THE FINANCIAL CRISIS AND THE GREAT RECESSION

What caused the 2008 financial crisis?

The roots of the financial crisis can be understood through corporate finance

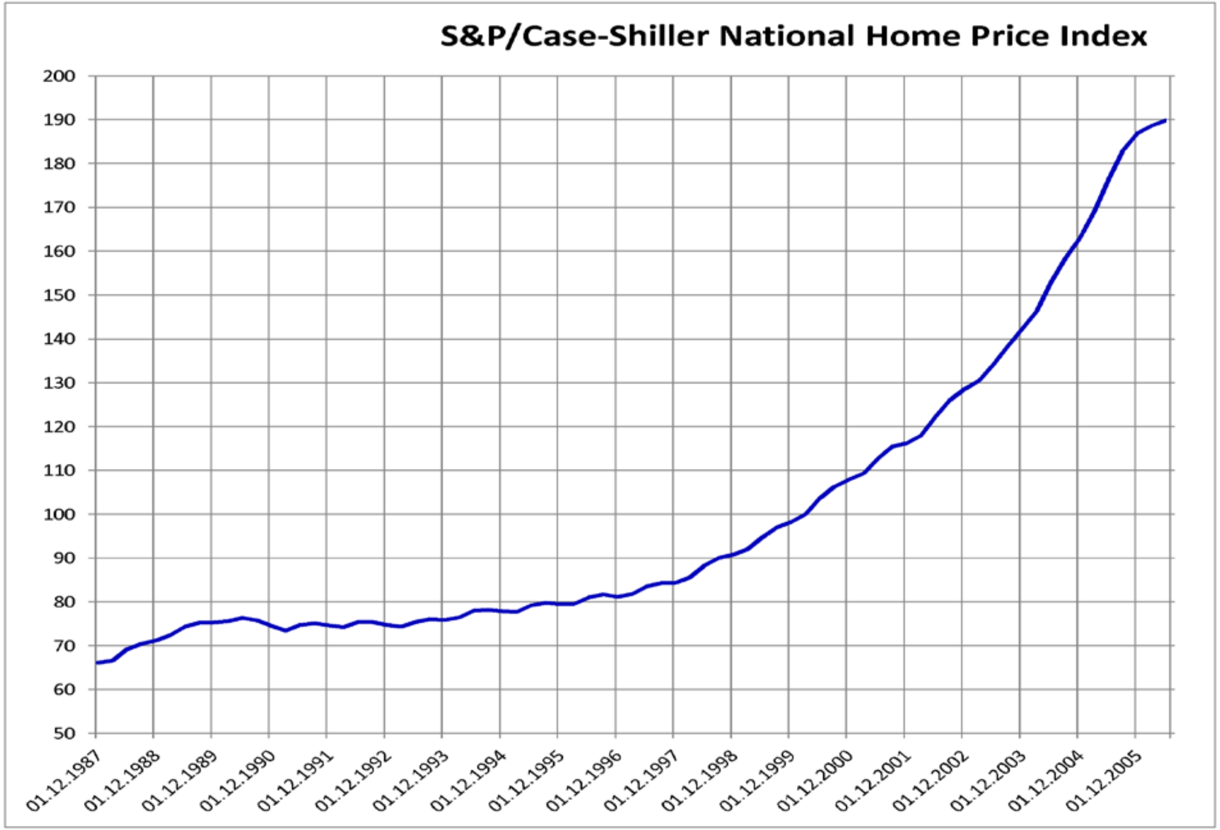
- Assets
  - Inflated valuations – “bubbles”?
  - Incentives to take on high risk
    - Options compensation
    - “Moral hazard”
- Liabilities
  - Excessive leverage
  - Among banks, but also for households
  - Especially high reliance on short-term (debt) financing
  - “Too big to fail” → Encourages excess leverage
- Systemic causes
  - High interconnectedness
  - Links of financial interdependence often hidden until problems emerged

We’re still living in the aftermath of “The Great Recession”

- Unemployment/underemployment has been declining
- Record corporate profits
- But, companies have record levels of cash on balance sheets but are “unwilling” to spend it
  - Why?
- Low interest rates, especially long term yields
  - Has been an intentional policy by the Federal Reserve

But how did it all begin?

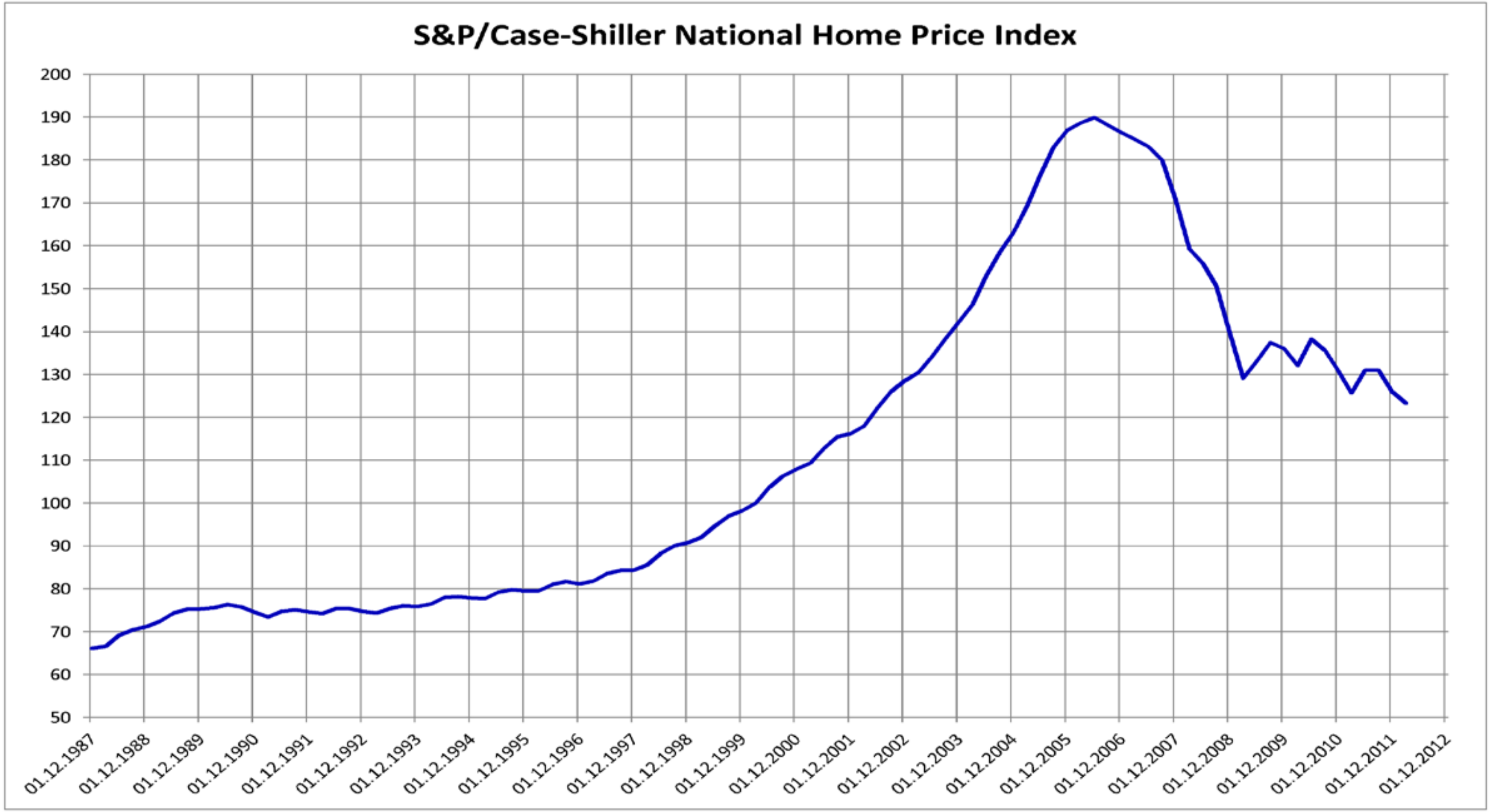
"Housing prices always rise"



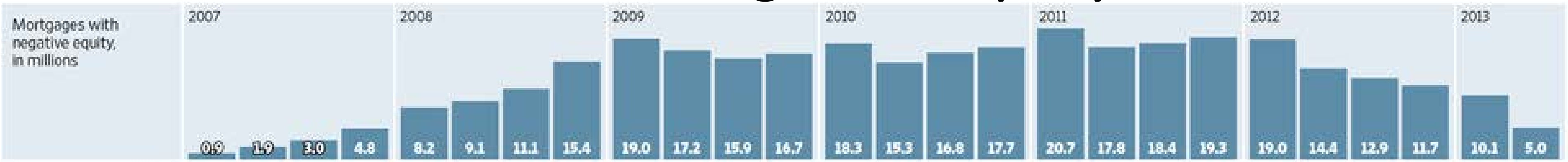
People took out mortgages like never before

- Total mortgage debt in U.S. before crisis around $10-12T
- Very lenient standards for many loans (e.g., “low doc” or “no doc”)
- Was there outright fraud?
- New York Times (Feb 2015) story of the “Art Department” at Ameriquest branch:
  - *“They used scissors, tape, Wite-Out and a photocopier to fabricate W-2s, the tax forms that indicate how much a wage earner makes each year.*
    It was easy: Paste the name of a low-earning borrower onto a W-2 belonging to a higher-earning borrower and, like magic, a bad loan prospect suddenly looked much better.”
- Banks initially had good experiences with these loans
  - As long as house prices rise, people can always **refinance** even if they otherwise can’t afford to pay anything on their mortgage
  - Originating and refinancing these mortgages brought fee income for the banks

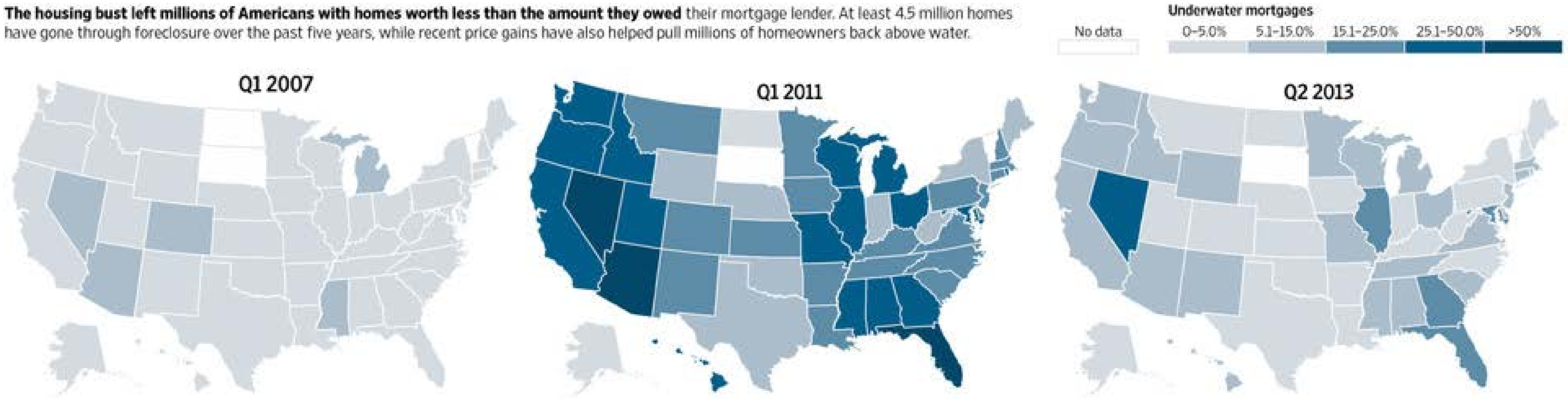
“Housing prices always rise”

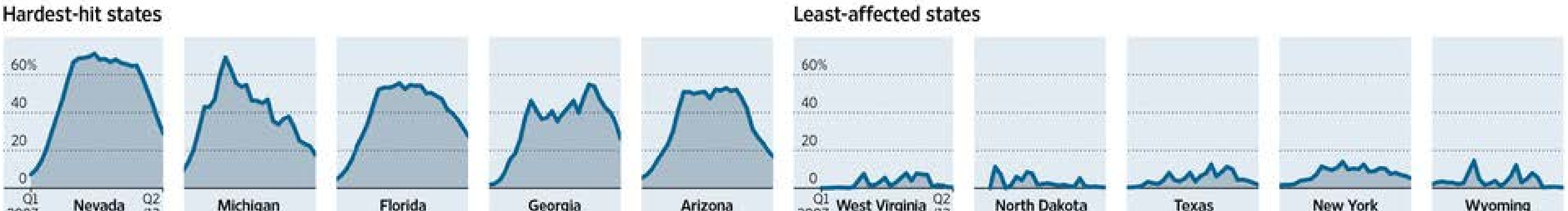


Result: Negative equity



The housing bust left millions of Americans with homes worth less than the amount they owed their mortgage lender. At least 4.5 million homes have gone through foreclosure over the past five years, while recent price gains have also helped pull millions of homeowners back above water.

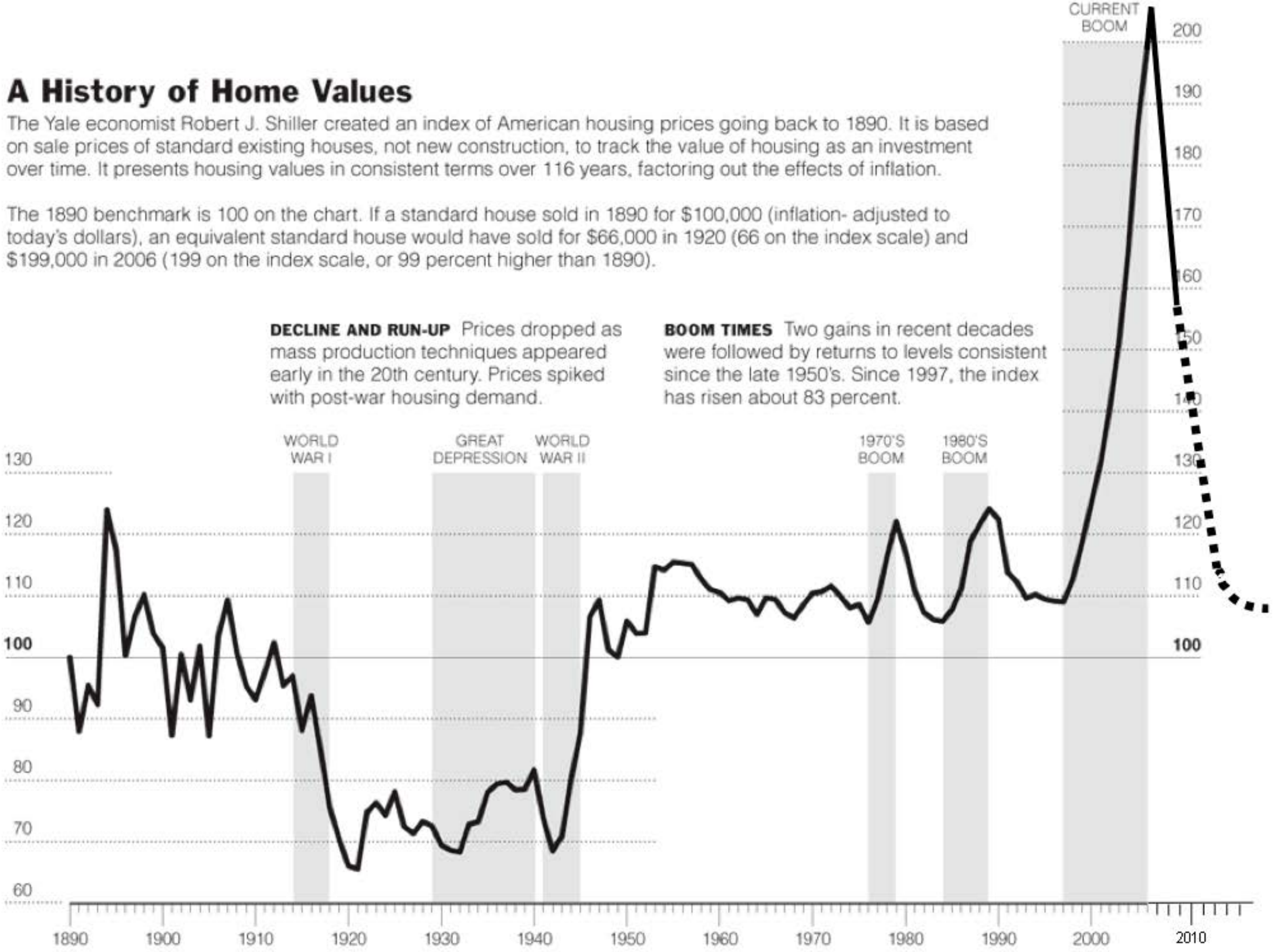




A History of Home Values

The Yale economist Robert J. Shiller created an index of American housing prices going back to 1890. It is based on sale prices of standard existing houses, not new construction, to track the value of housing as an investment over time. It presents housing values in consistent terms over 116 years, factoring out the effects of inflation.

The 1890 benchmark is 100 on the chart. If a standard house sold in 1890 for $100,000 (inflation- adjusted to today's dollars), an equivalent standard house would have sold for $66,000 in 1920 (66 on the index scale) and $199,000 in 2006 (199 on the index scale, or 99 percent higher than 1890).



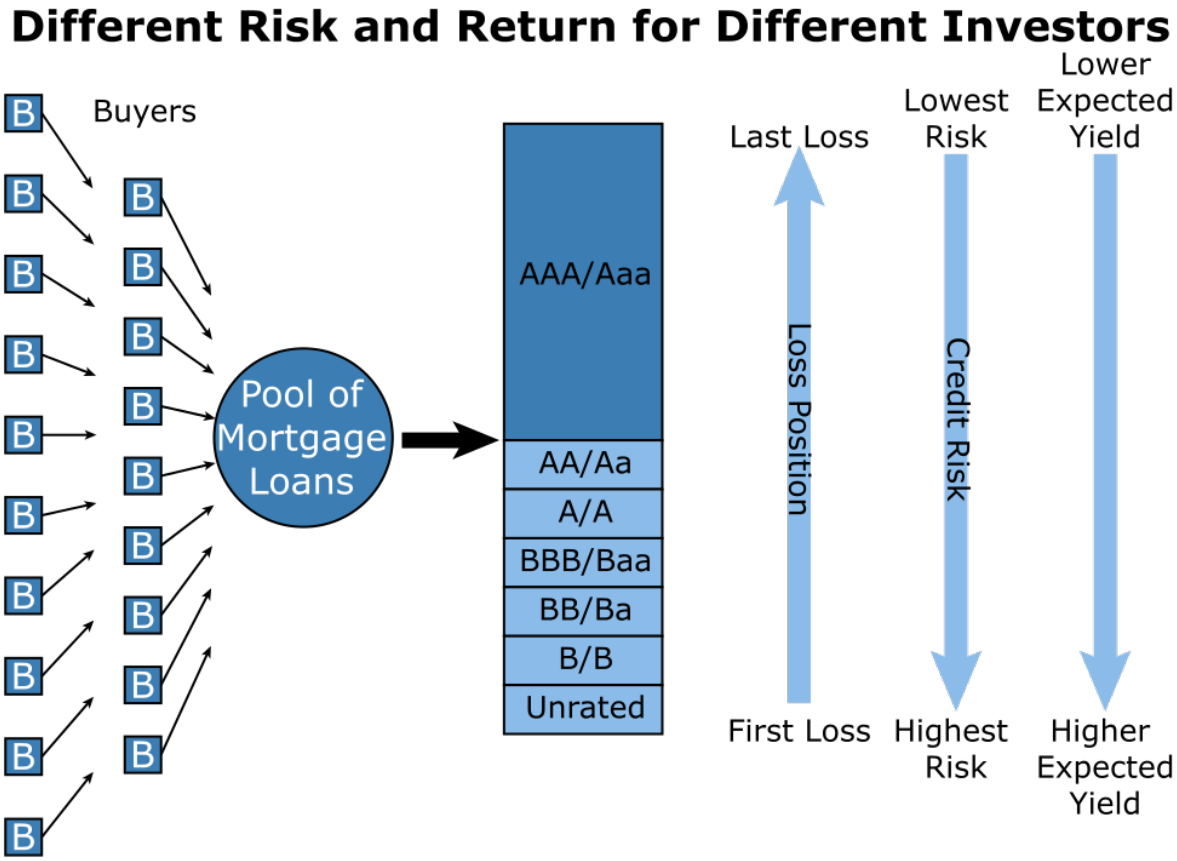
Source: *"Irrational Exuberance," 2nd Edition, 2006, by Robert J. Shiller*

Bill Marsh/The New York Times

Asset-Backed Securities

- An Asset-Backed Security (ABS) is a security that is constructed by **pooling** loans or other financial securities, in a process called **"securitization"**
- The ABS's cash flows come from underlying loans or other securities, e.g.:
  - Mortgages
  - Student loans, auto loans, credit card receivables
  - Receivables for corporations
- Securitization makes loan market more liquid and can increase total funding for these loans
  - It's much easier for an investor to buy a piece of a large mortgage pool (in the form of an MBS bond) than buying individual mortgages
  - Is this good or bad?
- ABSs are often sliced into "tranches" that are assigned different repayment priority and have different risk
- Collateralized debt obligation (CDO) is a **re-securitization** of other asset-backed securities

Tranching



Different Risk and Return for Different Investors
Buyers
B
Pool of Mortgage Loans
AAA/Aaa
AA/Aa
A/A
BBB/Baa
BB/Ba
B/B
Unrated
Last Loss
Loss Position
First Loss
Lowest Risk
Credit Risk
Highest Risk
Lower Expected Yield
Higher Expected Yield

Who are Fannie and Freddie?

- Fannie Mae and Freddie Mac are publicly-owned government sponsored enterprises (GSEs)
- They guarantee/buy mortgages and bundle them into "securitized" pools
  - Removes need for banks to "fund" mortgages
  - Transfers the default risk from banks when making these loans
- Result for banks:
  - Allows bank to make more mortgages at a lower interest rate
  - Also removes incentive to carefully screen borrowers
- Fannie and Freddie own or guarantee about one half of the mortgage market!

The (implicit) government guarantee

- Fannie and Freddie were stock-listed companies with private owners/shareholders
- But, they had implicit government bailout guarantee:
  - Federal government had founded them
  - Their failure could halt the entire mortgage market… would the government let that happen?
- How did this affect the rate at which these companies can borrow?
  - How will this affect their financing (capital structure) choices?

Defaults begin

- In 2007, mortgage crisis begins
- More and more borrowers defaulting on their mortgages
  - *"Teaser rate"* mortgages resetting
    - Borrowers hoping to refinance before that happened
    - But, house prices falling, so can no longer easily refinance
    - So borrowers can no longer afford the higher payments
  - *Strategic defaults (*by borrowers who perhaps could pay)

➢ Large losses for Fannie and Freddie who own or guarantee many of these mortgages

Problem!

- Fannie and Freddie have extremely high leverage (debt-to-capital ratio roughly 95% at end of 2007)
- Little room for error, vulnerable to write-downs in the value of assets
- In August of 2008, rating agencies start downgrading ratings of both companies…

Solution for Fannie and Freddie …


WALL STREET
U.S. Treasury
CHAPPATTE

U.S. Seizes Mortgage Giants

Government Ousts CEOs of Fannie, Freddie; Promises Up to $200 Billion in Capital

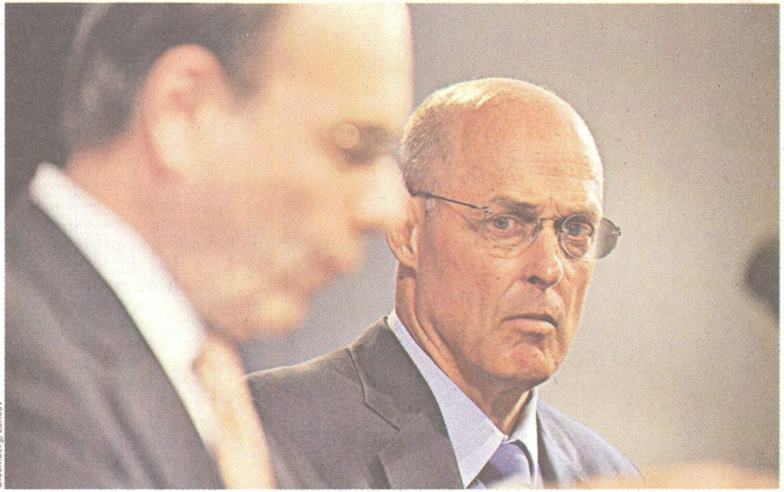
BY JAMES R. HAGERTY,
RUTH SIMON
AND DAMIAN PALETTA

In its most dramatic market intervention in years, the U.S. government seized two of the nation's largest financial companies, taking direct responsibility for firms that provide funding for around three-quarters of new home mortgages.

Treasury Secretary Henry Paulson announced plans Sunday to take control of troubled mortgage giants Fannie Mae and Freddie Mac and replace the companies' chief executives. The Treasury will acquire $1 billion of preferred shares in each company without providing immediate cash, and has pledged to provide as much as $200 billion to the companies as they cope with heavy losses on mortgage defaults. The Treasury's plan puts the two companies under a conservatorship, giving management control to their regulator, the Federal Housing Finance Agency, or FHFA.

With that, the U.S. mortgage crisis entered a new and uncharted phase, potentially saddling American taxpayers with billions of dollars in losses from home loans made by the private sector. Bush administration officials argued that the cost of doing nothing would be far greater because of the toll on the economy of falling home prices and defaults in the $11 trillion U.S. mortgage market.

Mr. Paulson noted that more than $5 trillion of debt and mortgage-backed securities issued by



Bloomberg/Landov

Treasury Secretary Henry Paulson (right) and James Lockhart, head of the Federal Housing Finance Agency, at news conference Sunday to announce takeover. **Full coverage on Pages A14, A15 and C1.**

Mounting Woes Left Officials With Little Room to Maneuver

By Deborah Solomon, Sudeep Reddy and Susanne Craig

WASHINGTON—In the end, Fannie Mae and Freddie Mac had no choice.

Summoned to separate meetings on Friday with Treasury Secretary Henry Paulson and other top officials, the two mortgage giants were told they could either agree to a government takeover or one would be foisted upon them.

coming, according to three people familiar with the meetings.

There was no dramatic trigger, nor was there fear of imminent collapse. Instead, the

any collapse would be devastating to the economy.

The decision was hashed out over weeks of meetings. They included a conclave of Federal Reserve officials during their annual retreat at Jackson Hole, Wyo.; a mid-August polling of bond-market players by Morgan Stanley bankers advising Treasury; and a

First Big Government Bailout

- September 7, 2008 U.S. government takes over Fannie and Freddie
  - What weekday is this?
- U.S. govt:
  - Pledges to provide as much as $200B of capital as companies deal with more mortgage defaults
  - Effectively takes majority ownership:
    - Gets warrants for purchase of new common stock of both companies
    - Buys $1B of preferred stock in each company (senior to existing preferred)
- Both firms' CEOs and Boards fired
  - But CEOs leave with "golden parachutes"
- Dividends on common and old preferred stock eliminated

What happened in the markets?

- Fannie and Freddie stock?
- Fannie and Freddie debt?
- Fannie and Freddie preferred stock?
- U.S. equity market?

Market Reaction

- Fannie and Freddie common stock prices substantially **down** on the Monday (9/8) following the Sunday gov't takeover
  - Fannie falls from \$7.04 to \$0.73 (\$37.46 on 1/2/08)!
  - Freddie falls from \$5.10 to \$0.88 (\$32.74 on 1/2/08)!
- Debt prices **up** (debt is now even safer!)
  - Maintain AAA rating
- Old preferred stock **down**
  - \$14 to \$2 for Freddie
  - Further downgraded (now at "junk" level)
- U.S. equity markets **up** (S&P 500 up 2.1%)
  - But shortlived … market falls 3.4% the next day!

Further concerns

- Half of mortgage market backed up by Fannie and Freddie
- But half is not!
  - Fannie and Freddie had minimum standards for the quality of loans they would guarantee/buy…
  - The half without Fannie/Freddie backing was typically even riskier mortgages
- These mortgages had also been securitized and sold to investors, usually by big banks that bought pools of mortgages and sold off the tranches
- Who owned the securities made up from these mortgages?
  - They are arguably in **even bigger** trouble!

A Tale of Two Firms:
Lehman Brothers and AIG

Lehman Brothers

- Historic Wall Street investment bank
- Extensive holdings of mortgage assets
- Financial holdings fell substantially in value, still had to service its debt
- Could not raise new capital
  - "Debt overhang"—makes raising equity difficult; we'll talk more about this later in the class!
  - Difficult to raise cash quickly by selling off its financial assets
- Government decided **not** to bail out Lehman
- Declared bankruptcy (Chapter 11)
  - Most expensive bankruptcy in U.S. history; we'll talk more about this later in the class too!

AIG, Lehman Shock Hits World Markets

Focus Moves to Fate of Giant Insurer After U.S. Allows Investment Bank to Fail; Barclays in Talks to Buy Core Lehman Unit

The convulsions in the U.S. financial system sent markets across the globe tumbling, as two of Wall Street's biggest firms looked set to exit the scene and insurance titan American In-

By Susanne Craig, Jeffrey McCracken, Jon Hilsenrath and Deborah Solomon

ternational Group Inc. turned to the Federal Reserve and the state of New York for assistance.

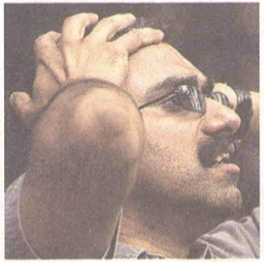
The U.S. stock market suffered its worst daily point plunge since the first day of trading after the Sept. 11, 2001, terrorist attacks. Financial markets were rattled by the rushed sale Sunday of Merrill Lynch & Co. and the bankruptcy-court filing of Lehman Brothers Holdings Inc., which scrambled Monday to sell its most-prized businesses before too many employees and customers walk out the door. (Please see related article on Page C1.)

All day Monday, top Lehman officials were huddled in Manhattan at their Seventh Avenue headquarters negotiating a sale of the U.S. investment bank—the core part of Lehman—to Barclays PLC of the U.K. People involved in the discussions were increasingly hopeful late Monday that a deal would be struck.

In stock markets from Sydney news was greeted with immediate selling. For much of the day, the major U.S. market indexes were down 2%, which, while a good-sized decline, was smaller than many had thought would be the case. But in the final hour of trading, a wave of selling hit, driven by concerns about the fate of AIG. The Dow Jones Industrial Average ended down 504.48 points on Monday, off 4.4%, at its daily low of 10917.51, down 18% on the year. Of the Dow industrials' 30 components, all but one—Coca-Cola Co.—fell, led by a 60.8% plunge in AIG. Several Asian markets, including Japan and China, were closed Monday due to holiday. By Tuesday, Tokyo shares were down 4.8% in early trading.

Monday's action was the latest fallout in a widening financial crisis that began a year ago with the fall of American housing prices and is now reordering the U.S. financial system. Steps unveiled by the Federal Reserve to expand its emergency lending arsenal did little to snap the sense of gloom.

Plenty of potential land mines remain. Banks are increasingly hoarding cash, curbing lending at a time when the economy is slowing. They are also starting to dump assets to raise capital. A mass sale of assets by the likes of AIG and Lehman could flood the market, reducing








Top: Associated Press, Reuters, Associated Press Center: Gabriele Stabile for The Wall Street Journal, Associated Press Bottom: Reuters, DPA/Landov, Robert Caplin for The Wall Street Journal

Traders around the world react to **sharp selloffs** after one of the most turbulent days in Wall Street's history.

AIG Faces Cash Crisis As Stock Dives 61%

By Matthew Karnitschnig, Liam Pleven and Serena Ng

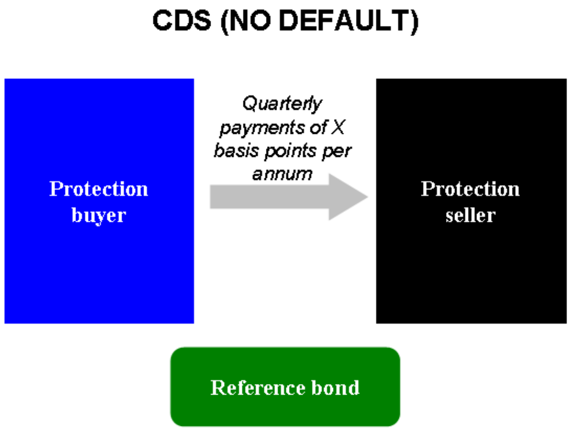
American International Group Inc. was facing a severe cash crunch last night as ratings agencies cut the firm's credit ratings, forcing the giant insurer to raise $14.5 billion to cover its obligations.

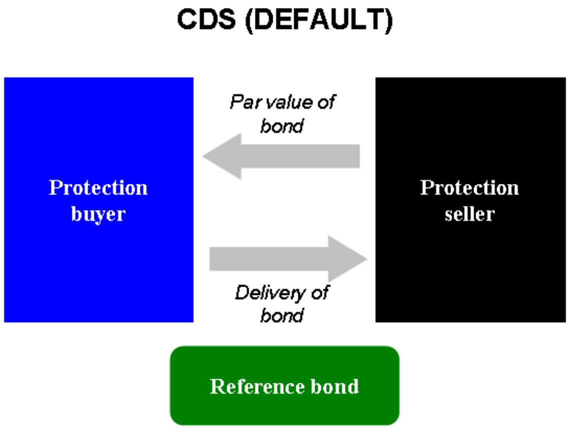
With AIG now tottering, a crisis that began with falling home prices and went on to engulf Wall Street has reached one of the world's largest insurance companies, threatening to intensify the financial storm and greatly complicate the government's efforts to contain it. The company, whose stock fell 61% yesterday, is such a big player in insuring risk for institutions around the world that its failure could shake the global financial system.

AIG has been scrambling to raise as much as $75 billion to

Credit Default Swaps (CDS)

- Credit default swaps are derivate contracts ("side bets") that act like insurance against debt default
- Buyers make regular payment to sellers, sellers in turn promise to make a big payout to the buyer if the underlying bonds go into default





CDS market had become huge

- The CDS market had grown substantially
  - — Grew 100 times from 2000 to 2008 to cover $62T worth of bonds
  - — Many bonds had more CDS contracts written on them than their total face value
- CDSs can also be used to bet against debt securities that you didn’t own
  - — John Paulson (hedge fund manager) made around $1 billion profit buying CDSs on bonds that defaulted in crisis
    - See Zuckerman: “The Greatest Trade Ever”
  - — Michael Burry (from “The Big Short”) also made hundreds of millions

AIG

- American International Group Inc. (AIG)
- One of the world's biggest insurers
- AIG more aggressive than most insurance companies in expanding its operations beyond life and property insurance
- AIG jumped into the market for CDSs in a wide range of assets
  - Effectively selling insurance for these assets
  - Had sold protection on \$441B of various types of bonds (\$58B on securities tied to subprime mortgages)

AIG’s financial situation began worsening

- Losses of $18B during last 3 quarters leading up to fall of 2008
- AIG’s assets still exceeded liabilities, but most of assets held by insurance subsidiaries (and therefore by law tied up as “reserve requirements”)
- Stock price plunged from around $56 at start of year to $3.75 at close 9/15/08
- Firm on verge of financial collapse

Tumultuous Monday 9/15/08 for AIG

- Credit rating downgraded by Moody's and S&P 9/15/08
- AIG had various derivative contracts with collateral requirements tied to its rating
  - As a result, AIG would need to post an additional $14.5B in collateral and pay $5.4B to terminate other contracts
- Liquidity crunch: Unable to raise financing, not enough time to sell assets
- Needed a lender/investor of last resort


WALL STREET
U.S. Treasury
CHAPPATTE

U.S. to Take Over AIG in $85 Billion Bailout; Central Banks Inject Cash as Credit Dries Up

Emergency Loan Effectively Gives Government Control of Insurer; Historic Move Would Cap 10 Days That Reshaped U.S. Finance

By Matthew Karnitschnig, Deborah Solomon and Liam Pleven

The U.S. government seized control of American International Group Inc.—one of the world's biggest insurers—in an $85 billion deal that signaled the intensity of its concerns about the danger a collapse could pose to the financial system.

The step marks a dramatic turnabout for the federal government, which had been strongly resisting overtures from AIG for an emergency loan or some intervention that would prevent the insurer from falling into bankruptcy. Just last weekend, the government essentially pulled the plug on Lehman Brothers Holdings Inc., allowing the big investment bank to go under instead of giving it financial support. This time, the government decided AIG truly was too big to fail.

The U.S. negotiators drove a hard bargain. Under terms hammered out Tuesday night, the Fed will lend up to $85 billion to AIG, and the U.S. government will effectively get a 79.9% equity stake in the insurer in the form of warrants called equity participation notes. The two-year loan will carry an interest rate of Libor plus 8.5 percentage points. (Libor, the London interbank offered rate, is a common short-term lending benchmark.)

The loan is secured by AIG's assets, including its profitable insurance businesses, giving the Fed some protection even if markets continue to sink. And if AIG rebounds, taxpayers could reap a big profit through the government's equity stake.

"This loan will facilitate a process under which AIG will sell certain of its businesses in an orderly manner, with the least possible disruption to the overall economy," the Fed said in a statement.

It puts the government in control of a private insurer—a historic development, particularly considering that AIG isn't directly regulated by the federal government. The Fed took the highly unusual step using legal authority granted in the Federal Reserve Act, which allows it to lend to nonbanks under "unusual and exigent" circumstances, something it invoked when Bear Stearns Cos. was rescued in March.

As part of the deal, Treasury Secretary Henry Paulson insisted that AIG's chief executive, Robert Willumstad, step aside. Mr. Paulson personally told Mr. Willumstad the news in a phone call on Tuesday, according to a person familiar with the call.

Mr. Willumstad will be succeeded by Edward Liddy, the former head of insurer Allstate Corp.

AIG's bailout caps a tumultuous 10 days that have remade the American financial system. In that time, the government has engineered rescues that insert it deep into the housing and insurance industries, while Wall Street has watched two of its last four big independent brokerage firms exit the scene.

The U.S. on Sept. 6 took over mortgage-lending giants Fannie Mae and Freddie Mac as they teetered near collapse. This Sunday, the U.S. refused to bail out Wall Street pillar Lehman Brothers, which filed for bankruptcy-court protection and is now being sold off in pieces. That same day, another struggling Wall Street titan, Merrill Lynch & Co., agreed to sell itself to Bank of America Corp.

The AIG deal followed a day of high drama in Washington. The Treasury's Mr. Paulson and Federal Reserve Chairman Ben Bernanke convened in the early evening an unexpected meeting of top congressional leaders. Late in the trading day Tuesday, anticipation that the government might assist the insurer helped propel the Dow Jones Industrial Average to a 1.3% gain.

In bailing out AIG, the Federal Reserve appeared to be motivated in part by worries that Wall Street's financial crisis could begin to spill over into seemingly safe investments held by small investors, such as money-market funds that invest in AIG debt.

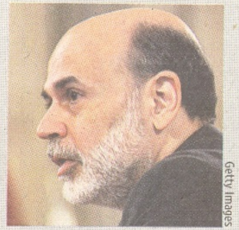
Indeed, on Tuesday the $62 billion Primary Fund from the Reserve, a New York money-market firm, said it "broke the buck"—that is, its net asset value fell below the $1-a-share level

Please turn to page A6

Urgent Mission

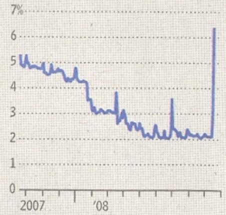
Plunging shares, soaring credit costs push the government to step in.

DJIA daily close



Fed chief Ben Bernanke

Overnight dollar Libor



Treasury Secretary Hank Paulson

AIG's daily share price

AIG CEO Robert Willumstad

Sources: Thomson Reuters Datastream (Libor); WSJ Market Data Group (stocks)

Lending Among Banks Freezes

By Carrick Mollenkamp, Mark Whitehouse and Neil Shah

Banks abruptly stopped lending to each other or charged exorbitantly high rates Tuesday, threatening to spread the troubles of American International Group Inc. and Lehman Brothers Holdings Inc. to a broad range of financial institutions and the global economy.

The breakdown came despite efforts by central bankers to keep money flowing. Central banks in the U.S., Europe and Japan pumped tens of billions of dollars each into the banking system. The Federal Reserve, while declining to lower its benchmark interest rate at a regular meeting Tuesday, said it will "act as needed" to combat ills including tight credit and the still-declining housing market.

In one stark sign of waning confidence, the overnight London interbank offered rate, or Libor, a benchmark reflecting the rates at which banks lend to one another, more than doubled, in

Another Gov’t Bailout

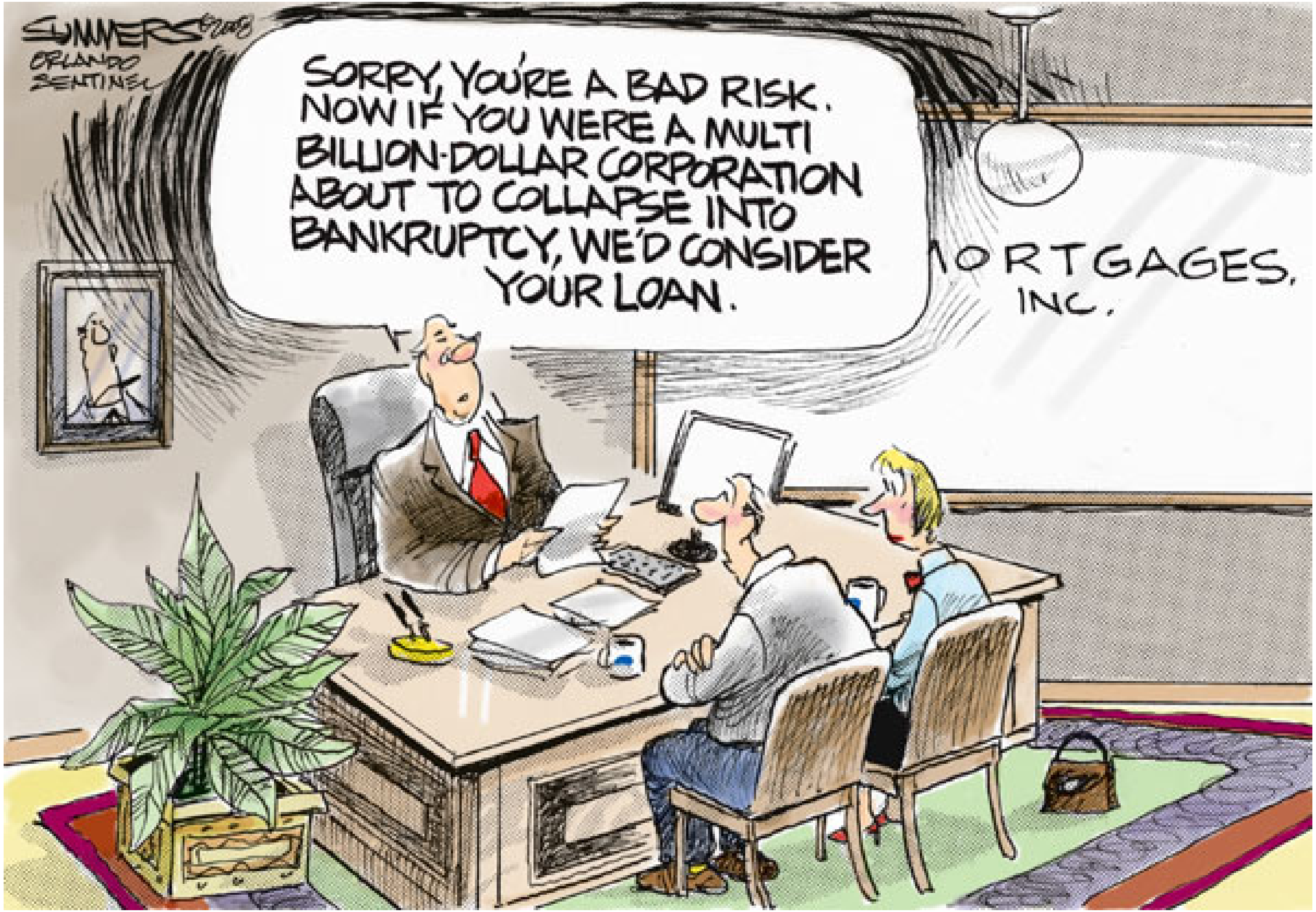
- Federal Reserve can normally only help banks
- Federal Reserve Act (1913) allows the Federal Reserve to make loans to *non-banks* under *“unusual and exigent”* circumstances
- Bailout hammered out night of 9/16/08
- AIG receives infusion of capital of up to $85 billion dollars from U.S. gov’t
  - Two-year loan with interest rate of Libor plus 8.5 percentage points
  - U.S. also effectively gets 79.9% ownership of AIG equity through warrants
- U.S. gets right to veto any payments of dividends to common and preferred shareholders
- AIG must fire current CEO

Why Bailout?

- Many banks and other financial firms (in U.S. and abroad) held CDSs sold by AIG in their portfolio
  - E.g., Goldman Sachs had a lot of CDS "insurance" on bonds they owned
- If AIG failed, the value of these holdings would fall substantially
  - Bond prices were falling, so firms would need to write down these bonds if they don't have CDS protection
  - The owners of these bonds themselves could become financially distressed…
  - And the downward spiral continues!

Moral of Story

- Bigger is better!
  - "Too Big to Fail" or "Too Interconnected to Fail"
- Many bank mergers after/during crisis:
  - Bank of America+Merrill Lynch,
  - Wells Fargo+Wachovia,
  - JP Morgan+WaMu&Bear Stearns,
  - Etc…
- Consolidation of banking sector after the crisis has arguably made them *even larger to fail*!


SUMMERS ORLANDO SENTINEL
SORRY, YOU'RE A BAD RISK. NOW IF YOU WERE A MULTI BILLION-DOLLAR CORPORATION ABOUT TO COLLAPSE INTO BANKRUPTCY, WE'D CONSIDER YOUR LOAN.
MORTGAGES, INC.

Many More Government Interventions

Why TARP (Troubled Asset Relief Program)?

- Capital injections (preferred stock) in all large financial institutions
  - E.g., Citigroup $45 billion, Bank of America $45 billion, JPMorgan Chase $25 billion, Wells Fargo $25 billion, GMAC $17 billion
- The original TARP idea had been to buy assets from banks – that plan was scrapped

- Why did the government “force” all the big banks to participate in the program?
- Any downside for the banks in getting financial help from gov’t?

Short-Sale Restrictions

- September 2008, U.S. banned short sales in nearly 1,000 financial stocks from 9/18/2008 to 1/16/2009
- Goal: To stabilize stock price of financial stocks
- Good or bad idea?

Insurance for Bank Deposits

- FDIC provides insurance for bank deposits
- Used to be $100,000 per depositor
- Increased to $250,000 per depositor during October of 2008

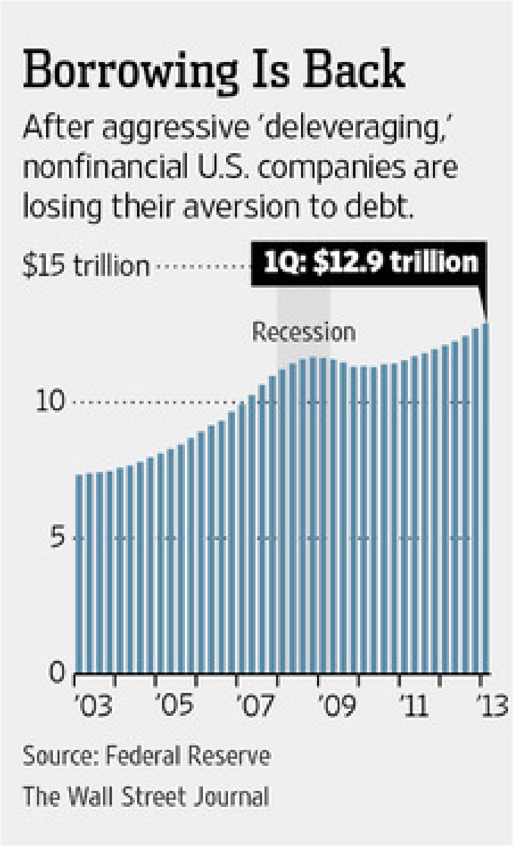
- Good or bad idea?

What has happened since?

Increased regulation of financial institutions

- 2010: Dodd-Frank
  - — Many proposed rules are still (five years later!) in the process of being written and implemented
  - — e.g., regulation of credit rating agencies
- Newer regulation:
  - — Limits on trading by banks ("Volcker rule")
  - — Basel 3; higher capital charges for risk-tasking
  - — Requiring more long-term financing (equity and long-term debt)

Firms are borrowing like never before

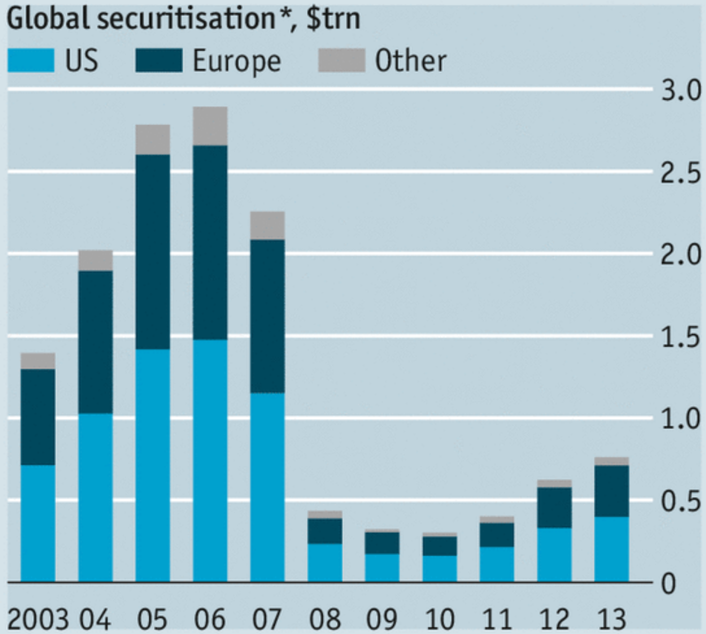


Even securitization has been coming back

Anyone care for a “Bespoke Tranche Opportunity”?

Old alphabet soup, new taste

ABS	*(asset-backed security)*	Most generic form of securitisation, includes credit-card debt, car loans, or any packaged income stream. Making steady comeback
MBS	*(mortgage-backed security)*	Backed either by commercial (CMBS) or residential (RMBS) mortgages. The most problematic in the downturn, fuelled subprime crisis
CDO	*(collateralised debt obligation)*	Pre-crisis these were often invested in “tranches” of ABSs and MBSs or in other CDOs. Not popular with regulators
CLO	*(collateralised loan obligation)*	Frequently filled with sliced and diced loans extended to poor-credit firms, such as those taken over by private-equity. Making a comeback



Sources: Dealogic; *The Economist*

*Excluding residential mortgages

Is the world safer now?
What will cause the next financial crisis?

If you want to learn more about the critical events during the financial crisis, a few good documentaries/movies to watch are:

“The Big Short”
Movie about Michael Burry who shorted the mortgage market
http://www.imdb.com/title/tt1596363/

"Frontline: Inside the meltdown"
Documentary.
http://video.pbs.org/video/1082087546/

"Too Big to Fail“
Docu-movie, focusing on the government's role
http://www.imdb.com/title/tt1742683/

"Margin Call“
Movie highly based on the Lehman collapse
http://www.imdb.com/title/tt1615147/