

Module 4: Financial Crises

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Module 4: Information

[Lesson 4-0: Module 4 Overview](#)



Hello and welcome, I hope you're doing well from wherever it is you're joining us in this module. We focus on the role of central banks as lenders of last resort. For this purpose, we study several financial crises and discuss why they came about. We then consider the policy responses by central banks to this crisis. We see that central banks can succeed but that there are limits to how far they can go alone.



Financial crises

- Panic of 1907
- Great Depression
- Auto loans during 2008 crisis
- Causes?
 - Short-term or foreign debt
 - Bad long-term investments
 - Unsustainable government policies

The first crisis we look at is the panic of 1907. This was the first major financial crisis of the 20th century. It was also the last US banking panic that occurred before the Federal Reserve system was founded. This crisis helps us understand why a central bank as the lender of last resort is needed. We then study the Great Depression. The Great Depression is another useful example because much of the present day social safety net did not exist. Next, we take an international perspective on financial crisis and identify common themes that help us identify the causes of financial crisis. This big picture perspective highlights credit booms that were financed with either short term or phone funding and combined with investments in long-term projects or unsustainable government policies. Such credit booms foreshadowed financial crisis. We reiterate the risks on relying on short-term funding by studying the US auto loan market during the 2008 financial crisis here. Non-bank lenders relied heavily on short-term funding markets to originate order loans. When the short-term funding markets dried up, auto sets collapsed. After all these examples, you may wonder whether credit booms always lead to financial crises and recessions. The short answer is no. As the next lesson discusses, it depends on in which sector the credit boom takes place. For example, credit booms in the manufacturing sector are often sustainable, at least historically. Having examined causes and consequences of financial crisis, we then turn to the policy responses, specifically how can central banks counteract bank runs and chart drops in credit supply. For this purpose, we studied the responses of the federal reserve to the 2008 financial crisis and the COVID-19 pandemic that illustrate the concept of the land of last resort, that is the Federal Reserve Lands when no one else bought. Monetary policy is not the only way to respond to financial crisis. Fiscal policy, which

involves government transfers and spending can also have the economy. In the final lesson, we therefore discussed the fiscal response to financial crisis.

Lesson 4-1: Causes of Financial Crises

[Lesson 4-1.1 Bank Runs and the Panic of 1907](#)

Learning Objectives

- Panic of 1907
- What caused the run
- How it was resolved

Hello and welcome to this lecture on the panic of 1907. In this class, we will take a close look at one of the most prominent bank run episodes in US history. We will look at why banks were susceptible to runs. We will then study what caused the runs to happen. Last, we will examine how this panic was resolved.

Bank Business Model

- Borrow short (deposits)
- Lend long (long)

Why are banks susceptible to runs? The key bank business model is liquidity transformation. They borrow short term by taking deposits and lend long term. This creates a maturity mismatch between the assets, the loans, and the liabilities, the deposits. When many savers decide to withdraw their deposits at the same time, the bank may not have enough cash at hand to satisfy all withdrawal demands because of the maturity mismatch.

Illiquid

- Ran out of cash
- But still profitable

In this case, the bank would be illiquid, meaning it ran out of cash, but all its investments can still be profitable.

Insolvent

- Ran out of equity

A bank being illiquid is different from a bank being insolvent, which means the bank has run out of equity. That is, it is bankrupt. Illiquid banks still has a viable business model. But forcing an illiquid bank to sell assets to satisfy the depositors withdrawal demands may weaken the bank, as the sales are likely to happen at large discounts.



The panic of 1907 is an instructing episode to learn about bank runs, because at the time two features of the modern financial system to mitigate bank runs were missing.

Panic of 1907

- No central bank
- No deposit insurance

First, there was no central bank, this means banks had no access to government backed emergency liquidity. Second, there was no deposit insurance, without deposit insurance, depositors are much more likely to withdraw their funds when a bank runs

into financial problems. In this period, if a bank meant bankrupt, depositors lost their money.

Panic of 1907

- No single cause

Let's have a look at how this crisis unfolded. Like most crisis, there was not a single cause by the buildup of factors that lead to the bank runs. Think about the 2008 financial crisis. The first tremors appeared as early as December 2007 when two Bear Stearns hedge funds collapsed.

Panic of 1907

- First shock
- 1906 San Francisco Earthquake
- Withdrawals from banks
- Silent stock market crash
- Stock dropped over several days
- Bankruptcies rose

But back to the causes of the panic of 1907, the story starts with the San Francisco earthquake of 1906, that caused damages of about 1.5% of GDP. Such a large shock immediately rippled through the financial system, insurers had to liquidate assets to meet insurance claims. Depositors withdrew money from banks, and stock markets in New York and London dropped. The trend continued. Over a series of days, in March, 1907 stocks declined by over 10%. Similarly, the money market exhibited several spikes with interest rates shooting up from 2.5% to over 10% on several days. This event has been referred to as the silent crash because it did not happen in a single day, but over several days. During April and May, stocks continued to decline by mildly, while bankruptcies rose sharply.

Panic of 1907

- Second shock
- Poor harvest in 1907
- US Treasury withdrew money from banks
- Lower money supply

The 1907 harvest was not as rich as the previous year's reducing exports. The US Treasury, unable to refinance maturing bonds with 230 million from US banks. With depositors withdrawing more money from banks and the US having to export gold to fulfill its obligations, money supply slumped, credit became scarce and interest rates increased. In Short, financial conditions worsened substantially during the summer of 1907. In this environment, the Heinze's brothers who got rich with copper mines, joined forces with Charles W. Morse's to speculate in the copper equity market and bought a large number of shares of the United Copper Company. They used these stocks as collateral for the banking transactions.



When stock prices of copper mine companies fell, the Heinze's brothers brought more and more stock of the United Copper Company to support the stock price. And therefore, the value of the collateral they had placed with banks. They financed this in part by using the stocks again for marching loans with as many as 20 banking houses. At this point, you can see the vulnerability building up in an already weakened system. Speculators make risky bets on stock markets financed by short-term credit. On October 9, 1907, Otto Heinze decided to analyze the trading behavior in United Copper stock and discovered that about 450,000 shares were traded. Even so, according to the company, only 425,000 shares were outstanding.

Short Sale

- Borrow and sell stock

In other words, some progress had lent their stock to investors who shorted the stock. That is, they borrowed the stock, sold it in the hope to buy it back later at a cheaper price and thereby making a profit. The Heinze's brothers believed that progress had lent out the shares that the Heinze's brothers had used as collateral and hands in fact owned. They reasoned that by calling in the shares, they could create a situation in which short sellers would scramble to cover their short position and would drive up the stock price.

Short Squeeze

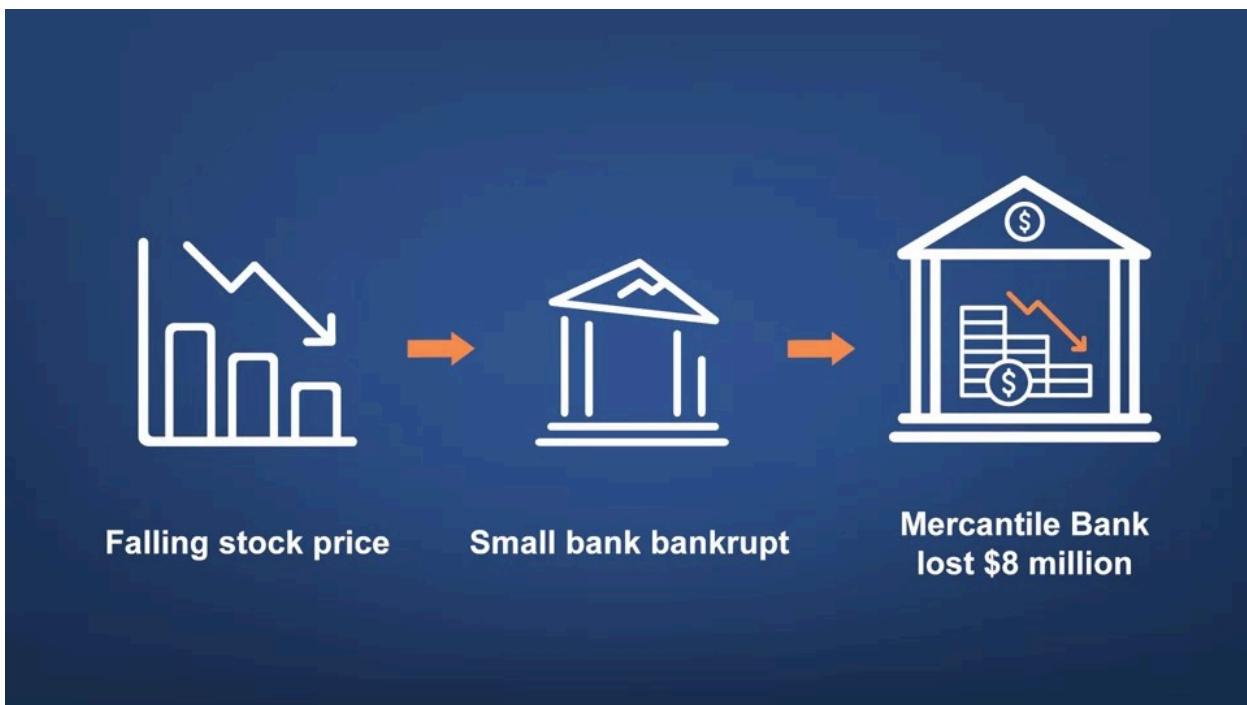
- Force short seller to buy at high prices

Some brokers would not be able to deliver the loaned-out stocks and would need to settle with the process directly. This is called a short squeeze. The most prominent short squeeze happened in 2008 when Volkswagen stock more than tripled within days. To induce the short squeeze, the Heinze Brothers had to borrow 1.5 million to pay off the debt that was collateralized with stocks.



When the United Copper stock dropped again from \$45.5 to \$37.75 the process started

calling in the shares by paying off loans. Within hours, the stock rose by \$23, but then it declined to about \$52. However, the process had miscalculated. All 20 brokers that had extended the process credit backed by the stocks, delivered all the stocks. As a result, the process were not able to meet all the required payments to pay off the loans and refused the delivery of the stocks. The brokers immediately sold off the stocks that the process had refused to accept and the stock price tumbled.

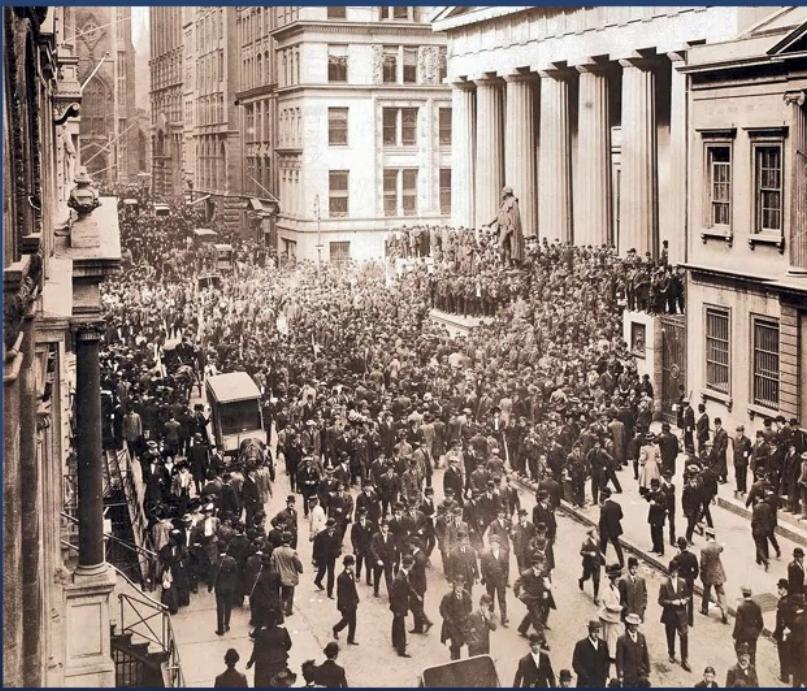


After three days, the United Copper stock had lost 50% of its value and eventually traded for \$10 per share. Otto Heinze & Co, and their broker went out of business and so did a small bank owned by Otto Heinze. That small bank however, used the New York based Mercantile Bank for payment services and deposits worth over \$1 million. Moreover, the Mercantile bank held some of the United Copper stock. Before the short gone wrong, the Mercantile Bank had already lost 8 million of the 19 million deposit it had in April 1907. The additional demands on the Mercantile bank stemming from the short squeeze threatened the survival of the bank.

Panic of 1907

- Private sector intervention
- Knickerbocker trust implicated
- Depositors lost trust
- Bank run starts

In this situation, the New York Clearing House, a consortium of New York banks stepped in and managed to coordinate an orderly settlement of all claims, so that by October 22, 1907, the Wall Street Journal proclaimed that the crisis was over. However, for whatever motivation, the Knickerbocker Trust, the third largest trust in New York, was, despite not having an interest in Copper speculation, implicated in financial irregularities due to the general association with the copper speculators during the Clearing House meetings. The National Bank of Commerce, which was also called J.P. Morgan's Bank, announced that it would no longer provide services to the Knickerbocker Trust. This announcement signaled to observers that the Knickerbocker Trust was in serious trouble. It is not clear that the Knickerbocker Trust was actually financially unsound. But banks rely on trust. If depositors are questioned whether they will get back their money, they will destroy their deposits. On the morning of October 22, 1907, a line started forming in front of the Knickerbocker Trust Office an hour before the trust opened.



The lines seem to grow by the minute, all depositors demanded back their money. The police were called to help with line formation. By mid-day Knickerbocker announced that it had assets worth about 69 million and liabilities worth only 64 million and could pay out everyone. No one dropped out of line, Knickerbocker lost 8 million deposits that day. This is an example of a classic bank run. Knickerbocker was financially sound, but depositors didn't think so and asked for their money back expecting everyone else asking for their money back. Knickerbocker seated operations and by the next day, banks in New York experienced bank runs. After all, if Knickerbocker had to suspend operations, who knows what was going on in the other banks.

Panic of 1907

- Runs spread
- J.P. Morgan stepped in
- Intervention was sufficient

By October 24, several banks had failed. When runs on the National Trust of America started, J.P. Morgan and others stepped in and provided loans to staff of the run. The lack of cash put the New York Stock Exchange on the brink of collapse. Again, J.P. Morgan intervened and raised capital for the exchange, but trading volumes plummeted. But with more trouble on the horizon, namely, more trust companies coming close to collapse, J.P. Morgan was unable or unwilling to extend more credit. A large brokerage firm had borrowed against shares of Tennessee coal, iron, and railroad. But with little trade in the stocks faced collapse.

Panic of 1907

- Solution: forced merger
- 120 Bankers met
- Promised to shore up banks
- Too late: recession followed

The collapse was to be avoided by selling the Tennessee coal, iron and railroad company to US Steel, freeing up cash. Over the first weekend of November, J.P. Morgan summoned about 120 New York Bank and Trust presidents and demanded that they help solving the current crisis and solving the issue of too little cash in trusts, telling them that there will be no additional loans forthcoming. To force a solution, he locked the bankers into his library. Eventually, the bankers agreed, and J.P. Morgan contributed another 25 million to resolve the crisis. The good news rested the bank runs, but the damage was done. A recession followed.

Panic of 1907

- Speculation about bank soundness
- Solution: Deposit Insurance
- Bank runs
- Solution: central bank liquidity

In this lesson, we have seen how a classic bank run evolves. In particular, the start of the run was caused by speculation about bank soundness. As such, the episode illustrates by deposit insurance is important, speculation that the bank is not sound has little effect if depositors know that their deposits will be in doubt paid by the insurance. This is one reason why classical bank runs that is depositors lining up to take out their money are rare nowadays. The second reason is that the Federal Reserve is now the lender of last resort, where banks can borrow. In the Panic of 1907, J.P. Morgan acted as the lender of last resort. However, without government backing, options of private lenders of last resorts are limited. They can also run out of cash or eventually face runs on their own institutions.

Lesson 4-2: Consequences of Financial Crises

[Lesson 4-2.1: The Great Depression](#)

Learning Objectives

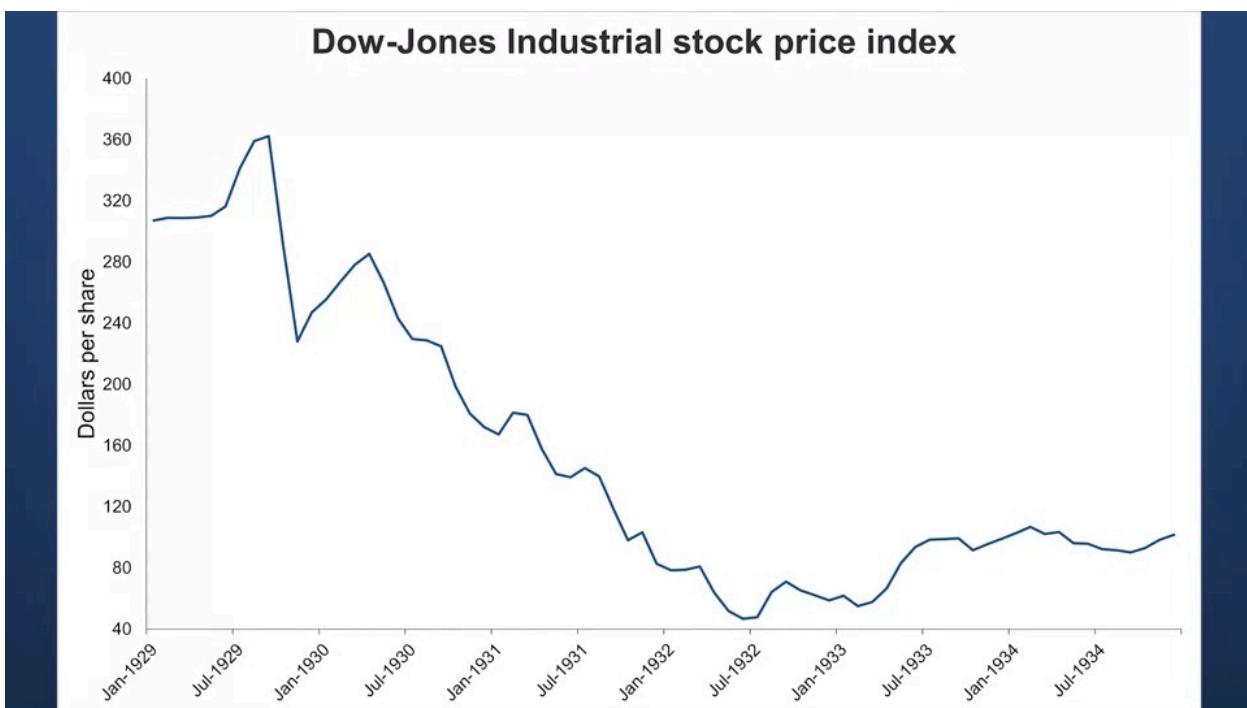
- Great Depression
- Financial developments
- Consequences of bank failures

Hello and welcome to this lecture on the Great Depression. The most severe economic downturn in the United States and most of the western world. We will first discuss the financial developments during the Great Depression. We will then study the economic consequences of large scale bank failures. Last we will examine the political response and the institutional changes instituted after the Great Depression. The Great Depression is a particularly instructive example when studying the effects of financial crisis. Because at the time, most policies that would mitigate the effects of a financial crisis, such as deposit insurance or unemployment benefits did not exist in the United States.

The Great Depression

- Stock market crash in 1929
- Margin calls led to...
- More stock market losses

Let's start by briefly summarizing the start of the Great Depression. On October 24, 1929, the so-called Black Thursday, the market lost 11% on the opening bell. The crash followed a trap of the London Stock Exchange caused by fraud allegations against large investors. On October 28, 1929, more and more investors faced margin calls on stocks bought on credit due to dropping stock prices. As a result, more investors sold their shares and cut their losses. The Dow lost almost 13% that day. The next day, investors traded a record number of shares. Sixteen million shares changed hands on a single day. The next day, the stock market showed signs of illiquidity. Some stocks could not be sold at any price. The Dow lost another 12%.



The chart shows the Dow-Jones Industrial stock price index. As you can see the developments over October 1929, were just the prelude to long decline in stock prices. From September 1929 to July 1932, stock prices dropped by over 80%. When the crisis began, over 8,000 commercial banks belonged to the Federal Reserve System, but nearly 16,000 did not. At the time Banks often owned stocks themselves and had limited cash reserves. So not having access to the Federal Reserve System for cash was problematic.

The Great Depression

- Contagion in the banking system
- Many local bank runs

Banks without access to the Federal Reserve often deposited cash, with other larger banks, creating the potential for contagion in case small banks withdrew their deposits from large banks or large banks themselves ran into difficulties. In this environment, depositors naturally wondered about the soundness of banks. A perhaps surprising feature of the Great Depression is that there was not one national bank panic, but a large number of local bank runs. In total about 9,000 banks closed their doors between 1929 and 1933. The large number of bank closures sharply reduced deposits.

The Great Depression

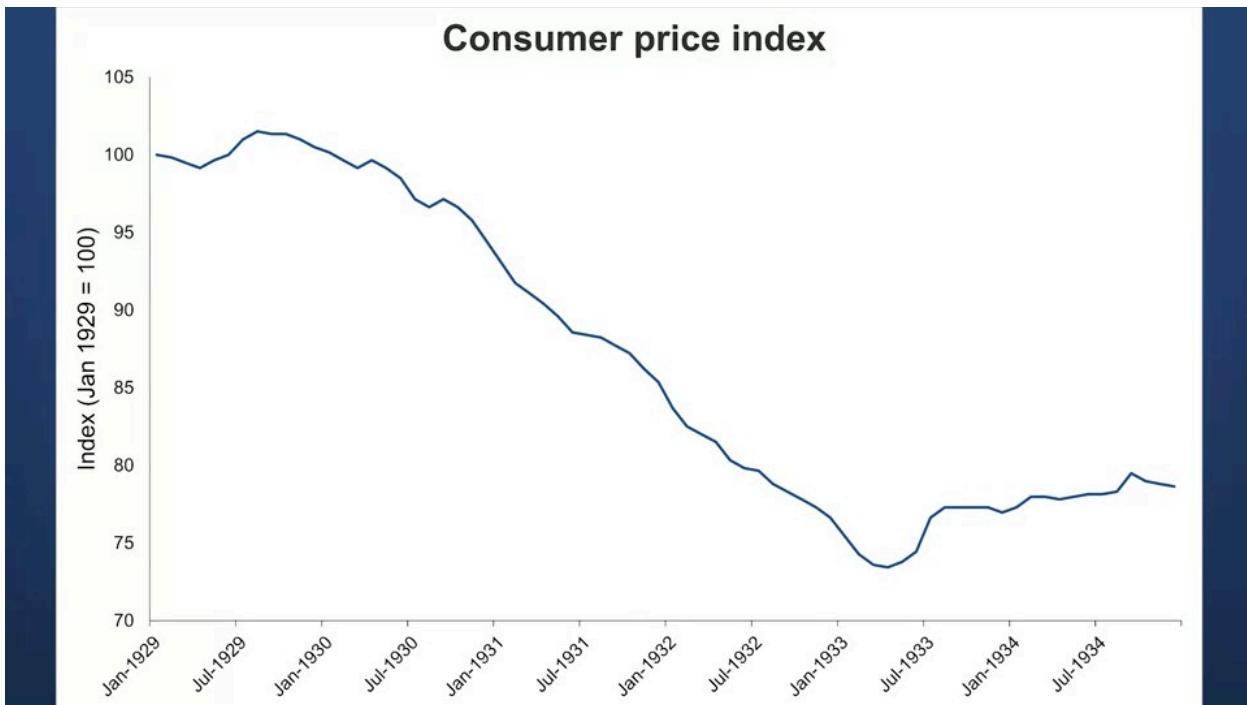
- Huge deposit outflows
- Money supply dropped
- Gold standard limited Federal Reserve

Banks in turn tried to shore up their cash reserves and reduced lending, and as a result, the money supply shrank. You may wonder why the Federal Reserve did not just increase the money supply. At this time, the United States, as most other nations was on the gold standard, meaning that money was backed to gold at a fixed exchange rate. That severely limited the Central Bank's options.

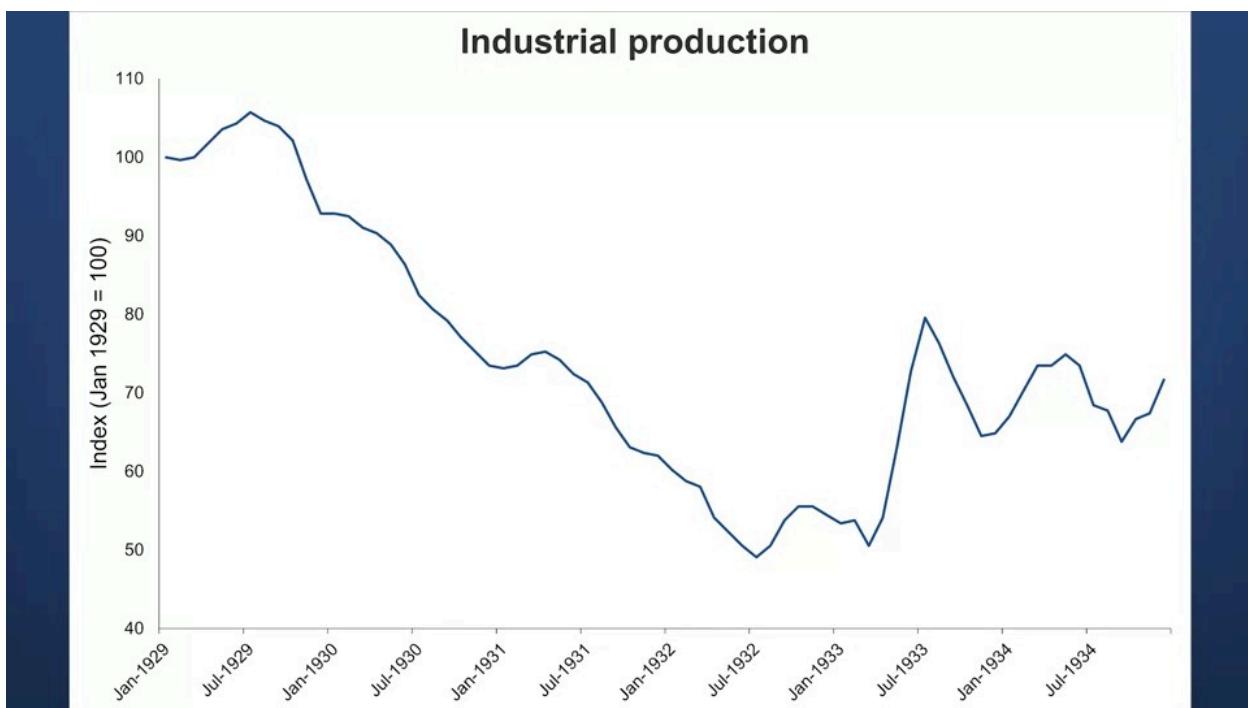
$$P * Y = M * V$$


Recall the quantitative theory of money that states that the price level, P times the

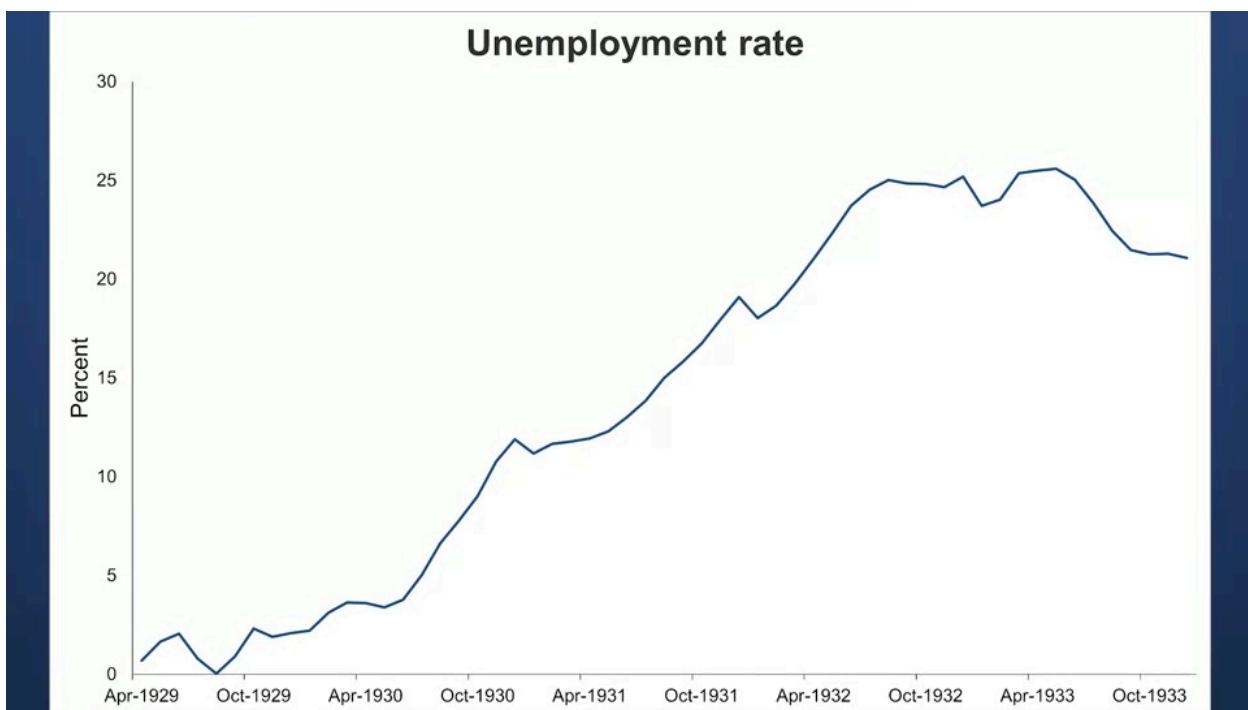
number of transaction Y has to be equal to the money supply M, times the velocity of money V. Large scale bank failures reduced the money supply M and because the whole financial intermediation process is affected, the velocity can go down as well. So either the price level or the number of transactions, meaning output or both have to go down as well.



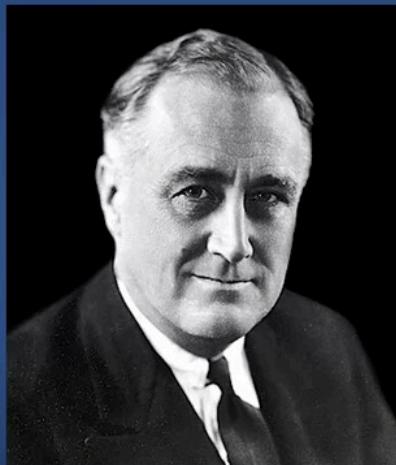
In this chart, you see prices dropped about 25% during the Great Recession. The decline was even more pronounced for food. This deflation meant that farmers and firms faced higher debt in real terms, meaning in terms of goods produced. As a result, many farmers and businesses went into bankruptcy. These bankruptcy would cause additional stress in the banking system, lower prices and especially expected lower prices in the future, reduce the incentives to invest. If holding cash means that you can buy more tomorrow, in terms of goods, why invest the cash in a risky business endeavor, that can only charge low prices in the future?



With deflation setting in and less credit being available, business investment plummeted. The reduction in investment, together with the large number of bankruptcies, led to a prolonged decline in industrial production. As you can see in this chart, industrial output dropped by 50% during the Great Depression. This was an unprecedented drop in economic activity. With the economy contracting unemployment, rose fast.



In this chart, you see the unemployment rate increased from virtually zero at the beginning of the Depression to over 25%, by the end of the depression. Poverty and social unrest followed as unemployment insurance did not exist. One of the most prominent examples of social unrest was the World War I Veterans march. In 1932, the troopers of World War One Veterans organized a group called the Bonus Expeditionary Forces to march on Washington D.C. An estimated 20,000 veterans converged on the nation's capital and camped in Washington D.C., demanding a bonus payment that had been promised but had stalled in Congress. The protest was eventually broken up by force, but the pictures of tanks dispersing hungry veterans weakened President Hoover's reelection bid.



In November Franklin Delano Roosevelt campaign on economic populism, won the election and the veteran bonus was eventually paid in 1936.

The Great Depression

- FDR declares bank holiday week

One of the first actions of Roosevelt after being sworn in, was to declare a bank holiday, or more precisely, a bank holiday week on March 6, 1933. For an entire week nobody had access to banks or banking services. That meant that no money could be withdrawn or transferred and arrested bank fronts that had started again earlier that year. The purpose of the bank holiday was to buy time to enact legislation that would restore confidence in the banking system and thereby prevent future runs.

Emerging Banking Act 1933

- Reopen only solvent banks
- Federal Reserve “guaranteed” deposits
- Stock market skyrocketed

The Emergency Banking Act of 1933 achieved this goal. In short, the act would ensure that only banks in good condition would reopen and banks in poor conditions would be shut down. Moreover, the act gave the Federal Reserve more authority and made it easier to lend to banks. The Federal Reserve became effectively the guarantor of deposits of reopened banks. The results were immediately visible. After the act passed, the Dow-Jones industrial stock price index gained over 15% in one day and bank runs ceased. The Banking Act of 1933, also called the Glass-Steagall Act, added Protections for depositors in June 1933.

Glass-Steagall Act 1933

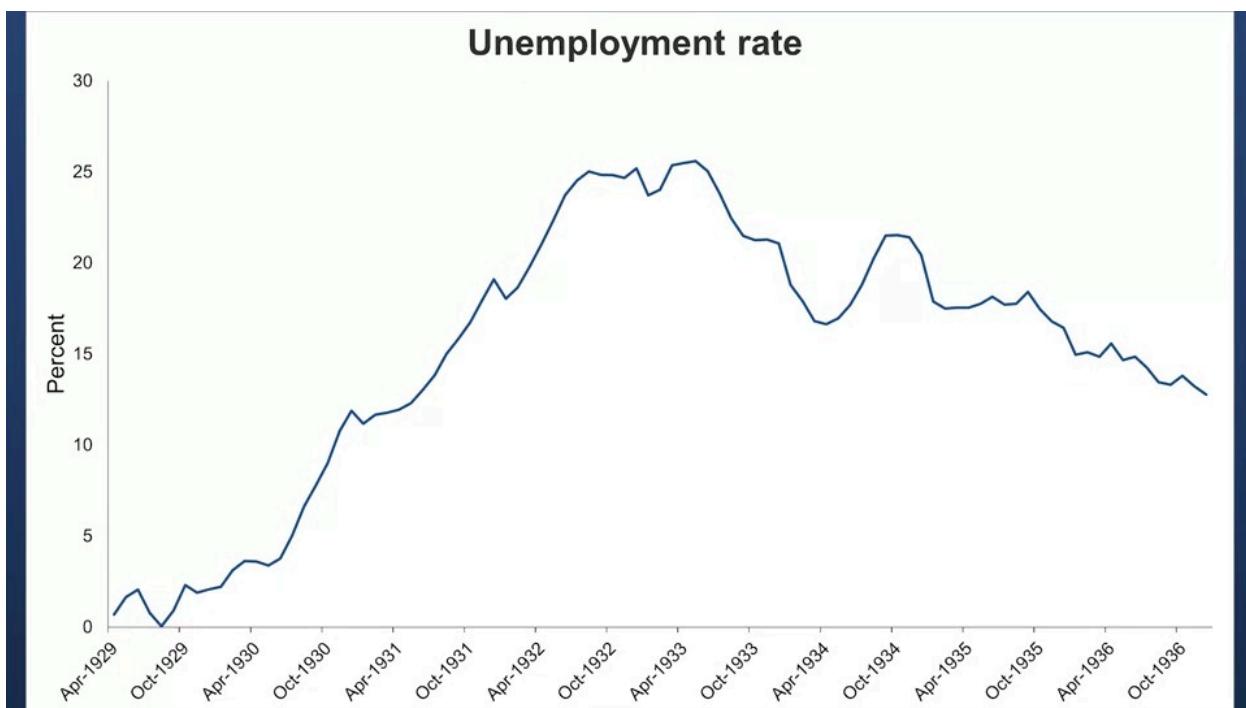
- Separate deposit-taking and investment banking
- Created deposit insurance
- Increased bank supervision

By separating commercial meaning deposit taking and investment banking, depositors were no longer exposed to banks risk taking in stock or, more generally, securities markets. The act also established the Federal Deposit Insurance Corporation, or FDIC, providing some insurance for deposits, which helped to prevent further runs. The Banking Act also increased bank supervision and altered some features of the Federal Reserve system. While the banking panic was over, the real economy was still in dire straits. As part of the new deal that fundamentally reshaped the role of government in economic crisis. Roosevelt's first objective was to alleviate the suffering of unemployed workers.

Economic Recovery

- Works Progress Administration
- Civilian Conservation Corps

The government created jobs through the Works Progress Administration, and the Civilian Conservation Corps. The Works Progress Administration gave some 8.5 million people jobs, mostly in construction. More than 650,000 miles of roads, 125,000 public buildings, 75,000 bridges and 8,000 parks were built. The Civilian Conservation Corps provided work that included planting trees, building flood barriers, fighting forest fires and maintaining forest roads. It is important to note that these projects could be started on short notice and had immediate effects.



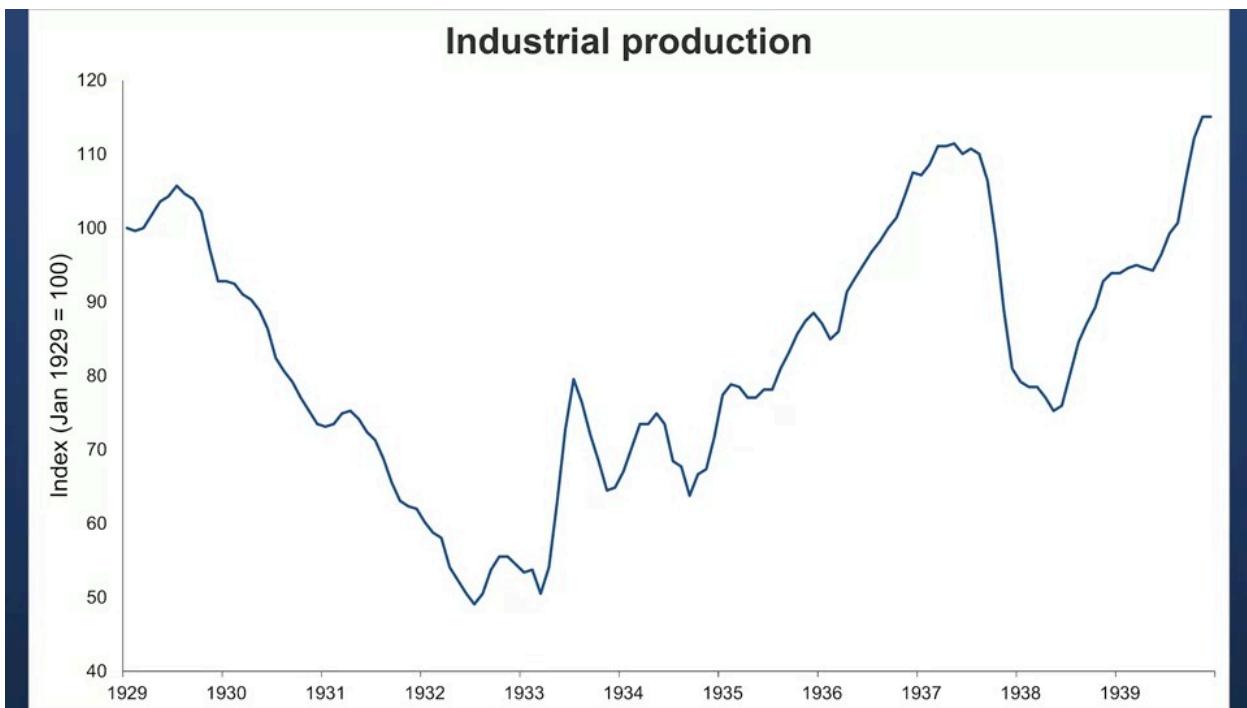
The chart shows you that unemployment dropped by nine percentage points within a year. The economic plight of people had also shown the need for a social safety net.

Social Safety Net

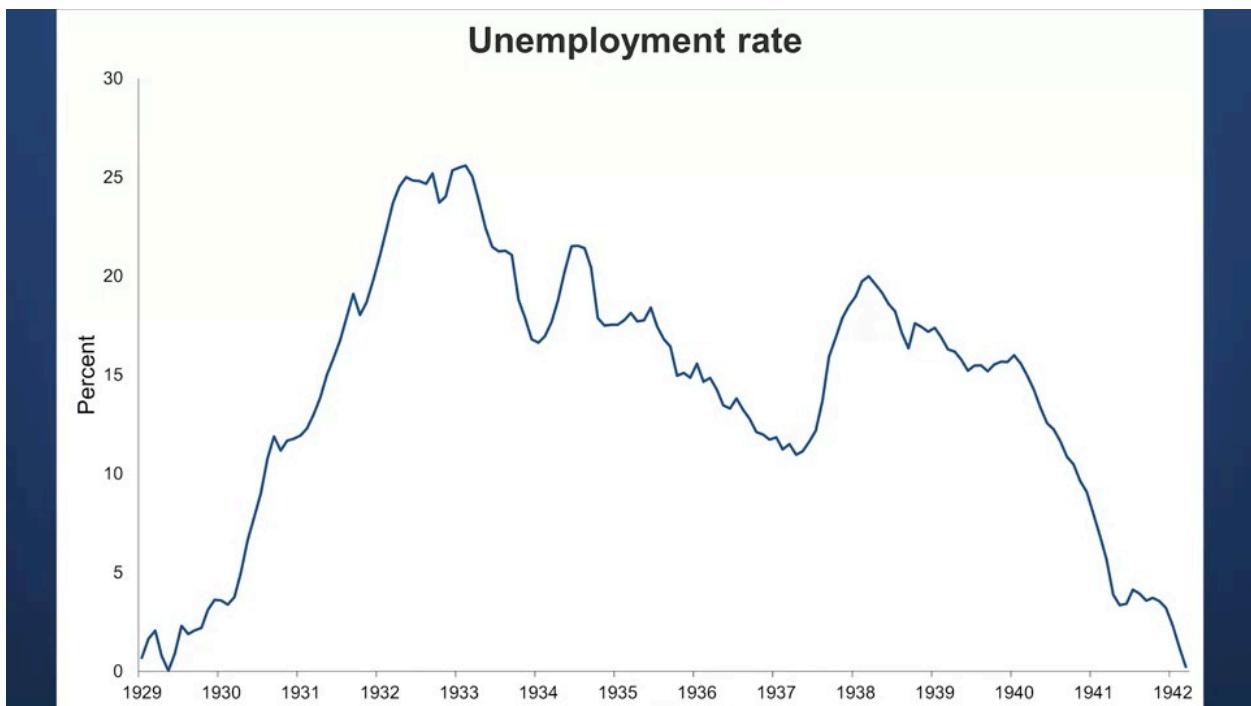
- Social security
- Unemployment and disability benefits
- National Labor Relations Board

The creation of a pension system through the Social Security Administration, unemployment benefits and disability benefits were part of the new deal. The new deal also restructured labor relations by creating the National Labor Relations Board. The economy seemed to be on track again. However, the new deal needed to be financed

and taxes increased. Moreover, with the improvements in the economy, the fiscal stimulus was withdrawn. At the same time, the Federal Reserve increased reserve requirements for banks, thereby reducing the availability of credit. In other words, contractionary monetary and fiscal policy hit the economy at the same time in 1937.



You can see the result in the chart. Industrial production collapsed again in 1937. The recession ended when the Federal Reserve reduced reserve requirements. The 1937 episode provides a cautionary tale against withdrawing economic support too early.



The recovery was swift. As you can see in this chart, unemployment dropped fast after the 1937 recession. However, it is important to note that another stimulus helped the economy to grow so fast. The defense buildup in Europe and the subsequent increase in government spending. You can see that starting mid 1940, the reduction in unemployment accelerated.

Summary

- Great Depression as a case study
- Lack of government safety net
- Only large-scale government interventions can restore confidence
- Early withdrawal of support counterproductive

What have we learned in this lesson? First, using the Great Depression as a case study

of the consequences of financial crisis. We saw that the effects can be devastating, especially in the absence of a social safety net or government interventions. Second, only large scale changes to the financial system can restore the confidence in the financial system. Third, the recession of 1937, illustrates that providing too little or destroying government support for the economy to early, may result in another economic slowdown.

Lesson 4.2.2: An International Perspective of Financial Crises

Global vs Local Crisis

- Common themes of global crises
- Common themes of idiosyncratic crises

Hello. Welcome to this lecture on an international perspective of financial crisis. In this lecture, we're examining differences between the global financial crisis and idiosyncratic financial crisis. We will study common themes of global financial crisis. We will then look at causes for idiosyncratic financial crisis and identify common themes. Let's start with five crisis that featured financial markets stress globally.

Global Crisis

- 1) The Panic of 1873
- 2) The Baring Crisis of 1890
- 3) The Panic of 1907
- 4) The Great Depression 1930/31
- 5) The 2008 Financial Crisis

The Panic of 1873, The Bearing Crisis of 1890, The Panic of 1907, The Great Depression of 1930/31, and The 2008 Financial Crisis. Our goal is to understand, A, how this crisis unfolded and, B, why the crisis were global. I will give a brief overview of each of the crisis. The Panic of 1873 was the first global banking crisis. One key vulnerability of a country's financial system was railroad bond speculation. Railroads were the hot investment of the mid 1800s. Milestones like the completion of the transcontinental railroad connecting the US east and west Coast in 1869 fueled the interest in railway investment. This was not only true in the United States, but also in Europe. For instance, railway companies financed by that popped up all over Germany. Railroad stocks rallied and many banks held railroad bonds as investments. However, note that railroads need a lot of upfront investments with little or no return in the early years.

Railroad Speculation Bubble

Shocks:

- Boston and Chicago Fires
- Abandon silver currency
- Franco-German war

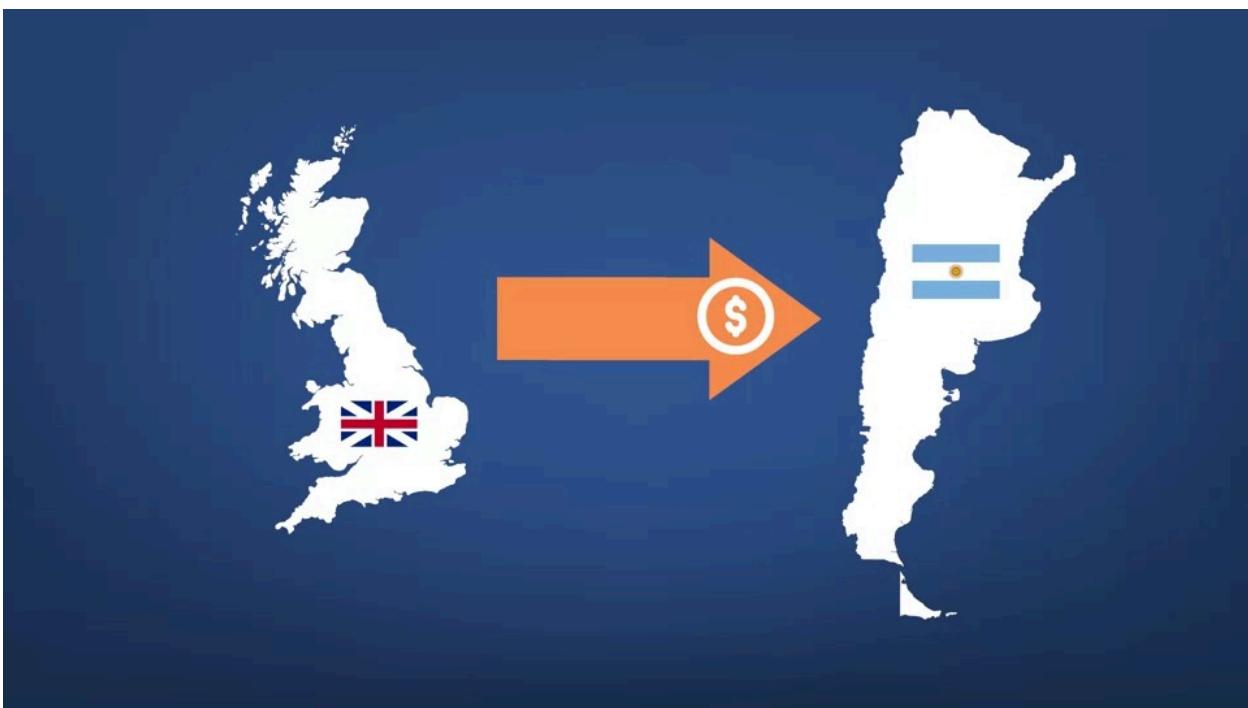
There are a number of contributing factors that eventually led to the bust of the railroad speculation bubble. For instance, the Boston and Chicago Fires right before the crisis reduced bank reserves. Germany and the US abandoned silver currencies, putting strains on the miners and the dislocations from the Franco-German War were still present. The first signs of the crisis became visible in Vienna, where the stock exchange crashed on May 9th in 1873 and a series of bankruptcy followed. In Germany, a large railway company collapsed, adding to the panic. In the US, Jay Cooke & Co, a major bank, was unable to market railroad bonds and collapsed in mid-September, sparking bank runs across the country and the bankruptcy of several insurance companies. The US and Europe plunged into deep recessions with unemployment rising fast. The crisis also affected the Ottoman Empire and Latin America. A prominent victim of this crisis was the Freedman's Bank, the first and at the time only bank that served the Freedmen.



Panic of 1873: Summary

- Speculative, long-term investments (railroad bonds)
- Large losses from railroad investments reduced trust in banking system

All told, this crisis originated in speculative investment, railroad bonds that lead to large losses and the lack of trust in the banking system. A different type of investment, namely government debt, sparked the so called Bearings Crisis of 1890. By 1890, Argentina had experienced a decade of capital inflows. The current account deficit was about 20% per year between 1884 and 1889. The money was used to finance long-term investment and infrastructure, including the building of railroads and transportation networks and the improvement of cultivator blend.



The capital was raised mostly in London by European banks, including Bearings.

The Baring Crisis of 1890

- Long-term investment
- Large budget deficit
- No more bond issuance
- Argentina defaulted
- Markets around the world dropped

By the late 1880s, as much as 40% of the foreign borrowing was going towards debt services, and 60% of imports were going towards consumption. Argentina was also running a substantial budget deficit. Railway net profits had peaked in 1888, and eventually, international investors became wary of Argentina's finances. Bearings could not find investors for Argentina's debt issuances and defaulted. Argentina experienced

bank runs and unable to raise new funds, defaulted. This default led to sharp recession in Latin America, and led to steep stock market drops in Europe and the US. As with the 1873 crisis, a credit room to speculative long-term investments eventually turned bad. But note the international linkages here. The credit was provided by international investors.

Panic of 1907

- Large insurance losses
- Copper speculation financed by credit
- Bank runs

The next crisis, the Panic of 1907 originated in copper speculation. Since we discussed the Panic of 1907 in a separate lecture, I will be very brief. The San Francisco earthquake caused large losses for insurance companies, railways and banks, and shops in the New York and London Stock markets. Against this backdrop, copper speculation led to even more losses in the banking system that in turn led to bank runs, bank closures, and the recession that spread from the US to Europe. In the US, the unemployment rate rose to over 16%, Britain was also [inaudible]. For instance, the British unemployment rate doubled from 3.6% to 7.8% between 1906 and 1908. Germany, Japan, and Italy also experienced bank runs. The Panic of 1907 is an example of financial speculation in the commodity market gone bad. However, the effects are similar to other crisis. Bank losses caused bank runs and hence credit and the real economy contracts. Here, too, international linkages, such as insurance companies backing risk in San Francisco, as well as global copper investments allowed the crisis to spread.

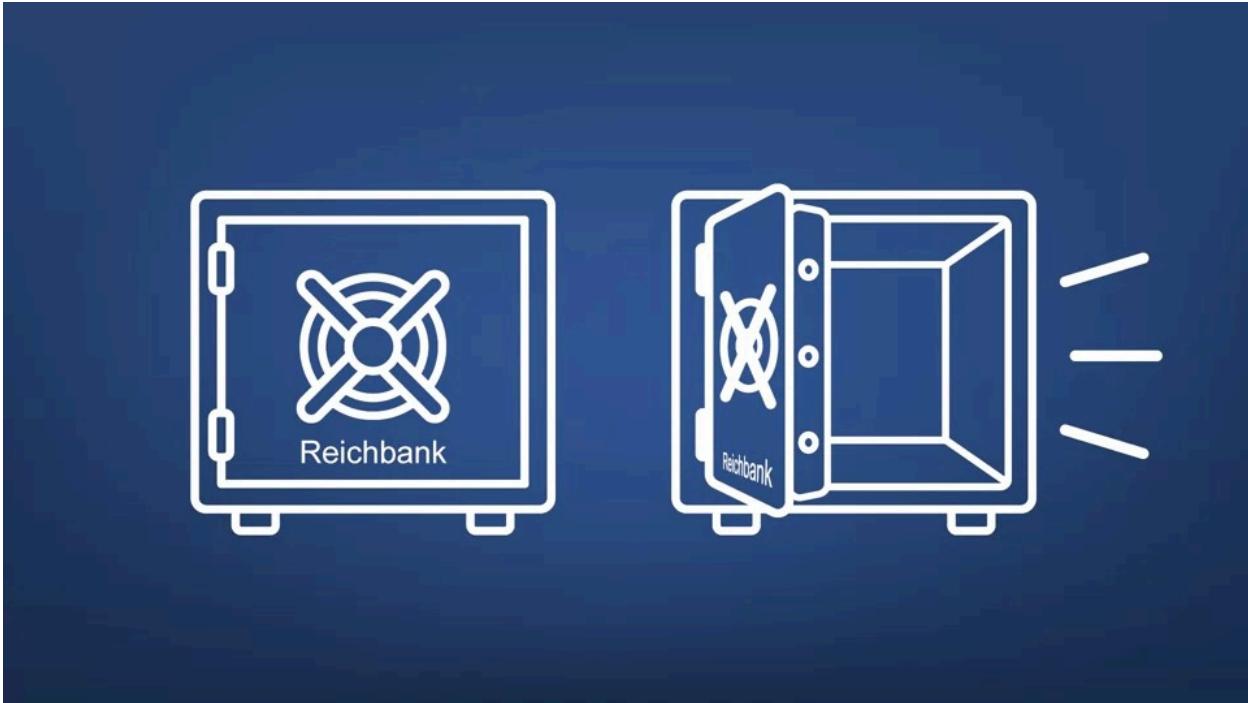
The Great Depression

The Great Depression provides the clearest example of the importance of international linkages. Since we discussed The Great Depression separately, let me just focus on the international component.



In 1929, when the stock market crash in the United States, triggered The Great Depression, most countries were on the gold standard, that means all currency was convertible into gold. This also meant fixed exchange rates as each currency was fixed

to gold. The US was also a net lender in the global market. When the banking crisis unfolded, the US stopped lending, and in fact, hoarded gold. This left other countries to scramble to increase the gold reserves and therefore their money supply. Less money supply put strains on banks, and eventually bank runs emerged.



For instance, the German Reichsbank basically ran out of gold when short-term creditors stopped lending to Germany. In the end, the gold standard was abandoned to increase the money supply and to stop bank runs.

The Great Depression

- Linkages through currency on gold standard
- Transmitted shocks internationally

In a nutshell, The Great Depression was transmitted through the international financial system that featured the gold standard and therefore fixed exchange rates. Different from the earlier crisis, the issue here was not that everybody invested in the same product, but that all currencies and all money supply around the world were linked. With floating exchange rate the value of a currency adjusts, when facing international shocks. With fixed exchange rate, the money supply and therefore credit have to adjust with large negative consequences. You are probably familiar with the 2008 financial crisis. Let us summarize the bigger points. The crisis originated in the US housing market, so other countries, such as Spain, had also experienced the housing boom.



But international investors had poured investments in the US housing market. The extents of these investments became clear when a mid-size German bank, the IKB failed in June 2007 due to losses in the US mortgage market.

2008 Financial Crisis

- Long term investments financed short-term credit
- Globally integrated financial system

Many mortgage investment vehicles were financed by short-term credit. Once the short-term credit, including repos, were no longer rolled over, the vehicles collapsed. But also banks, most notably Lehman, depended on short-term credit collateralized by mortgage

investments. You are familiar with the rest. Lehman collapsed so that the largest insurer, AIG, leading to large drops in the stock market and a panic in the funding markets worldwide. While in the great depression, linkages through the gold standard transmitted the crisis. In 2008, the crisis unfolded worldwide because of the globally integrated financial system. To be clear, an integrated financial system helps when shocks are small as they can be absorbed easily. But a shock to the largest economy impacts everyone.

Local Financial Crises

Now let us look at two more local crisis and their features. The first one is Turkey, which experienced a financial crisis in 2001, and one that started in 2018. The second is the Asian Financial Crisis. Both crisis are insightful because they highlight a potential vulnerability of emerging market economies.

Turkey

- Budget deficit financed with debt
- Government did not pay bonds
- Banks came under stress

Throughout the 1980s and 1990s, the Turkish economy had relied on international loans to finance investment. At the same time, the Turkish government ran a large deficit financed by debt that was mostly bought by Turkish banks. The higher debt also lead to a higher inflation. When the ruling coalition was unable to continue to work together, foreign investors became concerned and withdrew about 70 billion from Turkey. At the same time, the Turkish government did not serve its debt leading to losses in the banking sector. The economy was cut off from credit and slowed considerably and the IMF was called in for help. In 2001, financial and political instability resulted in a further deterioration of the situation.

Turkey

- Short-term interest rate spiked
- Foreign credit dried up
- Resulting in recession

Stocks plummeted and the overnight interest rate reached 3000%. Large quantities of Turkish lira were exchanged for US dollars or euros. The Turkish Central Bank lost \$5 billion of its reserves. The financial crisis that started in 2018 had similar features, political instability, high inflation, loss of trust of international investors, and high interest rates. However, foreign investors were crucial for Turkish firms. By the end of 2017, the corporate foreign currency debt in Turkey had more than doubled since 2009, up to \$240 billion after netting against their foreign exchange assets. As in 2001, with foreign investors withdrawing credit, the Turkish economy experienced the credit crunch, high interest rates, and the slowdown of economic activity.

1997 Asian Crisis

- Short-term credit from international investors
- Fixed exchange rate
- High leverage

The dependence on foreign, often short-term credit was also at the heart of the 1997 Asian Crisis. Many South East Asian countries had pegged their currency to the US dollar to ensure price stability. This means that the exchange rate is fixed and needs to be defended by the central bank. The advantage is that firms can take out loans in a currency with little volatility and hence lower their borrower costs if lenders are not concerned about exchange rate risk. As a result, the foreign debt to GDP ratios in the largest South Asian countries exceeded 100%. In other words, this economy is heavily dependent on foreign credit. The crisis was triggered when Thailand could not maintain the exchange rate peg with the US dollar and the bar depreciated considerably.

1997 Asian Crisis

- Fixed exchange rate not sustainable
- Capital flight

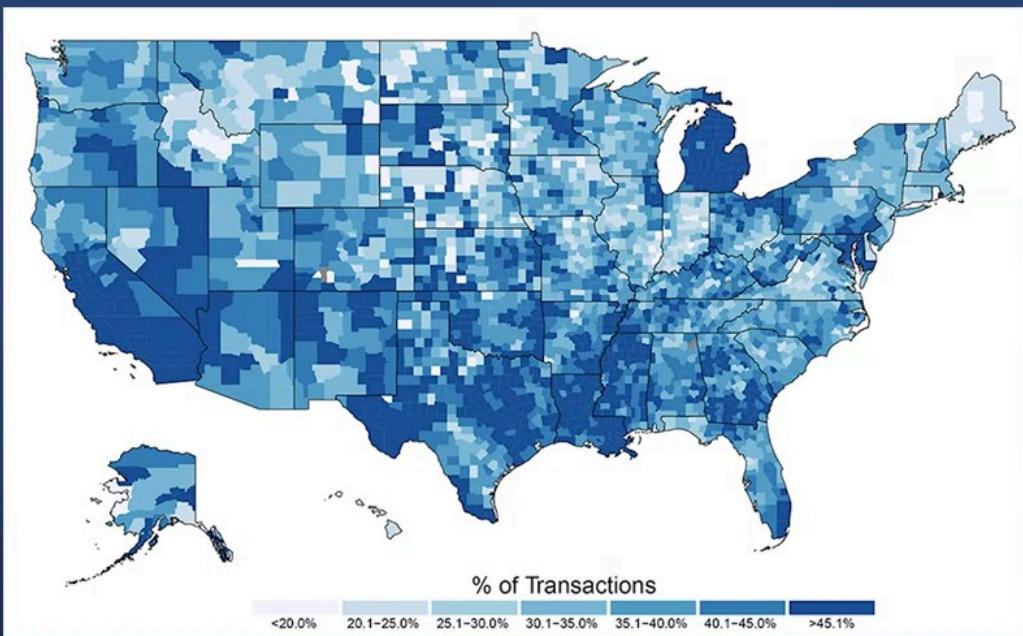
Because of concerns that other South Asian countries would also depreciate their currencies, international investors withdrew their money. This international chain reaction hit almost all South East Asian countries simultaneously. Stock markets dropped, financial companies went out of business. Having relied on short-term credit from international investors that was no longer available, the South Asian economies contracted.

Summary

- Common features of financial crises:
 1. Too much short-term debt
 2. Too much leverage
 - 3a. Long-term investment sours
 - 3b. Unsustainable government policy

What have we learned from all of these crisis? The following ingredients are common among them, reliance on flighty short-term funding, relatively high leverage using short-term funding, and either long-term investments like railway bonds that were banned, or unsustainable policies, like large budget deficits or fixed exchange rates.

[Lesson 4.2.3: Auto Loans During the 2008 Financial Crisis](#)



Hello and welcome to this lecture on auto loans during the 2008 financial crisis. In this case study, we will look at what happened in the auto loan market, a market in which non-bank lenders play a large role when short-term funding dried up. We will see that not only banks are susceptible to runs and that a drop in credit supply led to a drop in auto sales. Before the 2008 financial crisis, about half of all order loans were originated by captive finance companies. A captive finance company is a lender that is owned by the automaker. For instance, Ford Motor Credit, GM Financial, or Toyota Financial Services. The map shows you the distribution of market share of captive finance companies across US counties. As you can see, the market share is particularly high in Michigan, where most of the automakers are located, in the South which historically had less banks than the North, and in the West. In other words, captive finance companies were particularly strong where there was less access to bank credit. Different from banks, captive finance companies do not take deposits. Instead, captive finance companies funded themselves by issuing asset-backed commercial paper and asset-backed securities. Let's first discuss how asset-backed commercial paper work in this context.

Captive finance companies rely on short-term debt I



A captive finance company would establish a trust and transfer auto loans into that trust. The trust would then issue commercial paper that is backed by the order loans and the cash flow from these loans. The trust uses the proceeds of the asset-backed commercial paper issuance to pay the captive finance company for the loans. Typically, these trusts are revolving. This means that the captive finance company puts in new auto loans as old auto loans are being paid off. By doing so, the captive finance company has continuously access to short-term funding, which in turn allows the captive company to issue new loans.



However, commercial paper has a maturity of utmost 270 days and needs to be ruled over continuously. This means that the captive finance companies just like banks for short term and length long term, that is, they engage in maturity transformation. Asset-backed securities are slightly different. Here, the captive finance company sets up a trust and transfers the auto loans into that trust. The trust raises money by issuing longer-term notes.


FORD CREDIT

\$999,980,000

Ford Credit Auto Owner Trust 2018-B

Issuing Entity or Trust
(CIK: 0001754784)

Ford Credit Auto Receivables Two LLC Depositor (CIK: 0001129987)	Ford Motor Credit Company LLC Sponsor and Servicer (CIK: 0000038009)
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Before you purchase any notes, be sure you understand the structure and the risks. You should read carefully the risk factors beginning on page 17 of this prospectus.

The notes will be obligations of the issuing entity only and will not be obligations of or interests in the sponsor, the depositor or any of their affiliates.

The trust will issue:	Principal Amount	Interest Rate	Final Scheduled Payment Date
Class A-1 notes	\$ 205,000,000	2.50308%	November 15, 2019
Class A-2a notes	275,000,000	2.96%	September 15, 2021
Class A-2b notes ⁽¹⁾⁽²⁾	100,000,000	one-month LIBOR + 0.12%	September 15, 2021
Class A-3 notes	317,000,000	3.24%	April 15, 2023
Class A-4 notes	102,980,000	3.38%	March 15, 2024
Class B notes ⁽³⁾	31,580,000	3.53%	May 15, 2024
Class C notes ⁽³⁾	21,050,000	3.68%	April 15, 2025
Total	\$ 1,052,610,000		

Here's an example from Ford Motor Credit owner trust 2018-B that issues almost one billion in notes. The notes will be backed by a pool of car, light truck, and utility vehicle loans bought by Ford Motor Credit. As you can see in this transaction, the maximum maturity is seven years, a much longer financing horizon. There's not much maturity transformation in this deal. At the same time, you can also see that the longer maturity, the higher the interest rate on the note. Moreover, this is a one-time deal, meaning that different from asset-backed commercial paper, the pool of loans will not be replenished and the loan payments are used to pay off the notes. Before the 2008 financial crisis, asset-backed commercial paper was a mean source of funding for captive finance companies because it was cheaper than asset-backed securities and revolving. However, when the subprime crisis started to hit the mortgage market in 2006 and 2007, investors became suspicious of the qualities of loan pools backing asset-backed commercial paper.

Subprime Crisis

- Concerns about subprime auto loans
- Less funding for auto loans
- Finance companies tighten credit standards
 - Less credit available
 - Funding dried up

One question that was asked was, how many subprime auto loans were in those loan pools? When investors discovered that the mortgage pool from the term Motors Acceptance Corporation was of low quality, the concerns built over into the auto loan market. Investors were less and less willing to roll over asset-backed commercial paper backed by auto loans, reducing funding available to captive finance companies. The response of General Motors Acceptance Corporation was dramatic. In October 2008, General Motors Acceptance Corporation announced that it would considerably tightened credit standards and would only lend to consumers with a credit score above 700. At the same time, on the median credit score was 720, meaning a large number of potential auto buyers would be denied credit. Other captive finance companies had also already tightened their credit standards. Nevertheless, investors refused to roll over asset-backed commercial paper and this funding dried up completely. The collapse of the trust meant that the captive finance companies had to pay off the asset-backed commercial paper.

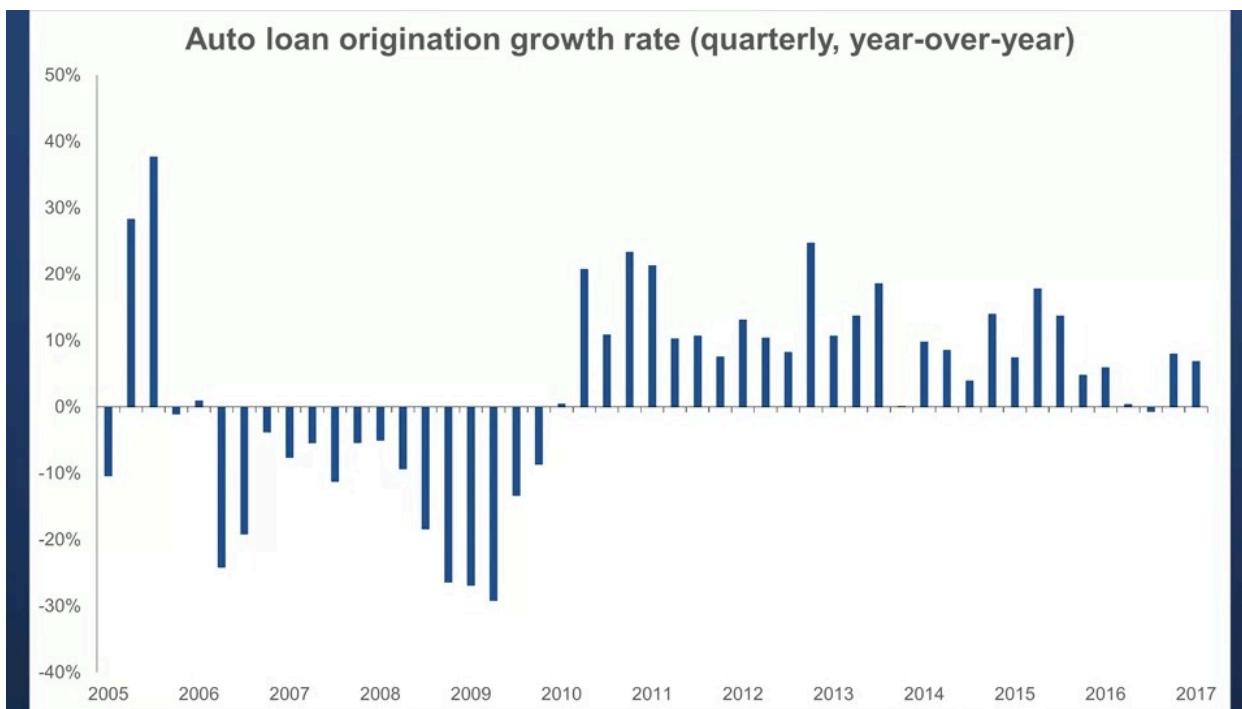


General Motors Acceptance Corporation and Chrysler Financial incorporated were unable to meet their obligations and collapsed.

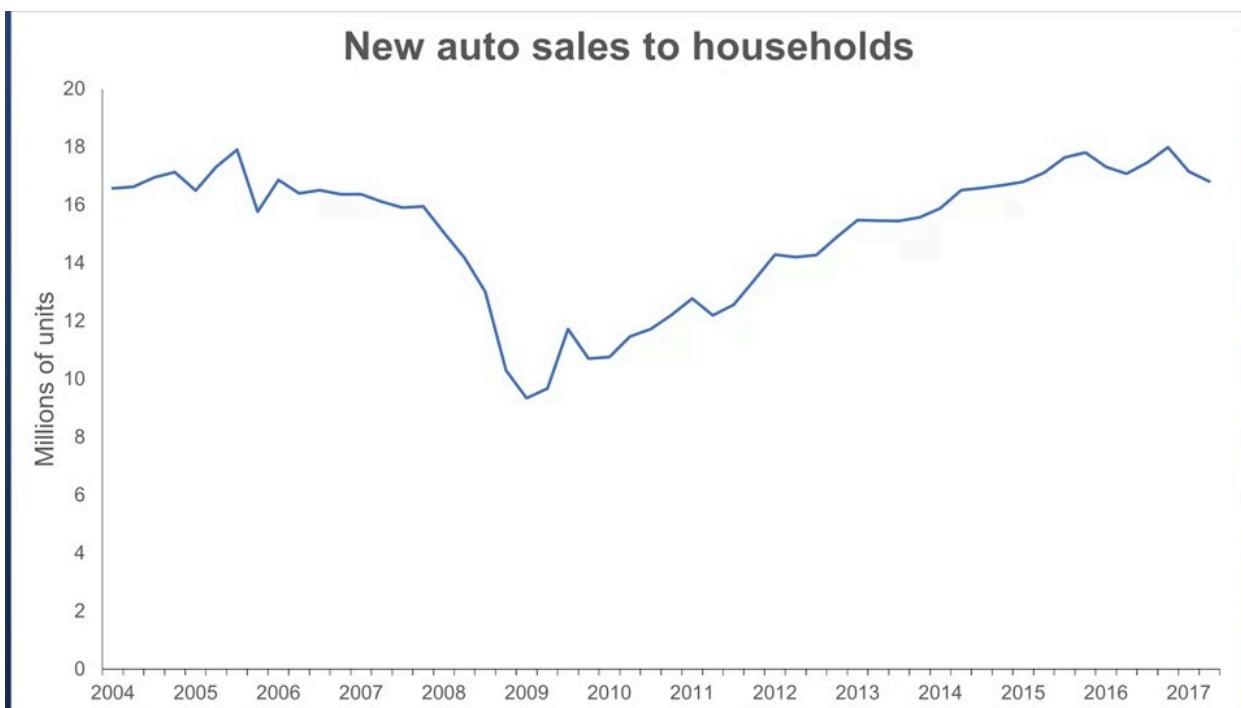


The unwillingness of investors to rule over the asset-backed commercial paper is in essence the same as a bank run. Short-term funding is withdrawn by all investors simultaneously, leading to the collapse and liquidation of the trust. Let's look what this

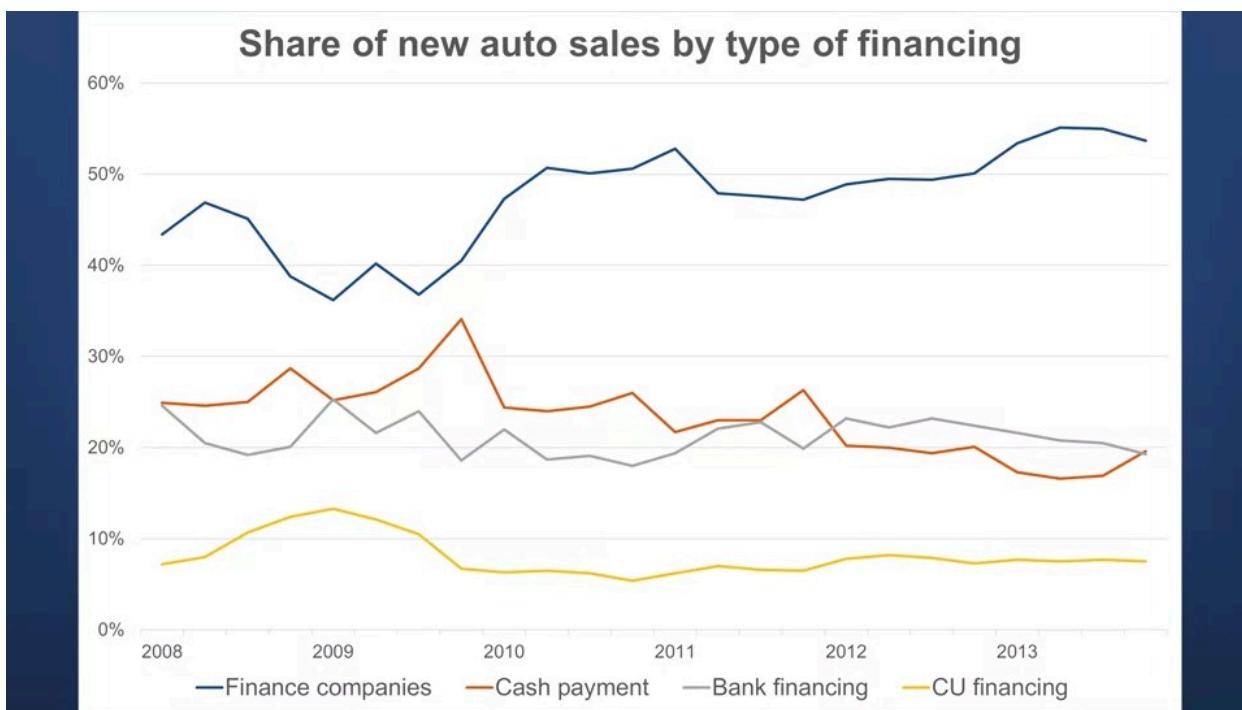
run on the asset-backed commercial paper trust and the resulting credit crunch meant for other loans.



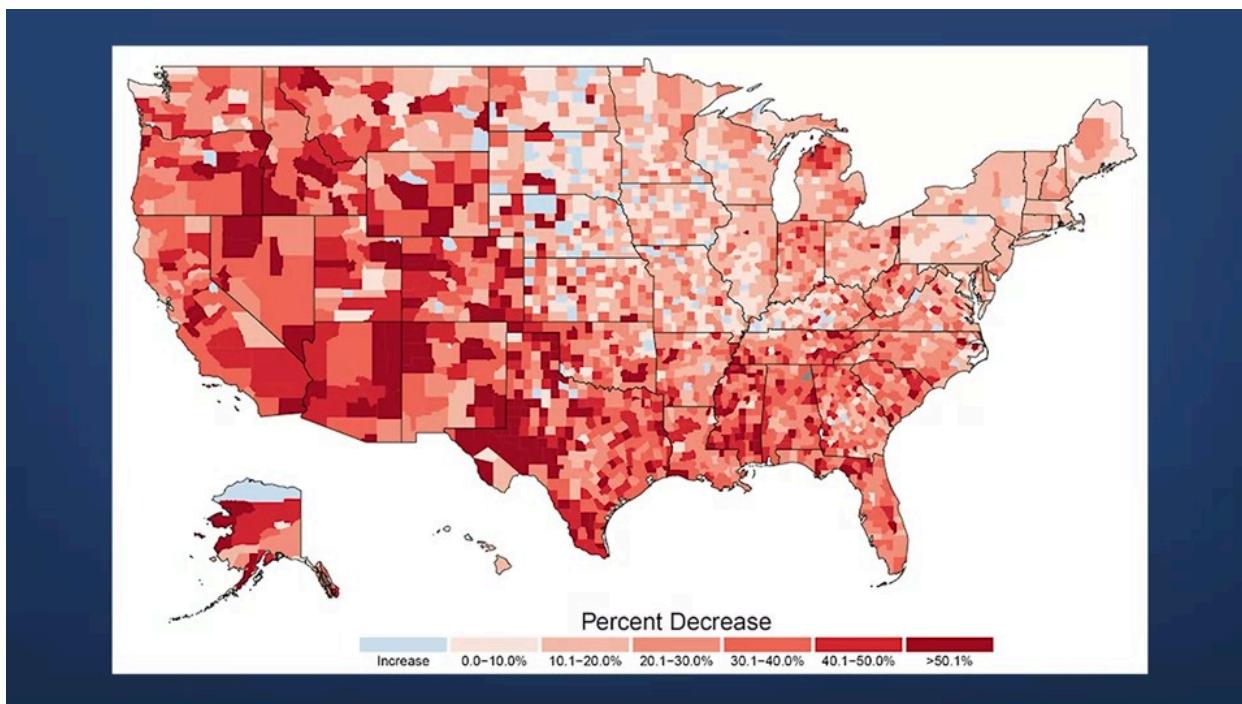
This graph shows you the year-over-year growth rate of auto loans. As you can see, they turn negative in early 2006 when the subprime crisis in the mortgage market started to unfold. But when investors stopped rolling over asset-backed commercial paper in mid-2008, loan originations dropped by over 30% when compared to the previous year.



What happened to auto sales? As you can see in this graph, before funding for finance corporations dried up, US households bought about 16 million new cars at an annual rate. When the financial crisis hit, retail auto sales collapsed to 7.9 million at an annual rate in the first quarter of 2009. The timing such as that the drop in auto sales was driven by a drop in credit supply, but how can we be sure that the drop in auto sales was not driven by low demand? During the financial crisis, many workers lost their job and pre-economic prospects could have made consumers hesitant to buy new cars. If the collapse was driven by demand and not by reduced credit supply, we should see that other lenders were not stepping in and making loans when captive finance companies could not.



However, this graph shows you that in 2008, more auto buyers paid either with cash or got credit from a bank or a credit union. This suggests that runs on asset-backed commercial paper had significant consequences for auto sales. There's one more piece of evidence that shows that reduced credit supply at least partly explains the drop in auto sales.



Have a close look at this map that shows you the decline of auto sales by counties. As

you can see, the decline in car sales was uneven across the country. The Southern and Western regions suffered the most significant declines. These are also the regions where captive finance lenders had the largest market shares before the financial crisis. Researchers estimated that the drop in credit supply accounts for about one-third in the drop of auto sales during the financial crisis. The example of captive finance companies illustrates that runs can occur outside the banking sector. Indeed, every financial institution that engages in maturity transformation can be subject to a run.

Risks at Nonbanks

- Nonbanks engage in maturity transformation
- May depend on runnable, short-term debt
- No access to the FED
- Credit collapses

However, before the 2008 financial crisis, regulators had largely ignored maturity transformation and credit provision by non-bank financial institutions. These non-bank financial institutions had no access to the Federal Reserve as the lender of last resort that would help to stop the runs in the short-term funding markets. This runs through their effects on credit supply contributed to the debt of the recession that followed.

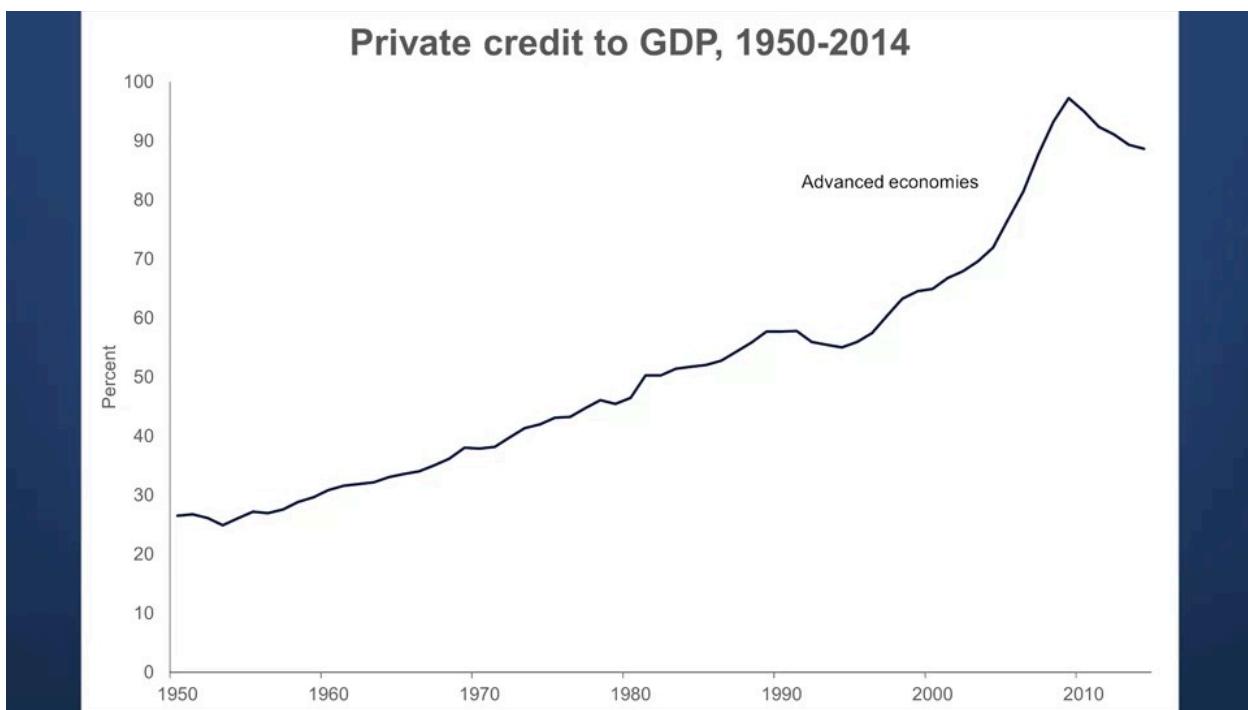


Summary

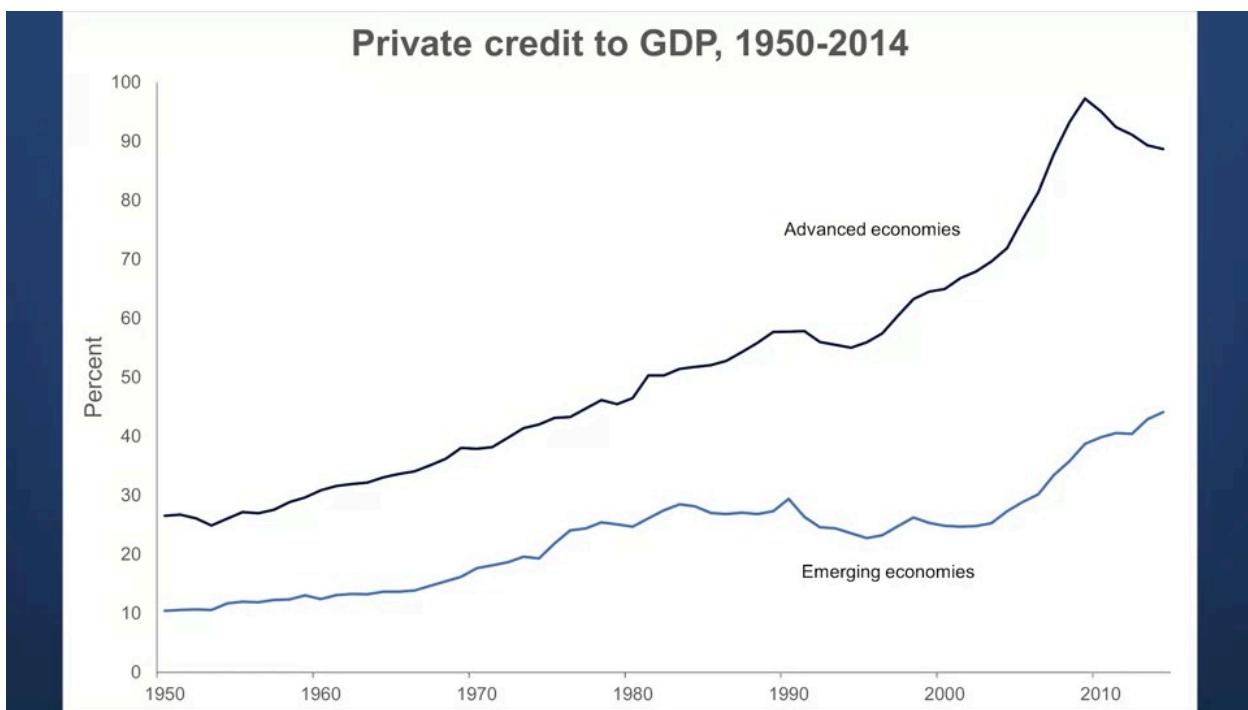
- Captive finance companies as a case study
- Captives borrow short and lend long
- Captives experienced runs during 2008
- Runs reduced auto loans and sales

What have we learned in this lesson? First, with captive finance companies as an example, we showed that non-bank financial institutions engaged in maturity transformation. Second, non-bank financial institutions experienced runs in the funding markets during the 2008 financial crisis. Third, the runs which used auto credit and therefore auto sales.

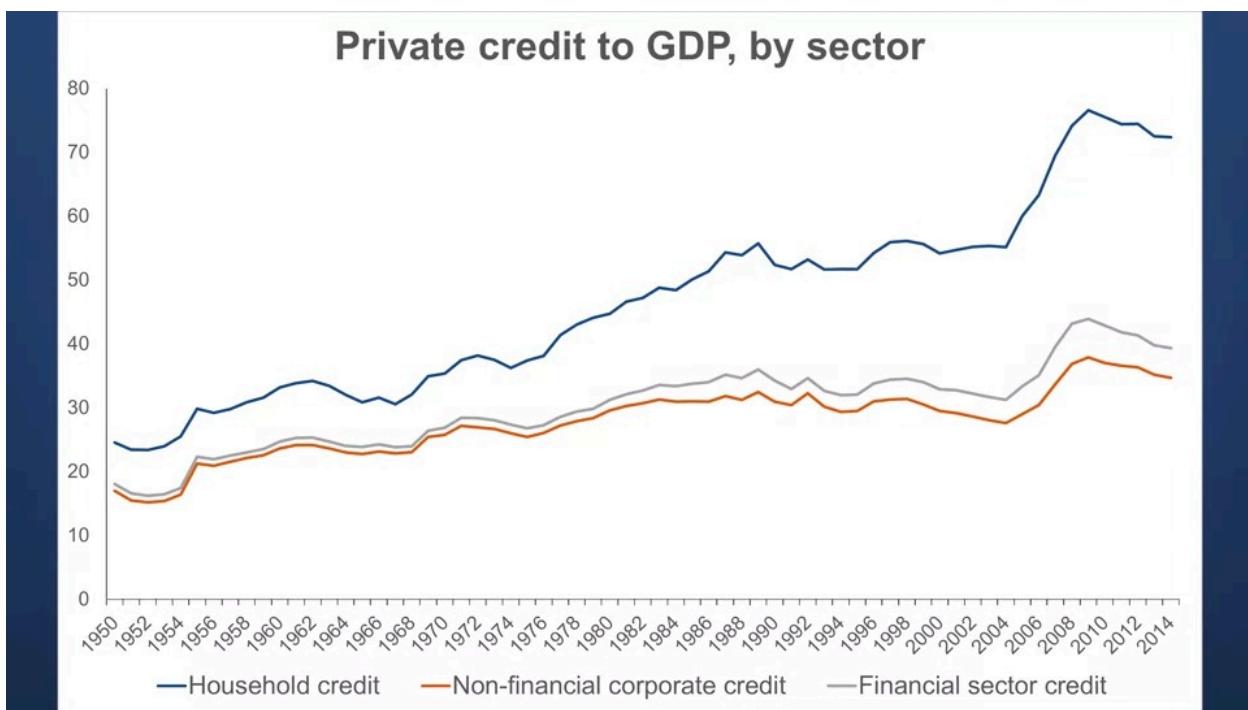
Lesson 4-2.4: Credit Booms and Busts



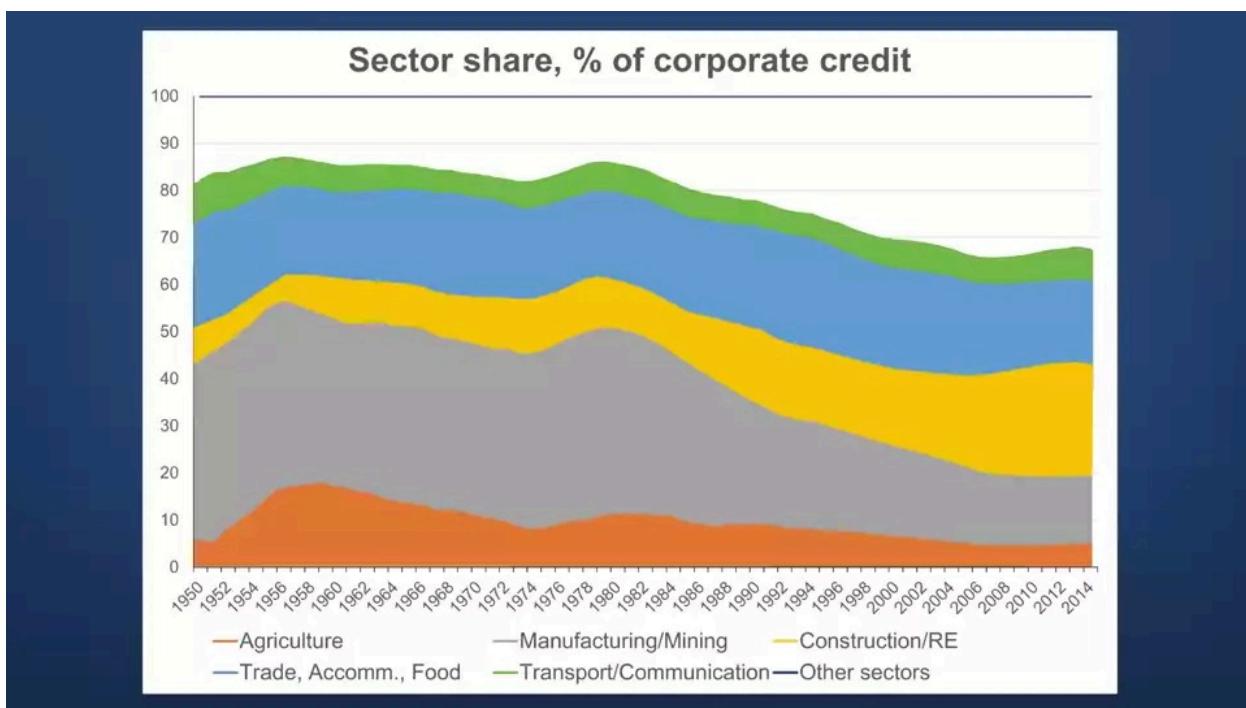
Hello, and welcome to this lecture on credit booms, and busts. In this lecture, we will study different types of credit booms. We will see that not all credit booms result in financial crisis, and as such, not all credit booms end with severe recessions. We will discuss several international examples to clarify which types of credit booms tend to have the most severe negative consequences. Let's start off with some facts. First, the credit to GDP ratio has risen sharply around the world over the last five decades. This figure shows you the average credit to GDP ratio for advanced economies. As you can see, the private credit to GDP ratio has been growing from about 25% in the early 1950s, to about 60% in 1990. Between 1995, and the 2008 financial crisis, the ratio increased by another 40 percentage points to 100%. That is, firms, and households in advanced countries had accumulated debt worth the annual output of the economy. In total, the private credit to GDP ratio went up by a factor of four between 1950, and 2008. Recall, that not all often economies income goes to firms and households because of taxes and imports, that means that the accumulated debt is larger than the annual income.



For emerging economies, you can see that the private credit to GDP ratio is considerably lower. The ratio is generally lower in emerging economies because their financial markets are less developed, that is, it is hard to get credit in the first place. Sometimes, this was related to the strengths of property rights. If property rights are not secure, the property cannot be used as collateral for credit, and hence, overall credit supply will be lower. Similarly, credit supply will be lower when creditor rights are hard to enforce in court. The ratio was only 10% in 1950, but reached over 40% around 2010. While coming from a lower level, the overall increase in the private credit to GDP ratio in emerging economy was also fourfold, and therefore comparable with the increase in advanced economies. The second fact is that household debt has driven this increase in the private credit to GDP ratio around the world.



In this figure, you see the averages of sectorial credits to GDP of 97 countries over time. Credit to household accounts for almost the entire growth in the private credit to GDP ratios since the early 1980s. In contrast, lending to non-financial corporations has changed little, keep this in mind when we discuss several credit booms. The third fact is that firm credit has shifted from tradable sectors to constructions, real estate, and other non-tradable sectors.



This figure shows you the distribution of corporate credit across industries in advanced economies. As you can see, corporate credit did not expand evenly across sectors. Specifically, the share of manufacturing sharply decreased since the 1980s. Perhaps this is not a surprise to you. Around this time, global trade started to increase considerably with more, and more emerging markets providing manufacturing goods to advanced economies. The manufacturing sector in the advanced economies decreased during this time. Construction and real estate lending now make up considerable shares of corporate loan portfolios. While the share of construction and real estate sectors in the 1950s was almost zero, it has risen to more than 24%. This re-allocation of corporate credit will also be crucial for our discussion of credit booms. Before going to case studies of specific credit booms, let's consider the differences between a credit boom in the household sector, or the construction and real estate sector, and in the manufacturing sector.

Credit Booms

- Real estate credit (mortgages)
- Construction credit

Household credit booms are usually linked to real estate, so we will discuss household credit booms and construction credit booms together.

Credit Booms

- Real estate is not tradable
- Real estate loans spent locally

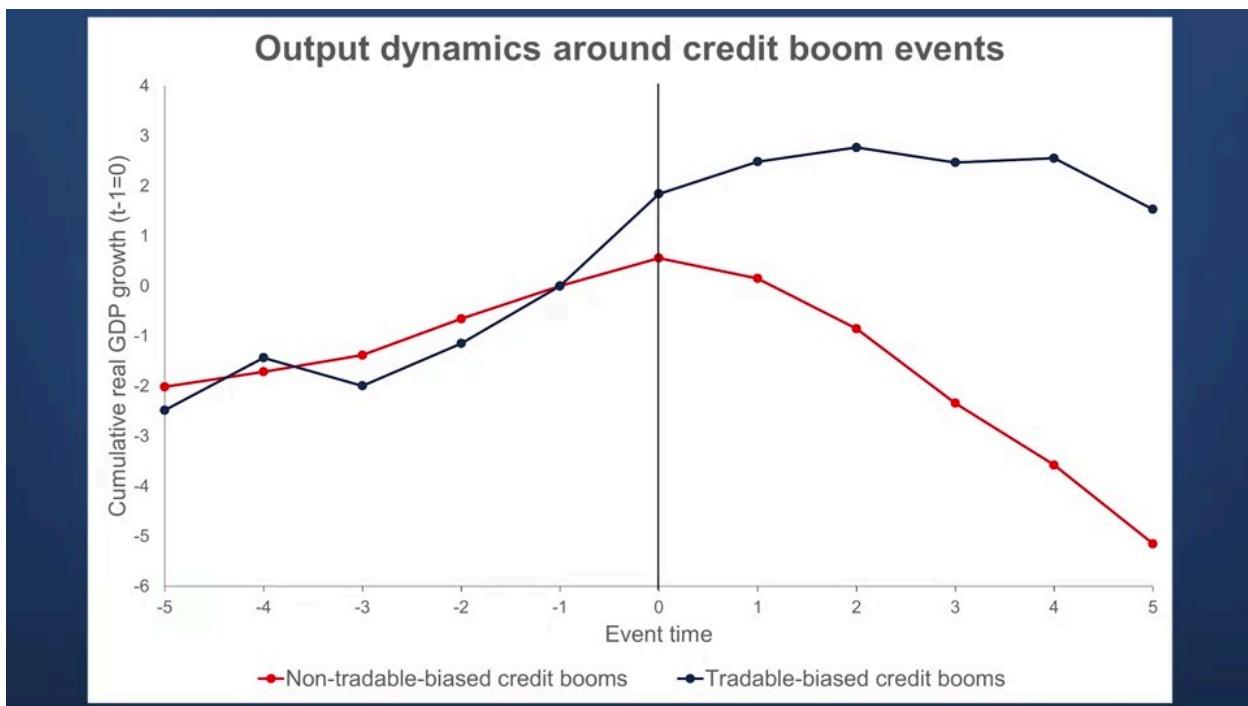
What is important is that real estate is not tradable, that is, all the credit that goes to the real estate sector is spent locally. This typically drives up house prices, and in turn leads to booming construction, and in credit to the construction sector.



Credit Booms

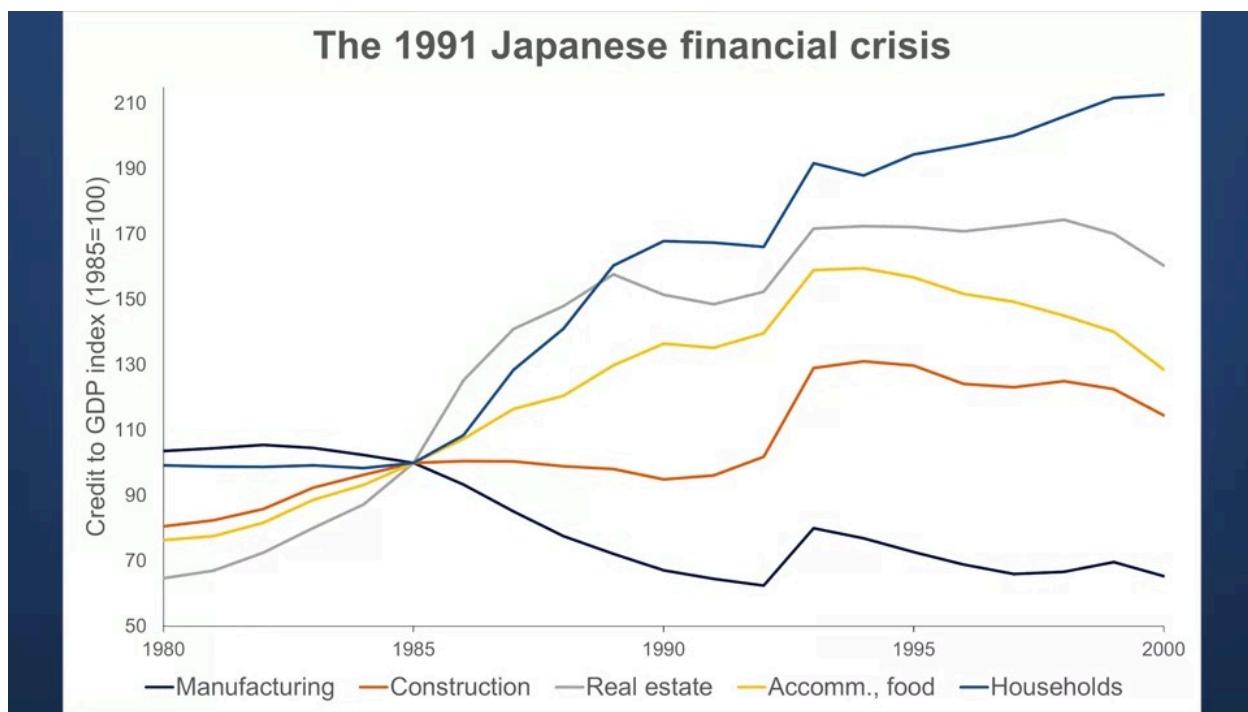
- Manufactured goods are tradable
- Credit goes to investment
- Reflects increase in global demand
- In contrast, real estate demand is local

In contrast, manufacturing products are usually tradable, this means that if there's a boom in credit to manufacturing companies, this usually indicates high demand, not only locally but globally. While manufacturing companies may increase hiring and investments, the goods will likely be sold globally. In other words, the global consumer base will support the additional debt in the manufacturing sector. But recall, that real estate credit boom is only supported by a local consumer base. Let's have a look at the consequences of credit booms in the tradable sector, that is, manufacturing, and the non-tradable sector, real estate.

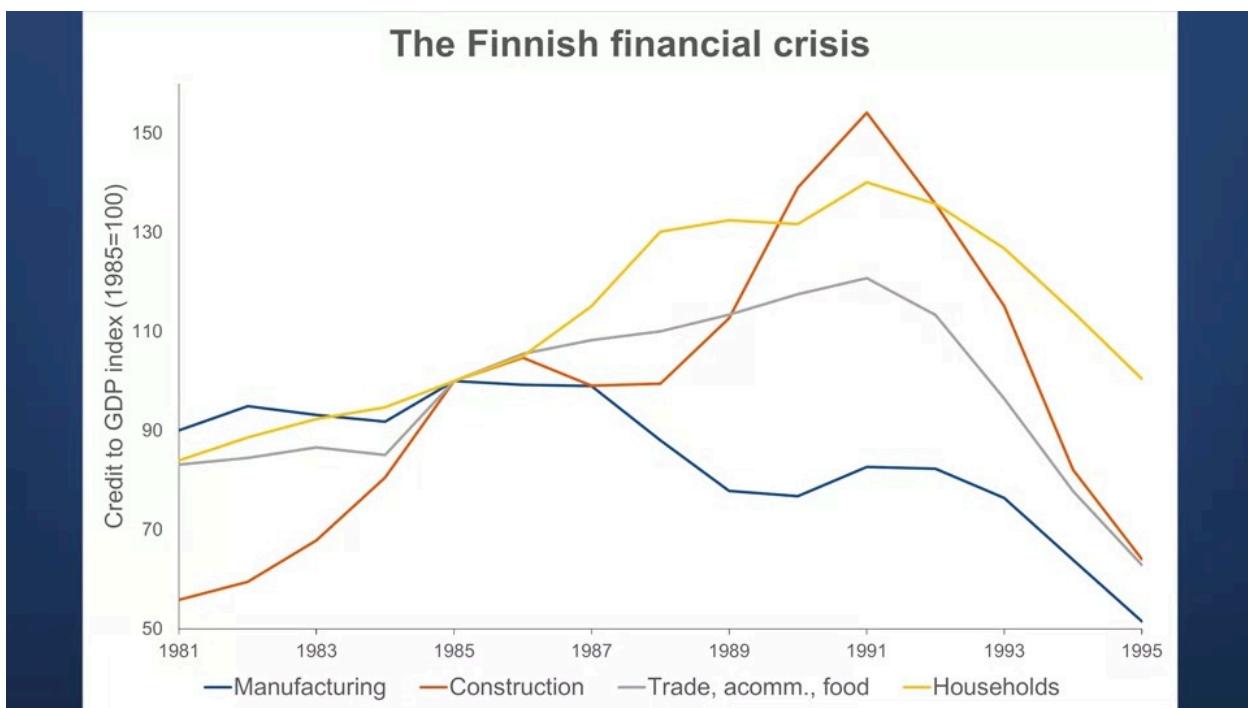


This figure provided by Karsten Muller, and Emil Verner, show you the output dynamics before and after the peak of a credit boom in the tradable and non-tradable sectors. The peak is indicated by event time equal to 0, indicated on the vertical line. As you can see, after the peak of the credit boom in the tradable sector, output, the blue line continues to grow. Why is this? Credit booms in the manufacturing sector are usually driven by international demand, or new products. Think about the fast increase in manufacturing in South Korea. Most of the products were exported, so additional credit to the manufacturing sector was used for investment, that in turn increased manufacturing output and eventually profits. These higher profits helped to pay off additional debt incurred during the credit boom. Such a credit boom is sustainable, because it is aimed to satisfy global demand. Now, have a look at the red line showing the evolution of output during and after a non-tradable or real estate credit boom. While output expands during the credit boom phase, output decreases after the credit boom peak. Why does this happen?

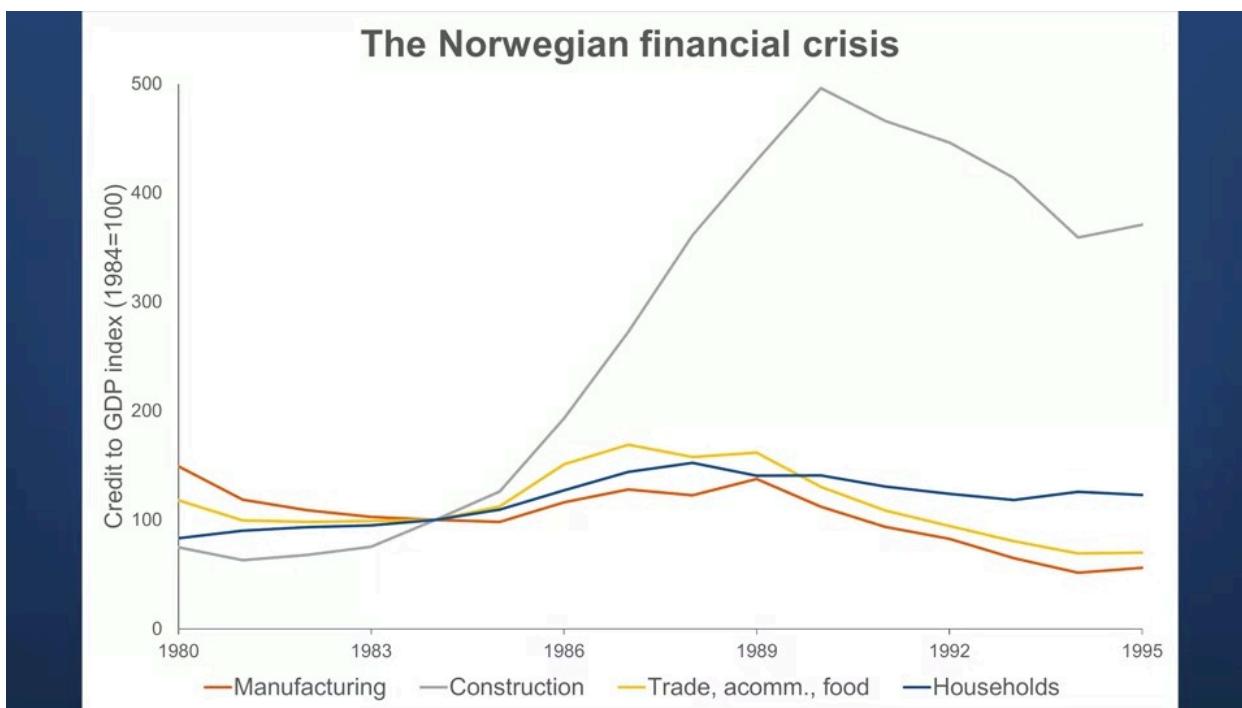
The real estate credit boom increases house prices, and therefore construction. More constructions mean more local hires and also higher output. However, eventually house prices become so high, that there won't be enough local buyers for the new constructions. This will lead to downward pressure on house prices. Since construction heavily relies on credit, construction companies may not be able to repay the credit taken out for the new constructions. More generally, decreasing house prices lead to a collapse in the construction sector. This means layoffs and lower output. In addition, lower house prices reduce the ability of households to obtain credit to finance consumption. Lower consumption also reduces output. This was all very abstract. Let's now look at a couple of concrete examples of credit booms and busts.



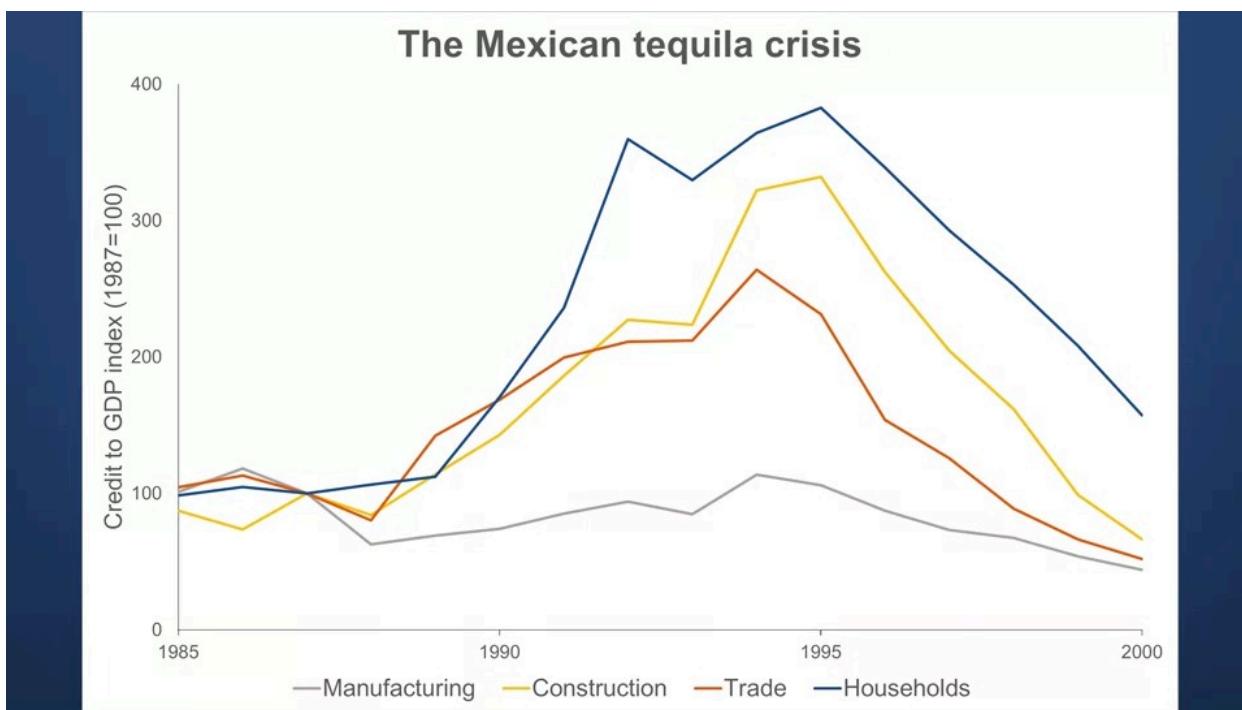
One of the most notable examples of a real estate boom and bust that led to a banking crisis before the 2008 financial crisis, is the Japanese experience. Japan experienced a rapid credit boom in the second half of the 1980s, which led to banking sector distress and slow growth since the 1990s. Deregulation led to a move away from export base to domestically oriented growth. The figure shows you that there was a boom in household and construction credit while manufacturing credit declined. The credit fueled soaring stock and real estate prices. When real estate and stock prices started to decline, many loans went bad, leading to a banking crisis. As you may know, it took a long time to improve bank balance sheets, and Japan experienced 20 years of low economic growth as a result of the bust of this credit boom and the resulting banking crisis.



Let's consider a second example of a credit expansion that led to a banking crisis. The Nordic crisis of the late 1980s and the early 1990s. Finland, Sweden, and Norway experienced major credit expansions in the 1980s. These expansions came after significant deregulation of the banking sector in the Nordic countries. At the same time, international capital flows were also deregulated. In this figure, you can see the evolution of sectoral credit in Finland during this period. Just as in the Japanese experience, real estate related credit sharply expanded while manufacturing credit declined. Construction credit rose by 50%.



Similarly in Norway, so here the extension of credit was solely driven by the construction sector. Construction credit increased to five-fold. The fall in oil prices in 1986, speculative attacks, and rising bankruptcy cost many loans in the Nordic countries to turn bad, leading to a severe banking crisis from 1987 through the early 1990s. This dynamic is not defined to develop economies.



Let's have a look at the so-called Mexican Tequila Crisis. The crisis is a prominent

emerging market, sudden stop episode. That is, after a long period of rapid capital inflows, large current account deficits, and real exchange rate appreciation, capital flows suddenly reversed and the Peso depreciated. This figure shows the dynamics of sectoral credit, resembling the experience of nature crisis in advanced economies that we have just discussed. From 1988-1984, the credit to households and the construction sector, as well as trade grew rapidly. But manufacturing credit remains stable relative to GDP during the boom. Credit booms in emerging economies, often fueled by capital inflows from abroad. This makes emerging economies more vulnerable as a change in international investor sentiment can cut credit to emerging economies overnight, causing banking crisis and large drops in output.

Summary

- Tradable sector credit booms can be sustainable
- Household credit booms leads to busts
- Holds for both advanced and emerging economies
- Many credit booms followed financial deregulation

What have we learned in this lesson? First, not all credit booms necessarily lead to banking crisis and drops in output. Credit booms in tradable sectors can be sustainable. Second, large increases in credit to households or construction sectors often lead to credit busts that have severe negative consequences. Third, the patterns hold for advanced and emerging economies. Fourth, many credit booms followed banking or financial market deregulation.

Lesson 4-3: Policy Responses to Financial Crises

[Lesson 4-3.1: Liquidity Provision of the Federal Reserve's Response to the 2008 Financial Crisis](#)

Learning Objectives

- Fed interventions
- Liquidity provision
- Lender of last resort function

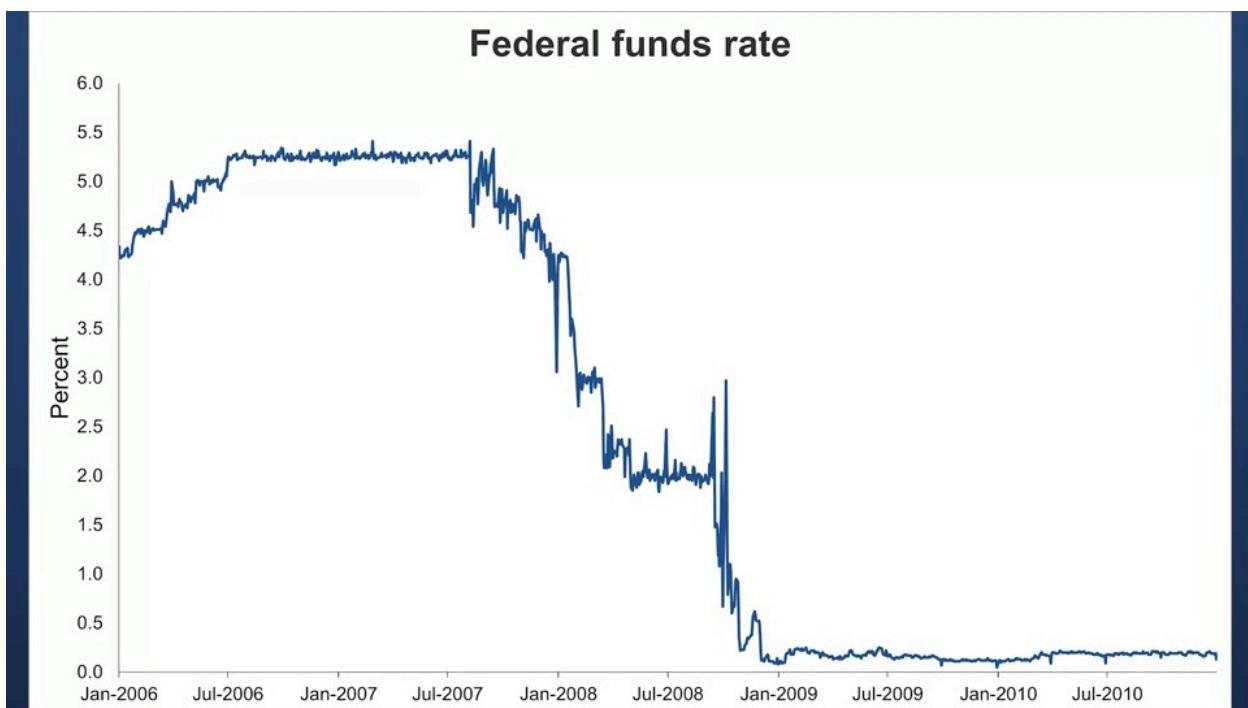
Hello and welcome to this lecture on liquidity provision by the Federal Reserve as response to the 2008 financial crisis. In this lecture, we are examining the main Federal Reserve programs and interventions during the 2008 financial crisis. We will study the provision of short term liquidity to banks and the provision of liquidity directly to borrowers and key investors in key financial markets. These examples will illustrate how the Federal Reserve acted as lender of last resort, in the 2008 financial crisis. The 2008 financial crisis was triggered by a contraction in the US housing market that began in 2006. The decline in house prices was accompanied by a rise of delinquency in subprime mortgages.



Short-term credit and securitization

- Most subprime mortgages were securitized and funded short-term credit
- Rising defaults reduced willingness to lend short-term
- When short-term credit collapsed, no new funding for mortgages and banks was no longer available

The subprime mortgages were securitized in asset pools and funded with short term credit, such as asset backed commercial paper. Lenders in short term funding markets were less and less willing to roll over credit that was backed by mortgages. This led to a sharp reduction in credit supply, especially in the short term funding markets. One consequence was the collapse of Lehman Brothers, an investment bank that had no access to the Federal Reserve's discount window, to obtain short term funds. More generally low credit availability and slumping asset prices in turn contributed to the US economic entering a recession.



In addition to cutting the Federal funds rate from five and a quarter percent in mid 2007 to 2% in 2008 and then to effectively 0%, after the collapse of Lehman process in September 2008. The Federal Reserve set up a variety of programs to support credit markets. You may wonder why additional programs were necessary, when banks could access the discount window at the Federal Reserve for emergency short term liquidity.

Discount Window

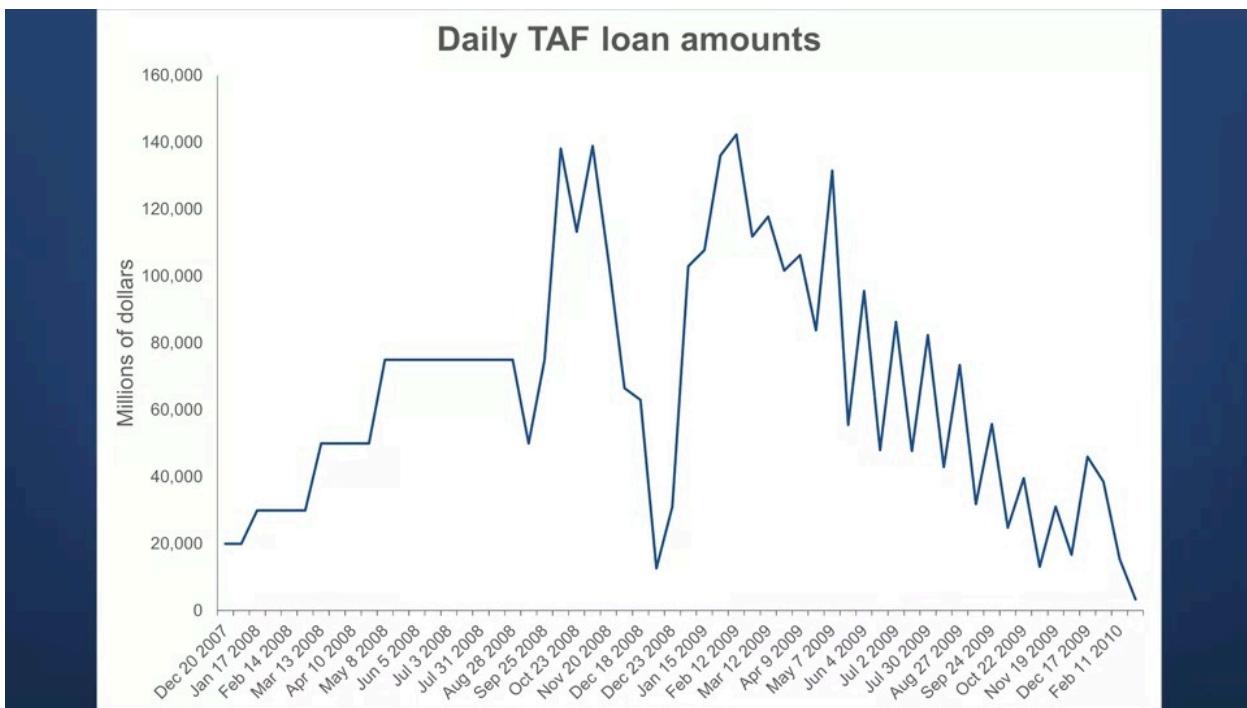
- Stigma effect
- Not effective
- Not term funding

There are three reasons for that. First, using the discount window comes with a stigma,

meaning everyone knows that a particular bank has used the discount window. This signals to lenders to these banks that the bank is in a bad shape. If lenders think that the bank is in a bad shape, then they will be less likely to lend to the bank starting a vicious cycle. Second, liquidity dried up in many markets in which banks were not involved and many non-bank financial institution had no access to the discount window. Examples include most asset backed securities markets, investment banks and money market mutual funds. Third, funding markets stressed first emerged in term lending markets that is borrowing money for one or two months became difficult, especially for banks. Because of widespread concerns about their financial conditions. Overnight funding was still available, but introduced additional uncertainty about funding the next day.

Term Auction Facility (TAF)

To address funding pressures in the term funding markets, the Federal Reserve established the Term Auction Facility (TAF), as an extension of the discount window in December 2007. TAF auction predetermined amount of credit in form of 28 day loans and in the beginning of August 2008, 84 day loans to banks. Banks place bids specifying an amount of funds and interest rate they were willing to pay and sufficient collateral to fully collateralize the loan. These funds were allocated beginning with the highest interest rate offered until either all funds were allocated or orbits were satisfied. The final interest rate on all loans was determined by the interest rate that would fully subscribe the auction. The fact that the total credit amount was limited and the allocation of credit was determined by an auction might have looked like a competitive market. The market like feature removed any stigma from boring from the Federal Reserve.



The chart shows you the take-off of tough auctions over time. As you can see, banks took out substantial amounts about one trillion in loans before the failure of Lehman Brothers. In total, 416 banks took out about 4,000 term loans, borrowing about \$3.8 trillion dollars from TAF.

Term Auction Facility (TAF)

- Deposit-taking banks only
- No investment banks
- Primary Dealers crucial for monetary policy

However, only deposit taking banks had access to the tough facility. Many investment banks, including Goldman Sachs and Merrill Lynch, had no access to Federal Reserve

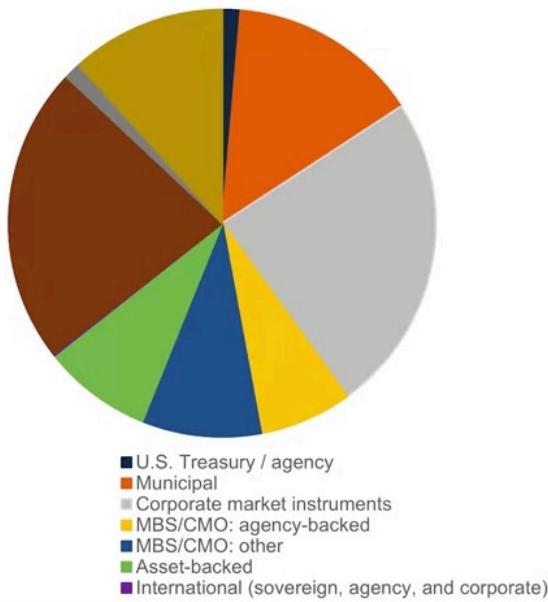
funding at the time. The most important and reputable investment banks are primary dealers. This means that they serve as the trading counter parties for the Federal Reserve's open market operations and have a key role in providing liquidity in the market for US Treasury Securities. A well-functioning Treasury market and therefore the financial health of primary dealers is vital for the financial system. To address funding pressures in the repurchase repo market, a critical short term funding market for primary dealers and other financial institutions. The Federal Reserve established the primary dealer credit facility PDCF in March of 2008. The PDCF, was the first facility for which the Federal Reserve used its emergency authority, under section 33 of the Federal Reserve Act.

I Primary Dealer Credit Facility (PDCF)

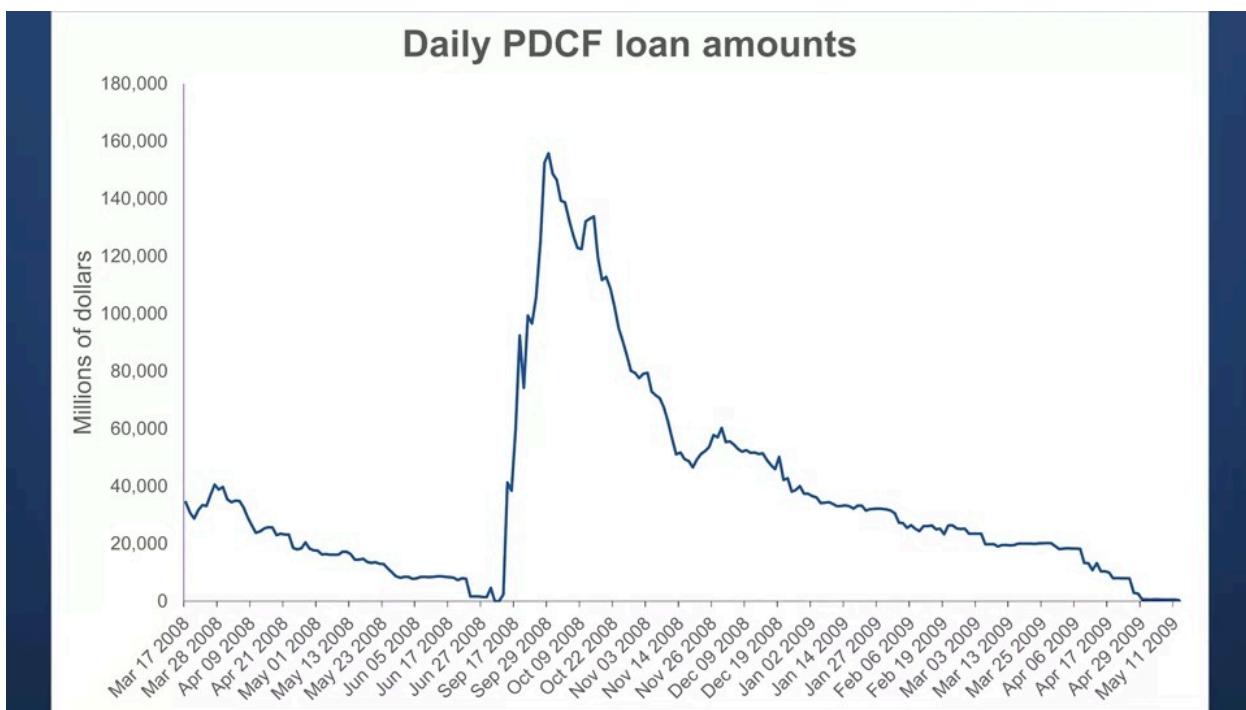
- Loans were fully collateralized

Loans made by the PDCF, were fully collateralized. Initially eligible collateral was restricted to investment grade securities. But with the stress in the financial markets increasing, the set of eligible collateral was expanded to all instruments that could be pledged in the triparty repurchase agreement systems, of the two major Clearing Banks in September 2008.

Collateral used in PDCF
Total amount: \$9,665bn



This chart shows you that the PDCF accepted a broad range of collateral, including treasuries and agency, mortgage-backed securities, municipal bonds, corporate bonds and asset backed securities. The interest rate was set to the primary credit interest rate of the discount window. However, to encourage investment banks to seek out other sources of funding. Primary dealers who borrowed from the PDCF or more than 45 business days had to pay a frequency based fee, since the PDCF loans were overnight, they occurred more frequently.



This graph shows you the daily take up of the PDCF facility. In total, the PDCF lent out almost nine trillion dollars in overnight loans to primary dealers.

Term Securities Lending Facility

In addition, the Federal Reserve established the term securities lending facility, TSLF.



The program offered to lend relatively liquid treasury securities to primary dealer for one month, in exchange for eligible collateral consisting of less liquid securities. Loans were extended for fee and were allocated through auctions. On September 26, 2008, the peak of TSLF lending about 236 billion dollars in TSLF loans were outstanding. Two facilities address short term funding markets outside the regular banking system. One, the commercial paper funding facility, CPFF. And two, be asset-backed commercial paper money market mutual fund liquidity facility, AMLF.



The CPFF provided liquidity bed stop to US issuers of commercial paper. For this purpose the Federal Reserve created a limited liability company, the LLC. The Federal Reserve provided funding in form of a loan to the CPFF collateralized by all CPFF assets. The CPFF purchased highly rated three-month unsecured and asset-backed commercial paper directly from eligible issuers. In addition to interest issuers of commercial paper had to pay an upfront fee.

CPFF

- Direct purchase program

This is the only example of a direct purchase program, meaning that the Federal Reserve Board Securities outright, during the 2008 financial crisis. However, most issuers of highly rated commercial paper were financial institutions. The asset-backed commercial paper, money market mutual fund liquidity facility financed the purchase is of high quality asset backed commercial paper, for money market mutual funds by banks.



The program was intended to assist money funds to sell asset backed commercial paper, to meet the demands for redemptions by giving banks non-recourse loans to finance the purchase of asset backed commercial paper.



To ensure that only money market funds that experienced large redemptions used this facility. The Federal Reserve required a certain level of money market fund outflows before the fund qualified for the program.



Note that different from the CCPF, the Federal Reserve did not buy the securities, but only provided financing to the buyer. Another facility aiming to provide liquidity to money market funds and reducing redemption pressures. The money market investor funding facility MMIFF, was not used as money funds were temporarily covered by deposit insurance.

TALF

Term Asset-Backed Securities Loan Facility

The Federal Reserve also established the term asset-backed securities loan facility

TALF in November 2008. The goal of this facility was to restart the securitization markets that had collapsed after the bankruptcy of Lehman Brothers.



The collapse of securitization markets severely impacted credit supply to consumers and businesses. Since, among others, auto loans, credit card loans, small business loans and commercial real estate loans, were typically funded by the securitization markets.

TALF

- Highly rated securities
- Non-recourse loans
- Haircuts
- Low take up (\$70bn), but successful

TALF was a funding facility that issued loans with terms up to five years to purchaser of highly rated asset-backed securities. To participate a borrower had to buy the security first. The borrower would then receive a non-recourse loan from TALF. The collateral was the purchase security and the border had to provide some equity to reduce risk taking incentives. While this program lent out only 70 billion in total, research shows that this program had been particularly successful in restarting the securitization of consumer loans by reducing spreads. That is boring costs. With the exception of the commercial paper funding facility, all these facilities have several key features in common.

Fed Interventions

- Provide liquidity
- Only high-quality collateral
- Above market interest rate
 - No losses
 - Incentives to leave program

First, they provide financing to financial institutions and investors to help market functioning and reduce the risk of fire sales due to low liquidity. Second, all facilities required high quality collateral. And third, the borrowers had to pay fees and interest rates that were above market rates in normal times. There are two reasons for this design. First, the Federal Reserve should not lose money in any of these programs, ensuring that the borrowers were not in fact insolvent and protected the taxpayer from losses. Second, by charging relatively high interest rates, borrower have an incentive to use the programs only, when no other options are available and leave the program once market conditions normalized.

Summary

- Fed as LOLR in 2008
- Numerous liquidity programs
- Low credit risk for Fed
- Smooth exit by Fed once conditions normalize

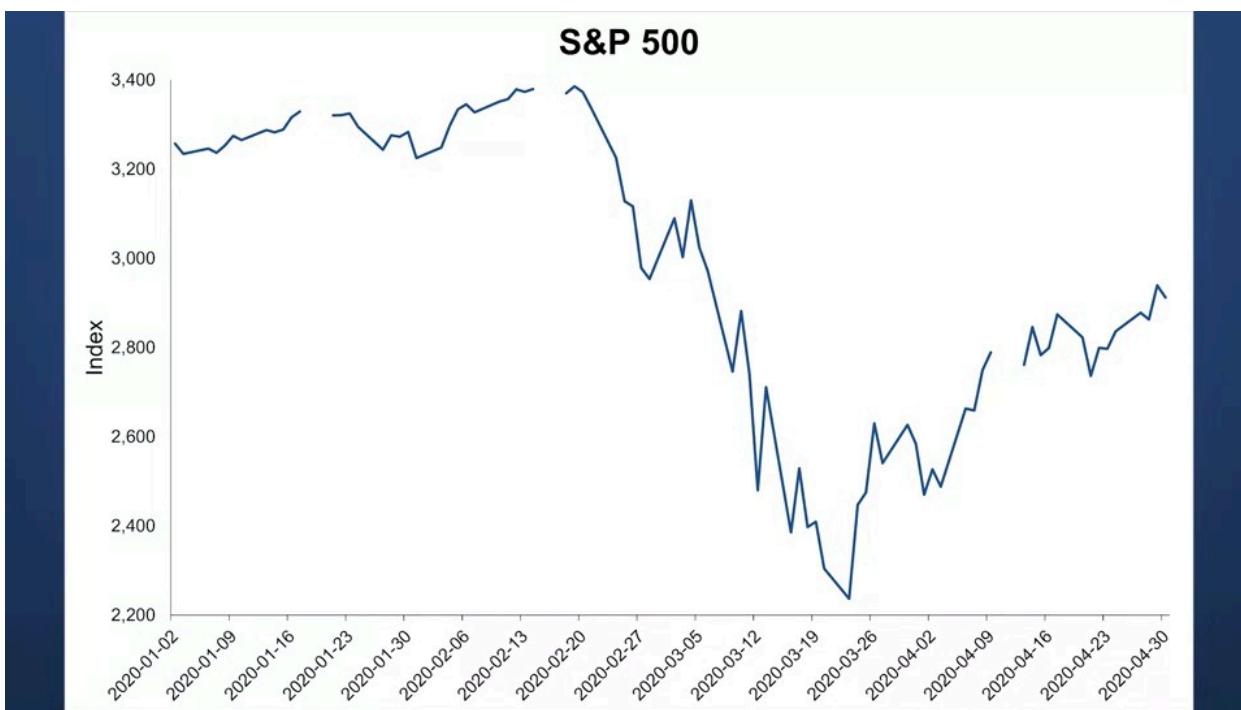
What have we learned in this lesson. First, the Federal Reserve fulfilled its lender of last resort function, by providing liquidity to banks and primary dealers, through lending programs and by providing support to the commercial paper and asset backed securities markets during the financial crisis. Second, as the lender of last resort, the Federal Reserve required high quality collateral and charged above market interest rates for loans. Third, by design, borrowers stopped using these programs once market conditions normalized.

[Lesson 4-3.2: Liquidity Provision of the Federal Reserve's Response to the Covid-19 Pandemic](#)

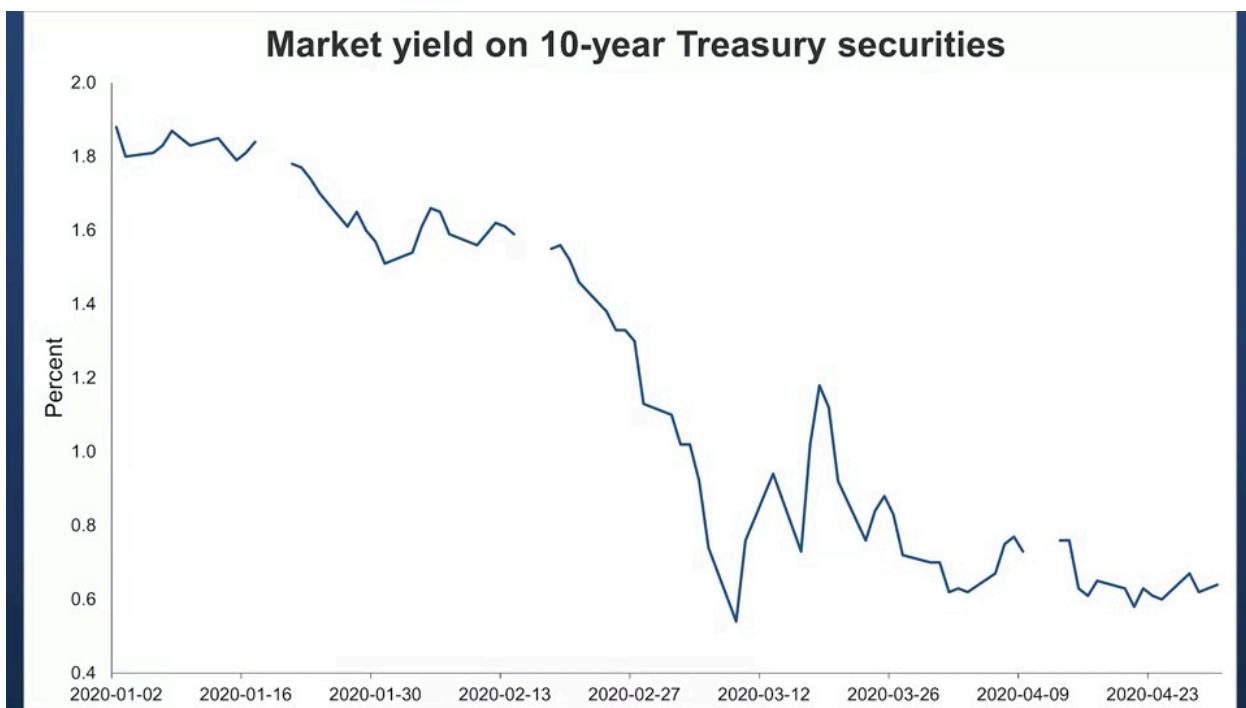
Covid-19 Pandemic

- Beginning February 2020

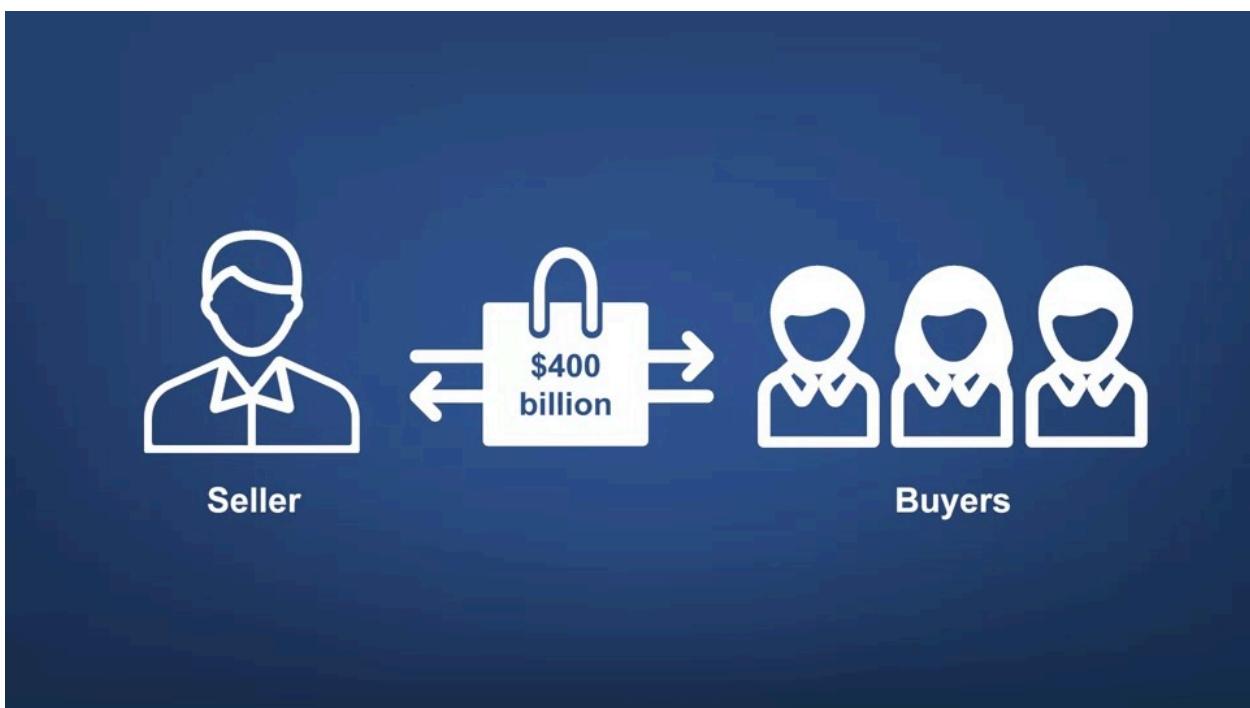
Hello and welcome to this lecture on liquidity provision by the Federal Reserve in response to the Covid-19 pandemic. In this lecture, we are examining the main programs of the Federal Reserve and the interventions during the COVID-19 pandemic. We will study the provision of short-term liquidity to banks and the provision of liquidity directly to borrowers and investors in key credit markets. We will also study new facilities that directly purchased securities. The COVID-19 pandemic started to severely affect financial markets in late February 2020, around the time when the Chinese government extended shutdowns in the Hubei Province and evidence of COVID-19 cases were found in Europe and the United States.



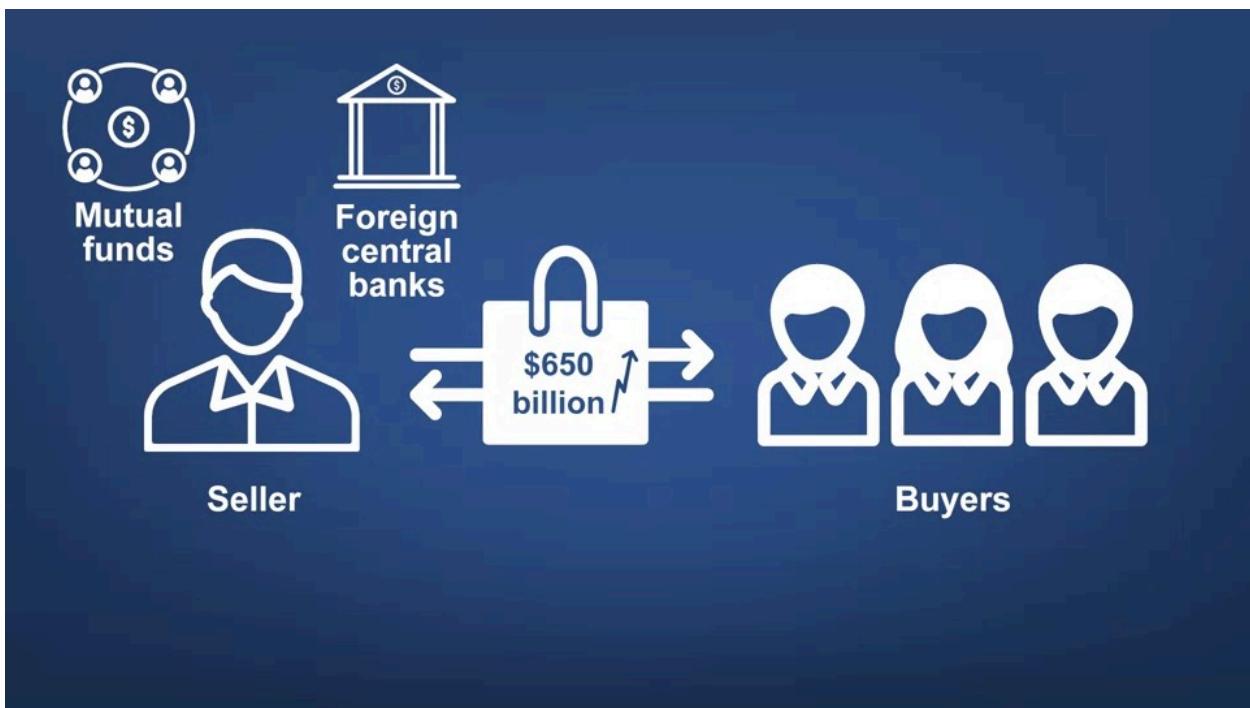
As you can see in this chart, the S&P 500 dropped over 1,000 points or more than a third in one month. Most concerning to policymakers, where the price swings in the \$20 trillion dollar market for treasury securities. While the decline in yields on treasury security is expected during crisis times because investors are looking for safe assets. The volatility in the treasury market suggested that the world's largest debt market was not functioning well.



You can see that the 10-year treasury yield dropped to 54 basis points on March 9 2020. But on March 18, 2020 the yield had more than doubled to 118 basis points, recall that increases in treasury yields indicate falling prices. In other words, sharp increases in yields suggests a fire sale dynamic with little liquidity in the treasury market.



During this time, customer transaction volume spiked, the average level of transaction was about \$400 billion per day in February.



But in mid-March, transactions peaked at \$650 billion dollars per day, an increase of more than 50%. These transaction volumes were driven by sales of treasury securities from a wide range of investors. Mutual funds sold exceptionally large volumes about \$200 billion dollars to prepare for potential redemptions. Similarly, foreign central banks

liquidated some of their treasury positions to show up their dollar holdings in anticipation of dollar needs in their respective countries.

Distrubances in the Treasury Market

- Treasury market illiquidity signals:
 - a) Fire sale dynamics everywhere
 - b) Scarce short-term funding

Disturbances in the treasury market set off alarm bells across the globe. Since in normal times, the treasury market is the most liquid market, little liquidity in the treasury market means that, a, other security markets are liquid, meaning you can only sell these securities at large discounts and b, that short term funding is scarce. As treasury securities are usually used in report transactions and volatility in the treasury market, make short term funding using treasury securities very costly. A disruption in the short-term funding markets can have large effects on the economy at the 2008 financial crisis has demonstrated. Hence, policymakers rushed to provide support first to the treasury market and then more generally to the financial markets.

The screenshot shows a white page from the Federal Reserve Bank of New York's website. At the top, it says "FEDERAL RESERVE BANK of NEW YORK Serving the Second District and the Nation". Below that is a navigation bar with links: "About the New York Fed", "Markets & Policy Implementation", "Economic Research", "Financial Institution Supervision", and "Financial Services & Infrastructure". Under "Markets & Policy Implementation", there is a link to "OPERATING POLICY". The main content is titled "Statement Regarding Treasury Reserve Management Purchases and Repurchase Operations". Below the title, it says "March 12, 2020". The text discusses the Open Market Trading Desk's new monthly schedule of Treasury securities operations and the update to the current monthly schedule of repurchase agreement (repo) operations. It mentions adjustments made to these schedules to address temporary disruptions in Treasury financing markets. The text also notes a change in the maturity composition of purchases to support functioning in the market for U.S. Treasury securities. Term repo operations in large size have been added to enhance functioning of secured U.S. dollar funding markets. A bullet point below states that as part of its \$60 billion reserve management purchases for the monthly period beginning March 13, 2020 and continuing through April 13, 2020, the Desk will conduct purchases across a range of maturities to roughly match the maturity composition of Treasury securities outstanding. Specifically, the Desk plans to distribute reserve management purchases across eleven sectors, including nominal coupons, bills, Treasury Inflation-Protected Securities, and Floating Rate Notes. The distribution of purchases across sectors will be the same distribution as the Desk uses to reinvest principal payments from the Federal Reserve's holdings of agency debt and agency MBS in Treasury securities. The first such purchases will begin tomorrow, March 13, 2020.

On March 12, 2020, the Federal Reserve Bank of New York announced that its trading desk will offer 500 billion in three months repo operations that will settle on March 13, 2020. Moreover the next day, on March 13, 2020, the trading desk would offer another five 100 billion in the three months repo operation, and 500 billion in a one-month repo operation.

Fed Intervention

- \$1 tr in repo operations
- \$500 bn additional repo on a weekly basis
- 7.5 percent of market size

To reassure the markets that liquidity in this market would be available in the future. The

Federal Reserve Bank of New York also announced that the three-month and the one-month repo transactions for \$500 billion dollars would be offered on a weekly basis for the remainder of the monthly schedule. The reason given was that the feds wanted to address the unusual disruptions in the treasury funding markets associated with the coronavirus outbreak. Think about this market intervention, in comparison to the total market size. The Federal Reserve Bank of New York announced intervention worth \$1.5 trillion in the 20 trillion dollar market or 7.5% of treasuries outstanding. This intervention was about four times the daily average transaction size in February 2020. On March 23 2020, the Federal Reserve announced a large scale intervention in financial markets.

March 23rd Announcement

- Quantitative easing
- Corporate bond purchases

This intervention included, first, the purchase of at least 500 billion of treasury securities and at least 200 billion of moderate backed securities. Second, the establishment of two facilities to support credit to large employers. The primary market corporate credit facility, PMCCF for new bond and loan issuance and the secondary market corporate credit facility SMCCF to provide liquidity for outstanding corporate bonds. And third, the reopening of several liquidity facilities used during the 2008 financial crisis, including the term asset-backed securities loan facility TALF, the commercial paper funding facility, CPFF, and the money market mutual fund liquidity facility, MMLF. If you're interested in the details of those, please watch the lesson on the 2008 financial crisis. The establishment of the primary market corporate credit facility and the secondary market corporate credit facility marked a new episode of financial crisis interventions for the Federal Reserve. The interventions during the 2008 financial crisis provided credit to banks, dealers, money funds, and other investors.



Corporate Bond Purchases

- Corporate credit facilities (PMCCF and SMCCF)
- New programs directly buying corporate debt

In contrast, the two corporate credit facilities would directly purchase bonds or exchange traded bond funds. Moreover, the primary market corporate credit facility would be able to participate in loan syndications.



Corporate Bond Purchases

- New programs directly buying corporate debt
- Exposes the FED to credit risk

The key difference to previous intervention was that the Federal Reserve would be directly exposed to credit risk and therefore losses if large defaults in the bond markets were to occur.

Liquidity Facilities

- \$750 bn
- Investment grade rated bonds
- Bond ETFs

The combined size of the facilities was \$750 billion. With this money, the Federal Reserve food buy bonds with a maximum maturity of four years from non-financial firms with an investment grade rating as of March 22, 2020. Note that this means that even if a firm experienced a credit rating downgrade during the COVID-19 pandemic, it would still have access to the facility as long as it was an investment grade rated firm before the facility was announced. Firms could issue bonds directly to the primary market corporate credit facility. The secondary market corporate credit facility was designed to purchase outstanding non-financial corporate bonds and ETFs to provide liquidity support to the corporate bond market. The Federal Reserve announced three more measures to support lending to businesses during the COVID-19 pandemic on April 9th, 2020.

The screenshot shows the homepage of the Federal Reserve Bank of Boston's website. At the top, there is a navigation bar with links to "Publications & Data", "News & Events", "Careers", and "About Us". A search icon and a grid icon are also present. Below the navigation, there is a horizontal menu with options like "Office of the President", "Monetary Policy & Economic Research", "Supervision & Credit", "Payments Innovation", "Community Development", and "In the Region". A banner image features a city street scene with the text "Main Street Lending Program". Below the banner, there is a sub-navigation bar with links to "About the Program", "Resources", "Publications & Data", "Events", "Related Links", and "Contacts". Three main content boxes are displayed: 1) "Was Main Street Lending Program its borrowers' best option for credit? Risk scores suggest 'yes'" with a "Read more" link. 2) "Main Street Lending: right times, right places" with a "Read more" link. 3) "Main Street Lending Program FAQs" with a "Read more" link.

The first was the main street lending program, this program was also an innovation, as the Federal Reserve would partner with banks to originate loans. To ensure credit quality, banks would have to retain a percentage of the loans issued through this program.

Main Street Lending Program

- Loans to medium-sized firms
- Banks had to hold a share
- \$16 bn loans originated

The program was aimed at firms that were too small to benefit from the corporate credit facilities and too big to qualify for the payment protection program that was aimed at

small businesses. However, the conditions for these loans were quite restrictive, and banks were not keen on retaining a share of these loans. In September 2021, about 16 billions of loans originated under this program was outstanding.

Municipal Liquidity Facility

- Municipal Bond support
- Up to \$500 bn
- Only large municipalities
- Little take up

Another innovation was the municipal liquidity facility, this facility was established to help state and local governments manage cash flow stresses caused by the COVID-19 pandemic. The facility offered up to \$500 billion dollars in lending to states and municipalities. However, tax [inaudible] did not fall as sharply as anticipated, and in the end only the New York transport authority and the state of Illinois made use of this facility. The last and most used intervention of the Federal Reserve was the payment protection program liquidity facility, or PPPLF.



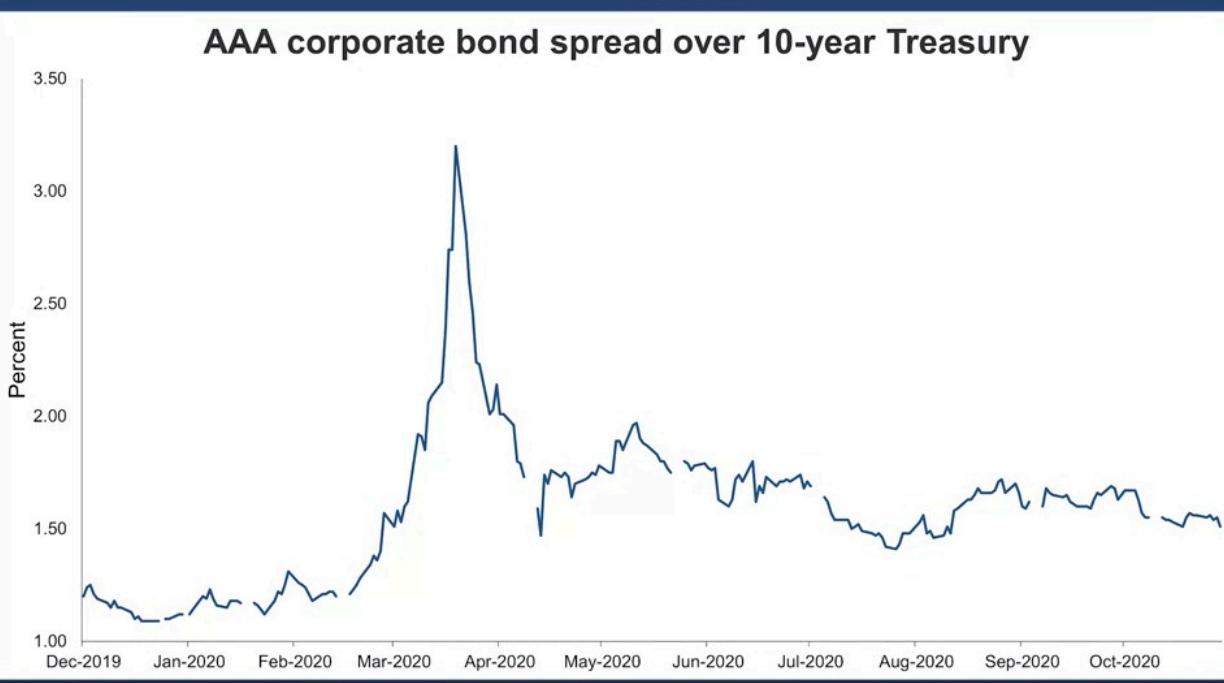
Under this program, lenders could receive funds for loans made under the Paycheck Protection Program.

Paycheck Protection Program

- Accessible by banks and nonbank lenders
- Like a discount window loan
- No haircut

In design the PPPLF looked like a discount window operation. However, different from the discount window, both bank and non-bank lenders that originated PPP loans did not face a haircut on these loans. That is the PPPLF took the loans as collateral at face value. The Federal Reserve was able to accept these loans without haircut as the loans

were guaranteed by the US treasury and therefore had no credit risk. You may ask yourself what the product lessons are from all these interventions. Since many market interventions were not heavily used, one can question whether all these facilities were effective or even necessary. The first lesson from the COVID-19 pandemic is that the Federal Reserve was credible in its announcements to support financial markets.



Look at this figure of AAA-rated corporate bonds yields over Treasury securities, you can see yields sharply rising until March 20th. With the March 23rd announcement of the corporate credit facilities that would purchase these bonds in the future and other interventions, the yields fall dramatically. While the yields did not drop to pre pandemic levels, it is clear that the announcement of the Federal Reserve to intervene in these markets, restored liquidity and confidence in these markets. This is not a trivial point, research that studied these interventions during the 2008 financial crisis found that the yields only declined once the Federal Reserve started issuing loans.



2008 Financial Crisis

Put differently during the 2008 financial crisis, investors first wanted to see that the Federal Reserve can actually establish these facilities and then that the facilities worked.



2020 Covid-19 Pandemic

In the COVID-19 pandemic, investors already knew that these facilities would work because they had worked before during the financial crisis.



Markets respond immediately

So, investors responded in anticipation of these facilities purchasing securities as a discount relative to what the facilities would offer. When the facilities became operational a couple of weeks later, yields had already declined and most of the profitable opportunities offered by the facilities were already gone. However, even if spreads have already come down and take up will be low. The Federal Reserve still will have to open these facilities to remain credible. This means that lower usage does not necessarily indicate that the facilities are failure. The measure of success is how low the spreads are and how well markets function.

Crisis Intervention

- Fiscal and monetary policy work hand in hand

A second lesson is that crisis interventions work best when fiscal and monetary policy work hand in hand.

I Coordinating fiscal and monetary policy

- Treasury provides equity for Federal Reserve programs
- Paycheck Protection Program: \$600 billion loan funding from the Federal Reserve

To be sure, all Federal Reserve facilities had a treasury backstop, that is Treasury provided equity for these facilities. However, the perhaps largest success was the paycheck protection program with Congress provided money for loan forgiveness, making loans risk free. The Federal Reserve could provide the funding for this program.

The PPP was originally designed to provide 600 billion dollars in forgivable loans. You can easily see by the Federal Reserve providing these \$600 billion dollars in funding for these loans was critical during crisis times when banks would rather hold liquidity than lend money. While from today's perspective, all these interventions look successful in avoiding a total meltdown of the economy and in fostering a fast rebound of the economy, here's something to think about.



If investors always expect the Federal Reserve to intervene, will the price risk appropriately in the future? There is no clear answer to that question. Traditionally, the Federal Reserve only intervened in government debt markets, that is, in a market that is by definition risk free. But with the COVID-19 interventions, the set of securities directly affected by Federal Reserve actions is much broader. If you think that the Federal Reserve provides insurance to all types of securities in financial markets, then you may conclude that investors discounts the risk covered by these types of insurance.



Coordinating fiscal and monetary policy

- Treasury provides equity for Federal Reserve programs
- Paycheck Protection Program: \$600 billion loan funding from the Federal Reserve

What have we learned in this lesson. First, the Federal Reserve intervened in many more markets during the COVID-19 pandemic than during the 2008 financial crisis. Second, many of these interventions with direct purchase programs. Third, the fast improvement in financial conditions, for instance, lower spreads such as that the Federal Reserve interventions were successful despite low usage of most facilities.

Lesson 4-3.3" Fiscal Responses to Financial Crises

Learning Outcomes

- Government transfers to consumers
- Support for business
- Government investment

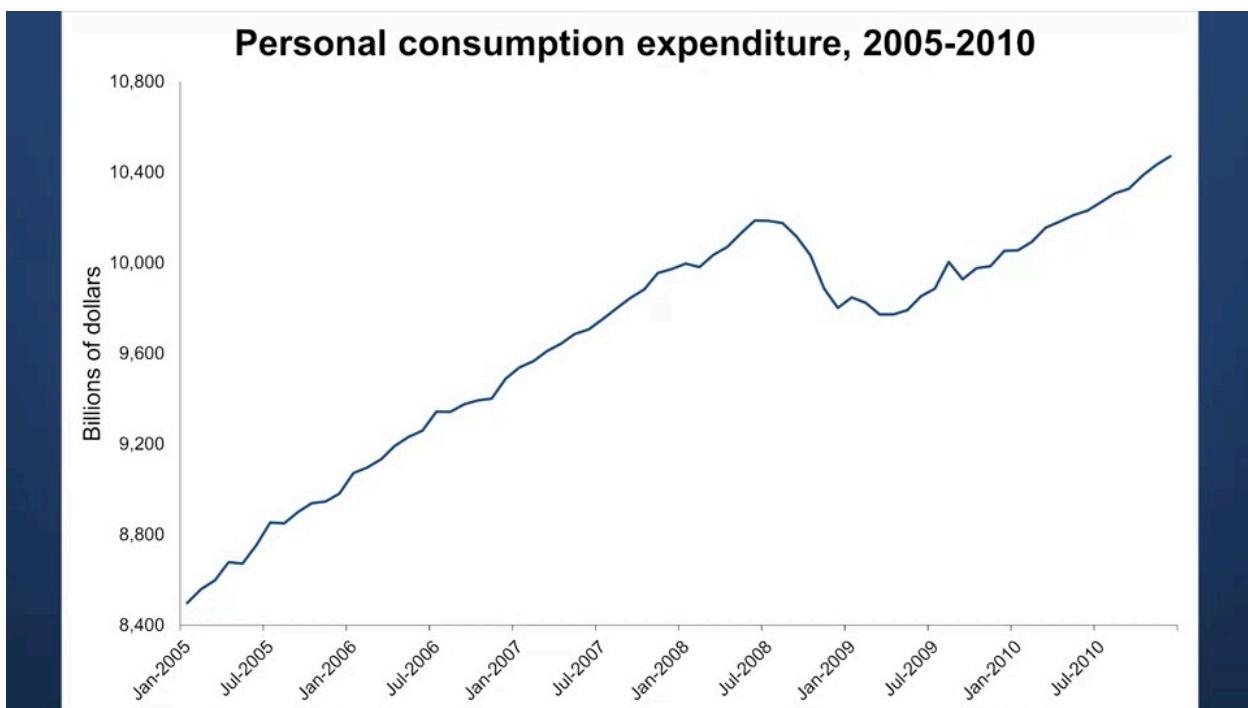
Hello and welcome to this lecture on fiscal responses to financial crisis. In this lecture we will discuss how fiscal policy can be used to mitigate the effects of financial crisis. We will study three types of responses. First, government transfers to consumers. Second measures to support businesses and third government investment spending. Our starting point is the basic accounting identity.

Output = Consumption + Investment + Government Spending + Net Exports (Exports - Imports)

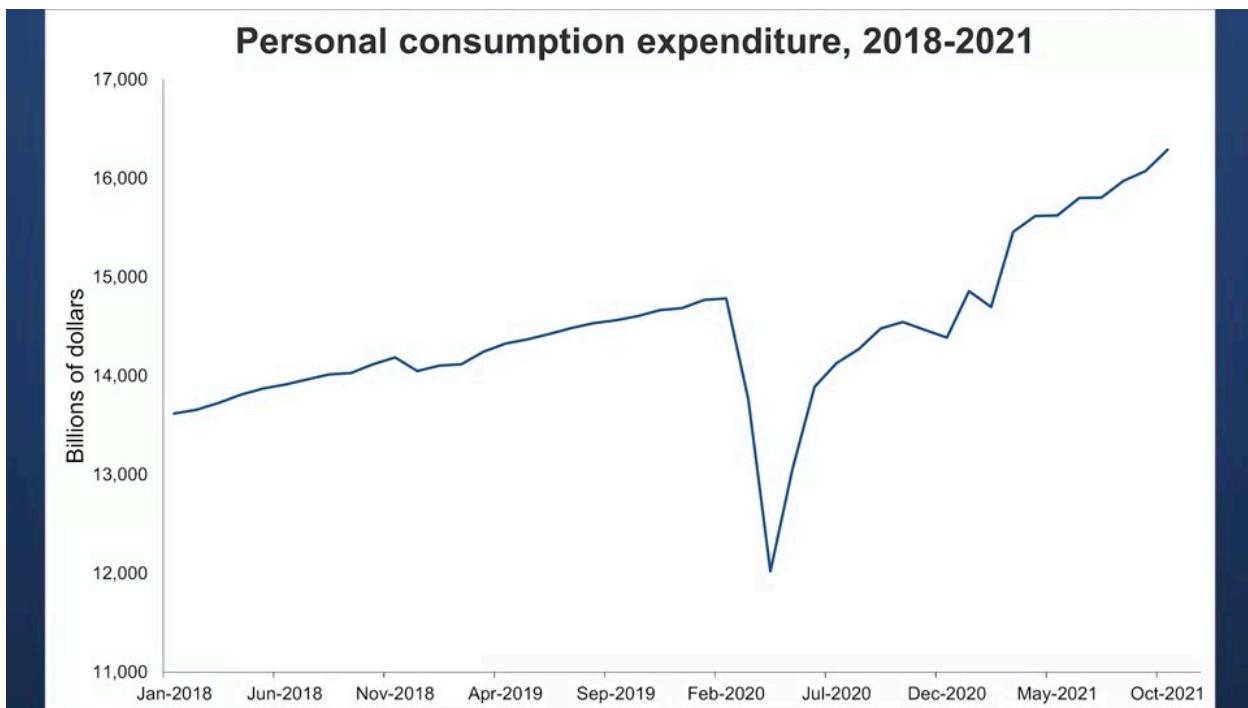
$$Y = C + I + G + NX$$

$$100\% = 68\% + 17\% + 19\% - 4\%$$

Output in an economy denoted by Y is the sum of private consumption C plus business investment I plus government spending G plus net exports. That is exports minus imports NX. For the United States, in 2019, consumption was about 68% of GDP, business investment 17%. Government expenditures 19% and net exports minus 4%. Net exports of -4% means that the US imported a lot more goods than it exported. It also implies that the US borrows from approach to finance domestic expenditure.



Let's have a look at what happens to consumption, as you can see in this chart, personal consumption expenditure has been growing continuously before the 2008 financial crisis. With the crisis unfolding, personal consumption expenditures dropped despite government programs that we will discuss shortly. This means that when consumption, which accounts for 2/3 of GDP declines, GDP is likely to decline as well.



Of course, the drop was much sharper during the COVID-19 pandemic. When

unemployment soared and shutdowns reduced the demand for goods in particular, travel and hospitality. More than six million workers in hospitality lost their jobs when the shutdown started in March 2020. This reduced the income available for consumption.

$$Y = C + I + G + NX$$

We call the composition of GDP. Y is equal to C plus I plus G plus NX. C is dropping a lot. How can the government offset the drops in consumption that is caused by rising unemployment. Note that the newly unemployed are those who will reduce consumption expenditure most. Cutting income taxes will not help the newly unemployed if they don't have an income anymore, you can send out checks to all households.

Direct Transfers

- 2008 up to \$1200
- 2020 up to \$2400

This has been done twice in the US, in 2008 an individual taxpayer could receive a payment of up to \$600 and a couple of up to \$1200. In 2020, an individual taxpayer could receive up to \$1,200 and a couple of up to \$2,400.

Direct Transfers

- 42 percent spent
- 27 percent saved
- 31 percent pay off debt

Where these direct payments effective in stimulating consumption? Research suggests that only 42% of the 2020 stimulus checks were spent on consumption while 27% were saved and 31% were used to pay off debt. Why is that? Those who did not lose their job

during the shutdowns got free money to spend on top of the income, but at the same time had little opportunity to spend their stimulus checks.

Direct Transfers

- Low-income households spend more

So, people with low incomes tended to spend more of their stimulus checks. Where people with high incomes saved it, in some, the effects of the stimulus checks sent to everybody to increase consumptions were mixed. The second type of direct payment is more targeted, increased unemployment benefits.

Targeted Intervention

- Extend unemployment benefits

Unemployment benefits if they're extended in 2009 and increased and extended during the COVID-19 pandemic. This is a much more targeted interventions as these payments only go to people who recently lost their jobs and therefore would have to cut consumption most. These payments helped to avoid an even sharper drop in consumption and a sharper increase in the poverty rate. There is another indirect way to support consumption. That was first broadly used in Germany during the 2008 financial crisis, paying employers to not lay off employees.

Short-Time Labor

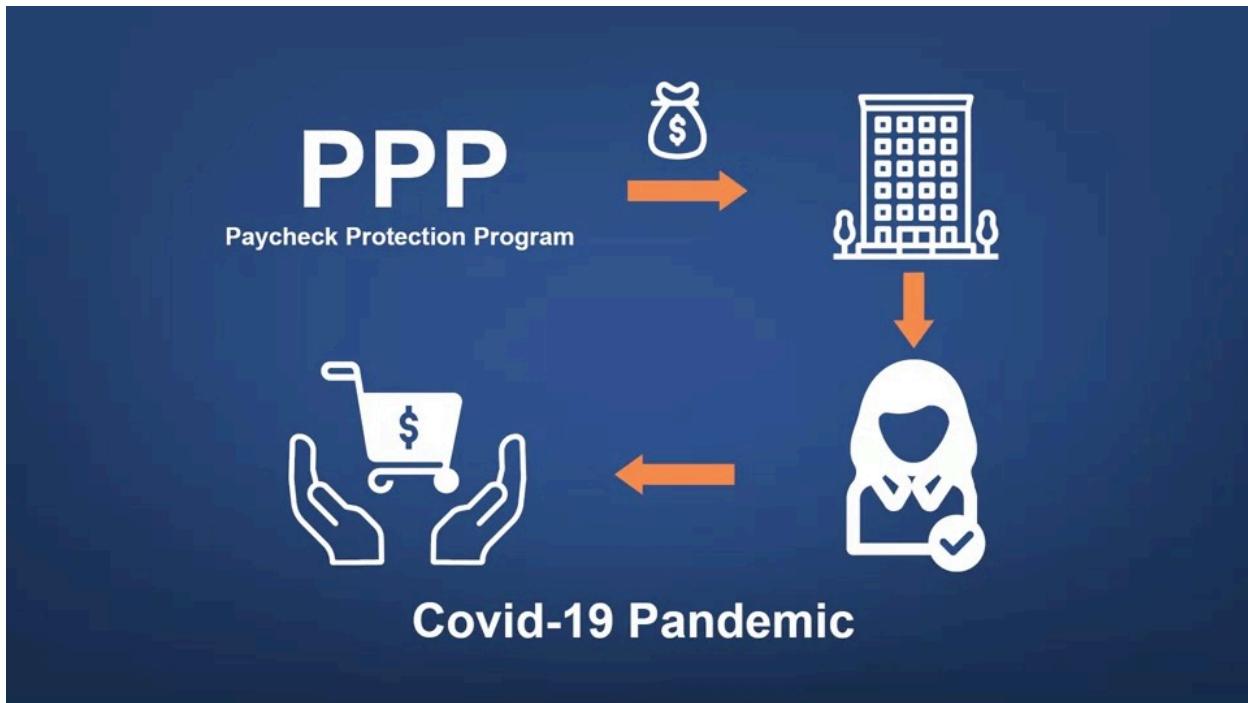
- Government offsets cut in hours

This program is called Short-Time Labor. In essence, the working hours of employees are reduced during the businesses wage bill and the state pays the difference. The advantages of such a program includes that worker skills don't depreciate and that businesses don't need to rehire when demand increases again. During the COVID-19 pandemic, the paycheck protection program had a similar intent.

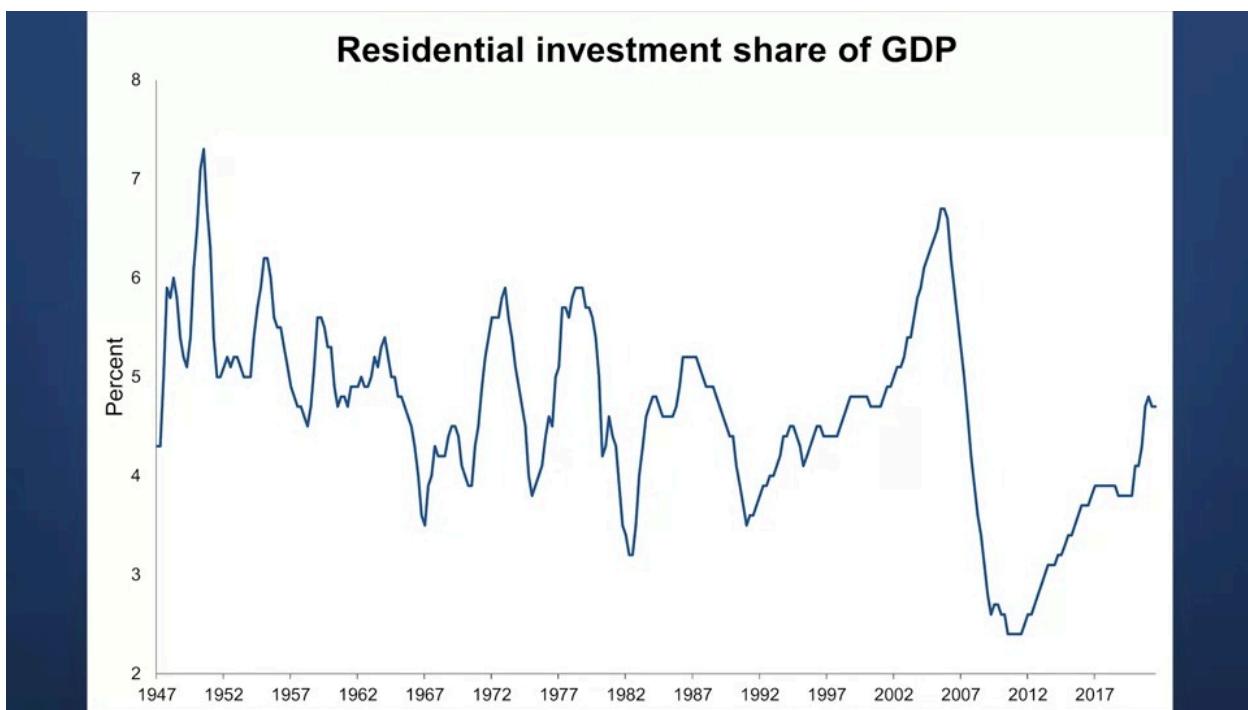


The program offered loans to businesses that would be forgiven if they do not fire their

employees. In other words, the program was designed to ensure that employees could be paid even if there were no sales due to shutdowns. Research suggests that getting PPP loans, in fact, help businesses to keep their employees during the COVID 19 pandemic.



This also means that these employees still had an income and did not have to cut consumptions. Putting these pieces together direct payments to newly unemployed and programs helping people to keep their jobs are the most effective way for governments to support consumption during a recession.



The second component of GDP is business investment. In this graph, you can see how much residential investment contributes to GDP. Perhaps unsurprisingly, residential investments collapsed during the 2008 financial crisis and was slow to recover. To counteract such drops, government have limited options. Governments can enact tax breaks or accelerate depreciation schedules to force the investment, but in the end, business investment is going to be driven by demand for goods. This brings us to the last type of interventions. The government itself increases its demands for goods.

American Recovery and Reinvestment Act

- \$275 billion
- Construction projects

For instance, in addition to extending unemployment benefits and cutting taxes, the American recovery and Reinvestment Act was passed in February of 2009 and allocated 275 billion dollars in federal contracts, grants and loans to create jobs.

The American recovery and Reinvestment Act sparked a number of public construction projects across the country. But is increasing government spending an effective tool to fight recessions, John Maynard Keynes certainly thought so. Others have disputed this claim. Let's have a closer look at the argument of each side.


$$Y = C + I + G + NX$$

Keynes argued that in a recession when consumption falls, governments should make up for the lost demand by purchasing goods themselves and thereby stabilizing GDP. The crucial question here is whether a dollar spent by the government increases GDP by more than \$1.

Government Intervention

- Government spending multiplier
- Keynesian view: >1

This is called the government spending multiplier. In the Keynesian view, the government spending multiplier is larger than one, at least in recessions because the

government by making up for lost private demand creates jobs which in turn increases consumption. Opposing Fuse, argue that the government spending multiplier is less than one. The argument here is that the government rather than substituting for private consumption, is replacing the private demand with demand for different types of good. Think for instance, the government increases defense spending in response to financial crisis originating in the housing sectors, workers from the construction sector would need to leave that sector and find employment in the defense sector. This is clearly problematic as construction workers may not have the skills needed in the defense industry, retooling and reallocations are costly and inefficient.



Hence, the argument goes, the government spending multiplier is smaller than one. The evidence on the government spending multiplier is mixed. So, most studies indicate that during recessions, the multiplier is larger than one. As so often, the answer will depend on what exactly the government is using the money for and how fast it can spend it. In a recession, the government should spend money immediately, but often projects take time. Think about large infrastructure projects, they need careful planning buy in from stakeholders and go through the government purchase process. All of this means that the implementations of programs is likely to be delayed.



It is even harder to measure the effects of this spending. How do you measure the benefit of a repaired bridge? In sum, under some conditions, increase in government spending on goods can be an effective way to support the economy in a recession. No matter which of the three types of government interventions is implemented, they all cost money.



In other words, each of these interventions will increase the budget deficit.

Government debt and monetary policy

- Lower interest rates lead to:
 1. Cheaper loans for consumers and firms, increasing the effect of the government stimulus
 2. Lower cost for the stimulus

This is where monetary policy comes in, by lowering the interest rate, expansionary monetary policy supports a government stimulus program in two ways. First, it becomes cheaper for firms to invest and for consumer to take out loans for consumption, increasing the effect of the government stimulus. Second, it makes the stimulus less expensive as it is financed by debt issued at lower interest rates.



Summary

- Government transfers and spending
- Targeted interventions have larger impacts
- Monetary policy can lower cost of fiscal programs

What have we learned in this lesson? First, the government can support the economy during the recession by either transferring money to households or increased government spending. Second, targeted interventions such as subsidizing wage bills or increased unemployment benefits have the largest effects on household consumption. Third, expansionary monetary policy can support government stimulus programs.