

Chapter 12

THE FEDERAL RESERVE AND MONETARY POLICY

Macroeconomics in Context (Goodwin, et al.)

Chapter Overview

In this chapter, you will be introduced to a standard treatment of central banking and monetary policy. You will learn about the role of the Federal Reserve and how the decisions made at the Fed impact the macroeconomy. You will be introduced to the market for federal funds, and learn how the Federal Reserve attempts to expand or cool off the economy using monetary policy. You will also be introduced to the quantity equation, the quantity theory of money, and monetarism. In the appendixes you will be introduced to bonds and different ways of thinking about interest rates.

Chapter Objectives

After reading and reviewing this chapter, the student should be able to:

1. Understand the basic workings of central banks.
2. Describe the tools the Federal Reserve can use to carry out monetary policy.
3. Understand how the Fed uses open market operations to influence the federal funds rate.
4. Explain how monetary policy is expected to affect investment and aggregate expenditure.
5. Explain the U.S. monetary policy experience of the 2000-2017 period in the context of Federal Reserve priorities and monetary policy actions.
6. Become familiar with the notions of “liquidity trap” and “credit rationing.”
7. Understand the quantity equation, the quantity theory of money, and monetarism.
7. Describe possible sources of inflation.
8. Understand the controversy over rules versus activism in monetary policy.

If the Appendix is included:

9. Understand the use of bonds and the relation of bond prices to interest rates
10. Understand the difference between real and nominal interest rates, and their impact on the economy.
11. Describe the transactions demand model of money.

Key Terms

open market operations	contractionary monetary policy
Federal Open Market Committee (FOMC)	quantitative easing (QE)
monetary base (or high-powered money)	liquidity trap
money multiplier	credit rationing
discount rate	quantity equation
federal funds rate	velocity of money
prime rate	quantity theory of money
accelerator principle	monetary neutrality
expansionary monetary policy	money supply rule
accommodative monetary policy	monetarism

monetizing the deficit
modern monetary theory

real interest rate
expected real interest rate
transactions demand
precautionary demand
speculative demand

Appendix:
bond

Active Review

Fill in the Blank

1. When the Federal Open Market Committee (FOMC) directs the Federal Reserve Bank in New York to buy or sell government bonds on the open market, it is conducting _____.
2. Suppose the Fed buys bonds on the open market. By doing so, it is increasing the _____ (also known as _____), which is the currency in circulation plus bank reserves.
3. The ratio of the money supply to the monetary base is called the _____, and in the U.S. is empirically estimated to have a value close to two.
4. The interest rate that the Fed charges banks on loans it makes to banks so they can to meet their reserve requirements is called the _____.
5. The interest rate that banks pay one another when they borrow on an overnight basis is called the _____.
6. The _____ is the interest rate that banks charge their most creditworthy commercial borrowers.
7. The idea that high GDP growth has a bigger impact on intended investment spending than do interest rates, and thus leads to high investment growth is called the _____.
8. The central bank process of buying diverse financial assets with the goal of creating more monetary reserves is known as _____.
9. When interest rates are so low that the Central Bank finds it impossible to lower them any further, the economy is in a _____.
10. In cases where inflation is a significant problem and the banking system is unstable, it is useful to use the _____, which analyzes the relationships between the money supply, the velocity of money, the price level, and real output.
11. The theory that assumes that the velocity of money is constant in the equation

$M \times V = P \times Y$ is the _____.

12. _____ is the idea that changes in the money supply may affect only prices, while leaving output unchanged.

13. When a central bank buys government debt as it is issued and thereby injects new money into the economy it is said to be _____, which can trigger hyperinflation.

14. (Appendix) A financial instrument that commits its seller to pay a fixed amount every year, in addition to repaying the amount of the principal on a particular date in the future, in return for the loan of funds, is called a _____.

15. (Appendix) The nominal interest rate minus inflation is the _____.

16. (Appendix) The three reasons that people choose to hold some of their assets as money include _____, _____, and _____.

True or False

17. The most common monetary policy tool used by the Fed is changing the discount rate.

18. A contractionary or “tight” money policy entails a decrease (or fall in the growth rate of) the money supply, M1, leading to a lower interest rate.

19. When the Fed conducts open market operations, it is either trying to keep the federal funds rate at its existing level, or trying to push the federal funds rate up or down.

20. Quantitative easing refers to the purchase of a diverse collection of financial assets to increase the money supply.

21. The quantity theory of money is an important component of Keynesian thinking.

Short Answer

22. Describe the structure of the Federal Reserve. How many governors are on the board, and how long is each governor’s term? Who appoints them? How many regional banks does the Fed have?

23. Is the role (or function) of the Fed only to conduct monetary policy (e.g. raise or lower interest rates)?

24. Identify the three tools of monetary policy, and what the Fed would do to increase (or decrease) the (growth of the) money supply.
25. Explain the sequence of links connecting an expansionary monetary policy with interest rates, intended investment, aggregate expenditure, and output.
26. Suppose the economy is characterized by inflation problems and an unstable banking system. Use the quantity equation, $M \times V = P \times Y$, to answer the following questions:
- What assumptions does the classical theory make about the variables in the quantity equation?
 - What assumptions does monetarist theory make about the variables?
 - What assumptions do Keynesian-oriented theories make?
 - How does monetarist theory use the quantity equation to explain the deflation and fall in output in the U.S. during the Great Depression?
 - How might a Keynesian-oriented theorist use the quantity equation to explain the cause of hyperinflation?
 - Provide two cases where inflation is caused by some factor other than an increase in the money supply.

Problems

- Suppose the Fed buys \$5 million worth of government bonds from TrustMe bank.
 - Show the changes in the Fed's Balance sheet, and the changes in TrustMe bank's balance sheet.
 - How much in new loans can TrustMe Bank make, given this change in its balance sheet? (Assume the borrowers deposit the amount they borrow in other banks.)
 - Assume that when the new loans are deposited in other banks in the banking system, all these banks loan out all of their excess reserves. Assume further that the money multiplier equals 2. By how much has the money supply increased from the Fed's bond purchase?

2. Suppose the Fed conducts an expansionary monetary policy. (Assume an economy with low inflation and a stable banking system). Illustrate graphically the effects of this expansionary monetary policy on:

a) The market for federal funds

b) Intended investment spending

c) Aggregate Expenditure and output

d) Suppose now that firms become pessimistic as they expect a fall in GDP and a fall in sales, such that the expansionary policy leaves no effect on aggregate expenditure and output. Illustrate graphically by re-doing the graphs in a-c above.

Self Test

1. Which of the following is *not* one of the functions of the Federal Reserve?
 - a. Performing banking functions for private banks
 - b. Issuing Treasury bills and bonds
 - c. Regulating banks
 - d. Promoting confidence and stability in the financial sector
 - e. Conducting monetary policy.

2. An open market purchase by the Fed
 - a. increases bank reserves, loans, and deposits, and thus increases the money supply.
 - b. decreases bank reserves, loans, and deposits, and thus decreases the money supply.
 - c. increases bank reserves, loans, and deposits, and thus decreases the money supply.
 - d. decreases bank reserves, loans, and deposits, and thus increases the money supply.
 - e. None of the above.

3. Suppose the Fed buys \$15 million worth of government bonds from Richland bank. Which of the following is Richland Bank most likely to do?
 - a. Reduce its outstanding loans by \$15 million.
 - b. Borrow more reserves at the “discount window”
 - c. Borrow more reserves from other banks.
 - d. Make new loans totaling about \$15 million.
 - e. None of the above

4. Suppose the Fed makes an open market purchase of \$3 million. Assume that the money multiplier equals 2. What is the change in the money supply?
 - a. The money supply has increased by \$1.5 million.
 - b. The money supply has increased by \$6 million.
 - c. The money supply had decreased by \$1.5 million.
 - d. The money supply has decreased by \$6 million.
 - e. None of the above.

5. Suppose the Fed makes an open market sale of \$8 million in bonds. Assume the money multiplier is equal to 2. What is the change in the money supply?
 - a. The money supply has increased by \$4 million.
 - b. The money supply has decreased by \$4 million.
 - c. The money supply has increased by \$16 million.
 - d. The money supply has decreased by \$16 million.
 - e. None of the above.

6. Which of the following is *not* one of the Fed's monetary policy tools?
- Buying bonds on the open market
 - Selling bonds on the open market
 - Raising or lowering taxes
 - Raising or lowering the reserve requirement ratio
 - Raising or lowering the discount rate
7. Suppose the Fed wanted to engage in an expansionary monetary policy. Which of the following should it do?
- Sell bonds on the open market.
 - Increase the reserve requirement ratio.
 - Increase the discount rate.
 - Buy bonds on the open market.
 - Lower taxes.
8. The rate determined in the private market for overnight loans of reserves among banks is called the
- federal funds rate
 - discount rate
 - prime rate
 - interest rate
 - None of the above.
9. Which of the following best describes the sequence of events in the conduct of contractionary monetary policy using open market operations (in an economy with low inflation and a stable banking system)?
- The Fed raises the interest rate, which leads to a decrease in intended investment spending and a decrease in the supply of federal funds, which decreases aggregate expenditure and output.
 - The Fed decreases intended investment spending, which leads to a decrease in aggregate expenditure and output, and a decrease in the supply of federal funds and the interest rate.
 - The Fed sells bonds, which decreases the supply of federal funds, which raises the interest rate, which leads to a decrease in intended investment spending, aggregate expenditure and output.
 - The Fed buys bonds, which increases the supply of federal funds, which lowers the interest rate, and leads to a decrease in intended investment spending and aggregate expenditure and output.
 - The Fed lowers the interest rate, which leads to an increase in intended investment spending and an increase in the supply of federal funds, which decreases aggregate expenditure and output.

10. What did the Federal Reserve do to expand the economy during the 2000-04 period?
- It pushed down the federal funds rate.
 - It raised the reserve requirement ratio.
 - It raised the discount rate.
 - It sold bonds on the open market.
 - None of the above.
11. A liquidity trap refers to a situation when
- The economy is trapped by a flood of money on the market.
 - A rise in interest rates causes people to want to hold less money.
 - Households' wealth becomes trapped in assets that cannot be easily exchanged into money.
 - The general public has a strong preference for holding the most liquid asset, money.
 - None of the above.
12. During a liquidity trap,
- as the Fed increases the money supply, the interest rate falls significantly.
 - increases in the money supply have no effect on the interest rate, because the money demand curve has become perfectly horizontal.
 - as the Fed increases the money supply, the interest rate rises substantially.
 - once the Fed increases the money supply, it can no longer control it, which leads to hyperinflation.
 - monetary policy is highly effective in expanding the economy
13. When credit rationing occurs,
- banks keep their interest rates below what the market would bear, and deny loans to some potential borrowers.
 - Banks lend to only those customers deemed to be creditworthy and less risky.
 - Smaller and less well-known firms may be more disadvantaged than bigger firms with well-established reputations.
 - The Fed's intended monetary policy actions may be limited or ineffective.
 - All of the above.
14. Which theory (or theories) assumes that the velocity of money is *not* constant, in the quantity equation $M \times V = P \times Y$?
- Classical theory
 - Monetarist theory
 - Keynesian-influenced theories
 - The theory expounded by Milton Friedman and Anna Jacobson Schwartz
 - None of the above

15. Which of the following characterizes classical monetary theory?
- a. Output is assumed to be always constant at its full-employment level.
 - b. Changes in the money supply have no effect on the level of real output, and thus money is assumed to be neutral.
 - c. An increase in the money supply can only lead to inflation.
 - d. The Fed should adopt a money supply rule, allowing the money supply to grow only at the same rate as real GDP.
 - e. All of the above.

For the next two questions, consider the following choices:

- I. the Classical theory**
- II. Monetarism**
- III. Keynesian-oriented theories**

16. Which of the above theories would be in agreement with the following statement?
“The Fed should not use interventionist monetary policy, but should adopt a money supply rule such that the money supply is only allowed to grow at a steady rate -- the same rate as real GDP.”
- a. I
 - b. II
 - c. III
 - d. I and II
 - e. I, II, and III
17. Which of the above theories would be in agreement with the following statement?
“Inflation is always and everywhere a monetary phenomenon.”
- a. I
 - b. II
 - c. III
 - d. I and II
 - e. I, II, and III
18. Which of the following is not one of the potential problems of monetary policy?
- a. long “outside lags”
 - b. long “inside lags”
 - c. disagreement over inflation and unemployment targets
 - d. liquidity traps
 - e. reluctant lenders and reluctant borrowers

From Appendix:

19. What happens to bond prices and their interest rate when the Fed makes a sizeable open market purchase?
- The price of bonds rises and their interest rate falls.
 - The price of bonds falls and their interest rate rises.
 - The price of bonds rises and their interest rate rises.
 - The price of bonds falls and their interest rate falls.
 - The price of bonds and their interest rate remain unchanged.
20. What is the difference between the nominal and real interest rate?
- The nominal interest rate is the real interest rate minus the rate of inflation.
 - The real interest rate is the nominal rate plus the rate of inflation.
 - The real interest rate is the nominal rate minus the rate of inflation.
 - The nominal interest rate is the real interest rate plus the rate of inflation.
 - There is no difference between real and nominal interest rates.

Answers to Active Review Questions

1. open market operations
2. monetary base, high-powered money
3. money multiplier
4. discount rate
5. federal funds rate
6. prime rate
7. accelerator principle
8. quantitative easing
9. liquidity trap
10. quantity equation
11. quantity theory of money
12. monetary neutrality
13. monetizing the deficit
14. (Appendix) bond
15. (Appendix) real interest rate
16. (Appendix) transactions demand, precautionary demand, and speculative demand
17. False. It is open market operations.
18. False. With “tight” policy, the interest rate *rises*.
19. True.
20. True.
21. False. It is an important component of the classical theory and monetarism.
22. The Fed’s board of governors has seven members who serve fourteen-year terms. They are nominated by the president and approved by the Senate, and one member of the board is named as chair. There are also 12 regional Federal Reserve banks.
23. No, the Fed is supposed to do more than that. Its roles include: performing banking functions for private banks; determining reserve requirements; stabilizing exchange rates; regulating banks; promoting confidence and stability in the banking sector; as well as conducting monetary policy.
24. The three tools of monetary policy are: open market operations (buying and selling of bonds), discount rate, and reserve requirement. To increase the (growth of the) money supply, the Fed could either buy bonds, lower the reserve requirement ratio, or lower the discount rate. To decrease the (growth of the) money supply, the Fed could either sell bonds, raise the reserve requirement ratio, or raise the discount rate.
25. An expansionary monetary policy will lower interest rates, which tends to encourage intended investment, leading to an increase in aggregate expenditure and output (GDP).
26.
 - a. Classical theory assumes that velocity is constant, and that the economy is always constant at the full employment level of income.
 - b. Monetarism also assumes that velocity is constant, but relaxes the assumption that the economy is always constant at full employment, and believes that output can fall with bad monetary policy.
 - c. Keynesian-oriented theories assume none of the variables (in particular neither velocity or output) are constant.
 - d. The monetarists thought that the bad monetary policy of decreasing the money supply caused both a drop in the price level (deflation) and a fall in output during the Great Depression.
 - e. A dramatic rise in the money supply (especially if the central bank is monetizing

- deficits) and/or the velocity of money could trigger hyperinflation.
- f. Inflation could be caused by an increase in the velocity of money, or by rise in prices of imports.

Answers to Problems

1. Suppose the Fed buys \$5 million worth of government bonds from TrustMe bank. a. The changes in the Fed's Balance sheet are:

Assets		Liabilities	
Government bonds	+\$ 5 million	Bank reserves	+\$ 5 million

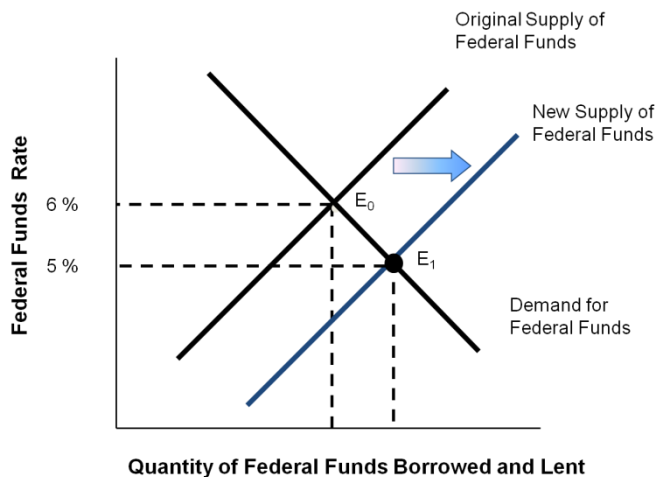
(b) The changes in TrustMe bank's balance sheet are:

Assets		Liabilities	
Government bonds	-\$ 5 million		
Reserves	+\$ 5 million		

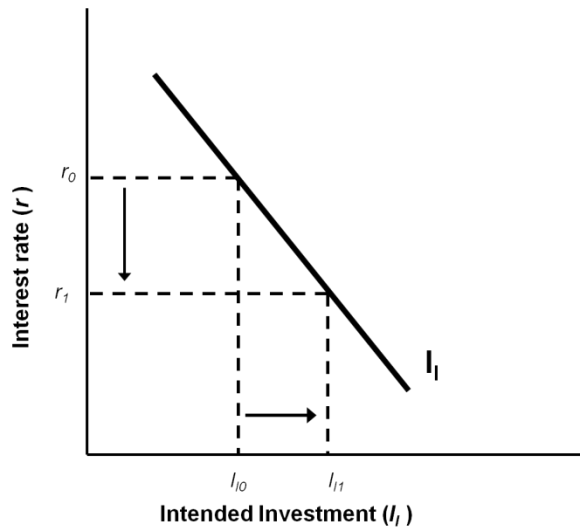
- b. \$5 million
 c. $\$5 \text{ million} \times 2 = \10 million

2. Effects of an expansionary monetary policy:

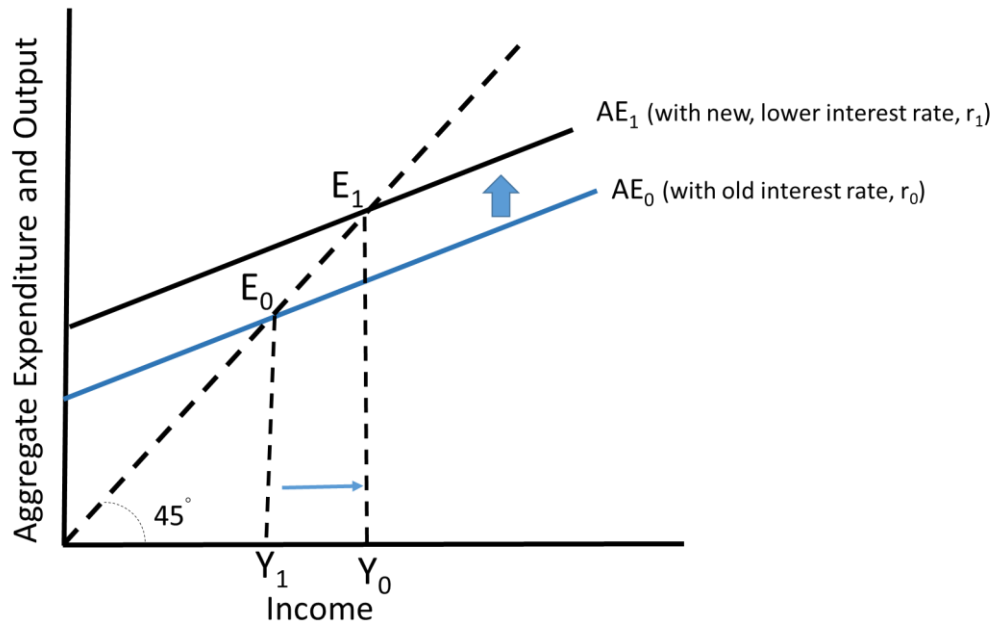
a.



b.



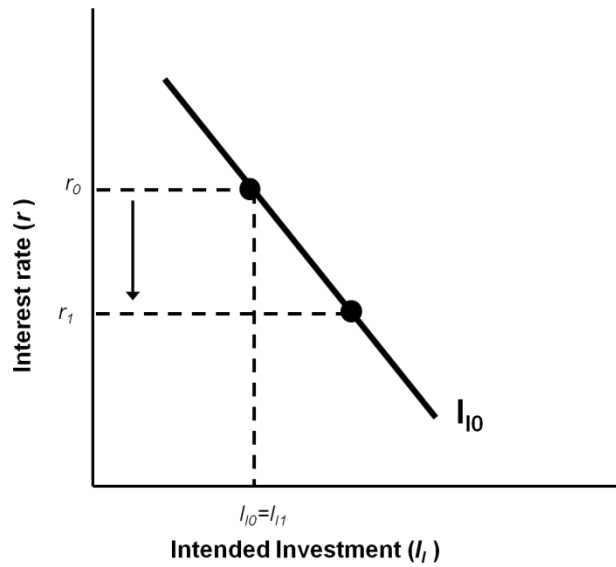
c.



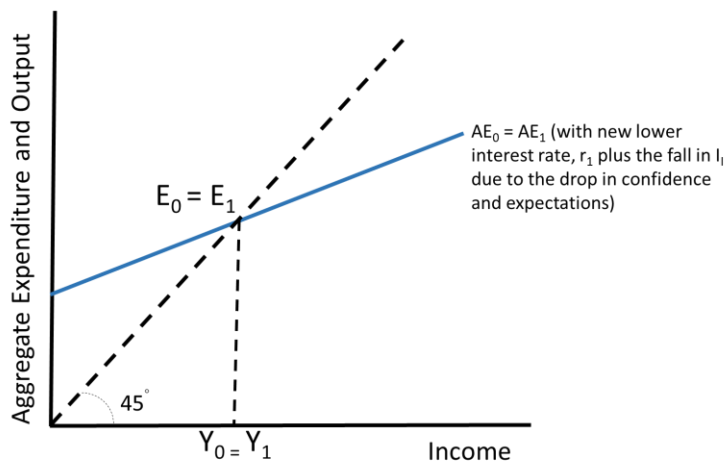
d. If firms become pessimistic as they expect a fall in GDP and a fall in sales:

Graph a would remain the same, as above.

Graph b would now look as follows, as the drop in confidence leads to a fall in I_{i0} to I_{i1} , so intended investment spending remains at its original level:



Graph c would now look like as follows, where AE remains unchanged, but at the lower interest rate:



Answers to Self Test Questions

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|-------|-------|
| 1. B | 11. D |
| 2. A | 12. B |
| 3. D | 13. E |
| 4. B | 14. C |
| 5. D | 15. E |
| 6. C | 16. D |
| 7. D | 17. D |
| 8. A | 18. B |
| 9. C | 19. A |
| 10. A | 20. C |