

SMALL BANKS AND BIG BOXES

REAL SECTOR INDUSTRIAL ORGANIZATION AND FINANCIAL CONSOLIDATION



CLAIRE BRENNECKE
STEFAN JACEWITZ
JONATHAN POGACH

FEDERAL DEPOSIT INSURANCE CORPORATION

SGE JANUARY 3, 2020

The analysis, conclusions, and opinions set forth here are those of the author alone and do not necessarily reflect the views of the Federal Deposit Insurance Corporation, the Consumer Financial Protection Bureau, or the United States.

DECLINE IN SMALL BANKS AND SMALL FIRMS

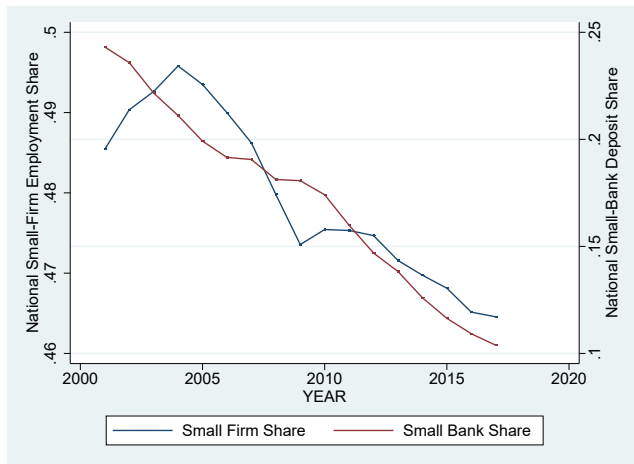


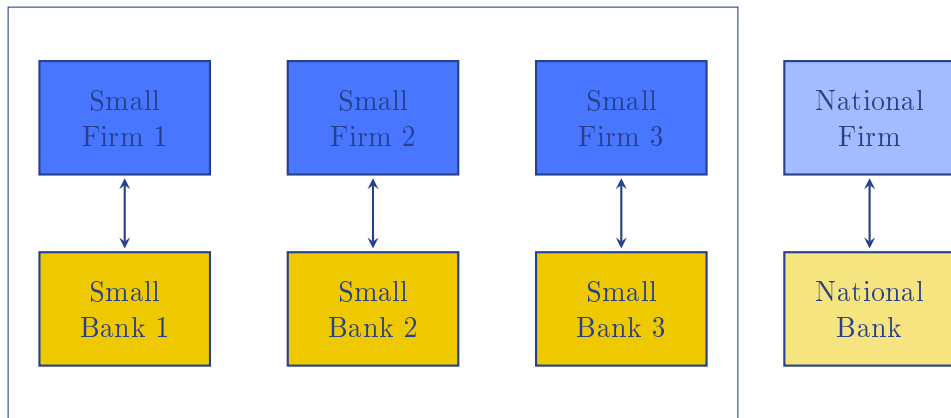
FIGURE 1: Source: Quarterly Workforce Indicators (Firm Shares). Summary of Deposits (Deposit Shares). Small Firms: < 250 emp. Small banks: < \$1 bn in assets.

BANKING CONSOLIDATION

- Consolidation of the banking system, driven by:
 - **Regulatory changes** (Riegle Neal 1994 (Berger et al 1999, Jayaratne & Strahan 1998), Gramm Leach Bliley 1999, Dodd-Frank Act 2010 (Cyree 2016))
 - **Technological changes** (ATMs (Radecki et al 1997), advances in credit scoring (Berger & Frame 2007))
- Small banks have comparative advantage in lending to small businesses (“relationship banking”)
 - Boot (1999), Petersen & Rajan (2002), Chakraborty & Hu (2006)
- Common narrative: Banking consolidation \Rightarrow loss of small businesses
 - Cetorelli & Strahan (2006), Sapienza (2002)

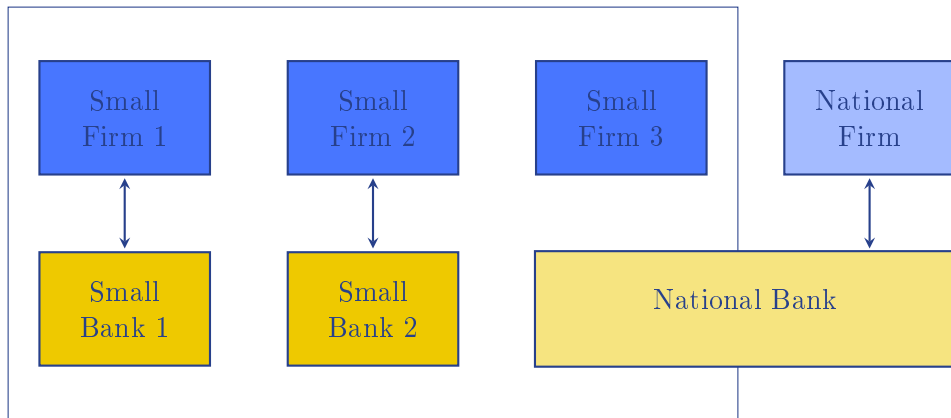
EXISTING LITERATURE ON REAL/FINANCIAL CONSOLIDATION

County C



EXISTING LITERATURE ON REAL/FINANCIAL CONSOLIDATION

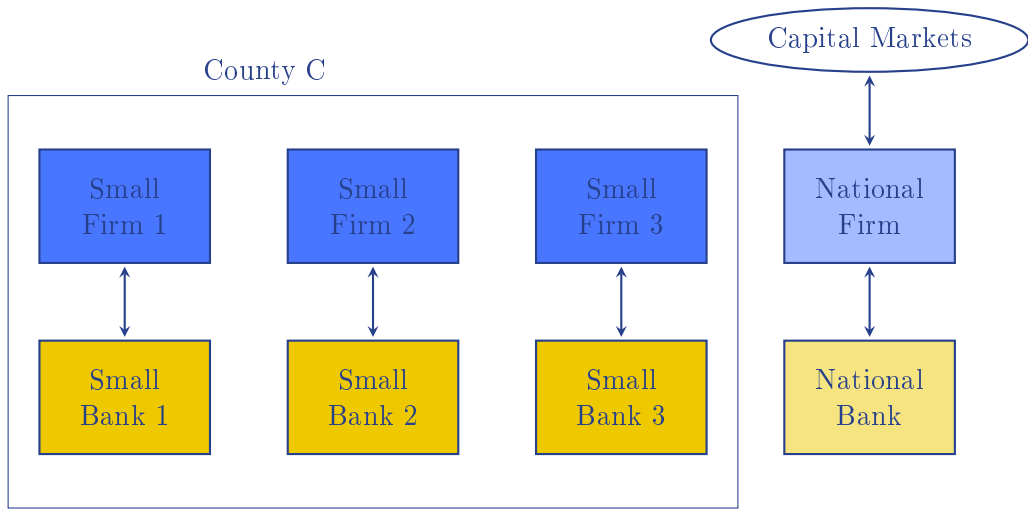
County C



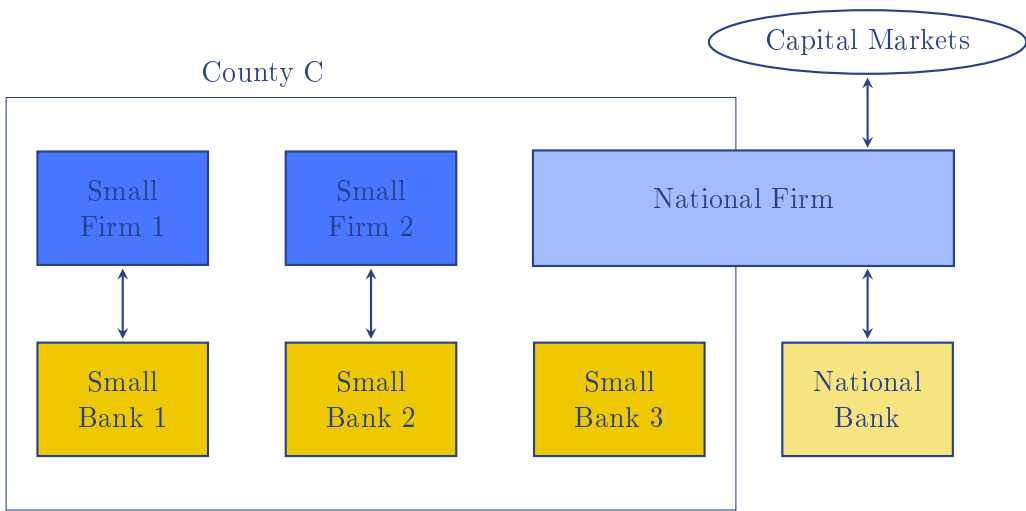
REAL-SIDE CONSOLIDATION

- Consolidation of real industry (Grullon et al (2019), CEA (2016), Jia (2008))
 - **Technological changes** (e.g. supply chain management (Holmes 2008), e-commerce (Goldmanis et al 2010))
 - **Regulatory** (e.g. Antitrust (Gutierrez & Philippon 2017))
- Small banks have comparative advantage in lending to small businesses (“relationship banking”)
- Our narrative: Loss of small business \Rightarrow changes to viability of small banks
 - Concurrent paper using Wal-Mart expansion: Allen (2019)

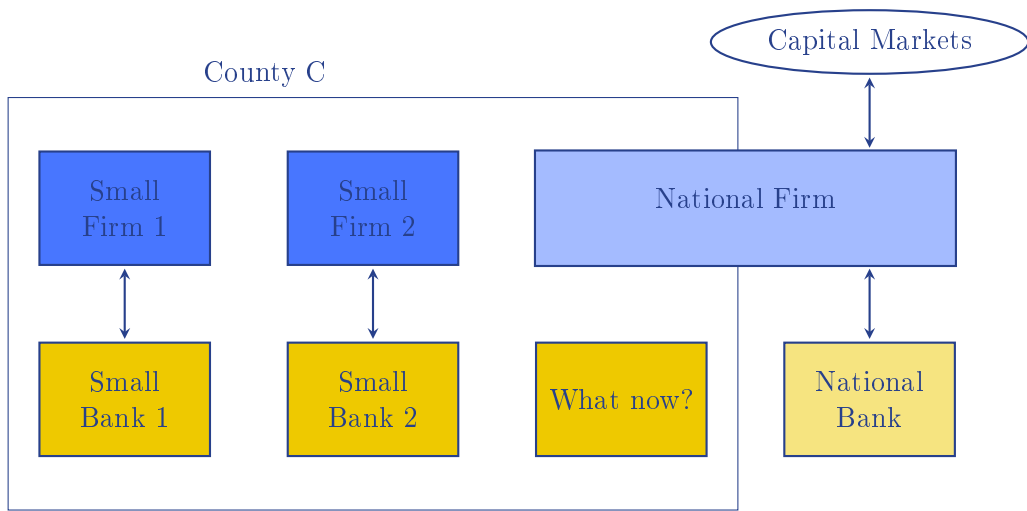
PAPER IN A PICTURE



PAPER IN A PICTURE



PAPER IN A PICTURE



WHAT WE DO

- Estimate effect of small business performance on small bank performance using:
 - Census Quarterly Workforce Indicators (QWI) data on county employment by firm size
 - FDIC Summary of Deposit (SOD) data on bank deposits by bank size
- Use a Bartik instrument to estimate effect of real industry growth patterns by industry-firm size on bank deposit (and branch) growth by bank size 2002-2017.
 - Rely upon 2000 county-industry shares as differential exposures to national trends by industry-firm size.
 - Use Goldsmith-Pinkham, Sorkin, Swift (2019) to unpack assumptions of our instrument

SUMMARY OF RESULTS

- A one standard deviation change in small-firm employment growth is associated with a 0.3 standard deviation change in small-bank deposit growth.
- Large-firm employment growth has no effect on small-bank deposit or branch growth.
- Small-firm employment growth has no effect on large-bank deposit or branch growth.
- Decreases in small-bank deposit growth from negative shocks to small-firm employment growth driven by propensity of small banks to be acquired.
- Small banks exposed to small-firm employment declines: small business lending \Rightarrow residential real estate lending.

DATA: 2002-2017

- QWI - small <250 emp, large ≥ 500 emp.
 - (Endogenous) County-level employment growth by firm size (not establishment size): $x_{c,size,t-1 \rightarrow t}$
 - County-level employment by industry: $z_{c,i,2000}$
 - National-level employment by firm size-industry: $g_{i,size,t-1 \rightarrow t}$
 - Instrument: $Bartik_{c,size,t-1 \rightarrow t} = \sum_i z_{c,i,2000} g_{i,size,t-1 \rightarrow t}$
- SOD - small $< \$1$ billion asset, large $> \$50$ billion
 - Location of bank branches and deposits
 - $y_{c,size,t-1 \rightarrow t}$ is growth of deposits (or branches) in county c by bank size

METHODOLOGY

- Interested in estimating small-bank growth variables (y) on small-firm growth variables (x), vector of controls D

$$y_{ct} = \rho D_{ct} + x_{ct}\beta_0 + \epsilon_{it} \quad (1)$$

- Endogeneity problem \Rightarrow use Bartik instrument B_{ct} as national small-firm industry growth weighted by year 2000 county-industry shares:

$$x_{ct} = D_{ct}\tau + B_{ct}\gamma + \eta_{ct}. \quad (2)$$

- Controls: =
 $\{Pop_{2000}, Inc_{2000}, SmBkShare_{2000}, Brch_{2000}, unemp_{2000}, urban_{2000}, YearFE\}$
- Controls next version: County FE



FIGURE 2: QWI - 11: Agriculture. 21: Mining. 22: Utilities. 23: Construction. 31-33: Manufacturing. 42: Wholesale Trade. 44-45: Retail Trade. 48-49: Transportation. 51: Information. 53: Real Estate. 54: Tech Serv. 55: Mgmt of Companies. 56: Admin, Support, Waste Mgmt. 61: Ed. 62: Health. 71: Arts. 72: Accomm and Food. 81: Other.

TABLE 1: Multivariate regressions of small bank deposit growth. Errors clustered at the state level.

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
$\Delta\text{Ln}(\text{Sm Emp})$	0.165** (0.0654)	0.161** (0.0644)	0.169** (0.0634)	0.161** (0.0637)				
$\Delta\text{Ln}(\text{Lg Emp})$					-0.00121 (0.0117)	0.000365 (0.0119)	0.000982 (0.0121)	0.000893 (0.0122)
Observations	39,341	39,341	39,341	39,341	39,341	39,341	39,341	39,341
R-squared	0.000	0.002	0.002	0.006	0.000	0.001	0.002	0.006
Controls	NO	NO	YES	YES	NO	NO	YES	YES
REG	OLS	OLS	OLS	OLS	OLS	OLS	OLS	OLS
YEAR	NO	YES	YES	YES	NO	YES	YES	YES
STATE FE	NO	NO	NO	YES	NO	NO	NO	YES

TABLE 2: Baseline Bartik Regressions. Errors clustered at the state level.

	$\Delta\text{Ln}(\text{Small Bank Deposits})$			$\Delta\text{Ln}(\text{Small Bank Branches})$		
	(1)	(2)	(3)	(4)	(5)	(6)
Bartik (Small Firm Emp Gr)	1.342** (0.560)			0.339** (0.131)		
$\Delta\text{Ln}(\widehat{\text{Small Firm Emp}})$		1.191** (0.583)			0.311** (0.142)	
$\Delta\text{Ln}(\widehat{\text{Large Firm Emp}})$			0.491* (0.283)			0.0976 (0.0741)
Observations	39,432	39,341	39,341	39,432	39,341	39,341
REG	OLS	2SLS	2SLS	OLS	2SLS	2SLS
Controls	YES	YES	YES	YES	YES	YES
YEAR FE	YES	YES	YES	YES	YES	YES

OTHER SPECIFICATIONS

- Population weights - Results Hold
- Other Outcome Variables
 - Change in HHI - No Result
 - Large Bank Deposit Growth - No Result
 - Large Bank Branch Growth - No Result
- Future iterations of paper
 - County FE - Results Hold
 - Large and Small Firm Growth Simultaneously - Results Hold
 - Contemporaneous County Population and Income Growth - Results Hold

ADDITIONAL ANALYSIS IN PAPER

1. What drives county small-bank performance differences?
 - Are small banks acquired?
 - Do small banks fail?
 - Do small banks “grow out” of small by acquiring other banks or through organic growth?
2. Do banks change on internal margin?
 - Change in loan composition?
 - Change in funding sources?
3. Relating firm employment to small business loan demand using CRA data
4. Diagnostic Tests from GSS (2019)

WHAT DRIVES SMALL-PERFORMANCE

- Construct proportion of county-year small-bank deposits associated with:
 - Small banks being acquired
 - Small banks failing
 - Small banks that acquire other banks
- Example: Bank A with Branch X in County C_X and Branch Y in C_Y is acquired in year t
 - Branch X represents 10% of deposits in C_X , Branch Y represents 2% of deposits in C_Y
 - Use 0.10 and 0.02 as LHS variables for $C_{X,t}$, $C_{Y,t}$.

TABLE 3: Drivers of Small Bank Deposit Changes. Errors are clustered at the state level.

VARIABLES	(1) Acquired	(2) Acquired	(3) Acquiring	(4) Acquiring	(5) Failed	(6) Failed
$\Delta \ln(\text{Sm Emp})$	-0.0187*** (0.00609)	-0.281*** (0.108)	0.0131** (0.00522)	-0.0360 (0.101)	-0.00757 (0.00653)	-0.295 (0.187)
Observations	39,341	5,748	39,341	5,651	21,037	717
R-squared	0.007		0.012		0.010	
REG	OLS	Tobit	OLS	Tobit	OLS	Tobit
Controls FE	YES	YES	YES	YES	YES	YES
YEAR FE	YES	YES	YES	YES	YES	YES
YRS	2003-2017	2003-2017	2003-2017	2003-2017	2008-2015	2008-2015

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

DO BANKS CHANGE ON THE INTERNAL MARGIN?

- Decreased demand for financial services from small businesses can lead to change in bank business strategy
- Challenge: Bank balance sheets exist at legal entity level, not geography
- Evidence suggests (e.g. FDIC (2018)) that more than 70% of small banks focus small business lending operations at the county level
 - Focus on small banks with branches within a single county
- Estimate relationship between small-firm employment growth and bank portfolios

TABLE 4: Bank Level Regressions of Bank Portfolios on Small Business Growth. Errors are clustered at the bank level.

VARIABLES	(1) $\frac{Core}{Liab}$	(2) $\frac{Core}{Liab}$	(3) $\frac{SB}{Ln}$	(4) $\frac{SB}{Ln}$	(5) $\frac{CI}{Ln}$	(6) $\frac{CI}{Ln}$	(7) $\frac{RE}{Ln}$	(8) $\frac{RE}{Ln}$
$\Delta Ln(SmEmp)$	0.0151*** (0.00490)	0.121* (0.0723)	0.0128*** (0.00495)	0.180** (0.0746)	0.0153*** (0.00427)	0.0971 (0.0630)	-0.0113** (0.00455)	-0.205*** (0.0681)
Obs	52,917	52,917	52,917	52,917	52,917	52,917	52,917	52,917
R-squared	0.348		0.102		0.017		0.019	
Banks	5,381	5,381	5,381	5,381	5,381	5,381	5,381	5,381
REG	OLS	2SLS	OLS	2SLS	OLS	2SLS	OLS	2SLS
YEAR FE	YES	YES	YES	YES	YES	YES	YES	YES
BANK FE	YES	YES	YES	YES	YES	YES	YES	YES

GOLDSMITH-PINKHAM, SORKIN, SWIFT (2019)

- Bartik instrument is a “black box”
- Show that the Bartik instrument is equivalent to a weighted average of just-identified instruments
 - Each Year 2000 county-industry variable is its own instrument
- Construct Rotemberg weights to understand:
 - Industry-years that drive results
 - Heterogeneity of estimates
- Visual diagnostics

GSS DIAGNOSTIC 1

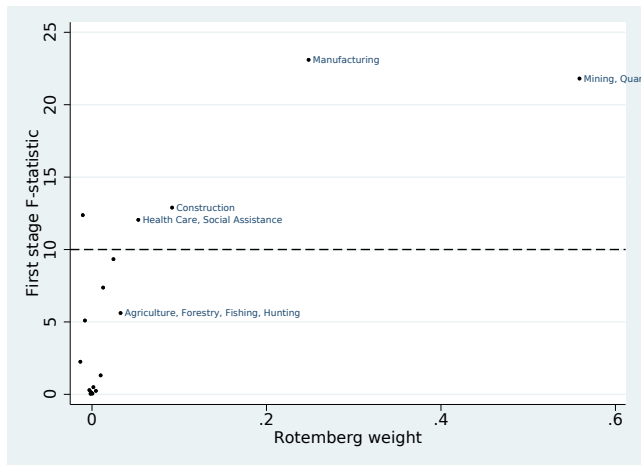


FIGURE 3: Industry Rotemberg Weights and First Stage F-statistics from just-identified county-industry-share instruments.

GSS DIAGNOSTIC 2

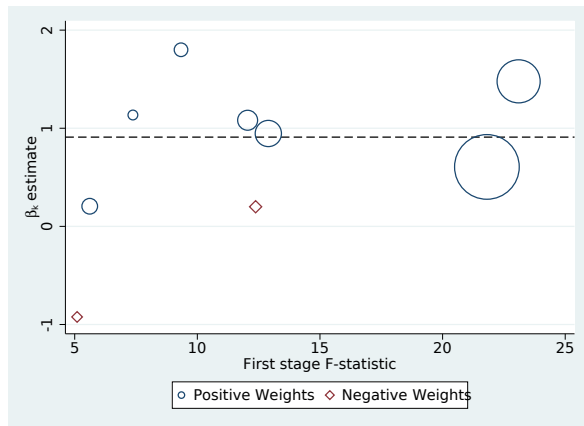


FIGURE 4: Heterogeneity of β_k for just-identified county-share instruments by first stage F-statistic (reporting only for those with F-stat > 5). Shape sizes reflect Rotemberg weights.

CONCLUSIONS

- Consolidation of banking industry not only causes, but is also a cause of industrial firm consolidation
- A 1% decline in small-firm employment growth associated with a similar size decline in small-bank deposit growth and a 0.3% decline in small-bank branch growth
- Differences in small-bank performance mainly driven by acquisitions (as targets)
- Declines in small-business employment associated with shift of small-bank loan portfolios from small business lending and into residential real estate lending