Sponsor-Underwriter Affiliation and Performance in Non-Agency Mortgage-Backed Securities

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Motivations

- The role of securitization in the recent financial crisis
- Mortgage finance transitioning from originate-and-hold to originate-and-distribute model (Mian and Sufi 2009, Purnanandam 2011)
  - Financial intermediaries are more connected than ever before
  - Private institutions play more and more important roles in securitization market (Agarwal, et al.2012)
- We empirically examine the differences in organizational structure and its impact on the performance of non-agency (*private label*) MBS market
- Information asymmetry, incentive misalignment, and moral hazard

First Lien Residential Mortgage Origination: Volume and Sources of Funds

First lien originations in 2013 totaled $1.83 trillion, just short of 2012's $2.12 trillion due to the impact of higher rates. Private label originations, at $13.1 billion, were more than double their 2012 total of $6 billion.
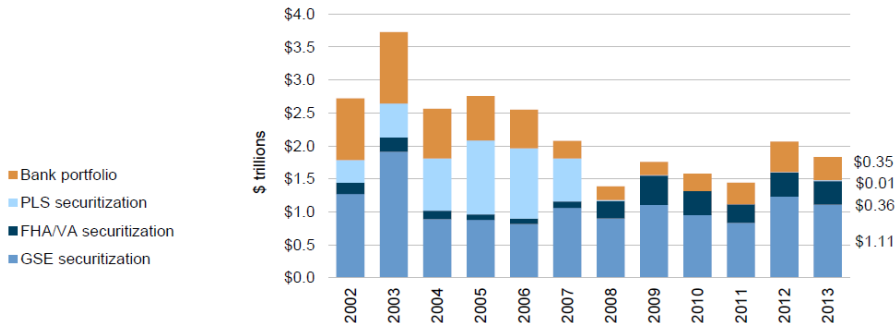
Sources: Inside Mortgage Finance and Urban Institute.

Key Players in the Non-agency Securitization

- **The Underwriter**
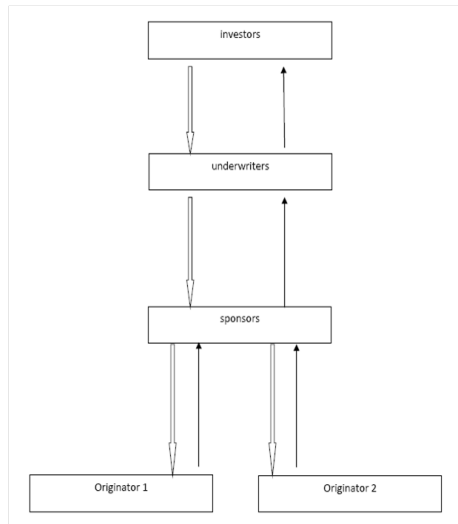 - ☐ Marketing and sale of securities
- **The Sponsor**
  - ☐ Organize and initiate (purchase) loans
  - ☐ Sell or transfer assets to an issuing entity (SPV)
- **The Originator**
  - ☐ Lenders in the primary mortgage market
- Other entities
  - ☐ Servicers, depositors, and rating agencies, etc.

Organizational Structure and MBS Performance

Securitization Deal	Underwriter	Sponsor
CWALT 2005-02	Deutsche Bank	Countrywide Home Loans
CWABS 2004-08	Countrywide Securities Cor.	Countrywide Home Loans
Bear Stearns 2006-AC5	Bear Stearns	EMC Mortgage Cor.

- Theories: Demarzo and Duffie 1999, Hartman-Glaser, et al. 2012
- Few works on industrial organization aspect with an exception: Demiroglu and James 2012 on originator and sponsor affiliation
- Ex-ante, we do not know whether securities organized by affiliated entities would perform differently
- If information is symmetric and no-arbitrage, we should not observe differences in delinquency rates after controlling risks
- There are pros and cons for the affiliation, which predicting different security performance
- Our results differ from Demiroglu and James 2012

Incentives When S-U are Unaffiliated

■ The sponsor needs to convince the underwriter that certificates are marketable

■ Underwriters have incentives to monitor sponsors (due diligence)
  □ They bear a reputation risk when securities perform poorly

■ Market provides discipline

■ In addition, sponsor often holds the equity tranche
  □ Thus bearing the consequence of the loan performance
  □ Have incentives to monitor originators (skin in the game)

Incentives When S-U are Affiliated

- Affiliation predicts a *better* performance
  - Better information sharing about loan quality and investor preference, cost effective
  - Provide underwriter more control over what is to be included in the deal
  - Better risk sharing: most deals organized by affiliated S_U involve loans from variety of different originators. Therefore we need to control S_O affiliation.
- Affiliation predicts a *poorer* performance
  - Sponsor's incentives to uphold standards weaken
  - More "control" by underwriters in selecting what to include
    - But went awry since the reward provided by the market is on quantity not quality
  - I-bank underwriter can more easily divest the sponsor's skin in the game (Faltin-Traeger and Mayer 2012)

Data and Methodology

- Private-label residential MBS (non-agency)
- 4,152 deals issued during 4 years span: 2004–2007:
- Data sources: ABSNet, ABS Alert, Bloomberg
- Manually code affiliation variables
  - □ SEC filings (secinfo.com), court filings (lawsuits), News (M&A)
- Data issues on originator information:
  - □ Missing originator info. for some deals by most data vendors
  - □ For others, we wrote an algorithm to extract originator information from prospectus in SEC filings (Document 424B5, Sections on "originators" or "sellers").

Variables and Econometric Specifications

- **Deal performance:**
  - □ 90 days or more delinquency rate in 2 yrs; as of Dec '08
- **Deal characteristics**
  - □ CLTV, FICO, Deal Amount, Coupon rate
  - □ Percentage of subprime, Alt-A, ARM, Low or no-documentation, IO, NegAm, Balloon, Prepayment penalty, Owner occupy, Purchase, 1st Lien, etc.
- **Housing price changes**
  - □ FHFA HPI change from deal close, weighted by state of origination
- **Main econometric specification:**

  $$90_{+}DELQ_{jsut} = \beta_1 S\_U\_AFFL_{jsut} + \beta_X X_{jsut} + \alpha_s + \alpha_u + \varepsilon_{jsut}$$

Summary Statistics

Variables	N	Mean
Sponsor-Underwriter Affiliation		
S_U_UNAFFL	4,113	34.50%
S_U_AFFL	4,113	65.57%
TYPE_NO_IBANK	4,113	16.48%
TYPE_CONGLOMERATE	4,113	43.06%
TYPE_IBANK	4,113	40.48%
Sponsor-Originator Affiliation		
O_S_UNAFFL	3,340	39.34%
O_S_AFFL	3,340	60.66%
O_S_AFFL_PCT	3,328	50.46%
HHI_O	3,340	0.94
Deal Performance and House Prices		
90+ DELQ (%)	3,993	17.67
90+ DELQ at Cutoff (%)	4,078	17.41
HPI in 2 Years	4,151	-2.41

Deal Characteristics	N	Mean	SD	Min	Median	Max
Amount (x $Billions)	4,125	0.84	0.60	0.05	0.70	5.76
CLTV (%)	4,124	76.64	7.36	50.89	75.71	118.19
Rate (%)	4,123	6.50	1.85	1.05	6.67	13.12
FICO	4,097	688.14	47.58	533	706	762
DTI (%)	2,387	38.62	3.45	19.4		46.3
ALT_A%	4,117	41.53	48.68	0	0	100
Subprime%	4,117	37.86	48.44	0	0	100
IO%	4,117	34.78	32.89	0	24.09	100
ARM%	4,117	59.95	42.33	0	79.45	100
NEGAM%	4,117	8.57	27.50	0	0	100
LOW/NO-DOC%	4,107	55.46	23.48	0	55.53	100
Balloon%	4,135	6.97	16.42	0	0	99.87
Prepayment penalty (%)	4,135	40.23	32.99	0	38.36	100
Purchase loan (%)	4,135	46.13	16.93	0	46.09	100
Silent second (%)	4,135	24.49	20.00	0	24.53	100
Single family (%)	4,135	68.54	10.20	0	68.13	99.95
Owner occupied (%)	4,135	87.50	10.55	0	90.75	100
Multi-underwriter (d)	4,152	0.12	0.32	0	0	1
Pct_subordinated (%)	2,836	3.55	6.77	0.00	0.00	73.95

Variable Definitions

Variables	Variable Definition
S_U_UNAFFL	An indicator variable at the deal level for the sponsor and none of underwriters being affiliated
S_U_AFFL	An indicator variable at the deal level for the sponsor and at least one of the underwriters being affiliated.
O_S_ UNAFFL	An indicator variable at the deal level for i) the sponsor and the sole originator being un-affiliated, or ii) the sponsor and none of the multiple originators are affiliated.
O_S_ AFFL	An indicator variable at the deal level for the sponsor and at least one of the originators being affiliated.
O_S_AFFL_PCT	A continuous variable at the deal level for the percent (weighted by each originator's loan balance value) of originators being affiliated with the sponsor.
HHI_O	Herfindahl-Hirschman Index of originators. This variable captures the concentration ratio of originators in a deal.

Panel C: Sponsor type and organizational structure

SPONSOR TYPE	N	S_U_ AFFL	N	S_O_ AFFL
TYPE_IBANK	1,712	1	1,408	31.25
TYPE_NO_IBANK	665	0	513	87.52
TYPE_CONGLOMERATE	1,775	58.70	1,419	85.13
SUM	4,152		3,340	
Corr(S_U_AFFL, S_O_AFFL |CONGLOMERATE) =	-0.3420			

Variable Definitions

|	Security Name	Underwriters (U)	Sponsor (S)	Originators (O)	S_U_ AFFL	O_S_ AFFL	O_S_ AFFL _PCT	# of Deals	FREQ _PCT
1	Luminent 2006-3	Bear Stearns Wachovia Securities	Luminent Mortgage Capital, Inc.	SouthStar Funding IndyMac Bank Paul Financial, LLC. Residential Funding Corp. American Mortgage Network, Inc Bear stearns Residential Mortgage corp. and Various other originators	0	0	0	66	1.98
2	WFALTA 2005-02	Goldman Sachs	Wells Fargo Bank, N.A.	Wells Fargo Bank	0	1	100	1,027	30.77
3	Harborview 2005-09	RBS Greenwich Capital	Greenwich Capital Financial Products, Inc.	Countrywide Home Loans	1	0	0	1,176	35.23
4	CWABS 2004-08	Countrywide Securities Corp.	Countrywide Home Loans	Countrywide Home Loans	1	1	100	573	17.17
5	Bear Stearns 2006-AC5	Bear Stearns	EMC Mortgage Corporation	1) EMC Mortgage Corporation 2) GreenPoint Mortgage Funding, Inc.	1	1	51	496	14.86
	SUM							**3,338**	**100**

Summary Statistics by Vintage

Panel B: Mean characteristics by vintage

Variables	2004	2005	2006	2007
90+ DELQ (%)	6.01	11.69	23.74	29.55
90+ DELQ at Cutoff (%)	9.72	16.69	23.75	17.84
S_U_UNAFFL	35.80%	35.74%	32.03%	33.12%
S_U_AFFL	63.99%	63.27%	66.47%	66.37%
O_S_UNAFFL	41.12%	37.59%	42.50%	36.01%
O_S_AFFL	58.88%	62.41%	57.50%	63.99%
O_S_AFFL_PCT	45.63%	47.91%	47.91%	42.39%
HHI_O	0.79	0.82	0.67	0.66
Amount (x $Billions)	0.76	0.88	0.88	0.82
CLTV (%)	75.75	76.43	77.68	76.47
Rate (%)	6.09	6.12	6.96	6.86
FICO	687.65	688.66	682.38	696.55
DTI	37.46	38.36	39.50	38.90
ALT_A%	33.55	42.11	42.91	48.25
Subprime%	37.27	37.92	43	30.58
IO%	26.45	36.79	35	41.48
ARM%	59.25	61.98	60.68	56.55
NEGAM%	3.15	8.1	10.68	12.65
LOW/NO-DOC%	45.35	52.99	60.99	63.24
Balloon%	1.77	2.53	12.16	12.11
Prepayment penalty (%)	35.39	39.95	45.84	38.01
Purchase loan (%)	44.73	48.17	48.66	40.89
Silent second (%)	16.19	23.7	29.42	28.16
Single family (%)	70.45	68.43	67.46	68.07
Owner occupied (%)	87.97	87.52	87.3	87.19
Multi-underwriter (d)	0.16	0.14	0.06	0.13
Number of deals	947	1,206	1,202	797

Deal Performance and Characteristics by Affiliation

	Affiliated (N=2,694)	Unaffiliated (N=1,419)
90+ DELQ (%)	19.23	14.66
HPI Change (%)	-2.61	-2.02
CLTV (%)	77.34	75.31
FICO	685.06	693.99
DTI (%)	38.74	38.32
Amount (x$Billions)	0.85	0.83
Rate (%)	6.61	6.29
ALT_A%	40.51	43.49
Subprime%	41.41	31.11
IO%	34.27	35.73
ARM%	60.88	58.18
NEGAM%	8.72	8.28
LOW/NO-DOC%	55.97	54.49
Balloon%	7.00	6.92
Prepayment penalty (%)	40.54	39.68
Purchase loan (%)	46.76	44.94
Silent second (%)	24.38	24.69
Single family (%)	68.01	69.54
Owner occupied (%)	86.94	88.55
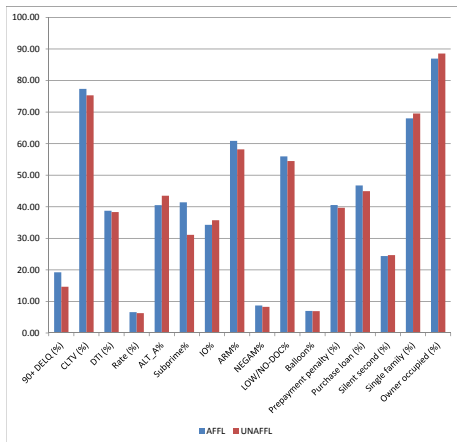
S-U Affiliation and Deal Performance - Baseline

Dep Var = 90+ DELQ

Explanatory Variables	(1)	(2)	(3)	(4)
S_U_AFFL	3.046***	2.686***	2.647***	1.420***
	(0.567)	(0.485)	(0.359)	(0.517)
CLTV	0.176***	0.120*	0.112*	0.109
	(0.0495)	(0.0714)	(0.0637)	(0.0707)
FICO	-0.226***	-0.221***	-0.220***	-0.218***
	(0.00813)	(0.0137)	(0.0175)	(0.0156)
Amount	-0.281	-0.512	-0.557	-0.513
	(0.583)	(0.511)	(0.469)	(0.583)
Rate	-1.464***	-0.156	-0.178	-0.0409
	(0.197)	(0.344)	(0.293)	(0.316)
HPI	-0.164***	-0.115***	-0.118***	-0.111***
	(0.0326)	(0.0272)	(0.0297)	(0.0304)
Deal characteristics	N	Y	Y	Y
Vintage FE	Y	Y	Y	Y
Underwriter FE	N	N	Y	N
Sponsor FE	N	N	N	Y
N	3,932	3,904	3,842	3,904
R^2	0.767	0.797	0.802	0.820

Overview of Results and Robustness Tests

- Baseline results–multivariate regressions
- Incorporate originator-sponsor affiliation
- Sub-sample analysis (affiliation type-mix, DTI, etc.)
- Soft information
- Endogeneity issue
  - Instrument variable (IV)
  - Propensity score matching (PSM)
- Sponsor risk
- Deal structure
- Is it priced?

The Role of Originator-Sponsor Affiliation(O_S_AFFL)

Dep Var = 90+ DELQ

Explanatory Variables	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
O_S_AFFL	-2.284***	-1.365***	-2.052***	-1.191***	-2.044***	-0.958	-0.535	-0.520
	(0.320)	(0.345)	(0.306)	(0.326)	(0.665)	(0.769)	(1.006)	(1.004)
S_U_AFFL		2.475***		2.304***		2.339***		1.329**
		(0.302)		(0.286)		(0.447)		(0.649)
HHI_O	-0.00779	-0.00844	-0.0120	-0.0128	-0.0151	-0.0159	-0.0170	-0.0172
	(0.0117)	(0.0117)	(0.0113)	(0.0115)	(0.00947)	(0.00960)	(0.0106)	(0.0108)
CLTV	0.187***	0.175***	0.126***	0.124***	0.120*	0.119*	0.120	0.122
	(0.0318)	(0.0312)	(0.0385)	(0.0376)	(0.0675)	(0.0653)	(0.0821)	(0.0811)
FICO	-0.227***	-0.229***	-0.216***	-0.220***	-0.217***	-0.221***	-0.222***	-0.222***
	(0.00443)	(0.00437)	(0.00940)	(0.00935)	(0.0214)	(0.0202)	(0.0174)	(0.0175)
Amount	-0.436*	-0.424*	-0.418*	-0.435*	-0.461	-0.462	-0.535	-0.519
	(0.239)	(0.239)	(0.228)	(0.230)	(0.427)	(0.431)	(0.531)	(0.528)
Rate	-1.346***	-1.375***	-0.140	-0.215	-0.164	-0.254	-0.116	-0.138
	(0.0967)	(0.0973)	(0.211)	(0.210)	(0.290)	(0.281)	(0.359)	(0.355)
HPI	-0.255***	-0.255***	-0.184***	-0.186***	-0.191***	-0.192***	-0.172***	-0.173***
	(0.0282)	(0.0280)	(0.0264)	(0.0263)	(0.0376)	(0.0387)	(0.0387)	(0.0387)
Deal characteristics	N	N	Y	Y	Y	Y	Y	Y
Vintage FE	Y	Y	Y	Y	Y	Y	Y	Y
Underwriter FE	N	N	N	N	Y	Y	N	N
Sponsor FE	N	N	N	N	N	N	Y	Y
N	3,203	3,203	3,176	3,176	3,123	3,123	3,176	3,176
R^2	0.759	0.764	0.790	0.793	0.795	0.799	0.817	0.817

Soft Information and S_U_Affiliation

Dep Var = 90+ DELQ

Explanatory Variables	(1) Low-doc	(2) High-doc	(3) Low-doc	(4) High-doc	(5) Low-doc	(6) High-doc	(7) Low-doc	(8) High-doc
S_U_AFFL	3.035***	2.844***	2.854***	2.570***	2.614***	2.458***	1.609**	1.822
	(0.629)	(0.790)	(0.562)	(0.651)	(0.302)	(0.478)	(0.801)	(1.179)
CLTV	0.112*	0.204***	0.121	0.0848	0.127	0.0620	0.0803	0.0796
	(0.0604)	(0.0547)	(0.0767)	(0.0725)	(0.0777)	(0.0657)	(0.0807)	(0.0742)
FICO	-0.271***	-0.197***	-0.281***	-0.174***	-0.277***	-0.175***	-0.285***	-0.174***
	(0.0122)	(0.00819)	(0.0156)	(0.0240)	(0.0170)	(0.0263)	(0.0136)	(0.0275)
Amount	-0.217	0.00177	-0.384	-0.447	-0.418	-0.352	-0.556	-0.278
	(0.546)	(0.583)	(0.380)	(0.542)	(0.382)	(0.473)	(0.411)	(0.622)
Rate	-1.469***	-1.272***	-0.349	0.0633	-0.318	0.0819	-0.00662	-0.00187
	(0.172)	(0.300)	(0.387)	(0.336)	(0.385)	(0.294)	(0.386)	(0.264)
HPI	-0.247***	-0.120***	-0.193***	-0.0783**	-0.197***	-0.0825**	-0.172***	-0.0790**
	(0.0361)	(0.0323)	(0.0325)	(0.0311)	(0.0312)	(0.0358)	(0.0348)	(0.0350)
Deal characteristics	N	N	Y	Y	Y	Y	Y	Y
Vintage FE	Y	Y	Y	Y	Y	Y	Y	Y
Underwriter FE	N	N	N	N	Y	Y	N	N
Sponsor FE	N	N	N	N	N	N	Y	Y
N	2,023	1,909	1,995	1,909	1,969	1,873	1,995	1,909
R-squared	0.794	0.757	0.824	0.789	0.831	0.798	0.849	0.820

Instrument Variable Approach (Sponsor-level Variation)

IV: percent of deals in the past year that is S_U_AFFL

Explanatory Variables	(1) Stage 1 S_U_AFFL	(2) Stage 2 90+DELQ	(3) Stage 1 S_U_AFFL	(4) Stage 2 90+DELQ	(5) Stage 1 S_U_AFFL	(6) Stage 2 90+DELQ
Sponsor_pct_s_u_affl (IV)	0.962***		0.975***		0.909***	
	(0.0382)		(0.0268)		(0.107)	
S_U_AFFL		2.728***		2.110**		3.334***
		(0.767)		(0.837)		(0.746)
CLTV	0.00227*	0.168**	-0.00606***	-0.0365	0.000668	-0.0396
	(0.00114)	(0.0739)	(0.00145)	(0.0474)	(0.00280)	(0.0464)
FICO	-0.00107	-0.232***	0.000537*	-0.200***	0.00182**	-0.199***
	(0.000753)	(0.00800)	(0.000285)	(0.00981)	(0.000873)	(0.0126)
Amount	-0.00821	-1.998***	-0.0276	-1.850***	0.000162	-1.895***
	(0.0157)	(0.582)	(0.0190)	(0.517)	(0.00746)	(0.313)
Rate	0.00964	-1.741***	0.0862***	0.873	0.0243	0.975**
	(0.0176)	(0.304)	(0.00846)	(1.124)	(0.0223)	(0.461)
HPI	0.000488	-0.0997***	0.00100	-0.0741**	-0.000546	-0.0685***
	(0.000793)	(0.0358)	(0.000837)	(0.0292)	(0.00101)	(0.0200)
Deal Characteristics	N	N	Y	Y	Y	Y
Vintage FE	Y	Y	Y	Y	Y	Y
Underwriter FE	N	N	N	N	Y	Y
Sponsor FE	N	N	N	N	N	N
N	1,733	1,624	1,705	1,596	1,689	1,582
R-squared	0.434	0.784	0.458	0.817	0.706	0.820

Propensity Score Matching (PSM)

- Concerns on endogeneity
- Wish to obtain average treatment effect on treated:
  - For treated, find the outcome if it is untreated
  - Look in those untreated ones that are close to treated ones.
- Matching: efficient way is to find propensity scores that are matched. (propensity to be treated)
  - Used psmatch in stata, nearest neighbor as method
  - Throw those treated whose propensity is outside of the common support (i.e. they can't find good match)
- Results:

Panel B: Treatment effects			
90+DELQ	Treated	Controls	Difference
Unmatched sample	19.325	14.734	4.592*** (0.576)
Matched sample, ATT	19.103	15.703	3.4*** (1.291)

Is the Sponsor-Underwriter Affiliation Priced?

Dep var: Yield Spread

Explanatory Variables	(1)	(2)	(3)	(4)	(5)
S_U_AFFL	-0.00614	-0.0324	0.0386	0.0401	0.0931***
	(0.171)	(0.160)	(0.0598)	(0.0250)	(0.0315)
CLTV	0.102***	0.105***	0.0829***	0.0828***	0.0874***
	(0.00972)	(0.0103)	(0.00593)	(0.00646)	(0.00630)
FICO	-0.0116***	-0.0103***	-0.00350**	-0.00374**	-0.00326*
	(0.00154)	(0.00136)	(0.00157)	(0.00162)	(0.00175)
Amount	-0.611***	-0.487***	-0.0821*	-0.0726*	-0.0882**
	(0.129)	(0.108)	(0.0458)	(0.0382)	(0.0426)
HPI		0.0475***	0.00918***	0.00835***	0.00968***
		(0.00662)	(0.00286)	(0.00290)	(0.00290)
Deal Characteristics	N	N	Y	Y	Y
Vintage FE	Y	Y	Y	Y	Y
Underwriter FE	N	N	N	Y	N
Sponsor FE	N	N	N	N	Y
N	4,085	4,085	4,057	3,992	4,057
R^2	0.416	0.462	0.867	0.870	0.881

Mean of coupon spread $= 1.99$.

Deal Structure and S_U Affiliation

Dep var: Pct_subordinated

Explanatory Variables	(1)	(2)	(3)	(4)	(5)
S_U_AFFL	1.232**	1.226**	1.262**	1.264**	1.817***
	(0.532)	(0.537)	(0.548)	(0.466)	(0.580)
CLTV	0.0775	0.0881	0.0184	0.0477	0.0873*
	(0.0812)	(0.0687)	(0.0403)	(0.0366)	(0.0486)
FICO	1.46e-05	-0.00137	0.000520	0.000269	-0.00249
	(0.0137)	(0.0149)	(0.0266)	(0.0269)	(0.0303)
Amount		-0.0747	-0.0389	-0.00769	0.0896
		(0.260)	(0.271)	(0.174)	(0.229)
Rate		-0.113	0.611	0.469	0.374
		(0.216)	(0.584)	(0.510)	(0.527)
HPI	-0.0395	-0.0349	-0.0284	-0.0144	-0.00991
	(0.0285)	(0.0231)	(0.0250)	(0.0253)	(0.0289)
Deal Characteristics	N	N	Y	Y	Y
Vintage FE	Y	Y	Y	Y	Y
Underwriter FE	N	N	N	Y	N
Sponsor FE	N	N	N	N	Y
N	2,801	2,801	2,797	2,741	2,797
R^2	0.021	0.021	0.029	0.071	0.118

Conclusions

- First empirical investigation of the impact of sponsor-underwriter affiliation on non-agency MBS performance
- Sponsor-underwriter affiliation is associated with poorer MBS performance (higher delinquency rate)
  - □ Partly due to higher percentage of riskier loans in the deals
  - □ Partly due to unobservable factors
- New evidence of moral hazard in securitization industry
- It appears that investors did not take the feature into consideration fully when making investment decisions.
- Policy implications
  - □ Dodd-Frank Wall Street Reform and Consumer Protection Act
  - □ Risk retention, ability-to-repay, Volcker rule

Literature on Mortgage backed securities

- Arentsen et al, 2013: security that ended up in CDS performed worse than otherwise.
- Faltin-Traeger, Johnson, Mayer (2012): sponsor risk and performance of MBS.
- Faltin-Traeger, Mayer (2012): MBS that is in CDO performs worse than MBS that is not.
- Titman and Tsyplakov (2010): MBS performance and the stock performance of originator
- Downing, Jaffee, and Wallace (2009): originators may use private information in selecting which to securitize.