



The Financial Crisis of 2007-2008

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Disclaimer

- The views expressed are my own and do not necessarily reflect official positions of the Federal Reserve Bank of St. Louis, or the Federal Reserve System.
- I am not an expert on housing markets or banking or accounting.



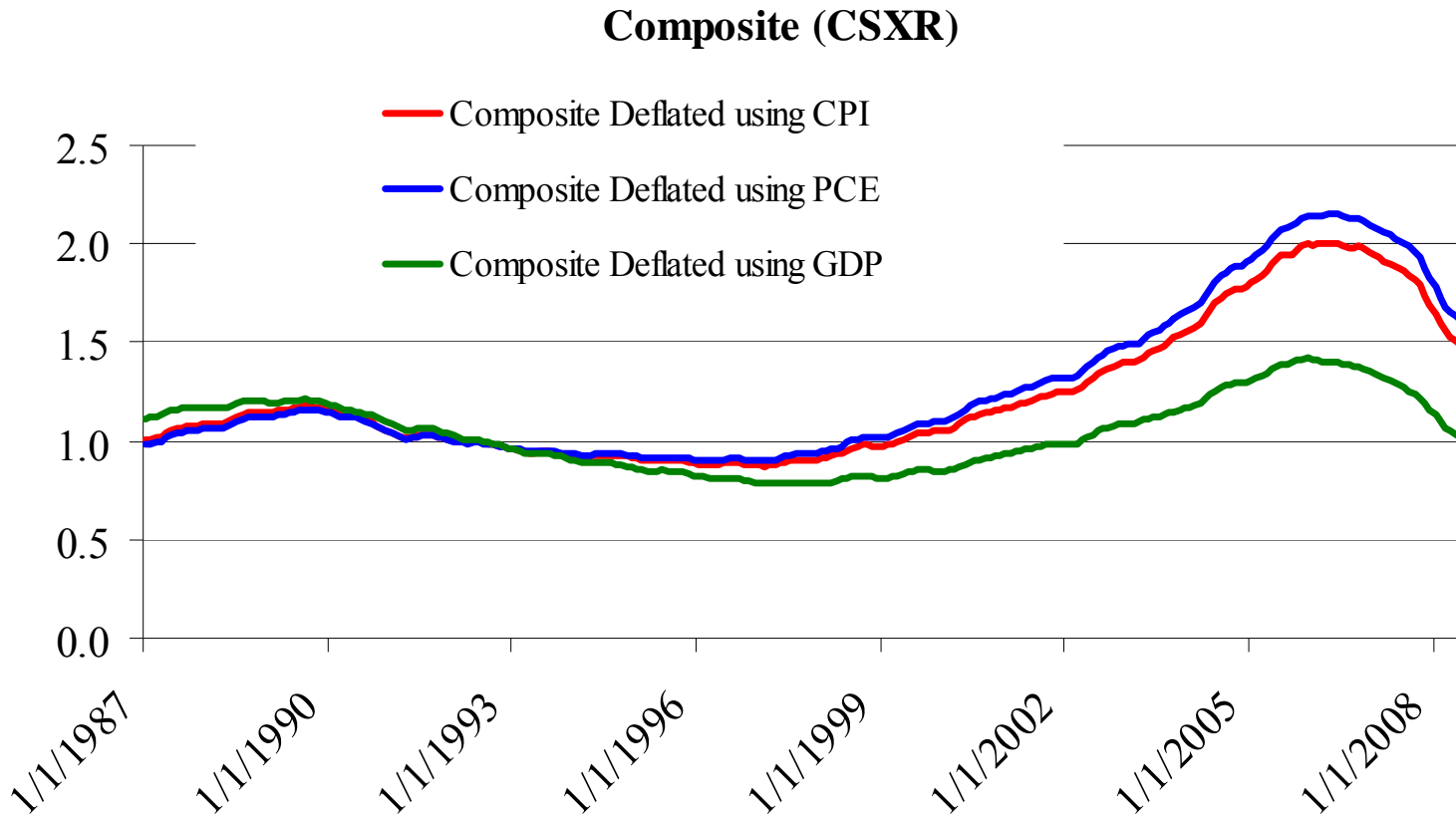
Today's Talk

- The housing bubble.
- The actors in the financial crisis.
- The virtuous/vicious circle.
- The bubble pops
- Capital and leverage
- Systemic risk and bank lending
- Federal Reserve policy responses
- The rescue packages.



Housing price bubble

- The Underlying Event: House prices started rising in 1997 but collapsed in 2006-2008.





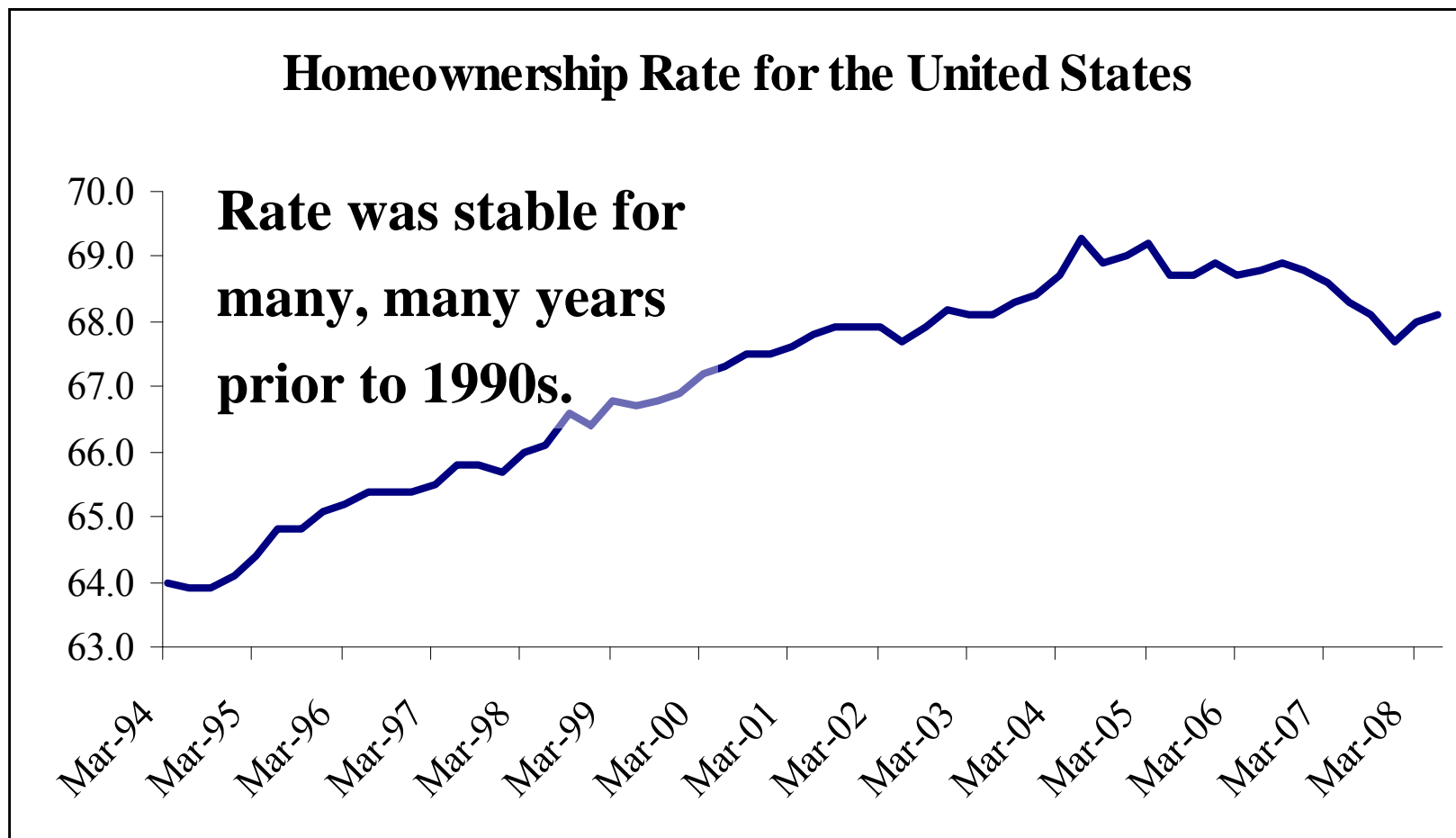
Why did house prices rise?

- Regulatory Factors: CRA, HUD decisions.
- Taxpayer Relief Act of 1997
- Chinese savings => Lower long-term real interest rates
- Easy M policy => Lower short-interest rates
- Short-selling houses is hard.
- Housing bubble was an int'l phenomenon to some extent.
- Home-ownership rates did rise to unprecedented levels.



Home-ownership rates

- 64% in 1994 to 69% in 2004





Who were the actors?

What did they do?

- Banks, mortgage brokers, made loans but mostly sold the payments.
- Fannie and Freddie guaranteed bonds backed by loans
 - CDOs and MBSs
 - Fannie and Freddie also held their own securities
- Investment banks packaged the loans into bonds of various risk
 - Mortgage payments were separated into tranches
 - The good, the not-so-good and the ugly.
 - Credit default insurance made the Good AAA
 - Investment banks often kept the riskiest bonds off their balance sheets in SPVs



Who were the actors?

What did they do?

- Rating agencies rated the bonds
 - Bad incentives for ratings agencies
 - Bad methodology that ignored underwriting standards and the housing bubble.
- Pension funds, bond funds, towns, central banks, bought the mortgage backed securities (MBSs)
 - MBSs are bonds. They bought mortgage payments.



A virtuous/vicious circle

- House prices rose.
- Lending standards fell as prices rose.
 - Troubled borrowers can always refinance or sell, right?
 - Lenders did not enforce standards.
 - Borrowers misrepresented their ability to pay.
- Securitization created a principal-agent problem.
 - The person making the loan doesn't hold the mortgage.
- House prices rose further.



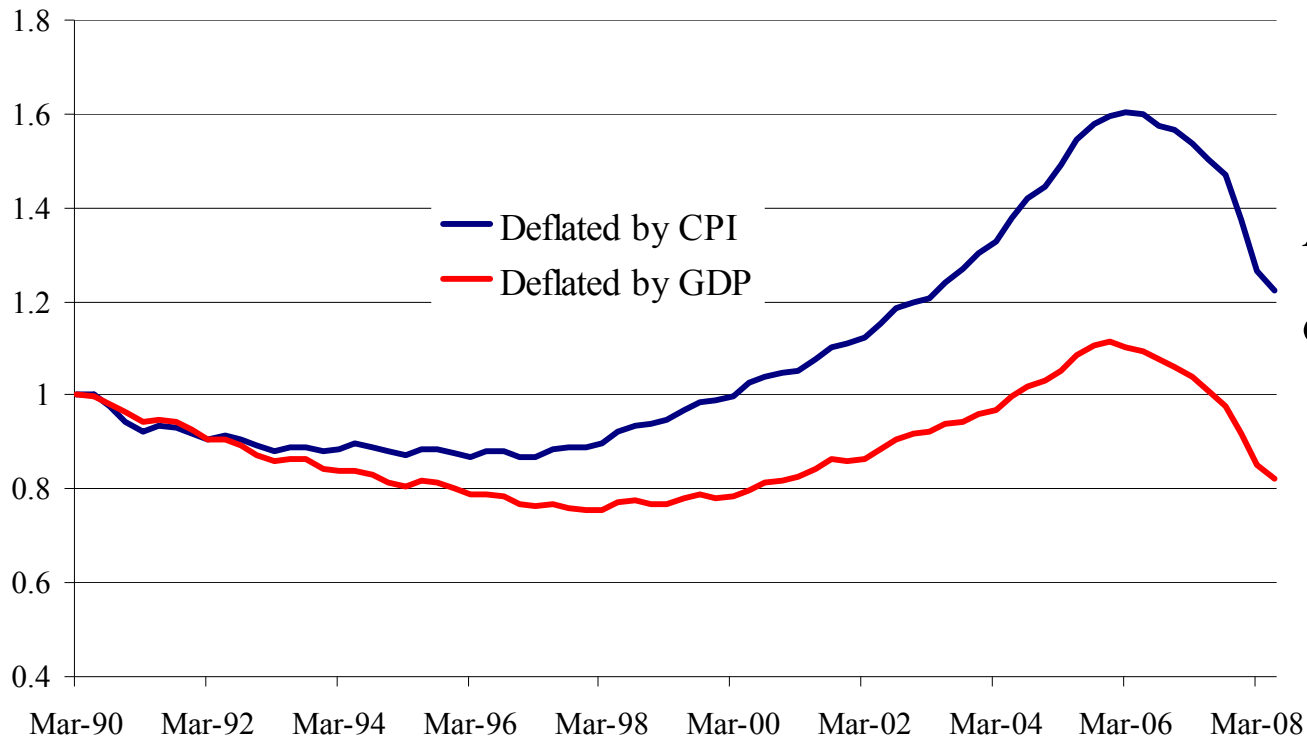
The bubble pops

- Oil prices rose from 2002
- The fed funds rate started rising in late June 2004
 - This increased all short-term interest rates
- The economy slowed.
- Prices stopped rising.
- Lending standards tightened.
- House prices eventually started declining.



The bubble pops

S&P/Case Shiller Home Price Index (2000=100)



Are houses still
overvalued?

- Fundamental valuation is difficult to determine.



Upside-down homeowners

- Your mortgage is worth more than your house.
 - It is cheaper to buy another house than pay off the mortgage.
- What do you do? Walk away from the house.
- Securitization of mortgages hinders renegotiation.
- Bad for lenders: Houses have modest collateral value.



Mortgage defaults

- Borrowers don't pay: Lenders lose
- Bond holders lose.
 - Bonds are backed by mortgage payments.
 - Pension funds, widows and orphans, small towns, insurance companies, hedge funds, investment banks, etc.
- Bond insurers lose too.
- Do firms have enough *capital* to weather the storm?



Capital and leverage

- Capital is the owner's stake in a business
 - Capital = assets – liabilities
 - High Capital = safety but low returns
 - Low leverage
 - Low Capital = risky but high returns
 - High leverage



Capital and leverage

- Financial firms typically must meet minimum capital requirements or shut down.
 - A firm with very low capital has every incentive to make a big bet with other people's money.
 - The S&L crisis.
 - Banks don't make business loans unless the owner has a significant stake in the business.



Who lost as house prices fell?

- Bear Stearns was heavily invested in MBSs
 - The Fed assumed the worst assets
- Fannie and Freddie had become hedge funds
 - Protected from regulators
- IndyMac Bank
- Lehman had been in trouble for a while
 - Widely anticipated. Less of a problem
- AIG insured credit defaults
 - A surprise



Systemic risk

- Some failures present a risk to the whole financial system.
 - Bank runs on the whole system.
 - Counterparty risk.
 - Financial firms are heavily leveraged and large transactions are settled every day.
 - If your counterparty goes under, you don't get paid.
You go under.



Consequences of systemic risk

- Financial firms will not lend to each other.
 - Information is asymmetric.
 - You might not be paid back.
- Financial system is paralyzed.
- All economic activity is affected.



Consequences for bank lending

- Low capital constrains banks from lending
- Banks hoard liquid assets (cash and Treasuries).
- Interbank lending temporarily dried up.
 - Bank lending seems to have recovered but it is substituting for commercial paper issue.
- The commercial paper market has dried up.



What is the problem?

- A quick summary:
 - House prices fell; borrowers default on mortgages.
 - Assets backed by mortgages lose value.
 - Capital falls. Financial firms could go bankrupt.
 - Huge uncertainty dries up the market for these assets.
 - No one knows who owns these assets.
 - Bad idea to lend or trade with a risky counterparty.
 - Not much lending or trading among financial firms.
 - The whole economy suffers.



Federal Reserve policy responses

- Federal funds rate cuts
 - Discount rate cuts
 - Swap lines with foreign central banks
 - Term Auction Facility
 - Term Securities Lending Facility
 - Primary Dealer Lending Facility
 - ABCPMMFLF
 - Participation in rescue packages
- Traditional monetary instruments**
- Help the financial system to function**



Federal Reserve policy responses

- Traditional Open market operations
 - The FRBNY buys and (rarely) sells Treasuries from and to Primary Dealers to control the federal funds rate.
 - Buying Treasuries increases bank reserves.
 - The most important OMO transactions are repurchase agreements (repos).
 - Primary dealers are 17 (formerly 20) investment banks and securities brokers.



Federal Reserve policy responses

- Federal funds rate cuts
 - Since September 2007, the FOMC has cut the funds rate 9 times, for a total of 425 basis points.
 - Helps the banks but reducing borrowing costs
 - Tends to inject liquidity



Federal Reserve policy responses

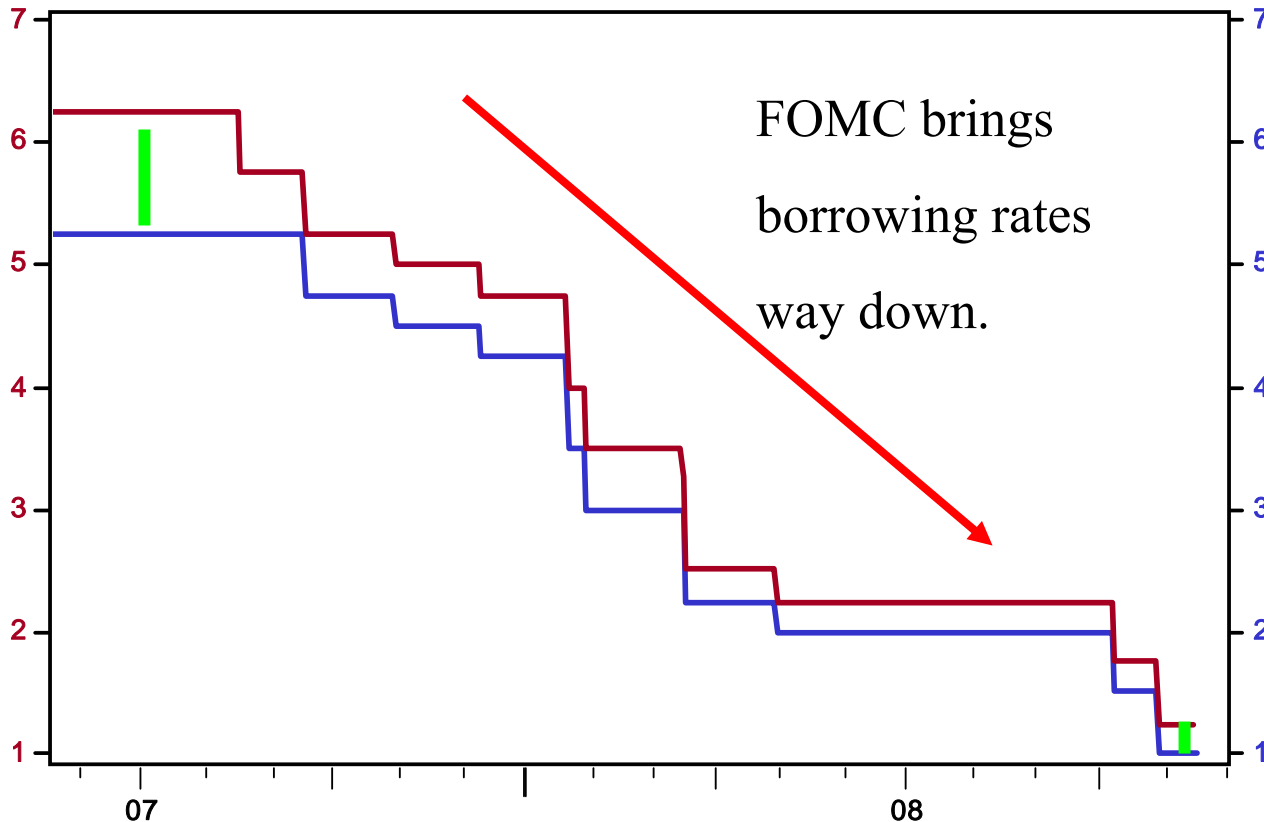
- Discount rate reductions
 - Discount borrowing traditionally subjects banks to additional scrutiny.
 - The Federal Reserve would like to change this.
 - Reduce the fed funds/discount rate gap from 100 to 25 b.p..
 - Provide end-of-day funds
 - Collateralized borrowing: Accept poor collateral in lender of last resort function (e.g., the Bank's buildings)



Federal Reserve policy responses

Discount Window Primary Credit
% p.a.

Federal Open Market Committee: Fed Funds Target Rate
%



Source: Federal Reserve Board /Haver Analytics



Federal Reserve policy responses

- Swap lines with foreign central banks
 - Foreign bank subsidiaries deal in USD
 - The NY lending markets are not open 24 hours.
 - Foreign central banks can now provide USD liquidity.
 - Swap lines started out small (ECB: \$24b, SNB: \$4b) and have grown enormously.
 - The Federal Reserve is at very low risk in these swaps.



Federal Reserve policy responses

- Term Auction Facility

- Lack of borrowing from the discount window.

- TAF begun on December 17, 2008.

- Bypass primary dealers; get liquidity to 7000+ commercial banks.

- Mechanics:

- Let banks bid on borrowing biweekly.

- What interest rate will a bank pay for what quantity of funds?

- Bidding is anonymous, overcollateralized

- Assign collateral to Fed to receive funds.



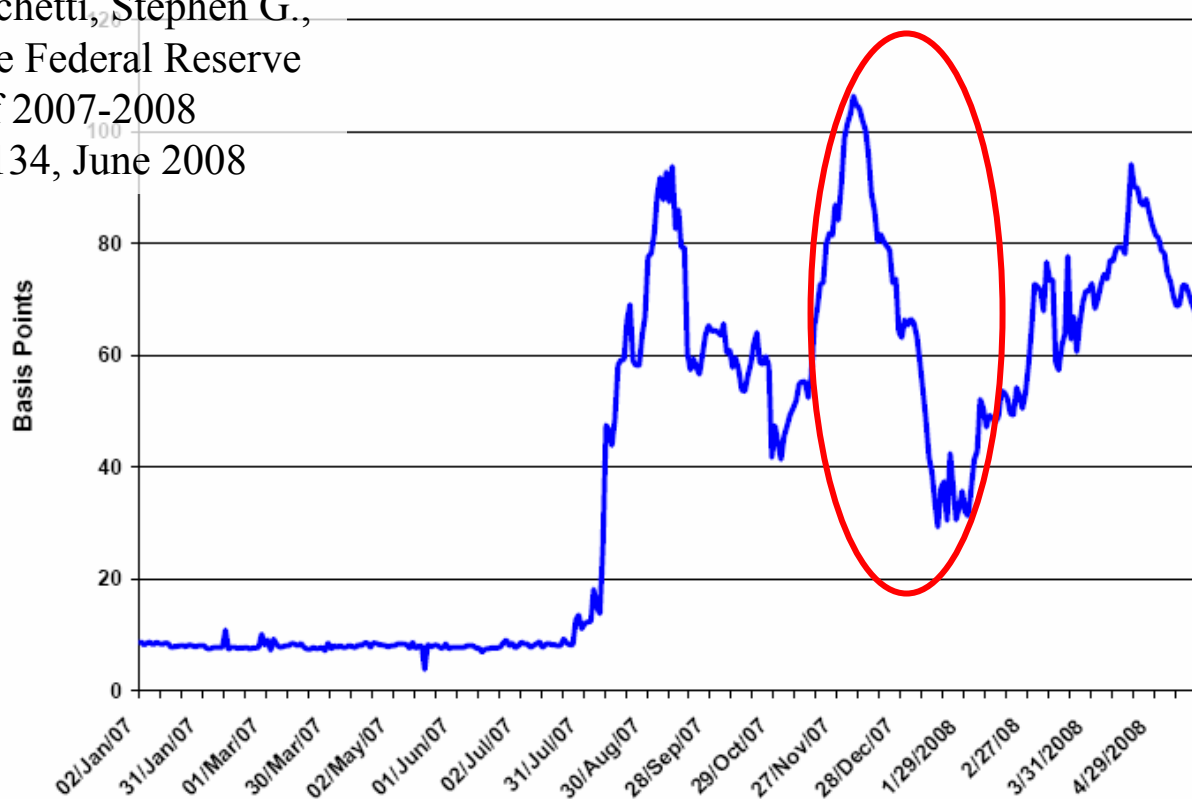
Federal Reserve policy responses

- Term Auction Facility
 - Auctions substitute for OMO. (Auctions are sterilized.)
 - Remove the stigma from discount borrowing
 - Allows banks to trade illiquid assets for liquid assets.
 - Illiquid collateral might otherwise have little market value.
 - Might have reduced the spread between Treasuries and interbank loans temporarily.
 - TAF was playing for time.



Federal Reserve policy responses

Figure 1: Spread between 3-month LIBOR and 3-month Expected Federal Funds Rate
January 2007 to May 2008, Daily



Source for the figure: Cecchetti, Stephen G.,
Crisis And Responses: The Federal Reserve
and the Financial Crisis of 2007-2008
NBER Working Paper 14134, June 2008

Source: LIBOR data are from the British Bankers' Association www.bba.org. The expected federal funds rate data are from Exhibit 2.10 of Greenlaw, Hatzius, Kashyap and Shin (2008). Note that because the LIBOR rate is determined at 11am UK time, which is 5am Eastern US time, I plot the expected federal funds rate on date t minus LIBOR at $t-1$. This avoids spurious spikes that would occur on dates with the FOMC made unexpected, inter-meeting, changes in the target federal funds rate.



Federal Reserve policy responses

- Term Securities Lending Facility
 - The scramble for safe, liquid assets meant Treasuries became scarce.
 - Treasury prices up => yields fall.
 - Overnight Treasury repo rate plunged.



Federal Reserve policy responses

- Term Securities Lending Facility
 - Solution was the TSLF
 - Grew out of an old program to lend particular Treasuries to Primary Dealers overnight.
 - First auction was March 27, 2008.
 - Lend up to \$200 billion in Treasuries for 28 days in exchange for broad collateral.



Federal Reserve policy responses

- Term Securities Lending Facility
 - TSLF changes the composition of Fed's balance sheet without changing its size.
 - **Goal: Reduce the risk premium by substituting Treasuries for risky MBSs.**
 - TSLF was very successful in increasing the Treasury repo rate.



Federal Reserve policy responses

- Primary Dealer Lending Facility
 - PDs are not eligible for discount lending.
 - Goals
 - Short-term funding for investment banks
 - Reduce interest rate spreads on ABSs.
 - PDLF allows PDs to post a variety of collateral.
 - Created March 16, 2008 under Article 13(3).
 - Very popular.
 - Spread between Agencies and Treasuries declined immediately.



Asset Backed Commercial Paper (ABCP) Money Market Mutual Fund (MMMF) Liquidity Facility (AMLF or "the Facility")

- Money market mutual funds
 - Borrow from consumers
 - Lend to businesses by purchasing ABCP
- Significant demands for redemption?
 - Can't sell the ABCP; **risks a run on MMMFs?**
- The Fed (AMLF) loans depository institutions money to purchase ABCP, reliquifying the Money Market funds.
 - Begun September 19, 2008.



Why not let them go bankrupt?

- An economy without bankruptcy is like religion without hell.
- Ideally: Let them all go bankrupt.
- But bankruptcy takes time.
 - Except for commercial banks.
- Assets are tied up as creditors fight for claims.
- We need a functioning financial system.



The new rescue package

- The goal is not to “bail out” anyone.
- Recapitalize banks by buying preferred stock.
 - Buy preferred stock
 - Favorable bankruptcy treatment but no voting
 - Warrants (options) to buy common stock
 - Adding assets (cash) means more capital
 - Banks are not lending constrained
- Limits on executive compensation.
- No longer purchase distressed assets.



The new rescue package

- The whole package is worth \$700 billion.
 - Two stages: Each worth \$350 billion
- Stage 1:
 - \$250 billion to buy bank stock
 - \$40 billion to AIG's CDS losses.
 - \$60 billion in reserve until January 2009.
- Stage 2:
 - Will be released with the new administration.



The old rescue package

- The goal was/is not to “bail out” anyone
- Replace risky securities with Treasuries
 - The government assumes the risk
- Unclog the financial system.
- Goal: The financial system can match up savers and borrowers again.



Why didn't economists predict it?

- Even the housing bubble wasn't as obvious in real time as in hindsight.
- People recognized the housing bubble.
- Price would fall; borrowers would default; bondholders would lose.
- Interconnectedness, derivatives/leverage magnified the problem.



What does the future hold?

- My crystal ball is cloudy today
- Public policy is much, much better than in the 1930's



Sources on the Policy Responses

- Cecchetti, Stephen G., Crisis And Responses: The Federal Reserve And The Financial Crisis Of 2007-2008. NBER Working Paper 14134, June 2008



The End