Shadow Banks and the Dynamic Effects of Monetary Policy on Small Business Lending

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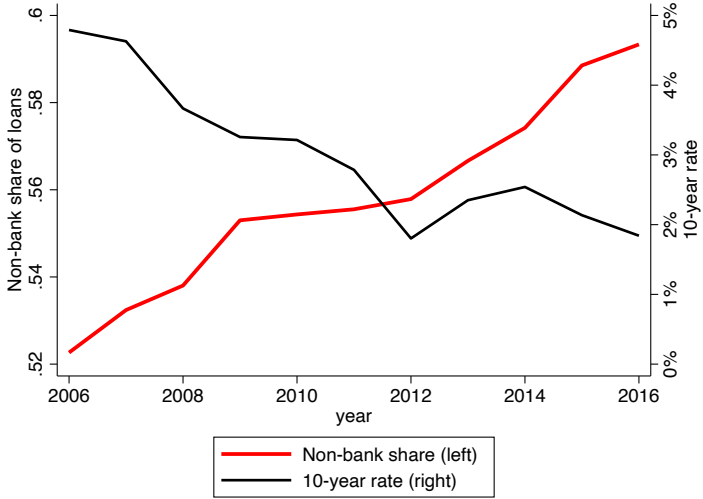
The rise of shadow banks



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  3. Small and medium businesses employ >50% of US workforce

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- But pervasive phenomenon → also in mortgages & syndicated loans
  - General concern about causes/consequences of migration to NBFIs

Different channels, different effects

- **Rate cuts** can have **positive** effect on bank lending to SMBs:
  - Asset revaluation
  - Core deposits channel

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  - Hurt bank profitability
  - Time deposits outflows

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- Different implications for NBFIs:
  1. Core deposits channel: **less** space for NBFIs
  2. Time deposits channel: **more** space for NBFIs
  3. Bank profitability channel: **more** space for NBFIs

Main Results

Key insight: Channels operate at different horizons

1. **Short-run:**

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2. **Medium/Long-run:**

   Time deposits and bank profitability channels operative: more exposed banks → lower small business lending → **higher shadow bank shares**

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3. **Real effects, long-run:**

   Employment falls in counties with banks more exposed to time deposits and bank profitability channels.

Related Literature

1. Non-bank lending:
   - **Mortgages**: Buchak et al. (2018), Demyanyk and Loutskina (2016), Fuster et al. (2019), Drechsler et al. (2022), Jiang et al. (2020), Jiang (2022), Gete and Reher (2020), Mian and Sufi (2021), Lewellen and Williams (2021), Buchak et al. (2022), Sarto and Wang (2023)
   - **C&I**: Chernenko et al. (2022), Gopal and Schnabl (2022), Irani et al. (2020)
2. Bank lending channel of monetary policy: Bernanke and Blinder (1992), Kashyap and Stein (1994, 2000), Drechsler, Savov, Schnabl (2017)...
3. Low interest rates : Abadi et al. (2022), Eggertsson et al. (2020), Heider et al. (2019), Ulate (2021), Wang et al. (2020), Wang (2022), Balloch and Koby (2022), Supera (2022)

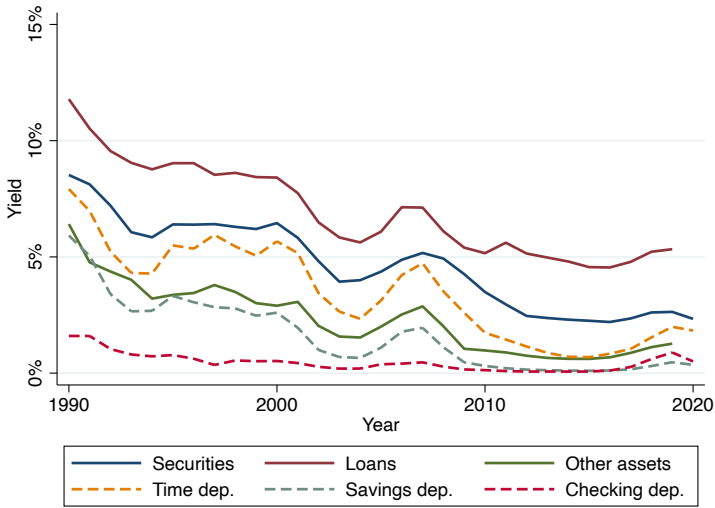
Data

- Small business lending: **UCC (2006-2016)** and CRA (1996-2016)
- Bank balance sheets: U.S. Call Reports (1984–2016)
- Employment, income, and population: BEA and BLS (1969-2019)
- Educational attainment: Census (1990, 2000, 2010, 2015-2019)
- Demographics: NBER (1990-2015)
- Fedfunds and Treasury interest rates: FRED (1962-2017)
- Real outcomes: Census Bureau's County Business Patterns (2006-2016)

UCC data

- First introduced in Gopal and Schnabl (2022).
- Secured, non-real estate business loans filed under Article 9 of the Uniform Commercial Code (UCC)
- Comprehensive coverage of small business lending in the U.S., complements syndicated loans to large firms and small bus. lending by banks in CRA.
- **Most importantly: UCC covers both banks and nonbanks**

Empirical strategy: the bank profitability channel



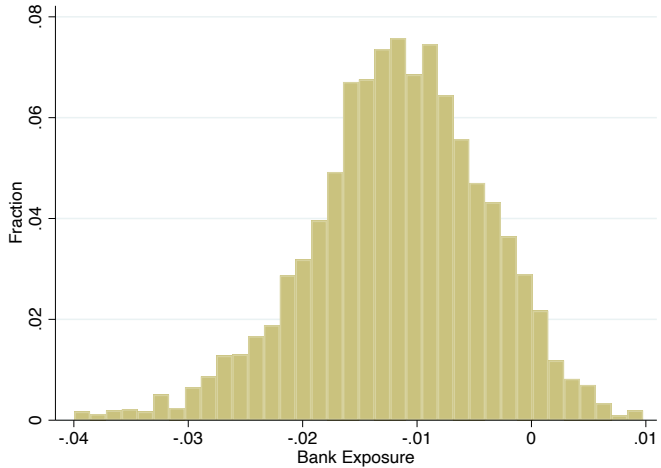
Empirical strategy: the bank profitability channel

Exposure through the bank profitability channel is a **Bartik/shift-share instrument**:

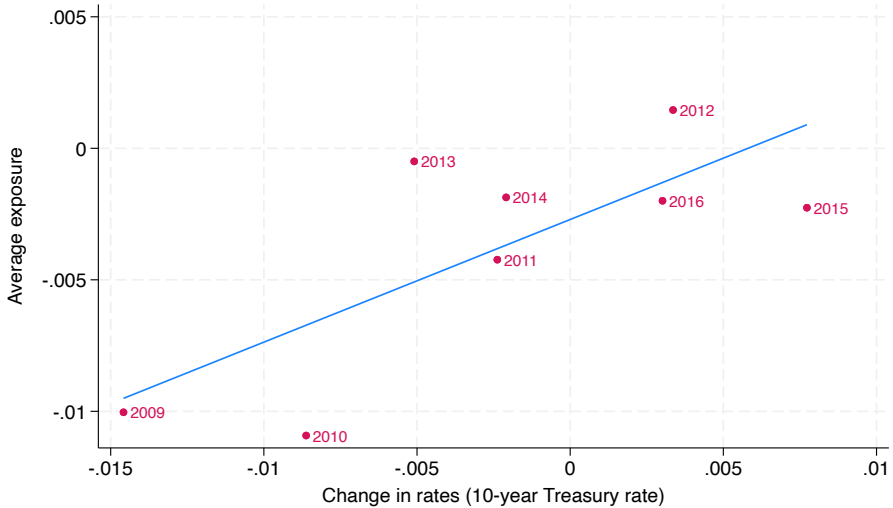
$$e_{b,t_0 \to t} = \int_{t_0}^{t} \left\{ \sum_{i \in I_A} \omega^i_{b,t_0-T} \left(r^i_s - r^i_{t_0} \right) - \sum_{i \in I_L} \omega^i_{b,t_0-T} \left(r^i_s - r^i_{t_0} \right) \right\} ds$$

- ω^i_{b,t_0-T}: lagged balance sheet weight of category i
- r^i_t: national average of category's i rate at time t
- I_A: loans, securities, other assets
- I_L: transaction deposits, savings deposits, time deposits, other liabilities

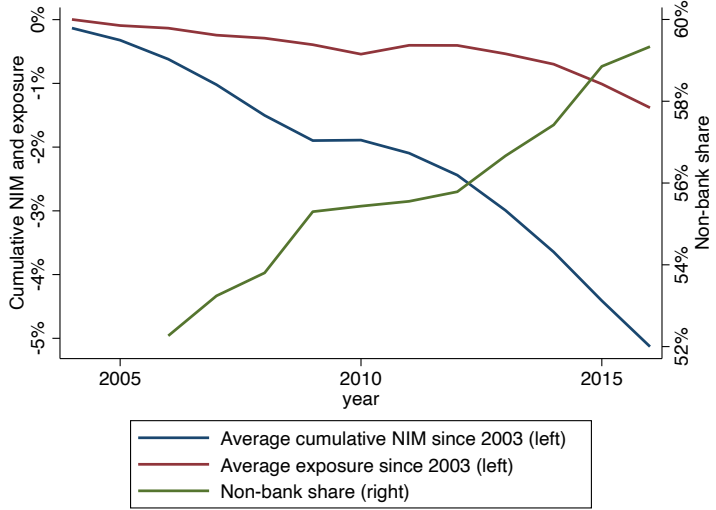
Distribution of $e_{b,2003 \rightarrow 2016}$



Exposure and changes in interest rates



Bank profitability and non-bank share



Empirical strategy: cross-county specifications

- In the cross-section we use:

$$e_{c,t\to t+h} = \sum_b \omega_{b,c,t-T} e_{b,t\to t+h}$$

$$\text{DepositBeta}_{c,t} = \sum_b \omega_{b,c,t-T} \text{DepositBeta}_{b,t}$$

$$\text{TD}_{c,t} = \sum_b \omega_{b,c,t-T} \frac{\text{TimeDeposits}_{b,t}}{\text{TotalAssets}_{b,t}}$$

where $\omega_{b,c,t-T}$ is the share of bank b's small business loans in county c at a lagged date t – T.

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- Controls: balance sheet controls, initial shadow bank share, demographics, economic indicators (income, employment, etc). List of controls

Time deposits and bank profitability, Long-run

- Time deposits channel → Supera (2022) shows show more exposed banks experience lower C&I loans growth and lower small business lending growth (CRA).

- Profitability channel → Sarto & Wang (2023) show more exposed banks:
  1. lower equity growth,
  2. lower loans growth,
  3. lower C&I loans growth,
  4. lower balance sheet size.

Time deposits and bank profitability, Long-run

	$\frac{\Delta \text{TimeDeposits}_{b,2006-2016}}{\text{TotalAssets}_{b,2006}}$	$\frac{\Delta \text{SmallBusinessLoans}_{b,2006-2016}}{\text{TotalAssets}_{b,2006}}$		
	(1)	(2)	(3)	(4)
$e_{b,2006-2016}$		0.376***		0.336***
		(0.0586)		(0.0606)
$\frac{\text{TimeDeposits}_{b,2006}}{\text{TotalAssets}_{b,2006}}$	-0.132***		-0.0244***	-0.0144***
	(0.0220)		(0.00535)	(0.00554)
	Covariates			
Bank Controls	Yes	Yes	Yes	Yes
N	2809	2385	2513	2385
R^2	0.0128	0.0170	0.00819	0.0198

* $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$

Bank profitability, Medium and Short-run

	Equity Growth				Loans Growth			
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Exposure (e_{ct})	-1.555	1.352	1.105	3.270***	1.111	3.549***	3.238***	5.681***
	(1.113)	(0.938)	(0.874)	(1.041)	(1.507)	(1.740)	(1.550)	(1.366)
Lagged Exposure (e_{ct})	-2.388	2.254**	1.957***	4.742***	-1.270	3.569***	3.285***	4.829***
	(1.752)	(0.930)	(0.753)	(1.032)	(1.633)	(1.613)	(1.188)	(1.500)
Year, Bank FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Expense Beta, Equity Ratio	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Window	1 yr	2 yrs	3 yrs	4 yrs	1 yr	2 yrs	3 yrs	4 yrs
N	42,930	19,341	8,954	4,410	42,808	12,837	6,206	6,952

* $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$

County-level results, Long run

What happened to shadow bank lending in exposed regions?

$$\Delta y_{c,2006-2016} = \gamma^{e} e_{c,2006-2016} + \gamma^{TD} TD_{c,2006} + \Gamma \cdot \text{controls}_{c,2006} + \epsilon_{c,2006-2016}$$

where:

- $\Delta y_{c,2006-2016}$ = change in shadow bank share:

$$y_{c,t} = \frac{\text{SB Loans}_{ct}}{\text{All Loans}_{ct}}$$

- And:

$$e_{c,2006-2016} = \sum_{b} \omega_{b,c,2006} e_{b,2006-2016}$$

$$TD_{c,2006} = \sum_{b} \omega_{b,c,2006} \frac{\text{TimeDeposits}_{b,2006}}{\text{TotalAssets}_{b,2006}}$$

Shadow bank share, 2006-2016

	Δ Shadow Bank Share$_{c,2006-2016}$				
	(1)	(2)	(3)	(4)	(5)
$e_{c,2006-2016}$	-0.844***	-0.820***			-0.457**
	(0.198)	(0.195)			(0.201)
$TD_{c,2006}$			0.201***	0.202***	0.185***
			(0.0233)	(0.0274)	(0.0285)
	Covariates				
County Controls	No	Yes	No	Yes	Yes
N	2895	2894	2900	2899	2894
R^2	0.00622	0.172	0.0249	0.182	0.184

* $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$

Bank and nonbank counts, 2006-2016

	Δ log(Non-Bank Loans)$_{c,2006-2016}$			Δ log(Bank Loans)$_{c,2006-2016}$			Δ log(Bank Loans)$_{b,c,2006-2016}$	
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
$e_{c,2006-2016}$	-4.404***		-2.926***	3.690***		3.206***		
	(0.799)		(0.826)	(0.840)		(0.874)		
$TD_{c,2006}$		0.860***	0.748***		-0.369***	-0.245**		
		(0.112)	(0.116)		(0.119)	(0.123)		
$e_{b,2006-2016}$							7.165***	5.178***
							(1.206)	(1.311)
$TD_{b,2006}$							-2.261***	-2.175***
							(0.229)	(0.266)
	Covariates							
County Controls	Yes	Yes	Yes	Yes	Yes	Yes	Yes	-
County FE	-	-	-	-	-	-	-	Yes
N	2922	2928	2922	2833	2839	2833	11990	11673
R^2	0.190	0.198	0.202	0.0661	0.0629	0.0674	0.0222	0.445

* $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$

Employment, 2010-2016

	$\Delta(\text{Emp})_{10-16}$	$\Delta(\text{SmallBus.Emp})_{10-16}$	$\Delta(\text{Est})_{10-16}$	$\Delta(\text{SmallEst})_{10-16}$
	(1)	(2)	(3)	(4)
$e_{b,2006-16}$	0.689**	0.178	−0.122	−0.129
	(0.303)	(0.267)	(0.257)	(0.257)
$TD_{c,2006}$	−0.118***	−0.133***	−0.108***	−0.108***
	(0.038)	(0.033)	(0.031)	(0.031)
Constant	−0.119**	−0.103**	−0.080*	−0.079*
	(0.047)	(0.043)	(0.044)	(0.044)
Controls	YES	YES	YES	YES
N	2,945	2,966	2,966	2,966
R^2	0.301	0.375	0.459	0.459

County-level results, medium- and short-run

What happens at higher frequencies?

$$\Delta y_{c,t\to t+h} = \gamma_h^{e} e_{c,t\to t+h} + \gamma_h^{TD} TD_{c,t} \times \Delta FFR_{t,t+h} + \gamma_h^{d} DepositBeta_{c,t} \times \Delta FFR_{t,t+h} + \Gamma_h \cdot controls_{c,t} + \epsilon_{c,t}$$

Key feature: γ now depends on the window h.

1yr windows: bank, nonbank counts & SB share

	Bank Growth			Non-Bank Growth			Change NB Share		
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
$e_{c,t}$	5.323		6.979	16.614***		19.706***	2.537		2.909
	(11.683)		(10.375)	(6.425)		(6.426)	(2.673)		(2.486)
$TD_{c,t} \times \Delta FFR_{t,t+1}$		0.013	0.010		0.014	0.035		0.000	0.006
		(0.032)	(0.031)		(0.028)	(0.028)		(0.007)	(0.007)
$DepositBeta_{c,t} \times \Delta FFR_{t,t+1}$	33.712***	27.510***	27.126***	9.774**	12.961***	10.478**	-5.725***	-3.454**	-3.929**
	(6.104)	(6.041)	(6.396)	(4.688)	(4.902)	(4.961)	(1.642)	(1.551)	(1.658)
Controls and Lags	YES	YES	YES	YES	YES	YES	YES	YES	YES
County and Time Window FE	YES	YES	YES	YES	YES	YES	YES	YES	YES
N	27235	27218	27216	27240	27221	27219	27185	27167	27165
R-sq	0.283	0.287	0.287	0.286	0.285	0.286	0.066	0.070	0.071

* $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$

3yr windows: bank, nonbank counts & SB share

	Bank Growth			Non-Bank Growth			Change NB Share		
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
$e_{c,t\to t+3}$	34.316***		37.605***	-54.762***		-32.749**	-20.370***		-15.626***
	(11.851)		(13.402)	(11.219)		(13.429)	(2.635)		(2.951)
$TD_{c,t} \times \Delta FFR_{t,t+3}$		25.048***	16.974**		-6.901	-4.266		-7.307***	-4.970**
		(9.342)	(7.637)		(7.390)	(6.675)		(2.283)	(2.087)
$DepositBeta_{c,t} \times \Delta FFR_{t,t+3}$	4539.335	2798.358	4880.687	105.773	359.553	158.269	-905.422	-514.287	-1004.740
	(2898.186)	(2885.001)	(2969.981)	(2557.121)	(2346.470)	(2695.235)	(718.996)	(749.771)	(763.628)
Controls and Lags	YES	YES	YES	YES	YES	YES	YES	YES	YES
County and Time Window FE	YES	YES	YES	YES	YES	YES	YES	YES	YES
N	6012	4878	4876	6014	4876	4874	5992	4876	4874
R-sq	0.527	0.549	0.556	0.485	0.473	0.484	0.473	0.495	0.509

* $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$

Conclusion

- Interest rates affect banks through different channels, and impact their market share against shadow banks in small business lending
- Different channels operate at different horizons: expansionary effects of low rates in the short run revert in the medium and long run
- Short and medium run effects relevant for MP.
  - More complex picture than standard thinking