## Monetary Policy

## Introduction and Description

Monetary policy refers to the actions taken by a central bank or monetary authority to influence the money supply, interest rates, Aggregate Demand (AD), real output, price levels, and the overall financial system of a country. While the general objectives of monetary policy, such as promoting price stability, economic growth, and full employment, may be similar across economies, the specific strategies and tools used can vary. The approach to monetary policy depends on numerous factors, including the economic conditions, institutional frameworks, and policy goals of a particular country. Different countries may have different central bank structures, legal mandates, and degrees of central bank independence, which can influence their monetary policy decisions.

In the US, the Federal Reserve has undergone a deliberate shift in its methodology for implementing monetary policy. A notable change is the transition from a limitedreserves regime to an ample-reserves regime. In the past, under the limited-reserves regime, reserve requirements played a crucial role. Reserve requirements mandated that banks hold a certain percentage of their deposits as reserves. However, in the ample-reserves regime, with a significant increase in the level of reserves in the banking system, reserve requirements have become largely non-binding. Banks hold excess reserves, and as a result, reserve requirements are no longer a primary tool used by the Federal Reserve to influence monetary conditions. To reflect this change, the Federal Reserve announced in March 2020 that it was reducing the reserve requirement ratios to zero, effectively making reserve requirements non-operational.

To reinforce their understanding of how monetary policy functions within an ample reserve or limited reserve system, students will complete the graphic organizer in Activity 4-8.1. This activity will help them demonstrate their comprehension of the mechanisms and outcomes of monetary policy in this particular system.

In Activity 4-8.2, students will understand and analyze the differences between the current Ample Reserves System and the Limited Reserves System. Students will understand
why the Interest on Reserve Balance rate (IORB) has now become the primary tool for monetary policy. Through this analysis, students will also grasp how changes in the IORB impact the Federal Funds Rate (FFR) and the Discount Rate.

In Activity 4-8.3, students will examine contractionary monetary policy using the Market for Reserves Graph. They will understand why the IORB has emerged as the key tool for targeting the Federal Funds Rate in the present scenario.

To demonstrate expansionary monetary policy, students will complete Activity 4-8.4. They will observe how the graph illustrates the implementation of expansionary monetary policy in the context of an ample reserve system.

Teacher Alert: Keep an eye on the AP CED for changing information about the role of limited reserves in monetary policy. As of publication in 2023, both ample and limited were required teaching. Expecting this to change in the future, this lesson emphasizes monetary policy with ample reserves. For anything having to do with the Fed (and lots of other economics and personal finance topics) there are amazing resources at federalreserveeducation.org.

## Objectives

1. Understand the difference between expansionary and contractionary monetary policy and when and how they are used.
2. Explain, using graphs, the short-run effects of a monetary policy action.
3. Identify and explain the ample reserve monetary policy tools and the difference between ample and limited reserve policies.
4. Determine how changes in the money supply change the nominal interest rate in the long run.

## Time Required

Three class periods or 135 minutes

## Materials

1. Activities 4-8.1, 4-8.2, 4-8.3, 4-8.4, 4-8.5
2. Visuals 4-8.1, 4-8.2, 4-8.3, 4-8.4

## Bell Ringer



There is a good chance that in the last 3 months the Federal Reserve Open Market Committee has met to determine whether to raise, lower, or keep the Federal Funds rate the same. Show a news clip or have students read an article about their decision. Then ask students: "With your prior knowledge of the Business Cycle and how interest rates can affect Aggregate Demand, explain what the Federal Reserve hopes to accomplish with its current decision."

## Procedure

1. This lesson assumes that students have already been taught the "old way" of teaching monetary policy what is now called "limited reserves policy" - which emphasized reserve requirements, open market operations, and the discount rate. Since there are so many excellent lessons already out there that address this method, this lesson is focused on teaching monetary policy when an economy has ample reserves.
2. Display Visual 4-8.1. Before 2008, there were limited reserves in the banking system. After 2008, there were ample reserves. Review the Financial Crisis of 2008 if you haven't done so already. Most economics textbooks do a good job of detailing the reasons for the crisis and the response of the Federal Reserve.

In response to the 2008 Financial Crisis, the Federal Reserve implemented measures that led to a transition from a limited reserve system to an ample reserve system. As part of its efforts to combat the crisis, the Fed purchased distressed assets from member banks and credited them with accounts at the Federal Reserve. This action significantly increased the level of reserves in the banking system, shifting from a system with billions of reserves to one with trillions of reserves.
3. Display Visual 4-8.2 and review the powers of a central bank's monetary policy when there are limited reserves.
4. Display Visual 4-8.3 and introduce the powers of a central bank's monetary policy when there are ample reserves.

The Federal Funds Rate is based on a banks' ability and willingness to loan to each other. Banks use this rate as signals that it is either a good time (lower federal funds rate) or a bad time (higher federal funds rate) to lend money. In a limited reserved system, this rate is based on the amount of excess reserves a bank has access to. In an ample reserves system, changing the interest on the reserve rate impacts a bank's willingness to loan to other banks or to just keep money at the Fed.

If banks lend to each other using the federal funds rate, then use the nominal interest rate to loan to the public; the nominal interest rate available to the public will increase if the banks' federal funds rate to each other increases. Or the nominal interest rate available to the public will decrease as the federal funds rate decreases. The nominal interest rate is directly related to the federal funds rate.

A change in the nominal interest rate will affect the investment spending component of aggregate demand. Investment spending, including additions to business inventories, spending on new capital, and real estate purchases requires a massive amount of money. Most of this investment spending needs to be borrowed. Investment spending is thus very interest rate sensitive.
5. Have students complete the chart in Activity 4-8.1 and discuss the answers.
6. Display Visual 4-8.4. Discuss the tools of limited and ample reserve monetary policy as displayed on the graph. Point out the supply curve in relation to demand in both curves and how the Ample Reserves curve uses the IORB and ON RRP rates to reach the FFR.

Teacher Alert: Remind students that this is a different graph than the Money Market or Loanable Funds Market. Point out that the x-axis measures "reserves."
7. Introduce Activity 4-8.2 to review the Market for Limited Reserves system and Ample Reserves System graph. Display the Activity and have students fill in the blanks as you lecture, identifying the function each rate serves as the banks' use interest rates to earn a profit. The top rate is the discount and ceiling rate, the middle/equilibrium rate is the Federal Funds Rate or FFR (the rate at which banks lend to each other) and the bottom rate (base rate) is the Interest on Reserve Balance rate or IORB. Below the IORB rate is the ON RRP rate (the sub-base rate). In the graphs that students will work on in Activity 4-8.2, 4-8.3, and 4-8.4 the ON RRP is not represented. Also, remind students that $\Delta E R$ means the change in Excess Reserves.
8. Within Activity 4-8.2, explain the Supply of Reserves (SR curve) is vertical because only the Federal Reserve can alter it using monetary powers. Looking at just the limited reserve portion of the graph, ask students: how does changing (shifting) the supply of reserves (and thus excess reserves in the banking system) change a bank's ability and willingness to lend to each other (and thus the equilibrium rate - federal funds rate - they offer to each other). (More reserves, more willingness to lend)
9. Examine the new ample reserve system section of the graph, created in response to the financial crisis. Stress that the graph is not drawn to scale and if it were, there would be "feet" separating the before and after.
10. Examine the effects of open market operations on this graph. Why would an open market operation of even tens of millions of dollars not change the Federal Funds Rate on this portion of the graph? The shift is not significant enough to change the Federal Funds Rate; it doesn't impact the trillions of reserves.

Ask students, why would the Federal Reserve not require banks to hold any required reserves anymore? There are just too many reserves for this number to be significant.
11. Since the new ample reserve system makes the original purpose of open market operations obsolete, review the new tool - interest on reserve balance rates and the idea of arbitrage.
"Policy Rates" is the holistic accepted name of the various rates for the purpose of the AP Test. While there are several rates on this graph, they do not have to be listed by students when shifting the Demand for Reserves (DR) curve, and the changes to the $y$-axis can just be labeled PR (Policy Rates) to PR1. However, breaking the axis and curve down into the 3 main rates is helpful to understand how the Federal Reserve targets and manipulates the Federal Funds Rate. The banks, using supply and demand, adjust it to a percentage that guarantees their profit when lending to each other (and then the public at the nominal rate) vs. earning interest on their reserve account at the Fed.

Although not on the AP Test, banks operate using arbitrage - creating a system that guarantees profit for themselves, by playing the interest rates against each other to guarantee that whether they save, lend, or borrow, they are guaranteeing profit. Arbitrage, in this instance, means that banks are borrowing money at a lower interest rate and lending that money out at a higher interest rate, earning a profit.
12. Activity 4-8.3 introduces contractionary monetary policy. To understand tools in the ample reserves system, ask the class to consider that the economy is suffering from inflation and the Federal Reserve needs to slow down economic spending by targeting the federal funds rate and interest on reserve rate, but in an ample system, using the IORB. Have students complete Activity 4-8.3 and discuss the role of contractionary monetary policy in the economy. Points for class discussion include:

- If the IORB is $3 \%$, would banks lend to each other (FFR) for less than this? No; they wouldn't profit.
- How can the Federal Reserve get the banks to raise this interest rate to each other? They can raise the IORB.
- If the IORB is $4 \%$, and banks wanted to profit by lending to each other, what rate would they lend to each other? Anything over 4\%. Now banks can profit by either keeping their money at the Fed and earning $4 \%$, or by lending to each other at a rate higher.
- Why would the Federal Reserve also raise the Discount Rate? To guarantee that banks borrow from each other and not the Fed - keeping the FFR in between the Discount Rate and IORB.
- If the banks change the FFR to $5 \%$, what rate are they going to offer to the public (the nominal interest rate) to guarantee that they profit? Anything above 5\%
- If they offer $6 \%$ to the public, how does this accomplish the Fed's goal of contracting the economy? A higher nominal interest rate will discourage interest-sensitive spending; which will decrease aggregate demand.

A contractionary shift in this graph involves shifting the Demand for Reserves higher, (indicating that the Demand for keeping Reserves at the Fed increases, due to the higher automatic profit) The top part of the graph also shifts higher - showing the Discount Rate also increases to maintain a higher ceiling rate.

In reality, the FFR and IORB are drawn as two separate rates on this graph, but for shifting on the AP Test, just label the change as "Policy Rate - PR to PR1" - this shows that by shifting the base rate (IORB) you are also changing the target rate.
13. Activity 4-8.4 introduces expansionary monetary policy. To understand tools in the ample reserves system, ask the class to consider that the economy is suffering from a recession and the Federal Reserve needs to increase economic spending by targeting the federal funds rate and interest on reserve rate, but in an ample system, using the IORB. Have students complete Activity 4-8.4 and discuss the role of expansionary monetary policy in the economy. Points for class discussion include:

- If the IORB is $3 \%$, would banks lend to each other (FFR) for less than this? No, they wouldn't profit.
- How can the Federal Reserve get the banks to lower this interest rate to each other? They can lower the interest on reserve balance (IORB) rate.
- Now if the IORB is $2 \%$, and banks wanted to profit by lending to each other, why does this encourage them to lend to each other instead of putting their money on deposit at the Federal Reserve? 2\% represents a small profit so it is better to lend to each other and earn a higher interest rate and more profit then keep their money in the Fed for 2\% interest.
- Now, why would the Federal Reserve also lower the Discount Rate? To get the banks to keep their rates under the discount rate. To guarantee that banks borrow from each other and not the Fed the banks would be forced to lower the rates to each other keeping the FFR in between both rates.

An expansionary shift in this graph involves shifting the Demand for Reserves lower, (indicating that the Demand for keeping Reserves at the Fed decreases, due to the decrease in base automatic profit) but also shifting the top part of the graph lower; showing the Discount Rate is used to keep the FFR in between the two rate and lower the FFR as well.

If the banks are lowering the FFR to each other how would they encourage the public to increase its borrowing from them (and thus increasing their profit?) They would lower the interest rate to the public. Remember, interest rates are to banks, as prices are to businesses; businesses will lower prices when it is a good time to buy. If banks have easy and cheaper access to credit and would rather profit from loaning, they will use the nominal interest rate as a signal to the public to borrow from the banks.
14. Have students complete Activity 4-8.5.

Teacher Alert: Students often confuse Monetary Policy and Fiscal Policy. Have students create a Venn Diagram that compares the two so they can see the differences side-by-side.

## Reserves in the Banking System 2000-2023



## Limited Reserves System

## Powers for Limited Reserves

| Power | Description | Impact |
| :--- | :--- | :--- |
| 1. Reserve <br> Requirement <br> Rate | The Fed sets the percentages of <br> bank deposits that must be held <br> as reserves. | Increase or decrease the excess <br> reserves a bank has available to <br> loan when people deposit money. |
| 2. Discount Rate | The rate that commercial banks <br> must pay to borrow from the Fed. | Increase or decrease the availability <br> of excess reserves banks have <br> access to from the Fed. |
| 3. Open Market <br> Operations | Fed buying Treasury Bonds from <br> the banks or selling Treasury <br> Bonds to the banks. | Immediately increase excess <br> reserves (Buying Bonds = Bigger <br> Bucks) or decrease excess reserves <br> (Selling Bonds = Smaller Bucks). |

## Ample Reserves System

# The Fed needs to increase or decrease the money supply. It sets a "target" Federal Funds Rate and uses the powers below to drive the market for money towards that rate. 

Powers for Ample Reserves

$\left.\begin{array}{|l|l|l|}\hline \text { Power } & \text { Description } & \text { Impact } \\ \hline \begin{array}{l}\text { 1. IORB - Interest } \\ \text { on Reserve } \\ \text { Balance } \\ \text { (Administered } \\ \text { Rates) }\end{array} & \begin{array}{l}\text { The savings rate the member } \\ \text { banks earn on their reserve } \\ \text { deposits at the Fed. Set by the } \\ \text { Fed and not determined by the } \\ \text { market. } \\ \text { power of the } \\ \text { Fed" }\end{array} & \begin{array}{l}\text { It is the price floor in the market } \\ \text { for reserves. }\end{array}\end{array} \begin{array}{l}\text { This represents the base profit for } \\ \text { the bank. By raising or lowering } \\ \text { this rate, this encourages or } \\ \text { discourages banks to either keep } \\ \text { the reserves at the Fed (decreasing } \\ \text { the money supply) or to make } \\ \text { them available to lend to the public } \\ \text { (increasing the money supply). }\end{array}\right\}$

## Comparing Graphs: Limited Reserves and Ample Reserves

Limited Reserves


## Ample Reserves



# Fed Actions and Their Effects Graphic Organizer 

> Student Alert: Open market operations include buying and selling government bonds. When you are asked about an open market operation, you should answer in terms of buying bonds or selling bonds.

Complete Activity 4-8.1. Illustrate how the Fed's Monetary Policy creates a chain reaction throughout the banking system to increase or decrease AD.

## Fed Actions and Their Effects

| Type of Reserve | Federal Reserve Action | Bank <br> Reserves | Money Supply | Federal Funds Rate | Nominal interest Rate | Borrowing \& investment spending | AD |
| :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: |
| Limited | Sold Treasury securities on the open market | $\downarrow$ | $\downarrow$ | $\uparrow$ | $\uparrow$ | $\downarrow$ | $\downarrow$ |
| Limited | Bought Treasury securities on the open market | $\uparrow$ | $\uparrow$ | $\downarrow$ | $\downarrow$ | $\uparrow$ | $\uparrow$ |
| Limited /Ample | Raises the discount rate | $\downarrow$ | $\downarrow$ | $\uparrow$ | $\uparrow$ | $\downarrow$ | $\checkmark$ |
| Limited /Ample | Lowered the discount rate | $\uparrow$ | $\uparrow$ | $\downarrow$ | $\downarrow$ | $\uparrow$ |  |
| Limited | Lowered the reserve requirement |  | $\uparrow$ | $\downarrow$ | $\downarrow$ | $\uparrow$ |  |
| Limited | Raised the reserve requirement | $\downarrow$ | $\downarrow$ | $\uparrow$ | $\uparrow$ | $\downarrow$ |  |
| Ample | Increase Interest on Reserve Balance Rate |  |  | $\uparrow$ | $\uparrow$ | $\downarrow$ | 1 |
| Ample | Decrease Interest on Reserve Balance Rate |  |  | $\downarrow$ | $\downarrow$ | $\uparrow$ |  |

Market For Reserves: Limited System - Ample System

Contractionary Monetary Policy

Expansionary Monetary Policy


# Reviewing the Federal Reserve and Monetary Policy 

## Part A

1. How do the monetary powers of the Federal Reserve help it perform its functions of:
(A) The Nation's Central Bank

The Federal Reserve uses its powers over its member banks to help expand or contract the money supply for the whole nation's banking system.
(B) The Bankers' Bank

Member banks can deposit excess reserves in the Federal Reserve System for an interest rate. They can also use the Discount Window at the Federal Reserve as a lender of last resort.
2. In a limited reserve system, why would Open Market Operations be the most frequently used monetary policy tool? It immediately changes a banks' excess reserves which will cause the banks to then change the Federal Funds Rate to each other and the nominal interest rate to the public.
3. In a limited reserve system (and prior to when banks were required to have required reserves), why would changing the required reserve rate be the least frequently used monetary policy tool?

Changing this too frequently would create instability in the banking system. Banks would not know how much they should lend out if the required amount to keep was subject to more frequent changes.
4. Due to the economic circumstances of the COVID 19 Pandemic and the existence of an ample reserve system, the Fed Board reduced reserve requirement ratios to zero percent effective March 26, 2020. What are the potential positives and negatives of removing required reserves from the banking system? Do you think it is more positive or more negative?
The Federal Reserve system needed to encourage the maximum amount of loans possible at the lowest interest rates possible, so removing the reserve requirements helped to accomplish this; allowing banks to lend more. It also is redundant if banks have access to trillions of dollars, there is less threat of a run on the bank. However, that possibility is still very real if a bank makes poor loans that cannot cover its deposits.
5. Why would the discount rate be considered the ceiling rate of banks and the interest on reserve rate the floor rate for banks?

The discount rate would be the ceiling rate because it is the rate of last resort so should be the highest rate. The interest on the reserve rate should be the floor rate because interest earned just by depositing money at the Fed represents the base or smallest profits banks are able to earn.
6. How does the Federal Reserve have an indirect relationship with aggregate demand? Why doesn't it affect AD directly?

The Federal Reserve has to target the Federal Funds rate which then affects the nominal interest rate. This then affects the interest sensitive aspect of Aggregate Demand - investment spending.
7. Policy Analysis: How would you describe the difference between monetary and fiscal policy?

Fiscal Policy is Congress using spending and taxes to change household disposable income. Monetary Policy is when the Fed uses its power over the banking system to affect interest rates, which then affects interest sensitive investment spending.

## Part B: Expansionary Response or Contractionary Response?

In the situations presented below, you must decide whether the appropriate policy response is Expansionary (E), Contractionary(C), or No Change (NC). Write E, C, or NC next to each of the following statements.

Once you have decided on the appropriate response, indicate what fiscal policy actions by Congress AND what Ample Reserve and Limited Reserve monetary policy actions taken by the Federal Reserve would be most appropriate.

E 1.The economy is suffering from its worst slowdown in 30 years. Unemployment has reached 10\%.
FISCAL RESPONSE Decrease taxes, increase spending
MONETARY RESPONSE A-Lower the IORB L-Buy securities, lower interest rates, lower the reserve requirement
C 2.The annual inflation rate is $8.5 \%$ and rising.
FISCAL RESPONSE Increase taxes, decrease spending
MONETARY RESPONSE $\boldsymbol{A}$ - Raise the IORB L-Sell securities, raise interest rates, raise the reserve requirement
E 3.Prices are dropping rapidly and inflation is at $-4 \%$. In other words, we are experiencing 4\% deflation.
FISCAL RESPONSE Decrease taxes, increase spending
MONETARY RESPONSE A-Lower the IORB L-Buy securities, lower interest rates, lower the reserve requirement
NC 4. Inflation is at a steady $2 \%$ and unemployment is at $4 \%$.
FISCAL RESPONSE No change in policy
MONETARY RESPONSE No change in policy
? 5. The annual rate of inflation is at $10 \%$ and rising and unemployment is also at $10 \%$ and rising.
FISCAL RESPONSE $\qquad$
MONETARY RESPONSE $\qquad$
Stagflation. In the late 1970's, The Fed under Paul Volker contracted the money supply in the short run and increased interest rates sending the economy into a recession. Inflation went down but unemployment stayed high. There is no satisfactory answer to this question.

# Fed Actions and Their Effects Graphic Organizer 

> Student Alert: Open market operations include buying and selling government bonds.
> When you are asked about an open market operation, you should answer in terms of buying bonds or selling bonds.

Complete Activity 4-8.1. Illustrate how the Fed's Monetary Policy creates a chain reaction throughout the banking system to increase or decrease AD.

## Fed Actions and Their Effects

| Type of <br> Reserve | Federal Reserve <br> Action | Bank <br> Reserves | Money <br> Supply | Federal <br> Funds <br> Rate | Nominal <br> Interest <br> Rate |  <br> Investment <br> Spending | AD |
| :--- | :--- | :--- | :--- | :--- | :--- | :--- | :--- |
| Limited | Sold Treasury <br> Lecurities on the <br> open market |  |  |  |  |  |  |
| Bought Treasury <br> securities on the <br> open market |  |  |  |  |  |  |  |
| Limited <br> /Ample | Raises the <br> discount rate |  |  |  |  |  |  |
| Limited <br> /Ample | Lowered the <br> discount rate |  |  |  |  |  |  |
| Limited | Lowered the <br> reserve the <br> requirement |  |  |  |  |  |  |
| Limited | Raised the <br> reserve <br> requirement |  |  |  |  |  |  |
| Ample | Increase Interest <br> on Reserve <br> Balance Rate |  |  |  |  |  |  |
| Ample | Decrease Interest <br> on Reserve <br> Balance Rate |  |  |  |  |  |  |

Market For Reserves: Limited System - Ample System

Contractionary Monetary Policy


## UNIT 4 ACTIVITY 4-8.4

Expansionary Monetary Policy

Which way did the graph shift?
What is the purpose of the shift?
What is the macro goal?

# Reviewing the Federal Reserve and Monetary Policy 

## Part A

1. How do the monetary powers of the Federal Reserve help it perform its functions of:
(A) The Nation's Central Bank
(B) The Bankers' Bank
2. In a limited reserve system, why would Open Market Operations be the most frequently used monetary policy tool?
3. In a limited reserve system (and prior to when banks were required to have required reserves), why would changing the required reserve rate be the least frequently used monetary policy tool?
4. Due to the economic circumstances of the COVID 19 Pandemic and the existence of an ample reserve system, the Fed Board reduced reserve requirement ratios to zero percent effective March 26, 2020. What are the potential positives and negatives of removing required reserves from the banking system? Do you think it is more positive or more negative?
5. Why would the discount rate be considered the ceiling rate of banks and the interest on reserve rate the floor rate for banks?
6. How does the Federal Reserve have an indirect relationship with aggregate demand? Why doesn't it affect AD directly?
7. Policy Analysis: How would you describe the difference between monetary and fiscal policy?

## Part B: Expansionary Response or Contractionary Response?

In the situations presented below, you must decide whether the appropriate policy response is Expansionary (E), Contractionary (C), or No Change (NC). Write E, C, or NC next to each of the following statements.

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1. The economy is suffering from its worst slowdown in 30 years. Unemployment has reached $10 \%$.

FISCAL RESPONSE $\qquad$
MONETARY RESPONSE $\qquad$
$\qquad$
2. The annual inflation rate is $8.5 \%$ and rising.

FISCAL RESPONSE $\qquad$
MONETARY RESPONSE $\qquad$
3. Prices are dropping rapidly and inflation is at $-4 \%$. In other words, we are experiencing $4 \%$ deflation.

FISCAL RESPONSE $\qquad$
MONETARY RESPONSE $\qquad$
$\qquad$
4. Inflation is at a steady $2 \%$ and unemployment is at $4 \%$.

FISCAL RESPONSE $\qquad$
MONETARY RESPONSE $\qquad$
$\qquad$
5. The annual rate of inflation is at $10 \%$ and rising and unemployment is also at $10 \%$ and rising.

FISCAL RESPONSE $\qquad$
MONETARY RESPONSE $\qquad$
$\qquad$

