

Renegotiating Home Mortgages: Evidence from the Subprime Crisis

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Disclaimer

- I am speaking today as a researcher and as a concerned citizen
- not as a representative of:
 - The Boston Fed
 - or the Federal Reserve System



- When I say “we”, I don’t mean Ben and me.

Caveat

- Everything I’m about to say could be wrong:

No one who cannot rejoice in the discovery of his own mistakes deserves to be called a scholar.

–Donald Foster

- Mortgages are a bit personal for me right now
- Subprime is my life



Loan Modifications

- Loan modifications are
 - Safe
 - Legal
 - and RARE!
- We look at loans after they became 60 days delinquent:
 - Over the next year, only about 7 percent of the loans received modifications
 - Servicers made no changes for 93 percent of the loans.
- Even after foreclosure proceedings start, we find the same thing
 - Over the next year, only about 6 percent of the loans received modifications
 - For 94 percent of the loans, no renegotiation.

“Common Sense” and Public Policy

- “Common Sense” often contradicted by data and/or economic theory.
- Examples:
 - Protectionism
 - Central Planning
- Common Sense: Loans with increasing payments are crazy
 - Data: Resets of adjustable rate mortgages played little or no role in causing the crisis.
- Common Sense: Renegotiation of mortgages should be common
 - Economic theory: Moral hazard problem.
 - Data: Very little renegotiation
- Common Sense: Dispersed ownership makes renegotiation difficult
 - Theory: Contracts can solve this problem.
 - Data: Dispersed ownership does not present a big problem

LPS Data

- Dataset formerly known as McDash
- 9 of the top 10 servicers
 - 29 million active residential loans
 - 60% of all active residential loans
 - \$6.5 trillion
- Dataset includes
 - 1 securitized subprime
 - 2 securitized alt-A
 - 3 securitized jumbo
 - 4 securitized conforming
 - FHLMC
 - FNMA
 - GNMA
 - 5 portfolio

Fields

- Static: All the origination information
 - FICO, DTI, amount, LTV
 - Zip Code, Date
 - ARM, FRM, interest rate
 - lien type
 - NO information about second liens or CLTV
- Dynamic: Updated monthly
 - Balance
 - Monthly payment
 - Interest rate
 - Delinquency status

Modifications

- LPS does not flag a loan as modified or describe changes.
- OCC/OTS has data but won't release it!
 - Not a “Chinese Wall”
 - Nor a “Firewall”
 - A “Chinese Firewall”
 - The “Great Firewall of China”
- But we have detailed payment information, so we can identify changes

Mod Example #1: Fixed-rate loan originated Jan 2007

Date	MBA Delinq. Stat.	Interest Rate	Monthly Payment	Outstanding Balance	Remaining Term in Months
2008m10	9	6.5	907	141,323	340
2008m11	9	6.5	907	141,323	339
2008m12	9	6.5	907	141,323	338
2009m1	C	4.5	660	146,686	479

- This borrower was 90 days delinquent, but then became current
- He then received an interest rate reduction (on a supposedly fixed-rate loan)
- His monthly payment *declined* while his outstanding balance *rose* (to make up for past arrears)
- The borrower also received a term extension to a 40-year loan

Mod Example #2: Hybrid-ARM originated Dec 2006

Date	MBA Delinq. Stat.	Interest Rate	Monthly Payment	Outstanding Balance	Remaining Term in Months
2008m5	6	9.25	1,726	208,192	346
2008m6	9	9.25	1,726	208,192	346
2008m7	9	9.25	1,726	208,192	346
2008m8	C	9.25	1,815	218,316	341
2008m9	C	9.25	1,815	218,184	340

- Borrower rolls into 90-day delinquency in June 2008 and receives a modification in October.
- Standard payment-increasing modification: Payment rises as past arrears are capitalized into loan balance
- No reduction in interest rate

Quality of the Modifications Algorithm

- Data from Wells Fargo Corporate Trust Servicers
- Includes only private securitized loans and has flags for modifications from servicers

	No Mod Using Our Algorithm	Mod Using Our Algorithm	Total
No Mod in WF Data	2,329,187	3,559	2,332,746
Mod in WF Data	3,627	17,514	21,141
Total	2,332,814	21,073	2,353,887

- Overall: 16.9% false positives; 17.2% false negatives

Modification Statistics by Type: 2007:Q1–2008:Q4

	# Loans Modified	Interest Rate Reductions		Principal Balance Reductions		Principal Balance Increases		Term Extensions	
		#	(% total)	#	(% total)	#	(% total)	#	(% total)
2007:Q1	10,940	600	5.3	700	6.2	8,660	76.4	1,380	12.2
2007:Q2	14,600	820	5.4	550	3.7	11,630	77.3	2,050	13.6
2007:Q3	17,720	770	4.1	810	4.3	15,170	81.2	1,940	10.4
2007:Q4	27,150	2,990	9.7	700	2.3	22,520	72.8	4,740	15.3
2008:Q1	36,230	6,010	13.8	900	2.1	32,100	73.8	4,500	10.3
2008:Q2	44,750	9,050	16.4	1,300	2.4	39,750	72.1	5,030	9.1
2008:Q3	62,190	16,280	20.3	940	1.2	56,940	70.9	6,110	7.6
2008:Q4	74,800	28,630	26.7	1,450	1.4	65,960	61.5	11,230	10.5

Why so rare?

- One explanation:

The complex webs that securitization weaves can be a trap and leave no one, not even those who own the loans, able effectively to save borrowers from foreclosure. With the loan sliced and tranced into so many separate interests, the different claimants with their antagonistic rights may find it difficult to provide borrowers with the necessary loan modifications, whether they want to or not. In the tranche warfare of securitization, unnecessary foreclosures are the collateral damage.

Kurt Eggert
 in *Housing Policy Debate*
 (2007)

The role of securitization

- Contrary to popular belief, this has *nothing* to do with the fact that many loans are securitized.
- Probability of a modification of a loan that becomes 60 days delinquent

	Securitized	Portfolio	Total
In next 3 months	1.7%	1.8%	1.8%
In next 6 months	3.9%	4.1%	3.9%
In next 12 months	7.4%	6.7%	7.3%

- The contracts state that servicers should treat securitized mortgages if they own them.
 - They appear to be doing that.
- Our results are quite robust.
 - When you put in a full set of controls, there is no real difference, correct for censoring, etc.

Differences with Previous Research

- Using the same data, Piskorski, Seru, and Vig (2008) argue that securitized lenders renegotiate less often.
- We find no difference. What explains the difference?
- They don't actually identify modifications, they simply look at the performance of loans and attribute the difference to modification.
 - Securitized loans are more likely to end up in REO, even when you control for observables.
 - Their evidence is, at best, indirect. Differences in renegotiation are only one unobservable difference between the pools.
 - But still provocative.
 - Look at “outcomes” not “inputs.”

Some data

- A closer look at the data shows renegotiation cannot be driving the results.
 - Loans are less likely to end in REO,
 - But data is right censored, and portfolio loans just as likely to still be in trouble.
 - And if lenders were renegotiating, portfolio loans would transition to current more, which they don't.
 - Other explanations: portfolio lenders have to address regulators and accountants.
- Loans one year after first 60DQ.:

	Securitized	Portfolio	All	Difference in rates
REO	17,416 20.7%	1,639 13.4%	19,055 19.8%	54%
90DQ, FC, REO	55,618 66.1%	7,104 58.2%	62,722 65.1%	14%
Current or prepaid	19,342 23.0%	3,254 26.7%	22,596 23.5%	16%

30DQ to Modification

GNMA	0.934	0.811	0.923	0.916	0.714
	-2.53	-5.42	-1.93	0.05	-4.72
FNMA	0.385	0.519	0.554	0.744	0.667
	-33.69	-19.33	-16.88	-7.32	-7.52
FHLMC	0.732	1.055	1.101	1.037	1.080
	-10.94	1.54	2.64	0.78	1.21
Privately Securitized	1.485	1.103	1.023	1.071	1.019
	19.26	4.22	0.93	2.31	0.46
Controls	No	Yes	Yes	Yes	Yes
Refinance	.	.	0.932	0.977	0.952
	.	.	-4.45	-1.18	-1.67
Subprime/Alt-A	.	.	1.692	1.711	1.951
	.	.	24.73	21.34	14.99
Equity	.	.	.	0.993	0.996
	.	.	.	-0.89	-0.36
Negative Equity Dummy	.	.	.	1.013	1.015
	.	.	.	6.40	5.20
Equity Interaction	.	.	.	0.963	0.964
	.	.	.	-2.13	-1.46
Cumulative Unemployment Change	.	.	.	1.028	1.029
	.	.	.	13.98	9.80
DTI ratio	.	.	.	.	1.004
	.	.	.	.	4.26
Low/No Document	.	.	.	.	0.995
	.	.	.	.	-0.17
# Mortgages	433,280	314,095	294,698	249,336	121,433

30DQ to Modification, payment reducing mods only

GNMA	0.311	0.543	0.752	0.899
	-21.39	-8.07	-3.52	-0.98
FNMA	0.199	0.377	0.434	0.647
	-32.59	-16.71	-13.80	-5.54
FHLMC	0.878	1.660	1.846	1.856
	-3.36	10.65	11.99	8.26
Privately Securitized	1.272	0.947	0.875	1.032
	8.16	-1.62	-3.84	0.64
Refinance	.	.	1.028	1.060
	.	.	1.12	1.76
Subprime/Alt-A	.	.	2.185	2.468
	.	.	23.35	20.49
Equity	.	.	.	0.973
	.	.	.	-3.51
Negative Equity Dummy	.	.	.	1.023
	.	.	.	7.81
Equity Interaction	.	.	.	0.956
	.	.	.	-1.90
Cumulative Unemployment Change	.	.	.	1.042
	.	.	.	17.72
DTI ratio	.	.	.	.

Low/No Document	.	.	.	.

# Mortgages	433280	314095	294698	249336

Understanding Modification

- Concessions to borrowers – Reduction in principal balance?
- Basic logic: If reduced principal balance exceeds loss from foreclosure...
- It would be an *error* not to take advantage of this
- But no one ever does. According to one *banker* (quoted in *ABA Banking Journal*):

We have not to date forgiven any principal.

- Reason:

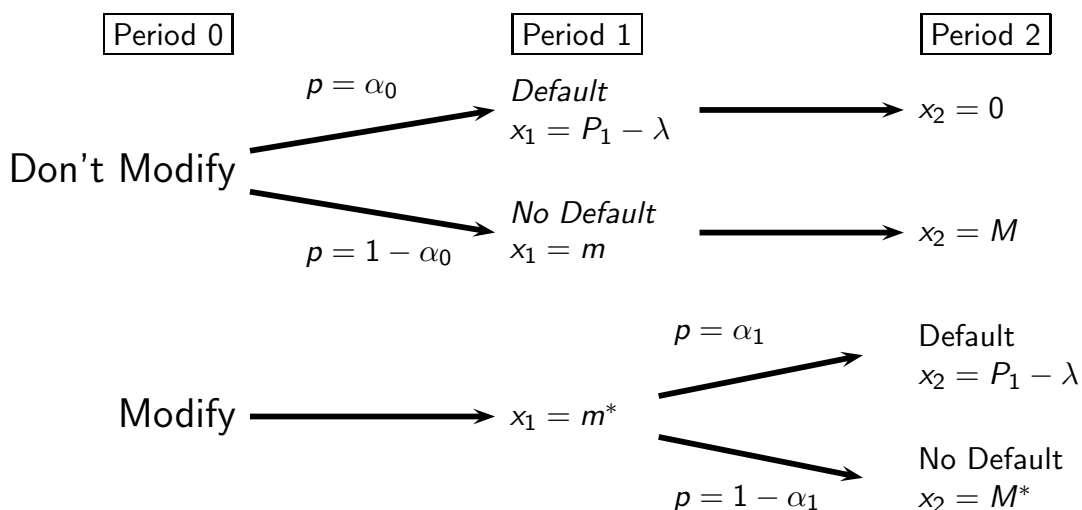
We are wary of the consequences of being known as a bank that forgives principal.

Type I and Type II Error

- Two errors:
 - 1 Type I error: Not assisting a borrower who can't repay.
 - 2 Type II error: Providing costly assistance to a borrower who will repay.

A model

- Three periods: $t = 0, 1, 2$
- Mortgage is a stream of payments x_1, x_2



The gains to modification

t	Mortgage	House Price	Foreclosure	Modification
1	m	P_1	$P_1 - \lambda$	m^*
2	M	P_2	$P_2 - \lambda$	M^*

- Value of loan without modification:

$$V_{\text{no mod}} = \alpha_0(P_1 - \lambda) + (1 - \alpha_0)[m + (1/R)M].$$

- Value of loan with modification:

$$V_{\text{mod}} = m^* + (1/R)\alpha_1(P_2 - \lambda) + (1/R)(1 - \alpha_1)M^*.$$

- NPV Test: Modify if $V_{\text{mod}} > V_{\text{no mod}}$

$$\begin{aligned}
 V_{\text{mod}} - V_{\text{no mod}} &= (\alpha_0 - \alpha_1)[m^* + \frac{1}{R}M^* - (P_1 - \lambda)] \\
 &\quad - (1 - \alpha_0)[m + \frac{1}{R}M - (m^* + \frac{1}{R}M^*)] \\
 &\quad + \alpha_1[m^* + \frac{1}{R}(P_2 - \lambda) - (P_1 - \lambda)] > 0 \quad (1)
 \end{aligned}$$

$$1 - \alpha_0$$

Borrower always repays
 Lender loses because
 borrower would have paid
 in full

$$m + \frac{1}{R}M - (m^* + \frac{1}{R}M^*)$$

“Type II error”
 Costly assistance to
 borrowers who can pay

$$\alpha_0 - \alpha_1$$

Modification effective
 Lender gains because
 modified payments worth
 more than foreclosure

$$m^* + \frac{1}{R}M^* - (P_1 - \lambda)$$

“Type I error”
 Don't help borrowers who
 would have defaulted

$$\alpha_1$$

Borrower never repays
 Foreclosure is delayed
 May or may not help lender

$$m^* + \frac{1}{R}(P_2 - \lambda) - (P_1 - \lambda)$$

“Type III error”
 Lender loses if R is large
 or if $P_2 - P_1$ is big

The NPV Test in practice

- OCC/OTS data released April 3, 2009:

	Delinquent after		
	3 Mos.	6 Mos.	9 Mos.
(1) Payment reduction	13.8%	22.7%	26.2%
(2) Payment increase	29.2%	45.8%	49.1%

- Let's say that:
 - Payment reduction is 20%, recovers 80¢ on the dollar
 - In foreclosure, lender loses 50% so recovers 50¢ on the dollar
- Does reducing payments increase NPV of loan?

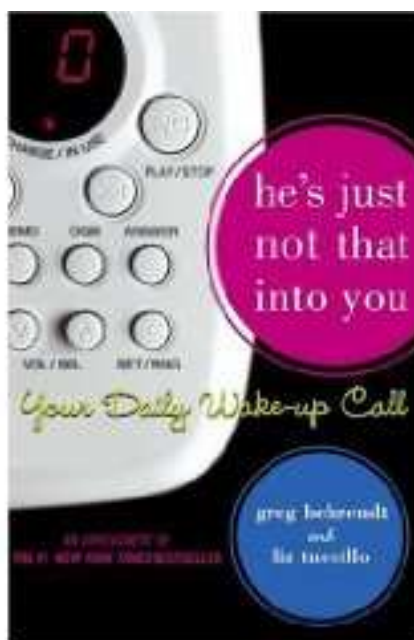
- NPV of increased payment loan:

$$NPV = \underbrace{49.1\% \times 50¢}_{\text{Recovery from Defaults}} + \underbrace{50.9 \times 100¢}_{\text{Recovery from Repayment}} = 75.45¢$$

- NPV of reduced payment loan:

$$NPV = \underbrace{26.2\% \times 50¢}_{\text{Recovery from Defaults}} + \underbrace{73.8 \times 80¢}_{\text{Recovery from Repayment}} = 72.14¢$$

Maybe the investors just aren't that into modification



The slide you've all been waiting for...

- The end.