

Holdup by Junior Claimholders: Evidence from the Mortgage Market

Internet Appendix

Table IA.1. Variable Definitions

Variable	Description
Holdup Servicer (0/1)	An indicator to whether the 1 st lien servicer is also the servicer and owner of the second lien mortgage.
Delinquency on 1 st lien only (X months)	An indicator to whether the 1 st lien mortgage is delinquent within the first X months.
FICO group X	An indicator to whether the borrower was at FICO score in bucket at the time of delinquency.
1 st lien current LTV group X	An indicator to whether the borrower current (at time of delinquency) loan-to-value is in bucket X. LTV is calculated using the home value as reported by 1 st lien holder.
2 nd lien unpaid balance covered by home equity (min.)	Fraction of the unpaid balance that could be covered by the home equity. Home equity at the time of delinquency is calculated based using the minimum of home values as reported by 1 st and 2 nd lien holders.
1 st lien unpaid balance group X	An indicator to whether the borrower's current dollar unpaid balance on 1 st lien mortgage is in bucket X.
2 nd lien unpaid balance group X	An indicator to whether the borrower's current dollar unpaid balance on 2 nd lien mortgage is in bucket X.
1 st lien term group X	An indicator to whether the term on the 1 st lien mortgage is in bucket X.
2 nd lien term group X	An indicator to whether the term on the 2 nd lien mortgage is in bucket X.
1 st lien is low or no doc	An indicator to whether the 1 st lien mortgage is low or no-documentation mortgage.
2 nd lien is low or no doc	An indicator to whether the 2 nd lien mortgage is low or no-documentation mortgage.
1 st lien is ARM	An indicator to whether the 1 st lien mortgage is an adjustable rate mortgage (ARM).
1 st lien is interest only (IO)	An indicator to whether the 1 st lien mortgage is an interest only mortgage (IO).
2 nd lien is interest only (IO)	An indicator to whether the 2 nd lien mortgage is an interest only mortgage (IO).
2 nd lien is fully drawn	An indicator to whether the 2 nd lien mortgage is fully drawn.
2 nd lien is frozen	An indicator to whether the 2 nd lien mortgage is frozen (no further withdrawal are available).
2nd lien is HELOC and piggyback	An indicator to whether the 2 nd lien mortgage is a home-equity line of credit (HELOC) and whether it is a piggyback mortgage (was issued within two months apart from the 1 st lien).
2nd lien is HELOC	An indicator to whether the 2 nd lien mortgage is a home-equity line of credit (HELOC).
2nd lien is piggyback	An indicator to whether the 2 nd lien mortgage is a piggyback mortgage (was issued within two months apart).

Table IA2. Full Specification of Table 2

The table shows the results of regressions of an indicator of whether the first-lien loan had no action on determinants. All regressions are ordinary least squares regressions. The sample includes first-lien mortgages serviced by holdup servicers and by non-holdup servicers. In Panel A, Columns (1) and (2) measure the dependent variable over the six-month period from the time the loan was identified as distressed. Columns (3) and (4) measure the dependent variable over the 12-month period from the time the loan was identified as distressed. The sample covers loans that became distressed between December 2009 and April 2012. *Holdup Servicer* indicates whether the mortgage is serviced by a holdup servicer. Panel B repeats the regressions in Panel A on a number of different subsamples: (a) a subsample limited to the servicers that do not get acquired during our sample period, which removes ambiguity about which entity exercised control over loss mitigation decisions; (b) a subsample limited to loan-pairs in which the second lien remained performing during the first six months following the delinquency of the first lien; and (c) a subsample that excludes piggyback second-lien loans, which helps to evaluate the possibility that piggyback-issuing holdup servicers have an informational advantage over non-holdup servicers of piggyback loans. Standard errors are clustered at the state level. Controls include the following measures captured at the time of first-lien delinquency: an indicator of whether the second lien has defaulted, indicators for five FICO score buckets, indicators for buckets of the leverage of the first-lien loan, indicators for buckets of the unpaid balance (in dollars) of the first- and second-lien loans, and the fraction of the second-lien loan that could be covered by the current value of the house. They also include indicators for categories of the original terms of the first- and second-lien loans, for whether the first- and second-lien loans had low-documentation, for whether the first-lien loan is an ARM, for whether the first- and second-lien loans are interest-only loans, for whether the second-lien loan is a home equity line of credit, for whether the second-lien loan is fully drawn, for whether the second-lien loan is a credit line and is frozen, and for whether the second-lien loan is a piggyback loan (i.e., originated within two months of the origination of the first-lien loan). The controls also include a set of dummies for the delinquency quarter, the state in which the secured property is located, the identity of the first-lien servicer, and indicators for the origination year of the first-lien loan. All regressions are ordinary least squares regressions. Standard errors are clustered at the state level. *t*-statistics are presented in brackets. *, **, and *** denote two-tailed significance at the 10%, 5%, and 1% levels, respectively.

Table IA2. Full Specification of Table 2 (Cont.)

Panel A: Holdup and No Action on Delinquent Mortgages

Dependent variable: Horizon: Sample:	No action on 1st lien within...			
	6 months		12 months	
	PLS	GSE	PLS	GSE
	(1)	(2)	(3)	(4)
Unconditional mean	49.8	44.1	31.2	26.5
Holdup Servicer (0/1)	4.419*** [5.626]	1.742*** [6.583]	3.082*** [4.622]	0.757** [2.418]
Delinquency on 1st lien only (6 months)	9.074*** [5.527]	16.367*** [15.644]		
Delinquency on 1st lien only (12 months)			11.109*** [6.744]	14.935*** [14.831]
FICO group 1 (<300)	7.868*** [7.182]	14.602*** [15.155]	7.696*** [7.439]	11.077*** [9.781]
FICO group 2 (300-579)	2.353** [2.403]	7.647*** [8.161]	2.231* [1.926]	5.499*** [5.448]
FICO group 3 (580-659)	-1.471 [-1.376]	2.539*** [2.801]	-1.340 [-1.182]	1.508 [1.510]
FICO group 4 (660-719)	-4.202*** [-4.398]	-1.200 [-1.493]	-3.850*** [-3.013]	-0.922 [-1.067]
FICO group 5 (720-779)	-6.952*** [-6.147]	-3.741*** [-4.469]	-6.616*** [-4.854]	-2.553*** [-2.758]
1st lien current LTV group 1 (<80%)	0.803 [0.975]	-0.366 [-0.877]	-0.417 [-0.607]	-0.602 [-1.172]
1st lien current LTV group 2 (80%-99%)	1.122 [1.336]	1.112* [1.768]	-0.043 [-0.072]	0.875 [1.474]
1st lien current LTV group 3 (100%-119%)	0.463 [0.371]	1.006 [1.262]	-1.503* [-1.744]	1.434** [2.015]
1st lien current LTV group 4 (>120%)	0.145 [0.232]	3.344*** [9.009]	-0.291 [-0.595]	2.501*** [5.351]
2nd lien unpaid balance covered by home equity (avg.)	1.088* [1.835]	1.597*** [4.340]	0.884 [1.624]	2.196*** [5.739]
1st lien unpaid balance group 1 (<\$133K)	-3.250*** [-2.686]	0.208 [0.418]	-3.636*** [-3.047]	-1.642*** [-3.082]
1st lien unpaid balance group 2 (\$133-217K)	-3.446*** [-2.842]	0.280 [0.522]	-4.613*** [-3.659]	-2.250*** [-3.046]
1st lien unpaid balance group 3 (\$218-341K)	-1.804* [-1.710]	1.249 [1.586]	-2.882** [-2.589]	-2.224** [-2.319]
1st lien unpaid balance group 4 (>\$341K)	52.553*** [20.882]	46.350*** [15.786]	66.872*** [31.976]	60.600*** [24.351]

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Table IA2. Full Specification of Table 2 (Cont.)

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2nd lien unpaid balance group 1 (<\$28K)	1.622*** [2.812]	0.863*** [2.777]	1.126** [2.161]	0.332 [0.933]
2nd lien unpaid balance group 2 (\$29-49K)	2.166*** [3.871]	1.501*** [4.963]	1.625*** [2.989]	0.777** [2.460]
2nd lien unpaid balance group 3 (\$50-83K)	1.822** [2.634]	1.205 [1.563]	1.822*** [2.898]	0.535 [0.607]
2nd lien unpaid balance group 4 (>\$83K)	-8.421*** [-6.777]	-7.736*** [-11.049]	-9.051*** [-6.860]	-7.667*** [-15.242]
1st lien term group 1 (<= 15 yrs)	0.359 [0.305]	-3.137*** [-8.844]	1.237 [0.983]	-2.640*** [-6.539]
1st lien term group 2 (20-30 yrs)	-1.957 [-1.623]	-1.369 [-0.809]	-0.272 [-0.191]	-0.900 [-1.064]
2nd lien term group 1 (<= 10 yrs)	0.005 [0.011]	-0.417 [-0.939]	0.542 [1.192]	-0.840** [-2.050]
2nd lien term group 2 (10 - 15 yrs)	3.134*** [5.323]	0.765* [1.796]	2.745*** [5.721]	-0.202 [-0.434]
2nd lien term group 3 (15 - 25 yrs)	0.350 [0.709]	1.288*** [2.715]	0.847 [1.475]	0.374 [1.063]
2nd lien term group 4 (> 25 yrs)	4.967*** [12.196]	4.589*** [8.238]	5.230*** [9.212]	3.682*** [8.437]
1st lien is low doc	2.486*** [6.738]	-0.950*** [-3.500]	1.149*** [3.257]	-0.248 [-1.377]
2nd lien is low doc	-1.511*** [-5.268]	-1.834*** [-7.196]	-2.110*** [-5.713]	-2.305*** [-10.540]
1st lien is ARM	-2.264*** [-4.952]	-2.150*** [-8.813]	-1.134** [-2.427]	-1.472*** [-6.569]
1st lien is interest only (IO)	-2.083*** [-3.731]	-0.401 [-0.915]	-2.298*** [-5.106]	-0.106 [-0.299]
2nd lien is interest only (IO)	-1.319 [-1.408]	-0.332 [-0.762]	-0.501 [-0.610]	0.551 [1.338]
2nd lien is fully drawn	-0.813** [-2.308]	-0.709** [-2.440]	-0.667 [-1.671]	-0.461* [-1.962]
2nd lien is frozen	-0.416 [-1.054]	-1.194*** [-3.363]	-1.056*** [-2.852]	-0.499 [-1.427]
2nd lien is HELOC and piggyback	-1.076 [-1.387]	-3.471*** [-4.106]	-1.281* [-1.852]	-2.854*** [-4.146]
2nd lien is HELOC	-1.808** [-2.508]	-3.704*** [-7.172]	-1.665** [-2.581]	-3.698*** [-8.658]
2nd lien is piggyback	-0.082 [-0.145]	-1.567*** [-4.960]	-0.906* [-1.725]	-0.951** [-2.515]
1st lien servicer FE	Yes	Yes	Yes	Yes
Delinquency quarter FE	Yes	Yes	Yes	Yes
Year of origination FE	Yes	Yes	Yes	Yes
State FE	Yes	Yes	Yes	Yes
Observations	86,132	219,912	80,943	205,388
Adj R ²	0.135	0.152	0.120	0.128

Table IA2. Full Specification of Table 2 (Cont.)

Panel B: Holdup and No Action: Robustness Checks

Dependent variable: Sample: Investor type:	No action on 1st lien within 6 months of default					
	Servicers that do not get		2nd lien is current during		No piggyback 2nd liens	
	PLS	GSE	PLS	GSE	PLS	GSE
	(1)	(2)	(3)	(4)	(5)	(6)
Unconditional mean	41.3	43.9	55.1	55.5	51.3	45.4
Holdup Servicer (0/1)	3.428*** [5.516]	1.522*** [6.702]	3.141*** [4.737]	1.702*** [3.987]	4.489*** [5.609]	2.217*** [7.617]
Delinquency on 1st lien only (6 months)	12.029*** [11.942]	15.233*** [15.346]			6.705*** [5.075]	14.852*** [16.726]
FICO group 1 (<300)	10.994*** [7.231]	15.077*** [13.141]	5.230*** [3.340]	10.845*** [6.147]	7.824*** [5.365]	15.035*** [15.244]
FICO group 2 (300-579)	5.367*** [4.063]	8.562*** [7.630]	0.466 [0.287]	5.876*** [3.631]	1.824 [1.266]	7.913*** [7.910]
FICO group 3 (580-659)	0.416 [0.324]	3.476*** [3.204]	-2.326 [-1.462]	3.791** [2.264]	-1.482 [-1.126]	2.174** [2.573]
FICO group 4 (660-719)	-2.449* [-1.897]	-0.233 [-0.238]	-4.211** [-2.562]	0.319 [0.188]	-4.675*** [-3.716]	-1.609* [-1.729]
FICO group 5 (720-779)	-5.687*** [-4.112]	-2.475** [-2.269]	-7.995*** [-3.941]	-1.381 [-0.765]	-7.433*** [-5.422]	-4.104*** [-3.814]
1st lien current LTV group 1 (<80%)	-0.719 [-0.888]	-0.667 [-1.283]	-2.211*** [-2.897]	-2.076*** [-3.955]	0.726 [1.101]	-0.425 [-1.026]
1st lien current LTV group 2 (80%-99%)	-0.909 [-0.897]	1.162 [1.502]	-1.953** [-2.222]	-2.836*** [-3.670]	0.956 [1.173]	1.374** [2.134]
1st lien current LTV group 3 (100%-119%)	-2.154 [-1.553]	1.761 [1.429]	-3.674** [-2.637]	-4.724*** [-3.506]	0.661 [0.595]	1.590** [2.265]
1st lien current LTV group 4 (>120%)	3.357*** [3.229]	4.458*** [6.860]	-2.654*** [-3.258]	0.419 [0.550]	-0.805 [-1.091]	2.750*** [4.899]
2nd lien unpaid balance covered by home equity (avg.)	-0.512 [-0.755]	1.551*** [3.673]	1.269* [1.704]	0.561 [0.932]	1.748** [2.164]	2.565*** [6.089]
1st lien unpaid balance group 1 (<\$133K)	-3.339*** [-3.367]	0.062 [0.131]	-5.299*** [-4.576]	-2.071*** [-3.274]	-2.422* [-1.693]	0.309 [0.530]
1st lien unpaid balance group 2 (\$133-217K)	-4.381*** [-3.630]	0.129 [0.238]	-7.075*** [-5.083]	-3.577*** [-4.635]	-2.781** [-2.311]	0.068 [0.112]
1st lien unpaid balance group 3 (\$218-341K)	-2.450* [-1.988]	1.143 [1.499]	-4.591*** [-3.492]	-3.783*** [-3.449]	-0.741 [-0.627]	1.372 [1.575]
1st lien unpaid balance group 4 (>\$341K)	50.653*** [18.826]	44.840*** [12.150]	45.398*** [22.485]	32.839*** [11.232]	54.795*** [17.231]	46.623*** [12.403]

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Table IA2. Full Specification of Table 2 (Cont.)

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2nd lien unpaid balance group 1 (<\$28K)	0.735 [0.922]	0.684* [1.982]	2.401*** [3.232]	1.857*** [4.624]	1.071 [1.434]	0.563 [1.433]
2nd lien unpaid balance group 2 (\$29-49K)	1.362* [1.920]	1.182*** [4.483]	3.477*** [6.206]	2.920*** [6.761]	1.476** [2.015]	1.162*** [2.933]
2nd lien unpaid balance group 3 (\$50-83K)	1.351** [2.524]	1.046 [1.225]	2.842*** [4.895]	2.930*** [3.017]	1.434** [2.260]	0.795 [1.116]
2nd lien unpaid balance group 4 (>\$83K)	-7.721*** [-6.196]	-6.965*** [-9.466]	-10.492*** [-8.235]	-10.385*** [-11.513]	-5.906*** [-4.051]	-5.939*** [-5.173]
1st lien term group 1 (<= 15 yrs)	1.599 [1.063]	-3.218*** [-8.252]	3.654** [2.451]	-1.906** [-2.453]	0.849 [0.588]	-2.278*** [-4.911]
1st lien term group 2 (20-30 yrs)	-4.091 [-1.561]	-1.098 [-0.619]	1.055 [0.571]	-3.881* [-1.962]	-3.746*** [-2.964]	-6.408*** [-3.245]
2nd lien term group 1 (<= 10 yrs)	-0.211 [-0.322]	-0.230 [-0.568]	1.591 [1.403]	0.486 [0.820]	-0.379 [-0.440]	-0.491 [-0.758]
2nd lien term group 2 (10 - 15 yrs)	2.745** [2.181]	1.690** [2.431]	1.074 [1.001]	-0.619 [-0.854]	1.301 [1.354]	0.909 [1.491]
2nd lien term group 3 (15 - 25 yrs)	2.285*** [2.745]	1.887*** [3.262]	0.284 [0.462]	1.226* [1.839]	0.956 [1.473]	0.650 [1.217]
2nd lien term group 4 (> 25 yrs)	2.893* [1.939]	4.735*** [8.050]	3.831*** [4.773]	2.875*** [4.155]	4.208*** [7.332]	4.349*** [7.973]
1st lien is low doc	1.007* [1.857]	-0.551* [-1.880]	2.747*** [5.851]	-1.107*** [-3.194]	1.637*** [3.532]	-0.925** [-2.637]
2nd lien is low doc	-0.762* [-1.817]	-1.911*** [-5.627]	-2.552*** [-4.008]	-2.062*** [-5.498]	-2.543*** [-3.772]	-2.736*** [-6.901]
1st lien is ARM	-0.334 [-0.518]	-1.854*** [-4.841]	-2.143** [-2.352]	-1.709*** [-4.142]	-1.675*** [-3.142]	-2.509*** [-5.598]
1st lien is interest only (IO)	-0.468 [-0.590]	-0.776* [-1.774]	-3.379*** [-3.019]	-0.349 [-0.594]	-4.069*** [-7.300]	-0.128 [-0.147]
2nd lien is interest only (IO)	-2.074** [-2.617]	-0.769 [-1.463]	1.096 [0.786]	-0.493 [-0.814]	-0.879 [-0.988]	-0.606 [-1.016]
2nd lien is fully drawn	-1.060* [-1.955]	-0.854*** [-3.151]	-0.778 [-1.407]	-1.071** [-2.070]	-1.211*** [-2.984]	-0.517 [-1.505]
2nd lien is frozen	-0.511 [-0.718]	-2.221*** [-5.533]	-0.450 [-0.579]	-1.396*** [-3.228]	-1.243** [-2.509]	-1.982*** [-4.615]
2nd lien is HELOC and piggyback	1.044 [0.940]	-1.132 [-1.490]	-0.048 [-0.042]	-1.330 [-1.525]		
2nd lien is HELOC	-0.191 [-0.197]	-1.510** [-2.525]	-2.967** [-2.393]	-3.237*** [-5.164]	-1.394 [-1.606]	-2.282*** [-3.535]
2nd lien is piggyback	1.972** [2.060]	-1.367*** [-3.366]	2.918*** [2.946]	2.118*** [3.516]		
1st lien servicer FE	Yes	Yes	Yes	Yes	Yes	Yes
Delinquency quarter FE	Yes	Yes	Yes	Yes	Yes	Yes
Year of origination FE	Yes	Yes	Yes	Yes	Yes	Yes
State FE	Yes	Yes	Yes	Yes	Yes	Yes
Observations	41,997	152,789	30,354	80,240	46,580	122,144
Adj R ²	0.122	0.159	0.105	0.095	0.131	0.135

Table IA3. Full Specification of Table 3

The table shows the results of regressions of an indicator of whether the first-lien loan had a liquidation or foreclosure in process conditional on being acted upon within 6 or 12 months of delinquency (Panels A and B, respectively) on a set of controls and the holdup servicer indicator. The sample contains the groups of first-lien mortgages that are serviced by holdup and by non-holdup servicers. The sample covers loans that became distressed between December 2009 and April 2012. *Holdup Servicer* indicates whether the mortgage is serviced by a holdup servicer. Columns (1) and (2) present the baseline case for all delinquent first-lien loans that received some loss mitigation action. Columns (3) and (4) restrict the sample to loan-pairs in which the second lien remained performing during the relevant action horizon. Columns (5) and (6) show the regressions of an indicator for voluntary liquidation outcomes (short sales or deeds-in-lieu) conditional on the first-lien loan being liquidated. All regressions are ordinary least squares regressions. All regressions include the same set of controls as in Table 2. Standard errors are clustered at the state level. *t*-statistics are presented in brackets. *, **, and *** denote two-tailed significance at the 10%, 5%, and 1% levels, respectively.

Panel A: Probability of Liquidation and Foreclosure Process, Six-Month Horizon

Dependent variable: Horizon: Sample restriction: Sample:	Liquidation + Foreclosure process				Voluntary liquidation	
	6 months		6 months		6 months	
	Any action taken		Any action on 1st lien; 2nd		Liquidated	
	PLS	GSE	PLS	GSE	PLS	GSE
	(1)	(2)	(3)	(4)	(5)	(6)
Unconditional mean	73.4	74.4	54.7	50.8	8.9	6.5
Holdup Servicer (0/1)	-2.264*** [-4.295]	-3.988*** [-15.391]	-4.325*** [-4.102]	-5.691*** [-7.268]	1.851*** [4.444]	1.172*** [6.595]
Delinquency on 1st lien only (6 months)	-26.283*** [-23.595]	-29.414*** [-28.228]			0.290 [1.119]	0.337 [1.154]
FICO group 1 (<300)	-9.891*** [-5.075]	-1.971 [-1.294]	-4.201* [-1.736]	3.417 [1.475]	-6.699*** [-7.471]	-3.228*** [-7.426]
FICO group 2 (300-579)	-7.158*** [-4.041]	-2.254 [-1.573]	-5.166** [-2.351]	-1.276 [-0.583]	-4.367*** [-5.332]	-1.724*** [-4.312]
FICO group 3 (580-659)	-2.856 [-1.408]	2.056 [1.513]	-2.482 [-1.093]	0.925 [0.437]	-1.227 [-1.390]	0.604 [1.668]
FICO group 4 (660-719)	-0.596 [-0.332]	3.357** [2.478]	-2.196 [-1.135]	2.148 [1.054]	1.747* [1.844]	4.629*** [9.406]
FICO group 5 (720-779)	-1.054 [-0.598]	3.861*** [2.980]	-3.942 [-1.596]	0.688 [0.373]	6.021*** [5.989]	8.083*** [10.667]
1st lien current LTV group 1 (<80%)	-0.043 [-0.042]	0.634 [1.090]	-1.957 [-1.585]	-0.704 [-0.746]	-0.663 [-1.072]	0.442 [1.292]
1st lien current LTV group 2 (80%-99%)	-0.783 [-1.040]	0.433 [0.735]	-4.012*** [-3.674]	-1.173 [-0.631]	1.741 [1.104]	1.448** [2.544]
1st lien current LTV group 3 (100%-119%)	-2.313** [-2.276]	0.166 [0.217]	-3.611** [-2.650]	-1.302 [-0.620]	3.917** [2.029]	3.167*** [4.006]
1st lien current LTV group 4 (>120%)	3.734*** [5.792]	4.159*** [7.286]	2.862** [2.507]	5.160*** [4.411]	2.958*** [4.242]	3.554*** [6.016]
2nd lien unpaid balance covered by home equity (avg.)	-2.053*** [-2.726]	-1.572*** [-3.065]	-1.865* [-1.705]	-1.152 [-0.886]	-2.294** [-2.216]	-1.924*** [-5.579]
1st lien unpaid balance group 1 (<\$133K)	-0.722 [-0.884]	-2.682*** [-5.242]	-0.057 [-0.031]	-4.451*** [-4.917]	-0.034 [-0.069]	1.320*** [6.358]
1st lien unpaid balance group 2 (\$133-217K)	-1.864** [-2.494]	-4.439*** [-6.802]	0.382 [0.215]	-6.818*** [-6.859]	1.165** [2.171]	2.811*** [6.892]
1st lien unpaid balance group 3 (\$218-341K)	-0.957 [-0.771]	-5.784*** [-4.793]	3.900** [2.078]	-8.903*** [-6.630]	1.591** [2.511]	2.746*** [5.010]
1st lien unpaid balance group 4 (>\$341K)	14.125** [2.120]	-7.917 [-1.661]	28.802*** [2.993]	-6.288 [-0.748]	62.666*** [7.691]	55.851*** [9.374]

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Table IA3. Full Specification of Table 3 (Cont.)

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2nd lien unpaid balance group 1 (<\$28K)	-1.228*** [-2.791]	-1.002** [-2.611]	-3.318*** [-3.225]	-2.132*** [-3.052]	0.437 [0.652]	0.046 [0.216]
2nd lien unpaid balance group 2 (\$29-49K)	-2.815*** [-6.566]	-1.381*** [-3.118]	-5.647*** [-6.038]	-2.932*** [-3.742]	0.700 [1.077]	0.525** [2.151]
2nd lien unpaid balance group 3 (\$50-83K)	-2.356** [-2.667]	-2.005*** [-3.898]	-6.147*** [-5.319]	-2.597*** [-3.011]	-0.926 [-1.446]	-0.657*** [-2.710]
2nd lien unpaid balance group 4 (>\$83K)	12.056*** [8.488]	11.753*** [11.124]	10.768*** [7.459]	10.959*** [7.420]	10.282*** [9.637]	6.446*** [7.132]
1st lien term group 1 (<= 15 yrs)	8.682*** [3.718]	6.018*** [11.922]	10.607*** [4.427]	7.396*** [7.999]	0.317 [0.514]	-0.227 [-0.797]
1st lien term group 2 (20-30 yrs)	2.465 [1.090]	-4.431*** [-3.585]	1.968 [0.630]	-2.387 [-1.128]	-0.382 [-0.364]	-1.676** [-2.203]
2nd lien term group 1 (<= 10 yrs)	-5.666*** [-6.318]	-3.834*** [-6.531]	-11.276*** [-6.795]	-6.142*** [-5.856]	-1.524*** [-2.873]	-0.483 [-1.577]
2nd lien term group 2 (10 - 15 yrs)	-3.143*** [-2.883]	-5.135*** [-10.303]	-6.590** [-2.586]	-7.882*** [-6.717]	-0.163 [-0.348]	-0.150 [-0.435]
2nd lien term group 3 (15 - 25 yrs)	-2.795*** [-4.454]	-5.049*** [-13.793]	-8.151*** [-6.355]	-9.087*** [-14.612]	0.140 [0.529]	-0.480 [-1.425]
2nd lien term group 4 (> 25 yrs)	1.312 [0.970]	1.768* [1.873]	0.433 [0.255]	-0.470 [-0.337]	-0.865*** [-2.757]	-1.333*** [-4.872]
1st lien is low doc	3.198*** [4.219]	-0.128 [-0.400]	5.550*** [8.498]	0.256 [0.336]	-1.856*** [-4.698]	-1.027*** [-5.370]
2nd lien is low doc	-0.144 [-0.251]	0.847*** [3.280]	2.415*** [2.760]	1.863*** [3.712]	-0.217 [-0.661]	-0.633** [-2.438]
1st lien is ARM	0.106 [0.245]	3.918*** [10.976]	-0.149 [-0.158]	6.170*** [6.876]	0.977*** [3.035]	0.741** [2.519]
1st lien is interest only (IO)	3.817*** [9.433]	2.025*** [6.939]	6.033*** [7.879]	2.425*** [2.845]	1.055** [2.514]	0.141 [0.503]
2nd lien is interest only (IO)	-1.105 [-1.373]	0.026 [0.059]	-3.945** [-2.146]	-1.495* [-1.994]	-0.165 [-0.373]	-0.221 [-0.778]
2nd lien is fully drawn	6.713*** [5.337]	2.088*** [2.869]	11.606*** [6.603]	5.525*** [5.189]	-3.559*** [-3.230]	-1.874*** [-6.291]
2nd lien is frozen	-1.023* [-1.952]	0.515 [1.340]	-1.428* [-1.847]	1.256* [1.802]	-0.636 [-1.381]	-0.558* [-1.701]
2nd lien is HELOC and piggyback	1.555*** [3.461]	1.893*** [5.385]	5.113*** [9.063]	6.266*** [9.757]	3.094*** [5.490]	1.886*** [6.328]
2nd lien is HELOC	1.754*** [4.261]	2.357*** [5.765]	-0.820 [-1.006]	2.618*** [4.078]	1.403*** [5.380]	0.691** [2.459]
2nd lien is piggyback	3.241*** [4.045]	3.979*** [10.063]	-2.681* [-1.906]	0.858 [0.909]	1.796** [2.468]	1.555*** [4.243]
1st lien servicer FE	Yes	Yes	Yes	Yes	Yes	Yes
Delinquency quarter FE	Yes	Yes	Yes	Yes	Yes	Yes
Year of origination FE	Yes	Yes	Yes	Yes	Yes	Yes
State FE	Yes	Yes	Yes	Yes	Yes	Yes
Observations	43,220	122,870	13,619	35,722	31,712	91,357
Adj R ²	0.166	0.229	0.162	0.202	0.132	0.083

Table IA3. Full Specification of Table 3 (Cont.)

Panel B: Probability of Liquidation and Foreclosure Process, 12-Month Horizon

Dependent variable: Horizon: Sample restriction: Sample:	Liquidation + Foreclosure process				Voluntary liquidation	
	12 months		12 months		12 months	
	Action taken		Action on 1st lien; 2nd lien		Liquidated	
	PLS	GSE	PLS	GSE	PLS	GSE
	(1)	(2)	(3)	(4)	(5)	(6)
Unconditional mean	69.2	66.5	45.3	38.1	17.2	11.8
Holdup Servicer (0/1)	-1.316*** [-3.014]	-3.992*** [-12.429]	-3.875*** [-3.456]	-4.508*** [-8.295]	2.695*** [6.311]	2.081*** [9.732]
Delinquency on 1st lien only (6 months)	-28.780*** [-22.141]	-33.375*** [-36.867]			0.391 [0.643]	0.924* [1.867]
FICO group 1 (<300)	-10.541*** [-5.998]	-7.912*** [-5.536]	-6.337*** [-3.617]	0.642 [0.261]	-9.431*** [-4.309]	-6.855*** [-9.235]
FICO group 2 (300-579)	-7.391*** [-4.620]	-6.993*** [-5.731]	-5.973*** [-3.360]	-3.754* [-1.709]	-5.219*** [-2.771]	-3.724*** [-5.485]
FICO group 3 (580-659)	-3.177 [-1.440]	-2.419* [-1.884]	-4.427** [-2.202]	-1.555 [-0.711]	-0.317 [-0.174]	-0.396 [-0.621]
FICO group 4 (660-719)	0.200 [0.125]	-0.456 [-0.378]	-2.861* [-1.806]	-1.320 [-0.642]	5.284*** [3.351]	5.657*** [7.106]
FICO group 5 (720-779)	0.402 [0.272]	0.655 [0.690]	-4.832** [-2.148]	-2.605 [-1.309]	10.973*** [6.303]	11.554*** [9.620]
1st lien current LTV group 1 (<80%)	-0.056 [-0.063]	0.596 [1.343]	-1.355 [-1.394]	0.002 [0.003]	0.493 [0.555]	1.243** [2.488]
1st lien current LTV group 2 (80%-99%)	-0.790 [-1.287]	0.480 [0.672]	-3.944** [-2.302]	-1.676 [-1.147]	2.381 [1.249]	2.439*** [2.902]
1st lien current LTV group 3 (100%-119%)	-1.556* [-1.694]	1.849** [2.325]	-2.443 [-0.773]	1.204 [0.548]	4.617** [2.266]	4.774*** [5.106]
1st lien current LTV group 4 (>120%)	4.269*** [4.574]	3.100*** [4.707]	5.653*** [4.203]	5.052*** [4.449]	1.746*** [2.780]	3.766*** [6.357]
2nd lien unpaid balance covered by home equity (avg.)	-2.265*** [-4.022]	-1.423*** [-3.511]	-3.575** [-2.574]	-1.922 [-1.618]	-1.723 [-1.379]	-1.946*** [-4.580]
1st lien unpaid balance group 1 (<\$133K)	-0.926 [-1.033]	-4.061*** [-7.653]	-0.678 [-0.308]	-5.206*** [-6.353]	2.244*** [2.982]	2.353*** [8.585]
1st lien unpaid balance group 2 (\$133-217K)	-2.216*** [-3.742]	-6.564*** [-8.592]	-0.599 [-0.270]	-7.609*** [-8.162]	4.878*** [7.069]	5.355*** [9.392]
1st lien unpaid balance group 3 (\$218-341K)	-2.724* [-1.820]	-8.459*** [-6.632]	0.502 [0.218]	-9.800*** [-10.158]	7.208*** [7.076]	6.033*** [8.509]
1st lien unpaid balance group 4 (>\$341K)	21.928*** [4.855]	-3.287 [-0.656]	33.699*** [4.857]	0.897 [0.113]	54.734*** [5.819]	58.763*** [10.258]

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Table IA3. Full Specification of Table 3 (Cont.)

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2nd lien unpaid balance group 1 (<\$28K)	-1.596***	-1.062***	-3.270**	-1.938***	-0.122	0.738**
	[-3.677]	[-3.860]	[-2.446]	[-3.098]	[-0.149]	[2.059]
2nd lien unpaid balance group 2 (\$29-49K)	-3.475***	-2.161***	-6.051***	-3.656***	0.285	0.858
	[-6.506]	[-5.987]	[-4.927]	[-4.216]	[0.385]	[1.549]
2nd lien unpaid balance group 3 (\$50-83K)	-3.689***	-3.146***	-5.987***	-1.571*	-1.833**	-1.101**
	[-6.392]	[-5.874]	[-6.641]	[-1.704]	[-2.146]	[-2.456]
2nd lien unpaid balance group 4 (>\$83K)	15.353***	14.971***	14.941***	16.455***	9.767***	6.496***
	[20.132]	[9.502]	[15.780]	[9.242]	[7.419]	[6.556]
1st lien term group 1 (<= 15 yrs)	10.767***	6.317***	13.674***	7.938***	-0.819	0.316
	[6.171]	[10.377]	[5.302]	[8.176]	[-1.021]	[1.156]
1st lien term group 2 (20-30 yrs)	6.874***	-3.711***	8.419**	-0.333	-1.117	-0.423
	[3.693]	[-3.261]	[2.200]	[-0.146]	[-0.645]	[-0.359]
2nd lien term group 1 (<= 10 yrs)	-5.212***	-4.260***	-10.578***	-6.491***	-3.504***	-0.684*
	[-5.205]	[-6.096]	[-5.629]	[-5.973]	[-4.045]	[-1.763]
2nd lien term group 2 (10 - 15 yrs)	-3.513***	-4.779***	-8.674***	-7.666***	-2.516***	-0.634
	[-3.007]	[-9.250]	[-4.111]	[-5.626]	[-3.253]	[-1.102]
2nd lien term group 3 (15 - 25 yrs)	-3.295***	-5.216***	-7.524***	-8.645***	-1.948***	-1.185*
	[-4.966]	[-14.109]	[-5.942]	[-11.126]	[-3.753]	[-1.973]
2nd lien term group 4 (> 25 yrs)	0.792	-0.170	2.378	-0.508	-3.335***	-2.022***
	[0.750]	[-0.234]	[1.357]	[-0.410]	[-4.372]	[-3.736]
1st lien is low doc	2.820***	0.205	3.934***	0.098	-2.196***	-1.098***
	[4.066]	[0.806]	[2.756]	[0.180]	[-9.184]	[-5.041]
2nd lien is low doc	-1.547***	0.406	1.468	2.939***	-1.264	-1.081***
	[-3.770]	[1.065]	[1.489]	[5.499]	[-1.661]	[-3.787]
1st lien is ARM	1.360***	4.875***	1.456*	5.827***	1.461**	1.097***
	[3.012]	[11.746]	[1.903]	[8.468]	[2.627]	[4.266]
1st lien is interest only (IO)	3.425***	2.403***	3.635**	2.296**	2.371***	0.721**
	[6.672]	[6.892]	[2.674]	[2.060]	[5.618]	[2.557]
2nd lien is interest only (IO)	-1.641*	0.393	-5.813**	-0.658	-1.598***	-0.133
	[-1.775]	[0.695]	[-2.502]	[-0.761]	[-4.370]	[-0.447]
2nd lien is fully drawn	5.880***	2.046**	10.750***	3.807***	-3.646**	-3.266***
	[3.572]	[2.516]	[4.992]	[3.663]	[-2.551]	[-6.451]
2nd lien is frozen	-0.733**	-0.123	-0.941	-0.521	-0.801*	-0.201
	[-2.130]	[-0.334]	[-0.767]	[-1.129]	[-1.702]	[-0.456]
2nd lien is HELOC and piggyback	2.419***	2.845***	6.075***	6.720***	4.202***	3.086***
	[3.911]	[8.277]	[6.886]	[10.947]	[4.964]	[7.982]
2nd lien is HELOC	2.365***	2.409***	-1.196	1.049	1.556***	0.810
	[6.615]	[5.013]	[-1.308]	[1.541]	[2.813]	[1.491]
2nd lien is piggyback	4.131***	4.463***	-2.381*	0.208	2.814***	2.123***
	[4.407]	[11.816]	[-1.964]	[0.194]	[4.389]	[4.906]
1st lien servicer FE	Yes	Yes	Yes	Yes	Yes	Yes
Delinquency quarter FE	Yes	Yes	Yes	Yes	Yes	Yes
Year of origination FE	Yes	Yes	Yes	Yes	Yes	Yes
State FE	Yes	Yes	Yes	Yes	Yes	Yes
Observations	43,220	122,870	13,619	35,722	31,712	91,357
Adj R ²	0.166	0.229	0.162	0.202	0.132	0.083

Table IA4. Full Specification of Table 4

The table explores holdup servicers' propensity to modify the first and second liens relative to non-holdup servicers. Panel A shows the results of regressions of an indicator for whether the first-lien loan was modified (Columns (1) and (2)) or the second-lien loan was modified (Columns (3) and (4)) within six months of delinquency. Panel B shows similar results for a horizon of 12 months. In Columns (3) and (4), the sample is limited to loan-pairs in which the first lien was modified during the first 6 or 12 months following delinquency. All regressions are ordinary least squares regressions and include the same set of controls as in Table 2. The sample encompasses the holdup and non-holdup groups. The sample covers loans that became distressed between December 2009 and April 2012. *Holdup Servicer* indicates whether the observation belongs to the holdup group. Standard errors are clustered at the zip code level. *t*-statistics are presented in brackets. *, **, and *** denote two-tailed significance at the 10%, 5%, and 1% levels, respectively.

Panel A: Modification of Delinquent First- and Second-Lien Mortgages within Six Months

	Dependent variable: Modification of 1st lien within 6 months		Modification of 2nd lien within 6 months	
	Sample restriction: Action taken		1st lien modified	
	Sample: PLS GSE		PLS GSE	
	(1)	(2)	(3)	(4)
Unconditional mean	14.5	11.2	14.1	15.4
Holdup Servicer (0/1)	-0.517 [-1.036]	2.167*** [7.290]	4.142*** [3.998]	3.130*** [5.612]
Delinquency on 1st lien only (6 months)	16.732*** [19.163]	18.160*** [23.991]	-7.473*** [-6.253]	-8.964*** [-14.724]
FICO group 1 (<300)	11.952*** [11.026]	6.268*** [7.859]	-4.271 [-1.638]	-6.458** [-2.332]
FICO group 2 (300-579)	10.025*** [10.799]	7.457*** [7.349]	-3.039 [-1.030]	-5.324* [-1.854]
FICO group 3 (580-659)	7.698*** [6.894]	4.853*** [5.532]	-2.677 [-1.114]	-4.471 [-1.624]
FICO group 4 (660-719)	5.504*** [6.804]	4.362*** [4.848]	-3.424 [-1.185]	-5.009* [-1.725]
FICO group 5 (720-779)	5.739*** [4.987]	4.572*** [5.386]	-3.358 [-1.430]	-6.541** [-2.208]
1st lien current LTV group 1 (<80%)	2.635*** [5.682]	0.950** [2.368]	-3.405** [-2.137]	-1.714* [-1.730]
1st lien current LTV group 2 (80%-99%)			-6.274*** [-3.060]	-4.129*** [-2.762]
1st lien current LTV group 3 (100%-119%)	3.780*** [6.637]	1.461** [2.485]	-7.483*** [-3.093]	-6.520*** [-3.646]
1st lien current LTV group 4 (>120%)	4.176*** [3.962]	1.653** [2.156]	2.144 [1.546]	-1.883 [-1.639]
2nd lien unpaid balance covered by home equity (avg.)	1.276 [1.347]	0.347 [0.433]	-5.908*** [-3.395]	-2.716*** [-2.945]
1st lien unpaid balance group 1 (<\$133K)	-0.577 [-1.473]	-0.999** [-2.512]	-4.247* [-1.775]	-0.287 [-0.260]
1st lien unpaid balance group 2 (\$133-217K)	0.070 [0.108]	1.955*** [5.170]	-5.351** [-2.581]	0.959 [0.709]
1st lien unpaid balance group 3 (\$218-341K)	0.593 [0.913]	3.962*** [6.350]	-7.191*** [-3.231]	0.112 [0.076]
1st lien unpaid balance group 4 (>\$341K)	-1.420 [-1.313]	4.975*** [4.971]	-16.537*** [-6.122]	-2.142 [-0.735]

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Table IA4. Full Specification of Table 4 (Cont.)

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2nd lien unpaid balance group 1 (<\$28K)	-14.852*** [-3.871]	-6.290** [-2.140]	4.700*** [3.980]	5.100*** [6.142]
2nd lien unpaid balance group 2 (\$29-49K)	0.890*** [2.969]	0.213 [0.735]	9.257*** [11.043]	7.901*** [9.449]
2nd lien unpaid balance group 3 (\$50-83K)	2.069*** [5.345]	0.789*** [3.661]	11.733*** [9.136]	12.667*** [14.187]
2nd lien unpaid balance group 4 (>\$83K)	1.973*** [3.416]	0.406 [1.143]	2.669 [1.638]	-2.693*** [-2.953]
1st lien term group 1 (<= 15 yrs)	-8.379*** [-15.195]	-6.775*** [-9.721]	-3.234 [-0.839]	-0.208 [-0.150]
1st lien term group 2 (20-30 yrs)	2.666* [1.923]	-1.239*** [-3.287]	-4.866 [-1.146]	4.251* [1.980]
2nd lien term group 1 (<= 10 yrs)	9.764*** [6.740]	4.524*** [2.880]	-8.136*** [-3.162]	-5.701*** [-6.856]
2nd lien term group 2 (10 - 15 yrs)	2.567*** [4.164]	1.686*** [4.709]	-7.293*** [-3.395]	-9.227*** [-5.047]
2nd lien term group 3 (15 - 25 yrs)	0.396 [0.641]	2.348*** [7.654]	-9.466*** [-6.771]	-9.612*** [-7.872]
2nd lien term group 4 (> 25 yrs)	2.136*** [5.655]	2.600*** [7.858]	-10.660*** [-7.500]	-10.967*** [-6.833]
1st lien is low doc	-0.018 [-0.020]	0.202 [0.346]	2.439** [2.572]	-1.605*** [-2.781]
2nd lien is low doc	-2.150*** [-2.827]	-1.009*** [-4.968]	0.893 [0.816]	0.438 [0.507]
1st lien is ARM	-0.299 [-0.387]	-0.618** [-2.461]	-5.394*** [-5.757]	-1.793 [-1.356]
1st lien is interest only (IO)	1.950*** [3.559]	-1.943*** [-5.878]	-0.443 [-0.381]	2.239** [2.548]
2nd lien is interest only (IO)	-2.907*** [-5.385]	-1.757*** [-5.980]	0.086 [0.055]	-5.300*** [-3.339]
2nd lien is fully drawn	1.215** [2.395]	1.038** [2.631]	-11.887*** [-6.076]	-12.476*** [-9.105]
2nd lien is frozen	-6.887*** [-7.623]	-3.424*** [-6.578]	-0.141 [-0.207]	3.188*** [3.882]
2nd lien is HELOC and piggyback	0.455 [1.385]	-0.924*** [-3.660]	6.705*** [5.703]	7.209*** [8.524]
2nd lien is HELOC	-0.304 [-0.743]	-0.841*** [-3.275]	-0.378 [-0.536]	0.104 [0.192]
2nd lien is piggyback	-1.611*** [-6.248]	-0.523 [-1.333]	4.183*** [2.921]	-1.213 [-0.937]
1st lien servicer FE	Yes	Yes	Yes	Yes
Delinquency quarter FE	Yes	Yes	Yes	Yes
Year of origination FE	Yes	Yes	Yes	Yes
State FE	Yes	Yes	Yes	Yes
Observations	43,220	122,870	6,194	13,580
Adj R ²	0.182	0.147	0.116	0.102

Table IA4. Full Specification of Table 4 (Cont.)

Panel B: Modification of Delinquent First- and Second-Lien Mortgages within 12 Months

Dependent variable: Sample restriction: Sample:	Modification of 1st lien within 6 months		Modification of 2nd lien within 6 months	
	Action taken		1st lien modified	
	PLS	GSE	PLS	GSE
	(1)	(2)	(3)	(4)
Unconditional mean	18.8	19.1	17.8	21.4
Holdup Servicer (0/1)	-0.918** [-2.603]	2.896*** [8.539]	2.673** [2.428]	3.378*** [3.606]
Delinquency on 1st lien only (6 months)	20.144*** [23.814]	23.496*** [42.142]	-1.743** [-2.414]	-2.637*** [-4.738]
FICO group 1 (<300)	11.425*** [11.026]	10.836*** [10.932]	-5.746*** [-2.719]	-0.910 [-0.580]
FICO group 2 (300-579)	9.218*** [11.145]	10.611*** [9.697]	-4.728* [-1.871]	2.594 [1.458]
FICO group 3 (580-659)	6.781*** [5.290]	7.450*** [7.195]	-4.209** [-2.202]	2.153 [1.160]
FICO group 4 (660-719)	3.739*** [4.923]	5.920*** [5.692]	-3.204 [-1.603]	4.303** [2.382]
FICO group 5 (720-779)	2.722*** [2.709]	5.732*** [5.610]	-4.073** [-2.333]	2.675 [1.326]
1st lien current LTV group 1 (<80%)	3.272*** [6.790]	1.397*** [3.209]	-2.771* [-1.976]	-1.270 [-1.559]
1st lien current LTV group 2 (80%-99%)			-6.128*** [-3.433]	-3.453*** [-3.214]
1st lien current LTV group 3 (100%-119%)	4.386*** [5.488]	1.932*** [2.810]	-6.323*** [-3.067]	-5.695*** [-4.817]
1st lien current LTV group 4 (>120%)	3.825*** [2.960]	0.184 [0.237]	0.144 [0.116]	-0.889 [-0.998]
2nd lien unpaid balance covered by home equity (avg)	1.505 [1.469]	1.829*** [2.693]	-5.224*** [-3.277]	-2.834*** [-3.408]
1st lien unpaid balance group 1 (<\$133K)	-0.675 [-1.152]	-1.716*** [-4.072]	-3.267* [-1.679]	-0.632 [-0.761]
1st lien unpaid balance group 2 (\$133-217K)	0.647 [0.961]	3.706*** [6.942]	-3.082** [-2.542]	0.037 [0.038]
1st lien unpaid balance group 3 (\$218-341K)	1.186* [1.814]	6.494*** [7.161]	-5.854*** [-3.988]	-0.412 [-0.309]
1st lien unpaid balance group 4 (>\$341K)	0.114 [0.076]	8.040*** [5.886]	-19.062*** [-7.297]	14.138 [0.759]

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Table IA4. Full Specification of Table 4 (Cont.)

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2nd lien unpaid balance group 1 (<\$28K)	-13.756*** [-5.158]	-11.434*** [-2.985]	5.621*** [3.887]	7.487*** [8.462]
2nd lien unpaid balance group 2 (\$29-49K)	1.280*** [2.839]	0.780*** [2.789]	11.678*** [13.834]	11.607*** [15.434]
2nd lien unpaid balance group 3 (\$50-83K)	2.714*** [5.483]	1.691*** [5.675]	14.631*** [12.919]	14.725*** [16.769]
2nd lien unpaid balance group 4 (>\$83K)	2.615*** [6.472]	0.999** [2.567]	0.001 [0.001]	-8.661*** [-9.716]
1st lien term group 1 (<= 15 yrs)	-12.213*** [-22.537]	-10.785*** [-9.428]	0.404 [0.093]	-3.020*** [-2.996]
1st lien term group 2 (20-30 yrs)	2.194* [1.917]	-0.616 [-1.364]	-1.012 [-0.234]	-3.974* [-1.761]
2nd lien term group 1 (<= 10 yrs)	7.010*** [5.074]	6.399*** [6.620]	-11.681*** [-4.359]	-5.917*** [-5.157]
2nd lien term group 2 (10 - 15 yrs)	2.737*** [4.666]	2.153*** [4.539]	-14.738*** [-7.290]	-13.791*** [-7.381]
2nd lien term group 3 (15 - 25 yrs)	1.743*** [3.144]	2.659*** [7.711]	-13.031*** [-8.735]	-11.362*** [-8.333]
2nd lien term group 4 (> 25 yrs)	2.810*** [6.418]	3.355*** [10.290]	-15.864*** [-9.768]	-14.216*** [-7.269]
1st lien is low doc	0.538 [0.685]	1.178** [2.010]	0.924 [1.116]	-0.788 [-0.813]
2nd lien is low doc	-1.641** [-2.592]	-1.173*** [-5.571]	1.941** [2.576]	1.005 [1.332]
1st lien is ARM	0.795 [1.624]	-0.389 [-0.984]	-5.212*** [-9.442]	-1.591*** [-2.832]
1st lien is interest only (IO)	0.248 [0.308]	-3.047*** [-7.523]	0.368 [0.495]	2.192*** [3.031]
2nd lien is interest only (IO)	-2.488*** [-3.185]	-2.472*** [-11.209]	0.514 [0.514]	-1.346 [-1.059]
2nd lien is fully drawn	1.856*** [2.793]	0.869 [1.630]	-16.973*** [-5.802]	-16.520*** [-16.612]
2nd lien is frozen	-6.716*** [-4.964]	-4.065*** [-5.382]	-0.702 [-1.113]	2.698*** [4.237]
2nd lien is HELOC and piggyback	0.190 [0.656]	-0.393 [-1.288]	7.570*** [11.575]	8.450*** [12.601]
2nd lien is HELOC	-0.966*** [-2.710]	-1.681*** [-5.600]	-0.938 [-0.678]	0.318 [0.346]
2nd lien is piggyback	-1.910*** [-7.258]	-0.843* [-1.940]	1.416 [0.841]	-0.788 [-0.817]
1st lien servicer FE	Yes	Yes	Yes	Yes
Delinquency quarter FE	Yes	Yes	Yes	Yes
Year of origination FE	Yes	Yes	Yes	Yes
State FE	Yes	Yes	Yes	Yes
Observations	55,681	150,858	9,537	26,448
Adj R ²	0.153	0.143	0.110	0.087

Table IA5. Full Specification of Table 6

The table shows the results of regressions of an indicator of whether the first-lien loan performs after 12 months on determinants. The evaluation period covers months 7 through 12 following delinquency. In cases where no action was taken on the delinquent first-lien mortgage (Columns (1) and (2)), an indicator value of 1 corresponds to loans self-curing by the end of the 12-month period. In cases in which the delinquent first loan was modified (Columns (3) and (4)), the value of 1 corresponds to the modified loan continuing to perform by the end of the 12-month period following the original delinquency. All regressions are ordinary least squares regressions. The sample contains the groups of second-lien mortgages that are serviced by holdup servicers and by non-holdup creditors. The sample covers loans that became distressed between December 2009 and April 2012. *Holdup Servicer* indicates whether the mortgage is serviced by a holdup servicer. All regressions are ordinary least squares regressions. Standard errors are clustered at the zipcode level. *t*-statistics are presented in brackets. *, **, and *** denote two-tailed significance at the 10%, 5%, and 1% levels, respectively.

Dependent variable: Horizon: Sample restriction: Sample:	First-lien loan performs after...			
	12 months		12 months	
	No action taken at month = 6		Modified loans at month = 6	
	PLS	GSE	PLS	GSE
	(1)	(2)	(3)	(4)
Unconditional mean	14.5	11.2	18.8	19.1
Holdup Servicer (0/1)	1.466** [2.074]	0.876*** [3.080]	4.473** [2.277]	2.401*** [3.056]
Delinquency on 1st lien only (6 months)	13.230*** [10.785]	13.398*** [17.563]	16.232*** [10.323]	9.249*** [7.193]
FICO group 1 (<300)	-1.362 [-0.798]	-0.978 [-0.697]	-6.445* [-1.881]	-1.576 [-0.353]
FICO group 2 (300-579)	-1.875 [-1.156]	-0.001 [-0.001]	-2.358 [-0.700]	-1.285 [-0.307]
FICO group 3 (580-659)	-1.481 [-0.898]	0.450 [0.319]	-1.127 [-0.363]	0.294 [0.068]
FICO group 4 (660-719)	-1.782 [-1.109]	1.197 [0.844]	4.069 [1.233]	2.636 [0.627]
FICO group 5 (720-779)	-0.829 [-0.468]	3.138 [1.665]	10.864*** [3.555]	2.400 [0.498]
1st lien current LTV group 1 (<80%)	-1.401*** [-2.746]	-1.125*** [-2.746]	-0.711 [-0.289]	0.156 [0.141]
1st lien current LTV group 2 (80%-99%)	-1.878*** [-3.055]	-1.202* [-1.720]	-0.940 [-0.320]	2.285* [1.729]
1st lien current LTV group 3 (100%-119%)	-1.693** [-2.196]	-0.291 [-0.413]	-3.482 [-0.956]	3.219* [1.807]
1st lien current LTV group 4 (>120%)	-2.366 [-1.374]	-1.038 [-1.191]	-1.276 [-0.517]	-4.101* [-1.874]
2nd lien unpaid balance covered by home equity (avg.)	2.617*** [3.148]	3.190*** [5.228]	0.725 [0.314]	3.233*** [2.728]
1st lien unpaid balance group 1 (<\$133K)	-5.784*** [-5.242]	-4.327*** [-9.929]	1.075 [0.441]	4.803*** [3.571]
1st lien unpaid balance group 2 (\$133-217K)	-7.665*** [-8.025]	-6.751*** [-9.255]	1.618 [0.627]	5.081*** [4.573]
1st lien unpaid balance group 3 (\$218-341K)	-8.208*** [-8.339]	-6.683*** [-8.931]	3.525 [1.193]	5.772*** [4.007]
1st lien unpaid balance group 4 (>\$341K)	-36.096*** [-15.883]	-38.364*** [-22.000]	-78.258*** [-17.909]	.

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Table IA5. Full Specification of Table 6 (Cont.)

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2nd lien unpaid balance group 1 (<\$28K)	0.679 [1.164]	-1.154*** [-3.520]	0.300 [0.210]	-0.738 [-0.618]
2nd lien unpaid balance group 2 (\$29-49K)	1.692*** [3.342]	-1.416*** [-3.524]	1.971 [1.273]	-0.315 [-0.308]
2nd lien unpaid balance group 3 (\$50-83K)	2.512*** [5.400]	-0.873 [-1.595]	1.588 [0.750]	0.600 [0.501]
2nd lien unpaid balance group 4 (>\$83K)	2.311** [2.436]	2.106** [2.488]	-2.327 [-0.760]	2.524 [1.465]
1st lien term group 1 (<= 15 yrs)	-5.580*** [-2.934]	-2.663*** [-5.665]	-0.983 [-0.118]	-5.969*** [-4.712]
1st lien term group 2 (20-30 yrs)	-4.210** [-2.147]	-1.773*** [-2.717]	-8.396 [-0.873]	-4.142 [-1.436]
2nd lien term group 1 (<= 10 yrs)	1.175 [1.053]	0.964* [1.763]	6.170*** [4.016]	0.820 [0.555]
2nd lien term group 2 (10 - 15 yrs)	1.363* [1.758]	0.419 [0.708]	2.016 [0.655]	0.919 [0.948]
2nd lien term group 3 (15 - 25 yrs)	1.898*** [3.997]	1.203** [2.615]	8.019*** [5.877]	0.869 [0.908]
2nd lien term group 4 (> 25 yrs)	0.337 [0.612]	-0.260 [-0.357]	4.873** [2.630]	-6.021** [-2.353]
1st lien is low doc	-1.485*** [-3.335]	-0.756* [-1.973]	3.742*** [3.955]	-0.092 [-0.138]
2nd lien is low doc	-1.587*** [-2.972]	-2.651*** [-8.585]	-1.301 [-0.986]	0.897 [1.026]
1st lien is ARM	-0.010 [-0.022]	0.478 [1.270]	-2.629* [-1.741]	-0.194 [-0.238]
1st lien is interest only (IO)	0.607 [1.553]	-0.741* [-1.955]	4.895*** [4.399]	-0.500 [-0.357]
2nd lien is interest only (IO)	0.488 [0.852]	1.134** [2.345]	0.716 [0.508]	-1.643 [-1.124]
2nd lien is fully drawn	0.062 [0.061]	0.341 [0.576]	1.518 [0.610]	4.354*** [2.825]
2nd lien is frozen	-1.231** [-2.343]	-2.080*** [-4.830]	-2.987*** [-2.846]	-2.622** [-2.308]
2nd lien is HELOC and piggyback	-2.605*** [-5.183]	-2.586*** [-5.956]	-5.159*** [-4.923]	-3.933*** [-3.016]
2nd lien is HELOC	0.751* [1.957]	1.123** [2.453]	3.537** [2.481]	0.119 [0.097]
2nd lien is piggyback	0.248 [0.474]	0.019 [0.052]	2.326 [1.675]	0.153 [0.161]
1st lien servicer FE	Yes	Yes	Yes	Yes
Delinquency quarter FE	Yes	Yes	Yes	Yes
Year of origination FE	Yes	Yes	Yes	Yes
State FE	Yes	Yes	Yes	Yes
Observations	39,867	89,100	6,035	13,319
Adj R ²	0.113	0.125	0.216	0.169

Table IA6. Full Specification of Table 7

The table shows the results of regressions of an indicator of whether the second-lien loan continues to perform in months 7 through 12 following the first-lien delinquency. The sample is limited to loan-pairs for which the second lien was performing at the time of first-lien mortgage delinquency. Columns (1) and (2) show the results for the sample that includes all first-lien loans regardless of their loss mitigation disposition. Columns (3) and (4) restrict the sample to those loan-pairs in which the first lien received no loss mitigation action in the first six months, and Columns (5) and (6) restrict the sample to pairs in which the first lien was modified during the first six months. All regressions are ordinary least squares regressions. The sample contains the groups of second-lien mortgages that are serviced by holdup and by non-holdup servicers. The sample covers loans that became distressed between December 2009 and April 2012. Standard errors are clustered at the zip code level. *t*-statistics are presented in brackets. *, **, and *** denote two-tailed significance at the 10%, 5%, and 1% levels, respectively.

	Dependent variable: Second-lien loan still performing after...					
	Horizon: 12 months		12 months		12 months	
	Sample restriction: All loans		No action taken at month = 6		Modified loans at month = 6	
	Sample: PLS	GSE	PLS	GSE	PLS	GSE
	(1)	(2)	(3)	(4)	(5)	(6)
Unconditional mean	66.6	71.4	68.5	73.9	77.3	85.0
Holdup Servicer (0/1)	2.211*** [3.190]	0.419 [0.902]	1.612** [2.029]	-0.871* [-1.775]	4.421* [2.000]	0.188 [0.141]
Delinquency on 1st lien only (6 months)	-0.342 [-0.198]	-3.903*** [-3.483]	-2.729 [-1.174]	-5.168*** [-2.690]	2.248 [0.489]	2.965 [0.631]
FICO group 1 (<300)	1.638 [0.830]	-0.713 [-0.643]	0.569 [0.227]	-1.301 [-0.638]	1.708 [0.394]	4.719 [0.970]
FICO group 2 (300-579)	1.023 [0.538]	-1.038 [-0.881]	0.395 [0.154]	-0.943 [-0.447]	2.542 [0.505]	5.683 [1.084]
FICO group 3 (580-659)	2.500 [1.349]	0.769 [0.634]	1.730 [0.699]	1.648 [0.743]	3.852 [0.867]	7.941 [1.567]
FICO group 4 (660-719)	5.178** [2.366]	3.279** [2.664]	3.656 [1.337]	4.517** [2.158]	9.776* [1.975]	10.186** [2.261]
FICO group 5 (720-779)	-1.059 [-0.973]	-0.019 [-0.027]	-1.689 [-1.183]	0.119 [0.211]	3.073 [1.418]	0.913 [0.540]
1st lien current LTV group 1 (<80%)	-2.566* [-2.002]	0.716 [0.948]	-2.888 [-1.460]	-0.002 [-0.003]	0.361 [0.121]	2.804 [1.307]
1st lien current LTV group 2 (80%-99%)	-1.622 [-1.040]	0.879 [1.023]	-2.365 [-1.001]	0.162 [0.166]	-1.183 [-0.255]	2.029 [0.683]
1st lien current LTV group 3 (100%-119%)	1.542* [1.771]	1.618*** [3.176]	1.127 [0.680]	0.915 [0.992]	0.340 [0.143]	0.855 [0.359]
1st lien current LTV group 4 (>120%)	0.321 [0.296]	1.921** [2.518]	1.363 [1.133]	2.421*** [3.663]	-0.293 [-0.079]	2.549 [1.617]
2nd lien unpaid balance covered by home equity (avg.)	-1.471 [-1.621]	1.996*** [5.000]	-1.229 [-0.986]	1.274** [2.585]	2.741 [0.887]	2.440 [1.536]
1st lien unpaid balance group 1 (<\$133K)	0.352 [0.316]	4.444*** [8.884]	0.270 [0.196]	3.683*** [5.427]	5.344 [1.559]	5.668*** [3.548]
1st lien unpaid balance group 2 (\$133-217K)	1.011 [0.954]	6.189*** [8.814]	2.380* [1.824]	5.368*** [5.542]	5.611* [1.869]	9.389*** [5.221]
1st lien unpaid balance group 3 (\$218-341K)	13.526*** [5.613]	10.843*** [10.739]	10.543*** [3.427]	5.102*** [4.825]	29.492*** [6.600]	-3.318 [-0.143]
1st lien unpaid balance group 4 (>\$341K)	-5.175*** [-4.762]	-5.232*** [-10.694]	-4.671*** [-2.703]	-5.587*** [-8.350]	-9.365*** [-3.920]	-4.287*** [-4.901]

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Table IA6. Full Specification of Table 7

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2nd lien unpaid balance group 1 (<\$28K)	-8.382*** [-7.344]	-7.146*** [-10.434]	-8.534*** [-6.009]	-8.639*** [-8.797]	-10.840*** [-4.907]	-5.935*** [-4.858]
2nd lien unpaid balance group 2 (\$29-49K)	-10.325*** [-13.600]	-9.914*** [-18.405]	-10.670*** [-8.083]	-12.156*** [-15.833]	-10.850*** [-4.146]	-8.873*** [-5.491]
2nd lien unpaid balance group 3 (\$50-83K)	26.094*** [21.600]	24.758*** [24.837]	22.536*** [14.634]	20.044*** [18.044]	10.960*** [5.376]	9.532*** [8.153]
2nd lien unpaid balance group 4 (>\$83K)	0.203 [0.116]	-5.528*** [-7.658]	1.716 [0.791]	-3.892*** [-4.447]	8.385 [1.065]	-9.490*** [-8.199]
1st lien term group 1 (<= 15 yrs)	-1.908 [-1.060]	-8.572*** [-4.451]	-0.837 [-0.304]	-9.223*** [-3.520]	4.861 [0.544]	-7.527* [-1.744]
1st lien term group 2 (20-30 yrs)	4.655*** [3.419]	4.638*** [6.160]	2.502* [1.714]	3.435*** [4.363]	7.079 [1.631]	3.181** [2.501]
2nd lien term group 1 (<= 10 yrs)	-0.368 [-0.311]	1.528 [1.638]	-1.403 [-1.024]	-0.441 [-0.365]	0.188 [0.061]	2.500* [1.855]
2nd lien term group 2 (10 - 15 yrs)	6.111*** [4.329]	4.135*** [5.983]	4.204*** [3.856]	2.128*** [3.340]	6.185*** [3.936]	4.226*** [4.978]
2nd lien term group 3 (15 - 25 yrs)	5.163** [2.524]	3.214*** [3.452]	2.327 [1.524]	1.616 [1.606]	2.308 [0.936]	-2.645 [-1.398]
2nd lien term group 4 (> 25 yrs)	-1.767*** [-3.807]	-0.698* [-1.759]	-2.252*** [-2.892]	-0.022 [-0.065]	-1.216 [-0.970]	-0.234 [-0.363]
1st lien is low doc	-3.376*** [-4.224]	-1.763*** [-4.548]	-3.182*** [-2.993]	-1.898*** [-3.209]	-4.310** [-2.582]	-1.560** [-2.170]
2nd lien is low doc	-1.996* [-1.918]	-2.232*** [-3.599]	-3.519** [-2.222]	-1.496** [-2.643]	0.794 [0.873]	-2.232 [-1.508]
1st lien is ARM	-1.008 [-1.302]	-2.863*** [-5.805]	0.508 [0.549]	-2.674*** [-3.115]	-1.088 [-0.388]	-0.597 [-0.460]
1st lien is interest only (IO)	3.652*** [3.276]	4.364*** [6.264]	6.465*** [4.215]	4.355*** [6.055]	2.419 [0.683]	0.558 [0.305]
2nd lien is interest only (IO)	4.843*** [4.280]	2.398*** [3.067]	4.530*** [2.923]	4.430*** [4.492]	8.852*** [3.086]	10.362*** [4.702]
2nd lien is fully drawn	-3.055*** [-3.479]	-2.586*** [-4.386]	-2.508** [-2.264]	-2.343*** [-3.407]	-0.606 [-0.341]	-0.418 [-0.331]
2nd lien is frozen	-7.419*** [-9.160]	-6.242*** [-11.821]	-8.298*** [-9.308]	-6.432*** [-10.391]	-9.570*** [-5.881]	-7.518*** [-6.789]
2nd lien is HELOC and piggyback	-2.505** [-2.389]	-1.473** [-2.294]	-2.221 [-1.533]	-1.278** [-2.511]	2.483** [2.159]	0.281 [0.289]
2nd lien is HELOC	-1.051 [-1.305]	-3.198*** [-3.911]	-1.662 [-1.391]	-3.580*** [-4.231]	2.117 [0.847]	2.033 [1.555]
2nd lien is piggyback	-11.914*** [-5.674]	-18.957*** [-19.973]	-13.573*** [-5.953]	-16.895*** [-12.592]	-15.399*** [-3.466]	-21.206*** [-4.789]
1st lien servicer FE	Yes	Yes	Yes	Yes	Yes	Yes
Delinquency quarter FE	Yes	Yes	Yes	Yes	Yes	Yes
Year of origination FE	Yes	Yes	Yes	Yes	Yes	Yes
State FE	Yes	Yes	Yes	Yes	Yes	Yes
Observations	27,185	71,216	15,298	41,002	3,519	8,528
Adj R ²	0.070	0.064	0.076	0.072	0.090	0.078