2007-2009 Financial Crisis

Trevor Gallen

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- But created (reinforced(?)) moral hazard.

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- Will separate Government's lending behavior (TARP) from stimulus (ARRA)
- Will not talk about ARRA.

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- Why is this useful?
- Note: "Safe" assets get a premium for a number of reasons.*

Prelude: Risk Management-II

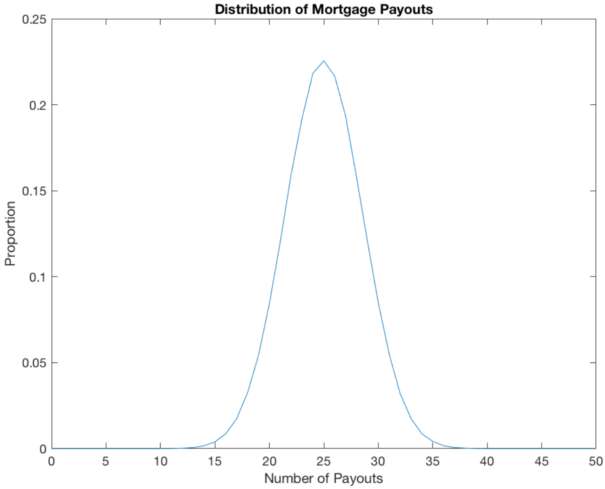
- Imagine whether or not a mortgage is paid is a coin flip.
- SPE gets 50 coin flips, orders them from heads to tails (heads pays \$, tails pays \$0).
- Says "I'm selling an asset that pays out the first ten ordered flips, another that pays the second ten, another that pays the third, and so on."
- I.e. creates senior and junior debt: HTTTHTHT becomes

$$\underbrace{HH}_{\text{First Tranche}}\ \underbrace{HT}_{\text{Second Tranche}}\ \underbrace{TT}_{\text{Third Tranche}}\ \underbrace{TT}_{\text{Fourth Tranche}}$$

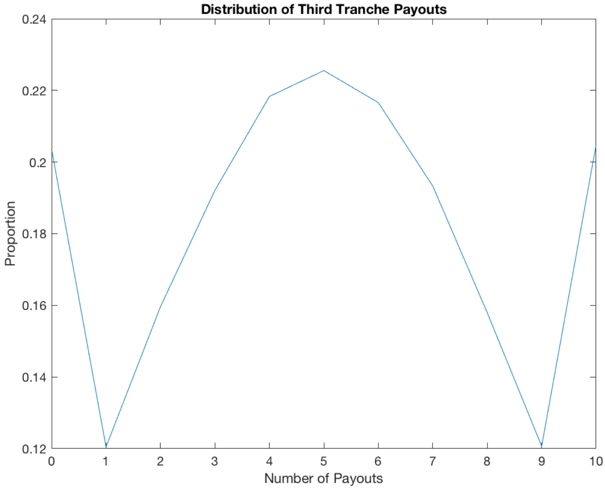
- If coin flip is 50/50, valuations from the Binomial distribution:

Tranche	Expected Value
First	9.999996
Second	9.88
Third	5
Fourth	0.12
Fifth	0.000004

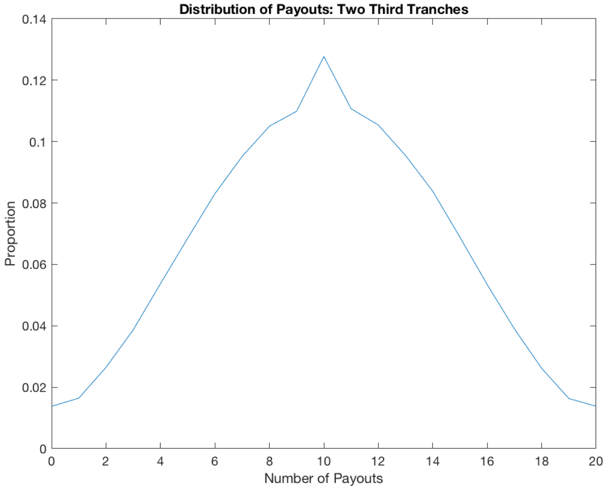
Distribution of Payouts



The Third Tranche



Two Third Tranches



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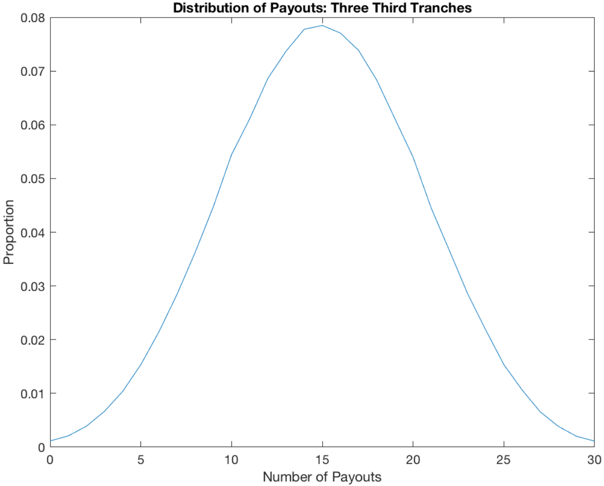
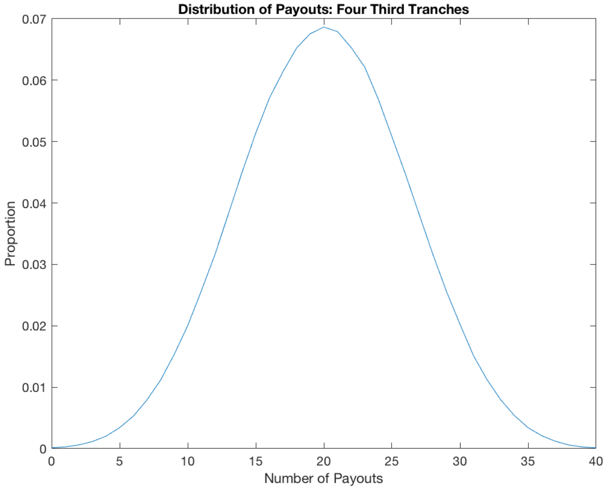
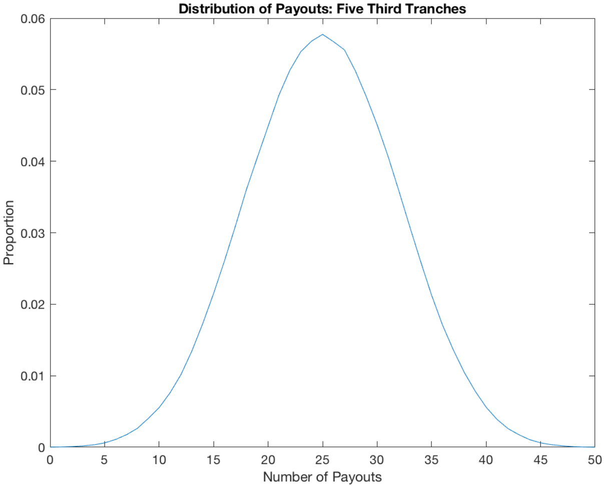


Four Third Tranches

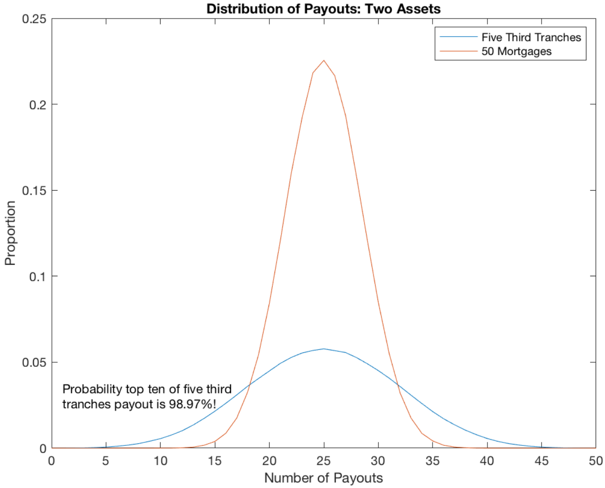


Five Third Tranches



Anybody getting any ideas?

Two Assets



How about now?

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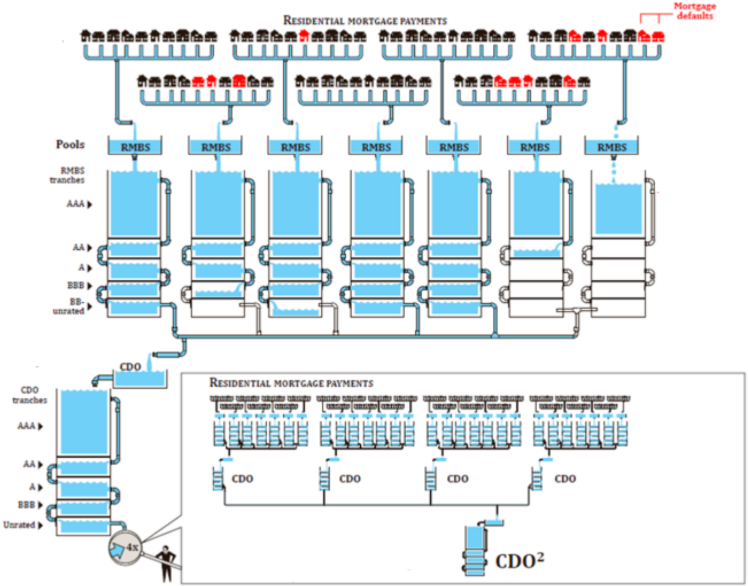
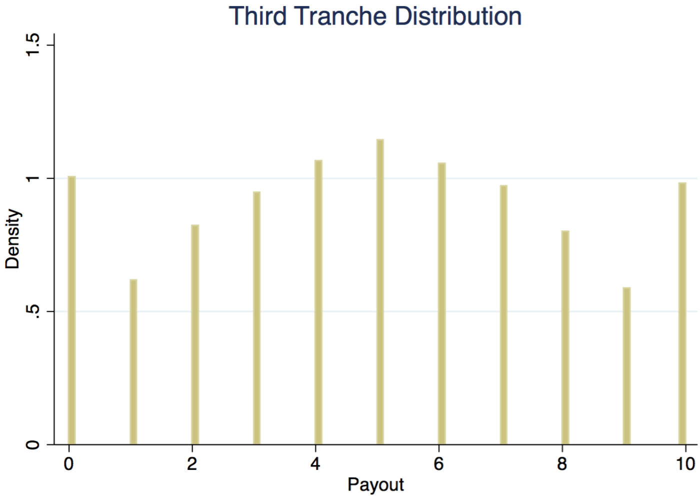
- There was in 2008.

IDEA BEHIND CDO'S

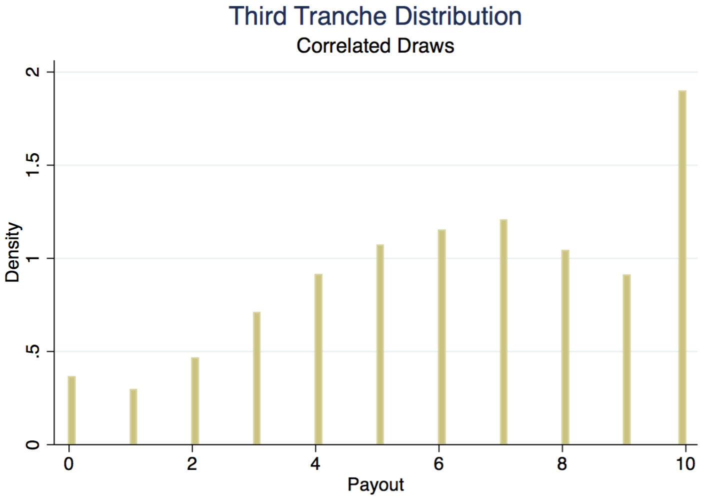


From IMF Global Financial Stability Report

Independent Draws



Correlated Draws: Good Outcome!



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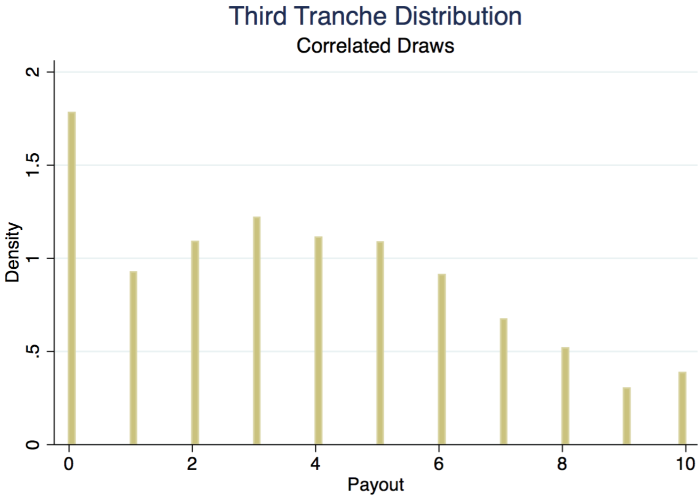

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- Ironically, core idea of Bernanke and Gertler (1989)

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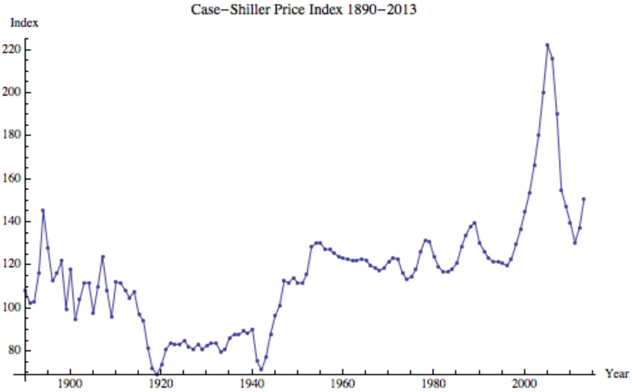

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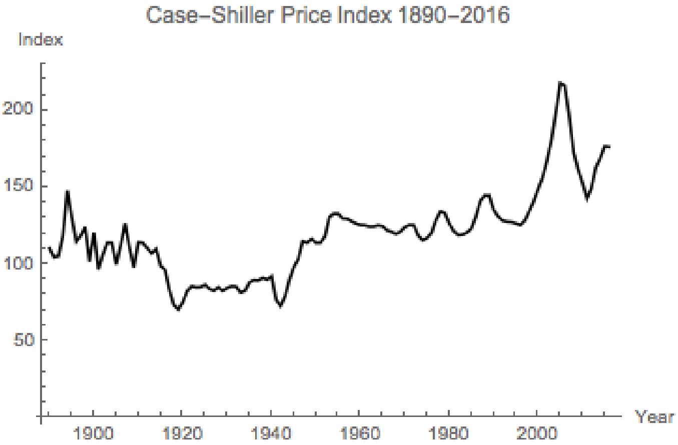

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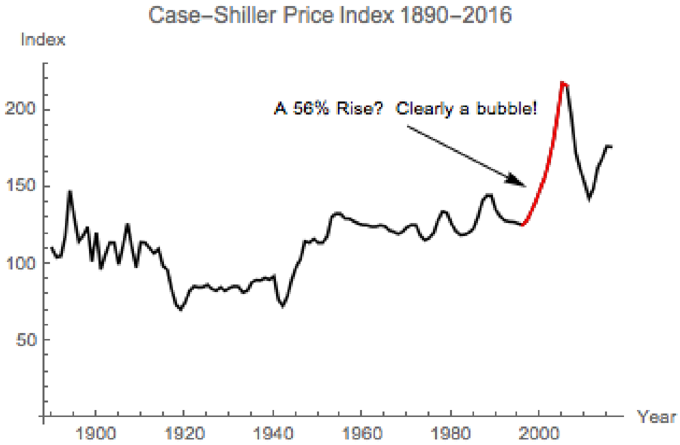

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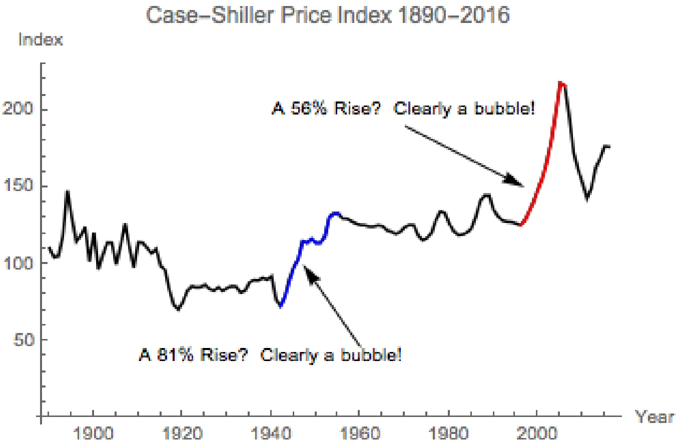

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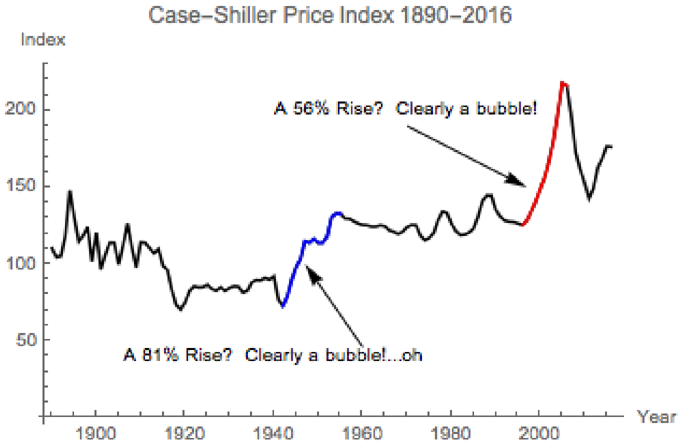

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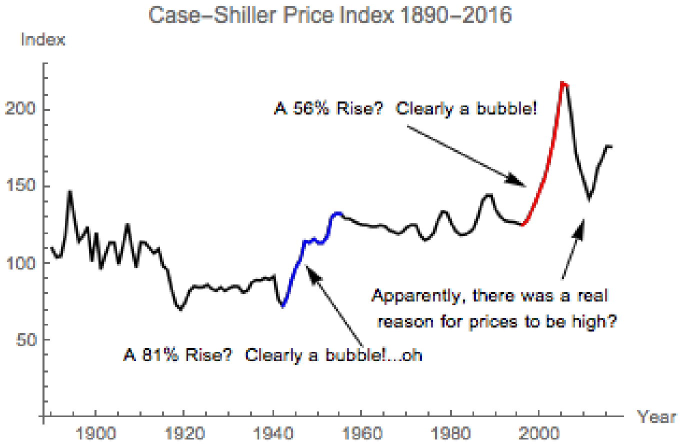

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- Do we need government-sanctioned certifications?

Is Regulatory Capture Inevitable?

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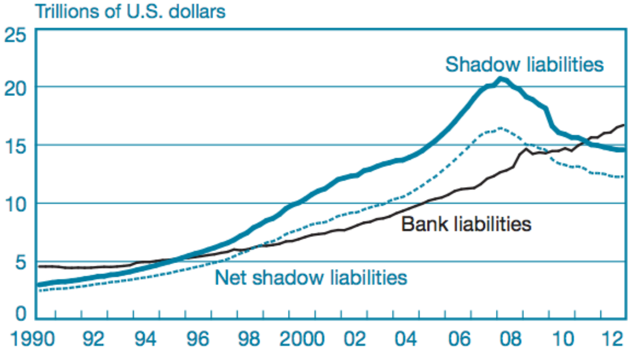
What are these symbols?

Shadow Banking grew!

Shadow Bank Liabilities versus Traditional Bank Liabilities



Sources: Board of Governors of the Federal Reserve System, "Flow of Funds Accounts of the United States" (as of 2011:Q3); Federal Reserve Bank of New York.

Pozsar, Adrian, Ashcraft, and Boesky (2013) "Shadow Banking"

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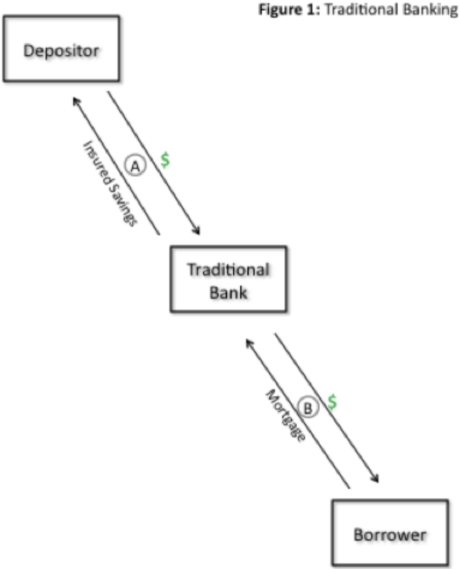
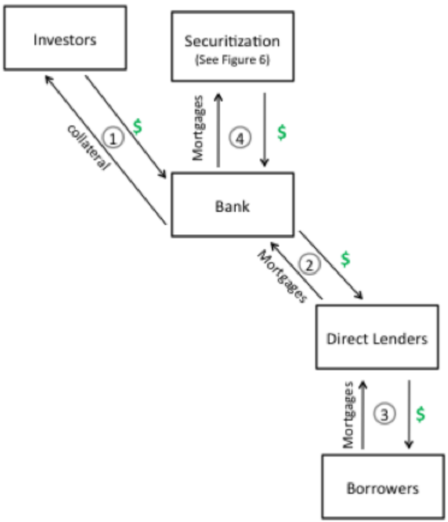
- Investment bank moves to another party, may have to pay more

Traditional Banking



Shadow Banking+Securitization

Figure 2: Securitized Banking



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- Repealed in 1998 (after slow decline, exploitation, expansion, and creation of loopholes).
  - This itself is interesting: flight from regulation competed it down (race to top (or bottom))

Glass-Steagall

- Banking Act of 1933
- Banks under Federal Reserve system can't:
  - Underwrite or distribute non-governmental securities
  - Invest in non-investment grade securities
  - Deal in non-governmental securities for customers
  - Share employees with companies that do any of those
- Repealed in 1998 (after slow decline, exploitation, expansion, and creation of loopholes).
  - This itself is interesting: flight from regulation competed it down (race to top (or bottom))
- Now banks like Citibank could hold CDOs.

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- Largest U.S. IBs: Goldman Sachs, Morgan Stanley, Merrill Lynch, Lehman Brothers, Bear Stearns

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- Similar story for Federal Home Loan Mortgage Corporation (Freddie Mac) (buys from thrifts instead of banks)

Mortgage origination for low-quality buyers grew!

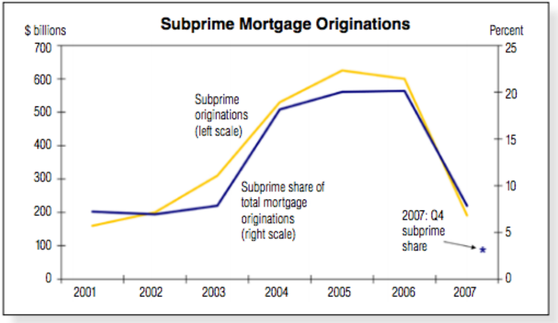

Figure 1

The surge in subprime mortgage lending peaked in 2005

Source:
Inside Mortgage Finance

FRBSF Annual Report (2007) "The Subprime Mortgage Market"

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- Provided insurance on CDO's to many investment banks.

Investment banks were highly leveraged

Leverage of Very Large Banks

Bank	Assets	Equity	Leverage
Deutsche Bank	2316	47.3	49
Barclays	2074	54.1	38.3
Bear Stearns	372	11.1	33.5
Morgan Stanley	985	29.5	33.4
Merrill Lynch	961	30.1	31.9
Lehman Brothers	651	21.2	30.7
Goldman Sachs	1055	47.2	22.4
Citigroup	2061	112	18.4
JP Morgan	1471	116.9	12.6
Wells Fargo	542	45.1	12
Bank of America	1616	138.3	11.7

Assets and equity in billions. Kalemli-Ozcan and Sorensen (2012)

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- Leveraging allows you to pick up pennies in front of a steamroller

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- Libor-OIS spread increased, reflecting counterparty concerns

Regular Default Rates

	Year				
Rating	1	2	3	4	5
Aaa	0.00%	0.00%	0.00%	0.00%	0.00%
Aa	0.00%	0.00%	0.01%	0.01%	0.01%
A	0.00%	0.00%	0.00%	0.01%	0.01%
Baa	0.01%	0.02%	0.04%	0.06%	0.08%
Ba	0.22%	0.71%	1.06%	1.33%	1.57%
B	3.65%	6.00%	7.88%	9.91%	11.73%
Caa-C	7.07%	8.97%	11.03%	11.60%	11.60%

Huxley and Burns (2011). Compare to 50% of AAA CDO's being impaired!!

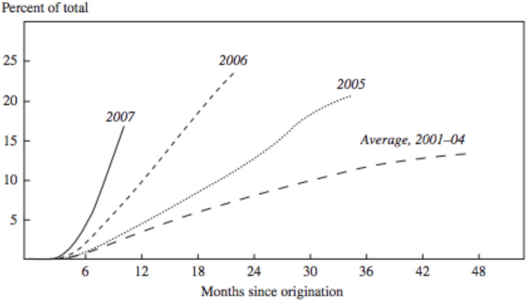
iClicker Question

- By late 2007, what proportion of subprime mortgages originated in 2006 had defaulted?
  a) 1% (avg six-month subprime mortgage default rate, 2001-2004)
  b) 5% (avg sixteen-month subprime mortgage default rate, 2001-2004)
  c) 10%
  d) 15%
  e) 20%

- Subprime credit score of < 600 is roughly the bottom 20% of the population in 2000.

Mortgages Started Failing in a Big Way

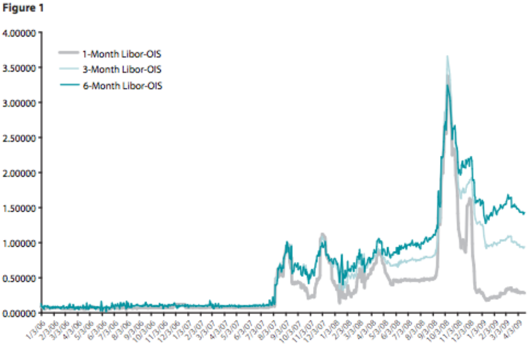
Figure 1. Cumulative Defaults on Subprime 2/28 Loans, by Year of Origination, 2001–07[a]



Sources: Federal Reserve, *Monetary Policy Report to the Congress*, July 2008, p. 5.
a. Monthly data; data for 2005–07 are incomplete. A 2/28 loan is a 30-year loan with a low fixed rate for the first 2 years and an adjustable rate for the remaining 28.

Swagel (2009).
Within first nine months, 2007 failures were at higher level than four year failures, 2001-2004.

Libor-OIS Spread



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  - The difference between the two is a measure of counterparty risk.

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- iClicker question! (with preamble first)

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September 2008

- September 7th: Fannie Mae and Freddie Mac are placed under conservatorship (nationalized)
- September 15th: Lehman Brothers declares bankruptcy
- September 16th: Reserve Primary Money Fund (MMMF) falls below $1.
- September 19th: Fed creates Asset-Backed Commercial Paper Money Market Mutual Fund Liquidity Facility (AMLF) to allow banks to buy ABS from MMMFs.
- September 20th: Treasury asks for permission to buy troubled assets
- September 29th: House rejects TARP
- October 3rd: House passes TARP
- October 8th: Commercial Paper Funding Facility (CPFF)
- October 21st: Money Market Investor Funding Facility (MMIFF)
- November 25th: Term Asset-Backed Securities Loan Facility (TALF)

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  - Credit cycles: Kiyotaki and Moore (1997)

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- When everyone has a hard time getting funding, fire sales may not yield value of asset to highest-valuing party (highest-valuing party is unable to bid) (Schleifer & Vishy 1992)

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- This means they're vulnerable to Diamond-Dyvbig type runs.

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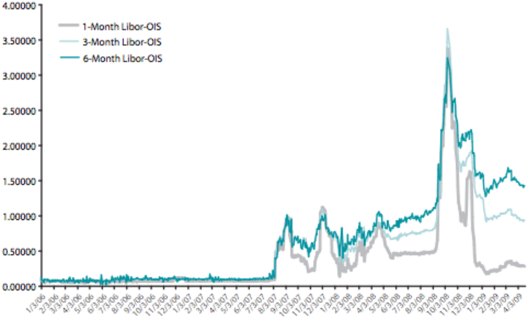
Libor-OIS Spread

Figure 1



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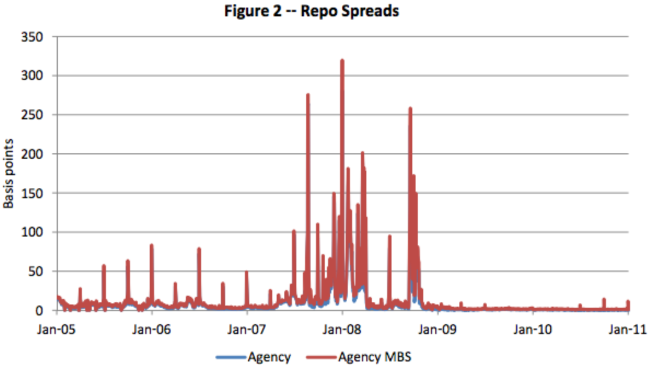
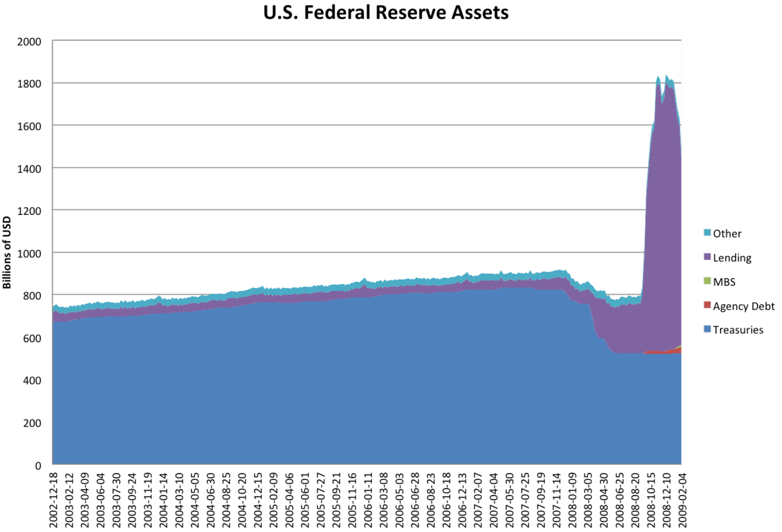
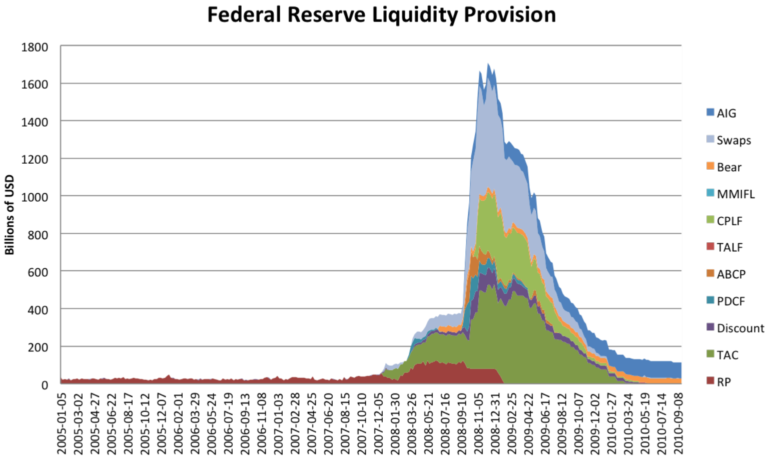
Repo Spreads



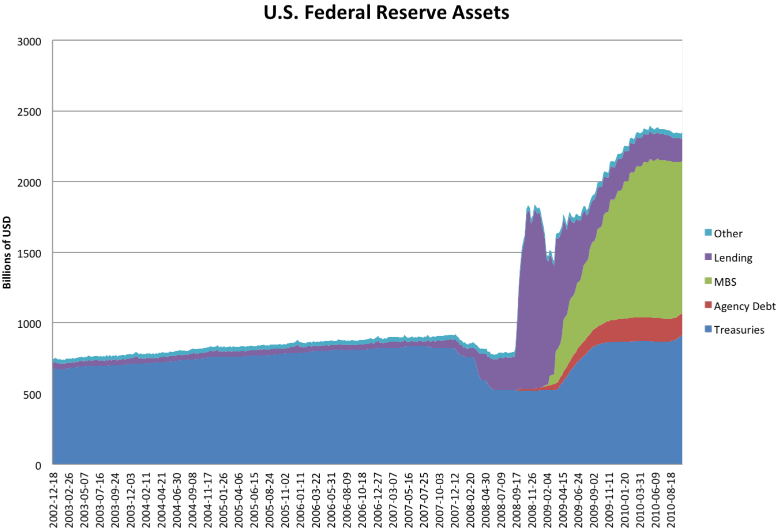
Balance Sheet Expansion-I



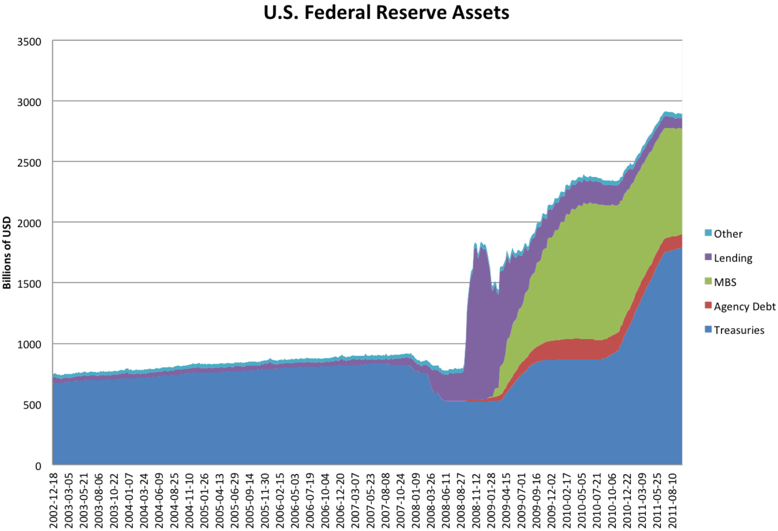
Balance Sheet Expansion-II



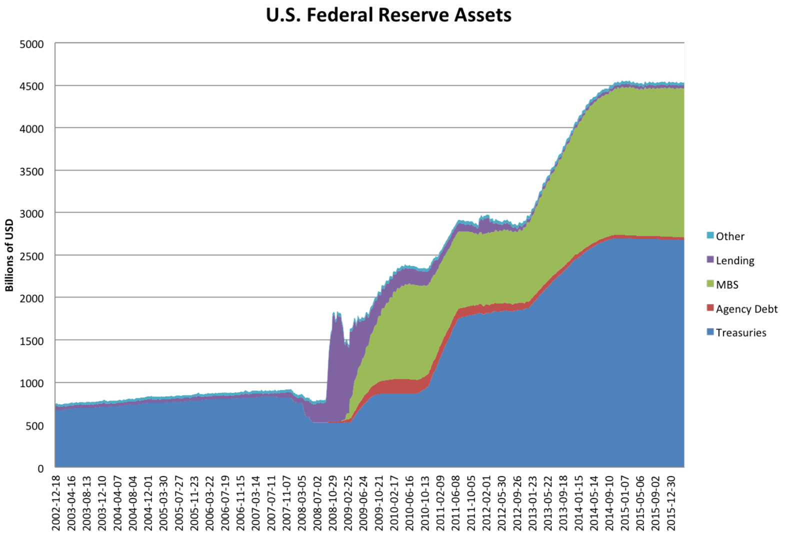
Balance Sheet Expansion-III



Balance Sheet Expansion-IV



Balance Sheet Expansion-V



Aside on the Zero Lower Bound

- Say we live in a world of sticky prices, like the NK model we studied
- Then government can stimulate economy inflation via lower interbank lending
- Does so through OMO: buy treasuries with cash
  - Now banks have cash (M$\uparrow$ so $P\uparrow$)
  - So inflation increases
  - So Y increases
- But when interest rates are zero, cash and treasuries are same thing (0% interest)
- Can't move interest rates any lower because people would just hold cash
- Inject cash into economy by buying other assets (like MBS)

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- In total a loss of around \$40.3 or $\sim$\$20 billion, most from "stimulus" not lending.

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- But with some lingering concerns...

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- We need a non-discretionary way to do this.
- Need a theory of systemic risk (Hansen 2013)

Final Exam

- Test is on Friday, 10:30a - 12:30p in RAWL 1086
- Topics:
  - Ch. 11: Inflation, Money Growth, and Interest Rates
  - Ch. 12: Government Expenditure
  - Ch. 13: Taxes
  - Ch. 14: Public Debt
  - Ch. 15: Money and Business Cycles I: The Price Misperceptions Model
  - Ch. 16: Money and Business Cycles II: Sticky Prices and Nominal Wage Rates
  - Doepke et al. 17.4: Bank Runs
  - Financial Crisis (these slides)
- Approximately (i) 26 multiple choice (ii) 5 true, false, uncertain (iii) 5 short answer, (iv) 1 long answer, (v) 1 multi-part question