

# Information Asymmetry in Private-Label Mortgage Securitization: Evidence from Allocations to Affiliated Funds.

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# Introduction and Motivation

Explanations for the mortgage foreclosure crisis and subsequent Great Recession include:

- Misrepresentation of
  - ▶ Borrower income
  - ▶ Borrower's assets
  - ▶ Collateral valuation
  - ▶ Combined LTV
- Securitization and
  - ▶ Originate-to-distribute model
  - ▶ Conflicts of interest
  - ▶ Moral Hazard
  - ▶ Incentives of financial intermediaries

# Introduction and Motivation

We present novel evidence on the placement of MBS with investors.

- Similar to studies on the placement of IPOs, we investigate whether MBS underwriter/issuer connections with investors affected the placement of those securities.
- We capitalize on a unique testing platform of institutional holdings of MBS combined with loan level performance.
- We find evidence that MBS deals allocated to affiliated funds are correlated with increased default and prepayment.

# Private Label Securitization Process

## Vertical Integration:

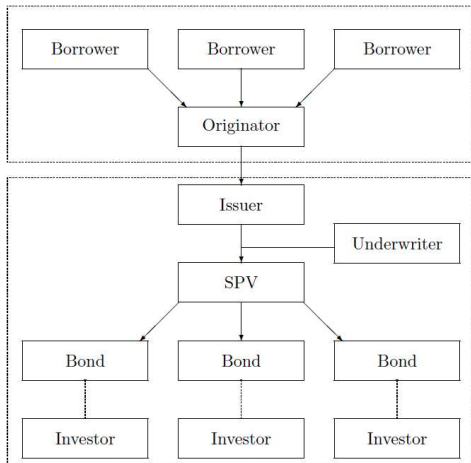
- Originator  
    ↔ Underwriter

## Horizontal Integration:

- Underwriter  
    ↔ Issuer

## Affiliated Fund:

- Issuer/Underwriter  
    ↔ Investor



# Hypotheses

- **Null Hypothesis**

- ▶  $H_0$ : Loans in MBS placed with affiliated funds performed no different than those placed with non-affiliated investors.

- **Differential Treatment Hypotheses**

- ▶  $H_P$ : Deals from an integrated issuer-underwriter placed with an affiliated fund perform better.
- ▶  $H_D$ : Underwriters place lower quality deals with affiliated funds.

# Data Sources

- Combined mutual fund holdings of MBS and loan level information/performance of those MBS deals.
  - ▶ 500 MBS deals from **CoreLogic** issued between 2002 and 2007.
  - ▶ **Thomson Reuters eMaxx** gives quarterly snapshots of MBS holdings across institutional investors.

## Distribution of MBS Deals by Securitization Year

	<i>Affiliated</i>		<i>Not Affiliated</i>		Total
	Number	Percent	Number	Percent	
2002	0	0%	8	100%	8
2003	1	2%	46	98%	47
2004	4	4%	85	96%	89
2005	6	5%	109	95%	115
2006	7	8%	82	92%	89
2007	7	12%	50	88%	57
<b>Deals</b>	<b>25</b>	<b>6%</b>	<b>380</b>	<b>94%</b>	<b>405</b>
<b>Loans</b>	<b>103,275</b>	<b>9%</b>	<b>1,076,181</b>	<b>91%</b>	<b>1,179,456</b>

# Univariate Statistics

	<i>Affiliated</i>		<i>Not Affiliated</i>		Diff. t-stat
	Mean	S.D.	Mean	S.D.	
Loans	103,275		1,076,181		
Deal Amount	\$1,384.6	\$1,369.3	\$900.9	\$672.3	-3.20
Loan Amount	\$408.4	\$189.8	\$383.4	\$169.1	-0.71
<b>At 12-Months</b>					
Prepaid	18.6%	0.39	19.4%	0.40	6.54
Default	4.4%	0.21	4.2%	0.20	-4.26



## Borrower and Loan Characteristics

	<i>Affiliated</i>		<i>Not Affiliated</i>		Diff. t-stat
	Mean	S.D.	Mean	S.D.	
FICO	701.3	60.1	703.9	61.1	13.06
FRM	0.32	0.47	0.33	0.47	4.85
Single Family	0.69	0.46	0.67	0.47	-9.90
Owner-Occupied	0.81	0.39	0.82	0.39	8.46
Refinance	0.48	0.50	0.48	0.50	-2.24
1st Lien	0.95	0.23	0.91	0.29	-39.49
CLTV	77.9	13.4	76.4	14.9	-33.2

## Borrower and Loan Characteristics Cont.

	<i>Affiliated</i>		<i>Not Affiliated</i>		Diff. t-stat
	Mean	S.D.	Mean	S.D.	
Interest Margin	2.07	1.60	2.04	2.04	-4.05
Months To Maturity	352.6	41.7	339.6	56.5	-71.53
Seasoning	3.97	5.63	3.77	5.62	-11.08
Low Document	<b>0.56</b>	0.50	<b>0.54</b>	0.50	-12.55
No Document	<b>0.06</b>	0.25	<b>0.03</b>	0.18	-52.44
Orig-UW at 75%	<b>0.34</b>	0.47	<b>0.30</b>	0.46	-23.08

## Ex-Ante Risk and Affiliation Status

- We follow methodology outlined in Ashcraft and Vickery (2010) and Adelino, Frame and Gerardi (2014) to create predicted probabilities of prepayment and default for each loan. Using a rolling window methodology:
  - ▶ We estimate a LPM of default and prepayment using benchmark samples of securitized loans over a 12-month period with a 12-month performance lag. Prepay Default
  - ▶ We use fitted models from benchmark samples to estimate predicted default and prepayment probabilities of loans by deal securitization quarter being considered.

## Ex-Ante Risk and Affiliation Status

- We obtain OLS coefficient estimates of the following model to gauge differences in *ex-ante* risk across integration-affiliation buckets:

$$\begin{aligned} Pr(\hat{Y}_i) = & \alpha + \beta_1 \text{Affiliated}_i + \beta_2 IU_i + \beta_3 OU_i + \beta_4 (\text{Affiliated}_i \times IU_i) \\ & + \beta_5 (\text{Affiliated}_i \times OU_i) + \beta_6 (IU_i \times OU_i) \\ & + \beta_7 (\text{Affiliated}_i \times IU_i \times OU_i) + \varepsilon_i \end{aligned}$$

- *IU*: Issuer-Underwriter indicator (Horizontal Integration).
- *OU*: Originator-Underwriter indicator (Vertical Integration).
- $\beta_1$  is the difference in predicted performance with affiliation status.
- $\beta_2, \beta_3$  identify differences with horizontal or vertical integration.
- $\beta_4, \beta_5$  interactions of affiliation and horizontal or vertical integration.
- $\beta_7$  captures the full risk differential.

## Ex-Ante Risk and Affiliation Status

Performance Window at 12-Months		
Explanatory Variable	<i>Predicted Likelihoods of</i>	
	Default	Prepayment
Affiliated	0.007 (-0.009)	0.002 (-0.032)
Issuer-Underwriter (IU)	0.005 (-0.004)	0.024 (-0.016)
Originator-Underwriter (OU)	<b>0.012*</b> (-0.006)	<b>0.076**</b> (-0.034)
Affiliated*IU	-0.004 (-0.011)	<b>-0.064*</b> (-0.035)
Affiliated*OU	-0.02 (-0.013)	<b>-0.090**</b> (-0.045)
IU*OU	<b>-0.020***</b> (-0.007)	-0.053 (-0.038)
Affiliated*IU*OU	<b>0.038**</b> (-0.016)	0.06 (-0.048)
Constant	0.017*** (-0.003)	0.253*** (-0.012)
Loans	1,100,584	1,100,584
Deals	366	366

## Ex-Ante Risk and Affiliation Status

- A loan originated by a vertically and horizontally integrated lender and sold to an affiliated investor ( $Affiliated * OU * IU = 1$ ) has a predicted probability of:
  - ▶ Default that is **1.80 percentage points higher**
  - ▶ Prepayment that is **4.5 percentage points lower**

## Ex-Post Risk and Affiliation Status

- We estimate a logit model with the dependent variable ( $Y_i$ ) now being an *ex-post* indicator of loan performance and report the AME.

$$Y_i = \alpha + \beta_1 \text{Affiliated}_i + \beta_2 IU_i + \beta_3 OU_i + \beta_4 (\text{Affiliated}_i \times IU_i) \\ + \beta_5 (\text{Affiliated}_i \times OU_i) + \beta_6 (IU_i \times OU_i) \\ + \beta_7 (\text{Affiliated}_i \times IU_i \times OU_i) + \beta_8 X_i + \eta_i$$

- $Y_i$  is the loan's status
- $X_i$  represent borrower and loan characteristics

## Comparing *Ex-Ante/Ex-Post* Risk

Affiliated & Fully Integrated	<i>at 12-Months</i>	
	<i>Ex-Ante</i>	<i>Ex-Post</i>
<b>Absolute Difference</b>		
Default	1.8%	2.4%
Prepayment	-4.5%	-5.2%
<b>Relative Difference</b>		
Default	105.9%	69.5%
Prepayment	-17.8%	-27.3%

*Ex-Post:* Default Prepay



# Conclusions

- Fully integrated deals purchased by affiliated funds are associated with loans that exhibit conditional *ex-ante* and *ex-post*:
  - ▶ Lower prepayment rates
  - ▶ Higher default rates
- Our results are consistent with a dumping or conflicted incentives hypothesis.

# Policy Implications

- This study contributes to the debate on conflicts-of-interest in investment banking.
- For example, the credit-risk retention measures implemented as part of the Dodd-Frank Act are silent with respect to the activities identified in this paper.

Thank You!

# Dumping vs. Preferential Treatment

- Our goal is to determine whether MBS issuers and underwriters pursued a preferential treatment or a dumping strategy with respect to affiliated investors.
- To do so, we estimate the following model of affiliated status by securitization year at the deal level:

$$\begin{aligned} Pr(\text{Deal} = \text{Affiliated}_i) = & \alpha + \beta_1 \overline{\text{Prepay}_i} + \beta_2 \overline{\text{Default}_i} \\ & + \beta_3 \overline{\text{OU}_i} + \beta_4 \overline{\text{Season}_i} + \epsilon \end{aligned}$$

- Allows us to test whether issuers/underwriters steered affiliated funds into higher or lower risk deals.

## Est. Affiliation Status using *Ex-Ante* Predictions

Explanatory Variable	
Pr(Prepayment)	-0.142** (0.066)
Pr(Default)	1.193* (0.658)
Deal Pct. Linked Originator-Underwriter at 75%	-0.044* (0.024)
Deal Avg. Seasoning	0.003 (0.004)
Constant	0.088*** (0.030)
R-Squared	0.032
# Deals	366

- The probability of a pool being placed with affiliated investors declined as predicted prepayments on the loans in the pool increased.
- The probability of a pool being placed with an affiliated fund increases as the underlying mortgage pool default risk increased.
- These results are consistent with the dumping hypothesis.

# Ex-Ante Risk and Affiliation Status: Default Results

Explanatory Variable	Performance Window			
	6 Months	12 Months	18 Months	24 Months
<b>Panel A: Average Predicted Early Termination Likelihoods</b>				
Predicted Default Rate	1.0%	1.7%	1.6%	1.2%
<b>Panel B: Default Likelihood</b>				
Affiliated	0.003 (0.005)	0.007 (0.009)	0.011 (0.009)	0.025* (0.014)
Same Issuer - Underwriter (IU)	0.003 (0.002)	0.005 (0.004)	0.008 (0.005)	0.018*** (0.007)
Linked Originator-Underwriter (OU) at 75%	0.009** (0.004)	0.012* (0.006)	0.012* (0.007)	0.041*** (0.015)
Affiliated*IU	-0.003 (0.006)	-0.004 (0.011)	-0.007 (0.012)	-0.019 (0.015)
Affiliated*OU	-0.012** (0.006)	-0.020 (0.013)	-0.023 (0.014)	-0.049** (0.020)
IU*OU	-0.013*** (0.004)	-0.020*** (0.007)	-0.013 (0.009)	-0.033* (0.018)
Affiliated*IU*OU	0.020** (0.008)	0.038** (0.016)	0.020 (0.019)	0.055** (0.023)
Constant	0.010*** (0.002)	0.017*** (0.003)	0.016*** (0.003)	0.012*** (0.004)
Loans	1,140,572	1,100,584	1,032,103	931,570
Deals	387	366	332	289

# Ex-Ante Risk and Affiliation Status: Prepayment Results

Explanatory Variable	<i>Performance Window</i>			
	6 Months	12 Months	18 Months	24 Months
<b>Panel A: Average Predicted Early Termination Likelihoods</b>				
Predicted Prepayment Rate	11.4%	25.3%	37.9%	55.7%
<b>Panel C: Prepayment Likelihood</b>				
Affiliated	0.001 (0.014)	0.002 (0.032)	0.019 (0.041)	-0.065 (0.040)
Same Issuer - Underwriter (IU)	-0.000 (0.007)	0.024 (0.016)	0.041** (0.018)	-0.004 (0.025)
Linked Originator-Unerwriter (OU) at 75%	0.023 (0.014)	0.076** (0.034)	0.100*** (0.029)	0.064** (0.028)
Affiliated*IU	-0.031* (0.016)	-0.064* (0.035)	-0.052 (0.062)	-0.041 (0.044)
Affiliated*OU	-0.031 (0.020)	-0.090** (0.045)	-0.154*** (0.048)	-0.101** (0.043)
IU*OU	-0.012 (0.016)	-0.053 (0.038)	-0.078** (0.034)	-0.027 (0.038)
Affiliated*IU*OU	0.035 (0.022)	0.060 (0.048)	0.140** (0.058)	0.078 (0.051)
Constant	0.114*** (0.005)	0.253*** (0.012)	0.379*** (0.013)	0.557*** (0.020)
Loans	1,140,572	1,100,584	1,032,103	931,570
Deals	387	366	332	289

**Table: Ex-Post Average Marginal Effects for Prepayment**

Explanatory Variable	<i>Performance Window</i>			
	6 Months	12 Months	18 Months	24 Months
<b>Panel B: Prepayment Likelihood</b>				
Affiliated	0.002 (0.005)	0.014 (0.011)	0.017 (0.014)	0.038*** (0.014)
Same Issuer - Underwriter (IU)	0.003 (0.005)	-0.001 (0.011)	-0.006 (0.014)	0.003 (0.016)
Linked Originator-Underwriter (OU) at 75%	-0.001 (0.003)	0.001 (0.006)	0.004 (0.007)	0.009 (0.009)
Affiliated*IU	-0.006 (0.010)	-0.055*** (0.021)	-0.030* (0.018)	-0.057*** (0.018)
Affiliated*OU	0.008 (0.006)	-0.003 (0.013)	-0.003 (0.015)	-0.033* (0.017)
IU*OU	-0.008* (0.005)	-0.012 (0.008)	-0.012 (0.011)	-0.016 (0.012)
Affiliated*IU*OU	-0.015 (0.010)	0.004 (0.024)	0.009 (0.019)	0.055*** (0.020)
Control Variables	Y	Y	Y	Y
Constant	Y	Y	Y	Y
Issuer, State, Origination Year/Month FE	Y	Y	Y	Y
Loans	1,143,175	1,143,175	1,116,274	999,729
Deals	393	393	383	340
Pseudo R-sqr	0.526	0.511	0.519	0.505

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**Table: Ex-Post Average Marginal Effects for Default**

Explanatory Variable	<i>Performance Window</i>			
	6 Months	12 Months	18 Months	24 Months
<b>Panel A: Default Likelihood</b>				
Affiliated	0.003 (0.003)	0.007 (0.005)	0.009 (0.008)	0.022** (0.010)
Same Issuer - Underwriter (IU)	0.007*** (0.002)	0.016*** (0.005)	0.020** (0.008)	0.017 (0.016)
Linked Originator-Underwriter (OU) at 75%	0.003*** (0.001)	0.005*** (0.002)	0.009*** (0.002)	0.009*** (0.003)
Affiliated*IU	-0.008 (0.006)	-0.014 (0.010)	-0.040*** (0.013)	-0.053*** (0.017)
Affiliated*OU	-0.001 (0.004)	-0.005 (0.006)	-0.003 (0.009)	-0.017 (0.011)
IU*OU	-0.003* (0.002)	-0.004* (0.003)	-0.003 (0.004)	-0.001 (0.005)
Affiliated*IU*OU	0.013** (0.006)	0.019** (0.008)	0.024 (0.015)	0.038** (0.017)
Control Variables	Yes	Yes	Yes	Yes
Constant	Yes	Yes	Yes	Yes
Issuer, State, Origination Year/Month FE	Yes	Yes	Yes	Yes
Loans	1,138,560	1,143,140	1,116,241	999,708
Deals	393	393	383	340
Pseudo R-sqr	0.364	0.347	0.325	0.294

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# Unobserved Heterogeneity

- We conduct a falsification test to confirm that unobserved factors are not driving our findings of *ex-post* differential prepayment and default across affiliated and unaffiliated portfolios.
- Create random *Affiliation* assignment. Random
- Results show no effect.

**Table:** First Stage *Ex-Ante* Prepayment Estimation: Average Coefficients

Explanatory Variable	6 Months	12 Months	18 Months	24 Months
Interest Rate Spread	0.034 2.9%	0.050 3.8%	0.048 4.4%	0.045 4.1%
Loan Balance	0.053 4.2%	0.080 6.2%	0.084 6.9%	0.079 6.8%
Months to Maturity*	0.000 0.0%	0.177 0.0%	0.247 0.0%	0.276 0.0%
FICO*	0.261 0.0%	0.210 0.1%	0.073 0.1%	-0.105 0.1%
CLTV*	-0.418 0.1%	0.042 0.1%	0.743 0.1%	1.334 0.1%
Fixed Rate	-0.052 7.6%	-0.073 5.3%	-0.088 5.6%	-0.112 5.9%
Single Family Property	0.018 5.8%	0.009 7.4%	0.014 7.4%	0.020 6.5%
Condo	0.011 6.3%	0.013 7.3%	0.028 6.7%	0.036 6.0%
Townhome	0.002 1.1%	0.008 2.9%	0.011 4.3%	0.015 6.0%
PUD	0.022 6.5%	0.019 7.7%	0.027 7.8%	0.034 7.1%
Property Type Other	-0.018 8.6%	-0.025 10.9%	-0.004 7.7%	0.004 7.9%
Owner Occupied	0.016 4.9%	0.038 6.5%	0.048 5.8%	0.058 4.3%
Purpose Refi	0.022 3.0%	0.024 2.6%	0.020 2.1%	0.009 1.4%
Low Documentation	0.001 1.7%	0.011 2.5%	0.019 2.5%	0.016 2.3%
No Documentation	0.002 10.1%	-0.012 12.3%	-0.022 13.7%	0.035 4.9%
1st Lien	-0.029 4.9%	-0.079 8.1%	-0.090 11.1%	-0.068 11.1%
Average Adjusted R-sqr	0.040	0.059	0.067	0.072
# Quarters	19	17	15	13

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Table: First Stage *Ex-Ante* Default Estimation: Average Coefficients

Explanatory Variable	6 Months	12 Months	18 Months	24 Months
Interest Rate Spread	0.006 0.3%	0.011 0.6%	0.013 0.8%	0.015 0.9%
Loan Balance	0.001 0.4%	-0.001 0.5%	-0.005 0.5%	-0.008 0.5%
Months to Maturity*	-0.010 0.0%	-0.009 0.0%	-0.018 0.0%	-0.026 0.0%
FICO*	-0.136 0.0%	-0.220 0.0%	-0.243 0.0%	-0.244 0.0%
CLTV*	0.110 0.0%	0.203 0.0%	0.260 0.0%	0.290 0.0%
Fixed Rate	-0.007 0.3%	-0.014 0.5%	-0.018 0.7%	-0.020 0.8%
Single Family Property	0.002 0.6%	0.002 0.9%	0.005 0.7%	0.005 0.7%
Condo	-0.001 0.6%	-0.003 1.0%	-0.001 0.7%	-0.003 0.7%
Townhome	-0.003 0.6%	-0.007 1.2%	-0.004 0.6%	-0.003 0.6%
PUD	0.000 0.7%	-0.001 1.0%	0.003 0.6%	0.002 0.6%
Property Type Other	0.005 0.8%	0.007 0.8%	0.008 1.0%	0.007 0.9%
Owner Occupied	0.003 0.2%	0.003 0.3%	0.003 0.3%	0.004 0.5%
Purpose Refi	-0.004 0.6%	-0.004 0.7%	-0.003 0.4%	-0.001 0.3%
Low Documentation	0.003 0.3%	0.006 0.5%	0.006 0.5%	0.005 0.4%
No Documentation	0.006 0.6%	0.011 0.9%	0.015 1.0%	0.016 1.2%
1st Lien	0.009 1.4%	0.020 3.0%	0.028 4.2%	0.039 5.3%
Average Adjusted R-sqr	0.025	0.045	0.056	0.064
# Quarters	19	17	15	13

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**Table: Ex-Post Marginal Effects Associated with the Logistic Estimation of Early Loan Termination when Affiliation is Randomly Assigned**

Explanatory Variable	Performance Window			
	6 Months	12 Months	18 Months	24 Months
<b>Panel A: Default Likelihood</b>				
Affiliated	-0.003 (0.006)	-0.006 (0.009)	-0.007 (0.011)	-0.004 (0.017)
Same Issuer - Underwriter ( <i>IU</i> )	0.007 (0.000)	0.016 (0.000)	0.021 (0.000)	0.017 (0.001)
Linked Originator-Underwriter ( <i>OU</i> ) at 75%	0.003 (0.000)	0.006 (0.001)	0.008 (0.001)	0.008 (0.001)
Affiliated*( <i>IU</i> )	0.001 (0.006)	0.005 (0.011)	0.008 (0.016)	0.008 (0.023)
Affiliated*( <i>OU</i> - 75%)	0.006 (0.020)	0.011 (0.028)	0.015 (0.036)	0.015 (0.040)
( <i>IU</i> )*( <i>OU</i> - 75%)	-0.002 (0.001)	-0.003 (0.001)	-0.002 (0.002)	0.001 (0.001)
Affiliated*( <i>IU</i> )*( <i>OU</i> - 75%)	-0.010 (0.023)	-0.017 (0.032)	-0.025 (0.044)	-0.024 (0.053)
<b>Panel B: Prepayment Likelihood</b>				
Affiliated	-0.002 (0.005)	0.002 (0.012)	0.004 (0.015)	0.006 (0.020)
Same Issuer - Underwriter ( <i>IU</i> )	0.003 (0.001)	-0.002 (0.001)	-0.006 (0.002)	0.003 (0.002)
Linked Originator-Underwriter ( <i>OU</i> ) at 75%	0.002 (0.001)	0.004 (0.002)	0.008 (0.002)	0.009 (0.003)
Affiliated*( <i>IU</i> )	0.008 (0.008)	0.008 (0.018)	0.009 (0.032)	0.003 (0.028)
Affiliated*( <i>OU</i> - 75%)	-0.004 (0.014)	-0.005 (0.029)	-0.014 (0.041)	-0.018 (0.045)
( <i>IU</i> )*( <i>OU</i> - 75%)	-0.011 (0.001)	-0.013 (0.002)	-0.016 (0.003)	-0.015 (0.003)
Affiliated*( <i>IU</i> )*( <i>OU</i> - 75%)	0.000 (0.018)	-0.001 (0.034)	0.010 (0.056)	0.011 (0.055)