Discussion of:

The Rise of Shadow Banking: Evidence from Capital Regulation

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Federal Reserve Board

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This Paper

An obviously timely and policy-relevant paper

- Financial crisis $\rightarrow$ push for more (capital) regulation

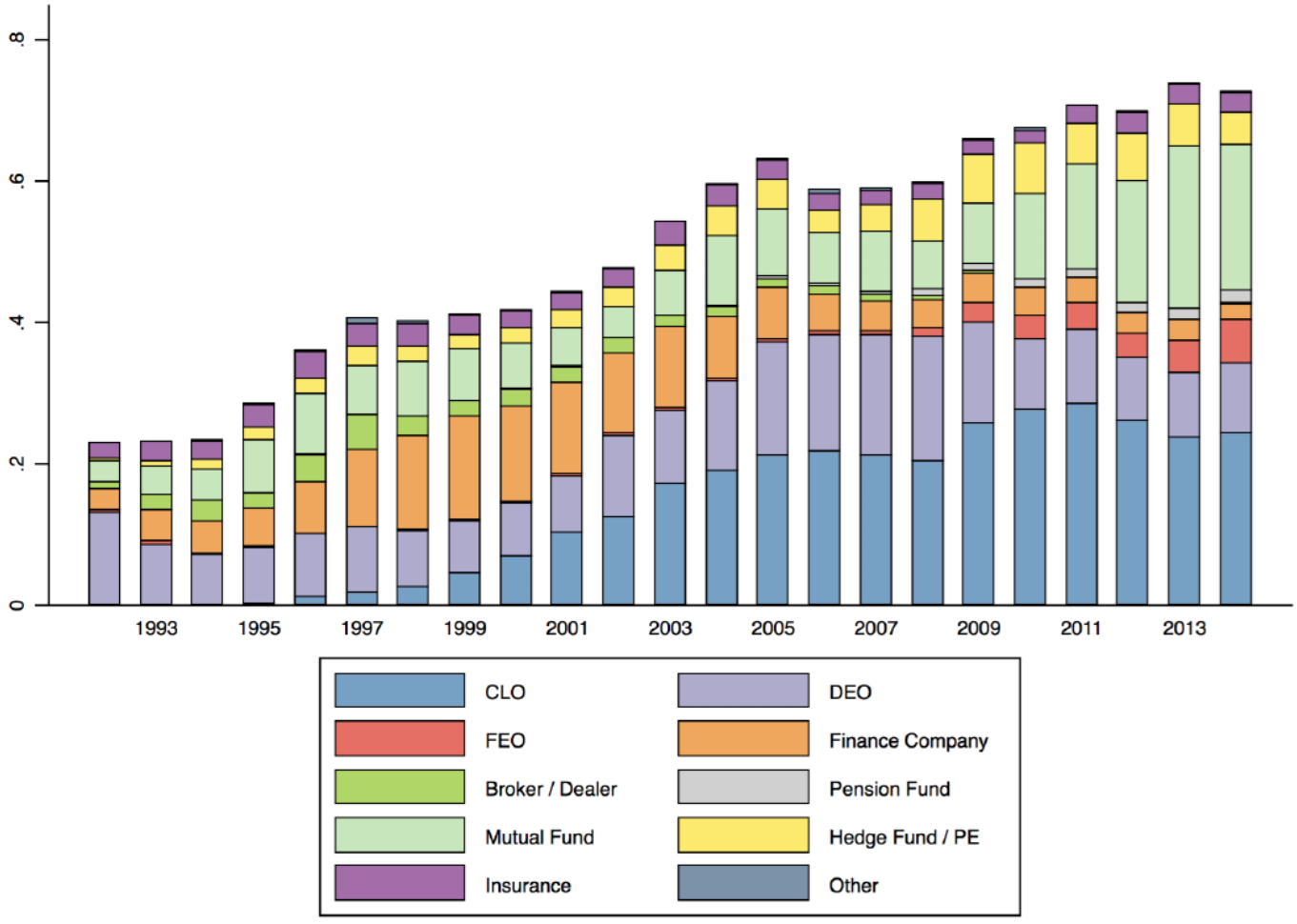
$\Rightarrow$ Intermediation might move to (unregulated) nonbanks

This paper identifies this conjecture in the syndicated loan market

1) Less (regulatory) capitalized banks reduce loan retentions
2) Non-banks step in as active buyers of these loans
3) Results are particularly strong
   - for loans with higher capital requirements
   - during years when capital is scarce
4) Loans funded by fragile nonbanks have higher price volatility

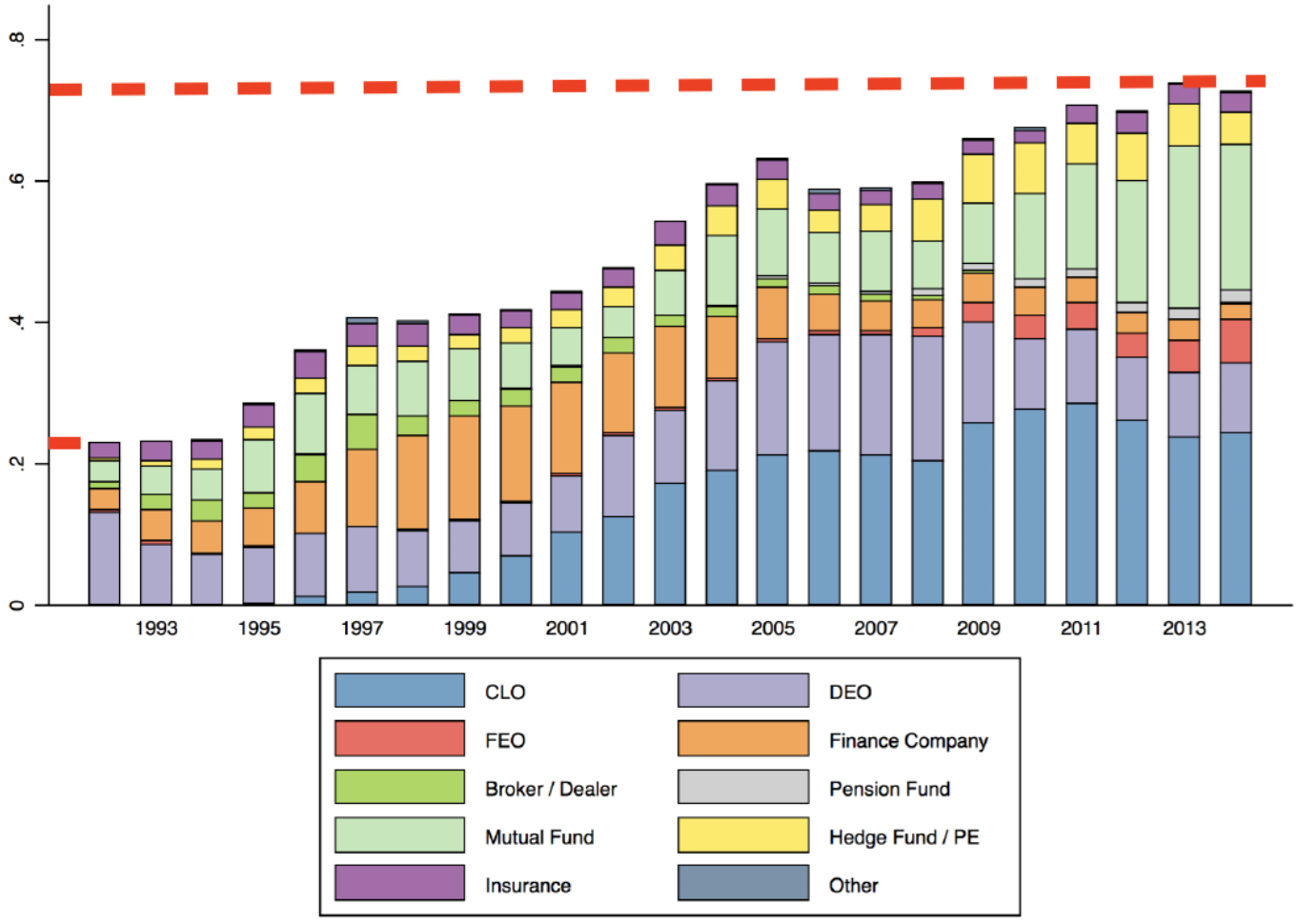
Insight: prudential regulation might be counterproductive if risks migrate to shadow banks

Nonbank Funding of U.S. Syndicated Loans



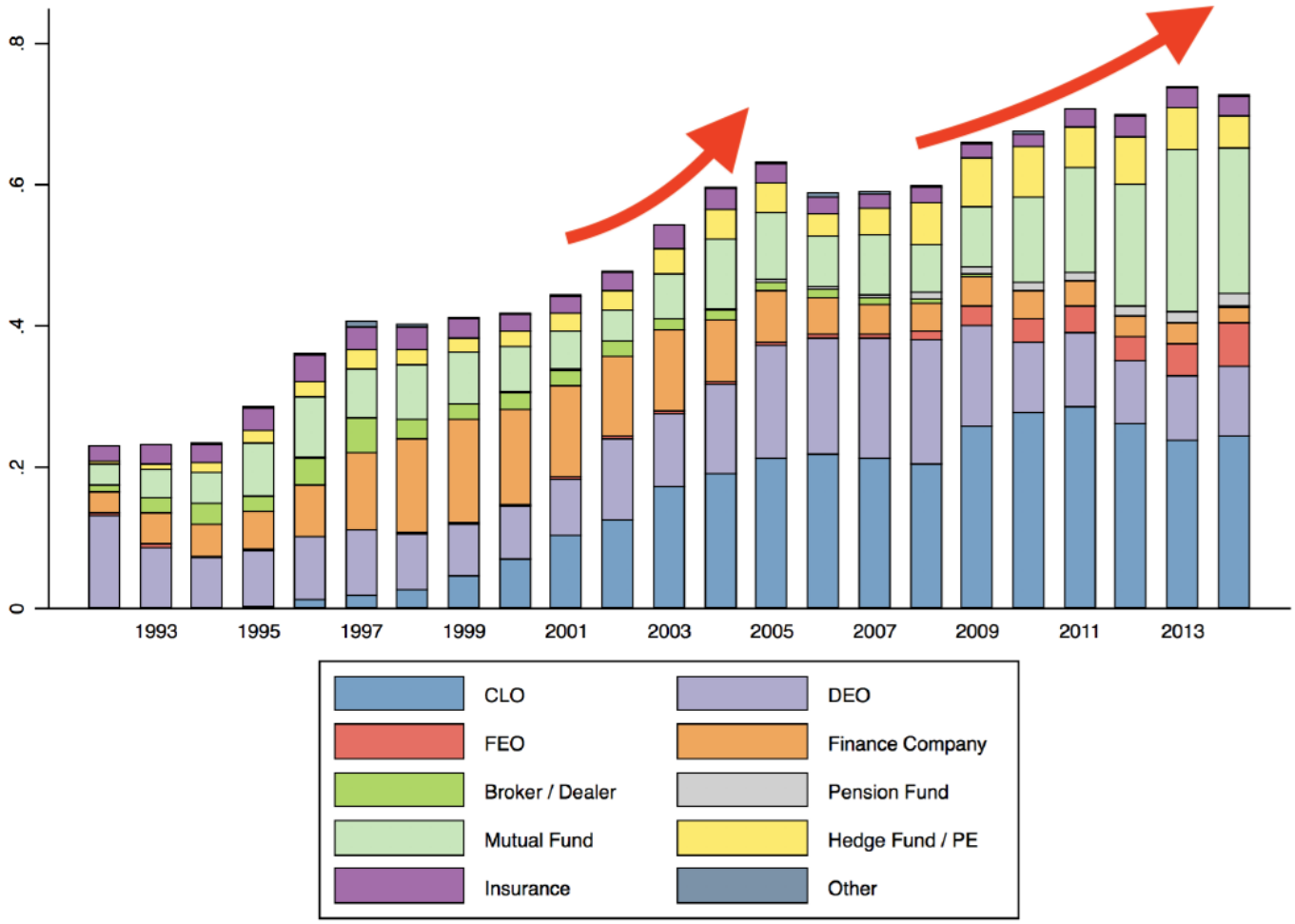
- Aggregate data, by type of nonbank

Nonbank Funding of U.S. Syndicated Loans



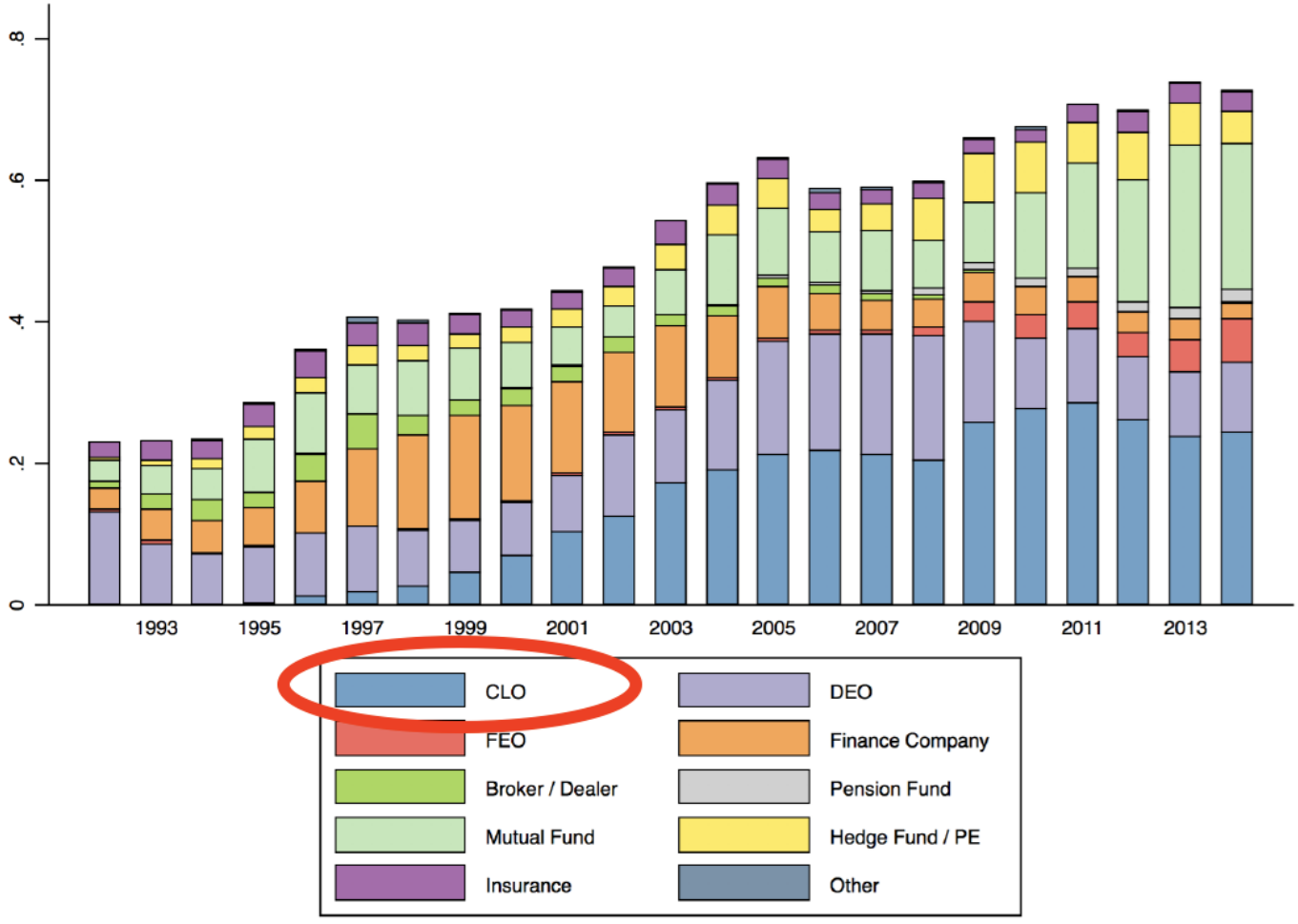
- Nonbank funding from $\approx$ 20% in 1992 to $\approx$ 70% in 2014

Nonbank Funding of U.S. Syndicated Loans



- Acceleration in 2002-06 and 2009-13

Nonbank Funding of U.S. Syndicated Loans



- CLOs largest investor class, but HF/PE are also important

Data and Setting

Data from three main sources:

1) **Supervisory credit register on U.S. syndicated loans**
   - Administered by FRB, FDIC, OCC
   - Yearly data from 1992 to 2015
   - All loans >$20m and shared by 3+ institutions
   - Borrower level info, loan type, loan quality
   ! Includes both banks and nonbanks
   ! Time-varying loan ownership (not only at origination)

2) **Bank balance sheet data (FR Y9-C)**

3) **Secondary market publicly-posted dealer quotes LSTA**

Final sample: 21K unique loans, 162K loan share-lender-year triples

The Effect of Capital Regulation on Loan Retention

Isolate the correlation b/w regulatory capital and loan retention

$$LoanSale_{ijt} = \alpha_{it} + \alpha_j + \beta Tier1Capital/RWA_{j,t-1} + \gamma X_{ij,t-1} + \epsilon_{ijt}$$

- Observations at loan share i lender j year t level
- Estimation *within loan* with loan-time FE α_{it}
  - Absorbs changes in loan characteristics (e.g., quality)
  - Pioneered by Irani and Meisenzahl, 2017
- Bank time-varying controls $X_{ij,t-1}$, bank FE α_j
- St. errors clustered at the loan-level
  - What about bank-level (see Bertrand et al. 2004)?
- Two nice features:
  1) Borrowers cannot influence secondary mkt activity
  2) All loan shares are have identical contractual features

Low Regulatory Capital, Low Loan Retention

$$LoanSale_{ijt} = \alpha_{it} + \alpha_j + \beta Tier1Capital/RWA_{j,t-1} + \gamma X_{ij,t-1} + \epsilon_{ijt}$$

Dependent variable: *Loan Sale*$_{ijt}$			Regulatory rating	
	Baseline	Dynamic	Pass	Fail
	[1]	[2]	[3]	[4]
Tier 1 Capital/RWA$_{t-1}$	–0.158***	–0.189***	–0.108*	–0.499**
	(0.057)	(0.050)	(0.060)	(0.196)
Tier 1 Capital/RWA$_{t-1}$ × *TED*$_t$		–0.292***		
		(0.070)		

- More regulatory capital, fewer loan sales
- Prima facie evidence, still consistent with alternative stories (e.g., Irani and Meisenzahl, 2017)
- If the goal is to improve regulatory capital, we can also use assets that are treated *favorably* as a LHS

Effect Stronger When Equity Capital is Scarce

Dependent variable: $Loan\ Sale_{ijt}$			Regulatory rating	
	Baseline	Dynamic	Pass	Fail
	[1]	[2]	[3]	[4]
$Tier\ 1\ Capital/RWA_{t-1}$	−0.158***	−0.189***	−0.108*	−0.499**
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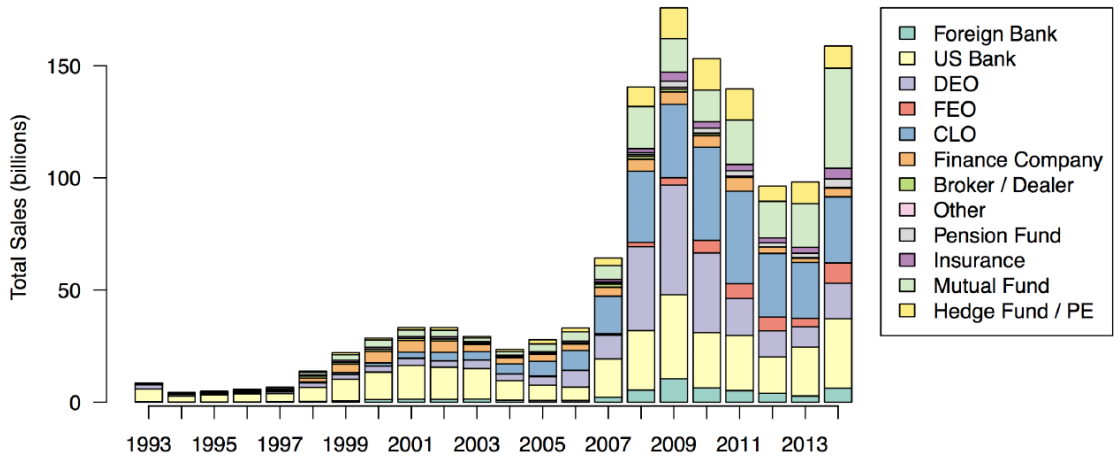
$Tier\ 1\ Capital/RWA_{t-1} \times TED_t$		−0.292***		
		(0.070)		

- During times of uncertainty, banks are more capital constrained
- TED spread to capture tightness of banks' funding conditions
- Effect is larger when the TED spread is high: **mid-07 to 2009**

Effect Stronger for Distressed Loans

Dependent variable: $Loan\ Sale_{ijt}$			Regulatory rating	
	Baseline	Dynamic	Pass	Fail
	[1]	[2]	[3]	[4]
$Tier\ 1\ Capital/RWA_{t-1}$	−0.158***	−0.189***	−0.108*	−0.499**
	(0.057)	(0.050)	(0.060)	(0.196)
$Tier\ 1\ Capital/RWA_{t-1} \times TED_t$		−0.292***		
		(0.070)		

- Effect is larger for distressed loans (≈2/3 of total sales)
- Was the 2007-09 rise in trading activity driven by capital regulation?
- What if we exclude the crisis period? Basel III is announced in late 2010



... but bank capital is endogenous

	N	Mean	Std.	p25	Med.	p75	N	Mean	Std.	p25	Med.	p75
	[1]	[2]	[3]	[4]	[5]	[6]	[7]	[8]	[9]	[10]	[11]	[12]
Panel A: Loan-level variables												
Loan Sale	161,794	0.370	0.483	0	0	1						
Loan Share/Assets	161,794	0.676	1.865	0.027	0.104	0.383						
Loan Size	161,794	274.0	619.0	34.5	95.0	256.0						
Agent Bank	161,794	0.181	0.385	0	0	0						
Non-Bank Share	39,058	0.231	0.320	0	0	0.403						
Panel B: Bank-level variables												
	Below-median capital						Above-median capital					
Tier 1 Capital/RWA	2,017	0.100	0.014	0.092	0.101	0.112	2,018	0.175	0.060	0.135	0.153	0.191
Tier 1 Gap	2,017	–0.009	0.020	–0.022	–0.011	0.003	2,018	0.006	0.040	–0.018	0.000	0.023
Total Capital/RWA	2,017	0.115	0.012	0.107	0.115	0.124	2,018	0.187	0.061	0.147	0.166	0.203
Equity/Assets	2,017	0.085	0.021	0.072	0.082	0.094	2,018	0.115	0.036	0.091	0.106	0.130
Bank Size	2,017	13.80	1.883	12.49	13.63	14.90	2,018	12.69	1.766	11.44	12.43	13.75
Wholesale Funding	2,017	0.300	0.146	0.192	0.285	0.389	2,018	0.231	0.147	0.126	0.202	0.297
Real Estate Loan Share	2,017	0.607	0.194	0.496	0.637	0.753	2,018	0.631	0.217	0.513	0.685	0.795
C&I Loan Share	2,017	0.116	0.101	0.011	0.110	0.170	2,018	0.062	0.086	0	0.015	0.101
Non-Interest Income	2,017	0.154	0.099	0.088	0.136	0.195	2,018	0.153	0.123	0.075	0.121	0.192

- Treated banks: larger, more wholesale funding, higher leverage
  - e.g., more trading expertise, hence sell more loans
  - e.g., more exposure to crisis, hence sell more loans

Basel III Implementation as Exogenous Variation

- U.S. implementation of Basel III had some "surprises" (2012Q2)
  - adjustments to types of capital that counts as tier 1
  - risk-weights on several real estate exposures

$\Rightarrow$ Bank-level "surprise shortfall" (*Basel III Tier 1 Shortfall*)

  - Now, yes, it is uncorrellated to observables!
  - This experiment provides a much tighter identification
  - I would consider making it the main specification

	Δ*Basel III Tier 1/RWA*$_{j,t+4}$ [1]	*Loan Sale*$_{i,j,t+1}$ [2]	*Nonbank Share*$_{i,t+1}$ [3]
Basel III Tier 1 Shortfall	–0.152***	–0.382***	–0.095**
	(0.041)	(0.135)	(0.044)
Loan controls	n/a	n/a	yes
Bank controls	yes	yes	yes
Loan fixed effects	n/a	yes	n/a
N	838	218,252	2,121
R^2	0.17	0.14	0.14

- Validation: negative surprise $\Rightarrow \uparrow$ future regulatory capital

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- Banks with greater shortfall more likely to sell loan shares

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- Higher syndicate shortfall, higher nonbank loan shares

Secondary Market Prices

- Analyze price drop from peak in Jan07 to trough in Jan09
- Compare loans mostly funded by banks Vs. by nonbanks
- Compare loans funded by stable Vs. unstable nonbanks
  - Stable nonbanks: pension funds, insurance companies,...
  - Unstable nonbanks: hedge funds, broker-dealers,...

- Loans with greater nonbanks share fall more
- Driven by loans with high share of *unstable* nonbank funding

- **What's the role of the development of secondary markets?**
  - Environment with capital regulation *and secondary markets*
  - What if we had no secondary markets?
  - Secondary markets allow banks to sell their expoure and also affect *ex-ante* their lending decision (e.g., screening)

Conclusion

- Excellent paper, careful identification
- Likely many more papers on shadow banks to come
  - Effect on this credit reallocation on systemic risk
  - Resilience of lending of shadow banks during shocks
- My two suggestions:
  1) Discuss the crisis more in detail
     (Irani and Meisenzahl, 2017)
  2) Discuss how capital regulation *and secondary markets* affect bank lending decision