Prudential Policies and Their Impact on Credit in the United States

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ABFER Speciality Conference
Financial Regulations: Intermediation, Stability and Productivity
NUS Business School, Singapore
January 16-17, 2017

Motivation

- The global financial crisis has triggered research about the impact of macroprudential instruments designed to promote financial stability
- Some macroprudential tools are designed to enhance the resilience of the financial system
- A few may have ”lean-against-the-wind” effects, that is, they may dampen the credit cycle
- There are still open questions about these instruments' effectiveness and objectives
  - Leakages across financial institutions (e.g., foreign-owned or non-covered)
  - What should be the intermediate objective (credit growth, distribution of risks)?
- *Our study examines the impact of prudential policies using credit-registry data in the United States*

Some Current U.S. Prudential Policies

- Comprehensive Capital Analysis and Review (CCAR)
  - Primarily structural, possibly some lean-against-the-wind effects via scenario specification
- Interagency Guidance on Leveraged Lending (IGLL)
  - Microprudential and structural in nature, but may have had macroprudential effects
- *We analyze the effects of the CCAR bank stress tests on the jumbo mortgage market and the IGLL supervisory guidance on the syndicated loan market*

Related literature

- Most studies on the impact of macroprudential policies have relied on cross-country analyses and/or macro data
  - Cross-country: Akinci and Olmstead-Rumsey (2015), Lim et al. (2011), Kuttner and Shim (2013), Cerutti, Claessens, and Laeven (2015)
  - United States: Elliott, Feldberg, and Lehnert (2013)
- Few studies use micro-level information, which help with identification
  - Spain: Jimenez, Ongena, Peydro, and Saurina (2015)
  - Uruguay: Dasatti, Peydro, and Tous (2015)
  - Cross-country effort coordinated by the BIS CCA
- Studies focused on the market impact of bank stress tests
  - Morgan et al. (2014), Candelon and Sy (2015), Flannery, Hirtle, and Kovner (2015)

Bank Stress Testing

- 2009 Supervisory Capital Assessment Program (SCAP)
  - Assessment of capital needs across 19 largest BHCs based on scenarios for real GDP growth, the unemployment rate, and house price growth
  - Provided greater assurance about the health of the banks
- Annual CCAR Stress Tests since 2011
  - Evaluates banks' capital distribution plans that would allow them to maintain sufficient capital even in the event of an extended period of highly adverse economic and financial conditions
  - The same 19 BHCs were subject to the review until 2013
  - The number of BHCs in the review expanded in 2014 and 2015
  - Two sets of scenarios in 2011 and 2012; expanded to three (baseline, adverse, severely adverse) in 2013

CCAR Adverse Scenarios and Possible Impact on Credit

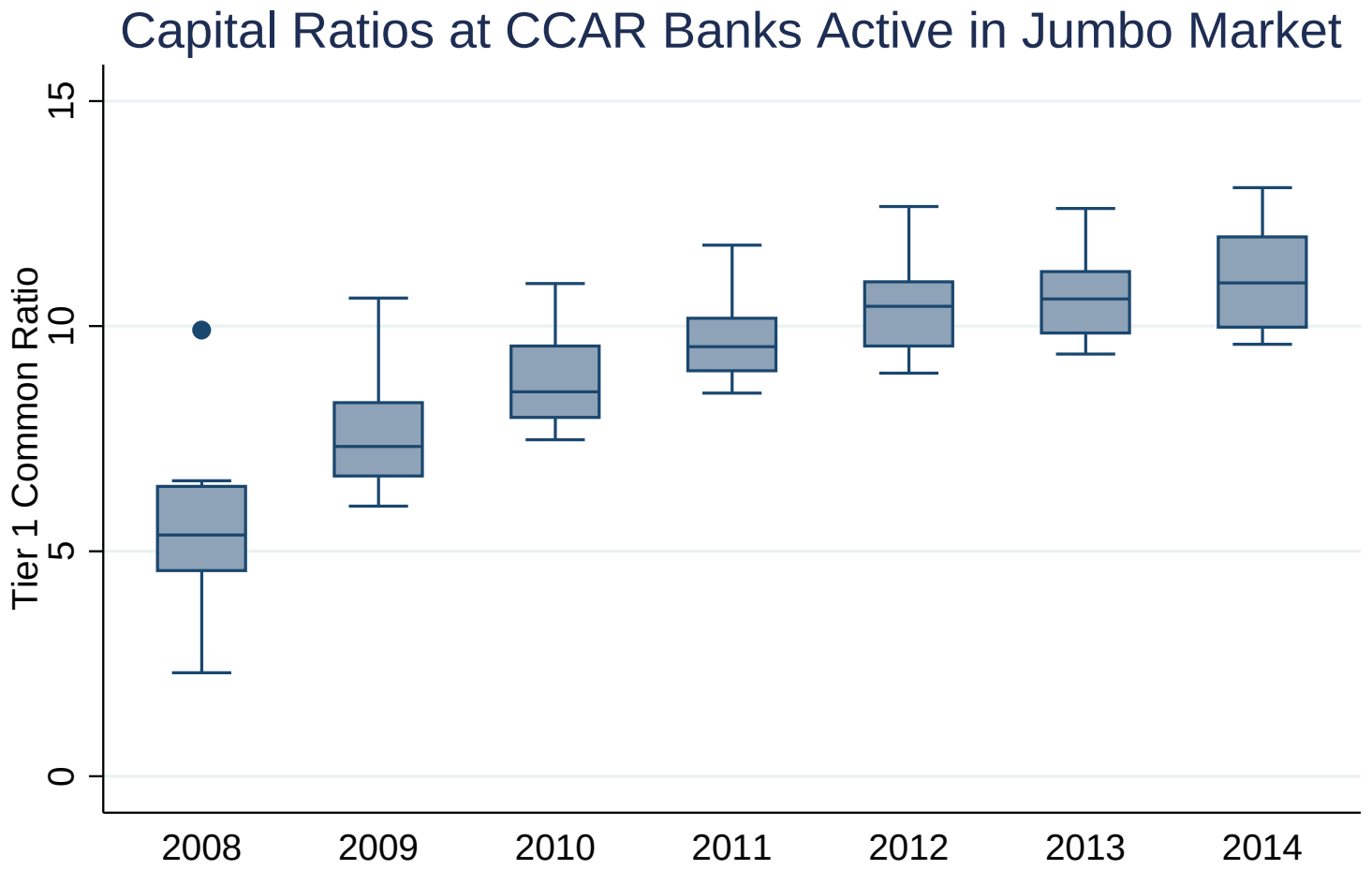
CCAR Adverse Scenarios for House Price Growth

SCAP/CCAR	Adverse Scenario	Severely Adverse Scenario
2009 SCAP	-28% (within 2 years)	
2011 CCAR	-11% (within 3 years)	
2012 CCAR		-21% (within 3 years)
2013 CCAR	-10% (within 3 years)	-21% (within 3 years)
2014 CCAR	-14% (within 3 years)	-26% (within 3 years)

- 2011 CCAR was the inaugural CCAR with expectations for further scenarios in the future
- The CCAR banks' capital ratios were generally still extremely low

HYPOTHESIS 1—CCAR banks tightened credit for mortgages typically held on balance sheet (jumbo loans), especially in 2011 when banks' capital ratios were still low

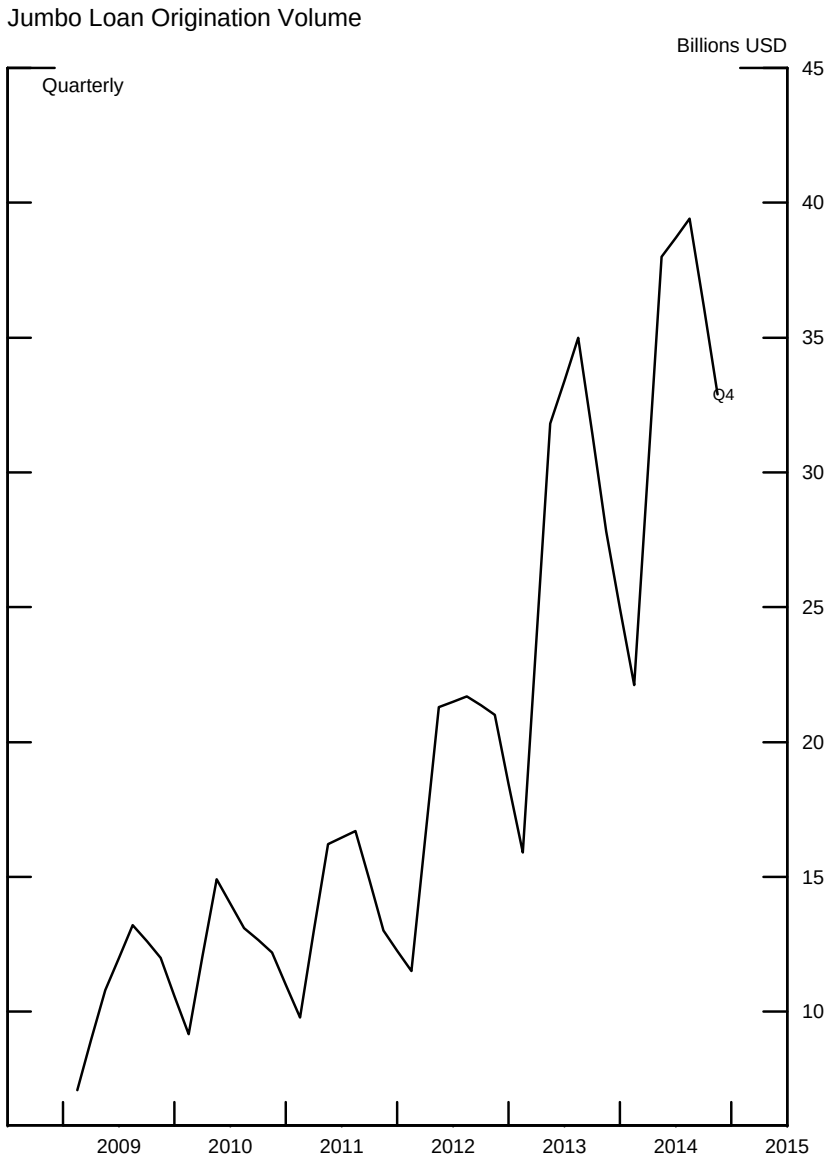
Capital Ratios at CCAR Banks

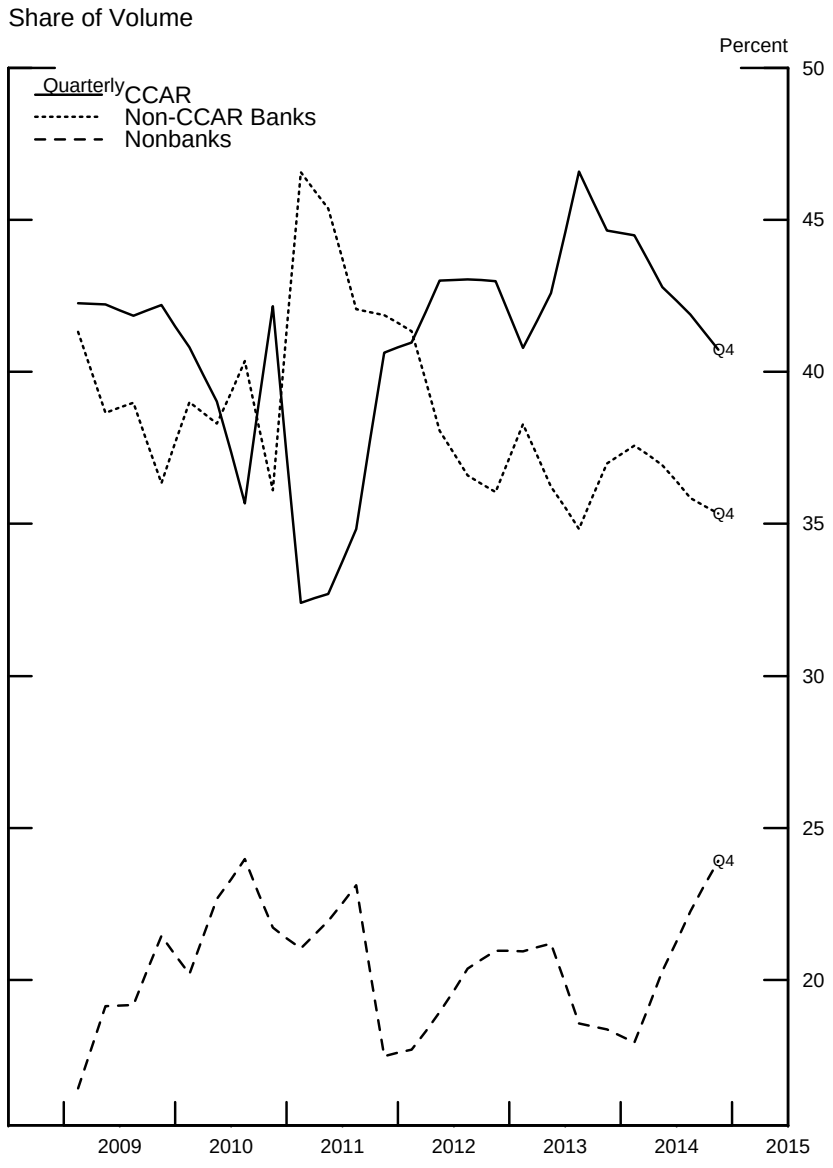


The Home Mortgage Disclosure Act (HMDA) Data

- Background and purpose
  - Enacted by Congress in 1975
  - Provides public data to be used to assist in determining whether financial institutions are serving the community housing needs
  - The 2015 HMDA data (for mortgage lending activity in 2014) had 7,062 reporting institutions and 11.9 million loan records
- Data items
  - Reporting institution, loan amount, loan purpose (home purchase, refinance, etc.), and property location (state)
  - Action variables (loans originated, total number of applications, applications denied, applications withdrawn, etc.)
- We focus on jumbo mortgage loans (mostly $\geq$ \$417,000)
  - Sales of these mortgages to GSEs are severely constrained
  - Conforming mortgages subject to litigation and putback risk
  - Main dependent variables are bank-specific state-level jumbo mortgage origination shares and approval rates

Recent Developments in the Jumbo Mortgage Market





State Level Summary Statistics

Table: State-level summary statistics (in percent)

	Mean	Median	Std.Dev.	Min	Max
CCAR banks' share	35.1	35.3	15.8	0.0	92.8
Growth in house prices	0.5	0.6	6.3	−29.7	27.2
Unemployment rate	7.7	7.6	1.9	3.3	14.4
Growth in per capita GSP	1.8	2.4	3.4	−21.2	11.7

Note: Summary statistics are for 49 states (which excludes North Dakota) and District of Columbia from 2009:Q1 to 2014:Q4. CCAR Banks' share is the share of jumbo mortgage loan originations by CCAR banks in a given state. Jumbo loans are defined as mortgages with principals above $417,000 loan limit. In Alaska and Hawaii, the limit is $625,500. Growth in house prices is compared to previous year. Unemployment rate is 12 month moving average. Growth in per capita GSP is compared to the previous year. All data is from 2009:Q1 to 2014:Q4.

Bank-State Level Empirical Specification I

$$jumboshare_{b,s,t} = \alpha_{b,s} + \beta^{cap}_{2009} median_{b,t} \times S^{2009}_{t} +$$

$$\sum_{j=2011}^{2014} \beta^{cap}_{j} median_{b,t} \times C^{j}_{t} + \beta^{cap} TCE_{b,t-1} + \log(Assets)_{b,t-1} +$$

$$\boldsymbol{X_{s,t-1}\gamma_X} + \gamma_T time_{b,s,t} + \gamma_{T2} time^2_{b,s,t} + \varepsilon_{b,s,t}$$

- $jumboshare_{b,s,t}$ is the share of jumbo originations at CCAR bank b in state s at time t
- S^{2009}_{t} is the 2009 SCAP period–can vary (1 to 4 quarter effect)
- C^{j}_{t} is the CCAR period for $j = 2011, 2012, 2013, 2014$–can vary (1 to 4 quarter effect)
- Interact whether bank performed below the median in each Stress Test episode ($median_{b,t}$) to see if worse performing CCAR banks were affected by the Stress Tests
- Restrict sample to be balanced panel (10 banks in 33 states)
- Error term double clustered by state and time

Bank-State Level Origination-Share Results I

Dependent Variable: CCAR bank-specific jumbo loan origination share in a given state—restricted to balanced panel of nonzero shares

	1 quarter	2 quarters	3 quarters	4 quarters
Bel.Median×2011CCAR	-2.252***	-1.811**	-1.849***	-1.783***
TCE ratio	-0.241	-0.273	-0.326*	-0.322*
log(total assets)	-4.982	-5.457	-5.307	-3.759
Growth in house prices	0.068	0.056	0.035	0.023
Unemployment rate	-0.381	-0.387	-0.390	-0.318
Growth in per capita GSP	-0.028	-0.011	-0.013	-0.059
Num. of observations	3120	3120	3120	3120
R-squared	0.87	0.87	0.87	0.87

* $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$. Errors double clustered by bank-state and time. Other regressors not shown.

Bank-State Level Empirical Specification II

$$jumboshare_{b,s,t} = \alpha_{b,s} + \beta_{2009} S_t^{2009} + \beta_{2009}^{cap} TCE_{b,t-1} \times S_t^{2009} +$$
$$\sum_{j=2011}^{2014} \beta_j C_t^j + \sum_{j=2011}^{2014} \beta_j^{cap} TCE_{b,t-1} \times C_t^j + \beta^{cap} TCE_{b,t-1} +$$
$$\log(Assets)_{b,t-1} + \boldsymbol{X_{s,t-1}\gamma_X} + \gamma_T time_{b,s,t} + \gamma_{T2} time_{b,s,t}^2 + \varepsilon_{b,s,t}$$

- Interact tier 1 common ratio (TCE) at each bank with each Stress Test episode to see if more capitalized CCAR banks were relatively less affected by the Stress Tests

Bank-State Level Origination-Share Results II

Dependent Variable: CCAR bank-specific jumbo loan origination share in a given state—restricted to balanced panel of nonzero shares

	1 quarter	2 quarters	3 quarters	4 quarters
2011 CCAR	-7.199***	-6.638***	-6.752***	-5.174*
TCE ratio × 2011 CCAR	0.683***	0.632***	0.638***	0.481
TCE ratio	-0.282*	-0.262	-0.289	-0.287
log(total assets)	-4.855	-5.355	-5.487	-5.000
Growth in house prices	0.072	0.060	0.038	0.032
Unemployment rate	-0.390	-0.368	-0.314	-0.227
Growth in per capita GSP	-0.042	-0.022	-0.017	-0.054
Num. of observations	3120	3120	3120	3120
R-squared	0.87	0.87	0.87	0.87

* $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$. Errors double clustered by bank-state and time. Other regressors not shown.

Bank-State Approval-Rate Results

Dependent Variable: CCAR bank-specific jumbo loan approval rate in a given state—restricted to balanced panel of nonzero shares

	1 quarter	2 quarters	3 quarters	4 quarters
2011 CCAR	-25.04*	-23.74**	-33.01***	-35.31***
TCE ratio × 2011 CCAR	2.777*	2.323*	3.280***	3.872***
TCE ratio	-0.305	-0.159	-0.564	-0.583
log(total assets)	-42.12***	-43.04***	-40.32***	-35.51**
Growth in house prices	0.057	-0.007	-0.104	-0.072
Unemployment rate	0.714	0.911	0.945	1.573
Growth in per capita GSP	-0.384	-0.271	-0.327	-0.339
Num. of observations	3120	3120	3120	3120
R-squared	0.58	0.58	0.58	0.58

* $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$. Errors double clustered by bank-state and time. Other regressors not shown.

Other Results and Conclusions

- Other Results
  - Results are robust to taking the CCAR banks' share of jumbo loan originations at all banks only (excluding nonbanks)
  - Results for non-CCAR banks are the opposite, which implies substitution to originations at non-CCAR banks (with higher capital ratios)
- Conclusion and Caveats
  - The 2011 CCAR appears to have been unique in affecting jumbo mortgage originations, possibly due to the generally weak capital positions at CCAR banks
  - In 2011, large banks were cognizant of DFA requirement for three sets of scenarios, and of phasing-in of Basel III requirements
  - The fact that jumbo mortgage origination shares were shifted to non-CCAR banks and CCAR banks with higher capital ratios may have been helpful for financial stability

Supervisory Guidance

- Clarifies standards for underwriting/risk-management practices in response to excessive activity in particular lending segments
- 2013 Interagency Guidance on Leveraged Lending (IGLL)
  - Updates and replaces 2001 Guidance as market began to become active again (May 21, 2013)
  - Describes expectations for sound risk management of leveraged lending activities (origination/distribution/participation)
  - Expectations on definition of leveraged lending, risk management framework, underwriting standards, etc.
- 2014 Frequently Asked Questions (FAQ) notice
  - Issued to foster better understanding of the guidance and supervisory expectations (November 7, 2014)

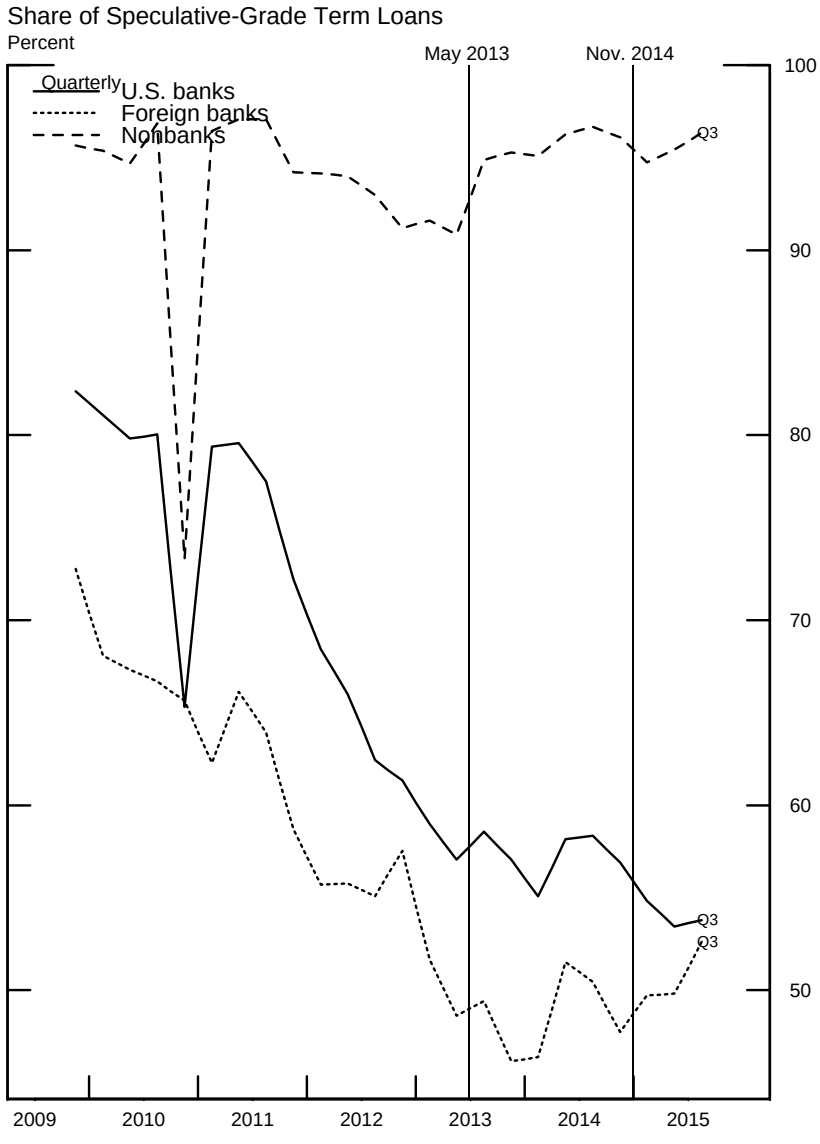
HYPOTHESIS 2—the IGLL and FAQ impacted loan originations in the syndicated term loan market and banks may have been relatively more affected than nonbanks

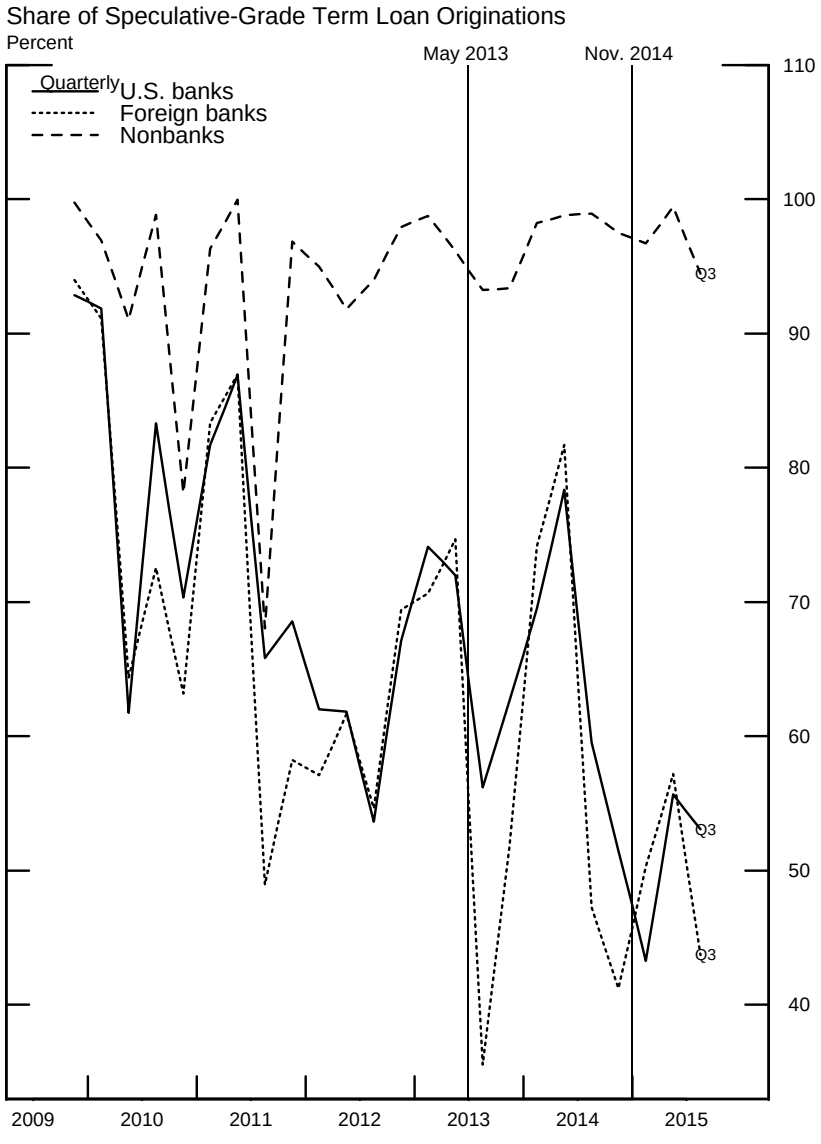
The Shared National Credit (SNC) Data

- Background and purpose
  - Established by bank regulatory agencies in 1977
  - Currently gathers loan information on commitments of at least $20 million shared by three or more supervised institutions
  - Collected to provide an efficient and consistent review and classification of large syndicated loans
- Data items
  - Reporting institution, participant institution, loan amount, and riskiness of borrower, etc.
- We use the data submitted by the 18 quarterly reporters (agent banks) since 2009:Q4
  - These loans compose more than 90 % of the total SNC universe
  - 10145 loans with utilized amount of $1.8 trillion, distributed among 9277 participant lenders as of 2015:Q3
  - We restrict to term loans because utilized amounts on revolvers may largely reflect borrower demand

Recent Developments in the Syndicated Term Loan Market

Leveraged loans (4 X debt/ebitda) ⊂ Speculative-grade loans





Summary Statistics

Table: Speculative-grade syndicated term-loan origination shares

	Observations	Mean	Median	Std.Dev.	Min	Max
Banks	3920	71.2	95.5	36.7	0	100
U.S. Banks	2140	76.1	100.0	33.7	0	100
Non-U.S. Banks	1780	65.3	82.9	39.2	0	100
Nonbanks	52792	97.1	100.0	13.6	0	100

Table: Shares for most active lenders

	Observations	Mean	Median	Std.Dev.	Min	Max
Banks	960	65.5	66.3	24.4	0	100
U.S. Banks	543	67.3	67.2	22.5	0	100
Non-U.S. Banks	417	63.1	62.8	26.6	0	100
Nonbanks	2040	96.0	100.0	11.6	0	100

Note: Summary statistics are for all lender-quarter observations from 2009:Q4 to 2015:Q3 in the Shared National Credit Program.

Main Lender Participant Empirical Specification

$$share_{i,t} = \alpha_i + \sum_{j=1}^{3} I_j \beta_j^S IGLL_t + \sum_{j=1}^{3} I_j \beta_j^F FAQ_t +$$
$$\sum_{j=1}^{3} I_j \boldsymbol{X_t} \boldsymbol{\gamma_j} + \sum_{j=1}^{3} \sum_{q=2}^{4} I_i \sigma_{j,q} quarter_{q,t} + \varepsilon_{i,t}$$

- $share_{i,t}$ is the share of speculative grade share of term loan originations for lender i at time t
- α_i is lender fixed effect
- I_j is an indicator for lender type (bank vs. nonbank)
- $IGLL_t$ is the period since the implementation of the IGLL–can vary from one-quarter effect to 4 quarter effect
- FAQ_t is the period since the FAQ documentation release–can vary from one-quarter effect to 4 quarter effect
- $\boldsymbol{X_t}$ includes European sovereign spread, high-yield bond spread, and VIX, share of noninvestment grade bond issuance etc.
- $quarter_{q,t}$ are quarterly dummies

Participant Lender Level Results

Dependent Variable: Speculative share of term loan originations

	1 quarter	2 quarters	3 quarters	4 quarters
Bank × IGLL	16.85***	2.438	-4.277	-4.509
Nonbank × IGLL	1.893	2.169	3.936	9.725*
Bank × FAQ	-17.35***	-16.97***	-15.60***	-25.61***
Nonbank × FAQ	0.907	1.642	1.524	0.118
Num. of observations	56712	56712	56712	56712
R-squared	0.43	0.43	0.43	0.44

* $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$. Errors double clustered by participant lender and time. Other regressors not shown.

Participant Lender Level Results–Most Active Lenders

Dependent Variable: Speculative share of term loan originations

	1 quarter	2 quarters	3 quarters	4 quarters
Bank × IGLL	22.98***	3.015	-9.116	-6.921
Nonbank × IGLL	2.971	3.587	7.392	13.567*
Bank × FAQ	-15.48***	-21.05***	-19.53***	-36.54***
Nonbank × FAQ	3.236	3.427	2.968	-0.500
Num. of observations	3000	3000	3000	3000
R-squared	0.60	0.60	0.60	0.61

* $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$. Errors double clustered by participant lender and time. Other regressors not shown.

Other Results and Conclusions

- Other Results
  - Splitting banks into U.S. banks and non U.S. banks shows similar results for most active lenders
  - Splitting banks into CCAR banks and non CCAR banks shows similar results - no CCAR effect
- Conclusion and Caveats
  - There is no evidence that the IGLL was effective at curtailing speculative-grade lending in the syndicated term loan market
  - The supervisory expectations outlined in the FAQ appears to have marked a change in risk-taking behavior of regulated banks
  - Indeed FAQ notice was a culmination of active communication between supervisors and banks
  - Nonbank originations may not have complete coverage in SNC
  - The fact that banks originated a smaller share of speculative-grade syndicated term loans may have been helpful for financial stability