Do banks respond to their friends' markets? Social spillovers in deposit pricing

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Motivation

- Advancements in technology broaden the geographic scope of competition and raise questions about the relevance of traditional local concentration measures in capturing pricing power of banks
- This is more relevant for small banks since small banks price deposits based on local market conditions $\rightarrow$ their customer base and business models are different to large banks
- Superior liquidity services provided by large banks make their customers less rate sensitive
- At the same time, interactions through social media platforms act as a new channel, producing novel, value-relevant information for consumers
- Deposit pricing decisions of small banks in a focal area might be influenced by deposit rate changes that occur in other - geographically distant - counties through social connections

Related literature

- Market power explains deposit-pricing behavior of large vs small banks (Sharpe 1997, Calem & Nakamura 1998; Drechsler et al. 2017).
- Recent studies challenge this: large banks use uniform deposit rate-setting policies, largely ignoring local market concentration (Granja & Paixao 2023; Begenau & Stafford 2023; d'Avernas et al. 2023)
- Online social network: important driver of consumers' decision making (Kuchler, Li, Peng, Stroebel & Zhou 2022)
- Social interactions have increasingly moved to digital social media platforms, altering how financial information is produced, distributed and consumed (Cookson, Mullins & Niessner 2024; Cao, Zhang, Feng & Meng 2021)
- Hirshleifer, Peng & Wang (2024): social connectedness on information transmission and return and volume dynamics
- Flynn & Wang (2022): social connections transmit shocks related to natural disasters that influence banks' deposit flows disasters
- Rehbein & Rother (2025): cross-county bank lending increases with social connectedness
- Zhou (2025): social networks play an important role in making Fintech lending more attractive to uninformed customers.

The paper in a nutshell

- **Small banks price deposits based on local market conditions**
- IV two-step approach: large bank branch closure in an area $\rightarrow$ large bank deposit share changes in area $\rightarrow$ deposit rates of small banks in the focal area increase as small banks compete on price to gain new customers.
- **Households' online social connections and deposit pricing of banks**
- IV two-step approach: large bank deposit share changes in socially connected areas $\rightarrow$ deposit rates of small banks in the focal area - although geographically distant - increase via the social connections of households $\rightarrow$ large banks follow a uniform pricing strategy, no reaction
- Several exercises to reinforce the social connections mechanism
  1. Exclude counties within 25 and 50-mile radius from the focal county
  2. Findings not driven by cross-country economic linkages
  3. Social connections matter only when high penetration of broadband
  4. High vs low financial sophistication
- **Social spillover accelerate the tech-driven convergence towards a common deposit rate offered by banks**
- β-convergence type model$\rightarrow$ increased social interactions effectively diminish heterogeneity across socially connected markets and prompt small banks to adjust towards a common rate

Data -bank branch level

- Quartlerly deposit rates from RateWatch; "rate setter" & "follower" branches
- Focus on 12-month CD with minimum $10,000 (*12MCD10K*); results also for (*6MCD10K*), (*12MCD100K*) & (*mm10k*)
- Branch-level data on total branch deposit amounts (FDIC-Summary of Deposits - SoD)
- Large banks if total amount of assets exceeds 100 billion
- Branch closure data (FDIC) & bank merger activity (Federal Financial Institutions Examination Council-FFIEC)

Data -social connectedness

- Social Connection Index (SCI) provided by Facebook (Bailey et al. 2018)

$$Social\ connectedness_{i,j} = \frac{number\ of\ friendship_{i,j}}{population_i \times population_j}$$

- Divide the SCI value by 1 billion in order to convert it into a weight
- Relative probability that a person in county i is acquainted with a person in county j
- SCI is constructed using the snapshot of Facebook connections at August 2020

Data -county-level characteristics

- All US counties except Alaska and Connecticut
- County-level population (*Population*) and proportion of population above 65 years old (*Seniors*), (Surveillance, Epidemiology, and End Results-SEER)
- Real GDP (*Realgdppc*) (Bureau of Economic Analysis) divided by total population
- Geographic distance between counties using the Haversine formula based on internal points in the geographic area (NBER County Distance Database)
- Financial sophistication (*Fsophistication*)
  1. Principal Component Analysis (PCA)
  2. educational attainment - proportion of the local population aged 24 years or older distributed to 7 different groups (Census Bureau)
  3. stock market participation - fractions of tax returns reporting dividend income and capital gains (IRS Statistics of Income (SOI) on Individual Income Tax Returns)

Local market competition and deposit rates - Empirical identification

- 2SLS - IV regression
- Branch closures of large banks that have been involved in a merge

1. First step: large bank branch closure as an exogenous variable for the associated change in large banks' market share.

$$\Delta LBMS_{c,t} = \alpha + \alpha_1 BC_{c,t} + \alpha_2 \Delta x_{c,t} + f_c + f_t + \epsilon_{c,t}$$

   $\Delta LBMS_{c,t}$: market share change of large banks in county c following branch closure
   $BC_{c,t}$ one if large bank branch closure
   $x_{c,t}$ set of controls in first differences

2. Second stage:

$$\Delta r_{c,t} = \beta + \beta_1 \widehat{\Delta LBMS}_{c,t} + \beta_2 \Delta x_{c,t} + f_c + f_t + \epsilon_{c,t}$$

   $\Delta r_{c,t}$: deposit rate changes of different sizes and maturities of large or small banks.

- Interaction of $\Delta LBMS$ with ($HighComp$) which equals one when the county's time-median HHI index of the small banks is lower than 1,400

Local market competition & deposit rates - Small banks (2nd stage results)

	(1) 6m10K	(2) 12m10K	(3) 12m100K	(4) mm10k	(5) 6m10K	(6) 12m10K	(7) 12m100K	(8) mm10k
LBMS	0.851***	0.822**	0.900**	0.351***	0.173	0.157	0.313	0.134
	(0.321)	(0.373)	(0.385)	(0.128)	(0.280)	(0.333)	(0.343)	(0.112)
LBMS × *HighComp*					3.328***	3.269**	2.870**	1.057**
					(1.246)	(1.403)	(1.445)	(0.485)
SBHHI	0.100	0.118	0.084	0.013	0.019	0.038	0.015	-0.013
	(0.099)	(0.119)	(0.122)	(0.042)	(0.102)	(0.123)	(0.126)	(0.042)
Seniors	1.723**	0.085	0.151	0.471	1.726**	0.087	0.156	0.472
	(0.774)	(0.878)	(0.907)	(0.332)	(0.777)	(0.880)	(0.908)	(0.333)
Population	0.000	-0.005*	-0.004	0.003**	0.000	-0.005	-0.004	0.003**
	(0.002)	(0.003)	(0.003)	(0.001)	(0.003)	(0.003)	(0.003)	(0.001)
Realgdppc	0.000	0.001	0.001	0.000**	0.000	0.001	0.001	0.000**
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
FSophistication	0.012**	0.008	0.006	0.000	0.012**	0.008	0.006	0.000
	(0.006)	(0.007)	(0.007)	(0.002)	(0.006)	(0.007)	(0.007)	(0.002)
Obs.	29,318	29,348	29,280	29,170	29,318	29,348	29,280	29,170

Local market competition & deposit rates - Large banks (2nd stage results)

	(1) 6m10K	(2) 12m10K	(3) 12m100K	(4) mm10k
LBMS	0.702***	0.402	0.112	0.110
	(0.244)	(0.278)	(0.330)	(0.086)
SBHHI	0.183**	0.072	0.032	0.006
	(0.086)	(0.089)	(0.111)	(0.019)
Seniors	-1.736**	2.768***	3.021**	0.017
	(0.823)	(0.992)	(1.184)	(0.155)
Population	-0.003**	-0.000	0.001	-0.002***
	(0.001)	(0.002)	(0.002)	(0.000)
Realgdppc	0.002***	-0.000	0.001	0.000
	(0.000)	(0.001)	(0.001)	(0.000)
FSophistication	0.006	0.011**	0.011*	-0.003***
	(0.005)	(0.005)	(0.006)	(0.001)
Obs.	17,135	17,125	17,042	16,264

Measuring social network spillovers

- *Social Deposit Rate* (*SDR*): social proximity of households in a county c to deposit rates offered peer counties:

$$SDR_{c,t} = \sum_{j \in C-c} SCI_{c,j} \times \Delta r_{j,t}$$

  $SCI_{c,j}$: SCI value between counties c and j
  $\Delta r_{j,t}$: deposit rate changes in county j at time t

- *Social Large Bank Market Share* (*SLBMS*): indirect exposure of bank in county c at time t to large banks' market share changes in all socially connected areas, :

$$SLBMS_{c,t} = \sum_{j \in C-c} SCI_{c,j} \times \Delta LBMS_{j,t}$$

- *Distant Deposit Rate* (*DDR*) with the weights being the inverse of the distance between each pair of counties

Social connectedness and deposit rates - Empirical identification

- 2SLS - IV regression
- First stage regression:

$$SDR_{c,t} = \beta + \beta_1 SLBMS_{c,t} + \beta_2 \Delta x_{c,t} + f_c + f_t + \epsilon_{c,t}$$

- Second stage regression:

$$\Delta r_{c,t} = \gamma + \gamma_1 \widehat{SDR}_{c,t} + \gamma_2 \Delta x_{c,t} + f_c + f_t + \epsilon_{c,t}$$

- γ_1 captures the deposit rate changes spillover effect
- f_c and f_t are county and time fixed effects
- $\epsilon_{c,t}$ error term adjusted for within-county correlation
- 2016 - 2023 (social network penetration above 70%)

Social connectedness and deposit rates - Empirical identification

- *SLBMS*: Bartik, *shift-share*, instrument that combines local exposure (social connections) to changes in market share of large banks in socially connected areas (Borusyak, Hull & Jaravel 2025).
- **Exclusion restriction:** Deposit rate changes in socially connected areas, driven by changes in the local market structure of these areas (the *shift*) are exogenous to focal county's bank deposit rates
- Banking market structure changes (local mergers or competitive exits) typically confined within county or metro-area boundaries $\rightarrow$ structural events in peer counties unlikely to be influenced by or responsive to market conditions in focal county
- Social connections (*share*) not confounded with focal area's deposit rate changes nor with deposit rate changes driven by changes in the connected counties' local market structure
- **Relevance:** Change in market share of large banks in socially connected areas, *SLBMS*, is correlated with *Social Deposit Rate*

Social connections and small bank deposit rate changes (2nd stage results)

	(1) 6m10K	(2) 12m10K	(3) 12m100K	(4) mm10k	(5) 6m10K	(6) 12m10K	(7) 12m100K	(8) mm10k
SDR	5.271***	5.420***	5.021***	6.680***	5.252***	5.427***	5.026***	6.674***
	(1.187)	(1.068)	(1.086)	(1.365)	(1.182)	(1.063)	(1.082)	(1.362)
SDR $\times$ *HighComp*					7.869**	4.913**	4.871*	4.265
					(3.189)	(2.480)	(2.488)	(2.910)
DDR	0.065***	0.038***	0.036***	0.091***	0.052***	0.030***	0.028***	0.082***
	(0.011)	(0.009)	(0.009)	(0.015)	(0.012)	(0.010)	(0.010)	(0.015)
SBHHI	0.123	0.080	0.016	-0.004	0.110	0.070	0.005	-0.007
	(0.140)	(0.168)	(0.174)	(0.056)	(0.141)	(0.168)	(0.174)	(0.056)
Seniors	-0.354	-1.717	-1.793	-0.285	-0.815	-1.996	-2.080	-0.369
	(1.185)	(1.357)	(1.404)	(0.505)	(1.198)	(1.363)	(1.411)	(0.508)
Population	0.001	-0.009	-0.007	0.003	0.000	-0.009	-0.007	0.003
	(0.006)	(0.008)	(0.008)	(0.003)	(0.006)	(0.008)	(0.008)	(0.003)
Realgdppc	0.001**	0.002**	0.002**	0.001***	0.001**	0.002**	0.002**	0.001***
	(0.001)	(0.001)	(0.001)	(0.000)	(0.001)	(0.001)	(0.001)	(0.000)
FSophistication	0.022**	0.020*	0.020*	-0.000	0.023**	0.021**	0.021*	0.000
	(0.009)	(0.011)	(0.011)	(0.004)	(0.009)	(0.011)	(0.011)	(0.004)
Obs.	17,162	17,191	17,152	17,055	17,162	17,191	17,152	17,055

Social connections, large bank deposit rate changes (2nd stage results)

	(1) 6m10K	(2) 12m10K	(3) 12m100K	(4) mm10k
SDR	-25.39	7.57	-32.69	1,187.6
	(24.02)	(18.89)	(36.56)	(2,355.7)
DDR	-0.112***	-0.083***	-0.093***	0.246
	(0.018)	(0.014)	(0.019)	(0.577)
SBHHI	0.423***	0.231*	0.134	-0.329
	(0.160)	(0.135)	(0.220)	(0.642)
Seniors	-3.387*	2.758	3.506	-1.175
	(1.822)	(1.841)	(2.603)	(3.906)
Population	0.001	0.004	0.006	-0.010
	(0.005)	(0.004)	(0.006)	(0.019)
Realgdppc	0.004***	0.001	0.003	0.002
	(0.001)	(0.001)	(0.002)	(0.005)
FSophistication	0.020**	0.024**	0.032**	-0.016
	(0.010)	(0.010)	(0.015)	(0.032)
Obs.	8,735	8,725	8,663	7,977

The role of financial sophistication

- A key source of banks' market power in terms of deposit rate setting could be customers' lack of financial sophistication
- Drechsler et al. (2017): deposit rates are stickier in areas with low levels of financial sophistication
- Fleckenstein & Longstaff (2024): financially unsophisticated customers might invest in (or automatically roll over into) tenors with dominated rates without being aware that there are better alternatives
- At the same time, customers with a high financial sophistication level are in general more engaged in social networks since this would require higher digital skills (Gambacorta et al. 2023)
- Split the sample into high (above the median) vs low (below the median) sophisticated markets
- In highly sophisticated markets social networks should play an important role in deposit pricing of small banks

Social connections, small bank deposit rate changes -high sophistication

	(1) 6m10K	(2) 12m10K	(3) 12m100K	(4) mm10k	(5) 6m10K	(6) 12m10K	(7) 12m100K	(8) mm10k
SDR	6.329***	6.003***	5.995***	7.416***	6.673***	6.249***	6.256***	7.616***
	(0.863)	(0.848)	(0.813)	(1.068)	(0.869)	(0.846)	(0.813)	(1.055)
SDR × *HighComp*					7.038***	4.999**	5.199**	3.840
					(2.538)	(2.080)	(2.051)	(2.515)
DDR	0.063***	0.038***	0.031***	0.084***	0.041***	0.022	0.014	0.071***
	(0.013)	(0.012)	(0.012)	(0.017)	(0.015)	(0.014)	(0.013)	(0.018)
SBHHI	0.106	0.238	0.183	0.136*	0.106	0.239	0.184	0.136*
	(0.206)	(0.247)	(0.258)	(0.073)	(0.205)	(0.247)	(0.257)	(0.073)
Seniors	-0.407	-0.796	-1.046	-0.127	-0.514	-0.841	-1.102	-0.136
	(1.564)	(1.834)	(1.913)	(0.675)	(1.562)	(1.831)	(1.910)	(0.675)
Population	0.008	-0.007	-0.009	0.003	0.008	-0.007	-0.009	0.003
	(0.006)	(0.010)	(0.011)	(0.003)	(0.006)	(0.010)	(0.010)	(0.003)
Realgdppc	-0.000	0.000	-0.000	0.000	-0.000	0.000	-0.000	0.000
	(0.001)	(0.001)	(0.001)	(0.000)	(0.001)	(0.001)	(0.001)	(0.000)
Obs.	7,661	7,672	7,649	7,613	7,661	7,672	7,649	7,613

Social connections, small bank deposit rate changes - low sophistication

	(1) 6m10K	(2) 12m10K	(3) 12m100K	(4) mm10k	(5) 6m10K	(6) 12m10K	(7) 12m100K	(8) mm10k
SDR	97.580	-5.217	-51.277	22.783	54.418	-6.163	-67.572	20.140
	(450.149)	(25.180)	(173.178)	(21.648)	(130.642)	(27.783)	(294.054)	(17.994)
SDR × *HighComp*					-47.807	8.281	46.472	-17.495
					(165.006)	(26.358)	(215.938)	(36.032)
DDR	-0.469	0.089	0.339	-0.042	-0.167	0.085	0.378	0.003
	(2.566)	(0.136)	(0.949)	(0.167)	(0.577)	(0.133)	(1.394)	(0.119)
SBHHI	-0.866	0.055	0.335	-0.117	-0.322	0.045	0.355	-0.103
	(4.817)	(0.364)	(1.569)	(0.087)	(1.182)	(0.361)	(2.099)	(0.088)
Seniors	13.890	-4.489	-13.885	0.853	10.281	-5.207	-20.391	1.041
	(69.643)	(5.738)	(37.391)	(1.709)	(30.147)	(7.392)	(76.465)	(1.954)
Population	0.196	-0.039	-0.150	0.016	0.126	-0.046	-0.221	0.017
	(1.004)	(0.066)	(0.460)	(0.020)	(0.377)	(0.083)	(0.899)	(0.022)
Realgdppc	-0.017	0.006	0.016	0.000	-0.007	0.006	0.019	0.000
	(0.097)	(0.006)	(0.039)	(0.002)	(0.027)	(0.006)	(0.063)	(0.001)
Obs.	9,501	9,519	9,503	9,442	9,501	9,519	9,503	9,442

Robustness tests- Geographic proximity

- Assumption: socially connected counties are geographically and administratively distinct from the focal county
- Control for the distance between socially connected counties using a distance-weighted measure of deposit rates (DDR)
- Additional tests to confirm that our measure of social proximity of deposit rates is not confounded with physical proximity
- Exclude all counties within 25-mile and 50-mile radius from the focal county c from the calculation of the social-connections weighted variables
- Counties are geographically distant "enough" and the only connection is though social networks

Social connections and small bank deposit rate changes - 25miles radius

	(1) 6m10K	(2) 12m10K	(3) 12m100K	(4) mm10k	(5) 6m10K	(6) 12m10K	(7) 12m100K	(8) mm10k
SDR	6.619***	6.973***	6.667***	9.160***	6.482***	6.884***	6.577***	9.048***
	(1.217)	(1.180)	(1.157)	(1.394)	(1.219)	(1.185)	(1.164)	(1.400)
SDR × *HighComp*					7.642*	6.741**	6.678**	7.336*
					(3.974)	(3.276)	(3.261)	(3.824)
SBHHI	0.156	0.096	0.025	0.007	0.145	0.084	0.012	0.004
	(0.140)	(0.168)	(0.173)	(0.057)	(0.141)	(0.168)	(0.174)	(0.057)
Seniors	0.134	-1.514	-1.594	-0.047	-0.319	-1.901	-1.988	-0.195
	(1.190)	(1.365)	(1.410)	(0.507)	(1.204)	(1.369)	(1.416)	(0.510)
Population	0.006	-0.005	-0.003	0.006**	0.004	-0.007	-0.005	0.006**
	(0.006)	(0.008)	(0.008)	(0.003)	(0.006)	(0.007)	(0.008)	(0.003)
Realgdppc	0.001	0.001*	0.001*	0.001**	0.001	0.001*	0.001*	0.001**
	(0.001)	(0.001)	(0.001)	(0.000)	(0.001)	(0.001)	(0.001)	(0.000)
FSophistication	0.020**	0.018*	0.018*	-0.002	0.021**	0.020*	0.019*	-0.001
	(0.009)	(0.011)	(0.011)	(0.004)	(0.009)	(0.011)	(0.011)	(0.004)
Obs.	17,162	17,191	17,152	17,055	17,162	17,191	17,152	17,055

Social connections and small bank deposit rate changes - 50miles radius

	(1) 6m10K	(2) 12m10K	(3) 12m100K	(4) mm10k	(5) 6m10K	(6) 12m10K	(7) 12m100K	(8) mm10k
SDR	7.525***	8.726***	8.660***	11.318***	7.666***	8.770***	8.699***	11.375***
	(1.465)	(1.375)	(1.330)	(1.630)	(1.461)	(1.367)	(1.324)	(1.618)
SDR × *HighComp*					10.664	2.513	2.410	8.049
					(9.637)	(6.088)	(6.141)	(6.967)
SBHHI	0.179	0.126	0.050	0.011	0.166	0.122	0.047	0.008
	(0.142)	(0.171)	(0.175)	(0.057)	(0.143)	(0.171)	(0.176)	(0.057)
Seniors	0.141	-1.433	-1.466	-0.060	-0.245	-1.521	-1.554	-0.166
	(1.204)	(1.366)	(1.416)	(0.509)	(1.245)	(1.377)	(1.429)	(0.514)
Population	0.005	-0.006	-0.004	0.006**	0.004	-0.006	-0.004	0.005**
	(0.006)	(0.007)	(0.008)	(0.003)	(0.006)	(0.007)	(0.008)	(0.003)
Realgdppc	0.001	0.001	0.001*	0.001**	0.001	0.001	0.001*	0.001**
	(0.001)	(0.001)	(0.001)	(0.000)	(0.001)	(0.001)	(0.001)	(0.000)
FSophistication	0.024***	0.023**	0.021**	-0.000	0.025***	0.023**	0.022**	0.000
	(0.009)	(0.011)	(0.011)	(0.004)	(0.009)	(0.011)	(0.011)	(0.004)
Obs.	17,162	17,191	17,152	17,055	17,162	17,191	17,152	17,055

Robustness tests - Economic proximity

- If two counties share similar industrial structures, then these may share stronger economic ties, such as through trade, labor mobility or migration patterns (Flynn & Wang 2022)
- For each county-year, share of total county employment in each 2-digit NAICS sector (BLS Quarterly Census of Employment and Wages)
- $EP_{c,j,t}$: cosine similarity of industry employment shares for each county pair
- *Economic Proximity Deposit Rate* ($EPDR$): indirect exposure of county c to deposit rate changes in economically connected counties:

$$EPDR_{c,t} = \sum_{j \in C-c} EP_{c,j,t} \times \Delta r_{j,t}$$

Social connections, small bank deposit rate changes - Economic proximity

	(1) 6m10K	(2) 12m10K	(3) 12m100K	(4) mm10k
SDR	5.341***	5.522***	5.114***	6.821***
	(1.250)	(1.128)	(1.143)	(1.456)
DDR	0.064***	0.037***	0.035***	0.088***
	(0.012)	(0.010)	(0.010)	(0.016)
EPDR	0.049	0.067	0.063	0.095
	(0.068)	(0.060)	(0.060)	(0.088)
SBHHI	0.118	0.073	0.008	-0.007
	(0.141)	(0.169)	(0.174)	(0.056)
Seniors	-0.353	-1.695	-1.770	-0.280
	(1.185)	(1.358)	(1.405)	(0.505)
Population	0.001	-0.009	-0.007	0.003
	(0.006)	(0.008)	(0.008)	(0.003)
Realgdppc	0.001**	0.002**	0.002**	0.001***
	(0.001)	(0.001)	(0.001)	(0.000)
FSophistication	0.022**	0.020*	0.020*	-0.000
	(0.009)	(0.011)	(0.011)	(0.004)
Obs.	17,162	17,191	17,152	17,055

Robustness tests - Residential broadband connections

- *Social Deposit Rate* (SDR) and *Social Large Bank Market Share* ($SLBMS$) controlling for internet access:

$$SDR_{c,t}^{rob} = I_{c,t} \times \sum_{j \in C-c} SCI_{c,j} \times I_{j,t} \times \Delta r_{j,t}$$

$$SLBMS_{c,t}^{rob} = I_{c,t} \times \sum_{j \in C-c} SCI_{c,j} \times I_{j,t} \times \Delta LBMS_{j,t}$$

  $I_{c,t}$ and $I_{j,t}$ one if more than 40% of households have Residential Fixed Broadband Connections with a Downstream Speed of at least 10 Mbps
- Identification relies on variability of residential broadband connections over time as a proxy of the activity of local households in social media

Social connections, small bank deposit rate changes - Internet access

	(1) 6m10K	(2) 12m10K	(3) 12m100K	(4) mm10k
SDR	7.671***	6.989***	7.193***	8.713***
	(1.091)	(1.034)	(1.009)	(1.269)
DDR	0.065***	0.045***	0.039***	0.095***
	(0.010)	(0.008)	(0.008)	(0.012)
SBHHI	0.111	0.035	0.008	
	(0.144)	(0.171)	(0.177)	(0.056)
Seniors	-0.369	-1.711	-1.717	-0.328
	(1.241)	(1.405)	(1.461)	(0.509)
Population	0.002	-0.008	-0.006	0.003
	(0.006)	(0.008)	(0.008)	(0.003)
Realgdppc	0.000	0.001	0.001	0.000
	(0.001)	(0.001)	(0.001)	(0.000)
FSophistication	0.026***	0.026**	0.026**	0.002
	(0.009)	(0.011)	(0.011)	(0.004)
Obs.	17,162	17,191	17,152	17,055

Social connections and uniform pricing

Corollary: increased social linkages are associated with uniformity in small bank deposit rates across socially connected areas, effectively diminishing local pricing heterogeneity and promoting convergence towards an equilibrium deposit rate

- β-convergence (Barro & Sala-i Martin 1992; Kremer, Willis & You 2022)
- Adjusted β-convergence model:

$$\begin{aligned}\Delta(r_{c,t} - r^{sc}_{c,t}) = \alpha_1 SC_{c,t-1} + \alpha_2 SC_{c,t-1} \times (r_{c,t-1} - r^{sc}_{c,t-1}) \\ + \beta(r_{c,t-1} - r^{sc}_{c,t-1}) + x_{c,t} + f_c + f_t + \epsilon_{c,t}\end{aligned} \tag{1}$$

- $r^{sc}_{c,t} = \sum_{j \in C-c} \frac{SCI_{c,j}}{\sum_{j \in C-c} SCI_{c,j}} r_{j,t}$
- $\Delta(r_{c,t} - r^{sc}_{c,t}) = (r_{c,t} - r^{sc}_{c,t}) - (r_{c,t-1} - r^{sc}_{c,t-1})$.
- $SC_{c,t-1} = \sum_{j \in C-c} SCI_{c,j} \times U_t$, where U_t: number of total users of social network
- α_2: negative sign $\rightarrow$ as social connections intensify, the gap between a county's deposit rates and the weighted average of their socially connected counties tends to decrease.

Use of social media and small banks uniform pricing (ols results)

	(1) 6m10K	(2) 12m10K	(3) 12m100K	(4) mm10k
$SC \times (r_{c,t-1} - r^{sc}_{c,t-1})$	-0.002***	-0.001***	-0.001***	-0.000
	(0.000)	(0.000)	(0.000)	(0.000)
$(r_{c,t-1} - r^{sc}_{c,t-1})$	-0.088***	-0.109***	-0.086***	-0.113***
	(0.005)	(0.004)	(0.004)	(0.004)
SC	0.001***	0.001**	0.001**	0.000***
	(0.000)	(0.000)	(0.000)	(0.000)
SBHHI	-0.010*	-0.014*	-0.018**	-0.004
	(0.006)	(0.008)	(0.008)	(0.003)
Seniors	-0.182***	-0.168***	-0.159***	-0.063***
	(0.043)	(0.050)	(0.053)	(0.019)
Population	0.008	0.017*	0.019**	0.016***
	(0.008)	(0.009)	(0.010)	(0.004)
Realgdppc	-0.000	-0.000	0.000	0.000
	(0.000)	(0.000)	(0.000)	(0.000)
FSophistication	0.001	-0.001	-0.002	-0.000
	(0.001)	(0.001)	(0.001)	(0.000)
Constant	-0.003	-0.032	-0.042	-0.047***
	(0.032)	(0.037)	(0.038)	(0.015)
Obs.	143,461	143,555	144,811	142,890

Use of social media and large banks uniform pricing (ols results)

	(1) 6m10K	(2) 12m10K	(3) 12m100K	(4) mm10k
$SC \times (r_{c,t-1} - r^{SC}_{c,t-1})$	0.001*	0.001	0.000	-0.002**
	(0.000)	(0.000)	(0.000)	(0.001)
$(r_{c,t-1} - r^{SC}_{c,t-1})$	-0.054***	-0.078***	-0.081***	-0.100***
	(0.005)	(0.004)	(0.004)	(0.005)
SC	0.001***	0.001***	0.002***	-0.000
	(0.000)	(0.000)	(0.000)	(0.000)
SBHHI	-0.002	-0.004	-0.005	0.001
	(0.004)	(0.004)	(0.005)	(0.001)
Seniors	0.005	0.022	0.064	0.008
	(0.033)	(0.037)	(0.051)	(0.008)
Population	0.063***	0.033***	0.057***	0.005***
	(0.006)	(0.007)	(0.008)	(0.001)
Realgdppc	0.000***	0.000***	0.000***	0.000*
	(0.000)	(0.000)	(0.000)	(0.000)
FSophistication	-0.002**	-0.001*	-0.002**	-0.000
	(0.001)	(0.001)	(0.001)	(0.000)
Constant	-0.268***	-0.146***	-0.257***	-0.020***
	(0.027)	(0.030)	(0.039)	(0.006)
Obs.	91,068	91,079	91,826	87,787

Uniform pricing and competition

- If market concentration of small banks in the county is low, then competitive forces will amplify the effect of social networks on uniform pricing
- Triple interaction:

$$
\begin{aligned}
\Delta(r_{c,t} - r^{sc}_{c,t}) = {} & \alpha_1 SC_{c,t-1} + \alpha_2 SC_{c,t-1} \times (r_{c,t-1} - r^{sc}_{c,t-1}) \\
& + \alpha_3 SC_{c,t-1} \times HighComp + \beta_1 (r_{c,t-1} - r^{sc}_{c,t-1}) \\
& + \beta_2 (r_{c,t-1} - r^{sc}_{c,t-1}) \times HighComp \\
& + \alpha_4 SC_{c,t-1} \times (r_{c,t-1} - r^{sc}_{c,t-1}) \times HighComp \\
& + x_{c,t} + f_c + f_t + \epsilon_{c,t}
\end{aligned} \tag{2}
$$

- α_4 negative and statistically significant $\rightarrow$ convergence is observed in markets with high competition between small banks

Uniform pricing and competition (ols results)

	(1) 6m10K	(2) 12m10K	(3) 12m100K	(4) mm10k
$SC \times (r_{c,t-1} - r^{sc}_{c,t-1}) \times HighComp$	-0.008***	-0.006***	-0.003**	-0.005***
	(0.001)	(0.001)	(0.001)	(0.001)
$SC \times (r_{c,t-1} - r^{sc}_{c,t-1})$	-0.001***	-0.000	-0.000	-0.000
	(0.000)	(0.000)	(0.000)	(0.000)
$(r_{c,t-1} - r^{sc}_{c,t-1})$	-0.105***	-0.122***	-0.103***	-0.120***
	(0.006)	(0.005)	(0.005)	(0.005)
$(r_{c,t-1} - r^{sc}_{c,t-1}) \times HighComp$	0.078***	0.060***	0.057***	0.044***
	(0.012)	(0.010)	(0.010)	(0.010)
SC	0.001***	0.001***	0.001**	0.000***
	(0.000)	(0.000)	(0.000)	(0.000)
$SC \times HighComp$	0.002***	0.001*	0.001	0.001**
	(0.001)	(0.001)	(0.001)	(0.000)
$SBHHI$	-0.010	-0.014*	-0.018**	-0.003
	(0.006)	(0.008)	(0.008)	(0.003)
$Constant$	-0.001	-0.033	-0.042	-0.047***
	(0.032)	(0.037)	(0.038)	(0.015)
Obs.	143,461	143,555	144,811	142,890

Conclusions

- We confirm previous findings that large banks price uniformly while providing new evidence that small banks price deposits based on local market conditions
- Leveraging exogenous shifts in local market structure in socially connected areas, we assess the subsequent impact on small banks' deposit rate changes
- We find that deposit pricing decisions of small banks in a focal area are influenced by deposit rate changes that occur in other counties through social connections and the effects is more pronounced in highly competitive areas
- We offer evidence that the mechanism of the social networks spillover effect is financial sophistication $\rightarrow$ Having a less-sophisticated customer base provides banks with market power and these customers are less engaged in social networks
- We find that the gap between the deposit rates offered by both small and large banks in a county and those offered by their peers shrinks over time as new technologies reduce the importance of geographic distance
- Social spillover effects play a key role in the speed of convergence towards a common deposit rate only for the small banks validating further our baseline results

Appendix

Summary statistics

Table 1: **Summary statistics of deposit rates (time-differences)**

	Small Banks Δr				Large Banks Δr			
Stats	**6m10K**	**12m10K**	**12m100K**	**mm10k**	**6m10K**	**12m10K**	**12m100K**	**mm10k**
N	34,787	34,817	34,745	34,639	21,847	21,837	21,741	20,876
Mean	0.093	0.109	0.111	0.026	0.026	0.023	0.033	-0.001
SD	0.372	0.456	0.470	0.138	0.161	0.201	0.248	0.038
p1	-0.675	-0.886	-0.916	-0.255	-0.340	-0.650	-0.750	-0.080
p50	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
p99	1.848	1.996	2.028	0.700	1.049	1.065	1.200	0.240

Table 2: **Principal components analysis: Top four components**

Component	Eigenvalue	Proportion	Cumulative
Comp1	4.564	0.507	0.507
Comp2	1.561	0.173	0.681
Comp3	1.062	0.118	0.799
Comp4	0.633	0.070	0.869

Table 3: **Principal components analysis: Top four components loadings**

Variable	Comp1	Comp2	Comp3	Comp4
Grade8	-0.296	-0.356	-0.161	0.604
Grade9-12	-0.404	-0.175	-0.083	-0.016
HSdiploma	-0.301	0.327	0.579	-0.266
College	0.112	0.450	-0.694	-0.289
Associate	0.214	0.497	0.003	0.658
Bachelor	0.414	-0.269	-0.084	-0.051
Graduate	0.336	-0.456	-0.020	-0.175
Dividends	0.402	0.001	0.298	0.045
Capgains	0.393	0.076	0.235	0.114