# Bank Diversification and Lending Resiliency

Michael Gelman Itay Goldstein Andrew MacKinlay

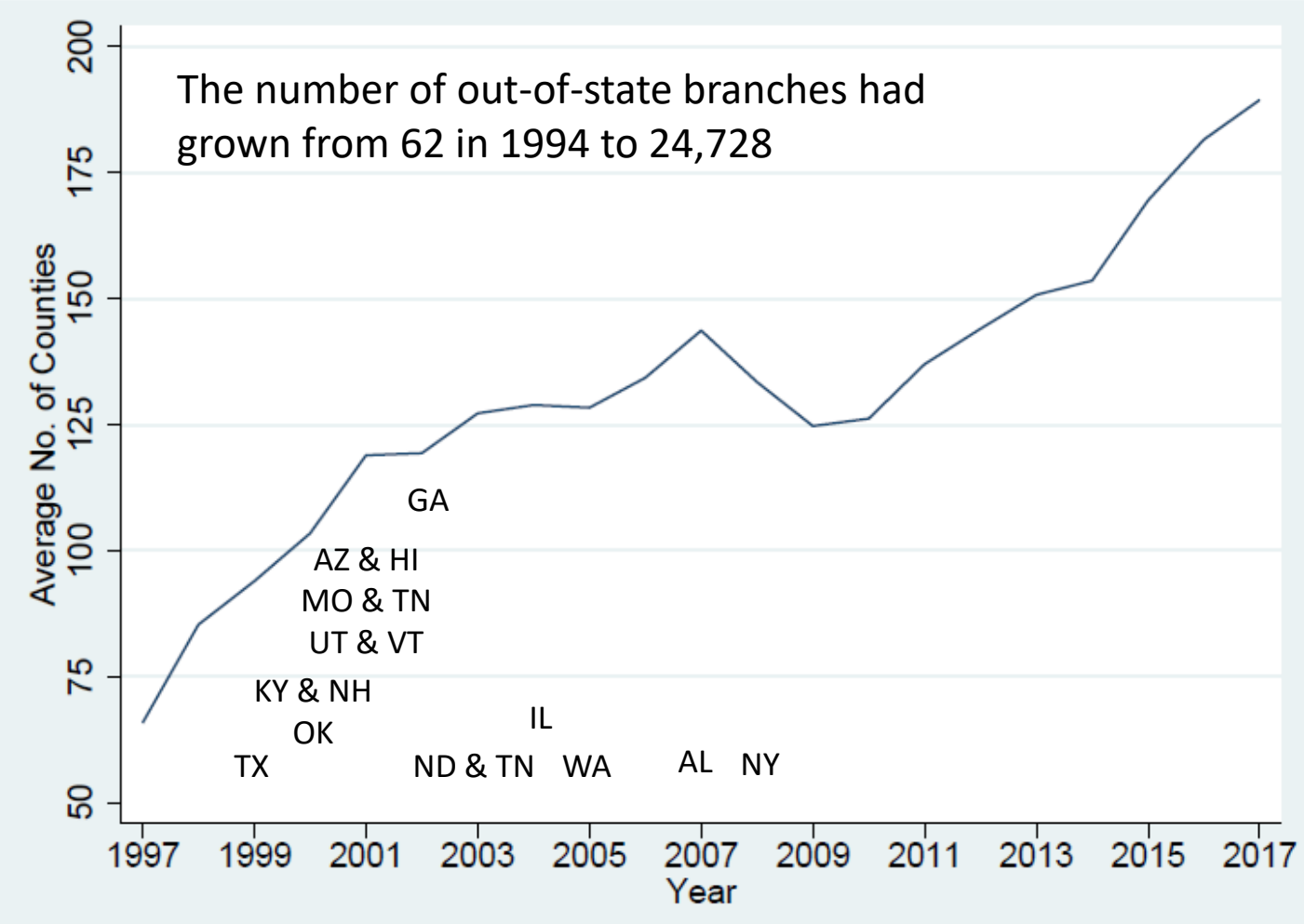
Comments

Alejandro Micco

# Main Idea

- The geographical diversification of credit supports the functioning of banks.

# Regulation put in place in the Great Depression has been gradually removed in the 1990s, allowing banks to operate across state lines.




Interstate banking (separate bank charter) and branching (not separately chartered) regulation have changes over time.
1.- States first relaxed restrictions on intrastate bank expansion,
2.- states allowed interstate expansion (with reciprocity).

By 1992, Most States had interstate banking agreements, but few permitted interstate branch.

Federal Branching Efficiency Act of 1994. removed any remaining federal interstate banking and branching barriers. But allowed individual states to decide specific.

# Diversification

- Dixit (1979) and Diamond (1984) "Financial Intermediation and Delegated Monitoring“ explains how diversification plays a central role in banks existence.
  - Diversification Reduces Monitoring Costs (deposit side).
  - Diversification of loans implies that the risk of aggregate default becomes more predictable (lending side).
- This papers provide evidence about the effect of geographical lending diversification on lending behavior.
  - The implicit assumption is that output correlation across agents is lower if they are in different geographic-markets.

# Main idea:

- Diversification helps:
  - Maintain credit supply during negative shocks.
  - Lead to a higher level of lending in normal times.
- The paper presents empirical evidence that bank lending diversification, measured by the number of counties covered by a bank's lending activities, results in:
  - Lower credit fluctuations during the Great Recession in the USA.
  - Higher levels of lending to SMEs during 1997-2017.
- The paper uses exogenous shocks (the Great Recession) and exogenous regulatory changes to support claims of causality.

# Main idea and comments:

- Diversification helps:
  - Maintain credit supply during negative shocks.
  - Lead to a higher level of lending in normal times.
- Empirical evidence about geographical diversification and:
  1. Credit fluctuations during the Great Recession in the USA.
  2. Higher levels of lending to SMEs during 1997-2017.
  3. Credit growth to SME after State level deregulations.
- Main comments:
  - The authors present a lot off evidence about the relationship between geographical diversification and lending,  but few about the channel through which geographical diversification help lending.
  - Additional discussion about the causal interpretation of 2 and 3 resutls.

# Main results

- During the Great Recession:
  - Most geographically diversified banks had **7.7% more total lending** than the least diversified banks after the crisis.
  - Geographically diversified banks maintain **twofold higher levels** of small business lending during the financial crisis.
  - Counties with a one standard deviation higher share of diversified banks experience 3.5% higher aggregate small business lending and 1.4% higher employment in the crisis.
  - Funding diversification does not reduce bank lending volatility, and therefore seen not to reduce risk independently (Goetz, Laeven, and Levine, 2016).

# Table II: Bank Diversification and the Financial Crisis

$$Y_{it} = \beta_1 \text{High Geographic Diversification}_{i,\text{Pre-Crisis}} \times \text{Post-Crisis}_t + \beta_2 \text{Bank Controls}_{i,\text{Pre-Crisis}} \times \text{Post-Crisis}_t + \alpha_i + \gamma_t + \varepsilon_{it}.$$

| | Loans to Pre-Crisis Assets | | Real Est. Loans to Pre-Crisis Assets | | C&I Loans to Assets Pre-Crisis Assets | |
|---|---|---|---|---|---|---|
| | (1) | (2) | (3) | (4) | (5) | (6) |
| High Geo. Div. × Post-Crisis | 0.0768*** | 0.101*** | 0.0483** | 0.0693*** | 0.0123** | 0.0162** |
| | (0.0235) | (0.0263) | (0.0198) | (0.0218) | (0.00517) | (0.00713) |
| Log No. Counties, Deposits × Post-Crisis | | -0.0294** | | -0.0119 | | -0.0108*** |
| | | (0.0129) | | (0.0104) | | (0.00359) |
| Log Assets × Post-Crisis | | 0.0153 | | 0.000363 | | 0.00967*** |
| | | (0.0109) | | (0.00840) | | (0.00286) |
| Z-Score × Post-Crisis | | 0.00759 | | 0.00778* | | 0.00101 |
| | | (0.00545) | | (0.00404) | | (0.00119) |
| Average ROA × Post-Crisis | | 0.197** | | 0.0810 | | 0.0327** |
| | | (0.0865) | | (0.0710) | | (0.0163) |
| Equity to Assets × Post-Crisis | | -0.296 | | -0.409* | | 0.0232 |
| | | (0.323) | | (0.243) | | (0.0742) |
| Deposits to Assets × Post-Crisis | | 0.177** | | 0.121* | | 0.0467** |
| | | (0.0882) | | (0.0722) | | (0.0198) |
| Bank Fixed Effects | Yes | Yes | Yes | Yes | Yes | Yes |
| Year-Quarter Fixed Effects | Yes | Yes | Yes | Yes | Yes | Yes |
| Observations | 5,228 | 5,228 | 5,228 | 5,228 | 5,228 | 5,228 |
| Adjusted $R^2$ | 0.716 | 0.728 | 0.824 | 0.831 | 0.890 | 0.894 |

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

- Sizeable effect.
- Shock variable: The same for each sector.
  - Potential bias?
  - **Manufacturing** and Financial sector, ¿more concentrated in large CZ as well as more national banks?
- Why did the lending diversification channel not appear in the Z-Score?
- Why not use HGD as an instrument for a volatility measure? Ap.A
- Diversification channel of deposits base.
  - ¿County (3.000) or CZ (000)?

Table III: Diversification, the Financial Crisis, and Small Business Lending

| | Log SBL, Bank-County Level | | | |
|---|---|---|---|---|
| | (1) | (2) | (3) | (4) |
| High Geo. Div. × Post-Crisis | 0.994*** | 0.879*** | 1.389*** | 1.378*** |
| | (0.269) | (0.283) | (0.370) | (0.419) |
| Log No. Counties, Deposits × Post-Crisis | 0.103 | 0.129* | -0.155 | -0.155 |
| | (0.0679) | (0.0735) | (0.153) | (0.157) |
| Log Assets × Post-Crisis | -0.284*** | -0.263*** | -0.147 | -0.107 |
| | (0.0610) | (0.0636) | (0.0954) | (0.0997) |
| SBL to Loans × Post-Crisis | 0.278 | 0.901 | 0.826 | 1.577 |
| | (0.725) | (0.718) | (3.517) | (3.433) |
| Loan Growth × Post-Crisis | -0.00456 | 0.215 | 0.745 | 0.854 |
| | (0.510) | (0.604) | (2.408) | (2.614) |
| Z-Score × Post-Crisis | 0.0227 | 0.0315 | 0.262 | 0.316 |
| | (0.0284) | (0.0278) | (0.263) | (0.266) |
| Avg. ROA × Post-Crisis | 2.247*** | 2.368*** | 3.564*** | 3.649*** |
| | (0.446) | (0.497) | (0.628) | (0.647) |
| Equity to Assets × Post-Crisis | 3.537 | 3.117 | 1.683 | 2.104 |
| | (2.170) | (2.175) | (7.161) | (7.289) |
| Deposits to Assets × Post-Crisis | 0.0157 | -0.0734 | 0.970 | 0.602 |
| | (0.593) | (0.620) | (1.981) | (2.107) |
| 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 |

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

- Huge effect.
  - Examples
    - Avg ΔSBL=-20%
    - Coef. 1.2
  - E1: Share H = L

| | Pre | Post |
|---|---|---|
| H | 0.5 | 0.61 |
| L | 0.5 | 0.19 |
| Total | 1 | 0.8 |
| Share H | 0.50 | 0.77 |

  - E2: Share H > L

| | Pre | Post |
|---|---|---|
| H | 0.6 | 0.70 |
| L | 0.4 | 0.14 |
| Total | 1 | 0.8 |
| Share H | 0.60 | 0.83 |

- Matching Sample.
  - Channel
  - Coef.

# Main results

- During 1997-2017:
  - 0ne standard deviation increase in geographic diversification is associated with a 3.8% quarterly increase in lending.
  - Using the relaxation of state-level banking restrictions, the authors find that treated banks increase small business lending in otherwise unaffected states by about 16.8% relative to the untreated banks.

## Table V: BHC Loans and Diversification

| | Loans to Assets | | | | |
|---|---|---|---|---|---|
| | All Loans | | | | Excl. SBL |
| | (1) | (2) | (3) | (4) | (5) |
| Log No. Counties, Loans | 0.0300*** | 0.0310*** | | | 0.0298*** |
| | (0.00370) | (0.00375) | | | (0.00403) |
| Log No. States, Loans | | | 0.0179*** | | |
| | | | (0.00255) | | |
| Geographic Share, Loans | | | | 0.0886*** | |
| | | | | (0.0207) | |
| Log No. Counties, Deposits | | 0.00925 | | | 0.0112 |
| | | (0.00712) | | | (0.00799) |
| Log No. States, Deposits | | | -0.00609 | | |
| | | | (0.00964) | | |
| Geographic Share, Deposits | | | | 0.00236 | |
| | | | | (0.0216) | |
| Log Assets | | -0.00835 | 0.00903 | 0.00935 | 0.000232 |
| | | (0.00905) | (0.00877) | (0.00892) | (0.00966) |
| Z-Score | | 0.00204** | 0.00209** | 0.00212** | 0.00201** |
| | | (0.000913) | (0.000920) | (0.000920) | (0.00102) |
| Average ROA | | 0.0232* | 0.0222* | 0.0261** | 0.0205 |
| | | (0.0129) | (0.0131) | (0.0132) | (0.0146) |
| Equity to Assets | | 0.119 | 0.131 | 0.131 | 0.166 |
| | | (0.125) | (0.128) | (0.126) | (0.135) |
| Deposits to Assets | | 0.246*** | 0.256*** | 0.262*** | 0.268*** |
| | | (0.0529) | (0.0538) | (0.0540) | (0.0565) |
| Bank Fixed Effects | Yes | Yes | Yes | Yes | Yes |
| Year-Quarter Fixed Effects | Yes | Yes | Yes | Yes | Yes |
| Observations | 37,452 | 37,452 | 37,452 | 37,452 | 9,122 |
| Adjusted $R^2$ | 0.787 | 0.795 | 0.791 | 0.790 | 0.762 |

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

- Reverse causality.
  - Bank had a productivity or deposit shock.
  - Bank increased it intensive and extensive margins.
- Z is significant (+), but when you introduce it the log No of Counties increases. ¿Should it fall?
- Appendix A.

# Main results: Deregulation

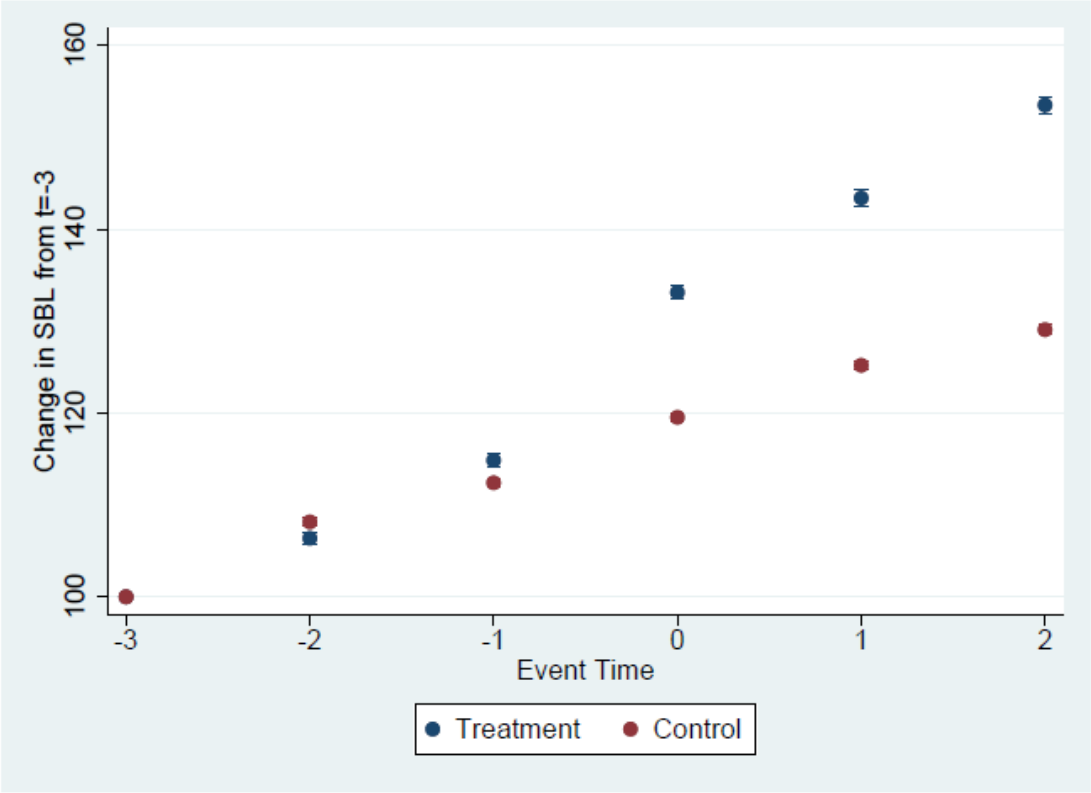



Figure 2: Effect of geographic deregulation on small business lending. The figure plots the average change in small business lending for treatment and control banks in counties outside of states that have changed banking regulations. The change is measured from the level three years before the change in regulation. The treatment group are out-of-state banks are actively lending in these affected states before the change while control banks do not lend in the affected states. 19 different regulatory changes (cohorts) are used. See Table A.6 for the list of the specific shocks. 95% confidence intervals are provided around each average change.

- Financial deregulations:
  - Treated banks increase small business lending in otherwise unaffected states by about 16.8% relative to the untreated banks.

Table VI: Geographic Deregulation and Small Business Lending

This table presents the results of the specification in Equation (5) for the effect of diversification on small business lending following deregulation. *Log SBL, Bank-County Level* is the log amount of the small business loans originated annually by a bank in a county. *Treat* is a dummy variable that equals one for out-of-state banks that operated in a state with a change in deregulation and zero otherwise. The sample uses six-year windows around 19 different deregulatory shocks. *Cohort* refers to the treatment and control banks associated with each shock. For each cohort, the sample is only counties outside of the state experiencing the shock. See Table A.6 for the list of the specific shocks. *Post* is an indicator variable that equals one for the shock year and the following years and zero for the pre-shock period. All control variables are as of the year before the shock and interacted with *Post*. *Matched Sample* is a subsample where each treated bank is matched to the nearest non-treated bank across the control variables. Standard errors are clustered by bank.

| | Log SBL, Bank-County Level | | | | | |
|---|---|---|---|---|---|---|
| | (1) | (2) | (3) | (4) | (5) | (6) |
| Treat × Post | 0.194** | 0.141*** | 0.203** | 0.155*** | 0.149*** | 0.179*** |
| | (0.0891) | (0.0422) | (0.0902) | (0.0448) | (0.0466) | (0.0507) |
| Log No. Counties, Loans × Post | | -0.0183 | | 0.000893 | 0.0172 | 0.0106 |
| | | (0.0541) | | (0.0685) | (0.0937) | (0.115) |
| Log No. Counties, Deposits × Post | | -0.145** | | -0.148** | -0.179** | -0.136* |
| | | (0.0639) | | (0.0725) | (0.0758) | (0.0769) |
| Log Assets × Post | | 0.111** | | 0.0873 | 0.120** | 0.0897 |
| | | (0.0475) | | (0.0621) | (0.0596) | (0.0860) |
| SBL to Loans × Post | | -0.908*** | | -0.950*** | -0.816 | -0.825 |
| | | (0.262) | | (0.313) | (0.536) | (0.666) |
| Loan Growth × Post | | -0.183 | | -0.205 | -0.779 | -1.004 |
| | | (0.414) | | (0.423) | (0.647) | (0.628) |
| Z-Score × Post | | 0.0145 | | 0.0107 | 0.0176 | 0.0143 |
| | | (0.0134) | | (0.0138) | (0.0177) | (0.0178) |
| Avg. ROA × Post | | -0.00619 | | -0.0244 | -0.0757 | -0.0471 |
| | | (0.266) | | (0.267) | (0.516) | (0.477) |
| Equity to Assets × Post | | -0.545 | | -0.778 | -1.833 | -1.530 |
| | | (1.045) | | (1.015) | (2.114) | (1.935) |
| Deposits to Assets × Post | | 0.0604 | | -0.127 | -0.215 | -0.352 |
| | | (0.271) | | (0.297) | (0.445) | (0.415) |
| Matched Sample | No | No | No | No | Yes | Yes |
| Cohort by Bank-County Fixed Effects | Yes | Yes | Yes | Yes | Yes | Yes |
| Cohort by Year Fixed Effects | Yes | Yes | No | No | Yes | No |
| Cohort by County-Year Fixed Effects | No | No | Yes | Yes | No | Yes |
| Observations | 1,322,150 | 1,150,965 | 1,251,036 | 1,073,550 | 537,223 | 438,487 |
| Adjusted $R^2$ | 0.792 | 0.795 | 0.786 | 0.788 | 0.798 | 0.781 |

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

- Comments:
  - It is important to discuss more the direct effect on credit in the deregulated state ("first stage").
  - Table A10, is an alternative model that, in an implicit way, shows that the first stage is not weak.
  - Z, Deposit.

# Deregulation

- Geographic Deregulation and SBL, Excluding Bordering States. Results are small. Should they be larger?

- The deposit gain channel. Maybe, you can test whether the lending/deposit level change after the treatment.

- There is difficult to mix all evidence presented in the paper and rule out a bank productivity or deposit shock explanation:
  - A bank experiences a productivity or funding shock. It would like to increase lending in all markets (local and out-of-state). Following Kroszner, Randall S., and Philip E. Strahan (1999), it lobbies for state deregulation.
  - This is more a concern, because deregulation does not pass at the same time after the Federal deregulation.

# Conclusion

- Very interesting and relevant topic.
- Clean idea to test the importance of diversification and reduction of the idiosyncratic risk (is the same product).
- Strong and hard to kill results. Although there is still some issues/question/lack-of-evidence to test the channel.
- More discussion and evidence for the causal effect.