Key Concepts

Instruments, Goals, Targets, and the Fed’s Performance

- The instruments of monetary policy are open market operations, the discount rate, and required reserve ratios.
- The primary goal of monetary policy is to maintain price level stability. Secondary goals are to keep real GDP as close as possible to potential GDP and help maintain sustainable real GDP growth.
- Possible intermediate targets are monetary aggregates, such as the monetary base, M1, or M2, and the federal funds rate. The Fed targets the federal funds rate.

Price level stability is the primary goal of monetary policy because the economy works best when the price level is stable and predictable. Because of bias in measuring the price level, a low inflation rate is considered equivalent to price level stability. Monetary policy can help avoid fluctuations around potential GDP, though some economists contend that it creates fluctuations.

The Fed faced shocks that raised the price level during the 1970s and 1980s. The growth rate of the quantity of money remained high throughout the 1970s before slowing after 1980. It rose again during the late 1990s. Monetary policy, whether measured by the growth rate of M2 or short-term interest rates, generally is expansionary before a presidential election and contractionary afterward. The two exceptions involved the failed reelection bids of Jimmy Carter and George Bush.

Because of the price shocks and the Fed’s policy of rapid monetary growth, between 1973 and 1983 the inflation rate was high. In addition, real GDP was below potential GDP. Between 1984 to 1993, the inflation rate fell and real GDP was closer to potential GDP. Between 1994 and 2003, the inflation rate was low and real GDP was close to potential GDP.

Achieving Price Level Stability

Monetary policies fall into three categories:

- **Fixed-rule policies** — specifies an action to be pursued that is independent of the state of the economy.
- **Feedback-rule policies** — specifies how policy actions respond to the state of the economy.
- **Discretionary policies** — responds to the state of the economy in a possibly unique way that uses all the information available. Discretionary policy is a type of sophisticated feedback-rule policy.

Fixed and feedback rules react differently to aggregate demand shocks. In response to a decrease in aggregate demand:

- **A monetarist fixed rule says, “Do nothing.”** (Monetarists are economists who think fluctuations in the quantity of money are the main source of economic fluctuations.) This policy allows aggregate demand to decrease, leading to a decrease in real GDP and a fall in the price level. If the decrease in aggregate demand is temporary, eventually aggregate demand returns to its initial level and real GDP returns to potential GDP.
- Feedback rules try to counter the swings in aggregate demand. When aggregate demand decreases, a Keynesian feedback rule offsets the fall with expan-
sionary monetary policy that lowers the interest rate and increases the quantity of money. (Keynesians are economists who think fluctuations in aggregate demand combined with sticky wages are the source of economic fluctuations.) If the policy actions are handled correctly, real GDP remains at potential GDP.

In theory, feedback rules seem superior. But some economists argue that, in practice, feedback rules are flawed because the effects of monetary policy operate with time lags that might be greater than the forecast horizon. In this case the policy might be incorrect for the conditions that exist when the policy takes effect. From 1994 to 2001, the Fed apparently overcame this problem, but in 2001 it reacted too slowly to the recession that was occurring.

Aggregate supply shocks bring a challenge for monetary policy. There are two types of aggregate supply shocks:

- Productivity growth fluctuations: As productivity growth fluctuates, the growth of potential GDP and the LAS curve also fluctuate.
- Fluctuations in cost-push pressure: Cost hikes lead to fluctuations in aggregate supply and the SAS curve.

For the case of a productivity shock:

- With a fixed rule, a decrease in long-run aggregate supply decreases real GDP and raises the price level.
- With a feedback rule stabilizing real GDP, a decrease in long-run aggregate supply decreases real GDP, which feeds back into an increase in aggregate demand. The increase in aggregate demand has no effect on real GDP, which decreases, but substantially raises the price level.
- With a feedback rule stabilizing the price level, a decrease in long-run aggregate supply raises the price level, which feeds back into a decrease in aggregate demand. The decrease in aggregate demand has no effect on real GDP, which decreases, but can offset the rise in the price level so that the price level remains constant.

To study the situation of a change in cost-push pressure, suppose that OPEC raises the price of oil so that short-run aggregate supply decreases and the SAS curve shifts leftward. In this case:

- A fixed rule does not change aggregate demand. Real GDP decreases and the price level rises. Eventually either the price of oil or the money wage rate will fall so that the SAS curve shifts rightward and the economy returns to potential GDP and the initial price level.
- A feedback rule stabilizing real GDP increases aggregate demand in response to the decrease in real GDP. The increase in aggregate demand returns real GDP to potential GDP but pushes the price level even higher, and the cost increase may recur. A sustained cost-push inflation might break out.
- A feedback rule stabilizing the price level decreases aggregate demand in response to the rise in the price level. The decrease in aggregate demand lowers the price level but decreases real GDP even more so that the economy might be plunged into a deep recession.

If the Fed pursues a policy that focuses on real GDP and accommodates price hikes, there are no incentives to prevent groups from pushing up costs and thereby leading to a cost-push inflation. So a fixed rule or feedback rule that reacts to the price level can deliver lower inflation.

### Policy Credibility

Slowing inflation requires decreasing growth in aggregate demand.

- Surprise slowing of the inflation rate by unexpectedly decreasing growth in aggregate demand decreases real GDP and raises unemployment.
- A credible announced slowing of the inflation rate might be able to reduce inflation without decreasing GDP or raising unemployment.
- In practice, anti-inflationary policy generally leads to recessions because economic agents do not believe announced anti-inflationary policies will be carried out.

### New Monetarist and New Keynesian Feedback Rules

A monetarist fixed rule prevents cost-push pressure from becoming ongoing cost-push inflation but it achieves this goal at the cost of lost real GDP. A Keynesian feedback rule that targets real GDP can result in cost-push inflation. A feedback rule that targets the price level avoids cost-push inflation but at a greater cost in terms of lost real GDP. Two policy rules that
economists have proposed and that respond to both the price level and real GDP are the:

- **McCallum rule**: The McCallum rule adjusts the growth rate of the monetary base to target the inflation rate but also takes into account changes in the trend productivity growth rate and fluctuations in aggregate demand. The McCallum is a new monetarist rule. It focuses more strongly on price stability than on stabilizing the business cycle.

- **Taylor rule**: The Taylor rule adjusts the federal funds rate to target the inflation rate and to take into account deviations of the inflation rate from its target and deviations of real GDP from potential GDP. The Taylor rule is a new Keynesian rule. It focuses on price stability and stabilizing the business cycle.

The McCallum rule targets the monetary base and lets the federal funds rate fluctuate to reach equilibrium. The Taylor rule targets the interest rate and lets the monetary base fluctuate. The Taylor rule is a closer description of the Fed’s actual policy.

**Helpful Hints**

1. **How Significant is This Chapter?** It asks the most important macroeconomic policy question: Can the Federal Reserve carry out successful policies to make the lives of individuals better? The answer makes a great deal of difference for everyone. For instance, if feedback policies can be used to avoid business cycles, no college student need fear graduating just when a recession hits and no older worker need fear forced early retirement because of a recession. However, if feedback policies actually worsen the severity of recessions, their use might condemn students to search for work in the face of a severe recession and many older Americans to endure poverty. So the answer to the question of whether the government can use macroeconomic policies to improve our lives is tremendously important — and is currently unknown!

2. **The McCallum and Taylor Rules**: Keep in mind that these rules have been proposed as guides for how the Federal Reserve should conduct its monetary policy. *Neither* rule has been adopted by the Federal Reserve, probably because the Federal Reserve wants to maintain as much discretion as possible. Interestingly, however, *both* rules are relatively accurate in predicting the Fed’s actual policy. So even though the Fed does not want to commit to a particular rule, nonetheless it appears that the Fed does generally follow these rules, though it does so only implicitly.

**Questions**

- **True/False and Explain**

**Instruments, Goals, Targets, and the Fed’s Performance**

1. Open market operations are one of the goals of monetary policy.
2. An intermediate target of monetary policy is to maintain price stability.
3. Over the last 30 years, the federal funds rate peaked around 1983 and has generally fallen since then.
4. The Fed’s performance in meeting its inflation and real GDP goals was better from 1994 to 2003 than from 1973 to 1983.

**Achieving Price Level Stability**

5. The statement, “allow the quantity of money to grow at the constant rate of 3 percent per year,” is an example of a feedback-rule policy.
6. Discretionary policy can be characterized as a type of sophisticated feedback policy.
7. A property designed feedback rule can offset the effects of changes in aggregate demand.
8. Economists agree that a feedback-rule policy is superior to a fixed-rule policy.
9. In the face of a negative productivity shock, a fixed rule helps offset the effect on real GDP.
10. If OPEC raises the price of oil and creates a cost-push shock, a feedback rule that seeks to stabilize real GDP results in a higher price level than a fixed rule.
11. A fixed rule or a feedback rule that targets the price level makes a cost-push inflation less likely.

**Policy Credibility**

12. If the Fed credibly announced its intention to slow the growth in aggregate demand, inflation would
slow and GDP would remain equal to potential GDP.

13. Reducing inflation usually leads to a recession.

**New Monetarist and New Keynesian Feedback Rules**

14. The Taylor rule is an example of a new monetarist feedback rule.

15. The McCallum responds more strongly to current real GDP than does the Taylor rule.

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**Multiple Choice**

**Instruments, Goals, Targets, and the Fed’s Performance**

1. Which of the following is NOT a macroeconomic instrument?
   a. open market operations
   b. price level stability
   c. discount rate
   d. required reserve ratio

2. Which of the following is one of the Fed’s intermediate targets?
   a. price level stability
   b. open market operations
   c. discount rate
   d. federal funds rate

3. Price level stability
   a. has no relationship to growth in potential GDP.
   b. is thought by most economists to be reached with a measured inflation rate of between 0 and 3 percent a year.
   c. is the most important tool of the Federal Reserve.
   d. was attained by the Fed for the period between 1973 and 1984.

4. The data show that in the United States, in the year before an election, monetary policy generally is ____, and in the year after an election, monetary policy generally is ____.  
   a. expansionary; expansionary
   b. expansionary; contractionary
   c. contractionary; expansionary
   d. contractionary; contractionary

5. The Federal Reserve came closest to its goals of price level stability and real GDP equal to potential GDP during

**Achieving Price Level Stability**

6. Which of the following is an example of a fixed-rule policy?
   a. Wear your boots if it snows.
   b. Leave your boots home if it does not snow.
   c. Wear your boots every day.
   d. Listen to the weather forecast and then decide whether to wear your boots.

7. A policy that responds to the state of economy in a possibly unique way and uses all available information is
   a. an anti-inflation policy.
   b. a fixed-rule policy.
   c. a feedback-rule policy.
   d. a discretionary policy.

8. Monetarists generally
   a. support the use of feedback rules.
   b. support the use of fixed rules.
   c. support the Taylor rule.
   d. are divided as to whether a feedback-rule policy or a fixed-rule policy is superior.

9. The rule, “Increase the quantity of money in a recession,” is an example of a
   a. Keynesian fixed-rule policy.
   b. Keynesian feedback-rule policy.
   c. monetarist fixed-rule policy.
   d. monetarist feedback-rule policy.

10. Businesses become convinced that future profits from investment will be less than initially believed. This conviction leads to a change in aggregate ____ and a ____ policy might be able to keep real GDP from falling below potential GDP.
    a. demand; fixed-rule
    b. demand; feedback-rule
    c. supply; feedback-rule
    d. supply; fixed-rule
For the next 3 questions, suppose that initially real GDP equals potential GDP at $11 trillion and that the initial price level is 120. Then a decrease in aggregate demand occurs.

11. The fixed rule being followed is: Do nothing. As a result, real GDP ____ $11 trillion and the price level ____ 120.
   a. equals; equals
   b. is less than; is less than
   c. is less than; equals
   d. is less than; is greater than

12. The feedback rule being followed targets real GDP: Increase the quantity of money whenever there is a decrease in real GDP. As a result, real GDP ____ $11 trillion and the price level ____ 120.
   a. equals; equals
   b. is less than; is less than
   c. is less than; equals
   d. is less than; is greater than

13. The feedback rule being followed targets the price level: Increase the quantity of money whenever there is a decrease in the price level. As a result, real GDP ____ $11 trillion and the price level ____ 120.
   a. equals; equals
   b. is less than; is less than
   c. is less than; equals
   d. is less than; is greater than

For the next 3 questions, suppose that initially real GDP equals potential GDP at $11 trillion and that the initial price level is 120. Then a decrease in potential GDP occurs.

14. The fixed rule being followed is: Do nothing. As a result, real GDP ____ $11 trillion and the price level ____ 120.
   a. equals; equals
   b. is less than; is less than
   c. is less than; equals
   d. is less than; is greater than

15. The feedback rule being followed targets real GDP: Increase the quantity of money whenever there is a decrease in real GDP. As a result, real GDP ____ $11 trillion and the price level ____ 120.
   a. equals; equals
   b. is less than; is less than
   c. is less than; equals
   d. is less than; is greater than

16. The feedback rule being followed targets the price level: Decrease the quantity of money whenever there is an increase in the price level. As a result, real GDP ____ $11 trillion and the price level ____ 120.
   a. equals; equals
   b. is less than; is less than
   c. is less than; equals
   d. is less than; is greater than

For the next 3 questions, suppose that initially real GDP equals potential GDP at $11 trillion and that the initial price level is 120. Then a decrease in short-run aggregate supply occurs.

17. The fixed rule being followed is: Do nothing. As a result, real GDP ____ $11 trillion and the price level ____ 120.
   a. equals; equals
   b. is less than; is less than
   c. is less than; equals
   d. is less than; is greater than

18. The feedback rule being followed targets real GDP: Increase the quantity of money whenever there is a decrease in real GDP. As a result, real GDP ____ $11 trillion and the price level ____ 120.
   a. equals; is greater than
   b. is less than; is less than
   c. is less than; equals
   d. is less than; is greater than

19. The feedback rule being followed targets the price level: Decrease the quantity of money whenever there is an increase in the price level. As a result, real GDP ____ $11 trillion and the price level ____ 120.
   a. equals; equals
   b. is less than; is less than
   c. is less than; equals
   d. is less than; is greater than
20. A fixed-rule policy that sets the growth rate of the quantity of money at 4 percent per year
   a. ensures that cost-push inflation does not occur.
   b. counteracts temporary increases in aggregate demand.
   c. counteracts temporary decreases in real output.
   d. offsets aggregate supply fluctuations.

Policy Credibility
21. If the Fed unexpectedly reduces the growth rate of the quantity of money, the short-run Phillips curve
   a. shifts leftward.
   b. shifts rightward.
   c. does not shift.
   d. becomes vertical.

22. The usual result when inflation is reduced is
   a. an immediate strong expansion.
   b. a recession.
   c. more rapid growth in aggregate demand.
   d. not known.

23. When might inflation be reduced without increasing unemployment?
   a. When the Fed unexpectedly reduces inflation.
   b. When the Fed announces that it will reduce inflation and people do not believe the Fed’s announcement.
   c. When the Fed announces that it will reduce inflation and people believe the announcement.
   d. Never.

New Monetarist and New Keynesian Feedback Rules
24. The McCallum rule
   a. is in the spirit of a new Keynesian feedback rule.
   b. puts more weight on price level stability than on responding to fluctuations in real GDP.
   c. is the rule actually followed by the Fed.
   d. says that Fed should target the federal funds rate.

25. The Taylor rule
   a. focuses on only fluctuations in real GDP.
   b. puts more weight on price level stability than on responding to fluctuations in real GDP.
   c. is the rule actually followed by the Fed.
   d. says that Fed should target the federal funds rate.

Short Answer Problems
1. What is the relationship between monetary policy instruments, goals, and intermediate targets?
2. Distinguish between a fixed-rule policy and a feedback-rule policy.

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**FIGURE 16.1**

Short Answer Problem 3 (a)

3. The figure above shows the economy at the end of 2003. Suppose that in 2004, a one-year decrease in aggregate demand occurs. Also assume that potential GDP does not change from 2003 to 2004.
   a. If the Fed follows the fixed rule, “Hold the quantity of money constant,” in Figure 16.1 show how the decrease in aggregate demand affects real GDP and the price level in 2004.
   b. If the Fed follows the feedback rule, “Raise the quantity of money whenever real GDP decreases,” in Figure 16.2 (on the next page) show the effect in 2004 of the temporary decrease in aggregate demand.
   c. Assume that holding GDP as close as possible to potential GDP is a target for policymakers. Which policy — the fixed-rule policy or the feedback-rule policy — is best?
4. The figure above shows the economy at the end of 2003. Suppose that in 2004, a slowdown in productivity growth decreases potential GDP and long-run aggregate supply.

a. If the Fed follows the fixed rule, “Hold the quantity of money constant,” in Figure 16.3 show how the decrease in potential GDP affects real GDP and the price level in 2004.

b. Assume that the Federal Reserve follows a feedback rule policy aimed at stabilizing real GDP, “Increase the quantity of money whenever real GDP decreases.” In Figure 16.4 show the combined effect in 2004 of the decrease in potential GDP and the Fed’s policy.

c. Assume that the Federal Reserve follows a feedback rule policy aimed at stabilizing the price level, “Decrease the quantity of money whenever the price level rises.” In Figure 16.5 show the combined effect in 2004 of the decrease in potential GDP and the Fed’s policy.
5. The figure above shows the economy at the end of 2003. In 2004 suppose OPEC raises the price of oil and decreases the short-run aggregate supply.
   a. If the Fed follows the fixed rule, “Hold the quantity of money constant,” in Figure 16.6 show how the decrease in short-run aggregate supply affects real GDP and the price level in 2004.
   b. Assume that the Federal Reserve follows a feedback rule policy aimed at stabilizing real GDP, “Increase the quantity of money whenever real GDP decreases.” In Figure 16.7 show the combined effect in 2004 of the decrease in short-run aggregate supply and the Fed’s policy.
   c. Assume that the Federal Reserve follows a feedback rule policy aimed at stabilizing the price level, “Decrease the quantity of money whenever the price level rises.” In Figure 16.8 show the combined effect in 2004 of the decrease in short-run aggregate supply and the Fed’s policy.

6. Summarize the results from problems 3, 4, and 5 by discussing when a feedback-rule policy and when a fixed-rule policy works best for society.

7. If the Fed announced its intention to reduce the rate of inflation by lessening the rate of growth of the quantity of money, expected inflation would decline accordingly. So a reduction in the actual rate of inflation could be achieved without a recession. Why does this result not occur in reality?

**You’re the Teacher**

1. Your friend is asking your opinion: “After reading this chapter, I’m confused. I don’t know if the Fed should conduct feedback-rule policies, or if it should stick to fixed-rule policies. What do you think?” Answer your friend’s question.
Answers

True/False Answers

Instruments, Goals, Targets, and the Fed’s Performance

1. F Open market operations are an instrument of monetary policy, not a goal.
2. F Price stability is goal of monetary policy; intermediate targets are the monetary aggregates such as M1, M2, and the monetary base, and the federal funds rate.
3. T The high inflation of the early 1980s brought the high federal funds rate of the time.
4. T Between 1994 to 2003, falling oil prices and decreasing budget deficits helped keep inflation low and increase real GDP.

Achieving Price Level Stability

5. F The statement in the question is a fixed rule because the monetary growth rate is fixed regardless of the current state of the economy.
6. T Discretionary policy means that policymakers respond to the current state of the economy, which is a form of feedback policy.
7. T A properly designed feedback rule can completely offset the effects of changes in aggregate demand so that neither real GDP nor the price level are affected.
8. F The superiority of feedback rules or fixed rules is an issue that is still very clouded by much uncertainty.
9. F The decrease in real GDP is going to occur and no type of monetary policy can offset that outcome.
10. T The feedback rule increases aggregate demand, which boosts the price level higher than it would otherwise.
11. T A feedback rule that targets real GDP makes a cost-push inflation more likely to occur.

Policy Credibility

12. F The natural rate of unemployment can be changed by changing the unemployment compensation rate or the minimum wage.
13. F A credible announcement slows growth in money wages simultaneously with slowing the growth of prices, leaving real GDP equal to potential GDP.

New Monetarist and New Keynesian Feedback Rules

14. F The Taylor rule is a new Keynesian rule because it focuses on both price level stability and real GDP.
15. F The McCallum rule pays little attention to current GDP because it focuses more strongly on keeping the inflation rate low.

Multiple Choice Answers

Instruments, Goals, Targets, and the Fed’s Performance

1. b Achieving price level stability is a goal of the Fed not an instrument.
2. d The Fed uses the federal funds rate as an intermediate target to help it obtain its goal of price level stability.
3. b Because quality improvements bias the measured price level to be higher than the “true” price level, most economists agree that an inflation rate between 0 and 3 percent a year is equivalent to price level stability.
4. b The tendency for monetary policy to be expansionary before an election raises the possibility that monetary policy is conducted on the basis of politics rather than concern about taming the business cycle.
5. c Between 1994 and 2003, the inflation rate was generally low and real GDP was generally close to potential GDP.

Achieving Price Level Stability

6. c Rule (c) is a fixed rule because it does not depend on the day’s weather.
7. d The question describes a discretionary policy.
8. b Monetarists believe that feedback rules worsen economic performance, so they support fixed rules.
9. b The rule makes the quantity of money depend on the state of the economy and so is a feedback rule, the type of rule advocated by Keynesian economists.
10. b A feedback-rule policy in this case increases aggregate demand. Such a policy offsets the initial
decrease in aggregate demand and might keep real GDP equal to potential real GDP.

11. b The fixed rule means that aggregate demand decreases and nothing else changes. The AD curve shifts leftward so that real GDP decreases to less than $11 trillion and the price level falls from 120.

12. a The feedback rule means that the initial decrease in aggregate demand is offset. As a result, there is no net change in aggregate demand so that the price level and real GDP remain constant.

13. a The feedback rule again offsets the initial decrease in aggregate demand. So there is no net change in aggregate demand and the price level and real GDP remain constant.

14. d Potential GDP decreases, so that the LAS curve shifts leftward, and the fixed rule means that nothing else changes. As a result, real GDP decreases to less than $11 trillion and the price level rises to more than 120.

15. d Potential GDP decreases, so that the LAS curve shifts leftward and real GDP decreases. The feedback rule that targets real GDP increases aggregate demand and the AD curve shifts rightward. The decrease in potential GDP means that real GDP is less than $11 trillion. The leftward shift of the LAS curve raises the price level as does the rightward shift of the AD curve, so the price level rises to (possibly much) more than 120.

16. c Potential GDP decreases, so that the LAS curve shifts leftward. The price level rises so that the feedback rule that targets the price level means that aggregate demand decreases and the AD curve shifts leftward to offset the price hike. The decrease in potential GDP lowers real GDP so it is less than $11 trillion. The leftward shift of the LAS curve raises the price level and the leftward shift of the AD curve lowers the price level, so on net the price level stays at 120.

17. d The SAS curve shifts leftward and the fixed rule means that nothing else changes. As a result, real GDP decreases to less than $11 trillion and the price level rises to more than 120.

18. a The SAS curve shifts leftward, which decreases real GDP. The feedback rule that targets real GDP increases aggregate demand and the AD curve shifts rightward. This change offsets the initial decrease in real GDP so that real GDP remains $11 trillion. Both changes raise the price level, so the price level rises to more than 120.

19. c The SAS curve shifts leftward, which raises the price level. The feedback rule that targets the price level decreases aggregate demand and the AD curve shifts leftward. This change offsets the initial price hike so that the price level remains at 120. Both changes decrease real GDP, so real GDP falls so it is (much) less than $11 trillion.

20. a A major benefit of fixed rules that specify low rates of monetary growth is that they eliminate the possibility of high and persisting inflation.

Policy Credibility

21. c The unexpected change in the monetary growth rate cannot affect people’s expectations about the inflation rate, so the short-run Phillips curve does not shift.

22. b Reductions in inflation generally are accompanied by a recession.

23. c A credible, announced policy of reducing inflation might allow people’s expectations to change so that inflation can be reduced without increasing unemployment.

New Monetarist and New Keynesian Feedback Rules

24. b Because the McCallum puts more weight on price stability, it is in the spirit of a monetarist feedback rule.

25. b The Taylor puts weight on both fluctuations in real GDP and price level stability. It targets the federal funds rate.

Answers to Short Answer Problems

1. The goals of monetary policy are the ultimate objectives that the Fed wants to meet. The primary goal of the monetary policy is price level stability. To reach its goals, the Fed must use its policy instruments, open market operations, the discount rate, and the required reserve ratios. But these tools do not affect the price level directly. Instead they affect the Fed’s intermediate targets, the monetary aggregates and the federal fund rate. The Fed uses its instruments to meet intermediate targets that the Fed expects will allow it to obtain its policy goals.
2. The difference between a fixed-rule policy and a feedback-rule policy is whether the specified action depends on the state of the economy. A fixed-rule policy specifies an action that will be pursued regardless of the state of the economy. For instance, a fixed-rule policy of increasing the quantity of money by 3 percent per year implies that the quantity of money will be increased by 3 percent regardless of whether the economy is expanding or contracting. In contrast, a feedback-rule policy of increasing the growth rate of the quantity of money if the economy is in a recession and decreasing the growth rate if the economy is in an expansion means that the growth rate of the quantity of money will change according to the state of the economy.

3. a. Figure 16.9 shows that with a fixed rule, nothing offsets the decline in aggregate demand from $AD_{03}$ to $AD_{04}$. So the decrease in aggregate demand decreases real GDP (from $10$ trillion to $9$ trillion) and the price level falls (from 120 to 110).

   b. A feedback rule offsets the initial decrease in aggregate demand. The Fed’s expansionary policy keeps aggregate demand stationary at $AD_{03}$. Figure 16.10 shows that real GDP remains at its full employment level ($10$ trillion) and the price level is unchanged.

4. a. Figure 16.11 shows the effect of the fixed rule in 2004. Long-run aggregate supply decreases, shifting the long-run aggregate supply curve from $LAS$ to $LAS_{04}$. The fixed rule means that aggregate demand does not change. So real GDP decreases (to $9$ trillion in the figure) and the price level rises (to 130 in the figure).
b. The decrease in potential GDP shifts the long-run aggregate supply curve shifts to \( LAS_{04} \). Real GDP decreases so the Fed’s feedback rule leads it to increase the quantity of money. As Figure 16.12 shows, aggregate demand increases from \( AD_{03} \) to \( AD_{04} \). Real GDP decreases and the price level rises, to 138 in the figure.

5. a. Figure 16.14 shows the effect of the fixed rule in 2004. Short-run aggregate supply decreases and the short-run aggregate supply curve shifts from \( SAS \) to \( SAS_{04} \). The fixed rule means that aggregate demand does not change. Real GDP decreases, to $9 trillion in the figure, and the price level rises, to 130 in the figure.

b. Short-run aggregate supply decreases and, in Figure 16.15 (on the next page) the short-run aggregate supply curve shifts from \( SAS \) to \( SAS_{04} \). Real GDP decreases, so the Fed’s feedback rule leads it to increase the quantity of money. Aggregate demand increases from \( AD_{03} \) to \( AD_{04} \). So real GDP remains at $10 trillion but the price level rises, to 140 in the figure.
c. Short-run aggregate supply decreases and, in Figure 16.16 the short-run aggregate supply curve shifts from \(SAS\) to \(SAS_0\). The price level rises, so the Fed’s feedback rule leads it to decrease the quantity of money. Aggregate demand decreases from \(AD_{03}\) to \(AD_{04}\). Real GDP decreases to $8 trillion but the price level remains constant.

6. Problem 3 showed the effect of feedback rules at their best. The Fed’s effective use of feedback rules was able to eliminate the pending recession, stabilize real GDP at potential GDP and stabilize the price level. The fixed rule allowed GDP to fall below potential GDP, which means that unemployment rises above the natural rate, and the price level fell. However, problems 4 and 5 illustrated potential problems with feedback rules. In problem 4, the fixed rule resulted in a decrease in real GDP and a rise in the price level. The feedback rule that aimed to stabilize GDP did not save the economy from a recession and the price level skyrocketed. This rule was clearly worse than the fixed rule. The feedback rule that aimed to stabilize the price level also did not save the economy from recession, but it did eliminate the rise in the price level. So this feedback rule was better than the fixed rule. But in problem 5, the feedback rules are probably worse than the fixed rule. The fixed rule allowed real GDP to fall and the price level to rise. The feedback rule that aimed to stabilize real GDP did so but at the cost of a much higher price level. And the feedback rule that aimed to stabilize the price level also did so, but at the cost of a much larger decrease in real GDP.

7. The problem is that expected inflation might not decline as a result of the Fed’s announcement. A credibility problem might arise because expectations are much more strongly affected by the Fed’s record of actions than by its announcements that it will take action. If people do not believe the Fed’s announcement, they will not adjust expectations. Then, if the Fed carries out the policy, a recession will result despite the announcement. In addition, even if people did believe the announcement, sticky wages could slow the adjustment of the labor market. So even if the announcement was totally credible, a recession might still be the result of the anti-inflation policy.

**You’re the Teacher**

1. “I think that a lot of students (and policymakers!) fall into the trap of thinking that feedback rules must be better than fixed rules. I mean, before I read this chapter it seemed so obvious! I thought human intelligence and action must be better than doing nothing! I couldn’t understand why we had recessions and slow economic growth because it..."
seemed so clear that these were bad. Then, when I was studying earlier chapters, I thought that the Fed surely should be able to take actions to avoid recessions. Until I hit this chapter, although I didn’t know the technical terms, I imagined that theoretically feedback rules should be able to avoid recessions. After all, it seemed like feedback rules could do everything fixed rules could, plus more.

“But this chapter was a real eye opener for me. I didn’t know the problems with the actual implementation of feedback rules: like they require good knowledge of the economy because they have a spread out effect and can lead to cost-push inflation or steep recessions when short-run aggregate supply changes. Once I thought about these things, it was clear that feedback rules aren’t necessarily better than fixed rules.

“So, I guess I’m with you. I don’t know whether the Fed should use feedback rules or fixed rules. And, you know, what the government should do is a serious question. In fact, I’ve been toying with the idea of taking more economics classes to get a better idea of what the answer to this question should be.”
1. Which of the following is one of the Fed’s instruments?
   a. price level stability
   b. maintain sustainable real GDP growth
   c. federal funds rate
   d. open market operations

2. If the economy is hit with ____, a monetary policy feedback rule of the proper magnitude can stabilize both real GDP and the price level.
   a. an aggregate demand fluctuation
   b. productivity growth fluctuation
   c. a change in cost-push pressure
   d. All of the above are correct.

3. The McCallum rule is designed primarily to achieve ____.
   a. a reduction in real GDP fluctuations.
   b. price level stability.
   c. a decrease in the unemployment rate.
   d. a constant velocity of circulation.

4. A monetarist supporting a fixed rule argues that the proper response of policy to a decrease in real GDP is to
   a. increase monetary growth to increase aggregate supply.
   b. increase monetary growth to increase aggregate demand.
   c. decrease monetary growth.
   d. maintain constant monetary growth.

5. Under a feedback rule that targets real GDP, if the economy is in a recession, an appropriate monetary policy would be to
   a. decrease the quantity of money.
   b. not change the quantity of money.
   c. do nothing.
   d. increase the quantity of money.

6. If the Fed makes a credible announcement that it will decrease the inflation rate and then carries out the policy, the inflation rate ____ and the unemployment rate ____.
   a. falls; rises
   b. falls; does not change
   c. falls; falls
   d. does not change; falls

7. The rule “Always stop at a red light” is a
   a. fixed rule.
   b. feedback rule.
   c. discretionary rule.
   d. rational rule.

8. Because of policy lags
   a. feedback-rule policies are definitely superior to fixed-rule policies.
   b. discretionary policy must be used because the lags make each policy event unique.
   c. fixed-rule policies are impractical.
   d. a feedback policy that reacts to economic conditions today might be the wrong policy when its effects are felt.

9. A policy that specifies how policy actions respond to changes in the economy is
   a. an open-market operation policy.
   b. a fixed-rule policy.
   c. a discretionary policy.
   d. a feedback-rule policy.

10. A cost-push inflation is least likely to occur when using
    a. a fixed rule.
    b. a feedback rule.
    c. discretionary policy.
    d. None of the above because no policy is able to stop a cost-push inflation from occurring.

The answers for this Chapter Quiz are on page 294