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What happens to seriously delinquent mortgage borrowers and their homes?

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Research Question

What are the effects of borrower characteristics, loan type and loan terms, and property and neighborhood characteristics, on post-default non-prime mortgage outcomes?

- Relatively few papers combine loan-level records with information on the borrower, property, and neighborhood
 - Understanding these relationships will improve intervention and regulation strategies
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First stage of mortgage default

Borrower default →

cure

refinance

modification

sale

deed in lieu

lis pendens (foreclosure notice)

no action

Second stage of default: foreclosure

Service *lis pendens* →

cure

refinance

modification

sale

deed in lieu

no action

foreclosure auction → sale or REO

New York City Data

- Monthly loan records from CoreLogic's LoanPerformance dataset
 - Property characteristics, deeds, and mortgage documents from NYC Department of Finance
 - *Lis pendens* court records
 - Loan application records from HMDA
 - Neighborhood (Census tract) characteristics
 - Repeat-sales house price indices for 56 local jurisdictions
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Analysis Sample

- First lien non-prime securitized mortgages originated 2003-2008 in NYC, observed until October 2010
 - About one third become seriously delinquent (90 DPD)
 - The post-default sample consists of 40,218 loans and 427,972 loan-month observations
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Distribution of post-default outcomes

	All loans in default		Received <i>lis pendens</i>	
			No	Yes
Post-default outcome:				
Modified	8,650	21.5%	5,697	2,953
Refinance	2,038	5.1%	1,490	548
Arms-length sale	6,061	15.1%	1,771	4,290
Deed-in-lieu	8	0.0%	1	7
Foreclosure auction:	2,950	7.3%		2,950
Auction sale	424	1.1%		424
REO	2,526	6.3%		2,526
Other outcome:	20,511	51.0%	9,710	10,801
Cured	1,019	2.5%	768	251
Cycled	2,197	5.5%	1,042	1,155
Remained delinquent	17,295	43.0%	7,900	9,395
Total number of loans	40,218	100%	18,669	21,549

Empirical Strategy

First stage

default → modification

refinance

sale

lis pendens →

no action

Second stage

modification

refinance

sale

foreclosure auction

no action

Empirical Specification

Proportional hazard model with competing risks.
Multinomial logit functional form.

Explanatory variables:

- ❑ Loan and property characteristics
 - ❑ Borrower risk characteristics
 - ❑ Borrower payment behavior
 - ❑ Neighborhood characteristics
 - ❑ Borrower demographic characteristics
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Results: Loan Characteristics

- Fixed-rate and interest-only loans are more likely to be modified and less likely to receive a *lis pendens*
- Loans with relatively lower interest rates at origination are more likely to be refinanced and less likely to receive a *lis pendens*
- As the current loan balance increases, the probability of no outcome decreases

	First stage of the foreclosure process				Second stage of the foreclosure process (conditional on <i>lis pendens</i>)			
	Modification	Refinance	Sale	<i>Lis pendens</i>	Modification	Refinance	Sale	Auction
Prepayment penalty in effect	0.8066* (0.070)	0.7444** (0.082)	0.9026 (0.085)	1.0609* (0.031)	1.0097 (0.132)	0.8493 (0.170)	0.9219 (0.063)	0.8022* (0.081)
Purchase loan	0.7570** (0.032)	0.7430** (0.060)	1.1814* (0.084)	1.2492** (0.029)	0.5756** (0.033)	0.4448** (0.064)	1.1356** (0.056)	1.3230** (0.085)
Owner-occupier	1.3643** (0.101)	1.0674 (0.139)	0.6780** (0.063)	0.8833** (0.031)	1.0911 (0.091)	1.3478 (0.317)	0.8323* (0.060)	0.9972 (0.095)

Results: Borrower Risk Characteristics

		First stage of the foreclosure process				Second stage of the foreclosure process (conditional on <i>lis pendens</i>)			
		Modification	Refinance	Sale	<i>Lis pendens</i>	Modification	Refinance	Sale	Auction
FICO at origination:	680-720	1.0637 (0.064)	0.8607 (0.123)	1.0449 (0.106)	0.9938 (0.030)	1.1409 (0.105)	1.1576 (0.385)	0.8592* (0.056)	0.9953 (0.071)
	650-680	1.2289** (0.074)	1.1936 (0.160)	0.8675 (0.093)	0.9604 (0.030)	1.5032** (0.136)	1.4479 (0.462)	0.9753 (0.063)	0.8987 (0.067)
	620-650	1.3781** (0.084)	1.1418 (0.152)	0.9478 (0.102)	0.9596 (0.031)	1.6376** (0.151)	2.1062* (0.640)	0.9274 (0.061)	0.9304 (0.071)
	590-620	1.5701** (0.110)	1.0383 (0.156)	1.0078 (0.126)	0.8291** (0.034)	2.0174** (0.207)	2.2045* (0.721)	1.0226 (0.083)	0.6626** (0.068)
	560-590	1.8457** (0.146)	1.2065 (0.186)	1.0045 (0.137)	0.8605** (0.040)	2.5724** (0.303)	3.9544** (1.281)	1.1588+ (0.104)	0.6077** (0.081)
	530-560	1.9242** (0.169)	1.3726+ (0.224)	1.0292 (0.151)	0.7428** (0.040)	2.6964** (0.346)	4.4066** (1.471)	1.1015 (0.109)	0.4668** (0.075)
	<530	2.2030** (0.227)	1.5484* (0.266)	0.9748 (0.164)	0.7729** (0.048)	3.2059** (0.471)	5.1137** (1.738)	1.2600* (0.139)	0.6718* (0.122)

- As the current LTV increases, the probability of modification increases while the probabilities of the other outcomes decrease
 - However, there is no discontinuity at $LTV > 100$
- Loans with junior liens are less likely to be modified

Results: Borrower Risk Characteristics

		First stage of the foreclosure process				Second stage of the foreclosure process (conditional on <i>lis pendens</i>)			
		Modification	Refinance	Sale	<i>Lis pendens</i>	Modification	Refinance	Sale	Auction
Full documentation & DTI <=45%		1.2130** (0.073)	1.3302* (0.152)	1.2413* (0.128)	1.0678+ (0.038)	1.0038 (0.089)	1.0910 (0.203)	0.8350* (0.063)	1.2770** (0.119)
Full documentation & DTI > 45%		1.3547** (0.077)	0.8491 (0.104)	1.1282 (0.121)	1.0533 (0.038)	0.9800 (0.082)	1.0366 (0.192)	0.9537 (0.067)	1.0320 (0.095)
Borrower payment outcomes:									
no. of months before default		1.0120** (0.002)	0.9682** (0.004)	0.9828** (0.003)	0.9723** (0.001)	1.0613** (0.004)	1.0132* (0.007)	1.0112** (0.003)	0.9741** (0.005)
Payments since default:	>0 but <half	2.8120** (0.147)	0.9344 (0.156)	0.8840 (0.117)	1.0069 (0.042)	3.0550** (0.251)	1.2147 (0.247)	0.9781 (0.074)	0.9295 (0.088)
	>half	1.6214** (0.074)	0.9134 (0.076)	0.8200** (0.058)	0.7024** (0.016)	2.3109** (0.182)	0.5775** (0.090)	1.1160* (0.060)	0.7550** (0.054)
Change in ARM payments:	25-50%	0.5228** (0.058)	0.9925 (0.158)	1.1032 (0.157)	1.0329 (0.051)	0.5077** (0.066)	1.2123 (0.219)	0.9841 (0.079)	0.9378 (0.086)
	> 50%	0.4543** (0.080)	0.9050 (0.235)	1.1007 (0.246)	1.2733** (0.086)	0.5131** (0.116)	1.4546 (0.670)	1.1146 (0.147)	1.0588 (0.193)

Results: Neighborhood Characteristics

		First stage of the foreclosure process				Second stage of the foreclosure process (conditional on <i>lis pendens</i>)			
		Modification	Refinance	Sale	<i>Lis pendens</i>	Modification	Refinance	Sale	Auction
Recent house price depreciation:	0-10%	1.1947+	0.8576	1.0117	1.0275	1.0505	0.7789	0.9480	1.2680*
		(0.111)	(0.104)	(0.122)	(0.034)	(0.122)	(0.141)	(0.073)	(0.119)
	>10%	1.2341*	0.9705	1.1790	0.8943**	1.0044	0.8637	1.0822	1.3715**
		(0.114)	(0.147)	(0.161)	(0.036)	(0.118)	(0.211)	(0.096)	(0.145)
Recent foreclosure rate:	1-2%	0.9155*	1.0602	0.9969	1.0562*	0.8870+	0.7537*	1.0798	1.0768
		(0.040)	(0.086)	(0.073)	(0.027)	(0.059)	(0.103)	(0.054)	(0.076)
	2-3%	0.8118**	0.8890	1.0909	1.1447**	0.7458**	0.8137	1.0265	1.1114
		(0.041)	(0.098)	(0.099)	(0.034)	(0.054)	(0.129)	(0.062)	(0.087)
	3-4%	0.6975**	0.9155	0.9280	1.1549**	0.6719**	0.9014	0.9967	1.1241
		(0.043)	(0.133)	(0.116)	(0.042)	(0.057)	(0.177)	(0.075)	(0.102)
	>4%	0.6048**	0.9869	0.7676+	1.2910**	0.5993**	0.6690+	1.0670	1.3196**
		(0.042)	(0.153)	(0.109)	(0.048)	(0.053)	(0.144)	(0.084)	(0.117)
Share of non-prime loans:	10-20%	1.1406	0.9490	1.0304	1.1217*	0.9865	1.2043	1.2334*	1.1549
		(0.092)	(0.127)	(0.113)	(0.051)	(0.113)	(0.261)	(0.111)	(0.151)
	>20%	1.1806*	1.0087	0.9740	1.1598**	0.9674	1.1022	1.2840**	1.4460**
		(0.098)	(0.142)	(0.112)	(0.054)	(0.112)	(0.249)	(0.120)	(0.192)

- Borrowers in neighborhoods with higher shares of Hispanic and foreign-born residents are more likely to receive a *lis pendens*, and to resolve the foreclosure via auction

Results: Borrower Demographics

- Black and Hispanic borrowers are more likely to receive loan modifications
 - However, Hispanic (and Asian) borrowers are more likely to resolve foreclosure via auction
 - Individual borrowers are less likely to obtain loan modifications or refinances, and are more likely to resolve default via distressed sale, *lis pendens*, and foreclosure auction
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