

ECO 202 Principles of Economics II

Lecture 11: Monetary Policy

Xiaozhou Ding

April 4, 2018

- 1 What Is Monetary Policy
- 2 The Money Market and the Fed's Choice of Monetary Policy Targets
- 3 Monetary Policy and Economic Activity
- 4 Monetary Policy in the Dynamic Aggregate Demand and Aggregate Supply Model
- 5 Fed's Monetary Policy Targets
- 6 Fed Policies during the 2007-2009 Recession

What Is Monetary Policy

What Is Monetary Policy?

In the previous lecture, we introduced the monetary policy tools that the Federal Reserve can use to influence the money supply.

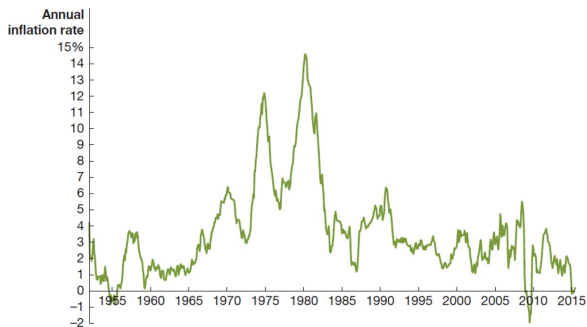
Definition

Monetary policy: The actions the Federal Reserve takes to manage the money supply and interest rates to pursue macroeconomic policy goals.

The Goals of Monetary Policy

- 1 Price stability
- 2 High employment
- 3 Stability of financial markets and institutions
- 4 Economic growth

We will consider each goal in turn.



The figure shows CPI inflation in the United States.

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.

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.

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.

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.

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

Recall the Fed has three monetary policy tools at its disposal:

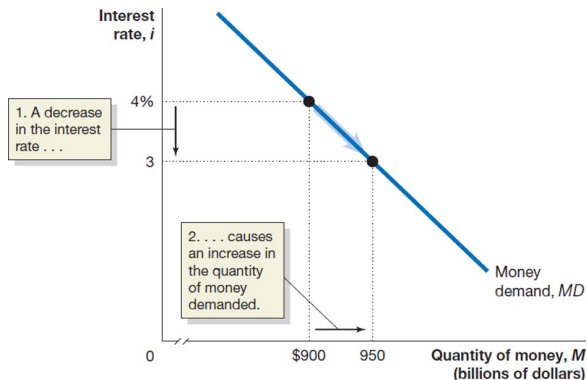
- Open market operations
- Discount policy
- Reserve requirements

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

It does this by directly influencing its monetary **policy targets**:

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

The Demand for Money



Higher interest rates result in a lower quantity of money demanded.(Why?)

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

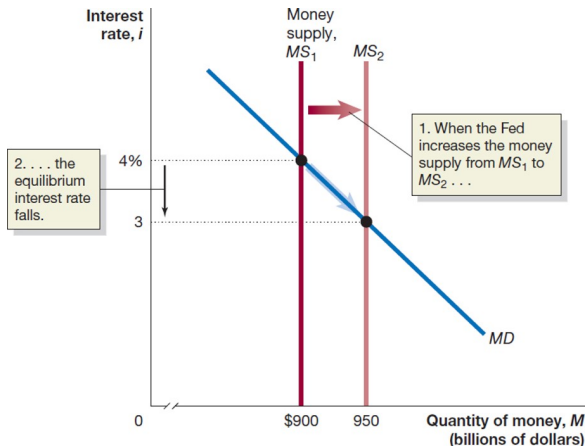
How Does the Fed Manage the Money Supply?

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.

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

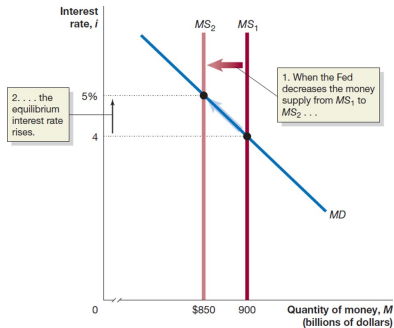


The Effect on the Interest Rate When the Fed Increases the Money Supply

- 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.

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.

We now have two models of the interest rate:

- 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.)
- 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

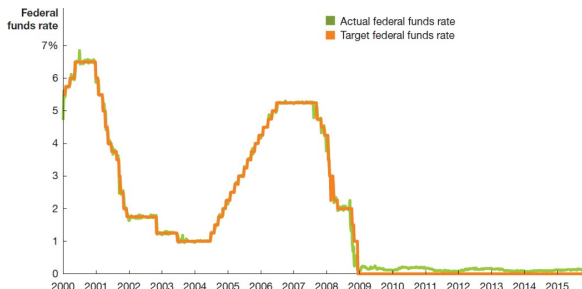
The Fed can choose to target a particular level of the money supply or a particular short-term nominal interest rate.

- 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.

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.

- Monetary policy goals
- Monetary policy tools
- Monetary policy targets
- The effect of monetary policy (money supply) on interest rate
- Quantity versus price?

Monetary Policy and Economic Activity

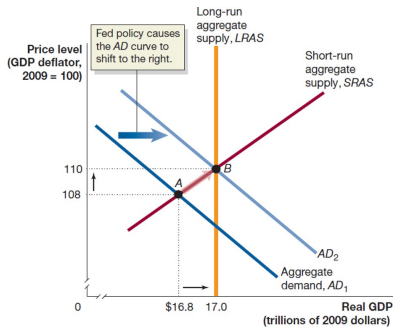
Our main job is to use aggregate demand and aggregate supply graphs to show the effects of monetary policy on real GDP and the price level.

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.

- 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 (cheaper to borrow through selling bonds, raise money by selling stocks, new residential investment)
- Net exports
High U.S. interest rates attract foreign funds, raising the \$US exchange rate, causing net exports to fall.

Expansionary Monetary Policy



(a) Expansionary monetary policy

Expansionary monetary policy: Fed takes actions to decrease interest rates to increase real GDP. Why?

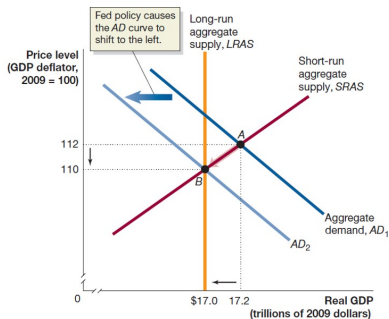
Decreases in interest rate raise consumption, investment, and net exports.

When will the Fed conduct expansionary policy?

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.

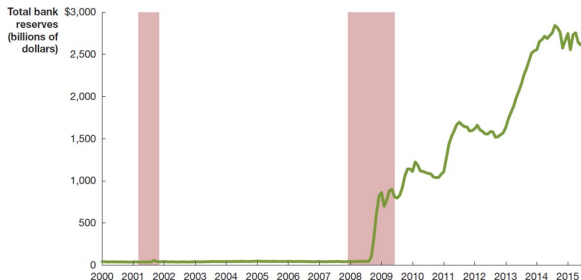
Contractionary Monetary Policy



(b) Contractionary monetary policy

Contractionary monetary policy: increasing interest rates to reduce inflation. Why? 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.

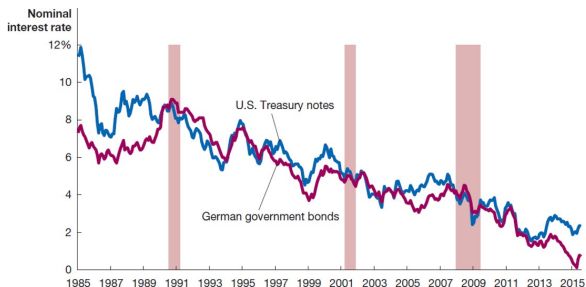
Liquidity Trap



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.

Central Banks, Quantitative Easing, and Negative Interest Rates



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 gov sold bonds with negative nominal interest rate in 2015.

Can the Fed Eliminate Recessions?

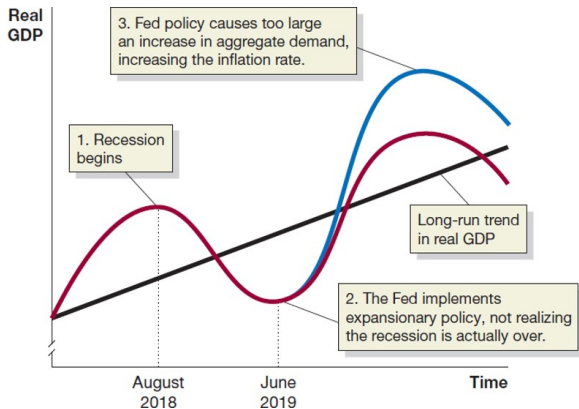
In our demonstration of monetary policy, the Fed

- Knew how far to shift aggregate demand
- 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.

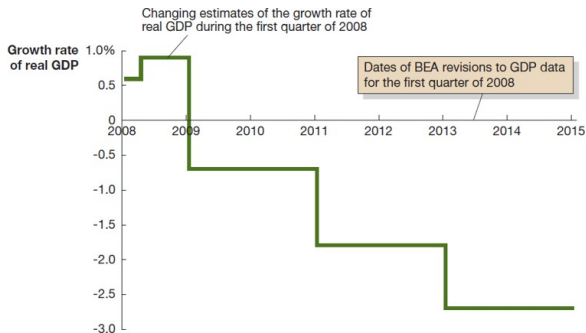
The Effect of a Poorly Timed Monetary Policy on the Economy



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** and **more severe** next recession.

Trying to Hit a Moving Target

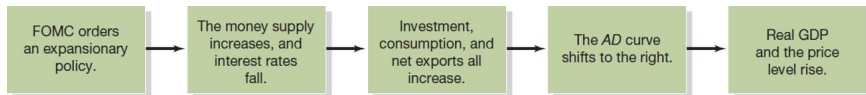


As if the Fed's job wasn't hard enough, it also has to deal with changing estimates of important economic variables.

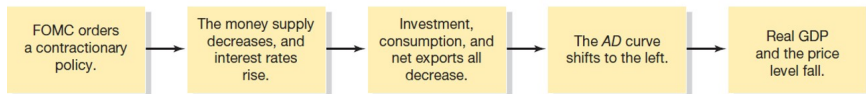
The Fed tries to set policy according to what it **forecasts** the state of the economy will be in the future. Good policy requires accurate forecasts.

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.

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.

Monetary Policy in the Dynamic Aggregate Demand and Aggregate Supply Model

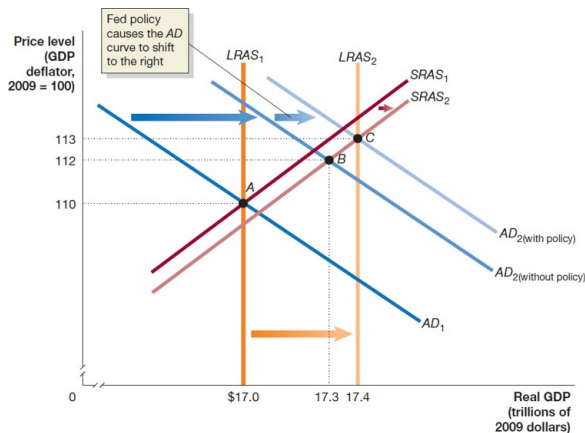
Monetary Policy in the Dynamic Aggregate Demand and Aggregate Supply Model

Similar to what we learned in fiscal policy, here we assume 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

Expansionary Monetary Policy



- (1) Start with long-run equilibrium at A.
- (2) The Fed forecasts that aggregate demand will not rise fast enough where the short-run equilibrium will fall below potential GDP, at B.
- (3) So the Fed uses expansionary monetary policy to increase aggregate demand.
- (4) Real GDP at its potential and a higher level of inflation than would otherwise have occurred.

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.

Fed's 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.

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

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:

$$i_t = \pi_t + r_t^* + w_1(\pi_t - \pi^*) + w_2(y_t - \bar{y}_t)$$

or

$$\begin{aligned} \text{Fed funds target rate} &= \text{Current inflation rate} + \text{Equilibrium real Fed funds rate} \\ &\quad + \frac{1}{2} \times \text{inflation gap} + \frac{1}{2} \times \text{output gap} \end{aligned}$$

where $w_1 = w_2 = \frac{1}{2}$ we choose equal weight. 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.

The Taylor rule was a good predictor of the federal funds rate during Alan Greenspan's tenure as Fed chair (1987-2006).

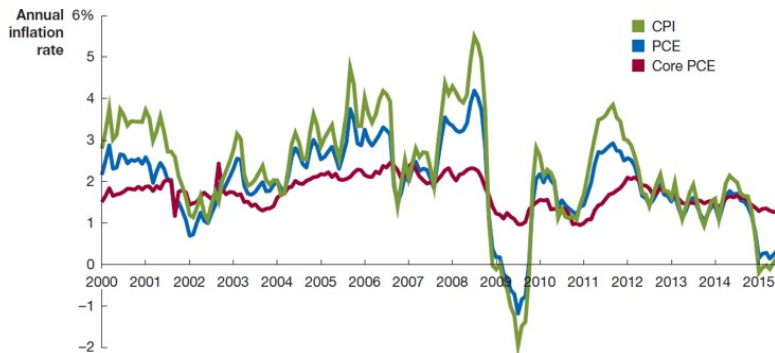
Should the Fed Target Inflation Instead?

- 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.

Which inflation rate does the Fed actually pay attention to? Not the CPI: it is too volatile. It used to use the PCE (personal consumption expenditures) index, a price index based on the GDP deflator.

Should the Fed Target Inflation Instead?



Since 2004, it has used the “core PCE”: the PCE without food and energy prices. The core PCE is more stable; the Fed believes it estimates true long-run inflation better.

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.

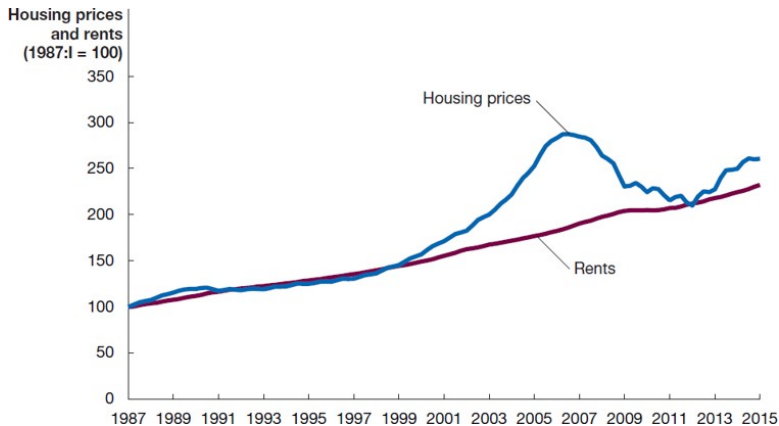
Fed Policies during the 2007-2009 Recession

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

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

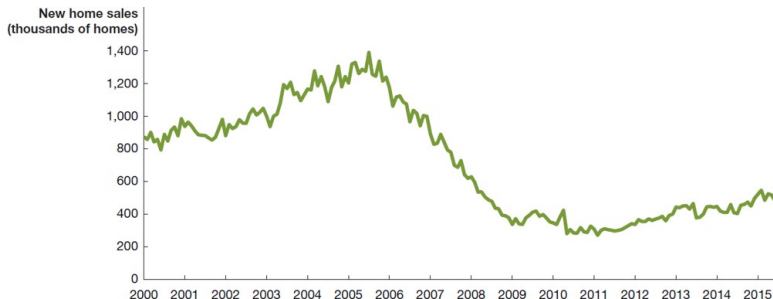
Stock prices of internet-related companies were “optimistically” high in the late 2000s, before the “dot-com bubble” burst, starting in March 2000.

The Housing Bubble?



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

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.

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.

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)

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.

Return on your investment as a result of ...		
Down Payment	a 10 percent increase in the price of your house.	a 10 percent decrease in the price of your house.
100%	10%	-10%
20	50	-50
10	100	-100
5	200	-200

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.

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 primary dealers —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.

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.

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.

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.