Bank Diversification and Lending Resiliency

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Motivation

Bank lending is an important driver of economic activity.

- Critical to encourage recovery during negative economic shocks.
  - Bernanke and Gertler (1995); Peek and Rosengren (1997, 2000); Bebchuk and Goldstein (2011).

Over the last few decades, banks have become increasingly diversified and expanded into new lines of business.

How diversification affects lending is unclear:

- Stronger lending resiliency—Less correlated earnings reduce sensitivity to shocks.
- Might distract banks from core activity of lending.
- More interconnected banks and heightened systemic risk.
  - Acharya (2009); Chu, Deng, and Xia (2019); Goldstein, Kopytov, Shen, and Xiang (2020); Ibragimov, Jaffee, and Walden (2011); Wagner (2010, 2011).

This Paper

We consider two major kinds of **asset diversification**:

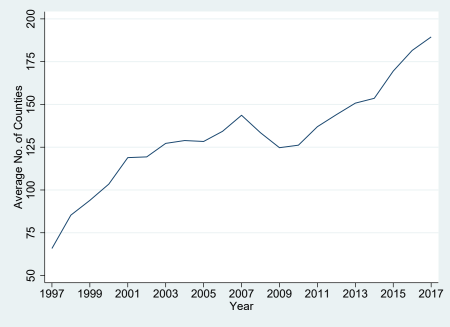
- Lending in more geographic markets $\Rightarrow$ geographic diversification.
- Undertaking more non-lending activities $\Rightarrow$ business line diversification.

Key takeaways:

- More diversification $\Rightarrow$ Banks better absorb negative shocks.
- **Higher** and **more resilient** credit supply over the business cycle and during economic downturns.
- **Positive spillovers** - more diversified banks contribute to higher employment.
- Provide some counterbalance to concerns about negative effects of bank diversification.

Geographic Diversification

- No. counties where bank reports small business or mortgage lending activity.
- Gain exposure to customers in areas that are imperfectly correlated with their existing pool of loans.
- Trend toward geographical diversification:



We separate asset diversification from funding diversification and bank size.

Underlying Mechanism

Quarterly BHC panel from 1997–2017:

	Idiosyncratic Risk (ROE)	Idiosyncratic Risk (ROA)	ROE Volatility	ROA Volatility
Log No. Counties, Loans	**-0.143****	**-0.0109****	**-0.186****	**-0.0149****
	(0.0648)	**(0.00499)**	**(0.0912)**	**(0.00660)**
Log No. Counties, Deposits	-0.107	-0.0110	-0.118	-0.0175
	(0.140)	(0.0104)	(0.194)	(0.0135)
Log Assets	0.418***	0.0283***	0.753***	0.0527***
	(0.144)	(0.0109)	(0.200)	(0.0146)
Other Controls	Yes	Yes	Yes	Yes
Bank Fixed Effects	Yes	Yes	Yes	Yes
Year-Quarter Fixed Effects	Yes	Yes	Yes	Yes
Observations	34,873	34,873	34,873	34,873
Adjusted R^2	0.468	0.423	0.468	0.440

- Other controls: Z-Score, ROA, Deposits to Assets, Equity to Assets

Increase in diversification $\Rightarrow$ Banks better absorb negative shocks:

- Lower idiosyncratic risk
- Higher earnings resiliency

Diversification and Lending During the Financial Crisis

Exploiting the heterogeneity in diversification *prior* to the crisis.

$$\begin{aligned}\text{Loans to Assets}_{it} = & \beta_1 \text{High Geo. Div.}_{i,\text{Pre-Crisis}} \times \text{Post-Crisis}_t \\ & + \beta_2 \text{Bank Controls}_{i,\text{Pre-Crisis}} \times \text{Post-Crisis}_t + \alpha_i + \gamma_t + \varepsilon_{it}\end{aligned}$$

- *High Geo. Div.*=1 if top quartile by no. of counties, 0 if bottom quartile.
- *Post-Crisis*=1 for 2008Q1-2010Q4, 0 for 2005Q1-2007Q4.

	Loans to Pre-Crisis Assets	Real Est. Loans to Pre-Crisis Assets	C&I Loans to Pre-Crisis Assets
High Geo. Div. × Post-Crisis	0.101***	0.0693***	0.0162**
	(0.0263)	(0.0185)	(0.00713)
Controls × Post-Crisis	Yes	Yes	Yes
Bank Fixed Effects	Yes	Yes	Yes
Year-Quarter Fixed Effects	Yes	Yes	Yes
Observations	5,228	5,228	5,228
Adjusted R^2	0.728	0.831	0.894

- Most geographically diversified banks: **10.1%** more loans over the crisis.

Diversification and Small Business Lending During the Financial Crisis

To show the spillovers to the economy, turn to small business lending.

Small Business Lending (SBL):

- Important driver of economic growth and employment (45% of GDP, employ 47% of the private workforce).
- Highly bank-dependent (exposed to financial constraints; Holmstrom, 1979) $\Rightarrow$ more pronounced real effects.
- Reported annually at a granular county-level for each bank.

We control for local economic conditions (loan demand) using county-year fixed effects (Khwaja and Mian, 2008).

$$\begin{aligned}\text{Log SBL}_{ict} =& \beta_1 \text{High Geo. Div.}_{i,\text{Pre-Crisis}} \times \text{Post Crisis}_t \\ & + \beta_2 \text{Bank Controls}_{i,\text{Pre-Crisis}} \times \text{Post Crisis}_t + \alpha_{ic} + \gamma_{ct} + \varepsilon_{ict}\end{aligned}$$

Diversification and Small Business Lending During the Financial Crisis

	Log SBL, Bank-County Level			
High Geo. Div. × Post-Crisis	0.994***	0.879***	1.389***	1.378***
	(0.269)	(0.283)	(0.370)	(0.419)
Controls × Post-Crisis	Yes	Yes	Yes	Yes
Matched Sample	No	No	Yes	Yes
Bank-County Fixed Effects	Yes	Yes	Yes	Yes
Year Fixed Effects	Yes	No	Yes	No
County-Year Fixed Effects	No	Yes	No	Yes
Observations	173,682	173,584	125,489	125,325
Adjusted R^2	0.850	0.847	0.873	0.867

- For most diversified banks prior to crisis:
  - Maintain **2x** higher SBL.
- Holds for matched sample on size and funding quartiles and other controls.
- Robust to mergers, market share, systematic risk, and dropping the big 4.

Diversification and SBL During the Financial Crisis: County Level

	Log SBL, County Level		Log Small Business Employment	
Geo. Div. × Post-Crisis	0.0770***	0.0340**	0.0135***	0.0136***
	(0.0263)	(0.0163)	(0.00309)	(0.00315)
Controls	Yes	Yes	Yes	Yes
Controls × Post-Crisis	Yes	Yes	Yes	Yes
Year Fixed Effects	Yes	Yes	Yes	Yes
State Fixed Effects	Yes	No	Yes	No
LMA Fixed Effects	No	Yes	No	Yes
Observations	19,224	18,696	18,226	18,202
Adjusted R^2	0.410	0.633	0.344	0.613

- For 1 SD increase in county diversification:
  - **Aggregate SBL** increases by about **3.5%**.
  - **1.4%** higher **small business employment**.
- Diversified banks do not simply capture market share of other banks.
- Diversification-induced lending resiliency is beneficial during the financial crisis, when maintaining credit availability is paramount.

Asset Diversification and Bank Lending

$$Y_{it} = \beta_1 \text{Log No. Counties}_{it-1} + \beta_2 \text{Bank Controls}_{it-1} + \alpha_i + \gamma_t + \varepsilon_{it}.$$

	Loans to Assets	
Log No. Counties, Loans	0.0300***	0.0310***
	(0.00370)	(0.00375)
Other Controls	No	Yes
Bank Fixed Effects	Yes	Yes
Year-Quarter Fixed Effects	Yes	Yes
Observations	37,452	37,452
Adjusted R^2	0.787	0.795

- Quarterly BHC panel from 1997–2017.
- 1 SD increase in log no. counties ⇒ **3.8%** SD increase in loans to assets.
- Results robust for:
  - Log no. states.
  - HHI-based geographic measure.

Shocks to Geographic Diversification

Riegle-Neal Interstate Banking and Branching Efficiency Act of 1994

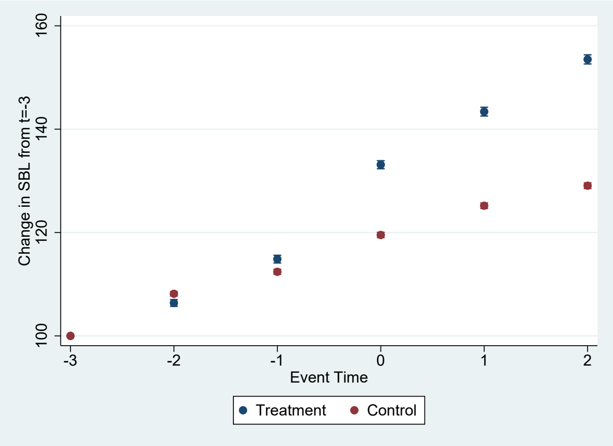
- Removed several obstacles to banks opening branches in other states and reduced barriers to expansion.
- Staggered implementation by state (Rice and Strahan, 2010; Krishnan, Nandy, and Puri, 2014).

Difference-in-differences setting:

- Use **19** distinct regulatory changes from 1998-2008.
- **Treatment group**: Banks that lend in the deregulated state.
- **Control group**: Banks that do not lend in the deregulated state.

Shocks to Geographic Diversification

Lending in states that **do not** experience the regulatory change:



Shocks to Geographic Diversification, Bank-County Level

	Log SBL, Bank-County Level	
Treat × Post	0.155***	0.179***
	(0.0448)	(0.0507)
Matched Sample	No	Yes
Cohort by Bank-County Fixed Effects	Yes	Yes
Cohort by County-Year Fixed Effects	Yes	Yes
Observations	1,073,550	438,487
Adjusted R^2	0.788	0.781

- Treated banks increase SBL in unaffected states by **16.7%** relative to the untreated banks.
- Verify treated banks utilize the new opportunity to diversify in affected states ⇒ observed increase in lending in unaffected states not substituting for losses in deregulated ones.
- Robustness: matching, banks entering upon deregulation, alternative DiD, non-deposit collectors, excluding neighboring states.
- Find evidence of lending and employment effects at the **county level**.

Business Line Diversification and Bank Lending

So far, we analyzed one dimension of asset diversification: The effect of geographic diversification on credit supply and the real economy.

Another dimension of asset diversification: **non-lending business activities**.

- Insurance activities.
- Security broker-dealer and Investment banking.
- Trust/Fiduciary activities.
- Securitization.
- Trading.

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Effects of business line and geographic diversification are not necessarily similar:

- Imperfect correlation between these activities and lending $\Rightarrow$ similar benefits of diversification.
- Increased non-lending activities may distract banks from lending.
- Negative impact on the banking system (e.g., Brunnermeier et al., 2020).

Business Line Diversification and Lending

Insurance activity supports lending resilience during the financial crisis.

	Loans to Pre-Crisis Assets				
Ins. Subsid. × Post-Crisis	0.0295**				
	(0.0132)				
Sec. B-D Subsid. × Post-Crisis		0.00102			
		(0.0245)			
Non-Dep. Trust × Post-Crisis			-0.00789		
			(0.0188)		
Securitization Subsid. × Post-Crisis				0.00667	
				(0.0379)	
Trading Activity × Post-Crisis					-0.0286
					(0.0194)
Controls × Post-Crisis	Yes	Yes	Yes	Yes	Yes
Bank Fixed Effects	Yes	Yes	Yes	Yes	Yes
Year-Quarter Fixed Effects	Yes	Yes	Yes	Yes	Yes
Observations	19,670	19,670	19,670	19,670	19,670
Adjusted R^2	0.689	0.687	0.687	0.687	0.688

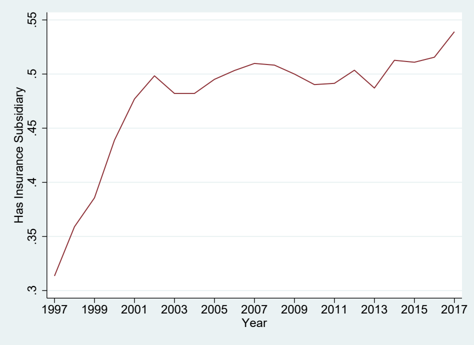
Standard errors in parentheses. * p<.10, ** p<.05, *** p<.01

- No similar benefits were found for other business lines.

Insurance Underwriting

We analyze diversification into insurance underwriting:

- Expected to reduce bank earnings volatility (Lown, Osler, Sufi, and Strahan, 2000).
- Relatively new and unexplored in the literature.
- Among most common non-lending business lines—around half of banks own at least one domestic insurance subsidiary by 2017.



Business Line Diversification and Lending during the Financial Crisis

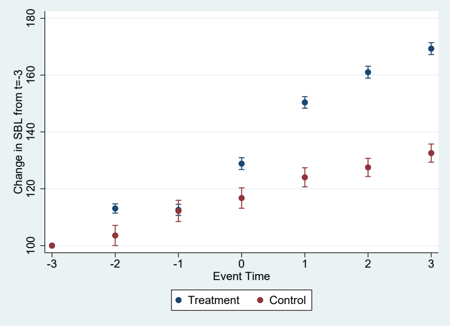
	Log SBL, Bank-County Level	Log SBL, County Level	Log Small Business Employment
Insur. Subsid. × Post-Crisis	0.303**		
	(0.122)		
County Insur. Div. × Post-Crisis		0.0190**	0.00372***
		(0.00803)	(0.00141)
Control Variables	Yes	Yes	Yes
Bank-County Fixed Effects	Yes	No	No
County-Year Fixed Effects	Yes	No	No
LMA Fixed Effects	No	Yes	Yes
State-Year Fixed Effects	No	Yes	Yes
Observations	239,955	18,695	18,196
Adjusted R^2	0.837	0.660	0.621

- Banks with at least one insurance underwriting subsidiary maintain **35%** more lending during the crisis.
- Positive spillovers to the economy:
  - Counties with more diversified banks $\Rightarrow$ higher SBL and employment.
- This diversification-induced lending resiliency is valuable during crisis periods, when credit supply is especially important.

Insurance Underwriting

Exogenous shock:

- Gramm–Leach–Bliley Act (1999): newfound ability of banks to undertake insurance underwriting.
- Difference-in-differences analysis for banks that acquire/start a domestic insurance subsidiary right after act vs. banks that do it later.



- Counties with more diversified banks ⇒ higher SBL and employment.

Conclusions

We focus on the **asset diversification** of banks.

- Consider two types: geographic and business line.

Increased diversification $\Rightarrow$ more stable stream of earnings and lower idiosyncratic risk $\Rightarrow$ banks better absorb negative shocks:

- Higher lending activity over the business cycle.
- More resilient credit supply.
- Higher employment.

Provide some counterbalance to concerns about negative effects of bank diversification:

- More diversified banks may lead to higher systemic risk, but once a crisis hits, they are more likely to help get out of it.