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

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Motivation

- Non-Bank Financial Institutions (NBFIs) play an increasingly important role
  - Their assets comprised over 50% of the total global financial assets by the end of 2024
- The growth of NBFIs has been remarkable (e.g., Buchak et al., 2018)

Total global financial assets

■ NBFI sector share (%, rhs) ■ NBFI sector ■ Banks ■ Central banks ■ Public financial institutions
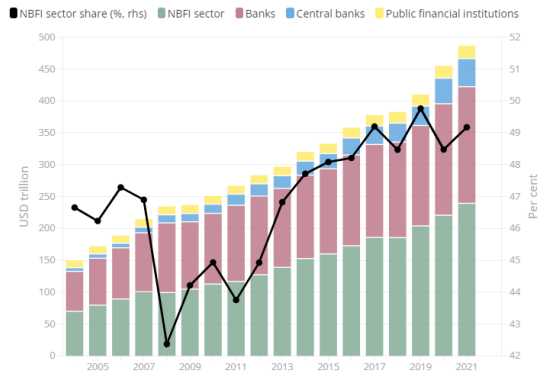
Forces Behind the Rise of NBFIs

- **Technology Advancements**

- **Shrinking Funding-Cost Gap**

- **Convergence in Access to Liquid Funding**

- **Growing Regulatory Gap**

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  - Enhances efficiency and loan origination.
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- **Shrinking Funding-Cost Gap**
  - A decade of low interest rates reduced banks' deposit advantage.
  - NBFI wholesale funding became comparatively cheaper.
  - Farhi & Tirole (2017); Irani et al. (2021).
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- **Convergence in Access to Liquid Funding**
  - NBFIs access repo, securitization markets.
  - Liquid funding sources now broadly accessible.
 - Gorton & Metrick (2012); Fleckenstein et al. (2020).

- **Growing Regulatory Gap**
  - Banks face strong capital/liquidity requirements.
  - NBFIs operate under lighter oversight.
  - Kashyap, Stein & Hanson (2010); Buchak et al. (2018).
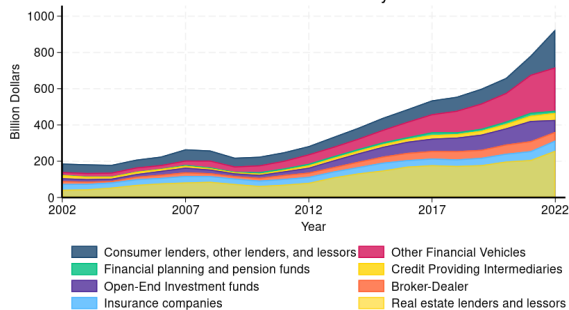
the Symbiotic Relationship

- However, few studies investigate the *direct* linkages between banks and NBFIs
- NBFIs' growth is partly fueled by bank loans (the topic of our paper)
  - Bank lending to NBFIs quadrupled from 2012 to 2022 in syndicated loan market, reaching \$2T

Total global financial assets
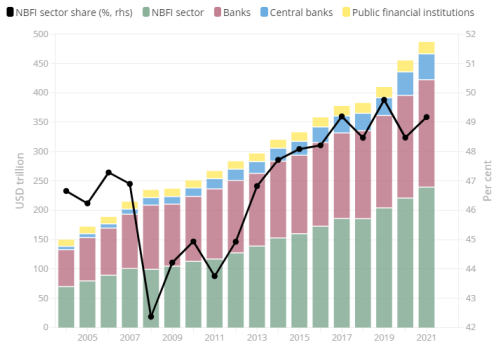
Banks credit commitments to NBFIs in syndicated loan market

A Symbiotic Relationship

- **This paper investigates the dynamics of banks' lending to NBFIs**
    - a novel channel that has fueled recent growth in NBFI assets.

- We conjecture that the significant growth in NBFI assets in the post-GFC era is fueled by banks direct lending to NBFIs.
    - Banks are uniquely positioned to channel funds to NBFIs:
        - Access to deposits & liquidity backstops
        - The lower capital and regulatory burden associated.

- We argue that the shift toward NBFI lending is connected to heightened regulatory capital pressure.
    - The trend is accelerated during economic shocks when banks' core capital positions are under pressure.

Research Question

- Research Questions:
  - Is bank lending to NBFIs fueled 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 NBFIs
- Banks with greater exposure to the capital shock directed lending toward NBFI borrowers
  - This allowed NBFIs to fill in the gap and lend more to nonfinancial firms

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- Implications for the real economy
    - NBFIs with pre-existing bank relationships were able to continue lending in bad times and demonstrate less cyclical behavior in credit origination.
    - The effects are stronger for NBFIs without access to stable funding

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), Irani et al. (2021)
  - Complementarity between banks and nonbanks: Albuquerque et al. (2025), 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
  - Use quarterly SNC data that tracks loan ownership over time
  - Include both term loans (held by banks & NBFIs) and revolvers (held by banks)

  - O&G sample: 5105 loans held by 234 US Banks to 3148 borrowers (20% NBFIs)
  - COVID sample: 9495 loans held by 195 US Banks to 5086 borrowers (26% NBFIs)

- Covers data on
  - banks' direct lending
  - banks lending to NBFI
  - NBFIs' direct lending

- Banks balance sheet information from Y9C

the Rise of NBFIs   Research Question and Findings   Contribution   **Data and Empirical Approach**   Results   Conclusion   Acknowledgement

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Empirical Setting

Exploit cross-bank exposure variation: Compare the change in NBFI lending across exposed banks vs. less exposed ones.

- More direct shock to regulatory capital and better identification of the channel.

- Created heterogeneous impact on cross section of banks regulatory capital.

- 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

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

- 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.

Result 1: Evidence of a "Backdoor Lending Channel"

- We look at the direct lending activity by NBFIs
- Do bank-funded NBFIs expand credit to firms?
- Model:

$$\Delta Ln\text{Credit}_{i,j,t} = \alpha_i + \kappa_t + \beta \cdot \text{BankFunding}_{i,t-1} + \gamma X_{i,t-1} + \varepsilon_{i,j}$$

- Do we see stronger effect when the lender is the agent bank?
- Interpretation: Evidence of a robust funding channel from banks to NBFIs.
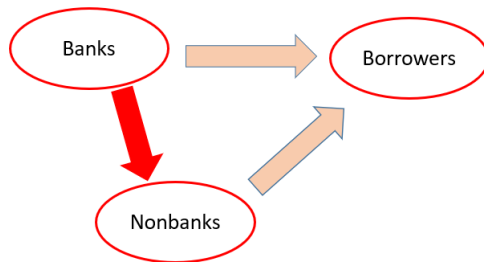
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- $\beta > 0$ — NBFIs with bank credit increase syndicate participation.

	(1)	(2)	(3)
Bank Funding	0.0733***	0.0848***	0.0747***
	(3.16)	(4.15)	(3.00)
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

Result 1: Bank-Funded NBFIs Lend More

- When the NBFI's funding bank simultaneously acts as the lead arranger in the same syndicated deal.

	(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

Result 2: Capital Constraints Increase Lending to NBFIs

- Motivation: NBFIs have higher credit ratings $\rightarrow$ lower Basel risk weights.
- Figure 5: Share of non-pass loans is higher for nonfinancial firms than NBFIs.

Share of non-pass exposures
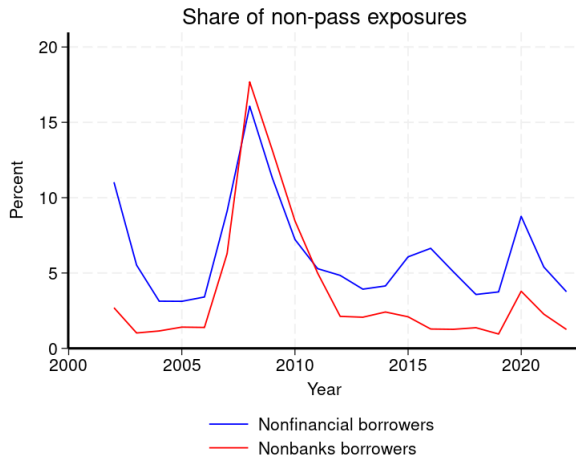
Result 2: Capital Constraints Increase Lending to NBFIs

- Banks with low Tier 1 capital shift credit portfolios to NBFIs.
- Model: Change in log commitment share per loan:

$$\Delta Ln\text{Credit}_{i,j,t} = \alpha_i + \kappa_t + \beta_1 \text{Tier1}_{i,t-1} + \beta_2 \text{Tier1}_{i,t-1} \times \text{NBFI}_j + \gamma X_{i,t-1} + \varepsilon_{i,j}$$

- Table 3: $\beta_2 > 0$ implies banks with low capital (in the bottom quartile) are more likely to increase lending to NBFIs.

Changes in banks' credit provisioning	(1)	(2)
Tier1 Ratio	0.0205***	
	(2.92)	
Tier1/rwa * Nonbank	-0.0269***	
	(-2.68)	
Nonbank	0.329***	-0.0711
	(2.76)	(-1.10)
Low_tier1		-0.0836***
		(-2.82)
Low_tier1 * Nonbank		0.209***
		(2.89)
Bank Controls	Yes	Yes
Bank FE	Yes	Yes
Year FE	Yes	Yes
Loan-Year FE	No	No
Observations	855446	855446
Adjusted R2	0.035	0.035

Result 3: Basel III Regulatory Shock

- We follow Irani et al. (2021) and define Basel III Tier 1 capital and risk weights as a surprise to U.S. banks.
- Defined capital shortfall: $\text{Tier1}_{\text{Basel I}} - \text{Tier1}_{\text{Basel III}}$
- Estimation:

$$\Delta \log(\text{Credit}_{i,j}) = \alpha + \beta_1 \cdot \text{Shortfall}_i + \beta_2 \cdot \text{Shortfall}_i \times \text{NBFI}_j + \gamma X_i + \varepsilon_{i,j}$$

- Table 6: Banks with greater shortfalls reduce credit to firms, increase credit to NBFIs.
- Table 7: Extensive margin — banks with high shortfalls retain more NBFI loans, sell firm loans.

Result 3: Basel III Regulatory Shock and Bank Lending

	All Banks		Above Median Shortfalls			
	(1)	(2)	(3)	(4)	(5)	(6) NBFI
Tier1 Shortfall	0.250 (1.56)	0.128 (0.79)	1.854*** (5.85)	0.719** (2.42)	0.297 (0.70)	-1.413** (-1.98)
Tier1 Ratio	-0.000892 (-1.11)	-0.00100 (-0.99)	0.00276*** (2.92)	0.00553*** (3.22)	0.00491** (2.08)	-0.00135 (-0.48)
Nonbank	-0.00892 (-0.94)	-0.0109 (-1.15)	-0.0604*** (-3.19)	-0.0562*** (-2.92)		
Tier1 shortfall * Nonbank	-0.353 (-1.45)	-0.430* (-1.76)	-1.418*** (-3.90)	-1.349*** (-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

Result 3: Basel III Regulatory ShockBasel III Shock and Bank 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 NBFI borrowers.

Result 4: Lending During O&G and COVID Shocks

- Two macro shocks: O&G (2014–16), COVID-19 (2020).
- Strategy: Compare banks with high vs. low pre-shock industry exposures.
- Difference-in-differences:

$$\Delta \log(\text{Credit}_{i,j}) = \alpha + \beta \cdot \text{HighExposure}_i \times \text{NBFI}_j + \gamma X_{i,j} + \varepsilon_{i,j}$$

- Exposed banks reduce lending to firms, but maintain/increase lending to NBFIs.
- On entry/exit margins, banks cut new loans to firms, but not to NBFIs.

Result 4: Oil & Gas Shock

- Is bank lending to NBFIs 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

Result 4: 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.

Result 5: 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

Result 6: Implications of NBFIs Access to Bank Credit

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

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

Result 6: Implications of NBFIs Access to Bank Credit - Direct Lending

	(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

Result 6: Implications of NBFIs Access to Bank Credit - Asset/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

Conclusion and Discussion

- Bank funding has been a major driving force behind the growth of NBFI sector.
    - Banks response to capital shocks was to lend more to NBFIs.
- Bank funding plays a crucial role in the resilience of NBFIs as reliable financial intermediaries.
- Findings generate optimism about the resilience of NBFI funding and credit provision during periods of economic downturns.
- A symbiotic bank-NBFI relationship.

Thank you!