examples that the Canadian dollar appreciated as a result of the external shock, but the causes of the appreciation were different. In the first case, there was a positive demand shock to net exports, which then caused the appreciation, which in turn dampened the initial increase in net exports. But the overall effect on the demand for Canadian goods was positive. In the second case, there was a positive shock to the *asset* market, which then caused the appreciation, which in turn reduced the demand for net exports. The overall effect on the demand for Canadian goods was negative. Thus, in the first case, the appropriate response for monetary policy was contractionary, whereas in the second case the appropriate response for monetary policy was expansionary.

Changes in the exchange rate can signal the need for changes in the stance of monetary policy. Only once the cause of the exchange-rate change is determined, however, can the Bank of Canada design a policy response appropriate for keeping inflation close to its target.

myeconlab **ADDITIONAL TOPICS**

For a more detailed discussion of how movements in the exchange rate complicate the implementation of monetary policy, look for **Monetary Policy and the Exchange Rate in Canada** in the *Additional Topics* section of this book's MyEconLab.

www.myeconlab.com

29.3 Long and Variable Lags

In Chapter 28 we encountered a debate that was prominent from the 1950s to the early 1980s. *Monetarists* argued that monetary policy was potentially very powerful in the sense that a given change in the money supply would lead to a substantial change in aggregate demand, whereas *Keynesians* were associated with the view that monetary policy was much less powerful.

This debate had some of its roots in differing interpretations of the causes of the Great Depression, especially as it occurred in the United States amid a large number of commercial-bank failures. One interesting part of the debate is why Canada and the United Kingdom had collapses in economic activity similar in magnitude to that in

the United States even though they did not suffer the same banking crisis. *Lessons from History 29-1* provides a brief summary of this interesting debate and applies some of the lessons about monetary policy we have learned in the past two chapters.

The debate between the Monetarists and the Keynesians was about more than just the *effectiveness* of monetary policy. The debate sometimes also focused on the question of whether active use of monetary policy in an attempt to stabilize output and the price level was likely to be successful, or whether it would instead lead to an increase in fluctuations in those variables. This debate is as important today as it was then, and at its centre is the role of *lags*.

What Are the Lags in Monetary Policy?

Experience has shown that lags in the operation of policy can sometimes cause stabilization policy to be destabilizing. In Chapter 24, we discussed how decision and implementation lags might limit the extent to which active use of fiscal policy can be relied upon to stabilize the economy. Although both of these sources of lags are less relevant for monetary policy, the full effects of monetary policy nevertheless occur only after quite long time lags. There are two reasons that a change in monetary policy does not affect the economy instantly.

Changes in Expenditure Take Time When the Bank of Canada changes its target for the overnight interest rate, the actual overnight rate changes almost instantly. Other, longer-term market interest rates also change quickly, usually within a day or two. However, it takes more time before households and firms adjust their spending and borrowing plans in response to the change in interest rates. Consumers may respond relatively quickly and alter their plans for purchasing durable goods like cars and appliances. But it takes longer for firms to modify their investment plans and then put them into effect. It may take a year or more before the full increase in investment expenditure occurs in response to a fall in interest rates.

In an open economy like Canada's, the change in the interest rate also leads to capital flows and a change in the exchange rate. These changes occur very quickly. But the effect on net exports takes more time while purchasers of internationally traded goods and services switch to lower-cost suppliers.

The Multiplier Process Takes Time Changes in consumption, investment, and net export expenditures brought about by a change in monetary policy set off the multiplier process that increases national income. This process, too, takes some time to work out. Furthermore, although the end result is fairly predictable, the speed with which the entire expansionary or contractionary process works itself out can vary in ways that are hard to predict. Thus, though the overall effects of monetary policy might be reasonably straightforward to predict, the timing of those effects is difficult to predict.

Monetary policy is capable of exerting expansionary and contractionary forces on the economy, but it operates with a time lag that is long and variable.

Economists at the Bank of Canada estimate that it takes between 9 and 12 months for a change in monetary policy to have its main effect on real GDP, and a further 9 to 12 months for the policy to have its main effect on the price level (or the rate of inflation).

LESSONS FROM HISTORY 29-1

Two Views on the Role of Money in the Great Depression

In most people's minds, the Great Depression began with the stock market crash of October 1929. In the United States, Canada, and Europe, the decline in economic activity over the next four years was massive. From 1929 to 1933, annual real output fell by roughly 25 percent, one-quarter of the labour force was unemployed by 1933, the price level fell by more than 25 percent, and businesses failed on a massive scale. In the more than seven decades that have followed, no recession has come close to the Great Depression in terms of reduced economic activity, business failures, or unemployment.

The Great Depression has naturally attracted the attention of economists and, especially in the United States, these few years of experience have served as a kind of "retrospective laboratory" in which they have tried to test their theories.

The Basic Facts

The stock market crash of 1929, and other factors associated with a moderate downswing in business activity during the late 1920s, caused U.S. firms and households to want to hold more cash and fewer demand deposits. The banking system, however, could not meet this increased demand for liquidity (cash) without help from the Federal Reserve System (the U.S. central bank). As we saw in Chapter 27, because of the fractional-reserve banking system, commercial banks are never able to satisfy from their own reserves a large and sudden demand for cash—their reserves are always only a small fraction of total deposits.

The Federal Reserve had been set up to provide just such emergency assistance to commercial banks that were basically sound but were unable to meet sudden demands by depositors to withdraw cash. However, the Federal Reserve refused to extend the necessary help, and successive waves of bank failures followed as a direct result. During each wave, hundreds of banks failed, ruining many depositors and thereby worsening an already severe depression. In the second half of 1931, almost 2000 U.S. banks were forced to suspend operations. One consequence of these failures was a sharp drop in the money supply; by 1933, M2 was 33 percent lower than it had been in 1929.

Competing Explanations

After the Great Depression was over, economists were able to examine the data and construct explanations for these dramatic events. To Monetarists, the basic facts seem decisive: To them, the fall in the money supply was clearly the major *cause* of the fall in output and employment that occurred during the Great Depression. Monetarists see the Great Depression as perhaps the single best piece of evidence of the strength of monetary forces and the single best lesson of the importance of monetary policy. In their view, the increased cash drain that led to the massive monetary contraction could have been prevented had the Federal Reserve quickly increased the level of cash reserves in the commercial banking system. In this case, the rise in cash reserves would have offset the increase in the cash drain, so that the money supply (currency plus bank deposits) could be maintained.

Keynesians argue that the fundamental cause of the Great Depression was a reduction in autonomous expenditure. They cite a large decline in housing construction (in response to a glut of housing), a decline in automobile purchases (as most first-time buying was

Destabilizing Policy?

The fact that monetary-policy actions taken today will not affect output and inflation until 1–2 years in the future means that the Bank of Canada must design its policy for what *is expected* to occur in the future rather than what *has already been observed*. To see why a monetary policy guided only by past and current events may be destabilizing, consider the following simple example. Suppose that on January 1 the Bank observes $Y < Y^*$ and concludes that an expansionary monetary policy is appropriate. It can reduce its target for the overnight rate at the next fixed announcement date (FAD),

done and only replacement demand remained), and a reduction in consumption driven largely by pessimism caused by the stock market crash. Although Keynesians accept the argument that the Federal Reserve's behaviour was perverse and exacerbated an already bad situation, they do not attribute a pivotal role to the Federal Reserve or to the money supply. Instead, they see the fall in the money supply as a *result* of the decline in economic activity (through a reduced demand for loans and thus reduced bank lending) rather than as its cause.

Lessons from Canada's Experience

Canada can be used as a "control" in this retrospective laboratory, for the simple reason that Canada had broadly the same magnitude of economic collapse as did the United States, but *did not* have the same magnitude of bank failures. Unfortunately, Canada's experience is not able to resolve the disagreement—both sides of the debate can offer explanations of the Canadian experience consistent with their central arguments.

Keynesians look to Canada's experience to support their view that money was not central to the cause of the economic collapse in the United States. They point out that in Canada, where the central bank came to the aid of the banking system, bank failures were much less common during the Great Depression, and as a consequence, the money supply did not shrink drastically as it did in the United States. Thus, their argument is that since Canada did not escape the Great Depression but *did* escape the collapse in the money supply, money must not have been the central cause of the U.S. economic collapse.

Monetarists accept the point that Canada did not have a massive reduction in the money supply, but they argue that the economic contraction in the United States (which *was* caused by the collapse in the money supply) spilled over into Canada, largely through a dramatic reduction in demand for Canadian goods. This spillover implies a large decline in export expenditure for Canada, and thus a decline in Canadian national income. Thus, Monetarists essentially argue that money in the United States was an important contributor to the economic decline in Canada.

During the Great Depression, bank failures were widespread in the United States but relatively uncommon in Canada. This difference in experience can be used to test hypotheses regarding the causes of the Great Depression. But considerable disagreement still remains.

For a discussion of these two views, and some attempts to discriminate between them, see Peter Temin, *Did Monetary Forces Cause the Great Depression?* (New York: Norton, 1976).

typically within a few weeks. By early February, the overnight interest rate will be reduced, as will the longer-term interest rates in the economy. The effects on aggregate demand, however, will not be felt in any significant way until late summer or early fall of that same year.

This policy action may turn out to be destabilizing, however. Some of the cyclical forces in the economy, unrelated to the Bank's actions, may have reversed since January, and by fall there may be a substantial inflationary output gap. However, since the effects of the monetary expansion that was initiated nine months earlier are just beginning to be felt, an expansionary monetary stimulus is adding to the existing inflationary gap.

If the Bank now applies the monetary brakes by raising interest rates, the output effects of this policy reversal will not be felt for another year or so. By that time, a contraction may have already set in because of the natural cyclical forces of the economy. Thus, the delayed effects of the monetary policy may turn a minor downturn into a major recession.

The long time lags in the effectiveness of monetary policy make monetary fine-tuning difficult; the policy may have a destabilizing effect.

The Bank of Canada recognizes the possibility that if it responds to every shock that influences real GDP, then the overall effect of its policy may be to destabilize the economy rather than stabilize it. As a result, it is careful to assess the causes of the shocks that buffet the Canadian economy. It tries to avoid situations in which it responds to shocks that are believed to be short-lived and then must reverse its policy in the near future when the shocks disappear. In general, the Bank responds only to those shocks that are significant in magnitude and are expected to persist for several months or more.

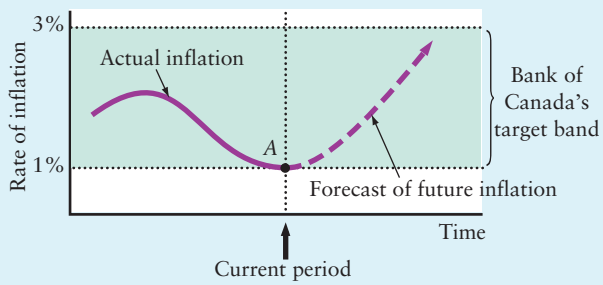
Political Difficulties

Long lags in the workings of monetary policy also lead to some political criticism for the central bank.

Figure 29-6 shows a situation in which the current inflation rate is at the bottom of the Bank's 1–3 percent target band, but the expectation of future events suggests that inflation will be rising. This situation is often faced by the Bank when the economy is in the early stages of an economic recovery, as occurred in late 2009 and early 2010. At that time, the Canadian economy had been in recession for a year, and monetary policy had been very expansionary in an effort to stimulate the economy. But as real GDP began to grow and the existing recessionary gap began to narrow, the Bank needed to judge the appropriate time to begin tightening its policy in an attempt to keep inflation from rising above the 2-percent target.

What is the political problem? Remember that because of the time lags involved, any policy change that occurs today has no effect on real GDP for roughly nine months and the full effect on the price level (or the rate of inflation) does not occur for 18–24 months. If the economy is at point *A* in Figure 29-6, and inflation is expected to rise in the near future, then monetary policy must be changed *now* in order to counteract this future inflation. But this action could generate some criticism because the *current* inflation rate is low. In such situations, the Bank finds itself in the awkward position of advocating a tightening of monetary policy, in order to fight the expectation of future inflation, at a time when the *current* inflation rate suggests no need for tightening. But if the goal is to keep inflation within the target range, such *pre-emptive* monetary policy is necessary because of the unavoidable time lags.

FIGURE 29-6 Forward-Looking Monetary Policy



Since monetary policy works only with a considerable time lag, central-bank actions to keep inflation within its target range must be taken in advance of expected future events. Suppose the economy is currently at point *A* with inflation at the lower bound of the target range. If events in the near future are expected to cause inflation to rise sharply, then monetary policy must be tightened immediately to keep inflation within the desired range.

Time lags in monetary policy require that decisions regarding a loosening or tightening of monetary policy be forward-looking. This often leads to criticism of monetary policy, especially by those who do not recognize the long time lags.

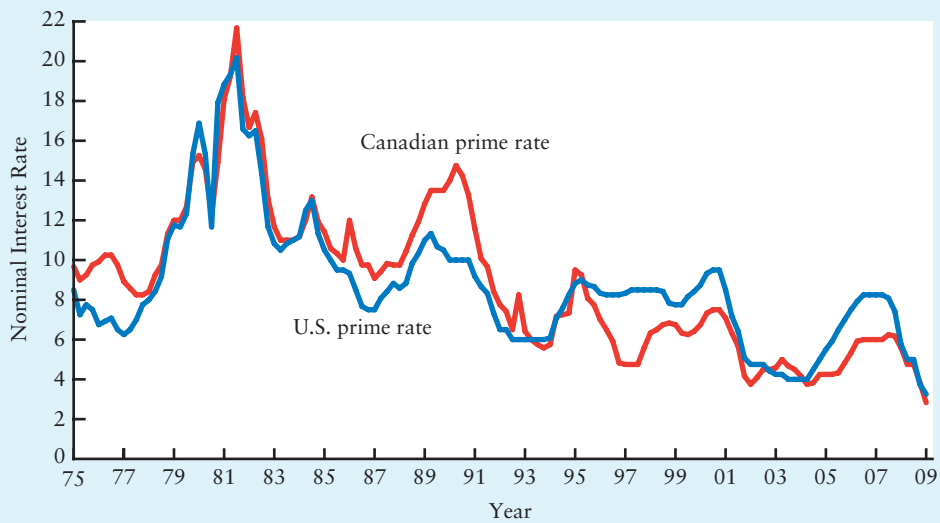
29.4 Thirty Years of Canadian Monetary Policy

This section describes a few key episodes in recent Canadian monetary history. This is not done to teach history for its own sake, but because the lessons of past experience and past policy mistakes, interpreted through the filter of economic theory, provide our best hope for improving our policy performance in the future.

The OPEC oil-price shocks of 1973 and 1979–1980 led to reductions in GDP growth rates and increases in inflation in Canada—what came to be known as *stagflation*. At that time, the role of aggregate-supply shocks and their effect on macroeconomic equilibrium was not as well understood as it is today. The Bank of Canada's policy response involved considerable monetary expansion, and by 1980 the rate of inflation in Canada was more than 12 percent.

The Bank of Canada (and the U.S. Federal Reserve) then embarked on policies designed to reduce the growth rate of the money supply and eventually reduce the inflation rate. Unfortunately, at the same time innovations in the financial sector led to unexpected increases in the demand for money. The result was a much sharper increase in interest rates (see Figure 29-7) than was intended by the Bank of Canada and the

FIGURE 29-7 Short-Term Interest Rates, Canada and the United States, 1975–2009



(*Source:* Bank of Canada. Canadian rate is Series V122495; U.S. rate is Series V122148. Both are quarterly averages of monthly data.)

most serious recession since the 1930s. But the rate of inflation *did* fall, from more than 12 percent in 1980 to about 4 percent in 1984. This experience taught the Bank two important lessons:

1. Monetary policy can be *very* effective in reducing inflation.
2. Because of unexpected changes in money demand, monetary policy should focus more on interest rates than on the money supply.

As we saw earlier in this chapter, this second lesson is an important reason why the Bank now implements its policy by targeting the interest rate rather than by directly influencing the money supply.

Economic Recovery: 1983–1987

In early 1983, a sustained recovery began, and by mid-1987, real GDP had moved back toward potential. Much of the growth was centred in the export-oriented manufacturing industries in Ontario and Quebec. The first four years of the recovery saw cumulative real GDP growth of 15.7 percent.

The main challenge for monetary policy in this period was to create sufficient liquidity to accommodate the recovery without triggering a return to the high inflation rates that prevailed at the start of the decade.

In other words, the Bank of Canada had to increase the money supply to *accommodate* the recovery-induced increase in money demand *without* increasing the money supply so much that it refuelled inflationary pressures.

In spite of much debate and uncertainty, the Bank handled this "re-entry" problem quite well. The Bank allowed a short but rapid burst of growth in the nominal money supply, thus generating the desired increase in real money balances. Once the new level of real balances was achieved, money growth was cut back to a rate consistent with low inflation (and for the underlying rate of growth in real income). The trick with this policy was that to avoid triggering expectations of renewed inflation, the Bank had to generate a one-shot increase in the *level* of the money supply without creating the impression that it was raising the long-term *rate of growth* of the money supply.

In late 1983 and early 1984, when growth in the money supply first started to surge, many voiced the fear that the Bank was being overly expansionary and was risking a return to higher inflation. As the re-entry problem came to be more widely understood and as inflationary pressures failed to re-emerge, these criticisms subsided, and the consensus appeared to be that the Bank had done a commendable job of handling the re-entry problem.

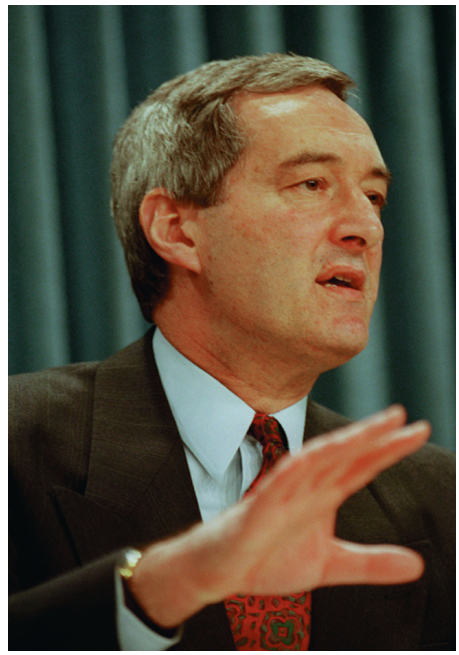
Rising Inflation: 1987–1990

By mid-1987, many observers began to worry that Canadian policymakers were too complacent in accepting the 4 percent range that Canadian inflation had settled into. Further, there was concern that inflationary pressures were starting to build—the money supply was growing quickly, real output growth was strong, unemployment was falling, and an inflationary gap was opening.

In 1987, many economists argued that if monetary policy was not tightened, Canada would experience gradually increasing inflation until once again a severe monetary restriction would be required to reduce the rate of inflation.

Inflation slowly crept upward. A monetary restriction designed to reduce inflation would obviously impose costs in the form of lower output and higher unemployment. Was the Bank prepared to inflict such costs, especially given that Canada had emerged from a deep recession only five years earlier?

In January 1988, Bank of Canada Governor John Crow announced that monetary policy would henceforth be guided less by short-term stabilization issues and more by the goal of long-term "price stability." Specifically, he said that "monetary policy should be conducted so as to achieve a pace of monetary expansion that promotes stability in the value of money. This means pursuing a policy aimed at achieving and maintaining stable prices."[2]



John Crow was the governor of the Bank of Canada from 1987 to 1994. In 1988 he announced that "price stability" would thenceforth be the Bank of Canada's objective.

Disinflation: 1990–1992

This explicit adoption of price stability as the Bank's only target set off a heated debate about the appropriate stance for monetary policy. The debate was fuelled by Crow's decision to give a high profile to his policy by repeatedly articulating and defending it in speeches and public appearances. He believed that this was necessary because expectations of continuing inflation had become entrenched. In his view, until the public believed that the Bank was serious about controlling inflation, whatever the short-term consequences, inflation could not be reduced. Some critics said that price stability was unobtainable. Others said the costs of reaching it would be too large in terms of several years of recessionary gaps. Supporters said that the long-term gains from having a stable price level would exceed the costs of getting there.

Despite the Bank's explicit policy of "price stability," the actual inflation rate increased slightly in the years immediately following John Crow's policy announcement, from about 4 percent in 1987 to just over 5 percent in 1990.

The controversy reached new heights when in 1990 the country (and much of the world) entered a sustained recession. Maintaining a tight monetary policy with high interest rates (see Figure 29-7) seemed perverse to many when the economy was already suffering from too little aggregate demand to sustain potential output.

[2] John W. Crow, "The Work of Canadian Monetary Policy," speech given at the University of Alberta, January 18, 1988; reprinted in *Bank of Canada Review,* February 1988.

Furthermore, the high Canadian interest rates attracted foreign funds. Foreigners who wanted to buy Canadian bonds needed Canadian dollars, and their demands led to an appreciation of the Canadian dollar. This increased the price of Canadian exports while reducing the price of Canadian imports, putting Canadian export and import-competing industries at a competitive disadvantage and further increasing the unemployment that had been generated by the worldwide recession.

Inflation Targeting I: 1991–2000

In spite of heavy political pressure to lower interest rates, and of criticism from some economists who might have supported a move toward price stability in less depressed times, the Bank stood by its tight monetary policy. Indeed, in 1991, it formally announced *inflation-control targets* for the next several years. Beginning in 1992, inflation was to lie within the 3–5 percent range, with the range falling to 2–4 percent by 1993 and to 1–3 percent by the end of 1995.

Gordon Thiessen became the governor of the Bank of Canada in 1994 after inflation had hovered around 2 percent for about two years.

As a result of the tight monetary policy, the inflation rate fell sharply, from about 5 percent in 1990 to less than 2 percent in 1992. For 1993 and 1994, inflation hovered around 2 percent. Furthermore, short-term nominal interest rates fell from a high of about 13 percent in 1990 to about 6 percent by the end of 1993. Recall that the nominal interest rate is equal to the real interest rate plus the rate of inflation. So this decline in nominal interest rates was the eventual result of the tight monetary policy that reduced inflation.

The Bank had succeeded in coming close to its target of price stability. Controversy continued, however, on two issues. First, was the result worth the price of a deeper, possibly more prolonged recession than might have occurred if the Bank had been willing to accept 3–4 percent inflation? Second, would the low inflation rate be sustainable once the recovery took the economy back toward potential output? If the inflation rate were to rise to 4 percent during the post-1993 recovery, then the verdict might well be that the cost of temporarily reducing the rate to below 2 percent was not worth the transitory gains.

The debate over the Bank's emphasis on maintaining low inflation became centred on Governor John Crow, especially during the federal election campaign of 1993. Some called for the non-renewal of Crow's term as governor (which was scheduled to end in 1994) and his replacement with someone perceived to care more about the costs of fighting inflation. Others argued that the Bank's policy of "price stability" under Crow's stewardship was the right policy for the times and that the long-run benefits of maintaining low inflation would be worth the costs required to achieve it.[3]

In 1994, the minister of finance appointed Gordon Thiessen, the former senior deputy governor of the Bank, to be the new governor. With some irony, the minister of finance, whose party had been severe critics of Crow's policy while they were in opposition, affirmed the previous monetary policy of the Bank and urged the new governor to maintain the hard-won low inflation rate. The new governor agreed and extended the formal inflation target of 2 percent until 2001.

[3] For a very readable account of Canadian monetary policy from 1988 to 1993, see William Robson and David Laidler, *The Great Canadian Disinflation* (Toronto: C. D. Howe Institute, 1993).

For the next three years, the rate of inflation continued to hover between 1 and 2 percent. The main challenge for the Bank in the next few years was to keep inflation low while at the same time encouraging the economy to progress through what was viewed as a fragile recovery. Excessive stimulation of the economy would lead to the rise of inflation, which would sacrifice the hard-won gains achieved only a few years earlier. On the other hand, insufficient stimulation would itself be an obstacle to economic recovery.

Beginning in the summer of 1997, the economies of Thailand, Malaysia, Indonesia, and South Korea fell into serious recessions, thus beginning what is now known as the Asian Economic Crisis.[4] Since these countries are major importers of raw materials, their recessions led to a large decline in the world's demand for raw materials. As a result, the world price of raw materials fell by an average of about 30 percent in the subsequent year. Since Canada is a major producer and exporter of raw materials, this decline in the demand for raw materials was a negative aggregate demand shock for Canada. Working in the opposite direction, however, was the expansionary supply-side effect of lower raw materials prices for the many Canadian manufacturing firms that use raw materials as inputs. This positive supply shock was especially important for the United States, a major importer and user of raw materials. The impact of the Asian Crisis on the U.S. economy produced a third effect on Canada as the quickly growing U.S. economy increased its demand for Canadian goods and services.

In the spring of 1997, before the Asian Crisis had begun, the Canadian economy was growing and steadily closing a recessionary gap. The combination of forces created by the Asian Economic Crisis presented problems for the Bank of Canada and for the appropriate direction for monetary policy. Especially difficult was judging the relative strengths of the three separate effects. As it turned out, Canada's recessionary gap continued to shrink as the economy grew steadily. By 1999, the Asian economies were on their way to a healthy recovery.

Changes in stock-market values also created some challenges for the Bank of Canada in the 1990s. From 1994 through 1999, U.S. and Canadian stocks enjoyed unprecedented bull markets. The Dow Jones Industrial Average (an index of U.S. stock prices) increased from about 3500 in mid-1994 to about 11 000 in late 1999, an average annual increase of 26 percent. The Toronto Stock Exchange Index (now called the S&P/TSX), increased from roughly 4000 to 8000 over the same period, an average annual increase of 14 percent.

The concern for the Bank of Canada during this time was that the increase in wealth generated by these stock-market gains would stimulate consumption expenditures in what was already a steadily growing economy, thus increasing inflationary pressures. In December 1996, the chairman of the U.S. Federal Reserve, Alan Greenspan, warned market participants about their "irrational exuberance," a phrase that is now often quoted. Bank of Canada Governor Gordon Thiessen made similar remarks in Canada. Both central bankers were trying to dampen expectations in the stock market so that the stock-market gains, and thus the increases in wealth-induced spending, would not significantly contribute to inflationary pressures. But they had to be careful not to have their comments create a "crash" in the market that would have even more dramatic effects in the opposite direction.

As it turned out, the crash happened anyway. In both the United States and Canada, the stock markets had reached such levels that many commentators said it was only a matter of time before participants realized that stock prices no longer reflected the

[4] An important part of the cause of these recessions was the sudden collapse of their currencies, which were previously pegged in value to the U.S. dollar. We examine fixed and flexible exchange rates in detail in Chapter 35.

David Dodge was the governor of the Bank of Canada from 2001 to early 2008 and needed to steer monetary policy during a time of a strong appreciation of the Canadian dollar, driven partly by rising world commodity prices.

underlying values of the companies, at which point there would be massive selling and an inevitable crash. From the fall of 2000 to the spring of 2001, the major Canadian stock-market indexes fell by roughly 40 percent, driven to a large extent by huge reductions in the stock prices of high-tech firms. This stock-market decline is often referred to as the "dot-com" crash.

Inflation Targeting II: 2001–2007

David Dodge became the new governor of the Bank of Canada in the spring of 2001. During his tenure as governor, the Bank faced several significant policy challenges.

When the terrorist attacks in New York and Washington occurred on September 11, 2001, the stock markets took another dramatic plunge. By late in 2003, stock markets were still far below their pre-crash levels. The main challenge for monetary policy was to provide enough liquidity to the banking systems to prevent the economy from entering a recession. In both Canada and the United States, the central banks dramatically lowered their key interest rates over a period of several months.

From 2002 to 2005, the Bank of Canada's target for the overnight interest rate was 3 percentage points below its level from the summer of 2000. During this period, two external forces on the Canadian economy became apparent and presented a further challenge for the Bank of Canada. First, strong world economic growth, especially in China and India, contributed to a substantial increase in the world prices of oil and other raw materials. Given Canada's position as a major producer and exporter of these products, these price increases represented a significant positive external shock to aggregate demand. They also contributed to a substantial appreciation of the Canadian dollar, by more than 40 percent from 2002 to 2005. Taken by itself, this positive shock to Canadian aggregate demand created a justification for the Bank of Canada to tighten its monetary policy.

Working in the opposite direction was a second external shock, also contributing to an appreciation of the Canadian dollar. During the 2002–2005 period, partly in response to a large and growing U.S. current account deficit, the U.S. dollar was depreciating against the pound sterling and the euro. This "realignment" of the U.S. dollar also involved Canada and explained some part of the Canadian dollar's appreciation during that period. These exchange-rate changes, which were not themselves being caused by changes in the demand for Canadian goods and services, nonetheless tended to reduce Canadian net exports and aggregate demand, thus providing some justification for a loosening of Canadian monetary policy.

The problem for the Bank of Canada during this period was to determine the *relative* strength of these opposing forces and thus the appropriate *overall* direction for monetary policy. During the early part of this period, when Canadian real GDP was below potential, the Bank resisted tightening its policy, choosing instead to allow the commodity-price-driven expansion to close the existing output gap. By the summer of 2005, however, when the output gap appeared to be all but closed, the Bank began a series of increases in the target for the overnight interest rate, and by the summer of 2006 it had increased its target by two percentage points.

Throughout 2006 and 2007, world commodity prices continued their steep ascent and the effect on the Canadian economy was dramatic. Employment grew rapidly, real

GDP grew above the level of potential output, and serious concerns about inflation began to mount. During this period, the Bank of Canada continued to gradually raise its policy interest rate.

A related challenge for the Bank during this period involved regional and sectoral differences in economic performance within Canada. The strong growth in the prices of oil and raw materials naturally led to boom conditions in these sectors, which tend to be located in both Western and Atlantic Canada. However, these price increases harmed the profitability of many central Canadian manufacturing firms who used these products as important inputs. In addition, the appreciation of the Canadian dollar further challenged these firms, as foreign buyers reduced their demand for more expensive Canadian-made products.

Regional and sectoral differences highlight an inherent difficulty with monetary policy in a country as economically diverse as Canada. Because there must be a single monetary policy for the nation as a whole (as long as all parts of Canada continue to use the same currency), policy must be guided by the *average* level of economic activity in order to keep the *average* rate of inflation close to its target. But significant differences in economic activity across regions and/or sectors mean that many people will feel that monetary policy is being conducted inappropriately because economic activity in their specific region or sector is not the same as the national average.

Financial Crisis and Recession: 2007–Present

The next significant phase of Canadian monetary policy was determined largely by events taking place in other countries. From 2002 to 2006, U.S. housing prices had been rising unusually rapidly, but they began to slow their ascent in the middle of 2006. In 2007, these prices reached their peak and then collapsed, falling by more than 30 percent in many parts of the country. On a large scale, U.S. homeowners began "walking away" from their houses, whose market values had fallen below the total amount owing on the associated mortgages. In these situations, the financial institution holding the mortgage no longer receives regular mortgage payments from the homeowner and instead takes ownership of the vacated house.

For the many financial institutions that held the mortgages—or the mortgage-backed securities—the housing collapse led to a significant decline in the value of their assets. It soon became clear that millions of U.S. mortgages and mortgage-backed securities had been bought by financial institutions all over the world, and thus many large financial institutions in many countries were soon on the edge of insolvency and bankruptcy. What began as a collapse of U.S. housing prices soon became a global financial crisis.

Mark Carney became the Bank of Canada's governor in early 2008, amid a global financial crisis and the beginning of a significant economic recession.

Mark Carney became the new governor of the Bank of Canada in February 2008, just as the financial crisis was entering its most serious phase. With the collapse of major U.S. and U.K. financial institutions only a few months later, panic spread throughout the world's financial sector. It was unclear which institutions held large amounts of these "toxic" mortgage-backed securities and thus which institutions were in danger of going under. In this setting, the widespread fear of "counterparty risk" led to a virtual disappearance of short-term interbank lending. The flow of credit declined, and most lending that did take place was

transacted at much higher interest rates. Given the importance of credit in a market economy, restoring the flow of credit was essential to maintaining the level of economic activity.

In Canada, it soon became clear that Canadian banks were far less exposed to these "toxic" mortgage-backed securities than were the banks in the United States and much of Europe. As a result, there was no significant danger of a Canadian bank becoming insolvent during this episode. However, the globalized nature of financial markets implies that short-term credit markets in Canada are highly integrated with those in other countries, with the result that Canada also experienced a decline in interbank lending and a rise in short-term interest rates. As we discussed in *Applying Economic Concepts 29-1* on page 735, the Bank of Canada took two sets of actions during 2007–2008. First, it reduced its target for the overnight rate by more than 3.5 percentage points between the fall of 2007 and the end of 2008. Second, it eased the terms with which it was prepared to make short-term loans to financial institutions. Both sets of actions were designed to restore the flow of credit and reduce interest rates, thus helping to maintain the level of economic activity.

By late in 2008, however, it was clear that Canada would not be shielded from the global recession that was then beginning. The global financial crisis had a dramatic effect on the level of economic activity in the United States, the European Union, and many countries in Asia. With these economies experiencing recessions, there was a sharp decline in demand for Canada's exports. Canadian real GDP slowed sharply in late 2008 and began to fall in early 2009. The Bank of Canada's objective at this time was to provide as much monetary stimulus as was possible, complementing the large fiscal stimulus implemented by the Canadian government in its budget of 2009.

By the spring of 2009, however, the Bank of Canada was up against a wall—or, more literally, a floor. Having reduced its target for the overnight interest rate to 0.25 percent, it would not be able to reduce it further should that be necessary. It had reached what economists refer to as the "nominal interest rate floor." The Bank announced that, should further monetary stimulus be needed, it was prepared to embark on policies of either "quantitative easing" or "credit easing." Quantitative easing would involve the Bank directly purchasing government securities in a way that increases reserves in the banking system—a conventional open-market purchase of government bonds. Credit easing would involve the Bank purchasing private-sector bonds in an attempt to improve liquidity in specific segments of the financial market.

By early 2010, the Bank had not yet implemented these policies. But it did make a public commitment to keep its target for the overnight interest rate constant at 0.25 percent until such a time as the threat of rising inflation would require it to begin tightening its monetary policy.

ADDITIONAL TOPICS

With the success of many central banks in maintaining low and stable inflation, some economists have raised the concern that inflation may now be "too low," and that the economy may actually function more smoothly with slightly higher inflation. For more details about this contentious debate, look for **Can Inflation Be Too Low?** in the *Additional Topics* section of this book's MyEconLab.

www.myeconlab.com

Summary

29.1 How the Bank of Canada Implements Monetary Policy

LO 1 2

- Monetary policy can be conducted either by setting the money supply or by setting the interest rate. But for a given negatively sloped M_D curve, both cannot be set independently.
- Because of its incomplete control over the money supply, as well as the uncertainty regarding both the slope and the position of the M_D curve, the Bank chooses to implement its policy by setting the interest rate.
- The Bank's policy instrument is the target it sets for the overnight interest rate. By offering to lend funds at a rate 25 basis points above this target (the bank rate) and to accept deposits on which it pays interest at 25 basis points below the target, the Bank of Canada can control the actual overnight interest rate.
- Changes in the Bank's target for the overnight rate lead to changes in the actual overnight rate and also to changes in longer-term market interest rates. The various steps in the monetary transmission mechanism then come into play.
- The Bank of Canada conducts an expansionary monetary policy by reducing its target for the overnight interest rate. It conducts a contractionary monetary policy by raising its target for the overnight interest rate.

29.2 Inflation Targeting

LO 3 4

- Many central banks have come to accept two propositions:
  1. High inflation is damaging to the economy.
  2. The long-run effects of monetary policy are mainly on the price level (or rate of inflation), and sustained inflation is ultimately generated by monetary policy.

  As a result, many central banks have adopted formal inflation targets.
- The Bank of Canada's formal inflation target is the rate of CPI inflation. It seeks to keep the annual inflation rate at 2 percent.
- In the short run, the Bank closely monitors the output gap. By tightening its policy during an inflationary gap (and loosening it during a recessionary gap), the Bank can keep the rate of inflation near 2 percent.
- The policy of inflation targeting helps to stabilize the economy. The Bank responds to positive shocks with a contractionary policy and responds to negative shocks with an expansionary policy.
- Two technical issues complicate the conduct of monetary policy:
  1. Volatile food and energy prices
  2. Changes in the exchange rate

29.3 Long and Variable Lags

LO 5

- Though the Bank of Canada can change interest rates very quickly, it takes time for firms and households to change their expenditure. Even once those new plans are carried out, it takes time for the multiplier process to work its way through the economy, eventually increasing equilibrium national income.
- Long and variable lags in monetary policy lead many economists to argue that the Bank should not try to "fine-tune" the economy. Instead, it should respond only to shocks that are significant in size and persistent in duration.

29.4 Thirty Years of Canadian Monetary Policy

LO 6

- In the early 1980s, the Bank of Canada embarked on a policy of tight money to reduce inflation. This policy contributed to the severity of the recession.
- A sustained economic recovery occurred from 1983 to 1987. The main challenge for monetary policy during this time was to create sufficient liquidity to accommodate the recovery without triggering a return to the high inflation rates that prevailed at the start of the decade.
- In 1988, when inflation was between 4 and 5 percent, the Bank of Canada announced that monetary policy would henceforth be guided by the long-term goal of "price stability." By 1992, the Bank's tight money policy had reduced inflation to below 2 percent.

- Controversy concerned two issues. First, was the cost in terms of lost output and heavy unemployment worth the benefits of lower inflation? Second, could the low inflation rate be sustained?
- This controversy was partly responsible for the 1994 change in the Bank of Canada's governor, from John Crow to Gordon Thiessen. Despite this administrative change, the stated policy of price stability continued. By 2000, the rate of inflation had been around 2 percent for about seven years.
- Following the stock-market declines in 2000–2001 and the terrorist attacks in the United States in September 2001, the Bank of Canada and the U.S. Federal Reserve dramatically reduced their policy interest rates in an attempt to prevent a recession.
- In the 2002–2005 period, the main challenges for the Bank involved determining the relative strength of the two different forces leading to a substantial appreciation of the Canadian dollar. By summer of 2006, the Bank had increased its target for the overnight interest rate by two percentage points, to a level still below its previous peak in the summer of 2000.
- The onset of the global financial crisis led the Bank of Canada to implement policies designed to restore the flow of credit and also to reduce interest rates.
- By early 2009 the Canadian economy had been dragged into recession by a collapse in global demand. After the Bank reduced its target for the overnight rate to 0.25 percent, it announced that it was prepared to implement policies of "quantitative or credit easing," if necessary.

Key Concepts

Money supply vs. the interest rate
Overnight interest rate
The target overnight interest rate
The bank rate
Endogenous money supply
Open-market operations
Inflation targeting
CPI inflation vs. core inflation
The exchange rate and monetary policy
Lags in the effect of monetary policy

Study Exercises

1. Fill in the blanks to make the following statements correct.
   a. In general, there are two approaches to implementing monetary policy. The central bank can attempt to influence _____ directly or to influence _____ directly.
   b. The Bank of Canada chooses to implement its monetary policy by influencing the _____ directly. The Bank then uses _____ to accommodate the resulting change in money demand.
   c. The Bank of Canada does not try to influence the money supply directly because (1) the Bank cannot control the process of _____ carried out by the commercial banks; (2) the Bank is unsure about the change in _____ that would result from a change in the money supply; (3) the Bank is unsure of the position of the _____ curve at any given time.
2. Fill in the blanks to make the following statements correct.
   a. The interest rate that commercial banks charge each other for overnight loans is called the _____.
   b. The bank rate is _____ points above the target overnight interest rate. At this rate, the Bank stands ready to _____ to commercial banks. At a rate _____ points below the target, the Bank stands ready to _____ from commercial banks (and pay that rate as interest).

c. The Bank of Canada can change the amount of currency in circulation through _____. The Bank conducts these transactions to accommodate the changing demand for _____ by the commercial banks.

d. An expansionary monetary policy is one where the Bank of Canada _____ its target for the overnight interest rate. A contractionary monetary policy is one in which the Bank _____ its target for the overnight interest rate.

e. If the Bank of Canada wants to stimulate aggregate demand it can implement a(n) _____ monetary policy by _____ its target for the overnight interest rate. If the Bank wants to dampen aggregate demand it can implement a(n) _____ monetary policy by _____ its target for the overnight interest rate.

3. Fill in the blanks to make the following statements correct.

a. The long-run policy target for the Bank of Canada is the _____. The current target is to keep the inflation rate at _____ percent.

b. In the short run, the Bank of Canada closely monitors the _____.

c. It is not possible for the Bank of Canada to independently influence the following two variables: _____ and _____. The Bank of Canada conducts its policy by announcing a change in the _____. It then conducts the necessary _____ in order to make this rate an equilibrium in the money market.

d. The conduct of monetary policy is made more difficult because of lags. Two reasons for these time lags are
- _____
- _____

e. Economists have estimated that a change in monetary policy has an effect on real GDP after a period of _____ months and an effect on the price level after a period of _____ months.

f. Because of the long time lags involved in the execution of monetary policy, it is very possible that the policy may in fact have a _____ effect on the economy.

4. Read *Applying Economic Concepts 29-1* (page 735), which discusses the Bank of Canada's open-market operations and how these influence the amount of currency in circulation in the Canadian economy. Using simplified balance sheets like the ones shown below, suppose that a commercial bank uses $100 000 of excess cash reserves to purchase a government bond from the Bank of Canada.

a. What are the immediate effects on assets and liabilities for the commercial bank? Fill in the left-hand table.

b. What are the changes for the Bank of Canada? Fill in the right-hand table.

c. Explain what has happened to the amount of currency in circulation.

Commercial Bank		Bank of Canada	
Assets	Liabilities	Assets	Liabilities
Reserves Bonds	Deposits	Bonds	Commercial bank deposits Currency

5. In the text we stated that the Bank of Canada's long-run policy target is the rate of inflation.

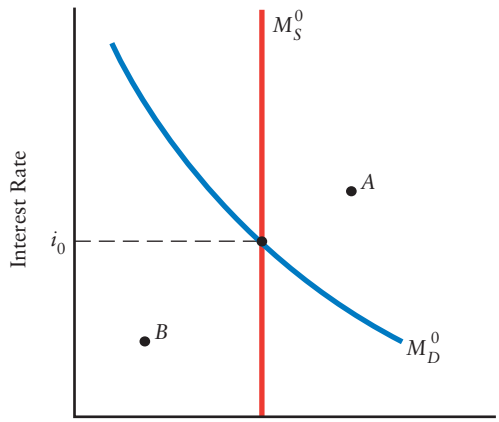
a. What are the two propositions that have led many central banks to choose this long-run policy target?

b. How does the idea of long-run money neutrality relate to this choice of policy target?

c. The Bank of Canada closely monitors the level of real GDP and the output gap in the short run. How does it use this information in pursuit of its long-run policy of targeting the rate of inflation at 2 percent?

d. If monetary policy had sustained and systematic effects on real economic variables, do you think the Bank might choose a different long-run policy target? Explain.

6. The diagram below shows the demand for money and the supply of money.



a. Explain why it is not possible for the Bank of Canada to set the money supply and the interest rate at point *A* or at point *B*.

b. In the diagram, draw a new money demand curve, M_D^1, to the right of M_D^0. Suppose the *MD* curve is shifting in unpredictable ways between M_D^0 and M_D^1. Why is a monetary policy that sets the interest rate

more stable (and therefore preferable) to one that sets the money supply?

c. The Bank of Canada implements its monetary policy by setting the target for the overnight interest rate. If the Bank reduces its target, explain what happens to the amount of money in the economy. What is the role of open-market operations in the Bank's policy?

7. Milton Friedman was for many years a professor of economics at the University of Chicago and was the most influential Monetarist of his generation. He was known for accusing the Federal Reserve (the U.S. central bank) of following "an unstable monetary policy," arguing that although the Federal Reserve "has given lip service to controlling the quantity of money . . . it has given its heart to controlling interest rates."

   a. Explain why, if the M_D function were approximately stable, targeting the growth rate in the money supply would produce a "stable" monetary policy. Show this in a diagram.
   b. Explain why, if the M_D function moves suddenly and in unpredictable ways, targeting the money supply produces an "unstable" monetary policy. Show this in a diagram.
   c. The Bank of Canada conducts its policy by setting short-term interest rates. What is the implication for this policy of an "unstable" M_D function?

8. Suppose it is mid-2007 and the stock market has been growing rapidly for the past five years. Some economists argue that the stock market has become "overvalued" and thus a "crash" is imminent.

   a. How does a rising stock market affect aggregate demand? Show this in an *AD*/*AS* diagram.
   b. For a central bank that is trying to keep real GDP close to potential, explain what challenges are posed by a rapidly rising stock market.
   c. Suppose the stock market "crashes," falling suddenly by approximately 35 percent as it did in the fall of 2008. How does this affect aggregate demand? Show this in an *AD*/*AS* diagram.

9. Consider the relationship among exchange-rate changes, aggregate demand, and monetary policy. Assume we begin in a situation with real GDP equal to Y^*.

   a. Suppose the world price for raw materials rises because of growing demand for these products. Given that Canada is a net exporter of raw materials, what is the likely effect on Canadian aggregate demand? Show this in an *AD*/*AS* diagram (assuming no change in the exchange rate).
   b. Suppose instead that there is an increase in the demand by foreigners for Canadian financial assets such as government bonds. What is the direct effect on Canadian aggregate demand? Show this in an *AD*/*AS* diagram (assuming again no change in the exchange rate).
   c. Both of the shocks described above are likely to cause an appreciation of the Canadian dollar on foreign-exchange markets. As the Canadian dollar appreciates, what are the effects on aggregate demand in part (a) and in part (b)? Show these "secondary" effects in your diagram and explain.
   d. Given your answers to parts (a), (b), and (c), explain why the appropriate monetary policy response to a change in the exchange rate depends crucially on the *cause* of the exchange-rate change. What are the appropriate responses to each of the shocks (assuming they occur separately)?

Discussion Questions

1. It is often said that an expansionary monetary policy is like "pushing on a string." What is meant by this statement? How does this contrast with a contractionary monetary policy?

2. In 1988, the Bank of Canada announced that it was committed to achieving "price stability," but it did not commit itself to a particular target growth rate for any monetary aggregate that would be consistent with achieving its price stability target. Why do you think it failed to make such a commitment?

3. In the last few years, the path of CPI inflation has deviated from the path of core inflation several times (see Figure 29-5 on page 742). Why is core inflation less volatile than CPI inflation, and why might the Bank focus more on core inflation during some periods?

4. Suppose the Canadian economy has real GDP equal to potential and that nothing significant is expected to change in the near future. Then the Canadian dollar suddenly depreciates—apparently permanently—by 5 percent against the U.S. dollar. Explain why the appropriate response of monetary policy depends on the *cause* of the depreciation. In particular, make a distinction between

   a. A depreciation caused by a reduction in demand for Canadian exports of raw materials; and
   b. A depreciation caused by a reduction in demand for Canadian bonds that are now perceived as less attractive than U.S. bonds.

5. Consider a situation in which the Bank decides to lower its target for the overnight interest rate (an expansionary

monetary policy). But at the same time, there is an unpredicted reduction in the demand for money.

a. Explain why the money supply is said to be endogenous when the Bank implements its policy by setting the interest rate.
b. Following the Bank's expansionary policy, and the simultaneous reduction in money demand, what is the overall effect on the money supply? What does the answer depend on?
c. If the money supply were to fall in this case, why would we still call this an expansionary monetary policy?

6. During the financial crisis of 2007–2008, the Bank of Canada took extraordinary actions to inject liquidity into the banking system. As a result, the amount of reserves in the banking system increased significantly, even though the measures of the money supply increased only modestly. Discuss the motivations of the Bank of Canada during this period, the connection between reserves and the money supply, and the possible future effect on inflation from the large change in reserves.