Bank Lending to Nonbanks: A Robust Channel Fueled by Constrained Capital?

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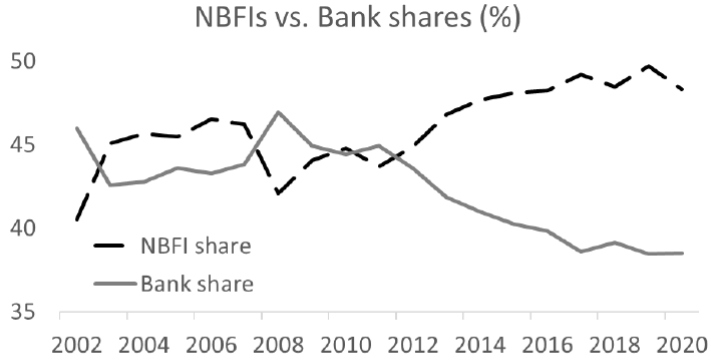
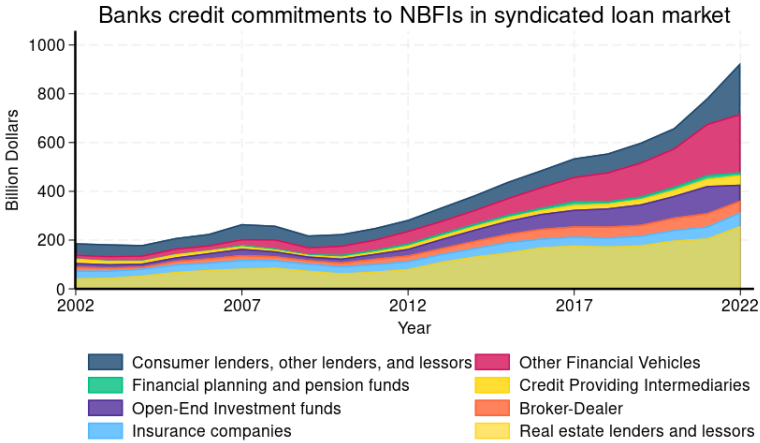
Motivation

- Non-Bank Financial Institutions play an increasingly important role in the global financial system
  - Their assets comprised 49.5% of the total global financial assets by the end of 2019
- The growth of nonbanks has been remarkable (e.g., Buchak et al., 2018)
  - However, few studies investigate the *direct* linkages between banks and nonbanks



Motivation

- Nonbanks' growth is partly fueled by bank loans (the topic of our paper)
  - Bank lending to nonbanks quadrupled from 2012 to 2022 in syndicated loan market, reaching $2T



Bank Lending Channel

- **This paper investigates the dynamics of banks' lending to nonbanks**
  - a novel channel that has fueled recent growth in nonbank assets.
- We conjecture that the significant growth in nonbank assets in the post-GFC era is fueled by banks increasing lending to nonbanks.
  - Banks are uniquely positioned to channel funds to nonbanks:
    - Access to deposits & liquidity backstops
    - The lower capital and regulatory burden associated.
- We argue that the shift towards nonbank lending is closely linked to the heightened regulatory capital pressure,
  - Lending to nonbanks is particularly accelerated during economic shocks when banks' core capital positions are under pressure.

Research Question

- Research Questions:
  - Is bank lending to nonbanks motivated by heightened cost of regulatory capital?
  - What are the implications for the real economy?

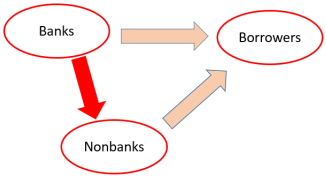
- Outline of our approach:
  - We use three exogeneous shocks:
  - First, we exploit the regulatory capital shock from U.S. implementation of Basel III.
  - Other Shocks to core capital:
    - The Oil & Gas shock of 2015 and the Covid-19 pandemic
    - Exploit cross-sectional variation in banks' exposure to these shocks in a DID setting
  - Last, we examine the impact on the real economy

Preview of Findings

- Banks are increasingly directing their lending portfolio to nonbanks
- Banks with greater exposure to the capital shock directed lending toward nonbank borrowers
  - This allowed nonbanks to fill in the gap and lend more to other borrowers
- Negative economic shocks did not suppress credit supply to nonbank borrowers
  - Banks exposed to the shocks shifted their lending portfolio towards nonbanks
  - This effect is stronger among capital constrained banks
- Implications for the real economy
  - Nonbanks with pre-existing bank relationships were able to continue lending in bad times and demonstrate less cyclical behavior in credit origination.

Contribution to Literature

- One of the first published references to "shadow banking" was at the 2007 Jackson Hole Symposium, where Paul McCulley noted a growing share of financial innovation
- Studies investigating the growth of the nonbank sector focus on the banks-nonbanks differences
  - The rise of shadow banking: Fahri and Tirole (2017), Kashyap, Stein, and Hanson (2010)
  - Complementarity between banks and nonbanks: Irani et al. (2020), Buchak et al. (2018), Fuster et al. (2019), Tang (2019), Erel & Liebersohn (2020).
  - Fragile funding of nonbanks and cyclicality: Gorton and Metrick (2012), Fleckenstein et al. (2020)



- Our study complements this work by exploring the dynamics of bank lending to nonbanks, its resilience during periods of bank distress, and its implications for credit provisioning by nonbanks.

Data

- Shared National Credit (SNC) dataset of syndicated loans (loans larger than $20 MM & held by at least 3 institutions)
  - 95% of DealScan loans meet SNC requirement (Ivashina & Scharfstein, 2010)
  - Use quarterly SNC data that tracks loan ownership over time
  - Include both term loans (held by banks & nonbanks) and revolvers (held by banks)
- Banks balance sheet information from Y9C

Identification Strategy

- We use a DiD methodology:
- Three exogenous shocks:
  1. Regulatory capital shock related to the U.S. implementation of Basel III in 2012q2.
  2. Other Shocks to Core capital: Oil price decline and COVID economic shutdown

- Exploit cross-bank exposure variation: Compare the change in nonbank lending across exposed banks vs. less exposed ones.
  - Define Basel III Tier1 shortfall as the difference between the tier 1 capital ratio under Basel I and under proposed Basel III capital calculation framework
  - Collapse quarterly time dimension into single "pre" and "post" shock periods

$$\Delta\ Ln\ Credit_{i,j} = \alpha + \beta_1\ Tier1Shortfall_i + \beta_2\ Tier1Shortfall_i \times\ NonBank_j + \gamma\ X_{it-1} + \varepsilon_{i,j},$$

- Other shocks to the core capital: measure "shock exposure" as the pre-shock share of a bank's committed exposures to the industries most severely impacted by the shock.

Bank Funding and Nonbanks Syndicate Participation

- Is existence of bank funding associated with more lending by the nonbanks?

$$\Delta \ Ln \ Credit_{i,j,t} = \alpha_i + \kappa_t + \beta \ BankFunding_{i,t-1} + \gamma \ X_{it-1} + \varepsilon_{i,j},$$

	(1)	(2)	(3)
Bank Funding	0.0767***	0.0856***	0.0742***
	(3.21)	(4.13)	(2.94)
Loan Controls	No	Yes	Yes
Participant FE	Yes	Yes	Yes
Year FE	No	No	Yes
Observations	3343677	3296006	3296006
Adjusted R2	0.481	0.622	0.624

Lender is the lead arranger

	(1)	(2)	(3)
Lead Bank Funding	0.556***	0.103***	0.566***
	(14.74)	(5.56)	(15.21)
Loan Controls	Yes	Yes	No
Loan FE	Yes	Yes	No
Year FE	Yes	Yes	No
Loan-Year FE	No	No	Yes
Participant FE	No	Yes	No
Observations	3292655	3289406	3311886
Adjusted R2	0.261	0.651	0.245

Basel III Shock - Intensive Margin

	All Banks		Above Median Shortfalls			
	(1)	(2)	(3)	(4)	(5)	(6) NBFI
Tier1 Shortfall	-0.250	-0.128	-1.854***	-0.719**	-0.297	1.413**
	(-1.56)	(-0.79)	(-5.85)	(-2.42)	(-0.70)	(1.98)
Tier1 Ratio	-0.000892	-0.00100	0.00276***	0.00553***	0.00491**	-0.00135
	(-1.11)	(-0.99)	(2.92)	(3.22)	(2.08)	(-0.48)
Nonbank	-0.00892	-0.0109	-0.0604***	-0.0562***		
	(-0.94)	(-1.15)	(-3.19)	(-2.92)		
Tier1 shortfall * Nonbank	0.353	0.430*	1.418***	1.349***		
	(1.45)	(1.76)	(3.90)	(3.61)		
Bank Controls	No	Yes	No	Yes	Yes	Yes
Loan FE	No	No	No	No	Yes	Yes
Observations	29395	29395	10893	10893	8601	1567
Adjusted R2	0.000	0.002	0.002	0.004	0.221	0.323

Basel III Shock - Loan Sales

	OLS			Fixed Effects	
	(1)	(2)	(3)	(4)	(5)
			Above Median Shortfall		NBFI
Tier1 Shortfall	-0.917***	-0.911***	-1.860**	-0.714***	-0.160
	(-4.81)	(-3.85)	(-2.28)	(-4.63)	(-0.52)
Tier1 Ratio	0.00788***	0.00915***	-0.00423	-0.00315***	-0.000913
	(6.53)	(5.10)	(-0.97)	(-2.66)	(-0.37)
Nonbank	-0.00330	-0.00160	0.0152		
	(-0.21)	(-0.10)	(0.42)		
Tier1 shortfall * Nonbank	1.454***	1.507***	1.908**		
	(4.08)	(4.18)	(2.47)		
Bank Controls	No	Yes	Yes	Yes	Yes
Loan FE	No	No	No	Yes	Yes
Observations	31006	31006	11531	29872	4991
Adjusted R2	0.005	0.006	0.009	0.734	0.790

- Higher *Tier1 Shortfall* generally leads to lower credit provision and higher loan sales, but that's not the case for nonbank borrowers.

Oil & Gas Shock

- Is bank lending to nonbanks resilient when banks are hit by the Oil shock?

	OLS				Fixed Effects		
	(1)	(2)	(3)	(4)	(5)	(6)	(7) NBFIs
O&G Exposure	-0.00806*** (-2.80)	-0.0173*** (-5.38)	-0.0188*** (-5.46)	-0.0188*** (-5.46)	-0.00672** (-2.56)	-0.00847*** (-2.93)	-0.00323 (-0.53)
Nonbank			0.0290 (1.49)	0.0288 (1.48)			
O&G Exposure * Nonbank			0.0120** (2.11)	0.0121** (2.13)			
Rating				-0.00885 (-0.50)			
Loan controls	No	Yes	Yes	Yes	Yes	Yes	Yes
Bank controls	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Loan FE	No	No	No	No	Yes	No	No
Borrower FE	No	No	No	No	No	Yes	Yes
Observations	21708	20349	20349	20349	19833	20105	3892
Adjusted R2	0.002	0.023	0.024	0.024	0.426	0.275	0.310

COVID-19 Shock

	OLS				Fixed Effects		
	(1)	(2)	(3)	(4)	(5)	(6)	(7) NBFIs
COVID Exposure	-0.00912** (-2.47)	-0.00967*** (-2.89)	-0.0132*** (-3.16)	-0.0131*** (-3.16)	-0.00766*** (-2.60)	-0.00654** (-2.12)	-0.00463 (-1.02)
Nonbank			0.0334** (2.50)	0.0289** (2.18)			
Covid Exp. * Nonbank			0.0110* (1.82)	0.0116* (1.94)			
Rating				-0.0737*** (-4.01)			
Loan controls	No	Yes	Yes	Yes	Yes	Yes	Yes
Bank controls	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Loan FE	No	No	No	No	Yes	No	No
Borrower FE	No	No	No	No	No	Yes	Yes
Observations	38423	34777	34777	34777	33837	34399	7995
Adjusted R2	0.002	0.016	0.017	0.021	0.440	0.264	0.289

- Extensive margin analysis is consistent with the finding.

Regulatory Capital Channel

O&G Shock

	(1)	(2)
O&G Exposure	0.249*	-0.0197***
	(1.88)	(-5.64)
O&G Exposure * Nonbank	0.0110	0.0110*
	(0.13)	(1.95)
CET1 buffer	-0.0723**	
	(-2.54)	
O&G Exp. * Nonbank *CET1 buffer	0.00281	
	(0.29)	
Low buffer		0.163**
		(2.55)
O&G Exp. * Nonbank *Low buffer		0.0758**
		(2.10)
Loan controls	Yes	Yes
Bank controls	Yes	Yes
Borrower FE	No	No
Observations	13391	20349
Adjusted R2	0.033	0.024

COVID Shock

	(1)	(2)
COVID Exposure	0.434***	-0.0136***
	(5.79)	(-3.30)
Covid Exp. * Nonbank	-0.0403	0.0128**
	(-0.42)	(2.13)
CET1 buffer	-0.213***	
	(-5.72)	
COVID Exp. * Nonbank *CET1 buffer	0.014	
	(0.58)	
Low buffer		-0.0509
		(-0.32)
COVID Exp. * Nonbank *Low buffer		0.314**
		(2.13)
Loan controls	Yes	Yes
Bank controls	Yes	Yes
Borrower FE	No	No
Observations	27761	34777
Adjusted R2	0.026	0.021

Implications of Nonbanks Access to Bank Credit

- Evidence of resilience of bank lending channel to nonbanks even during bad times
- How does this affect credit supply from nonbanks in bad times?
  - Do nonbanks with bank funding sell fewer loans?
  - Do nonbanks with bank funding originate more loans?
- Compare nonbanks with bank funding vs. those without
- Excess Bond Premium (EBP): a proxy for overall credit condition
- Estimation sample:
  - Nonbank lenders
  - Term loans only for loan sales
  - Sales is identified at the top-holder level
  - Period of 2010q1 to 2020q3

$$LoanSales_{ijt} = \alpha + \mu_i + \psi_j + \beta\ LenderBankLoan_{jt} \times EBP_t + \gamma\ X_{ijt} + \varepsilon_{ijt},$$

$$NewOrigination_{ijt} = \alpha + \mu_i + \beta\ LenderBankLoan_{jt} \times EBP_t + \gamma\ X_{it-1} + \nu Y_{it} + \varepsilon_{ijt}.$$

Implications of Nonbanks Access to Bank Credit - Loan Sales

	(1)	(2)	(3)
ExcessBondPremium (EBP)	0.0669***	0.0646***	0.0523***
	(8.45)	(7.92)	(6.01)
Lender Bank loans	-1.857**	-1.351**	-0.480
	(-2.27)	(-2.15)	(-0.75)
EBP * Lender Bank loans	-7.560***	-8.147***	-4.361**
	(-3.80)	(-4.77)	(-2.48)
Unstable			-0.0273**
			(-2.22)
Unstable*Lender Bank Loans*EBP			-50.84***
			(-4.31)
Loan controls	Yes	Yes	Yes
Borrower FE	Yes	No	No
Loan FE	No	Yes	Yes
Lender FE	Yes	Yes	Yes
Observations	10309043	10859614	10514760
Adjusted R2	0.158	0.227	0.227

Implications of Nonbanks Access to Bank Credit - New Originations

	(1)	(2)	(3)
ExcessBondPremium (EBP)	-0.0758***	-0.0859***	-0.144***
	(-11.87)	(-13.00)	(-13.09)
Lender Bank loans	0.765**	1.485***	1.011***
	(2.49)	(5.63)	(2.59)
EBP * Lender Bank loans	1.957*	2.357***	2.965**
	(1.95)	(2.66)	(2.13)
EBP * Lender Bank Loan * Rating			-0.720
			(-0.80)
Loan controls	Yes	Yes	Yes
Borrower FE	No	Yes	Yes
Loan FE	No	No	No
Observations	10505416	10505178	10505178
Adjusted R2	0.057	0.120	0.122

Conclusion and Discussion

- Bank funding has been a major driving force behind the growth of nonbank sector.
  - Banks response to capital shocks was to lend more to nonbanks.
- Bank funding plays a crucial role in the resilience of nonbanks as reliable financial intermediaries.
- Findings generate optimism about the resilience of nonbank funding and credit provision during periods of economic downturns.
- Implications for policymakers in terms of regulating and monitoring bank-nonbank relationships.

Thank you!

Summary Statistics - Basel III shock

Loan-level variables

	Observations	mean	p10	p90	sd
sale1	32340	.082	0	0	.27
Loan Size	32340	5.6	3.9	7.2	1.3

Bank-level variables

	Observations	mean	p10	p90	sd
Tier1 Shortfall	243	-.031	-.052	-.015	.014
Tier1 Ratio	243	14	10	20	3.1
Bank Size	243	16	14	18	1.5
Wholesale Funding	243	.1	.035	.19	.099
Realestate loan share	243	.65	.39	.79	.18
C&I loan share	243	.2	.085	.36	.12
Non-Interest Income/NI	243	2	.26	3.7	3.5
Loan Share	243	.61	.41	.77	.15

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Banks-level Summary Statistics - O&G and COVID shocks

O&G Shock

	Observations	mean	p10	p90	sd
O&G Exposure	249	.068	0	.24	.17
CET1 buffer	12	8.7	6.9	11	1.8
Bank Size ($Bn)	249	58	.81	39	274
Return-on-Assets	249	.0044	.0018	.0067	.002
Non-Interest Income/NI	249	1.7	.32	3.7	2
Equity/Total Assets	249	.11	.079	.14	.028
Wholesale Funding	249	.1	.025	.2	.091
NPL/Total Assets	249	.0096	.0024	.015	.012

COVID Shock

	Observations	mean	p10	p90	sd
COVID Exposure	204	.2	0	.46	.24
CET1 buffer	20	3.1	1.8	5.4	1.3
Bank Size ($Bn)	204	84	3.5	109	332
Return-on-Assets	204	.012	.007	.016	.0035
Non-Interest Income/NI	204	1.1	.31	1.8	1
Equity/Total Assets	204	.12	.091	.16	.024
Wholesale Funding	204	.13	.046	.21	.086

Loan-level Summary Statistics

O&G Shock

Intensive Margin	All Loans			Nonbanks		
	Number of Loans	mean	sd	Number of Loans	mean	sd
Loan Size (MM)	21708	604	917	3978	655	1,080
Δ Ln(Loan Size)	21708	.01	.38	3978	.014	.34
Exit Margin						
	Number of Loans	mean	sd	Number of Loans	mean	sd
Loan Size (MM)	18054	498	807	2858	482	692
Entry Margin						
	Number of Loans	mean	sd	Number of Loans	mean	sd
Loan Size (MM)	1166	529	1,058	117	675	1,060

COVID Shock

Intensive Margin	All Loans			Nonbanks		
	Number of Loans	mean	sd	Number of Loans	mean	sd
Loan Size (MM)	38423	667	959	8182	663	835
Δ Ln(Loan Size)	38423	-.04	.39	8182	-.022	.33
Exit Margin						
	Number of Loans	mean	sd	Number of Loans	mean	sd
Loan Size (MM)	7616	652	1,295	1340	700	1,390
Entry Margin						
	Number of Loans	mean	sd	Number of Loans	mean	sd
Loan Size (MM)	1490	862	1,224	230	1,119	1,130

Balance test

Panel A: Oil Shock

Covariates	Coefficients	p-value	Observations	Mean Treatment Group	Mean Control Group
Bank Size	1.986454	.0044549	233	16.66352	15.28937
Return-on-Assets	.0002689	.7054937	233	.0045692	.0043203
Non-Interest Income/NI	.026115	.6334769	233	.3284648	.2638759
Equity/Total Assets	.0175723	.0979466	233	.1169354	.1103709
Wholesale Funding	-.0047981	.8581593	233	.1111498	.0868502
NPL/Total Assets	-.0061479	.2284286	233	.0145069	.0149848

Panel B: COVID Shock

Covariates	Coefficients	p-value	Observations	Mean Treatment Group	Mean Control Group
Bank Size	-.6672392	.0079104	187	16.23059	16.75999
Return-on-Assets	-.0006118	.5121053	187	.0119371	.0117645
Non-Interest Income/NI	-.0720154	.0319973	187	.2306725	.2875751
Equity/Total Assets	-.0077503	.218678	187	.1191214	.1211735
Wholesale Funding	-.0092621	.5526199	187	.1121377	.1307236

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Extensive Margin

O&G Shock	Exit				Entry			
	OLS	OLS	FE	FE-NBFI	OLS	OLS	FE	FE-NBFI
O&G Exposure	-0.00257	-0.00264	0.000571	-0.00286	-0.00414***	-0.00370***	-0.00162**	-0.00182
	(-0.81)	(-0.77)	(0.45)	(-0.79)	(-3.44)	(-2.88)	(-2.49)	(-1.27)
Nonbank	-0.0537**	-0.128***			-0.0212***	-0.0136*		
	(-2.11)	(-5.18)			(-2.79)	(-1.88)		
O&G Exposure * Nonbank	-0.0105	-0.0149**			-0.00297	-0.00149		
	(-1.47)	(-2.06)			(-1.14)	(-0.62)		
Loan controls	No	Yes	Yes	Yes	No	Yes	Yes	Yes
Bank controls	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Borrower FE	No	No	Yes	Yes	No	No	Yes	Yes
Observations	43632	38450	37889	6812	43632	38450	37889	6812
Adjusted R2	0.012	0.186	0.831	0.815	0.003	0.018	0.529	0.519

COVID Shock	Exit				Entry			
	OLS	OLS	FE	FE-NBFI	OLS	OLS	FE	FE-NBFI
COVID Exposure	0.00485	0.00723*	0.00990***	0.00136	-0.00610**	-0.00518**	-0.00137	0.00297**
	(1.13)	(1.76)	(4.69)	(0.49)	(-2.57)	(-2.25)	(-0.94)	(2.01)
Nonbank	-0.0335**	-0.0441***			0.00903	0.00788		
	(-2.21)	(-3.35)			(1.54)	(1.42)		
Covid Exp. * Nonbank	-0.00410	0.00103			0.0104***	0.00697***		
	(-0.57)	(0.16)			(3.68)	(2.59)		
Loan controls	No	Yes	Yes	Yes	No	Yes	Yes	Yes
Bank controls	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Borrower FE	No	No	Yes	Yes	No	No	Yes	Yes
Observations	51146	44259	43826	10101	51146	44259	43826	10101
Adjusted R2	0.001	0.183	0.681	0.741	0.005	0.017	0.382	0.325