

# MONETARY POLICY

Chapter 15

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# Chapter Outline

- **15.1** What Is Monetary Policy?
- **15.2** The Money Market and the Fed's Choice of Monetary Policy Targets
- **15.3** Monetary Policy and Economic Activity
- **15.4** Monetary Policy in the Dynamic Aggregate Demand and Aggregate Supply Model
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# What is Monetary Policy?

Macroeconomic Policy Objectives: high employment, price stability, high rates of economic growth, and stability of the financial system

**Monetary policy** comprises the actions the Federal Reserve takes to manage the money supply and interest rates to achieve its macroeconomic policy objectives.

Last chapter we introduced the monetary policy tools that the Federal Reserve can use to influence the money supply.

- Now we will address how and why the Fed takes the actions that it does.
- We will also discuss the unique circumstances surrounding the recession of 2007-2009 and the Fed's response to those circumstances.

# What Is the Role of the Federal Reserve?

When the Federal Reserve was created in the 1913, its main responsibility was to prevent *bank runs*.

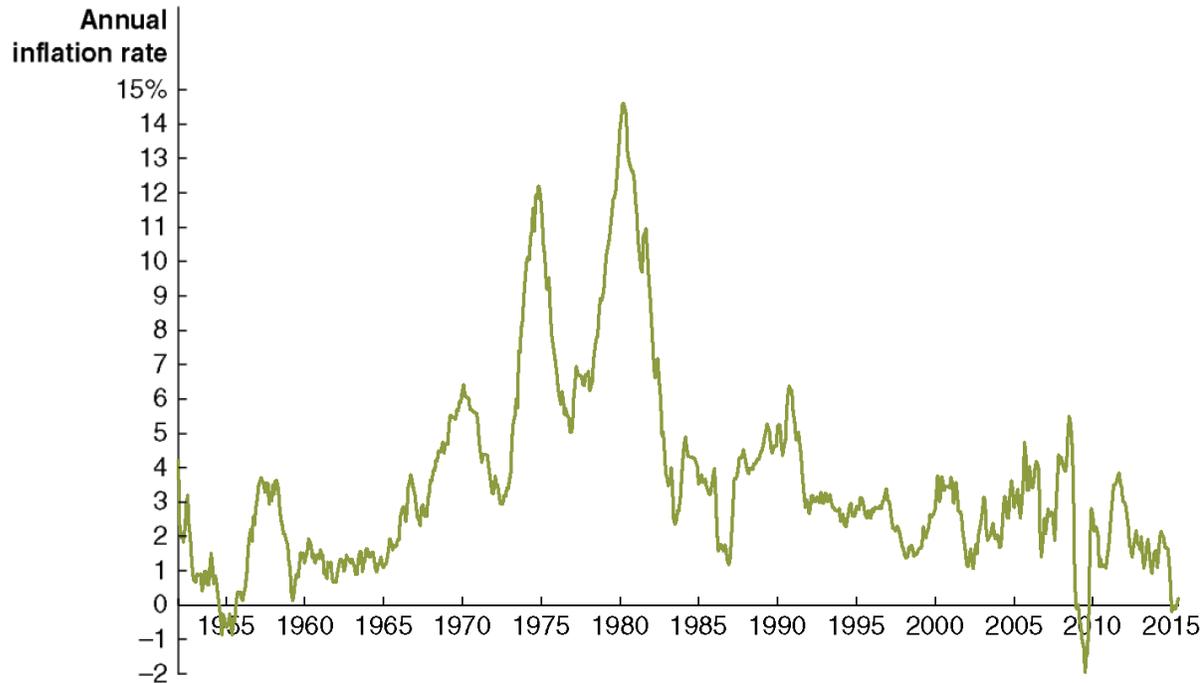
- After the Great Depression of the 1930s, Congress gave the Fed broader responsibilities: to act “so as to promote effectively the goals of maximum employment, stable prices, and moderate long-term interest rates.”
- Since World War II, the Fed has carried out an active *monetary policy*.

# The Goals of Monetary Policy

The Fed pursues four main *monetary policy goals* (macroeconomic policy objectives):

1. Price stability
  2. High employment
  3. Stability of financial markets and institutions
  4. Economic growth
- We will consider each goal in turn.

# Fed Goal #1: Price Stability



The figure above depicts the CPI inflation in the United States between January 1952 and June 2015.

- Since rising prices erode the value of money as a medium of exchange and a store of value, policymakers in most countries pursue **price stability** as a primary goal.
- After the high inflation of the 1970s, then Fed chairman Paul Volcker made fighting inflation his top policy goal. To this day, price stability remains a key policy goal of the Fed.

# Fed Goal #2: High Employment

At the end of World War II, Congress passed the Employment Act of 1946, which stated that it was the:

*“responsibility of the Federal government... to foster and promote... conditions under which there will be afforded useful employment, for those able, willing, and seeking to work, and to promote maximum employment, production, and purchasing power.”*

- Price stability and high employment are often referred to as the ***dual mandate*** of the Fed.

# Fed Goal #3: Stability of Financial Markets and Institutions

Stable and efficient financial markets are essential to a growing economy.

The Fed makes funds available to banks in times of crisis, ensuring confidence in those banks.

- In 2008, the Fed temporarily made these *discount loans* available to investment banks also, in order to ease their *liquidity* problems.

# Fed Goal #4: Economic Growth

Stable economic growth encourages long-run investment, which is itself necessary for growth.

- It is not clear to what extent the Fed can really encourage long-run investment, beyond meeting the previous three goals; Congress and the President may be in a better position to address this goal.

# 15.2 The Money Market and the Fed's Choice of Monetary Policy Targets

The Fed has three *monetary policy tools* at its disposal:

- Open market operations
- Discount policy
- Reserve requirements

It uses these tools to try to influence the unemployment and inflation rates.

It does this (at least, in “normal” times) by directly influencing its *monetary policy targets*:

- The money supply
- The interest rate (primary monetary policy target of the Fed)

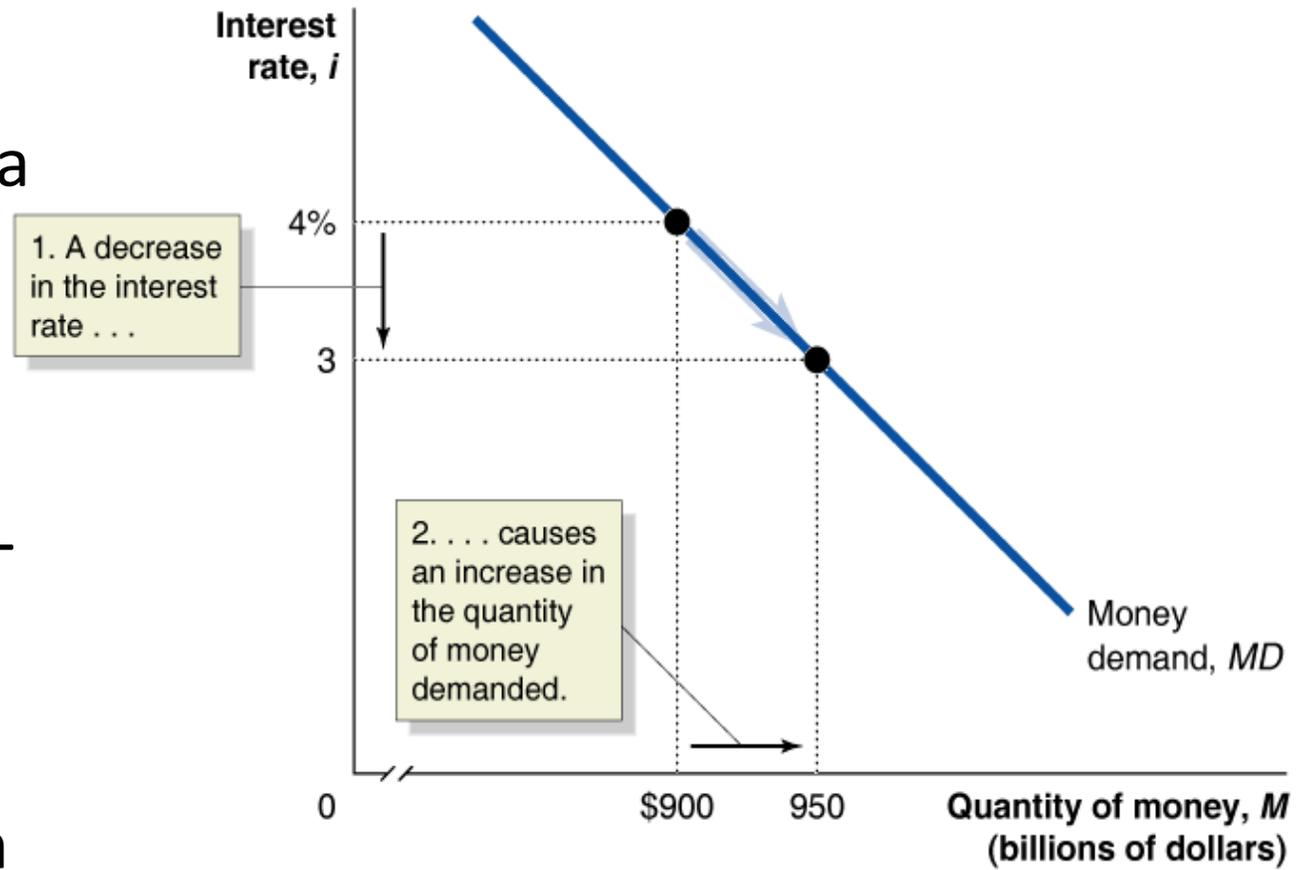
# Figure 15.2 The Demand for Money

The Fed's two monetary policy targets are related in an important way:

- Higher interest rates result in a lower quantity of money demanded.

Why? When the interest rate is high, alternatives to holding money begin to look attractive—like buying U.S. Treasury bills or saving in a bank.

- So the *opportunity cost* of holding money is higher when the interest rate is high.



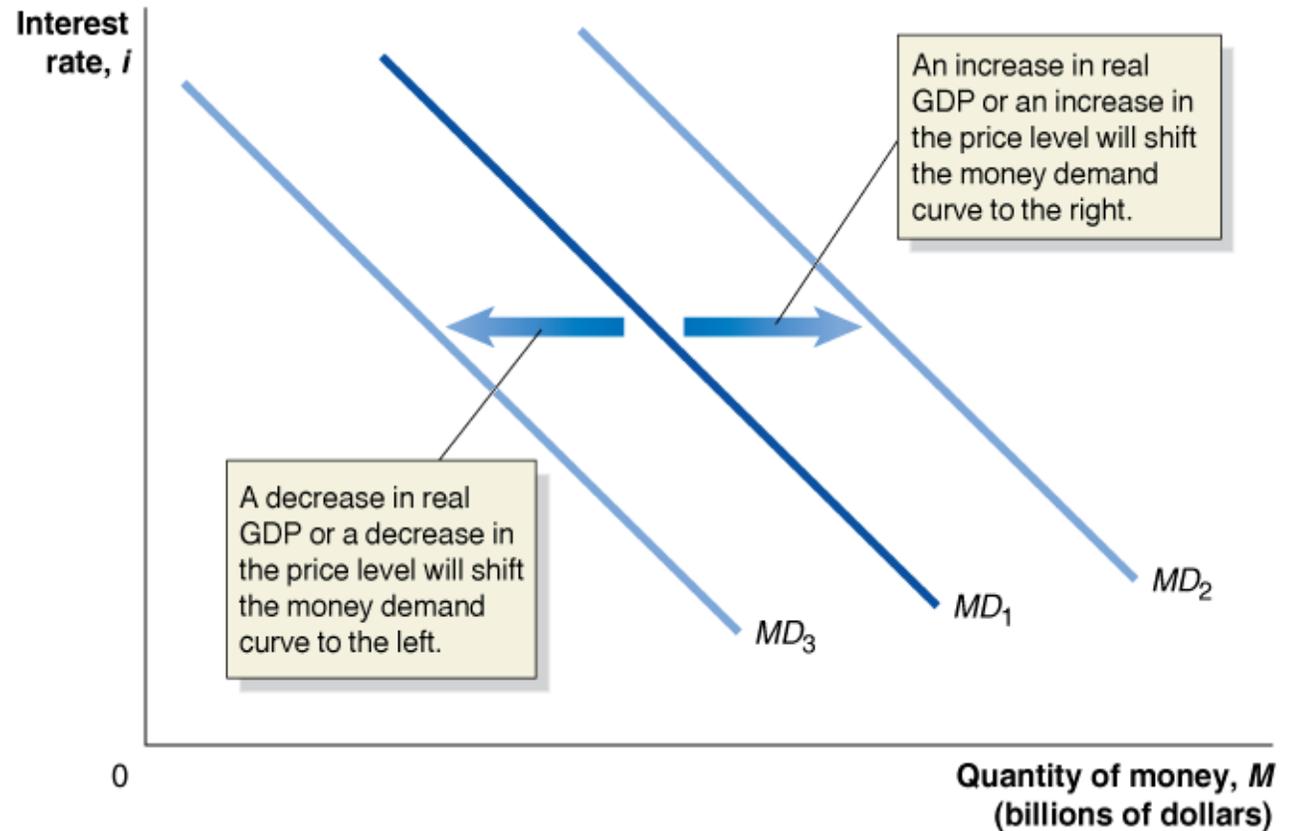
# Figure 15.3 Shifts in the Money Demand Curve

What could cause the money demand curve to shift?

- A change in the *need* to hold money to engage in transactions.

For example, if more transactions are taking place (higher real GDP) or more money is needed for each transaction (higher price level), the demand for money will be higher.

- Decreases in real GDP or the price level decrease money demand.



# How Does the Fed Manage the Money Supply?

We saw in the previous chapter that the Fed alters the money supply by buying and selling U.S. Treasury securities—*open market operations*.

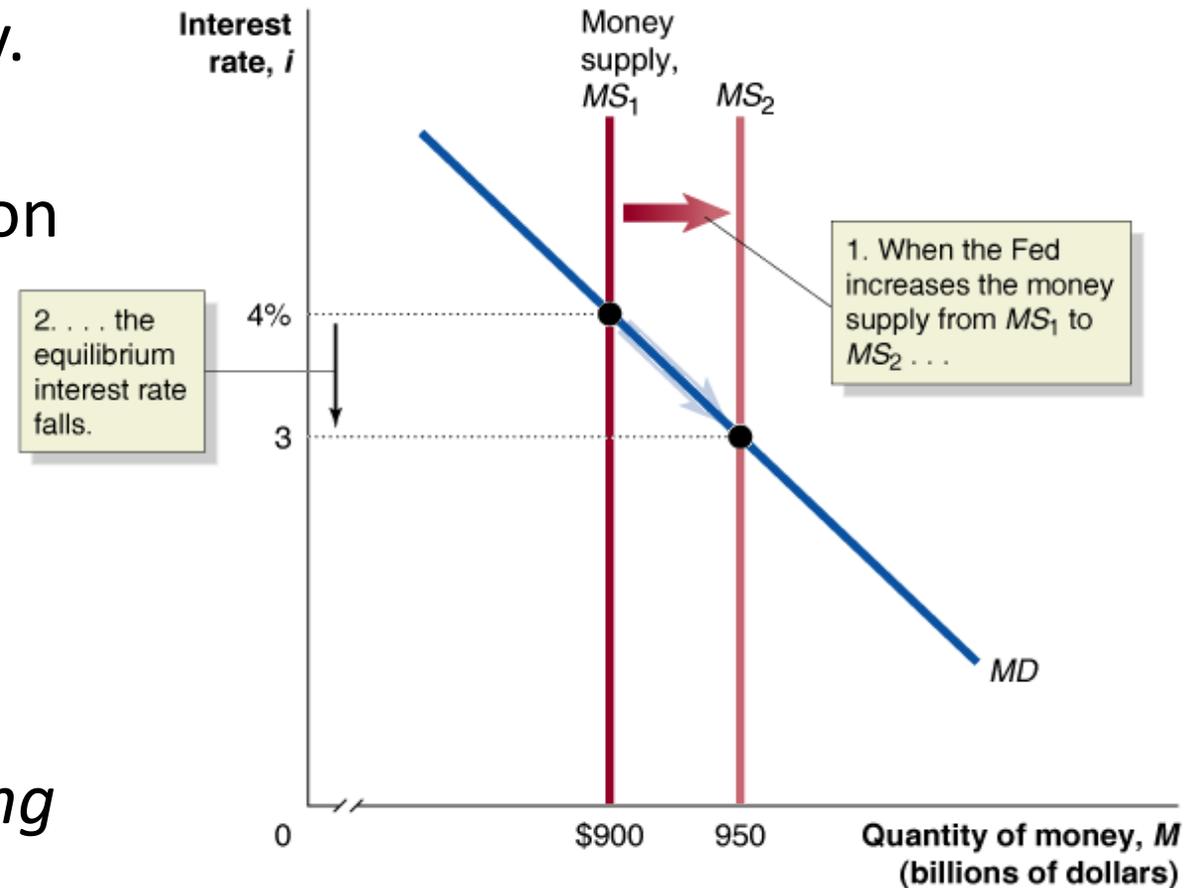
- To increase the money supply, the Fed *buys* those securities; the sellers deposit the sale proceeds in a checking account, and the money gets loaned out—increasing the money supply.
- Decreasing the money supply would require *selling* securities.

# Figure 15.4 The Effect on the Interest Rate When the Fed Increases the Money Supply

For simplicity, we assume the Fed can completely control the money supply.

- Then the money supply curve is a vertical line—it does not depend on the interest rate.

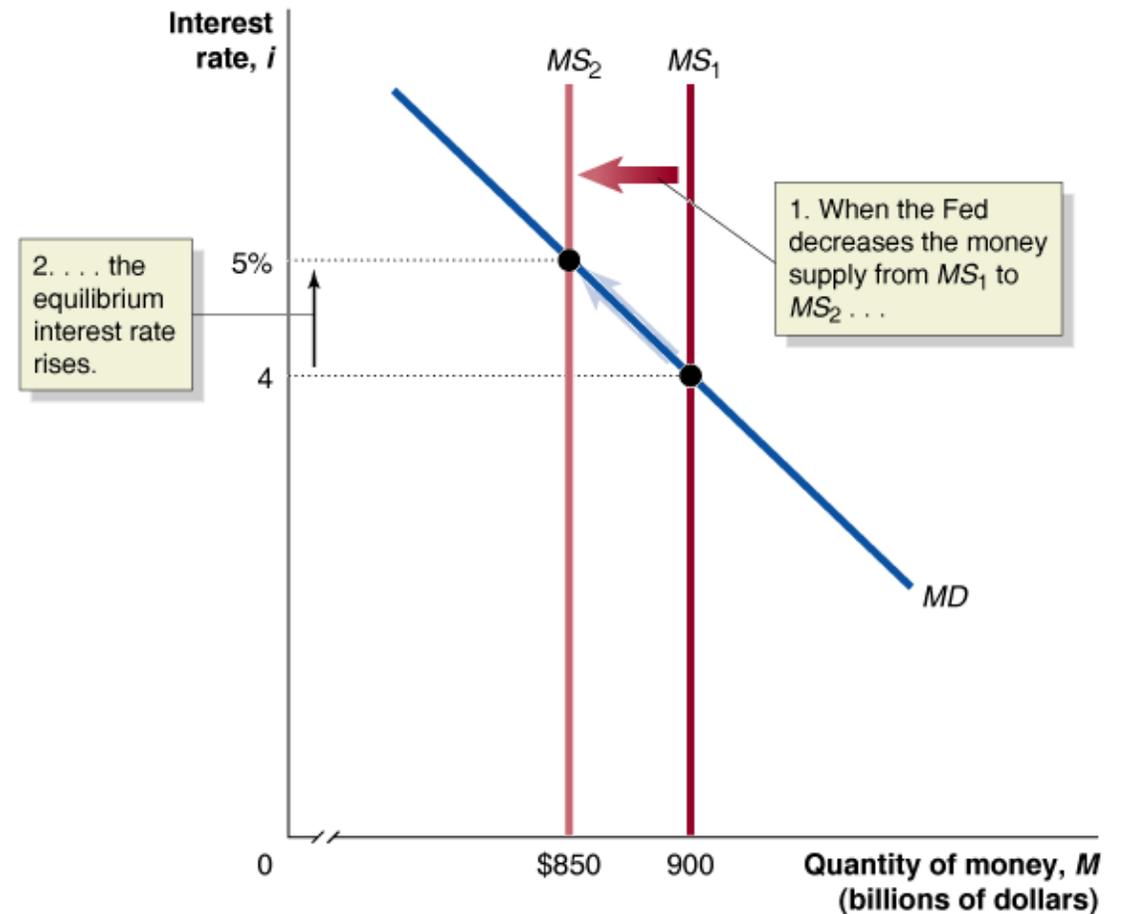
Equilibrium occurs in the money market where the two curves cross. *When the Fed increases the money supply, the short-term interest rate must fall until it reaches a level at which households and firms are willing to hold the additional money.*



# Figure 15.5 The Effect on the Interest Rate When the Fed Decreases the Money Supply

Alternatively, the Fed may decide to lower the money supply by selling Treasury securities.

- Now firms and households (who bought the securities with money) hold less money than they want, relative to other financial assets.
- In order to retain depositors, banks are forced to offer a higher interest rate on interest-bearing accounts.



# A Tale of Two Interest Rates

We now have two models of the interest rate:

1. *The loanable funds model (chapter 10)*

- Concerned with long-term real rate of interest
- Relevant for long-term investors (firms making capital investments, households building new homes, etc.)

2. *The money market model (this chapter)*

- Concerned with short-term nominal rate of interest
- Most relevant for the Fed: changes in money supply directly affect this interest rate

Usually, the two interest rates are closely related; an increase in one results in the other increasing also.

# Choosing a Monetary Policy Target

The Fed can choose to target a particular level of the money supply or a particular short-term nominal interest rate.

- It concentrates on the interest rate, in part because the relationship between the money supply (M1 or M2) and real GDP growth broke down in the early 1980s (M1) and 1990s (M2).

There are many different interest rates in the economy; the Fed targets the **federal funds rate**: the interest rate banks charge each other for overnight loans.

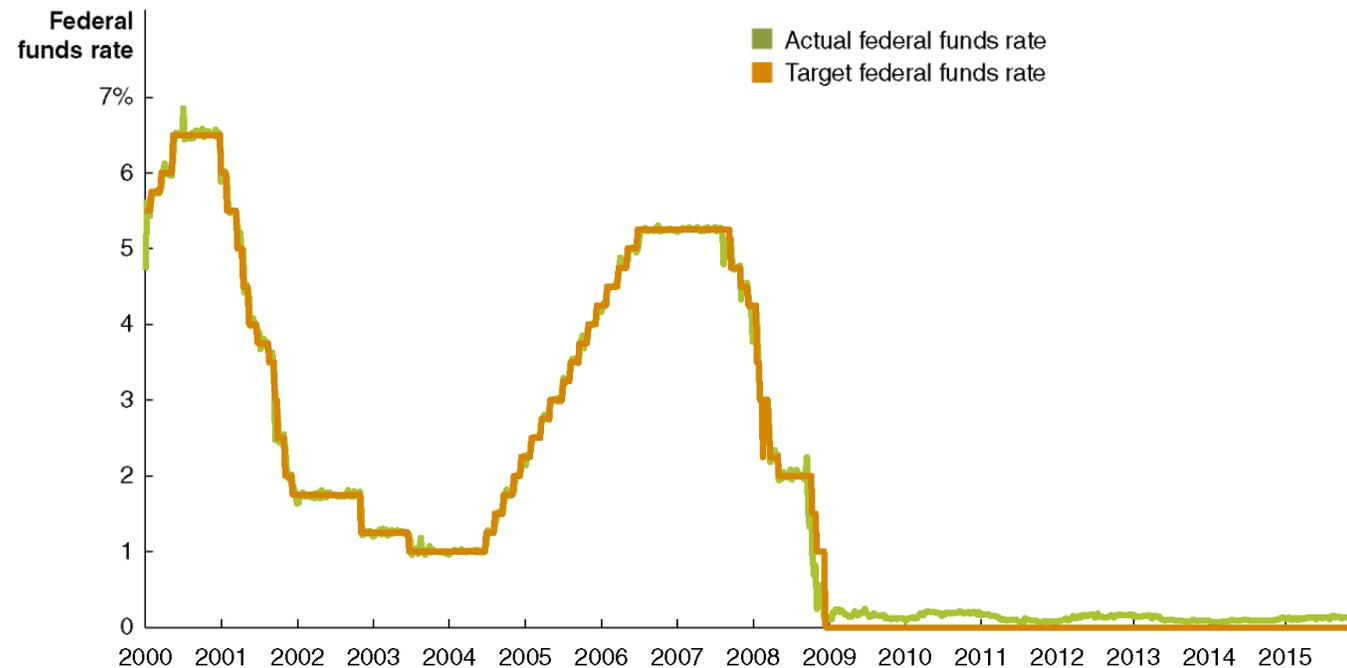
- The Fed does not *set* the federal funds rate, but rather affects the supply of bank reserves through open market operations.

# Figure 15.6 Federal Funds Rate Targeting, January 2000-October 2015

Although it does not directly set the federal funds rate, through open market operations the Fed can control it quite well.

From December 2008, the target federal funds rate was 0-0.25 percent.

- The low federal funds rate was designed to encourage banks to make loans instead of holding excess reserves which banks were holding at unusually high levels.



# 15.3 Monetary Policy and Economic Activity

The ability of the Fed to affect economic variables such as real GDP depends on its ability to affect long-term real interest rates.

- It uses the federal funds rate (a short-term nominal interest rate) for this—an imperfect tool.
- We will assume in this section that the Fed *can* affect long-term real interest rates using the federal funds rate.

# How Interest Rates Affect Aggregate Demand

## *Consumption*

- **Lower** interest rates encourage buying on credit, which typically affects the sale of durables. Lower rates also discourage saving.

## *Investment*

- **Lower** interest rates encourage capital investment by firms:
  - By making it cheaper to borrow (sell corporate bonds).
  - By making stocks more attractive for households to purchase, allowing firms to raise funds by selling additional stock.
- **Lower** rates also encourage new residential investment.

## *Net exports*

- **High** U.S. interest rates attract foreign funds, raising the \$US exchange rate, causing net exports to fall.

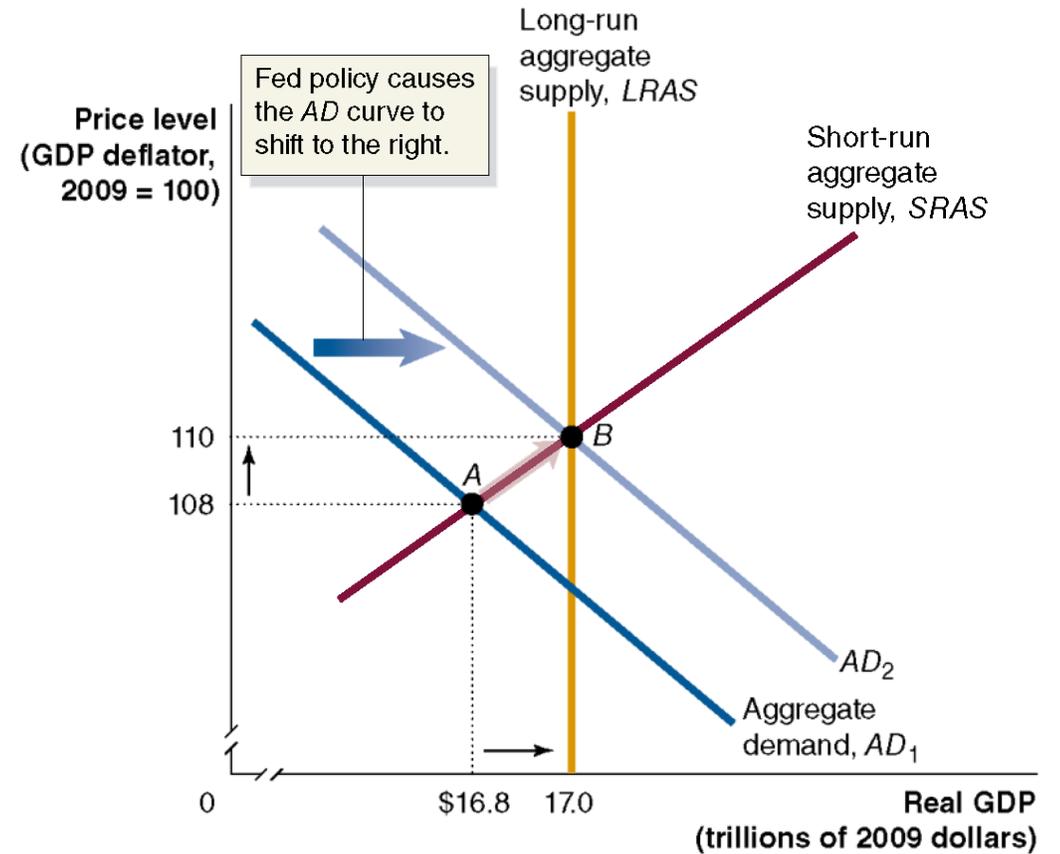
# Figure 15.7 Monetary Policy (1 of 2)

The Fed conducts expansionary monetary policy when it takes actions to decrease interest rates to increase real GDP.

- This works because decreases in interest rates raise consumption, investment, *and* net exports.

The Fed would take this action when short-run equilibrium real GDP was below potential real GDP.

- The increase in aggregate demand encourages increased employment, one of the Fed's primary goals.



(a) Expansionary monetary policy

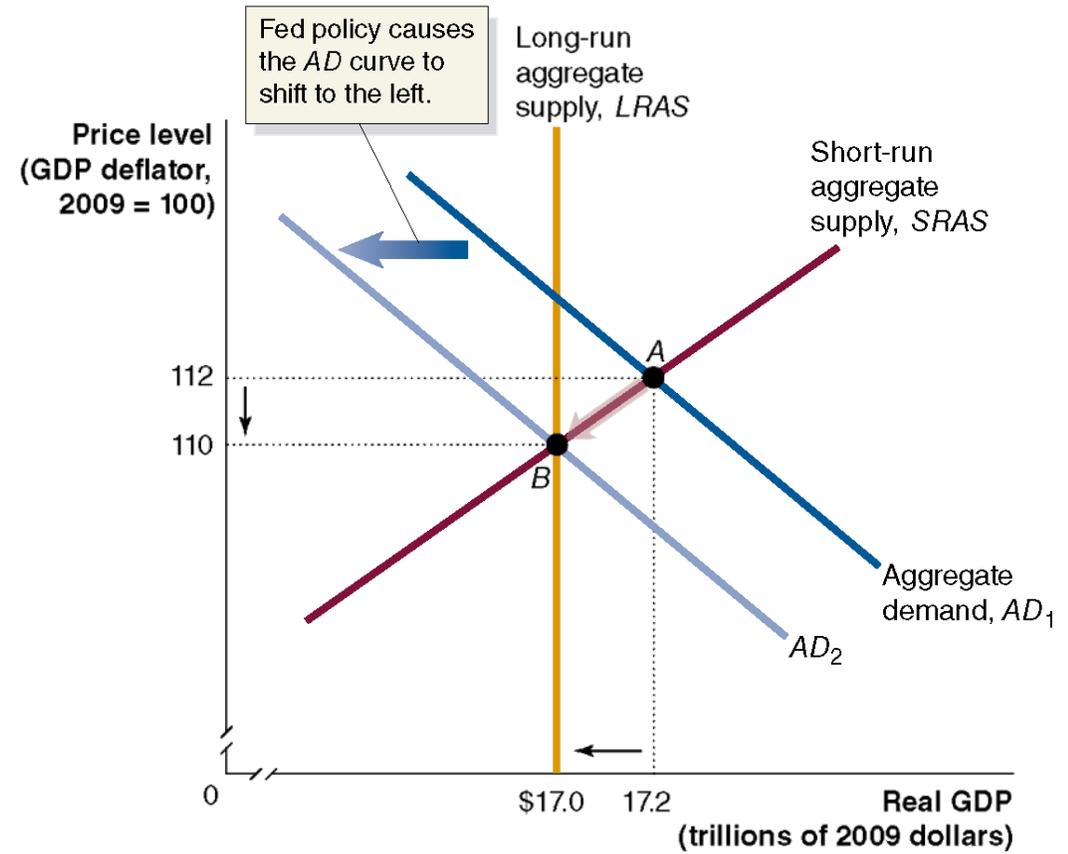
# Figure 15.7 Monetary Policy (2 of 2)

Sometimes the economy may be producing *above* potential GDP.

- In that case, the Fed may perform **contractionary monetary policy**: increasing interest rates to reduce inflation.

Why would the Fed intentionally reduce real GDP?

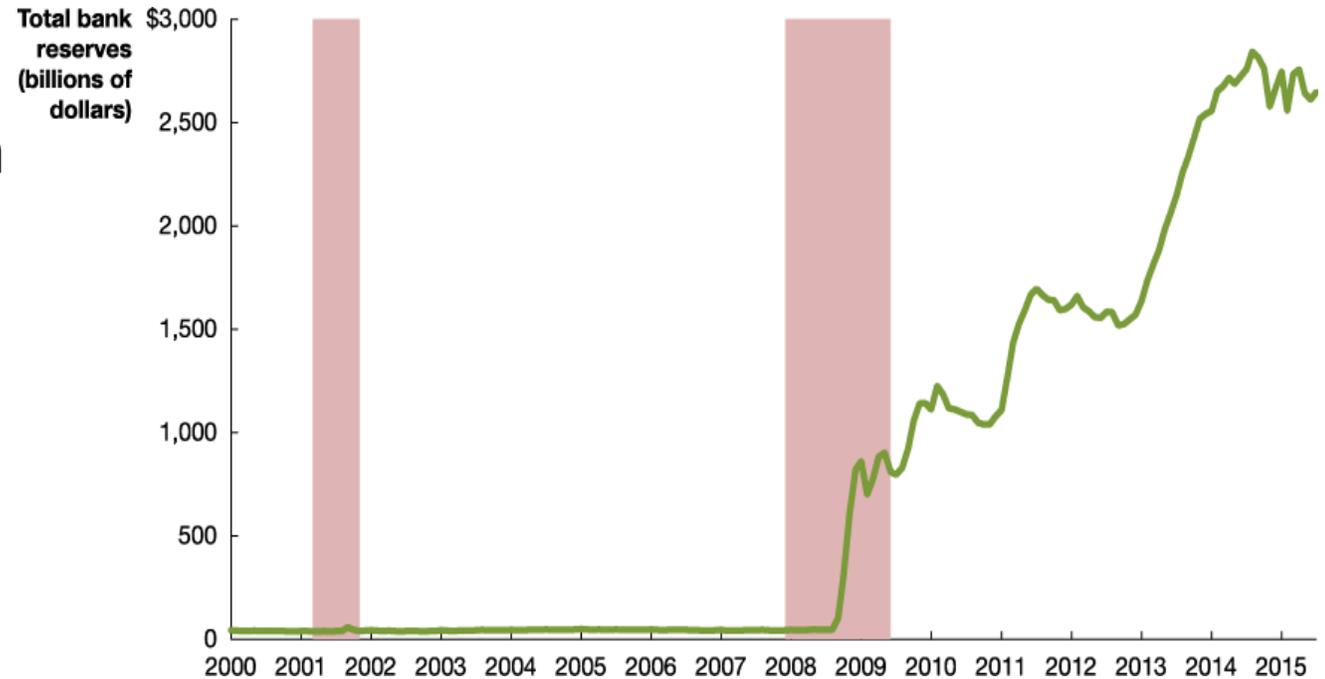
- The Fed is mostly concerned with *long-run* growth. If it determines that inflation is a danger to long-run growth, it can contract the money supply in order to discourage inflation, i.e. encouraging *price stability*.



(b) Contractionary monetary policy

# Making the Connection: Central Banks, Quantitative Easing, and Negative Interest Rates (1 of 2)

- Adjusting the federal funds rate had been an effective way for the Fed to stimulate the economy, but it began to fail in 2008.
- Banks did not believe there were good loans to be made, so they refused to lend out reserves, despite the federal funds rate being maintained at zero. This is known as a *liquidity trap*: the Fed was unable to push rates any lower to encourage investment.



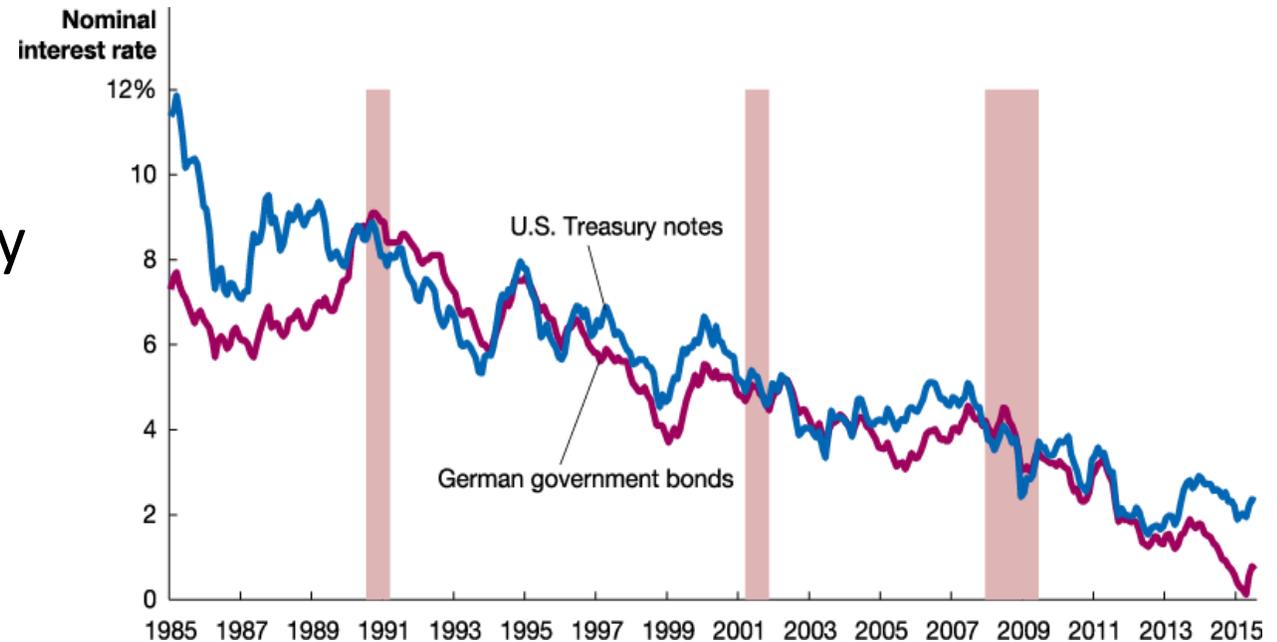
# Making the Connection: Central Banks, Quantitative Easing, and Negative Interest Rates (2 of 2)

But the Fed was certain the economy was below potential GDP, so it wanted to stimulate demand. It performed quantitative easing: buying securities *beyond* the normal short-term Treasury securities, including 10-year Treasury notes and mortgage-backed securities.

- This pushed real interest rates into the negatives.

The German government went a step further in 2015: it sold bonds with *negative nominal interest rates*.

- Investors believed the guarantee of repayment was worth avoiding the risk of default from alternative bonds and deposits.



# Can the Fed Eliminate Recessions?

In our demonstration of monetary policy, the Fed

- Knew how far to shift aggregate demand and
- Was able to shift aggregate demand exactly this far.

In practice, monetary policy is *much* harder to get right than the graphs make it appear.

- Completely offsetting a recession is not realistic; the best the Fed can hope for is to make recessions milder and shorter.

Another complicating factor is that *current* economic variables are rarely known; we usually can only know them for the *past*—i.e. with a *lag*.

- *In November 2001, NBER announced that the economy was in a recession that had begun in March 2001; several months later, it announced the recession ended... in November 2001.*

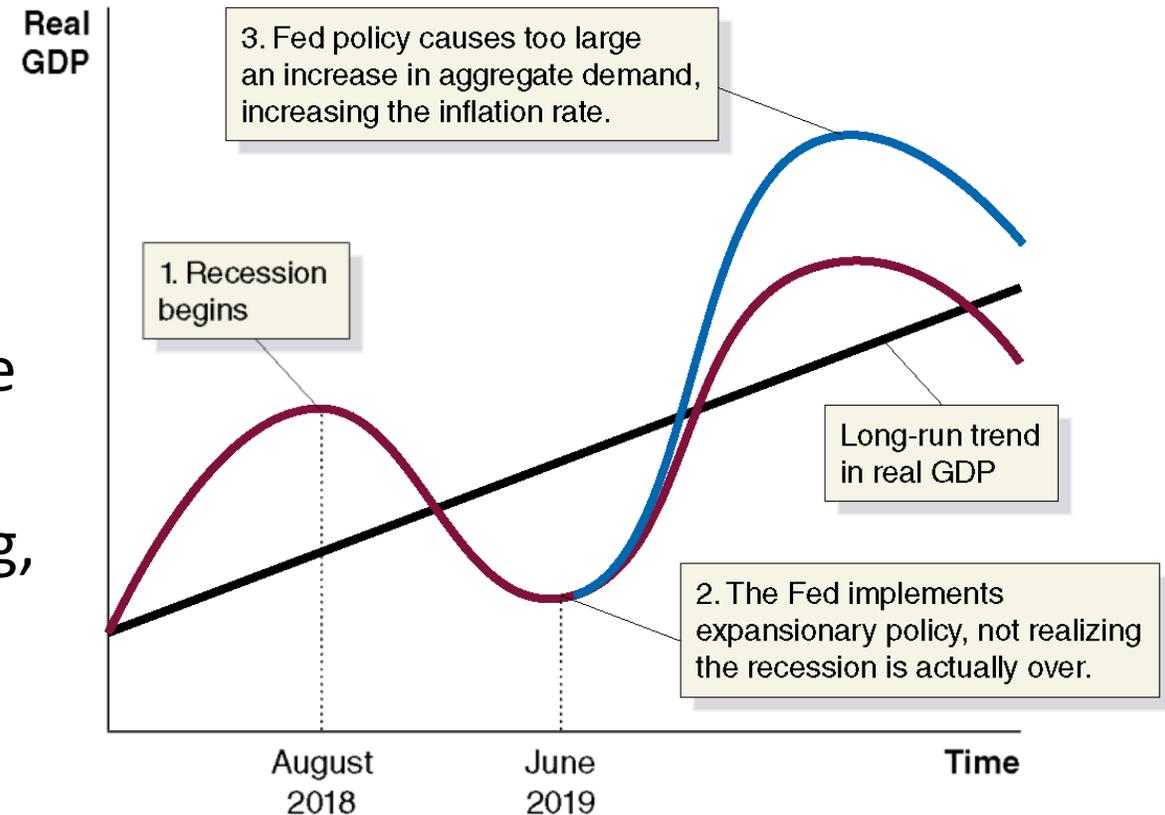
# Figure 15.8 The Effect of a Poorly Timed Monetary Policy on the Economy.

Suppose a recession begins in August 2018.

- The Fed finds out about the recession with a lag.
- In June 2019, the Fed starts expansionary monetary policy, but the recession has already ended.

By keeping interest rates low for too long, the Fed encourages real GDP to go far beyond potential GDP. The result:

- High inflation
- The next recession will be more severe



# Table 15.1 Fed Forecasts of Real GDP Growth during 2007 and 2008

Blank	Forecast Growth Rate	Blank	Actual Growth Rate	
Date forecast was made	For 2007	For 2008	2007	2008
February 2006	3% to 4%	No forecast	1.8%	-0.3%
May 2006	2.5% to 3.25%	No forecast	Blank	Blank
February 2007	2.25% to 3.25%	2.5% to 3.25%	Blank	Blank
July 2007	No forecast	2.5% to 3.0%	Blank	Blank

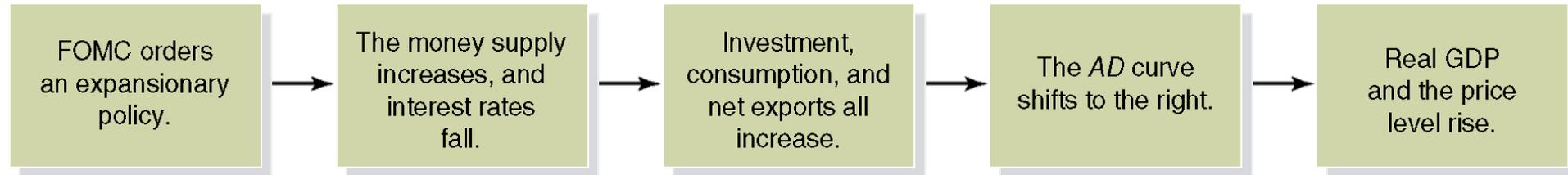
The Fed tries to set policy according to what it *forecasts* the state of the economy will be in the future.

- Good policy requires accurate forecasts.

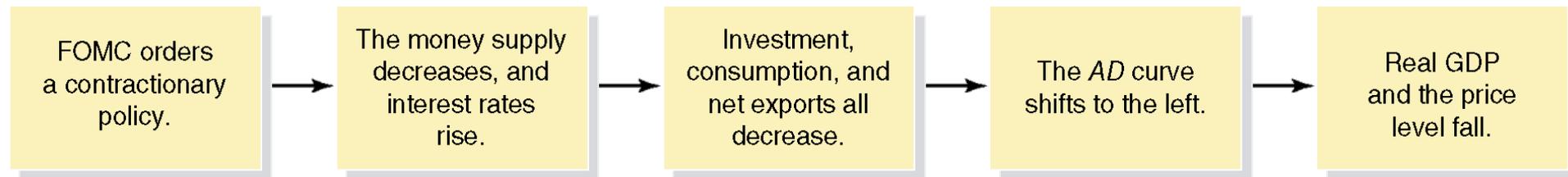
The forecasts of most economists in 2006/2007 did not anticipate the severity of the coming recession.

- So the Fed missed the opportunity to dampen the effects of the recession.

# Table 15.2 Expansionary and Contractionary Monetary Policies



(a) An expansionary policy



(b) A contractionary policy

In each of these steps, the changes are relative to what would have happened *without* the monetary policy.

- Expansionary monetary policy is sometimes called “loose” or “easy” monetary policy.
- Contractionary monetary policy is “tight” monetary policy.

# 15.4 Monetary Policy in the Dynamic Aggregate Demand and Aggregate Supply Model

We used the static AD-AS model initially for simplicity.

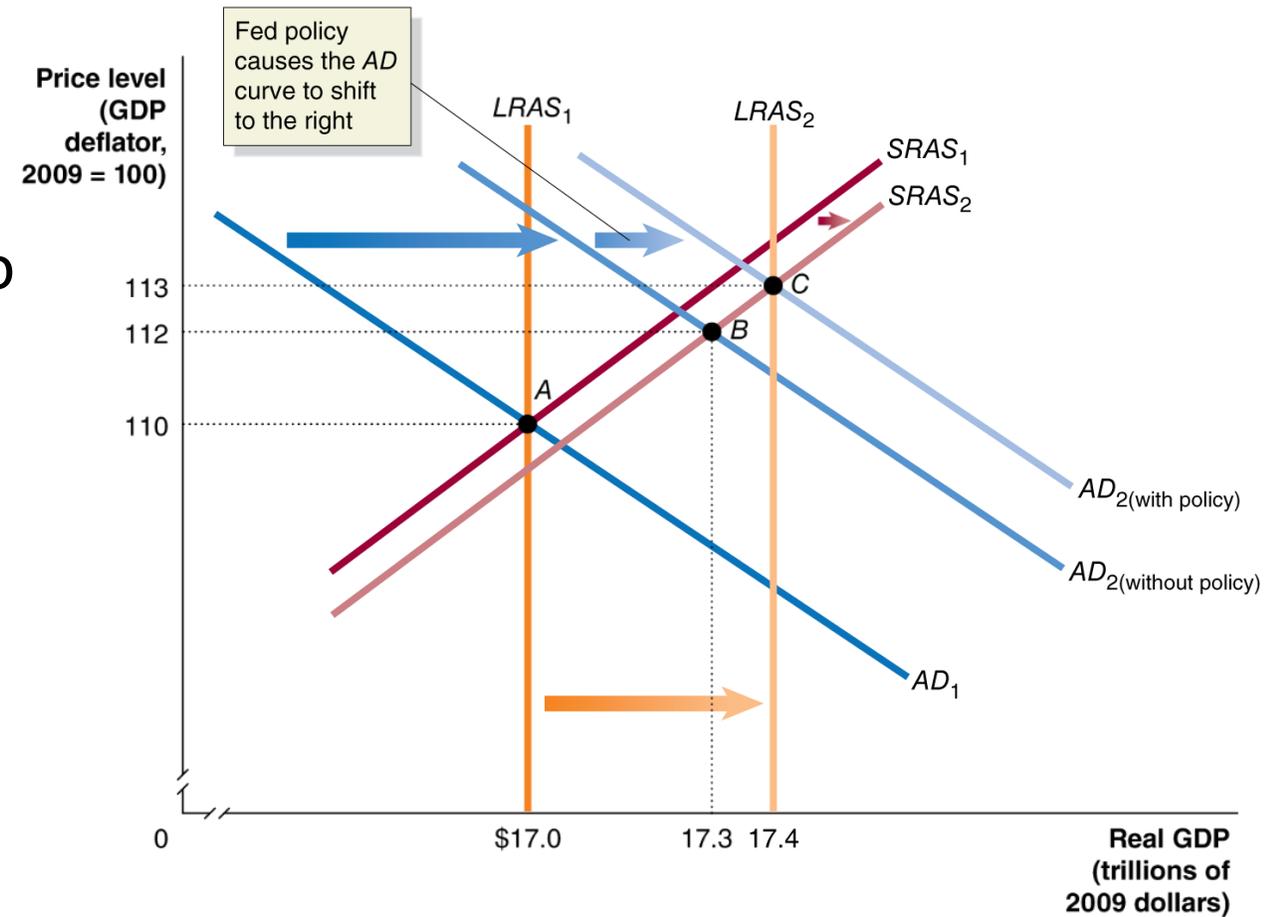
- But in reality, potential GDP increases every year (long-run growth), and the economy generally experiences inflation every year.

We can account for these in the *dynamic aggregate demand and aggregate supply model*. Recall that this features:

- Annual increases in long-run aggregate supply (potential GDP)
- Typically, larger annual increases in aggregate demand
- Typically, smaller annual increases in short-run aggregate supply
- Typically, therefore, annual increases in the price level

# Figure 15.9 An Expansionary Monetary Policy

- In period 1, the economy is in long-run equilibrium at \$17.0 trillion.
- The Fed forecasts that aggregate demand will not rise fast enough, so that in period 2, the short-run equilibrium will fall below potential GDP, at \$17.3 trillion.
- So the Fed uses expansionary monetary policy to increase aggregate demand.
- The result: real GDP at its potential and a higher level of inflation than would otherwise have occurred.

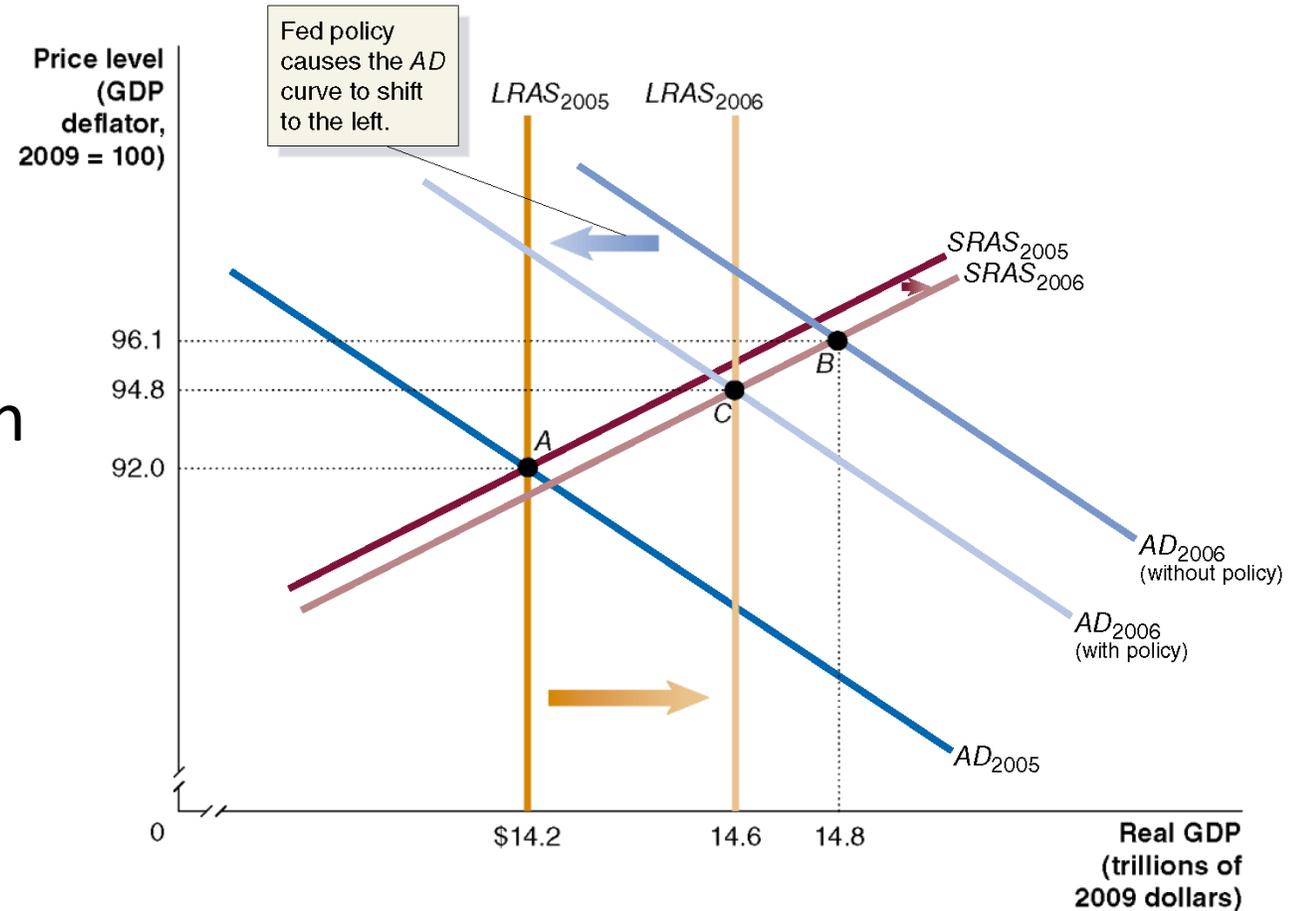


# Figure 15.10 A Contractionary Monetary Policy

In 2005, the Fed believed the economy was in long-run equilibrium.

In 2006, the Fed believed aggregate demand growth was going to be “too high,” resulting in excessive inflation.

- So the Fed raised the federal funds rate—a contractionary monetary policy, designed to decrease inflation.
- The result: lower real GDP and less inflation in 2006 than would otherwise have occurred.



# 15.5 A Closer Look at the Fed's Setting of Monetary Policy Targets

In normal times, the Fed targets the federal funds rate.

- One alternative to this is to target the money supply instead.
- Should it use the money supply as its monetary policy target instead?

# Should the Fed Target the Money Supply?

*Monetarists*, led by Nobel Laureate Milton Friedman, said “yes”.

- Friedman advocated a *monetary growth rule*, increasing the money supply at about the long-run rate of real GDP growth.
- He argued that an active *countercyclical* monetary policy would serve to destabilize the economy; the monetary growth rule would provide stability instead.

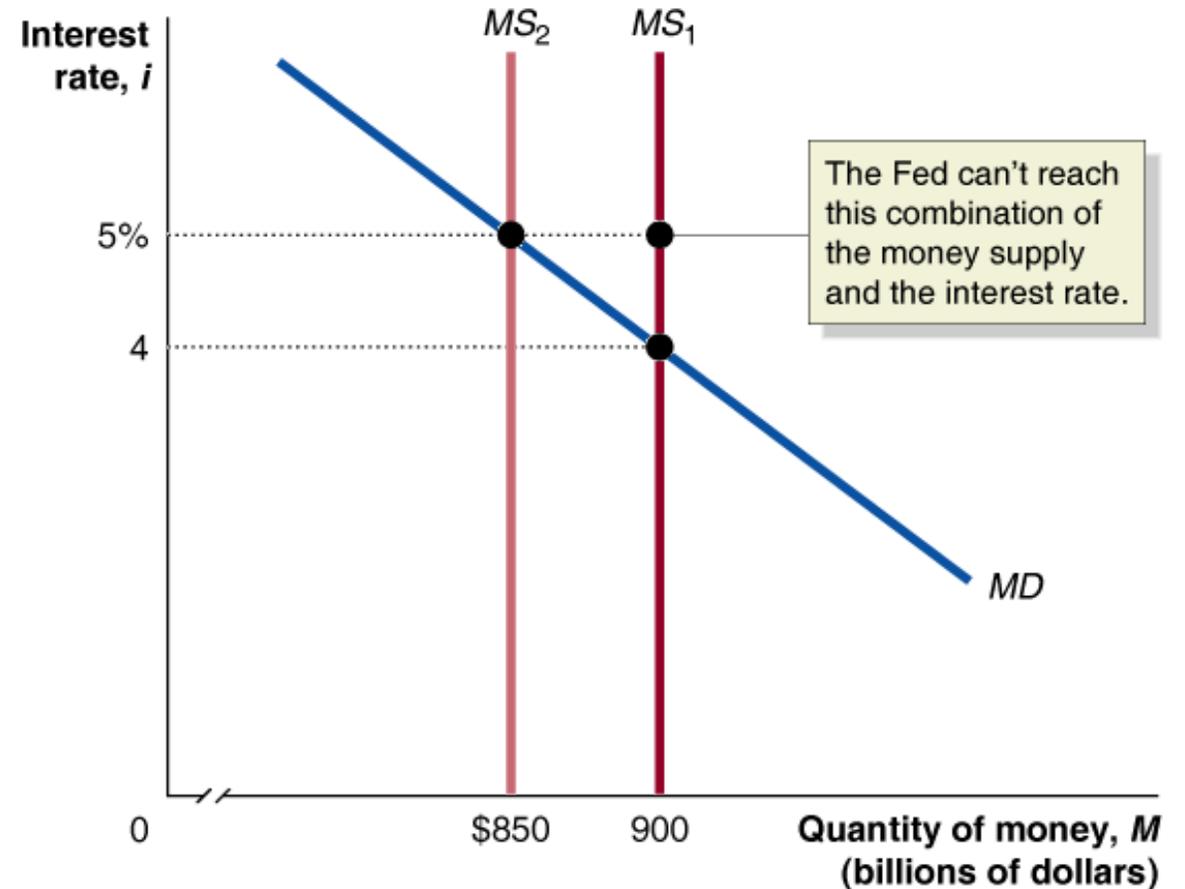
Monetarism was popular in the 1970s, but since the 1980s, the link between the money supply and real GDP seems to have broken down: M1 seems to change “wildly,” but real GDP and inflation do not react in the same way.

- Now, targeting the money supply is not seriously considered.

# Figure 15.11 The Fed Can't Target Both the Money Supply and the Interest Rate

It might seem that the Fed could “get the best of both worlds” by targeting *both* interest rates and the money supply.

- But this is impossible: the two are linked through the money demand curve.
- So a decrease in the money supply will increase interest rates; an increase in the money supply will increase interest rates.



# The Taylor Rule (1 of 2)

The **Taylor rule** is a rule developed by John Taylor of Stanford University that links the Fed's target for the federal funds rate to economic variables. Taylor estimates that:

$$\begin{aligned} &\text{Federal funds target rate} \\ &= \text{Current inflation rate} + \text{Equilibrium real federal funds rate} \\ &+ \left[ \frac{1}{2} \times \text{Inflation gap} \right] + \left[ \frac{1}{2} \times \text{Output gap} \right] \end{aligned}$$

where:

- Equilibrium real federal funds rate is the estimate of the inflation-adjusted federal funds rate that would be consistent with maintaining real GDP at its potential level in the long run.
- Inflation gap is the difference between current inflation and the Fed's target rate of inflation (could be positive or negative)

# The Taylor Rule (2 of 2)

where

- Output gap is the difference between current real GDP and potential GDP (could be positive or negative)

The weights ( $\frac{1}{2}$ ) indicate the relative importance the Fed places on the inflation and output gaps.

The Taylor rule was a good predictor of the federal funds rate during Alan Greenspan's tenure as Fed chair (1987-2006). Until the mid-2000s, when the rate was lower than predicted.

# Should the Fed Target Inflation Instead?

**Inflation targeting**: A framework for conducting monetary policy that involves the central bank announcing its target level of inflation.

This policy has been adopted by central banks in some other countries, including the Bank of England and the European Central Bank.

- The typical outcome of adopting inflation targeting appears to be that inflation is lower, but unemployment is (temporarily) higher.

In 2012, the Fed announced its first explicit inflation target: an average inflation rate of 2 percent per year.

# Arguments For and Against Inflation Targeting

## For:

- Makes it clear that the Fed cannot affect real GDP in the long run.
- Easier for firms and households to form expectations about future inflation, improving their planning.
- Promotes Fed accountability—provides a yardstick against which performance can be measured.

## Against:

- Reduces the Fed's flexibility to address and accountability for other policy goals.
- Assumes the Fed can correctly forecast inflation rates, which may not be true.
- Increased focus on inflation rate may result in Fed being less likely to address other beneficial goals.

# 15.6 Fed Policies during the 2007-2009 Recession

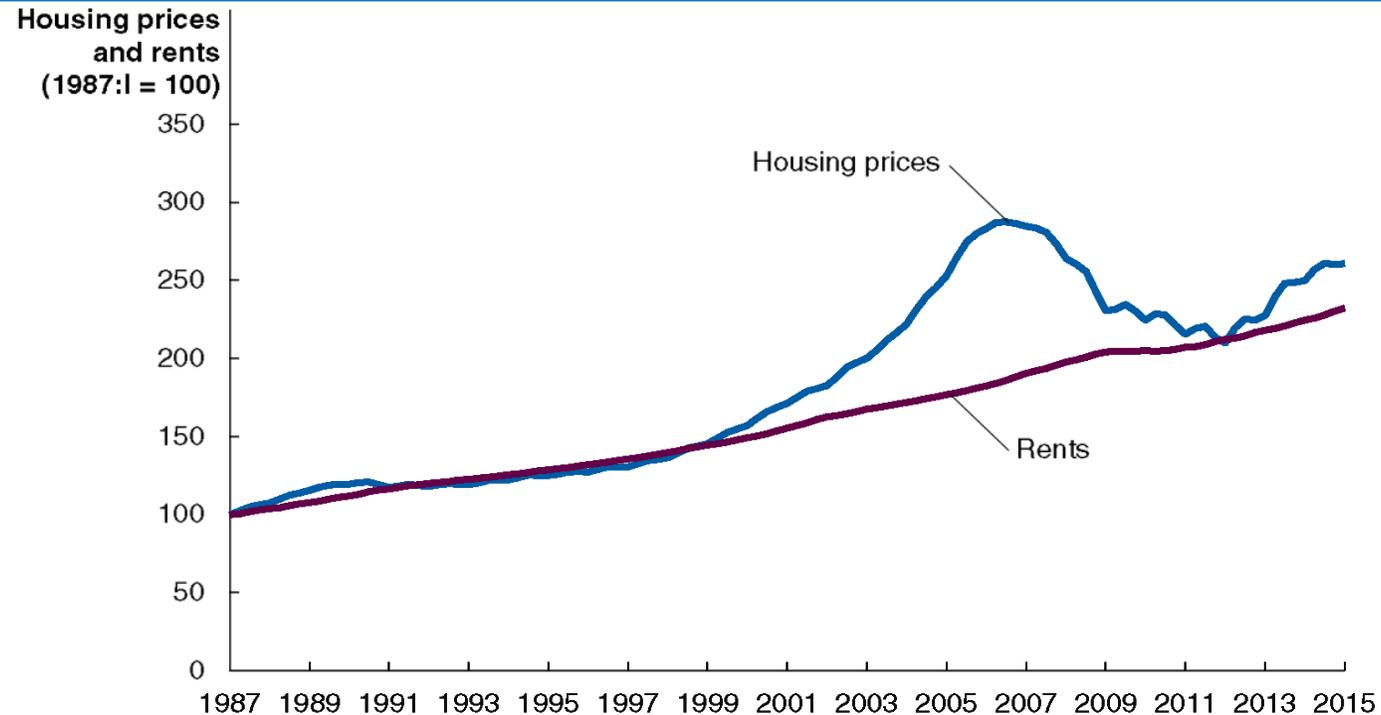
A *bubble* in a market refers to a situation in which prices are too high relative to the underlying value of the asset.

Bubbles can form due to:

- *Herding behavior*: failing to correctly evaluate the value of the asset and instead relying on other people's apparent evaluations; and/or
- *Speculation*: believing that prices will rise even higher and buying the asset intending to sell it before prices fall.

*Example: Stock prices of internet-related companies were "optimistically" high in the late 2000s, before the "dot-com bubble" burst, starting in March 2000.*

# Figure 15.12 Housing Prices and Housing Rents, 1987-2015

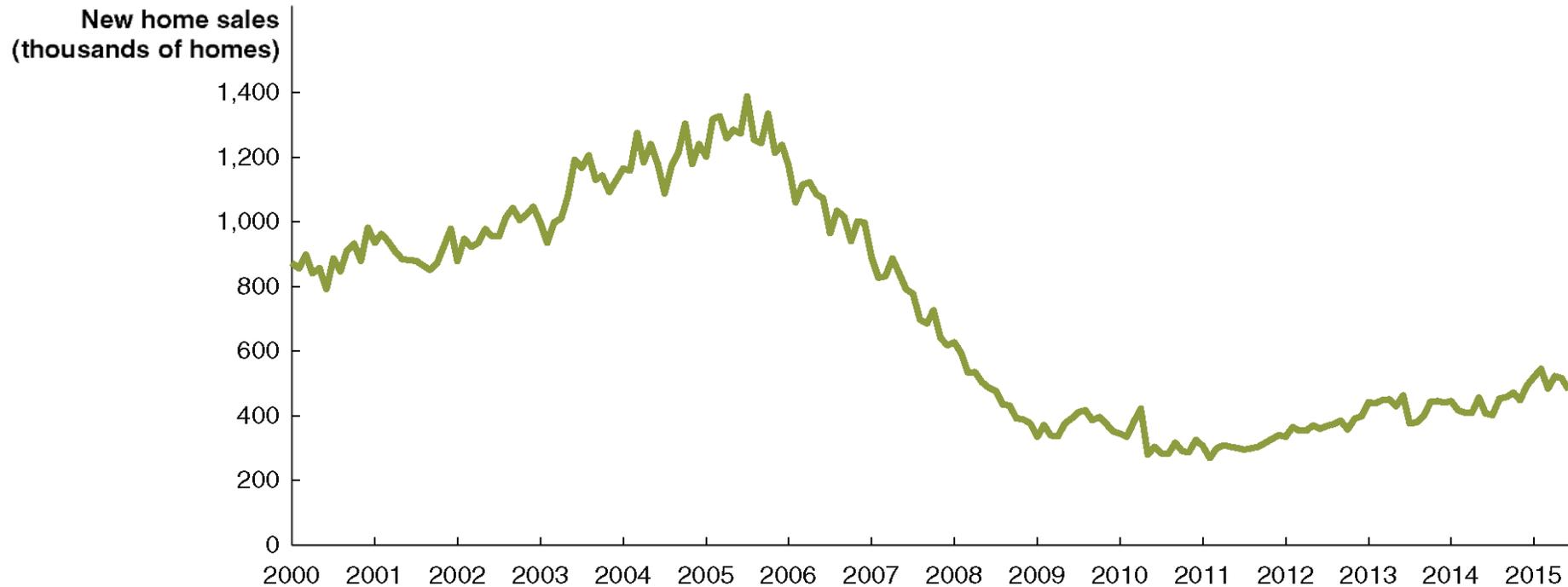


By 2005, many economists argued that a bubble had formed in the U.S. housing market.

- Comparing housing prices and rents makes it clear now that this was true.

The high prices resulted in high levels of investment in new home construction, along with optimistic *sub-prime loans*.

# Figure 15.13 The Housing Bubble



- During 2006 and 2007, house prices started to fall, in part because of mortgage defaults, and new home construction fell considerably.
- Banks became less willing to lend, and the resulting *credit crunch* further depressed the housing market.

# The Changing Mortgage Market

Until the 1970s, when a commercial bank granted a mortgage, it would “keep” the loan until it was paid off.

- This limited the number of mortgages banks were willing to provide.

A *secondary market* in mortgages was made possible by the formation of the Federal National Mortgage Association (“Fannie Mae”) and the Federal Home Loan Mortgage Corporation (“Freddie Mac”).

- These *government-sponsored enterprises (GSEs)* sell bonds to investors and use the funds to purchase mortgages from banks.
- This allowed more funds to flow into mortgage markets.

# The Role of Investment Banks

By the 2000s, investment banks had started buying mortgages also, packaging them as *mortgage-backed securities* and reselling them to investors.

- These securities were appealing to investors because they paid high interest rates with apparently low default risk.

But with more money flowing into mortgage markets, “worse” loans started to be made to people:

- With worse credit histories (*sub-prime loans*)
- Without evidence of income (“Alt-A” loans)
- With lower down-payments
- Who couldn’t initially afford traditional mortgages (*adjustable-rate mortgages* start with low interest rates)

# Making the Connection: The Wonderful World of Leverage

Why does the size of the down payment matter?

- By owning a house, you become exposed to increases or decreases in the price of that large asset.
- With a smaller down payment, you are said to be highly *leveraged*, exposed to large potential changes in the value of your investment.

# Result of the Lower Quality Loans

When the housing bubble burst, more of these lower quality loans were defaulted on than investors were expecting.

- The market for securities based on these loans became very *illiquid*—few people or firms were willing to buy them, and their prices fell quickly.
- Many commercial and investment banks were invested heavily in these mortgage-backed securities, and so suffered heavy losses.

These problems were so profound that the Fed and the U.S. Treasury decided to take unprecedented actions.

# Table 15.3 Treasury and Fed Actions at the Beginning of the Financial Crisis

Date	Action	Goal
March 2008	Although the Fed traditionally made discount loans only to commercial banks, the Fed announced it would temporarily make discount loans to <i>primary dealers</i> —firms that participate in regular open market transactions with the Fed.	Provide short-term funds to these dealers, some of which are investment banks, so they would not have to raise funds by selling securities, which might further reduce the prices of these securities.
March 2008	The Fed announced that it would loan up to \$200 billion of Treasury securities in exchange for mortgage-backed securities.	Make it possible for primary dealers that owned mortgage-backed securities that were difficult or impossible to sell to have access to Treasury securities that they could use as collateral for short-term loans.
March 2008	The Fed and the Treasury helped JPMorgan Chase acquire the investment bank Bear Stearns, which was close to failing.	Avoid a financial panic that the Fed and the Treasury believed would result from Bear Stearns's failure. Its failure might have caused many investors and financial firms to stop making loans to other investment banks.
September 2008	The Treasury moved to have the federal government take control of Fannie Mae and Freddie Mac. Although the federal government sponsored Fannie Mae and Freddie Mac, they were actually private businesses. The firms were placed under the supervision of the Federal Housing Finance Agency.	Avoid further devastating a weak housing market. The Treasury believed that the bankruptcy of Fannie Mae and Freddie Mac would have caused a collapse in confidence in mortgagebacked securities.

# Responses to the Failure of Lehman Brothers

Many economists were critical of the Fed underwriting Bear Stearns, as managers would now have less incentive to avoid risk: a *moral hazard* problem.

- So in September 2008, the Fed did not step in to save Lehman Brothers, another investment bank experiencing heavy losses. This was supposed to signal to firms not to expect the Fed to save them from their own mistakes.

Lehman Brothers declared bankruptcy on September 15.

- Financial markets reacted adversely—more strongly than expected.
- When AIG began to fail a few days later, the Fed reversed course, providing them with a \$87 billion loan.

# More Consequences of Lehman Brothers

Reserve Primary Fund was a money market mutual fund that was heavily invested in Lehman Brothers.

- Many investors withdrew money from Reserve and other money market funds, fearing losing their investments.

This prompted the Treasury to offer insurance for money market mutual funds, similar to FDIC insurance.

- Finally, in October 2008, Congress passed the *Troubled Asset Relief Program (TARP)*, providing funds to banks in exchange for stock—another unprecedented action.

Although these interventions took new forms, they were all designed to achieve traditional macroeconomic goals: high employment, price stability, and financial market stability.

# THE END

“If you put the federal government in charge of the Sahara Desert, in 5 years there’d be a shortage of sand.”

- Milton Friedman, Think Exist

“The kind of economic trouble that Asia experienced a decade ago, and that we're all experiencing now, is precisely the sort of thing we thought we had learned to prevent. In the bad old days big, advanced economies with stable governments-like Britain in the 1920s-might have had no answer to prolonged periods of stagnation and deflation; but between John Maynard Keynes and Milton Friedman, we thought we knew enough to keep that from happening again.”

-Paul Krugman, 2009