part V

Macroeconomic Policy Debates

CHAPTER 14 FOURTEEN

Stabilization Policy

The Federal Reserve's job is to take away the punch bowl just as the party gets going.

— *William McChesney Martin*

What we need is not a skilled monetary driver of the economic vehicle continuously turning the steering wheel to adjust to the unexpected irregularities of the route, but some means of keeping the monetary passenger who is in the back seat as ballast from occasionally leaning over and giving the steering wheel a jerk that threatens to send the car off the road.

— *Milton Friedman*

How should government policymakers respond to the business cycle? The two quotations above—the first from a former chairman of the Federal Reserve, the second from a prominent critic of the Fed—show the diversity of opinion over how this question is best answered.

Some economists, such as William McChesney Martin, view the economy as inherently unstable. They argue that the economy experiences frequent shocks to aggregate demand and aggregate supply. Unless policymakers use monetary and fiscal policy to stabilize the economy, these shocks will lead to unnecessary and inefficient fluctuations in output, unemployment, and inflation. According to the popular saying, macroeconomic policy should "lean against the wind," stimulating the economy when it is depressed and slowing the economy when it is overheated.

Other economists, such as Milton Friedman, view the economy as naturally stable. They blame bad economic policies for the large and inefficient fluctuations we have sometimes experienced. They argue that economic policy should not try to "fine-tune" the economy. Instead, economic policymakers should admit their limited abilities and be satisfied if they do no harm.

This debate has persisted for decades, with numerous protagonists advancing various arguments for their positions. The fundamental issue is how policymakers should use the theory of short-run economic fluctuations developed in the

preceding chapters. In this chapter we ask two questions that arise in this debate. First, should monetary and fiscal policy take an active role in trying to stabilize the economy, or should policy remain passive? Second, should policymakers be free to use their discretion in responding to changing economic conditions, or should they be committed to following a fixed policy rule?

14-1 Should Policy Be Active or Passive?

Policymakers in the federal government view economic stabilization as one of their primary responsibilities. The analysis of macroeconomic policy is a regular duty of the Council of Economic Advisers, the Congressional Budget Office, the Federal Reserve, and other government agencies. When Congress or the president is considering a major change in fiscal policy, or when the Federal Reserve is considering a major change in monetary policy, foremost in the discussion are how the change will influence inflation and unemployment and whether aggregate demand needs to be stimulated or restrained.

Although the government has long conducted monetary and fiscal policy, the view that it should use these policy instruments to try to stabilize the economy is more recent. The Employment Act of 1946 was a key piece of legislation in which the government first held itself accountable for macroeconomic performance. The act states that "it is the continuing policy and responsibility of the Federal Government to . . . promote full employment and production." This law was written when the memory of the Great Depression was still fresh. The lawmakers who wrote it believed, as many economists do, that in the absence of an active government role in the economy, events such as the Great Depression could occur regularly.

To many economists the case for active government policy is clear and simple. Recessions are periods of high unemployment, low incomes, and increased economic hardship. The model of aggregate demand and aggregate supply shows how shocks to the economy can cause recessions. It also shows how monetary and fiscal policy can prevent recessions by responding to these shocks. These economists consider it wasteful not to use these policy instruments to stabilize the economy.

Other economists are critical of the government's attempts to stabilize the economy. These critics argue that the government should take a hands-off approach to macroeconomic policy. At first, this view might seem surprising. If our model shows how to prevent or reduce the severity of recessions, why do these critics want the government to refrain from using monetary and fiscal policy for economic stabilization? To find out, let's consider some of their arguments.

Lags in the Implementation and Effects of Policies

Economic stabilization would be easy if the effects of policy were immediate. Making policy would be like driving a car: policymakers would simply adjust their instruments to keep the economy on the desired path.

Making economic policy, however, is less like driving a car than it is like piloting a large ship. A car changes direction almost immediately after the steering wheel is turned. By contrast, a ship changes course long after the pilot adjusts the rudder, and once the ship starts to turn, it continues turning long after the rudder is set back to normal. A novice pilot is likely to oversteer and, after noticing the mistake, overreact by steering too much in the opposite direction. The ship's path could become unstable, as the novice responds to previous mistakes by making larger and larger corrections.

Like a ship's pilot, economic policymakers face the problem of long lags. Indeed, the problem for policymakers is even more difficult, because the lengths of the lags are hard to predict. These long and variable lags greatly complicate the conduct of monetary and fiscal policy.

Economists distinguish between two lags in the conduct of stabilization policy: the inside lag and the outside lag. The **inside lag** is the time between a shock to the economy and the policy action responding to that shock. This lag arises because it takes time for policymakers first to recognize that a shock has occurred and then to put appropriate policies into effect. The **outside lag** is the time between a policy action and its influence on the economy. This lag arises because policies do not immediately influence spending, income, and employment.

A long inside lag is a central problem with using fiscal policy for economic stabilization. This is especially true in the United States, where changes in spending or taxes require the approval of the president and both houses of Congress. The slow and cumbersome legislative process often leads to delays, which make fiscal policy an imprecise tool for stabilizing the economy. This inside lag is shorter in countries with parliamentary systems, such as the United Kingdom, because there the party in power can often enact policy changes more rapidly.

Monetary policy has a much shorter inside lag than fiscal policy, because a central bank can decide on and implement a policy change in less than a day, but monetary policy has a substantial outside lag. Monetary policy works by changing the money supply and thereby interest rates, which in turn influence investment. But many firms make investment plans far in advance. Therefore, a change in monetary policy is thought not to affect economic activity until about six months after it is made.

The long and variable lags associated with monetary and fiscal policy certainly make stabilizing the economy more difficult. Advocates of passive policy argue that, because of these lags, successful stabilization policy is almost impossible. Indeed, attempts to stabilize the economy can be destabilizing. Suppose that the economy's condition changes between the beginning of a policy action and its impact on the economy. In this case, active policy may end up stimulating the economy when it is overheated or depressing the economy when it is cooling off. Advocates of active policy admit that such lags do require policymakers to be cautious. But, they argue, these lags do not necessarily mean that policy should be completely passive, especially in the face of a severe and protracted economic downturn.

Some policies, called **automatic stabilizers**, are designed to reduce the lags associated with stabilization policy. Automatic stabilizers are policies that stimulate or depress the economy when necessary without any deliberate policy change. For

example, the system of income taxes automatically reduces taxes when the economy goes into a recession, without any change in the tax laws, because individuals and corporations pay less tax when their incomes fall. Similarly, the unemployment-insurance and welfare systems automatically raise transfer payments when the economy moves into a recession, because more people apply for benefits. One can view these automatic stabilizers as a type of fiscal policy without any inside lag.

The Difficult Job of Economic Forecasting

Because policy influences the economy only after a long lag, successful stabilization policy requires the ability to predict accurately future economic conditions. If we cannot predict whether the economy will be in a boom or a recession in six months or a year, we cannot evaluate whether monetary and fiscal policy should now be trying to expand or contract aggregate demand. Unfortunately, economic developments are often unpredictable, at least given our current understanding of the economy.

One way forecasters try to look ahead is with **leading indicators**. A leading indicator is a data series that fluctuates in advance of the economy. A large fall in a leading indicator signals that a recession is more likely.

Another way forecasters look ahead is with macroeconometric models, which have been developed both by government agencies and by private firms for forecasting and policy analysis. As we discussed in Chapter 11,

Drawing by Dana Fradon; © 1988 The New Yorker Magazine, Inc.

"It's true, Caesar. Rome is declining, but I expect it to pick up in the next quarter."

FYI What's in the Index of Leading Economic Indicators?

Each month the Conference Board, a private economics research group, announces the *index of leading economic indicators*. This index is made up from 10 data series that are often used to forecast changes in economic activity about six to nine months ahead. Here is a list of the series. Can you explain why each of these might help predict changes in real GDP?

1. Average workweek of production workers in manufacturing.
2. Average initial weekly claims for unemployment insurance. This series is inverted in computing the index, so that a decrease in the series raises the index.
3. New orders for consumer goods and materials, adjusted for inflation.
4. Vendor performance. This is a measure of the number of companies receiving slower deliveries from suppliers.
5. New orders, nondefense capital goods.
6. New building permits issued.
7. Index of stock prices.
8. Money supply (*M*2), adjusted for inflation.
9. Interest rate spread: the yield spread between 10-year Treasury notes and 3-month Treasury bills.
10. Index of consumer expectations.

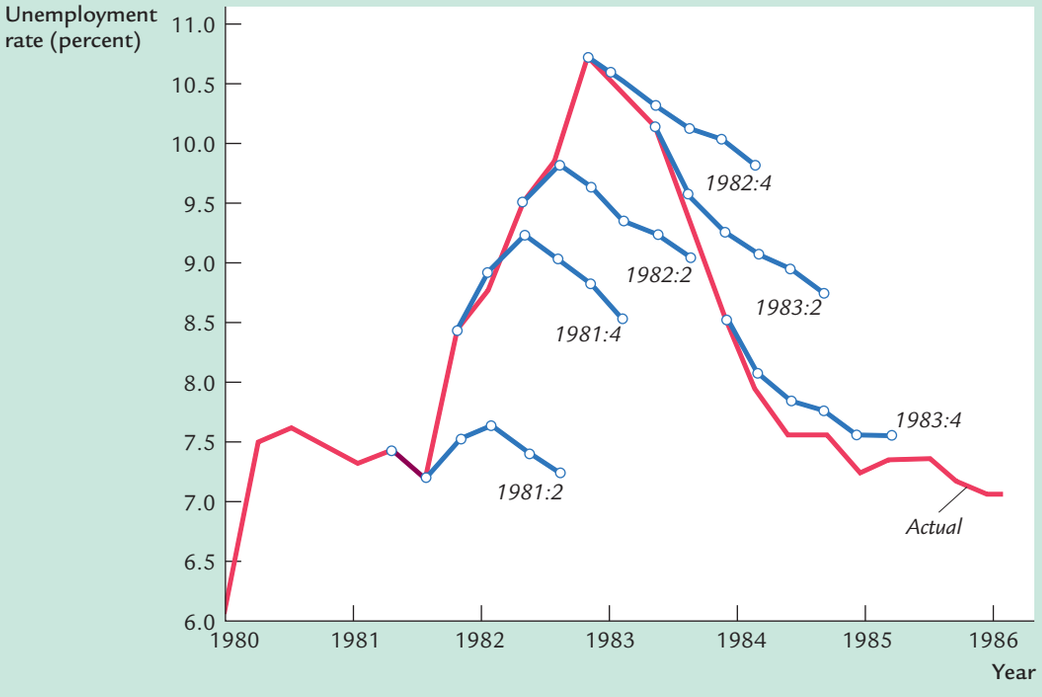
these large-scale computer models are made up of many equations, each representing a part of the economy. After making assumptions about the path of the exogenous variables, such as monetary policy, fiscal policy, and oil prices, these models yield predictions about unemployment, inflation, and other endogenous variables. Keep in mind, however, that the validity of these predictions is only as good as the model and the forecasters' assumptions about the exogenous variables.

CASE STUDY

Mistakes in Forecasting

"Light showers, bright intervals, and moderate winds." This was the forecast offered by the renowned British national weather service on October 14, 1987. The next day Britain was hit by the worst storm in more than two centuries.

figure 14-1



Forecasting the Recession of 1982 The red line shows the actual unemployment rate from the first quarter of 1980 to the first quarter of 1986. The blue lines show the unemployment rate predicted at six points in time: the second quarter of 1981, the fourth quarter of 1981, the second quarter of 1982, and so on. For each forecast, the symbols mark the current unemployment rate and the forecast for the subsequent five quarters. Notice that the forecasters failed to predict both the rapid rise in the unemployment rate and the subsequent rapid decline.

Source: The unemployment rate is from the Department of Commerce. The predicted unemployment rate is the median forecast of about 20 forecasters surveyed by the American Statistical Association and the National Bureau of Economic Research.

Like weather forecasts, economic forecasts are a crucial input to private and public decisionmaking. Business executives rely on economic forecasts when deciding how much to produce and how much to invest in plant and equipment. Government policymakers also rely on them when developing economic policies. Yet also like weather forecasts, economic forecasts are far from precise.

The most severe economic downturn in U.S. history, the Great Depression of the 1930s, caught economic forecasters completely by surprise. Even after the stock market crash of 1929, they remained confident that the economy would not suffer a substantial setback. In late 1931, when the economy was clearly in bad shape, the eminent economist Irving Fisher predicted that it would recover quickly. Subsequent events showed that these forecasts were much too optimistic.[1]

Figure 14-1 shows how economic forecasters did during the recession of 1982, the most severe economic downturn in the United States since the Great Depression. This figure shows the actual unemployment rate (in red) and six attempts to predict it for the following five quarters (in blue). You can see that the forecasters did well predicting unemployment one quarter ahead. The more distant forecasts, however, were often inaccurate. For example, in the second quarter of 1981, forecasters were predicting little change in the unemployment rate over the next five quarters; yet only two quarters later unemployment began to rise sharply. The rise in unemployment to almost 11 percent in the fourth quarter of 1982 caught the forecasters by surprise. After the depth of the recession became apparent, the forecasters failed to predict how rapid the subsequent decline in unemployment would be.

These two episodes—the Great Depression and the recession of 1982—show that many of the most dramatic economic events are unpredictable. Although private and public decisionmakers have little choice but to rely on economic forecasts, they must always keep in mind that these forecasts come with a large margin of error.

Ignorance, Expectations, and the Lucas Critique

The prominent economist Robert Lucas once wrote, "As an advice-giving profession we are in way over our heads." Even many of those who advise policymakers would agree with this assessment. Economics is a young science, and there is still much that we do not know. Economists cannot be completely confident when they assess the effects of alternative policies. This ignorance suggests that economists should be cautious when offering policy advice.

Although economists' knowledge is limited about many topics, Lucas has emphasized the issue of how people form expectations of the future. Expectations play a crucial role in the economy because they influence all sorts of economic behavior. For instance, households decide how much to consume based on expectations

[1] Kathryn M. Dominguez, Ray C. Fair, and Matthew D. Shapiro, "Forecasting the Depression: Harvard Versus Yale," *American Economic Review* 78 (September 1988): 595–612. This article shows how badly economic forecasters did during the Great Depression, and it argues that they could not have done any better with the modern forecasting techniques available today.

of future income, and firms decide how much to invest based on expectations of future profitability. These expectations depend on many things, including the economic policies being pursued by the government. Thus, when policymakers estimate the effect of any policy change, they need to know how people's expectations will respond to the policy change. Lucas has argued that traditional methods of policy evaluation—such as those that rely on standard macroeconometric models—do not adequately take into account this impact of policy on expectations. This criticism of traditional policy evaluation is known as the **Lucas critique**.[2]

An important example of the Lucas critique arises in the analysis of disinflation. As you may recall from Chapter 13, the cost of reducing inflation is often measured by the sacrifice ratio, which is the number of percentage points of GDP that must be forgone to reduce inflation by 1 percentage point. Because these estimates of the sacrifice ratio are often large, they have led some economists to argue that policymakers should learn to live with inflation, rather than incur the large cost of reducing it.

According to advocates of the rational-expectations approach, however, these estimates of the sacrifice ratio are unreliable because they are subject to the Lucas critique. Traditional estimates of the sacrifice ratio are based on adaptive expectations, that is, on the assumption that expected inflation depends on past inflation. Adaptive expectations may be a reasonable premise in some circumstances, but if the policymakers make a credible change in policy, workers and firms setting wages and prices will rationally respond by adjusting their expectations of inflation appropriately. This change in inflation expectations will quickly alter the short-run tradeoff between inflation and unemployment. As a result, reducing inflation can potentially be much less costly than is suggested by traditional estimates of the sacrifice ratio.

The Lucas critique leaves us with two lessons. The narrow lesson is that economists evaluating alternative policies need to consider how policy affects expectations and, thereby, behavior. The broad lesson is that policy evaluation is hard, so economists engaged in this task should be sure to show the requisite humility.

The Historical Record

In judging whether government policy should play an active or passive role in the economy, we must give some weight to the historical record. If the economy has experienced many large shocks to aggregate supply and aggregate demand, and if policy has successfully insulated the economy from these shocks, then the case for active policy should be clear. Conversely, if the economy has experienced few large shocks, and if the fluctuations we have observed can be traced to inept economic policy, then the case for passive policy should be clear. In other words, our view of stabilization policy should be influenced by whether policy has historically been stabilizing or destabilizing. For this reason, the debate over macroeconomic policy frequently turns into a debate over macroeconomic history.

Yet history does not settle the debate over stabilization policy. Disagreements over history arise because it is not easy to identify the sources of

[2] Robert E. Lucas, Jr., "Econometric Policy Evaluation: A Critique," *Carnegie Rochester Conference on Public Policy* 1 (Amsterdam: North-Holland, 1976), 19–46.

economic fluctuations. The historical record often permits more than one interpretation.

The Great Depression is a case in point. Economists' views on macroeconomic policy are often related to their views on the cause of the Depression. Some economists believe that a large contractionary shock to private spending caused the Depression. They assert that policymakers should have responded by stimulating aggregate demand. Other economists believe that the large fall in the money supply caused the Depression. They assert that the Depression would have been avoided if the Fed had been pursuing a passive monetary policy of increasing the money supply at a steady rate. Hence, depending on one's beliefs about its cause, the Great Depression can be viewed either as an example of why active monetary and fiscal policy is necessary or as an example of why it is dangerous.

CASE STUDY

Is the Stabilization of the Economy a Figment of the Data?

Keynes wrote *The General Theory* in the 1930s, and in the wake of the Keynesian revolution, governments around the world began to view economic stabilization as a primary responsibility. Some economists believe that the development of Keynesian theory has had a profound influence on the behavior of the economy. Comparing data from before World War I and after World War II, they find that real GDP and unemployment have become much more stable. This, some Keynesians claim, is the best argument for active stabilization policy: it has worked.

In a series of provocative and influential papers, economist Christina Romer has challenged this assessment of the historical record. She argues that the measured reduction in volatility reflects not an improvement in economic policy and performance but rather an improvement in the economic data. The older data are much less accurate than the newer data. Romer claims that the higher volatility of unemployment and real GDP reported for the period before World War I is largely a figment of the data.

Romer uses various techniques to make her case. One is to construct more accurate data for the earlier period. This task is difficult because data sources are not readily available. A second way is to construct *less* accurate data for the recent period—that is, data that are comparable to the older data and thus suffer from the same imperfections. After constructing new "bad" data, Romer finds that the recent period appears almost as volatile as the early period, suggesting that the volatility of the early period may be largely an artifact of data construction.

Romer's work is part of the continuing debate over whether macroeconomic policy has improved the performance of the economy. Although her work remains controversial, most economists now believe that the economy in the aftermath of the Keynesian revolution was only slightly more stable than it had been before.[3]

[3] Christina D. Romer, "Spurious Volatility in Historical Unemployment Data," *Journal of Political Economy* 94 (February 1986): 1–37; and Christina D. Romer, "Is the Stabilization of the Postwar Economy a Figment of the Data?" *American Economic Review* 76 (June 1986): 314–334.

CASE STUDY

The Remarkable Stability of the 1990s

Although economists who take a long historical view debate how much the economy has stabilized over time, there is less controversy about the more recent experience. Everyone agrees that the decade of the 1990s stands out as a period of remarkable stability for the U.S. economy.

Table 14-1 presents some statistics about economic performance for the last five decades of the twentieth century. The three variables are those highlighted in Chapter 2: growth in real GDP, inflation, and unemployment. For each variable, the table presents the average over each decade and the standard deviation. The standard deviation measures the volatility of a variable: the higher the standard deviation, the more volatile the variable is.

table 14-1

The U.S. Macroeconomic Experience, Decade by Decade

	1950s	1960s	1970s	1980s	1990s
Real GDP Growth					
Average	4.18	4.43	3.28	3.02	3.03
Standard deviation	3.89	2.13	2.80	2.68	1.56
Inflation					
Average	2.07	2.33	7.09	5.66	3.00
Standard deviation	2.44	1.48	2.72	3.53	1.12
Unemployment					
Average	4.51	4.78	6.22	7.27	5.76
Standard deviation	1.29	1.07	1.16	1.48	1.05

Note: Real GDP growth is the growth rate of inflation-adjusted gross domestic product from four quarters earlier. Inflation is the rate of change in the consumer price index over the previous 12 months. Unemployment is the monthly, seasonally adjusted percentage of the labor force without a job.
Source: Department of Commerce, Department of Labor, and author's calculations.

One striking result from this table is the low volatility of the 1990s. The averages for real growth, inflation, or unemployment are not unusual by historical standards, but the standard deviations of these variables are the smallest ever seen. Moreover, the changes are large. For instance, the standard deviation of inflation was 24 percent lower in the 1990s than it was in the 1960s—the second most stable decade.

What accounts for the stability of the 1990s? Part of the answer is luck. The U.S. economy did not have to deal with any large, adverse supply shocks, such as the oil-price shocks of the 1970s. Part of the answer is also good policy. Many economists give credit to Alan Greenspan, who was chairman of the Federal

Reserve throughout the 1990s. His decisions about interest rates and the money supply kept the economy on track, avoiding both deep recession and runaway inflation.

14-2 Should Policy Be Conducted by Rule or by Discretion?

A second topic of debate among economists is whether economic policy should be conducted by rule or by discretion. Policy is conducted by rule if policymakers announce in advance how policy will respond to various situations and commit themselves to following through on this announcement. Policy is conducted by discretion if policymakers are free to size up events as they occur and choose whatever policy seems appropriate at the time.

The debate over rules versus discretion is distinct from the debate over passive versus active policy. Policy can be conducted by rule and yet be either passive or active. For example, a passive policy rule might specify steady growth in the money supply of 3 percent per year. An active policy rule might specify that

$$\text{Money Growth} = 3\% + (\text{Unemployment Rate} - 6\%).$$

Under this rule, the money supply grows at 3 percent if the unemployment rate is 6 percent, but for every percentage point by which the unemployment rate exceeds 6 percent, money growth increases by an extra percentage point. This rule tries to stabilize the economy by raising money growth when the economy is in a recession.

We begin this section by discussing why policy might be improved by a commitment to a policy rule. We then examine several possible policy rules.

Distrust of Policymakers and the Political Process

Some economists believe that economic policy is too important to be left to the discretion of policymakers. Although this view is more political than economic, evaluating it is central to how we judge the role of economic policy. If politicians are incompetent or opportunistic, then we may not want to give them the discretion to use the powerful tools of monetary and fiscal policy.

Incompetence in economic policy arises for several reasons. Some economists view the political process as erratic, perhaps because it reflects the shifting power of special interest groups. In addition, macroeconomics is complicated, and politicians often do not have sufficient knowledge of it to make informed judgments. This ignorance allows charlatans to propose incorrect but superficially appealing solutions to complex problems. The political process often cannot weed out the advice of charlatans from that of competent economists.

Opportunism in economic policy arises when the objectives of policymakers conflict with the well-being of the public. Some economists fear that politicians

use macroeconomic policy to further their own electoral ends. If citizens vote on the basis of economic conditions prevailing at the time of the election, then politicians have an incentive to pursue policies that will make the economy look good during election years. A president might cause a recession soon after coming into office to lower inflation and then stimulate the economy as the next election approaches to lower unemployment; this would ensure that both inflation and unemployment are low on election day. Manipulation of the economy for electoral gain, called the **political business cycle**, has been the subject of extensive research by economists and political scientists.[4]

Distrust of the political process leads some economists to advocate placing economic policy outside the realm of politics. Some have proposed constitutional amendments, such as a balanced-budget amendment, that would tie the hands of legislators and insulate the economy from both incompetence and opportunism.

CASE STUDY

The Economy Under Republican and Democratic Presidents

How does the political party in power affect the economy? Researchers working at the boundary between economics and political science have been studying this question. One intriguing finding is that the two political parties in the United States appear to conduct systematically different macroeconomic policies.

Table 14-2 presents the growth in real GDP in each of the four years of the presidential terms since 1948. Notice that growth is usually low, and often negative, in the second year of Republican administrations. Six of the eight years in which real GDP fell are second or third years of Republican administrations. By contrast, the economy is usually booming in the second and third years of Democratic administrations.

One interpretation of this finding is that the two parties have different preferences regarding inflation and unemployment. That is, rather than viewing politicians as opportunistic, perhaps we should view them as merely partisan. Republicans seem to dislike inflation more than Democrats do. Therefore, Republicans pursue contractionary policies soon after coming into office and are willing to endure a recession to reduce inflation. Democrats pursue more expansionary policies to reduce unemployment and are willing to endure the higher inflation that results. Examining growth in the money supply shows that monetary policy is, in fact, less inflationary during Republican administrations. Thus, it seems that the two political parties pursue dramatically different policies and that the political process is one source of economic fluctuations.

Even if we accept this interpretation of the evidence, it is not clear whether it argues for or against fixed policy rules. On the one hand, a policy rule would

[4] William Nordhaus, "The Political Business Cycle," *Review of Economic Studies* 42 (1975): 169–190; and Edward Tufte, *Political Control of the Economy* (Princeton, N. J.: Princeton University Press, 1978).

table 14-2

Real GDP Growth During Republican and Democratic Administrations

	YEAR OF TERM			
President	**First**	**Second**	**Third**	**Fourth**
Democratic Administrations				
Truman	–0.6	8.9	7.6	3.7
Kennedy/Johnson	2.3	6.0	4.3	5.8
Johnson	6.4	6.6	2.5	4.8
Carter	4.6	5.5	3.2	–0.2
Clinton I	2.7	4.0	2.7	3.6
Clinton II	4.4	4.4	4.2	5.0
Average	3.3	5.9	4.1	3.8
Republican Administrations				
Eisenhower I	4.6	–0.7	7.1	2.0
Eisenhower II	2.0	–1.0	7.2	2.5
Nixon	3.0	0.2	3.3	5.4
Nixon/Ford	5.8	–0.6	–0.4	5.6
Reagan I	2.5	–2.0	4.3	7.3
Reagan II	3.8	3.4	3.4	4.2
Bush (elder)	3.5	1.8	–0.5	3.0
Average	3.6	0.2	3.5	4.3

Source: Department of Commerce

insulate the economy from these political shocks. Under a fixed rule, the Fed would be unable to alter monetary policy in response to the changing political climate. The economy might be more stable, and long-run economic performance might be improved. On the other hand, a fixed policy rule would reduce the voice of the electorate in influencing macroeconomic policy.[5]

The Time Inconsistency of Discretionary Policy

If we assume that we can trust our policymakers, discretion at first glance appears superior to a fixed policy rule. Discretionary policy is, by its nature, flexible. As long as policymakers are intelligent and benevolent, there might appear to be little reason to deny them flexibility in responding to changing conditions.

Yet a case for rules over discretion arises from the problem of **time inconsistency** of policy. In some situations policymakers may want to announce in

[5] Alberto Alesina, "Macroeconomics and Politics," *NBER Macroeconomics Annual* 3 (1988): 13–52.

advance the policy they will follow in order to influence the expectations of private decisionmakers. But later, after the private decisionmakers have acted on the basis of their expectations, these policymakers may be tempted to renege on their announcement. Understanding that policymakers may be inconsistent over time, private decisionmakers are led to distrust policy announcements. In this situation, to make their announcements credible, policymakers may want to make a commitment to a fixed policy rule.

Time inconsistency is illustrated most simply in a political rather than an economic example—specifically, public policy about negotiating with terrorists over the release of hostages. The announced policy of many nations is that they will not negotiate over hostages. Such an announcement is intended to deter terrorists: if there is nothing to be gained from kidnapping hostages, rational terrorists won't kidnap any. In other words, the purpose of the announcement is to influence the expectations of terrorists and thereby their behavior.

But, in fact, unless the policymakers are credibly committed to the policy, the announcement has little effect. Terrorists know that once hostages are taken, policymakers face an overwhelming temptation to make some concession to obtain the hostages' release. The only way to deter rational terrorists is to take away the discretion of policymakers and commit them to a rule of never negotiating. If policymakers were truly unable to make concessions, the incentive for terrorists to take hostages would be largely eliminated.

The same problem arises less dramatically in the conduct of monetary policy. Consider the dilemma of a Federal Reserve that cares about both inflation and unemployment. According to the Phillips curve, the tradeoff between inflation and unemployment depends on expected inflation. The Fed would prefer everyone to expect low inflation so that it will face a favorable tradeoff. To reduce expected inflation, the Fed might announce that low inflation is the paramount goal of monetary policy.

But an announcement of a policy of low inflation is by itself not credible. Once households and firms have formed their expectations of inflation and set wages and prices accordingly, the Fed has an incentive to renege on its announcement and implement expansionary monetary policy to reduce unemployment. People understand the Fed's incentive to renege and therefore do not believe the announcement in the first place. Just as a president facing a hostage crisis is sorely tempted to negotiate their release, a Federal Reserve with discretion is sorely tempted to inflate in order to reduce unemployment. And just as terrorists discount announced policies of never negotiating, households and firms discount announced policies of low inflation.

The surprising outcome of this analysis is that policymakers can sometimes better achieve their goals by having their discretion taken away from them. In the case of rational terrorists, fewer hostages will be taken and killed if policymakers are committed to following the seemingly harsh rule of refusing to negotiate for hostages' freedom. In the case of monetary policy, there will be lower inflation without higher unemployment if the Fed is committed to a policy of zero inflation. (This conclusion about monetary policy is modeled more explicitly in the appendix to this chapter.)

The time inconsistency of policy arises in many other contexts. Here are some examples:

- To encourage investment, the government announces that it will not tax income from capital. But after factories have been built, the government is tempted to renege on its promise to raise more tax revenue from them.
- To encourage research, the government announces that it will give a temporary monopoly to companies that discover new drugs. But after a drug has been discovered, the government is tempted to revoke the patent or to regulate the price to make the drug more affordable.
- To encourage good behavior, a parent announces that he or she will punish a child whenever the child breaks a rule. But after the child has misbehaved, the parent is tempted to forgive the transgression, because punishment is unpleasant for the parent as well as for the child.
- To encourage you to work hard, your professor announces that this course will end with an exam. But after you have studied and learned all the material, the professor is tempted to cancel the exam so that he or she won't have to grade it.

In each case, rational agents understand the incentive for the policymaker to renege, and this expectation affects their behavior. And in each case, the solution is to take away the policymaker's discretion with a credible commitment to a fixed policy rule.

CASE STUDY

Alexander Hamilton Versus Time Inconsistency

Time inconsistency has long been a problem associated with discretionary policy. In fact, it was one of the first problems that confronted Alexander Hamilton when President George Washington appointed him the first U.S. Secretary of the Treasury in 1789.

Hamilton faced the question of how to deal with the debts that the new nation had accumulated as it fought for its independence from Britain. When the revolutionary government incurred the debts, it promised to honor them when the war was over. But after the war, many Americans advocated defaulting on the debt because repaying the creditors would require taxation, which is always costly and unpopular.

Hamilton opposed the time-inconsistency policy of repudiating the debt. He knew that the nation would likely need to borrow again sometime in the future. In his *First Report on the Public Credit*, which he presented to Congress in 1790, he wrote

> If the maintenance of public credit, then, be truly so important, the next inquiry which suggests itself is: By what means is it to be effected? The ready answer to which question is, by good faith; by a punctual performance of contracts. States,

like individuals, who observe their engagements are respected and trusted, while the reverse is the fate of those who pursue an opposite conduct.

Thus, Hamilton proposed that the nation make a commitment to the policy rule of honoring its debts.

The policy rule that Hamilton originally proposed has continued for more than two centuries. Today, unlike in Hamilton's time, when Congress debates spending priorities, no one seriously proposes defaulting on the public debt as a way to reduce taxes. In the case of public debt, everyone now agrees that the government should be committed to a fixed policy rule.

Rules for Monetary Policy

Even if we are convinced that policy rules are superior to discretion, the debate over macroeconomic policy is not over. If the Fed were to commit to a rule for monetary policy, what rule should it choose? Let's discuss briefly three policy rules that various economists advocate.

Some economists, called **monetarists**, advocate that the Fed keep the money supply growing at a steady rate. The quotation at the beginning of this chapter from Milton Friedman—the most famous monetarist—exemplifies this view of monetary policy. Monetarists believe that fluctuations in the money supply are responsible for most large fluctuations in the economy. They argue that slow and steady growth in the money supply would yield stable output, employment, and prices.

Although a monetarist policy rule might have prevented many of the economic fluctuations we have experienced historically, most economists believe that it is not the best possible policy rule. Steady growth in the money supply stabilizes aggregate demand only if the velocity of money is stable. But sometimes the economy experiences shocks, such as shifts in money demand, that cause velocity to be unstable. Most economists believe that a policy rule needs to allow the money supply to adjust to various shocks to the economy.

A second policy rule that economists widely advocate is nominal GDP targeting. Under this rule, the Fed announces a planned path for nominal GDP. If nominal GDP rises above the target, the Fed reduces money growth to dampen aggregate demand. If it falls below the target, the Fed raises money growth to stimulate aggregate demand. Because a nominal GDP target allows monetary policy to adjust to changes in the velocity of money, most economists believe it would lead to greater stability in output and prices than a monetarist policy rule.

A third policy rule that is often advocated is inflation targeting. Under this rule, the Fed would announce a target for the inflation rate (usually a low one) and then adjust the money supply when the actual inflation deviates from the target. Like nominal GDP targeting, inflation targeting insulates the economy from changes in the velocity of money. In addition, an inflation target has the political advantage that it is easy to explain to the public.

Notice that all these rules are expressed in terms of some nominal variable—the money supply, nominal GDP, or the price level. One can also imagine policy rules expressed in terms of real variables. For example, the Fed might try to target the unemployment rate at 5 percent. The problem with such a rule is that no one

knows exactly what the natural rate of unemployment is. If the Fed chose a target for the unemployment rate below the natural rate, the result would be accelerating inflation. Conversely, if the Fed chose a target for the unemployment rate above the natural rate, the result would be accelerating deflation. For this reason, economists rarely advocate rules for monetary policy expressed solely in terms of real variables, even though real variables such as unemployment and real GDP are the best measures of economic performance.

CASE STUDY

Inflation Targeting: Rule or Constrained Discretion?

Since the late 1980s, many of the world's central banks—including those of Australia, Canada, Finland, Israel, New Zealand, Spain, Sweden, and the United Kingdom—have adopted some form of an inflation target. Sometimes inflation targeting takes the form of a central bank announcing its policy intentions. Other times it takes the form of a national law that spells out the goals of monetary policy. For example, the Reserve Bank of New Zealand Act of 1989 told the central bank "to formulate and implement monetary policy directed to the economic objective of achieving and maintaining stability in the general level of prices." The act conspicuously omitted any mention of any other competing objective, such as stability in output, employment, interest rates, or exchange rates. Although the U.S. Federal Reserve has not adopted inflation targeting, some members of Congress have proposed bills that would require the Fed to do so.

Should we interpret inflation targeting as a type of precommitment to a policy rule? Not completely. In all the countries that have adopted inflation targeting, central banks are left with a fair amount of discretion. Inflation targets are usually set as a range—an inflation rate of 1 to 3 percent, for instance—rather than a particular number. Thus, the central bank can choose where in the range it wants to be. In addition, the central banks are sometimes allowed to adjust their targets for inflation, at least temporarily, if some exogenous event (such as an easily identified supply shock) pushes inflation outside of the range that was previously announced.

In light of this flexibility, what is the purpose of inflation targeting? Although inflation targeting does leave the central bank with some discretion, the policy does constrain how this discretion is used. When a central bank is told to "do the right thing," it is hard to hold the central bank accountable, because people can argue forever about what the right thing is in any specific circumstance. By contrast, when a central bank has announced an inflation target, the public can more easily judge whether the central bank is meeting that target. Thus, although inflation targeting does not tie the hands of the central bank, it does increase the transparency of monetary policy and, by doing so, makes central bankers more accountable for their actions.[6]

[6] See Ben S. Bernanke and Frederic S. Mishkin, "Inflation Targeting: A New Framework for Monetary Policy?" *Journal of Economic Perspectives* 11 (Spring 1997): 97–116.

CASE STUDY

John Taylor's (and Alan Greenspan's?) Rule for Monetary Policy

If you wanted to set interest rates to achieve stable prices while avoiding large fluctuations in output and employment, how would you do it? This is exactly the question that Alan Greenspan and the other governors of the Federal Reserve must ask themselves every day. The short-term policy instrument that the Fed now sets is the federal funds rate—the short-term interest rate at which banks make loans to one another. Whenever the Federal Open Market Committee meets, it chooses a target for the federal funds rate. The Fed's bond traders are then told to conduct open-market operations in order to hit the desired target.

The hard part of the Fed's job is choosing the target for the federal funds rate. Two guidelines are clear. First, when inflation heats up, the federal funds rate should rise. An increase in the interest rate will mean a smaller money supply and, eventually, lower investment, lower output, higher unemployment, and reduced inflation. Second, when real economic activity slows—as reflected in real GDP or unemployment—the federal funds rate should fall. A decrease in the interest rate will mean a larger money supply and, eventually, higher investment, higher output, and lower unemployment.

The Fed needs to go beyond these general guidelines, however, and decide how much to respond to changes in inflation and real economic activity. To help it make this decision, economist John Taylor has proposed a simple rule for the federal funds rate:

$$\text{Nominal Federal Funds Rate} = \text{Inflation} + 2.0 + 0.5\,(\text{Inflation} - 2.0) - 0.5\,(\text{GDP Gap}).$$

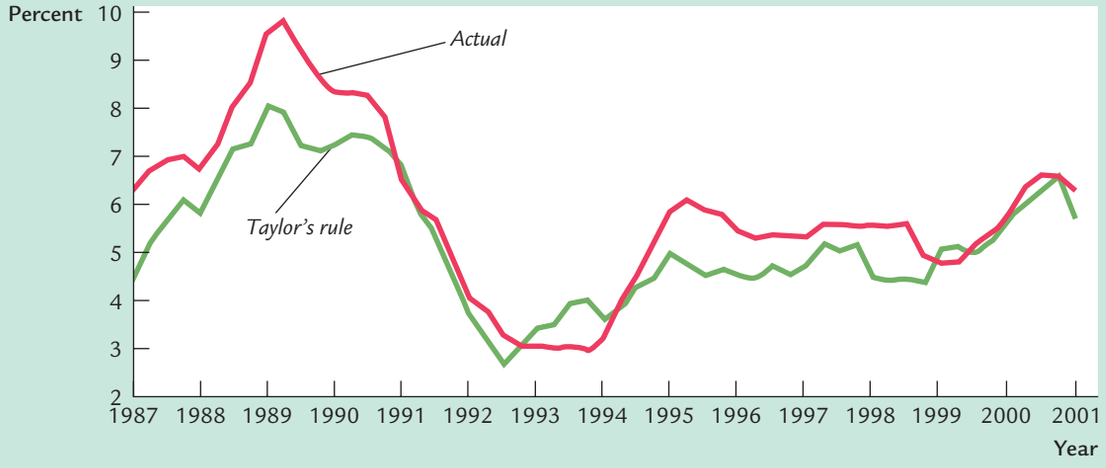
The GDP gap is the percentage shortfall of real GDP from an estimate of its natural rate.

Taylor's rule has the real federal funds rate—the nominal rate minus inflation—responding to inflation and the GDP gap. According to this rule, the real federal funds rate equals 2 percent when inflation is 2 percent and GDP is at its natural rate. For each percentage point by which inflation rises above 2 percent, the real federal funds rate rises by 0.5 percent. For each percentage point by which real GDP falls below its natural rate, the real federal funds rate falls by 0.5 percent. If GDP rises above its natural rate, so that the GDP gap is negative, the real federal funds rate rises accordingly.

One way to view the Taylor rule is as a complement to (rather than a substitute for) inflation targeting. As the previous case study discussed, inflation targeting offers a plan for the central bank in the medium run, but it does not constrain its month-to-month policy decisions. The Taylor rule may be a good short-run operating procedure for hitting a medium-run inflation target. According to the Taylor rule, monetary policy responds directly to inflation—as any inflation-targeting central bank must. But it also responds to the output gap, which can be viewed as a measure of inflationary pressures.

Taylor's rule for monetary policy is not only simple and reasonable, but it also resembles actual Fed behavior in recent years. Figure 14-2 shows the actual fed-

figure 14-2



The Federal Funds Rate: Actual and Suggested This figure shows the federal funds rate—the short-term interest rate at which banks make loans to each other. It also shows the federal funds rate suggested by John Taylor's monetary rule. Notice that the two series move closely together.

Source: Federal Reserve Board, U.S. Department of Commerce, and author's calculations. To implement the Taylor rule, the inflation rate is measured as the percentage change in the GDP deflator over the previous four quarters, and the GDP gap is measured as twice the deviation of the unemployment rate from 6 percent.

eral funds rate and the target rate as determined by Taylor's proposed rule. Notice how closely together the two series move. John Taylor's monetary rule may be more than an academic suggestion. It may be the rule that Alan Greenspan and his colleagues subconsciously follow.[7]

CASE STUDY

Central-Bank Independence

Suppose you were put in charge of writing the constitution and laws for a country. Would you give the president of the country authority over the policies of the central bank? Or would you allow the central bank to make decisions free from such political influence? In other words, assuming that monetary policy is made by discretion rather than by rule, who should exercise that discretion?

Countries vary greatly in how they choose to answer this question. In some countries, the central bank is a branch of the government; in others, the central

[7] John B. Taylor, "The Inflation/Output Variability Tradeoff Revisited," in *Goals, Guidelines, and Constraints Facing Monetary Policymakers* (Federal Reserve Bank of Boston, 1994).

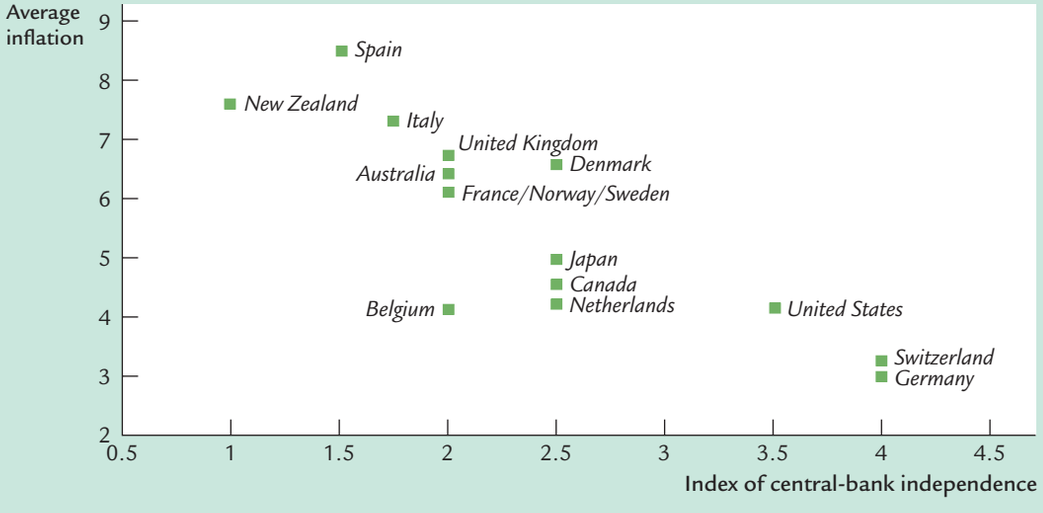
bank is largely independent. In the United States, Fed governors are appointed by the president for 14-year terms, and they cannot be recalled if the president is unhappy with their decisions. This institutional structure gives the Fed a degree of independence similar to that of the Supreme Court.

Many researchers have investigated the effects of constitutional design on monetary policy. They have examined the laws of different countries to construct an index of central-bank independence. This index is based on various characteristics, such as the length of bankers' terms, the role of government officials on the bank board, and the frequency of contact between the government and the central bank. The researchers then examined the correlation between central-bank independence and macroeconomic performance.

The results of these studies are striking: more independent central banks are strongly associated with lower and more stable inflation. Figure 14-3 shows a scatterplot of central-bank independence and average inflation for the period 1955 to 1988. Countries that had an independent central bank, such as Germany, Switzerland, and the United States, tended to have low average inflation. Countries that had central banks with less independence, such as New Zealand and Spain, tended to have higher average inflation.

Researchers have also found there is no relationship between central-bank independence and real economic activity. In particular, central-bank independence is not correlated with average unemployment, the volatility of unem-

figure 14-3



Inflation and Central-Bank Independence This scatterplot presents the international experience with central-bank independence. The evidence shows that more-independent central banks tend to produce lower rates of inflation.

Source: Figure 1a, page 155, of Alberto Alesina and Lawrence H. Summers, "Central Bank Independence and Macroeconomic Performance: Some Comparative Evidence," *Journal of Money, Credit, and Banking* 25 (May 1993): 151–162. Average inflation is for the period 1955–1988.

ployment, the average growth of real GDP, or the volatility of real GDP. Central-bank independence appears to offer countries a free lunch: it has the benefit of lower inflation without any apparent cost. This finding has led some countries, such as New Zealand, to rewrite their laws to give their central banks greater independence.[8]

14-3 Conclusion: Making Policy in an Uncertain World

In this chapter we have examined whether policy should take an active or passive role in responding to economic fluctuations and whether policy should be conducted by rule or by discretion. There are many arguments on both sides of these questions. Perhaps the only clear conclusion is that there is no simple and compelling case for any particular view of macroeconomic policy. In the end, you must weigh the various arguments, both economic and political, and decide for yourself what kind of role the government should play in trying to stabilize the economy.

For better or worse, economists play a key role in the formulation of economic policy. Because the economy is complex, this role is often difficult. Yet it is also inevitable. Economists cannot sit back and wait until our knowledge of the economy has been perfected before giving advice. In the meantime, someone must advise economic policymakers. That job, difficult as it sometimes is, falls to economists.

The role of economists in the policymaking process goes beyond giving advice to policymakers. Even economists cloistered in academia influence policy indirectly through their research and writing. In the conclusion of *The General Theory*, John Maynard Keynes wrote that

> the ideas of economists and political philosophers, both when they are right and when they are wrong, are more powerful than is commonly understood. Indeed, the world is ruled by little else. Practical men, who believe themselves to be quite exempt from intellectual influences, are usually the slaves of some defunct economist. Madmen in authority, who hear voices in the air, are distilling their frenzy from some academic scribbler of a few years back.

This is as true today as it was when Keynes wrote it in 1936—except now that academic scribbler is often Keynes himself.

[8] For a more complete presentation of these findings and references to the large literature on central-bank independence, see Alberto Alesina and Lawrence H. Summers, "Central Bank Independence and Macroeconomic Performance: Some Comparative Evidence," *Journal of Money, Credit, and Banking* 25 (May 1993): 151–162. For a study that questions the link between inflation and central-bank independence, see Marta Campillo and Jeffrey A. Miron, "Why Does Inflation Differ Across Countries?" in Christina D. Romer and David H. Romer, eds., *Reducing Inflation: Motivation and Strategy* (Chicago: University of Chicago Press, 1997), 335–362.

Summary

1. Advocates of active policy view the economy as subject to frequent shocks that will lead to unnecessary fluctuations in output and employment unless monetary or fiscal policy responds. Many believe that economic policy has been successful in stabilizing the economy.
2. Advocates of passive policy argue that because monetary and fiscal policies work with long and variable lags, attempts to stabilize the economy are likely to end up being destabilizing. In addition, they believe that our present understanding of the economy is too limited to be useful in formulating successful stabilization policy and that inept policy is a frequent source of economic fluctuations.
3. Advocates of discretionary policy argue that discretion gives more flexibility to policymakers in responding to various unforeseen situations.
4. Advocates of policy rules argue that the political process cannot be trusted. They believe that politicians make frequent mistakes in conducting economic policy and sometimes use economic policy for their own political ends. In addition, advocates of policy rules argue that a commitment to a fixed policy rule is necessary to solve the problem of time inconsistency.

KEY CONCEPTS

Inside and outside lags
Automatic stabilizers
Leading indicators
Lucas critique
Political business cycle
Time inconsistency
Monetarists

QUESTIONS FOR REVIEW

1. What are the inside lag and the outside lag? Which has the longer inside lag—monetary or fiscal policy? Which has the longer outside lag? Why?
2. Why would more accurate economic forecasting make it easier for policymakers to stabilize the economy? Describe two ways economists try to forecast developments in the economy.
3. Describe the Lucas critique.
4. How does a person's interpretation of macroeconomic history affect his view of macroeconomic policy?
5. What is meant by the "time inconsistency" of economic policy? Why might policymakers be tempted to renege on an announcement they made earlier? In this situation, what is the advantage of a policy rule?
6. List three policy rules that the Fed might follow. Which of these would you advocate? Why?

PROBLEMS AND APPLICATIONS

1. Suppose that the tradeoff between unemployment and inflation is determined by the Phillips curve:

$$u = u^n - \alpha(\pi - \pi^e),$$

where u denotes the unemployment rate, u^n the natural rate, π the rate of inflation, and π^e the expected rate of inflation. In addition, suppose that the Democratic party always follows a policy of high money growth and the Republican party always follows a policy of low money growth. What "political business cycle" pattern of inflation and unemployment would you predict under the following conditions?

a. Every four years, one of the parties takes control based on a random flip of a coin. (*Hint*: What will expected inflation be prior to the election?)

b. The two parties take turns.

2. When cities pass laws limiting the rent landlords can charge on apartments, the laws usually apply to existing buildings and exempt any buildings not yet built. Advocates of rent control argue that this exemption ensures that rent control does not discourage the construction of new housing. Evaluate this argument in light of the time-inconsistency problem.

3. Go to the Web site of the Federal Reserve (www.federalreserve.gov). Find and read a press release, congressional testimony, or a report about recent monetary policy. What does it say? What is the Fed doing? Why? What do you think about the Fed's recent policy decisions?

APPENDIX

Time Inconsistency and the Tradeoff Between Inflation and Unemployment

In this appendix, we examine more analytically the time-inconsistency argument for rules rather than discretion. This material is relegated to an appendix because we will need to use some calculus.[9]

Suppose that the Phillips curve describes the relationship between inflation and unemployment. Letting u denote the unemployment rate, u^n the natural rate of unemployment, π the rate of inflation, and π^e the expected rate of inflation, unemployment is determined by

$$u = u^n - \alpha(\pi - \pi^e).$$

Unemployment is low when inflation exceeds expected inflation and high when inflation falls below expected inflation. The parameter α determines how much unemployment responds to surprise inflation.

For simplicity, suppose also that the Fed chooses the rate of inflation. Of course, more realistically, the Fed controls inflation only imperfectly through its control of the money supply. But for purposes of illustration, it is useful to assume that the Fed can control inflation perfectly.

The Fed likes low unemployment and low inflation. Suppose that the cost of unemployment and inflation, as perceived by the Fed, can be represented as

$$L(u, \pi) = u + \gamma\pi^2,$$

where the parameter γ represents how much the Fed dislikes inflation relative to unemployment. $L(u, \pi)$ is called the *loss function*. The Fed's objective is to make the loss as small as possible.

Having specified how the economy works and the Fed's objective, let's compare monetary policy made under a fixed rule and under discretion.

First, consider policy under a fixed rule. A rule commits the Fed to a particular level of inflation. As long as private agents understand that the Fed is committed to this rule, the expected level of inflation will be the level the Fed is committed to produce. Because expected inflation equals actual inflation ($\pi^e = \pi$), unemployment will be at its natural rate ($u = u^n$).

What is the optimal rule? Because unemployment is at its natural rate regardless of the level of inflation legislated by the rule, there is no benefit to having any inflation at all. Therefore, the optimal fixed rule requires that the Fed produce zero inflation.

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[9] The material in this appendix is derived from Finn E. Kydland and Edward C. Prescott, "Rules Rather Than Discretion: The Inconsistency of Optimal Plans," *Journal of Political Economy* 85 (June 1977): 473–492; and Robert J. Barro and David Gordon, "A Positive Theory of Monetary Policy in a Natural Rate Model," *Journal of Political Economy* 91 (August 1983): 589–610.

Second, consider discretionary monetary policy. Under discretion, the economy works as follows:

1. Private agents form their expectations of inflation π^e.
2. The Fed chooses the actual level of inflation π.
3. Based on expected and actual inflation, unemployment is determined.

Under this arrangement, the Fed minimizes its loss $L(u, \pi)$ subject to the constraint that the Phillips curve imposes. When making its decision about the rate of inflation, the Fed takes expected inflation as already determined.

To find what outcome we would obtain under discretionary policy, we must examine what level of inflation the Fed would choose. By substituting the Phillips curve into the Fed's loss function, we obtain

$$L(u, \pi) = u^n - \alpha(\pi - \pi^e) + \gamma\pi^2.$$

Notice that the Fed's loss is negatively related to unexpected inflation (the second term in the equation) and positively related to actual inflation (the third term). To find the level of inflation that minimizes this loss, differentiate with respect to π to obtain

$$dL/d\pi = -\alpha + 2\gamma\pi.$$

The loss is minimized when this derivative equals zero. Solving for π, we get

$$\pi = \alpha/(2\gamma).$$

Whatever level of inflation private agents expected, this is the "optimal" level of inflation for the Fed to choose. Of course, rational private agents understand the objective of the Fed and the constraint that the Phillips curve imposes. They therefore expect that the Fed will choose this level of inflation. Expected inflation equals actual inflation [$\pi^e = \pi = \alpha/(2\gamma)$], and unemployment equals its natural rate ($u = u^n$).

Now compare the outcome under optimal discretion to the outcome under the optimal rule. In both cases, unemployment is at its natural rate. Yet discretionary policy produces more inflation than does policy under the rule. *Thus, optimal discretion is worse than the optimal rule.* This is true even though the Fed under discretion was attempting to minimize its loss, $L(u, \pi)$.

At first it may seem strange that the Fed can achieve a better outcome by being committed to a fixed rule. Why can't the Fed with discretion mimic the Fed committed to a zero-inflation rule? The answer is that the Fed is playing a game against private decisionmakers who have rational expectations. Unless it is committed to a fixed rule of zero inflation, the Fed cannot get private agents to expect zero inflation.

Suppose, for example, that the Fed simply announces that it will follow a zero-inflation policy. Such an announcement by itself cannot be credible. After private agents have formed their expectations of inflation, the Fed has the incentive to renege on its announcement in order to decrease unemployment. (As we have

just seen, once expectations are given, the Fed's optimal policy is to set inflation at $\pi = \alpha/(2\gamma)$, regardless of π^e.) Private agents understand the incentive to renege and therefore do not believe the announcement in the first place.

This theory of monetary policy has an important corollary. Under one circumstance, the Fed with discretion achieves the same outcome as the Fed committed to a fixed rule of zero inflation. If the Fed dislikes inflation much more than it dislikes unemployment (so that γ is very large), inflation under discretion is near zero, because the Fed has little incentive to inflate. This finding provides some guidance to those who have the job of appointing central bankers. An alternative to imposing a fixed rule is to appoint an individual with a fervent distaste for inflation. Perhaps this is why even liberal politicians (Jimmy Carter, Bill Clinton) who are more concerned about unemployment than inflation sometimes appoint conservative central bankers (Paul Volcker, Alan Greenspan) who are more concerned about inflation.

MORE PROBLEMS AND APPLICATIONS

1. In the 1970s in the United States, the inflation rate and the natural rate of unemployment both rose. Let's use this model of time inconsistency to examine this phenomenon. Assume that policy is discretionary.

a. In the model as developed so far, what happens to the inflation rate when the natural rate of unemployment rises?

b. Let's now change the model slightly by supposing that the Fed's loss function is quadratic in both inflation and unemployment. That is,

$$L(u, \pi) = u^2 + \gamma\pi^2.$$

Follow steps similar to those in the text to solve for the inflation rate under discretionary policy.

c. Now what happens to the inflation rate when the natural rate of unemployment rises?

d. In 1979, President Jimmy Carter appointed the conservative central banker Paul Volcker to head the Federal Reserve. According to this model, what should have happened to inflation and unemployment?