Understanding the 2007-08 Financial Crisis

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Some U.S. Figures

- S&P 500 falls 37% over a one-year period
  - $7.4tr in total stock value lost
- Unemployment rises 4.7% to 6.2%
  - 5.5mm jobs lost
- GDP falls 3-4%
- Households lose average of $5,800 of annual income
- More than 500,000 foreclosures beyond projections
  - $3.4tr in real estate wealth lost
- All in addition to more international effects...

Understanding the Crisis

1. Building the Bubble
    a. Community Reinvestment Act
    b. Commercial Mortgage-Backed Securities, Collateralized Debt Obligations, etc.
    c. Agencies
        i. GSEs
        ii. Credit Rating Agencies
2. The Bubble Bursts
    a. Policy responses
        i. Monetary
        ii. Fiscal
        iii. Dodd Frank & Volcker Rule

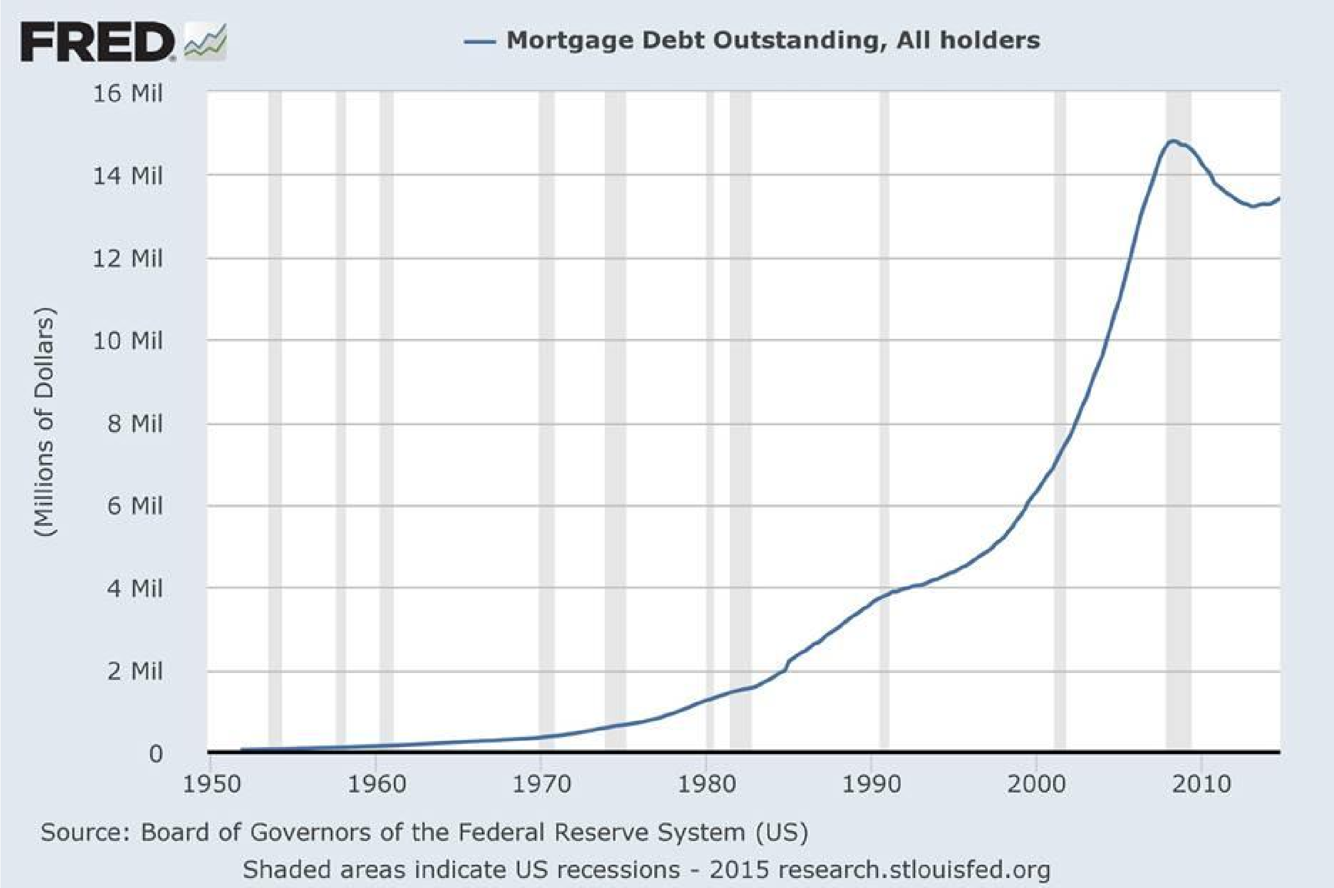
Broad Overview of the Financial Crisis

- Investors looking for low-risk high reward alternative to the US treasury bills
  - Turn to the housing market
- Mortgage backed securities (MBS) look like safe investments because housing prices are always increasing
- Ratings agencies give many MBS AAA ratings
- In order to provide more MBS, banks start giving “subprime mortgages”
- Eventually, people can no longer pay off mortgages, banks are left with a lot of houses and no demand in market for them
- Panic sets in, the stock market crashes and BOOM, we’re in a recession

Community Reinvestment Act -1977

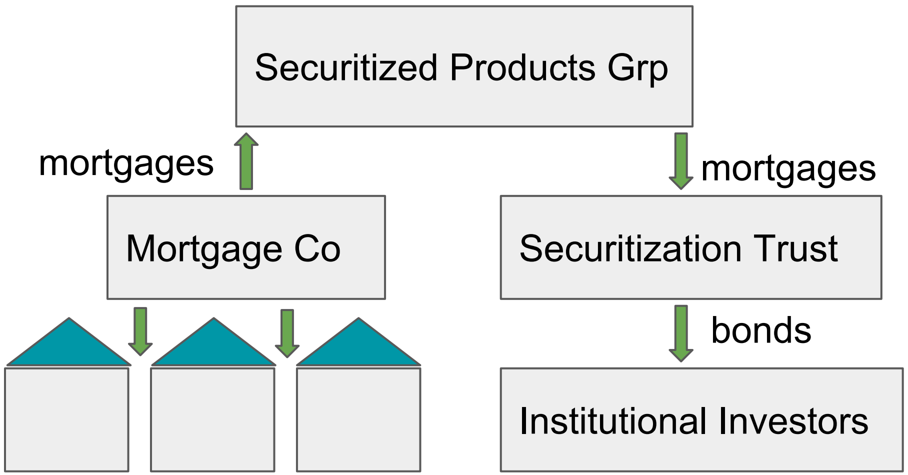
- **“Intended to encourage depository institutions to help meet the credit needs of the communities in which they operate, including low- and moderate-income neighborhoods”**
- Proliferation of lax lending standards and popularity of debt refinancing
  - Especially for home lending and mortgage creation
- Lowering of down payments and income requirements
  - Automated underwriting to eliminate bias
- Bottom line - CRA regulators spread faulty lending standards across the mortgage market

*Note: CRA loans themselves only accounted for 6% of subprime loans


FRED
Mortgage Debt Outstanding, All holders
16 Mil
14 Mil
12 Mil
10 Mil
8 Mil
6 Mil
4 Mil
2 Mil
0
(Millions of Dollars)
1950
1960
1970
1980
1990
2000
2010
Source: Board of Governors of the Federal Reserve System (US)
Shaded areas indicate US recessions - 2015 research.stlouisfed.org

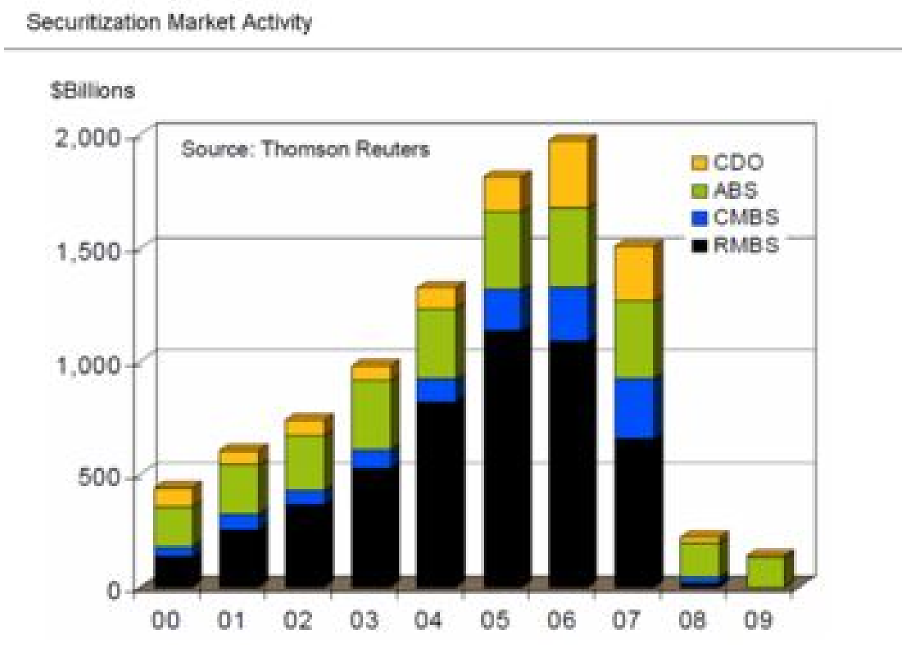
Financial Instruments - MBS

- **Structured securities backed by cash flow from income producing properties**
- Origination -> Underwriting -> Securitization -> Distribution



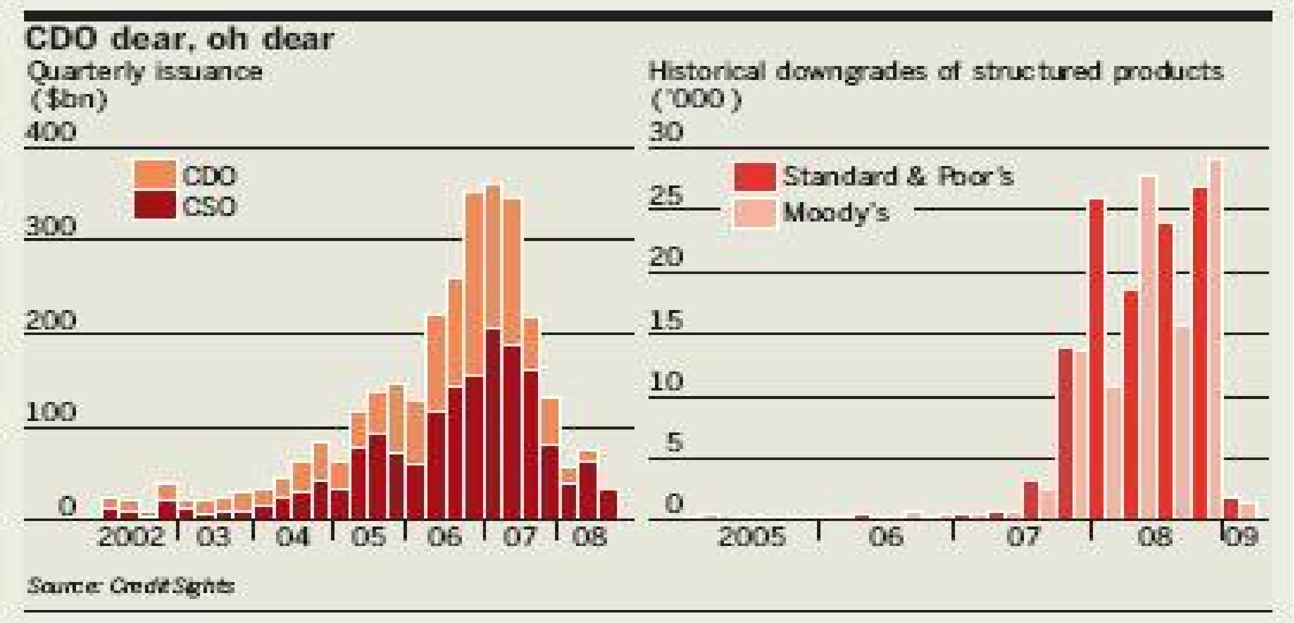
MBS and the Financial Crisis

- Tranched based on risk appetite
- Relatively low risk with sizeable returns gave way to MBS explosion in late 1990s and mid-2000s
- By 2006, "some institutions [banks] have high and increasing concentrations of commercial real estate loans on their balance sheets"
- Includes Residential & Commercial



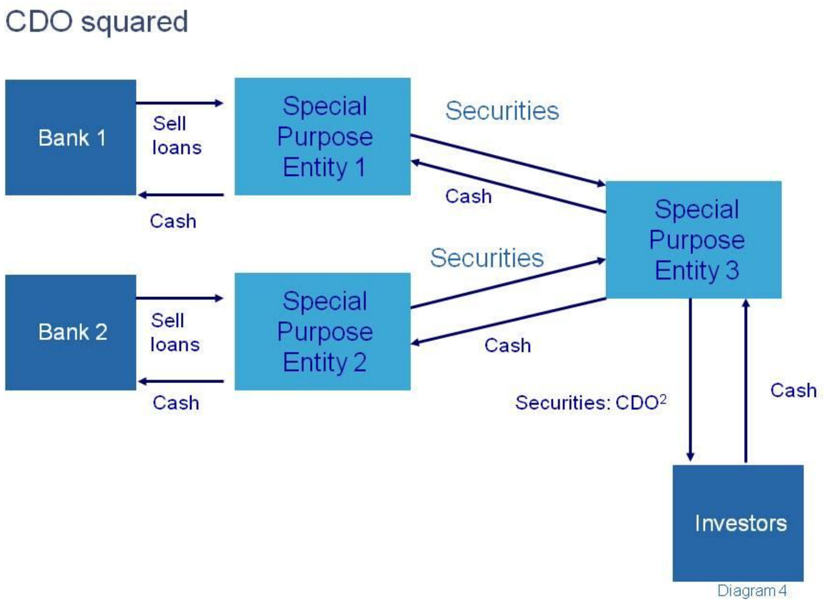
Financial Instruments - CDO

- Similar to MBS, but pool from broader debt instruments
    - E.g. auto, student loan, corporate, etc.



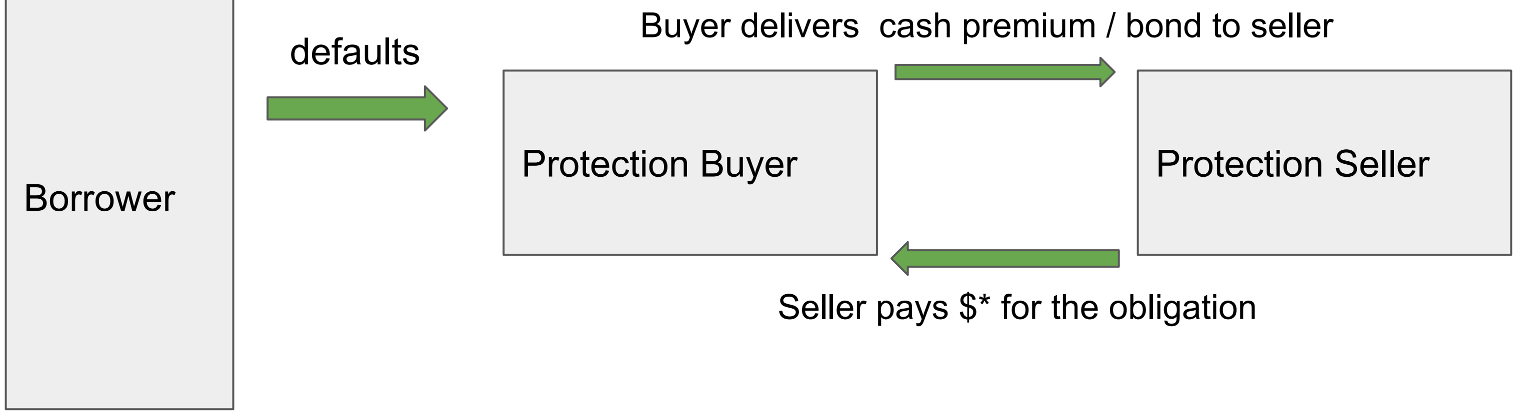
CDO and the Financial Crisis (cont.)

- Products often failed to accurately diversify risk; were traded at superficially high ratings
  - E.g. package BB+ securities with diversified A-rated securities to achieve a AA rating
- Creation of secondary products like Synthetic CDOs exacerbated risk
  - 100s of billions of $ sold during the mid-1990s with many securities appearing multiple times



Financial Instruments - CDS

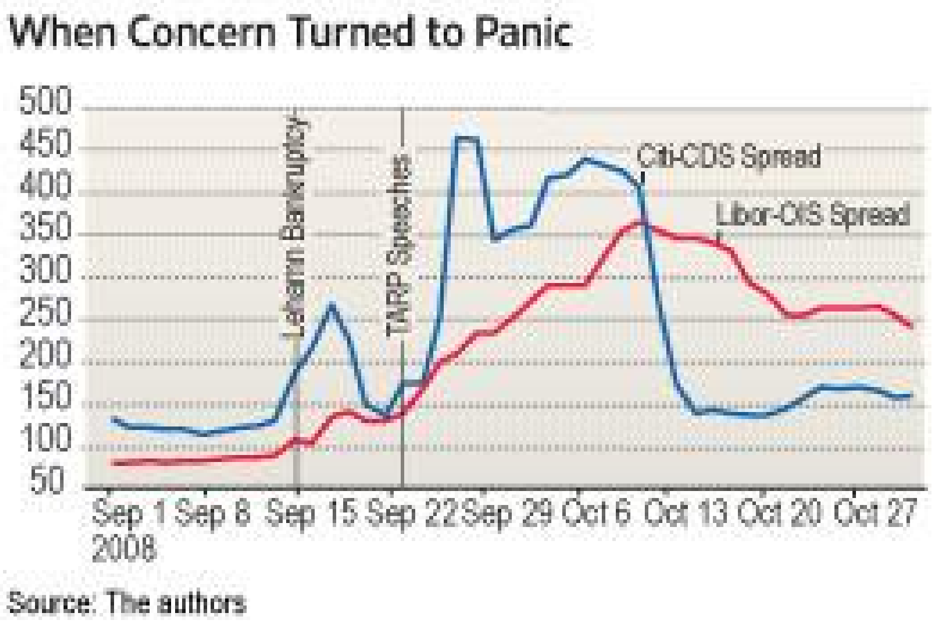
- A Credit Default Swap is a derivative that gives the buyer of the CDS a payout in the event of a ‘credit event’ i.e. default
  - Buy CDS/Protection- short risk
  - Sell CDS/Protection - long risk



*Note: Payment in the event of default = (1-market price)

CDS and the Financial Crisis

- Over $62tr notional in securities protected under CDS agreements in 2007
    - Many institutions viewed CDS as acceptable hedge for credit products
- While not a direct factor, did exacerbate creation/purchasing of risky credit products
- Many contracts are still being settled today



Government-sponsored Entities

- Privately-held corporations who serve public purposes by reducing the cost of capital in certain sectors
  - Fannie Mae - Federal National Mortgage Association
  - Freddie Mac - Federal Home Loan Mortgage Corporation

FannieMae®

FreddieMac

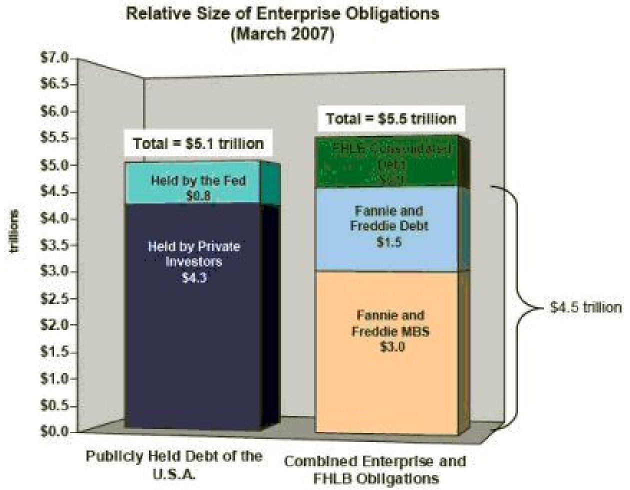
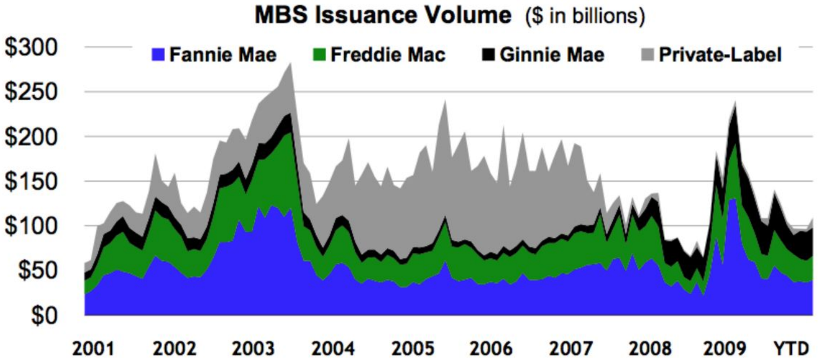


Figure 1

Source: Office of Federal Housing Enterprise Oversight

GSEs and the Financial Crisis

- Held $5.4tr in outstanding securities - 45% of all mortgage debt
  - Investors were led to believe these products were ‘low risk’ because of government backing
  - Highly levered
- Proliferation of non-traditional and poorly underwritten mortgages
- Purchased risky products
  - GSE delinquency rates < Non-GSE delinquency rates



	2001	2002	2003	2004	2005	2006	2007	2008	2009	YTD
Enterprises	67%	68%	70%	47%	41%	40%	58%	73%	72%	66%
Ginnie Mae	13%	9%	8%	7%	4%	4%	5%	22%	25%	29%
Total Agency	80%	77%	78%	54%	45%	44%	63%	95%	97%	95%

Sources:
Inside Mortgage Finance, Enterprise Monthly Volume Summaries.
Issuance figures exclude MBS issued backed by assets previously held in the Enterprises' portfolios.

Source: Federal Housing Finance Agency (2010)

Credit Ratings and Ratings Agencies (CRAs)

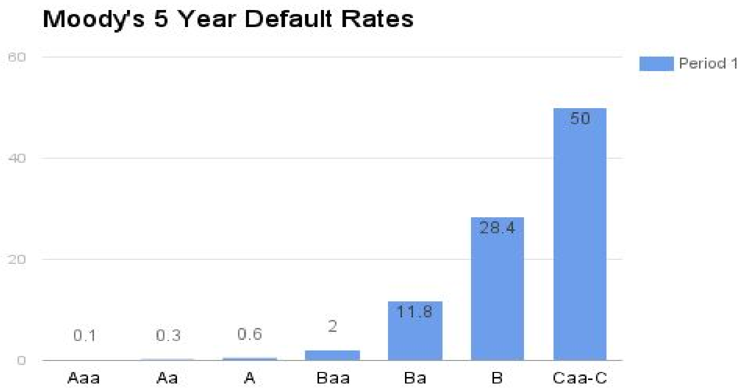
- Most bonds are assigned a credit rating
- Scale of relative riskiness
  - Proxy for the probability of an entity defaulting on their financial commitments
- Gives investors a guide to judge risk
- Issuer pays **rankings agency** to generate credit rating

FitchRatings Moody's Standard & Poor's

Credit Ratings and Ratings Agencies Cont.

- 3 Major Agencies
  - Moody's, Standard and Poors (S&P), Fitch
- Together they control 95% of the ratings business
  - Moody's and S&P alone 80%

Sortable Table Key	Moody's	Fitch	S&P
Highest grade credit	Aaa	AAA	AAA
Very high grade credit	Aa1, Aa2, Aa3	AA+, AA, AA-	AA+, AA, AA-
High grade credit	A1, A2, A3	A+, A, A-	A+, A, A-
Good credit grade	Baa1, Baa2, Baa3, Baa4	BBB+, BBB, BBB-	BBB+, BBB, BBB-
Speculative grade credit	Ba1, Ba2, Ba3	BB+, BB, BB-	BB+, BB, BB-
Very speculative credit	B1, B2, B3	B+, B, B-	B+, B, B-
Substantial risks - In default	Caa1, Caa2, Caa3, Ca	CCC, CC, C, RD, D	CCC+, CCC, CCC-, CC, C, D



Ratings Agencies and the Financial Crisis

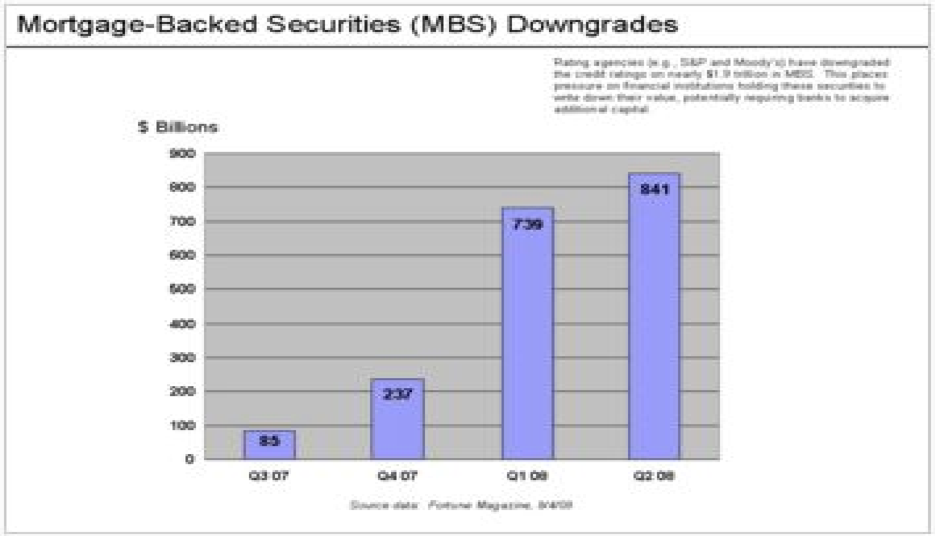
- Play a key role in the financial crisis
- Gave “investment grade” rating to securitized mortgages in the form of Mortgage Backed Securities (MBS) and Collateralized Debt Obligations (CDO)
- High ratings on these securities encouraged a significant flow of investment
  - Including from Money Markets and Pension Funds
- Investors often rely blindly on the ratings from the CRAs when considering investment opportunities
  - Meant to be an unbiased source of public information

Ratings Agencies and the Financial Crisis

- "The rating agencies were important tools because the people that we were selling these bonds to had never really had any history in the mortgage business. ... They were looking for an independent party to develop an opinion…"
- From 2000-2007 nearly half of the 45,000 mortgage rated securities were given an “Aaa” rating by Moody’s
  - Only 6 private companies in US had the same rating during that time period
- Investment banks paid significant fees in order to obtain high ratings from the CRAs

Ratings Agencies and the Financial Crisis

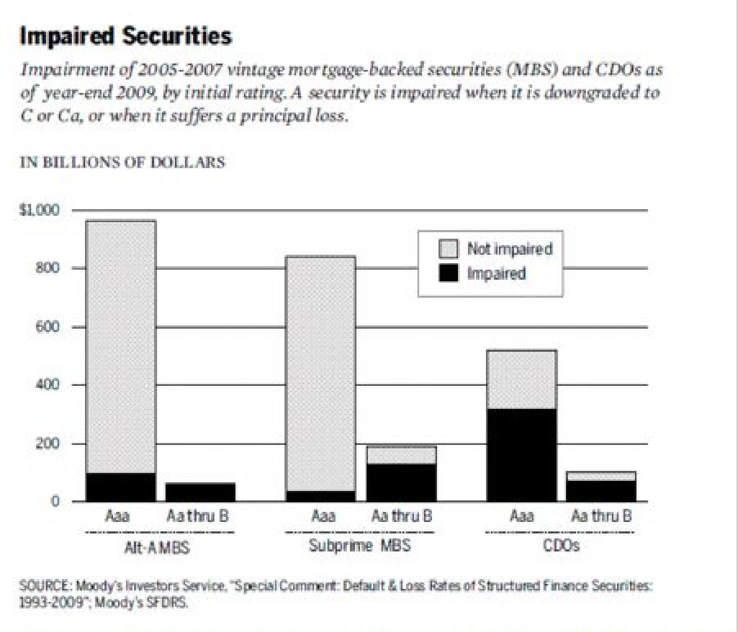
- Mezzanine tranches of MBS pooled together to form CDOs
  - Significant percentage made up “investment grade” bonds, about 70-80% AAA rated
- Leads to products like “CDO-squared” securities and synthetic CDOs



MBS Credit Rating Downgrades, By Quarter[37]

Ratings Agencies and the Financial Crisis

- Federal Crisis Inquiry Commission (FCIC) investigation 2010
  - “Failures” of Big Three were “essential cogs and key enablers of the financial meltdown”
- Why?
  - Flawed computer models
  - Influence from companies paying for ratings
  - Lack of resources
  - Absence of public oversight
  - Willful suspension of skepticism
  - Desire for big fees and increased market share

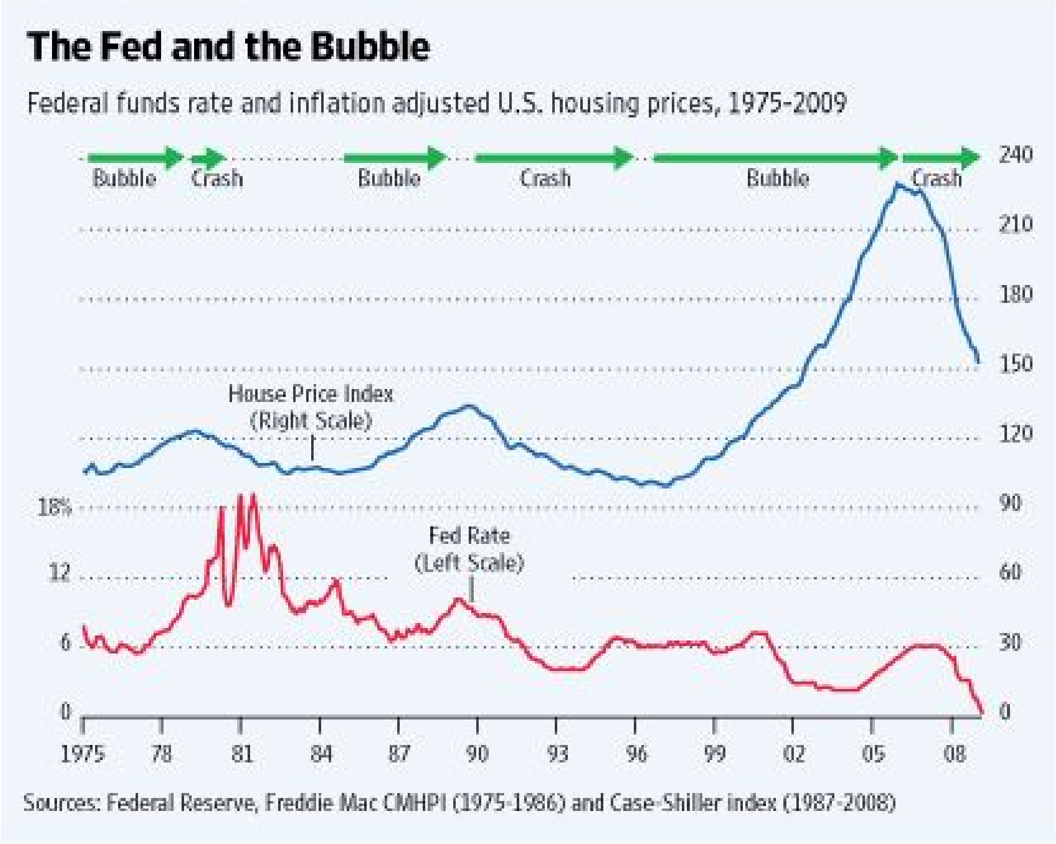


source: Final Report of the National Commission on the Causes of the Financial and Economic Crisis in the United States, p.229, figure 11.4

Pre-Crisis Summary

- Numerous factors gave way to widespread reliance of risky credit products
  - **Moral Hazard** - party in a transaction has provided misleading information about its credit capacity
  - Adverse Selection - party in a transaction have information that the other does not about the quality of the product being exchanged

The Bubble Bursts!



Monetary Policy

- Lender of Last Resort
  - Provided short-term liquidity to struggling banks
  - Discount Window
  - TAF, PDCF, TSLF
- Providing liquidity to borrowers/investors in key credit markets
  - CPFF, AMLF, MMIFF, TALF
- Expanded open market operations
  - Downward pressure on interest rates
  - Quantitative easing - $40bn/month in agency guaranteed MBS, $45bn/month in long-dated T-notes

Fiscal Policy

- Economic Stimulus Act of 2008, Troubled Asset Relief Program (TARP)
  - ~$700bn to bailout institutions - very little **stimulus**
  - In sum, these measures provided bailouts to insurance companies, financial institutions, auto manufacturers, GSEs, etc
- American Recovery and Reinvestment Act of 2009
  - ~$800bn in tax cuts and federal spending

Dodd Frank

- 2010 Response to Great Recession
  - Most significant changes to US financial regulation since Great Depression
  - Designed to decrease various risks within financial system
- New Committees
  - Financial Stability Oversight Council (FSOC) - Monitor institutions that are “too big to fail”
    - Break up banks that are too big to fail, increase reserve requirements
  - Consumer Financial Protection Bureau (CFPB) - Prevent predatory mortgage lending
    - Help consumers understand mortgage terms before signing

*Note 30% of Dodd Frank has yet to be enacted

The Volcker Rule

- Volcker Rule
  - Separates investment and commercial functions of banks
    - Limits speculative trading and eliminates proprietary trading
  - Regulates derivatives (namely Credit Default Swaps)
  - Limits banks’ relationships with hedge funds and PE funds
  - Greater reporting requirements for trading activities
    - Large institutions more affected than smaller banks

Sources

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