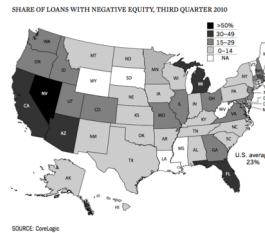




# Housing and the Financial Crisis



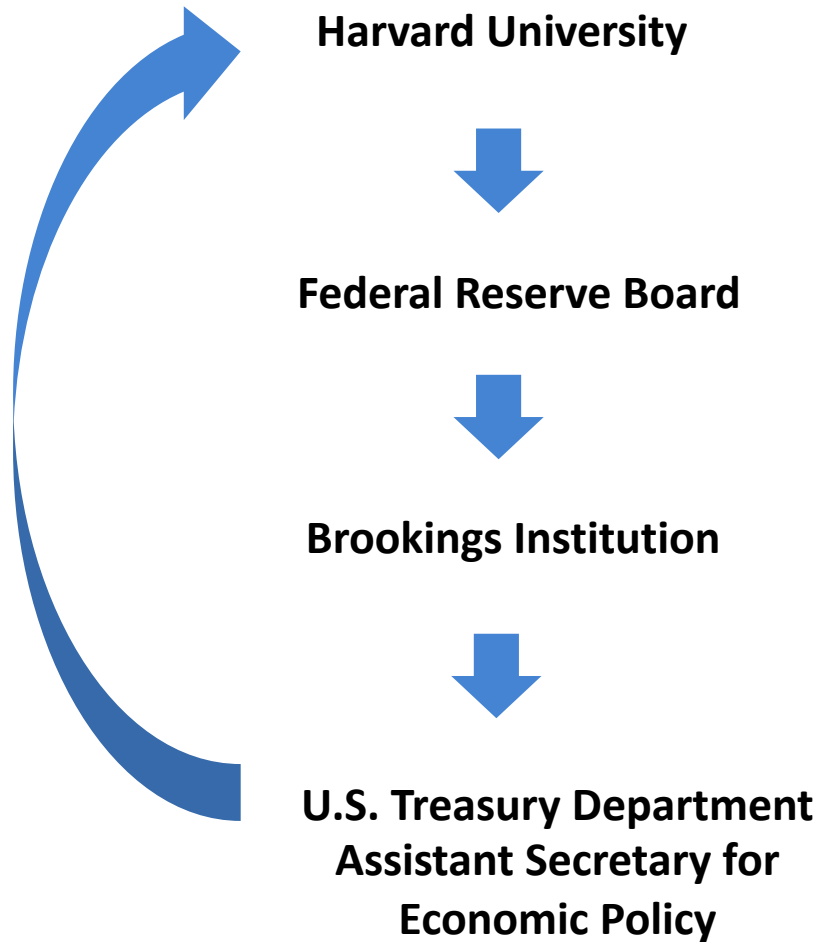
**Ec 10 Lecture**

**Karen Dynan**

**Harvard University**

**March 9, 2020**

# My background



# **Outline for today**

**Basic facts about the mortgage boom and bust**

**The rise of riskier mortgages**

**Changes in the way mortgages were funded**

**Overly optimistic home price expectations**

**Fallout**

# Outline for today

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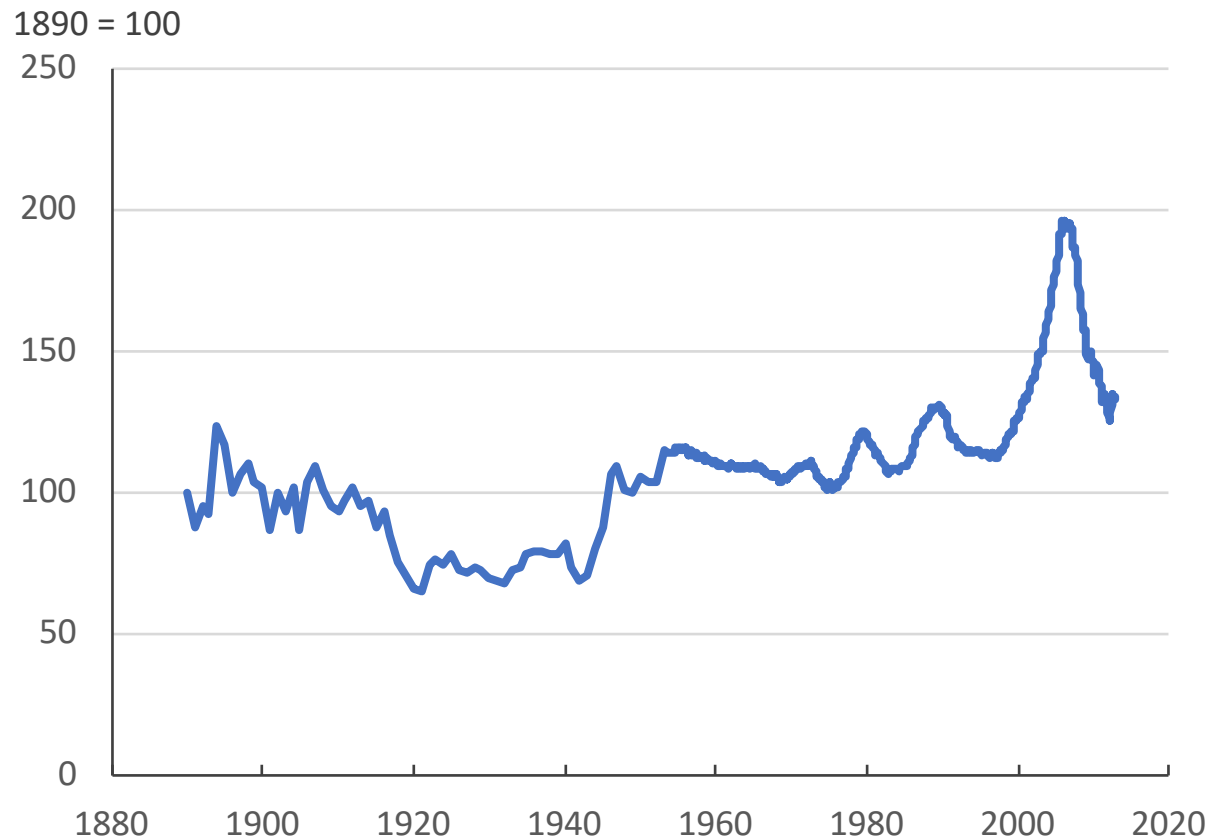
Overly optimistic home price expectations

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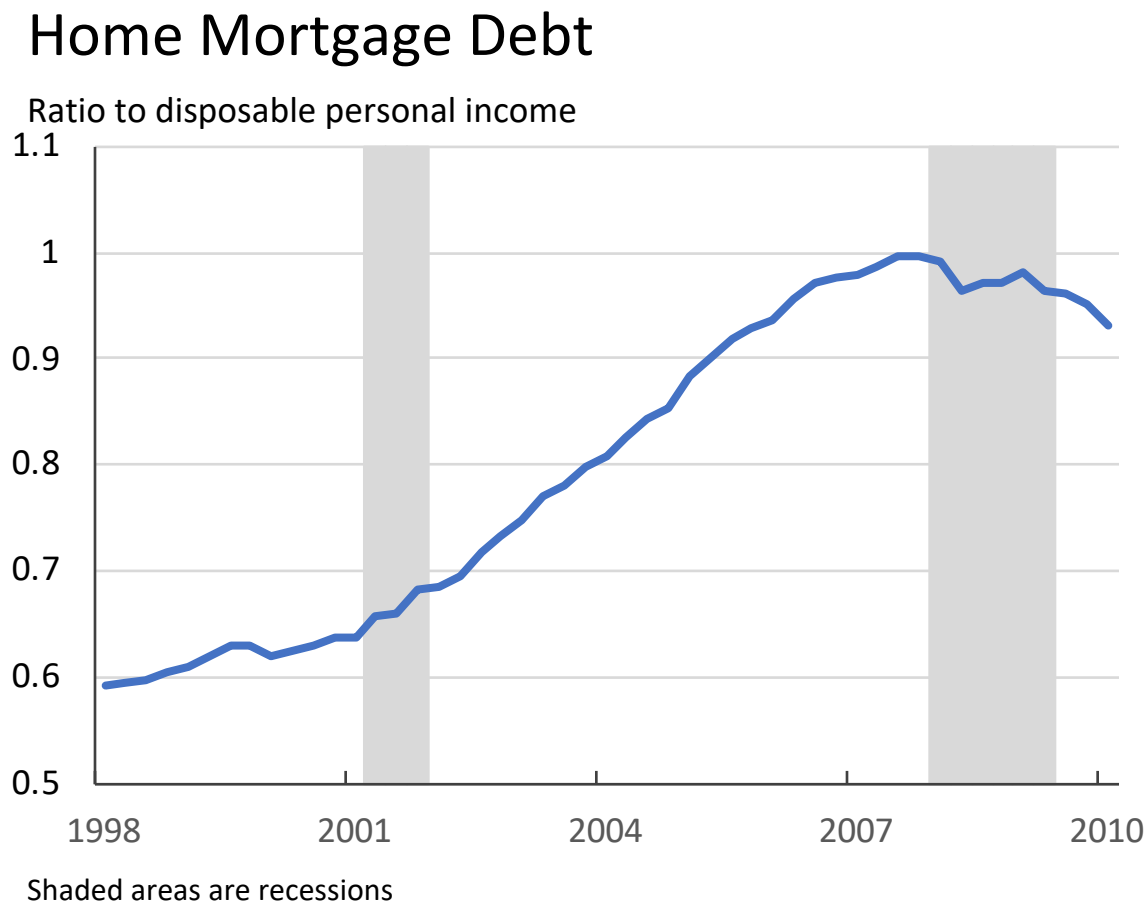
# The early 2000s saw an extraordinary boom and bust in home prices

Inflation-Adjusted U.S. Home Prices



Data from [Robert Shiller](#)

# The run-up in home prices was mirrored by rapid growth in mortgage debt



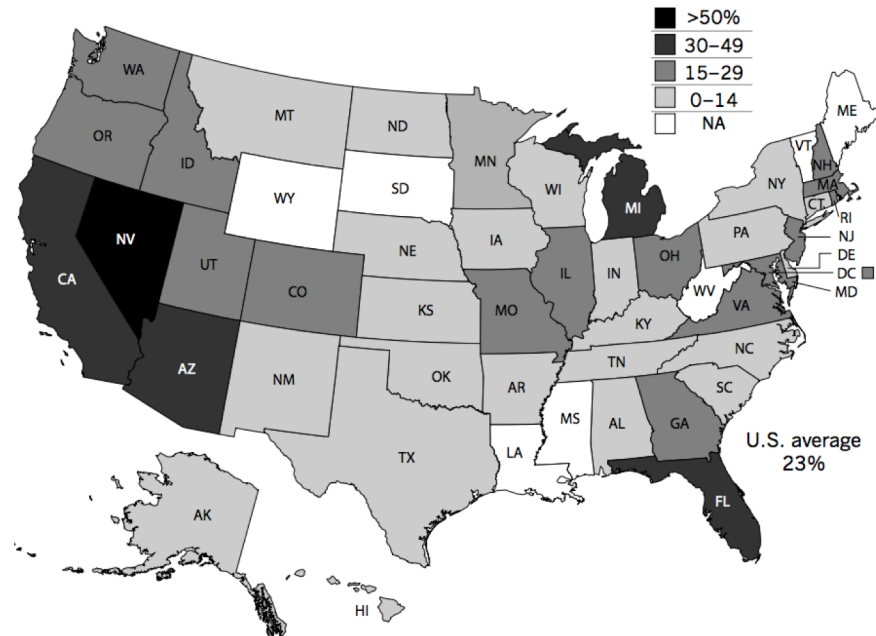
Data from the U.S. Financial Accounts via [FRED](#)

# The plunge home prices left nearly one-quarter of mortgage borrowers “underwater”

A **mortgage** is a loan that finances a home

A mortgage is **underwater** if its outstanding balance exceeds the value of the underlying home

SHARE OF LOANS WITH NEGATIVE EQUITY, THIRD QUARTER 2010



SOURCE: CoreLogic

Screenshot from [Financial Crisis Inquiry Report](#) (p. 404)

# In 2010, nearly 10 percent of U.S. mortgages were seriously delinquent or in foreclosure

You become **delinquent** when you fail to make payments; **foreclosure** is the process by which the lender takes possession of a home after the borrower has failed to make the agreed-upon mortgage payments



Scene from [99 Homes](#)

Foreclosure often leads to displacement, which is costly and personally traumatic

It damages your credit record and impairs access to credit for years

Concentrations of foreclosures can reduce neighboring property values

# In the remainder of my talk today

I will focus on three important developments in the period leading up to the mortgage crisis and discuss what we know about how these developments set the stage for the crisis

The rise of **riskier mortgages**

Changes in the way **mortgages were funded**

Overly **optimistic home price expectations**

# Outline for today

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Screenshot from [Perry](#) (2008)

# In the early 2000s, subprime and Alt-A grew as a path for riskier borrowers to get mortgages

**Subprime**—mortgage loans made to borrowers with relatively poor credit histories (sometimes combined with other risky features)

**Alt-A**—loans made to borrowers with strong credit scores but which have other characteristics that make them riskier such as:

- Low downpayments

- Investor-owned properties

- Limited or no documentation—sometimes known as NINJA (“no income, no job, no assets”) loans



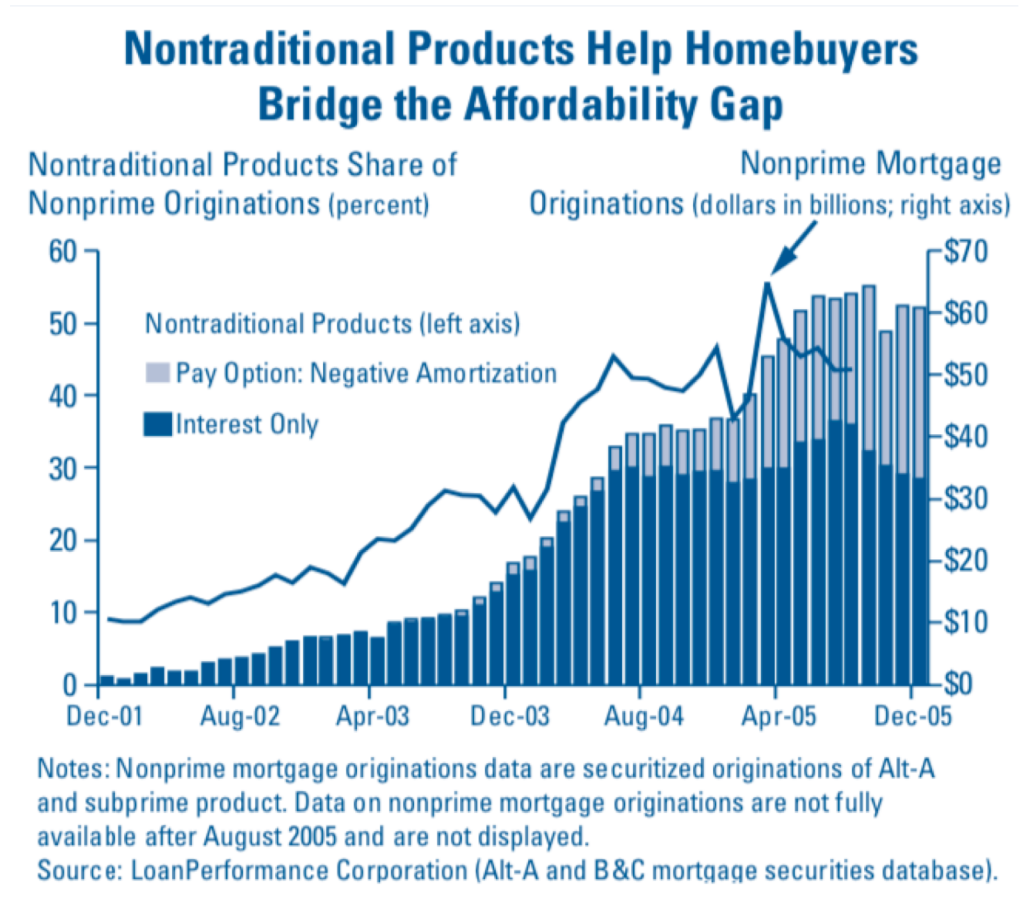
# These loans also often featured non-traditional repayment schemes

Traditional mortgage products amortize—with each monthly payment you pay down some principal and you pay interest on the remaining balance

**Interest-only mortgages** allow the borrower to only pay the interest accrued

**Option ARMs** (or “pick-a-pay loans”) allow the borrower to pay less than the interest charged in which case the outstanding balance of the loan will grow over time

Non-standard repayment schemes are generally viewed negatively in hindsight but, **at the time, some championed them as a way to increase access to homeownership**

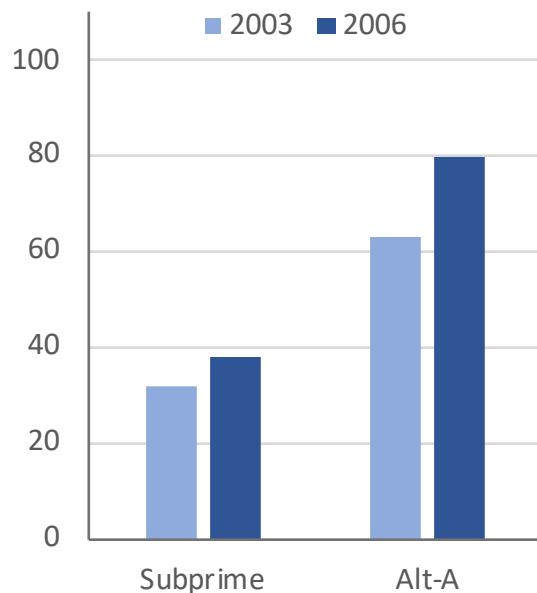


Screenshot from [FDIC Outlook](#) Summer 2006

# Subprime and Alt-A mortgages became riskier as we approached the financial crisis

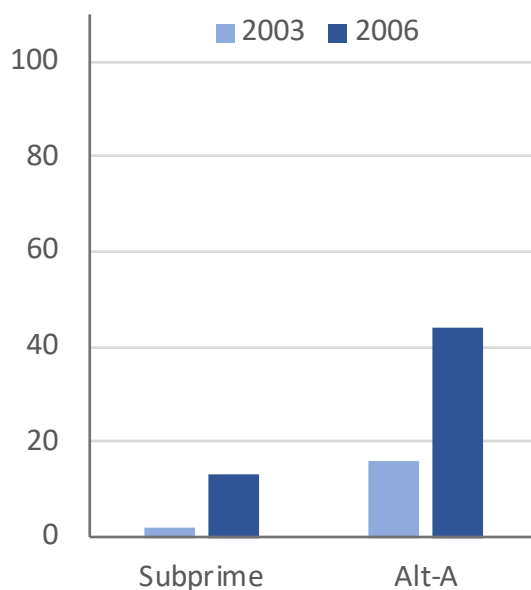
Share of Loans with Low or No Documentation

Percent



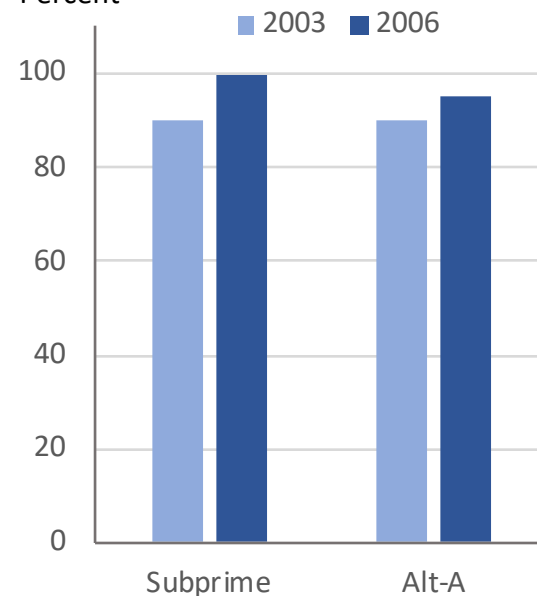
Share of Loans that were "Interest Only"

Percent



Median Loan-to-Value Ratio for Purchase Mortgages

Percent



Data from [Mayer, Pence, Sherlund](#) (2009) analysis of loans in securitized subprime pools

# High leverage may result in benefits, but it's risky

Consider a highly leveraged homeowner:

Value of home = \$200,000

Mortgage balance = \$190,000

Home equity = \$10,000

This homeowner has a loan-to-value ratio (LTV) of 95%

You can think of equity as the homeowner's "housing wealth"

If home prices rise by 10% (\$20,000), the homeowner now has \$30,000 of home equity—**she has tripled her money!**

But, if home prices fall by 10% (\$20,000), the homeowner has not only lost all her housing wealth—**she is underwater!**

# Outline for today

Basic facts about the mortgage boom and bust

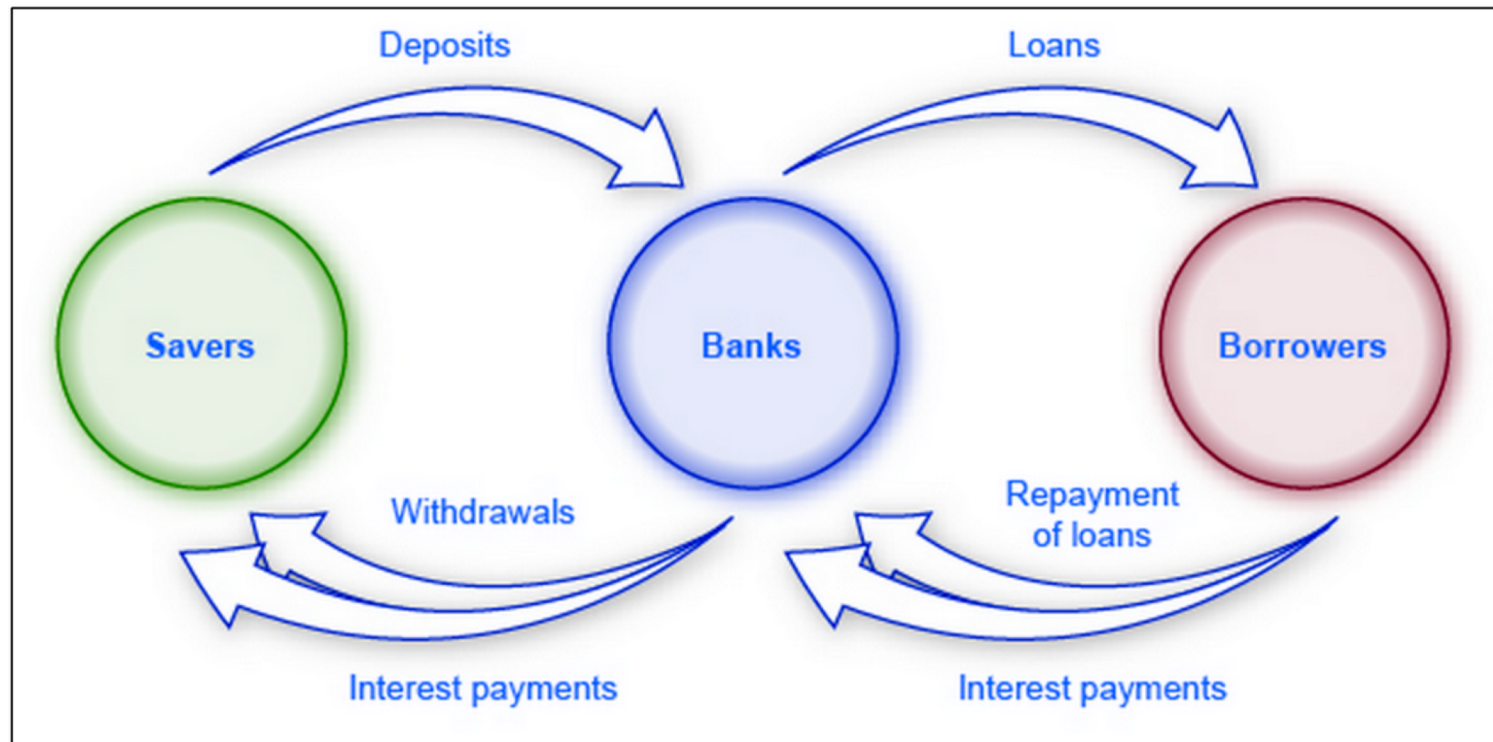
The rise of riskier mortgages

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# Traditional model—banks make mortgage loans and hold them in their own portfolios



Screenshot from Ec 10 lecture 9

# Over the decades, lenders increasingly engaged in mortgage securitization

Lenders sold their mortgages to entities that **securitized them** and sold the resulting security to investors

**Securitization is the practice of pooling together loans and then selling the cash flow from the loans**—the interest and principal payments—to financial investors as a security (a “mortgage-backed security” or MBS)

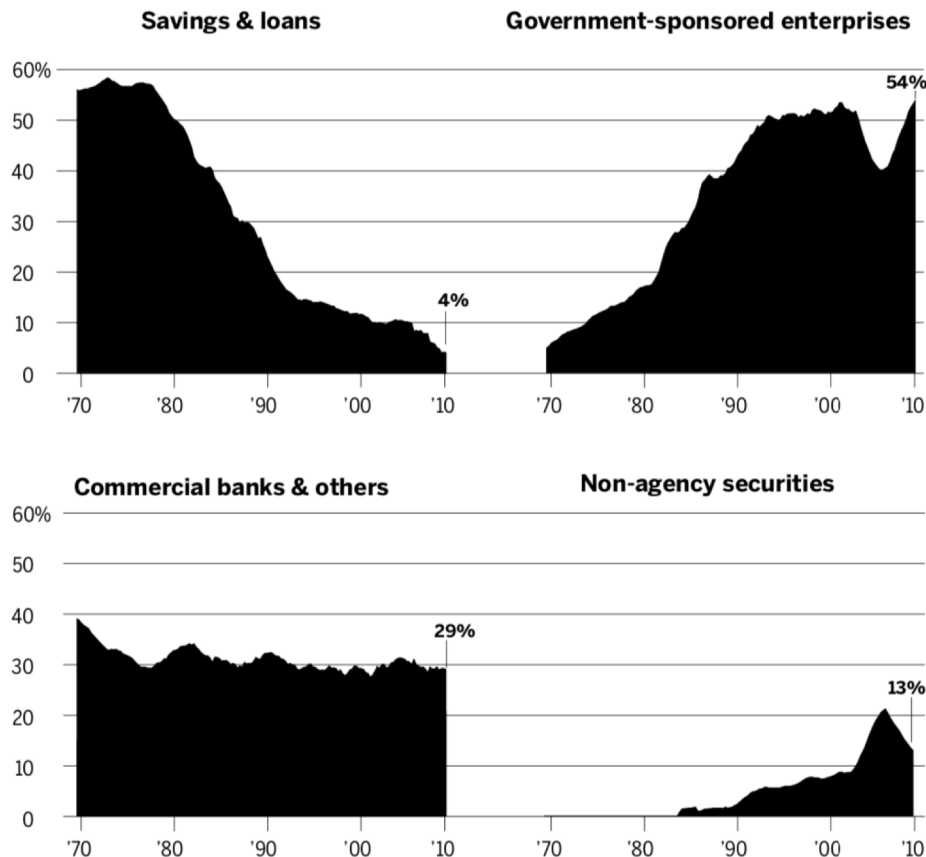
Roughly speaking, **the investor is buying the borrower’s future mortgage payments**

[Mortgage-related securities can be created in other ways, including by re-securitizing MBS into collateralized debt obligations but we won’t worry about this for now]

## Funding for Mortgages

*The sources of funds for mortgages changed over the decades.*

IN PERCENT, BY SOURCE



SOURCE: Federal Reserve Flow of Funds Report

Screenshot from [FCIC report](#)

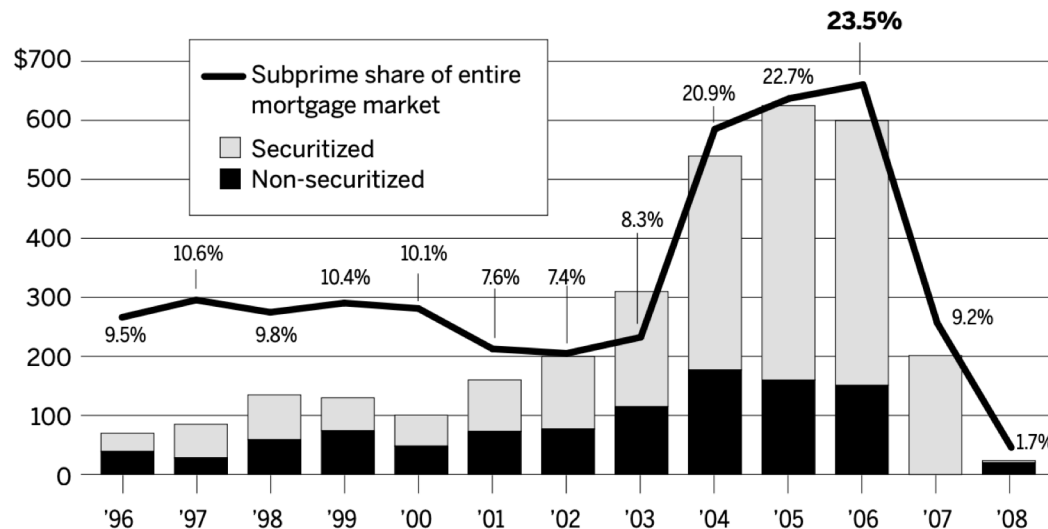
Government-sponsored enterprises (Fannie Mae and Freddie Mac) had been in the mortgage securitization business for decades; **what changed in the early 2000s was a surge in “private-label” securitization**



# Private-label MBS funded most subprime (and Alt-A) loans

## Subprime Mortgage Originations

IN BILLIONS OF DOLLARS



NOTE: Percent securitized is defined as subprime securities issued divided by originations in a given year. In 2007, securities issued exceeded originations.

SOURCE: Inside Mortgage Finance

Screenshot from [FCIC report](#) (p. 70)

# Why was securitization attractive to lenders?

Selling mortgages and buying back MBS was appealed to **many financial institutions** because:

It was a different way of **making money from the maturity transformation** that you learned about in lecture 9

Getting income from *pools* of loans (for example, from different geographic areas) **could help diversify risk**

Holding highly rated MBS **could lower their capital requirements**

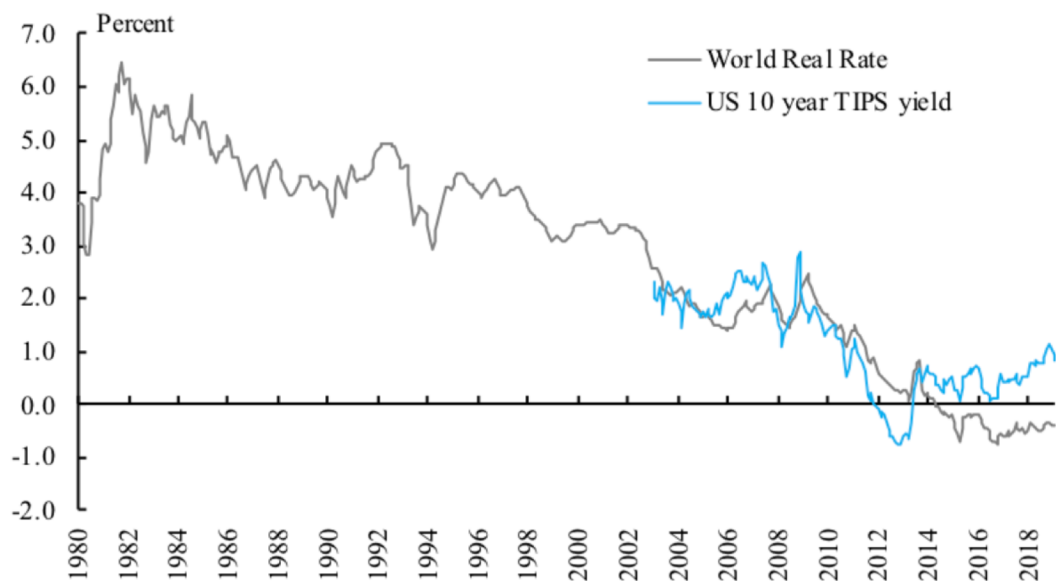
# One attraction of securitization for investors— it created “safe” investments

**GSE MBS included a credit guarantee** that protected investors from losses associated with defaults of the underlying mortgages

**Privately securitized MBS were divided into “tranches”** that were ordered according to their priority in receiving cash flow from the pool

**If you didn’t like risk, you could buy the “Triple-A” tranches** that yielded less but had income streams that were (in principle) unlikely to be disrupted by defaults

# Important context (which you'll learn more about in future classes)



Screenshot from [Rachel and Summers](#) (2019)

We had seen a long-term downtrend in government interest rates

This downtrend left investors **particularly interested in securities that were “safe” but yielded a little more than government bonds**

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Fallout

# The evidence we've seen so far raises some important questions

Why were borrowers, lenders, and investors so willing to enter these seemingly risky contracts?

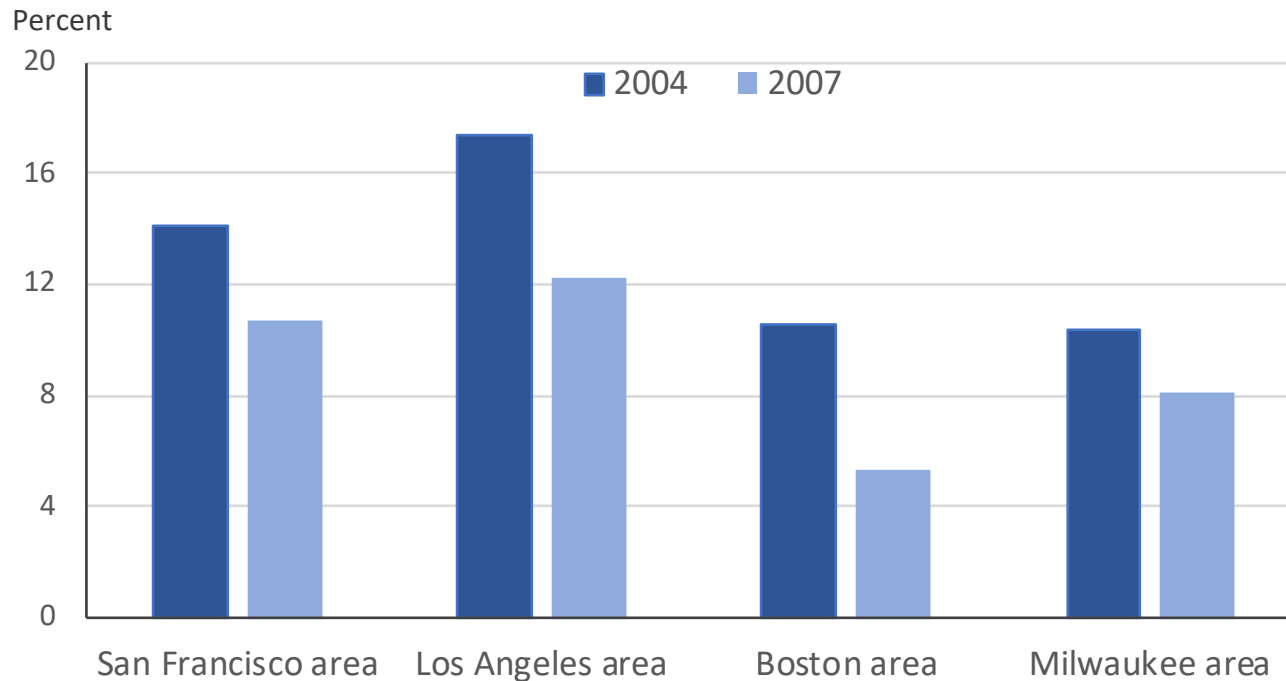
It wasn't just borrowers who suffered when their underwater mortgages were foreclosed upon—lenders/investors lost the difference between the value of the mortgage and the price at which they could sell the home

Why weren't regulators more alarmed?

Let's consider how overly optimistic home price expectations might help answer these questions

# We know that households were extremely optimistic about home prices

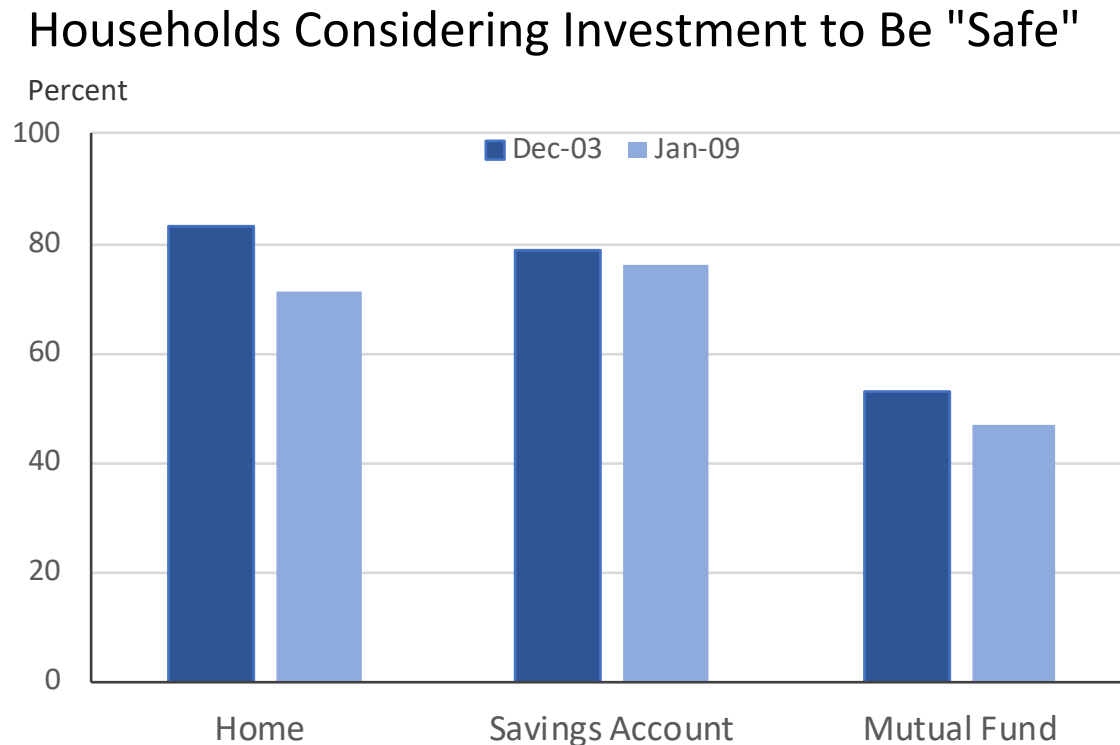
*"On average over the next 10 years, how much do you expect the value of your property to change each year?"*



Results from a survey conducted of people who bought homes in previous year near major cities

Data from [Case and Shiller](#) (2012)

# Households considered homes to be about as safe as savings accounts



Data from Fannie Mae [National Housing Survey](#)



# Wall Street analysts were also incredibly optimistic

Name	Scenario	Probability	Cum Loss
(1) Aggressive	11% HPA over the life of the pool	15%	1.4%
(2)	8% HPA for life	15%	3.2%
(3) Base	HPA slows to 5% by end-2005	50%	5.6%
(4) Pessimistic	0% HPA for the next 3 years 5% thereafter	15%	11.1%
(5) Meltdown	-5% for the next 3 years, 5% thereafter	5%	17.1%

**Table 2.** CONDITIONAL FORECASTS OF LOSSES ON SUBPRIME INVESTMENTS FROM LEHMAN BROTHERS. This table shows that investors knew that subprime investments would turn sour if housing prices fell. The “meltdown” scenario for housing prices above implies cumulative losses of 17.1 percent on subprime-backed bonds; such losses would be large enough to wipe out all but the highest-rated tranches of most subprime deals. The table also shows that investors placed small probabilities on these adverse price scenarios, a fact that explains why they were so willing to buy these bonds.

Source: “HEL Bond Profile Across HPA Scenarios” from Lehman Brothers: “U.S. ABS Weekly Outlook,” August 15, 2005.

Screenshot from [Foote, Gerardi, Willen](#) (2012)

# Home price optimism and the rise of riskier mortgages

A good case can be made that optimism was a central factor behind the rise in the nontraditional mortgage products we discussed earlier—**when home prices are expected to rise rapidly, the risk is muted**

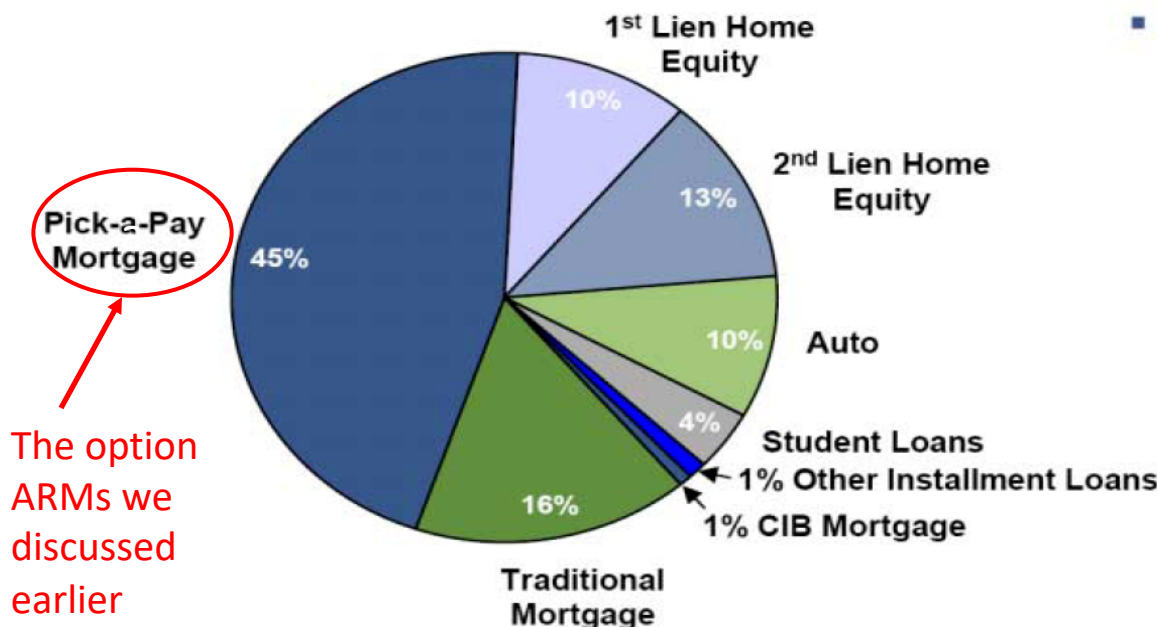
Lose your job and **can't make your mortgage payments?**

If your home is worth more than your mortgage: you can sell your home, pay off your mortgage, walk away with some cash, and the lenders/investors don't take a loss

If you are underwater with your mortgage: you can't pay off your loan by selling your home—you'll probably be foreclosed upon and the lenders/investors will take losses

# What about the role of securitization—did it allow lenders to pass off bad loans to unsuspecting investors?

As noted earlier, lenders were very optimistic about home prices too—and they don't appear to have been just passing the risk along, as **they too held risky mortgage products**



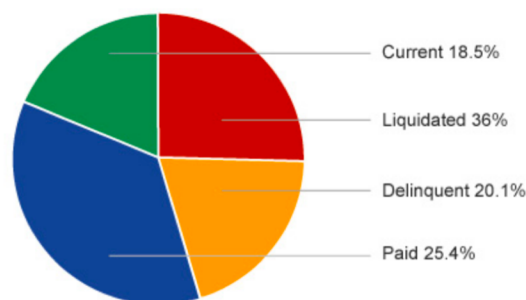
The consumer portfolio of [Wachovia](#) shortly before the government forced a sale to Wells Fargo to avoid its failure in 2008

# Were investors naïve or were they just optimistic too?

A key fact here is that **lots of information** about the loans underlying MBS were available to investors

A great website if you want to see for yourself what information was typically available to investors, see [The Story of a Security: Inside CMLTI 2006-NC2](#) by the Financial Crisis Inquiry Commission—it has [the data](#) for all 4499 loans underlying the deal

The Story of a Mortgage-Backed Security: Inside CMLTI 2006-NC2



## BEFORE THE CRISIS

### September 2006

Avg Initial Loan Balance **\$210,580**  
Avg FICO Score **620**  
Avg Debt-to-Income Ratio **40.6**  
Avg Initial Interest Rate **8.9%**  
Most Frequent Product **2/28 ARM**  
with 40 year amortization

# Investors probably did put too much faith in the “Triple A” ratings of mortgage securities

But recognize that **the credit ratings agencies** (e.g. Moody’s, S&P, Fitch) who assigned the ratings likely made the same **inaccurate assumptions about home prices** as others did

Indeed, the models used to predict the relationship between risky loan features and mortgage defaults *for any given path of home prices* were generally fairly accurate [see [Foote and Willen, 2017](#)]

[That’s not to entirely let the ratings agencies off the hook—there were some [incentive problems](#) and the ratings on more complicated mortgage-related securities [were inaccurate](#)]

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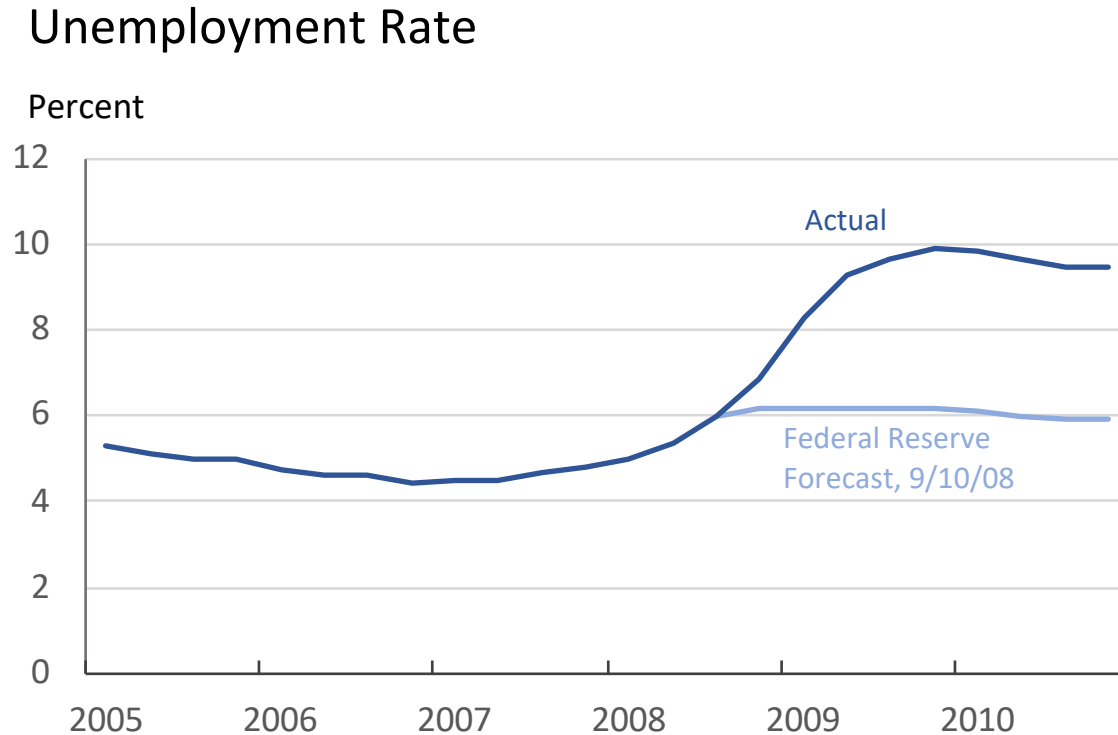
**Fallout**

# The mortgage crisis ultimately wreaked havoc on the financial system

By September 2008, mortgage-related losses had **crippled important financial institutions** such as Countrywide Financial, Wachovia, Bear Stearns, Washington Mutual, Fannie Mae, and Freddie Mac

By this time, it was recognized that there would be **many channels through which the economy would weaken**—including lower wealth, an overbuild of housing, reduced credit access

# And, yet, forecasters did not see anything like the Great Recession coming



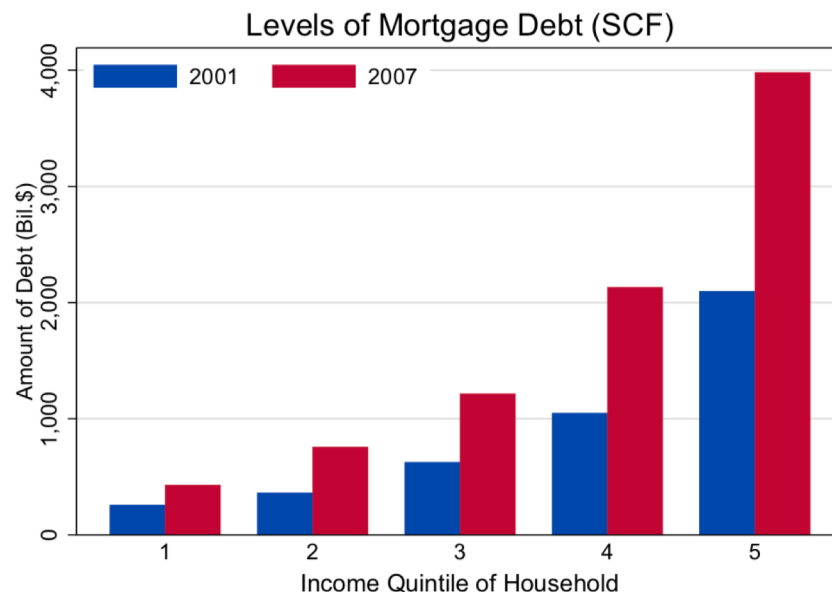
Data from the [Philadelphia Fed Greenbook Data Set](#)



# What explains the miss? Factor 1—lack of recognition that the mortgage crisis was not just about risky borrowers

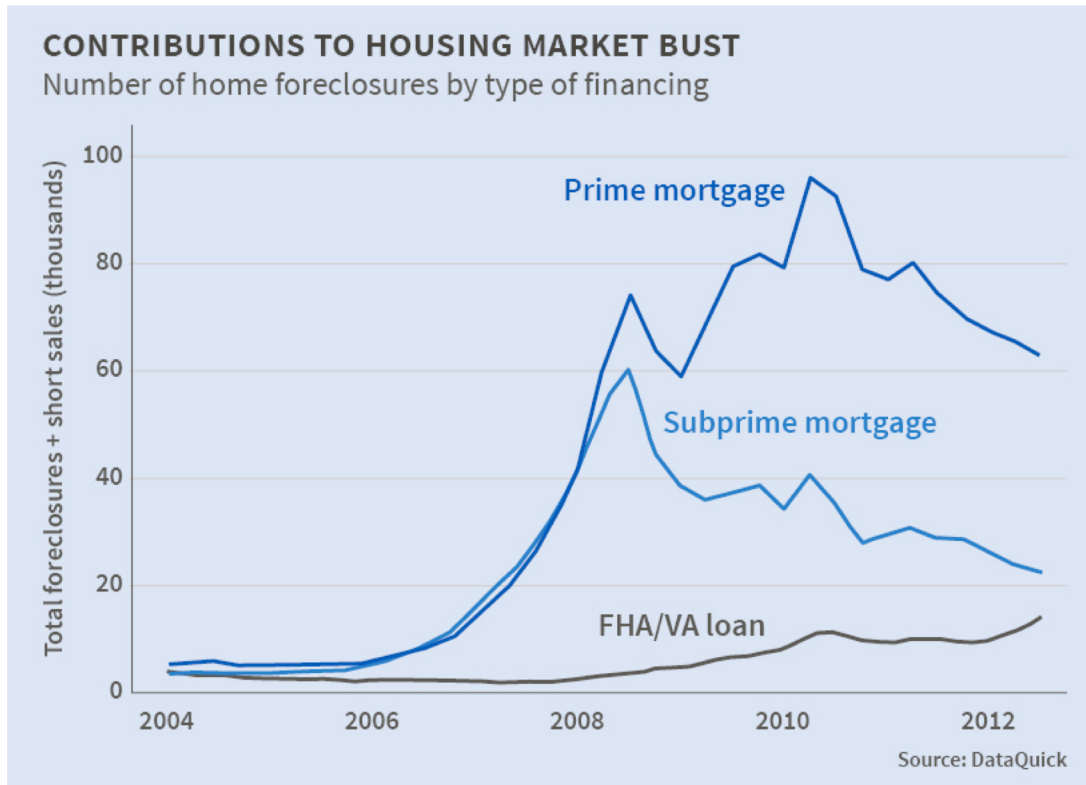
Households across the income (and credit) distribution were spurred to do more borrowing by rapidly rising home prices

Many of these households were “extracting equity” through cash-out refinancings to fund other types of spending



Screenshots from [Foote, Loewenstein, and Willen](#) (2016)

# What explains the miss? Factor 1—lack of recognition that the mortgage crisis was not just about risky borrowers



Screenshot from [Ferreira and Gyourko](#) (2015)

High leverage left **a broad swath of the population exposed** to the risks of being underwater with their mortgages

In the end, there were **more foreclosures on prime mortgages than on subprime mortgages**

[Prime mortgages had lower default rates but there were far more of them]

# What explains the risk? Factor 2—lack of recognition of how mortgage losses would be amplified through the financial system

**Credit markets seized up in late September 2008** due to panic about the exposure of financial institutions to mortgage losses

There were widespread liquidity problems, failures, and near-failures, including in the regulated banking sector and among systemically important institutions

You can **take EC 1746 if you want to know more about this amplification**, as well as:

What policymakers did to stop the crisis and the recession

What policies we have put in place to protect homeowners and the financial system from another crisis

# Summary

**Over-optimism about home prices** (the home price “bubble”) likely **played a central role** fueling the housing and mortgage boom and bust

The rise in home prices was **enabled and sustained** by **the rise of riskier mortgages and financial engineering** that drew in a large amount of funding for mortgages

The losses were amplified by the pre-crisis structure of the financial system, leading to the **global financial crisis** that precipitated **the Great Recession**