

Bank Consolidation and Financial Inclusion

The Adverse Effects of Mergers on Depositors

Vitaly Bord
Federal Reserve Board

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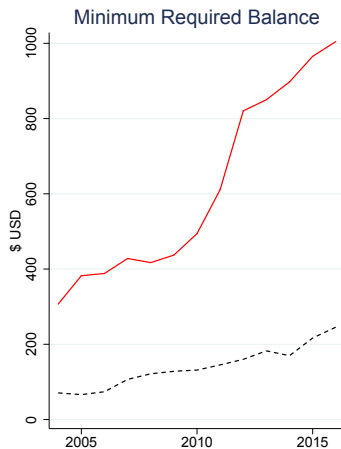
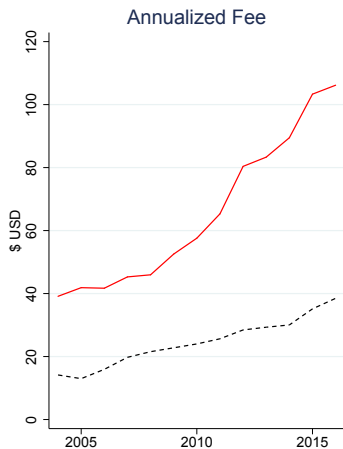
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Motivation

Bank consolidation is one of the prominent themes of the past 30 years.

- 1990: small banks ($< \$10\text{B}$ in assets) comprised 80% of branches and 66% of deposits.
- 2020: small banks comprised 43% of branches and 17% of deposits.
- Much of the literature on bank consolidation has focused on lending (Berger, Demsetz and Strahan, 1999; Stein, 2002; Erel, 2007).
- The effect on depositors is relatively understudied.

Checking Account Fees and Required Minimum Balances



----- Bank Assets < 10B

————— Bank Assets > 10B

Why Do Fees and Minimum Balances Matter?

- Almost 40% of US population cannot come up with \$400 immediately (2019 SHED survey).

- 5-6% of households are unbanked (FDIC Survey of Unbanked and Underbanked Households, 2009-2019).
 - 20% of households with income \leq \$30,000
 - Approximately half have had a bank account in the past.
 - Many cite “fees too high” (FDIC, 2015).

The Effect of Bank Consolidation on Depositors

How does bank consolidation affect depositors?

Do large banks push some lower-income depositors out of the banking system?

Analysis of Mergers:

- Examine mergers in which a small bank is acquired by a large bank
- Differences-in-differences analysis, relative to small banks acquired by other small banks

Preview of Results

- Deposit growth following a merger is 1.8pp lower at branches acquired by a large bank.
- Fees and required minimum balances increase, and effect on deposit growth is stronger in low-income areas.
- Increase in check cashing facilities, consistent with some depositors leaving the banking system altogether.
- Real and financial consequences to leaving the banking system: lessened ability to withstand subsequent personal financial shocks.

Related Literature

Vast literature on consolidation and differences between small and large banks

- Small business lending:
Peek and Rosengren (1998), Berger et al (1998), Stein (2002), DeYoung, Evanoff, Molyneaux (2009)
- Loan rates and real effects (on crime):
Erel (2011), Garmaise and Moskowitz (2006)
- Deposit rates:
Hannan and Prager (1998; 2006), Park and Pennacchi (2006), Granja and Paixao (2019)

Financial inclusion

- Benefits of having a bank account:
Rhine et al (2006), Barr, Dokko and Feit (2011), Ashraf et al (2006), Prina (2013), Celerier and Matray (2018)

Outline

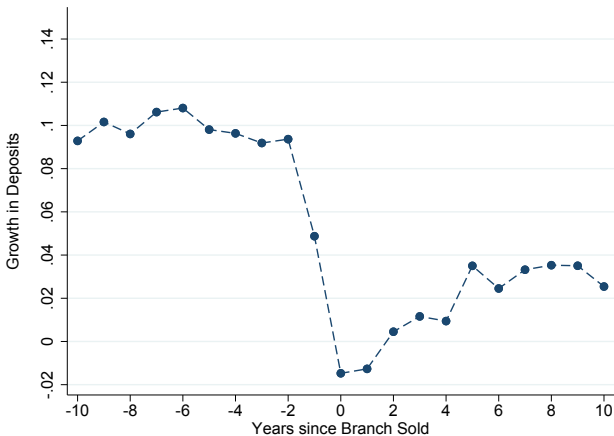
- 1 Introduction
- 2 **Empirical Methodology and Deposit Growth**
- 3 Effects on Fees and Exit from the Banking System
- 4 Real and Financial Consequences
- 5 Conclusion

Acquisitions of Small Banks

What is the effect of bank consolidation on deposit growth?

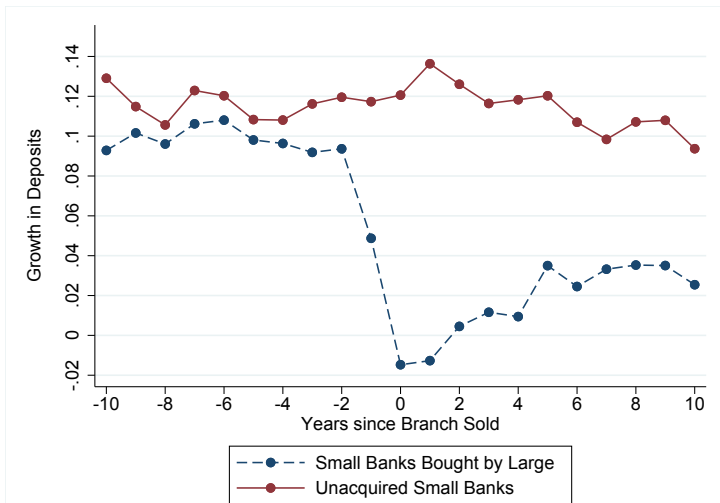
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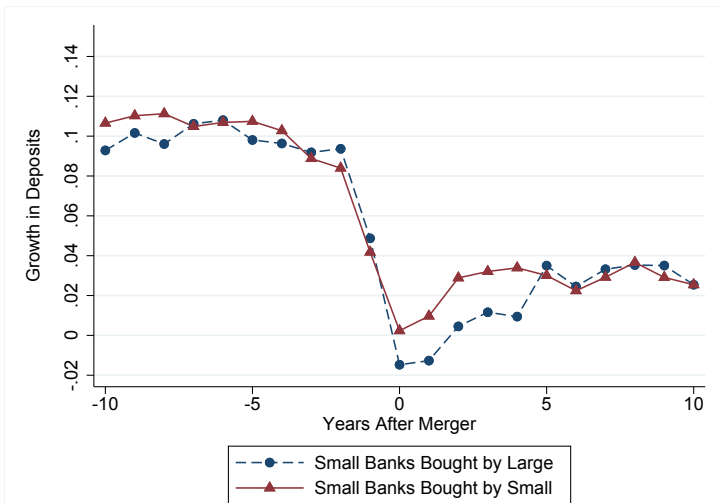
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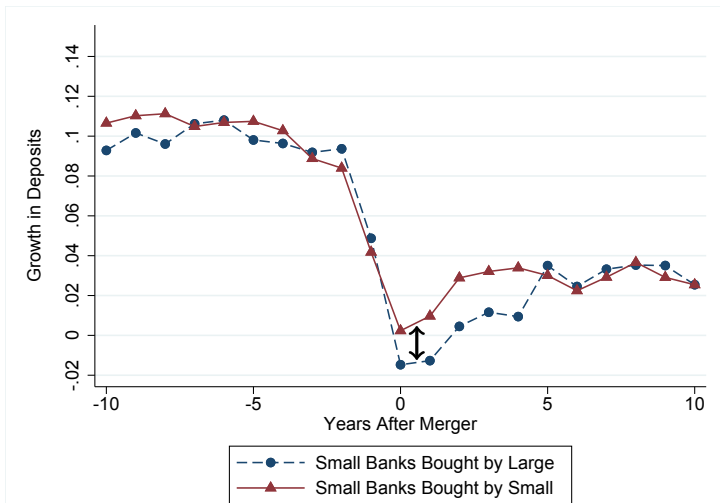
Acquisitions of Small Banks

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Acquisitions of Small Banks

What is the effect of bank consolidation on deposit growth?



Difference-in-Differences Methodology

$$y_{i,b,m,t} = \alpha_{m,t} + \beta_i + \phi_\tau + \delta T_b \times Post_{b,\tau} + \epsilon_{i,b,m,t,\tau}$$

- i =branch, b = bank, m = MSA, t = year, τ = event-time
- T_b : “treatment” = whether the acquirer had assets of more than \$10B in 2016 dollars.
 - $y_{i,b,m,t}$ = deposit growth
 - $\alpha_{m,t}$ = MSA-year fixed effects
 - β_i = branch fixed effects
 - ϕ_τ = event-time fixed effects
- **Within MSA-year** comparison of branches of small banks bought by large banks vs branches of small banks bought by other small banks, after, relative to before, the merger.

Data and Sample

- 1998-2018 period
- Data sources:
 - FDIC's Summary of Deposits: panel data of branches, deposit growth
 - FFIEC Call Reports: bank balance sheets
 - RateWatch: branch-level fees, rates, minimum balances
 - Census and IRS Statistics of Income: zip code demographic and economic characteristics

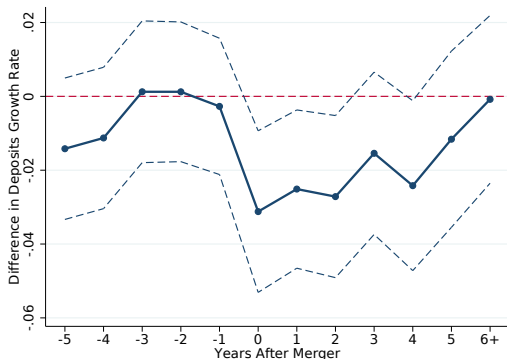
Bank Consolidation and Deposit Growth

Dependent Variable: Branch Deposit Growth

	OLS
Bought by Large _b × Post _{b,τ}	-0.016*** (0.004)
MSA-Year FE	Yes
Branch FE	Yes
Observations	142642
Within R-squared	0.294

Deposit growth is 1.6pp lower in treated branches after the acquisition.

Deposit Growth Year-by-Year



- Cumulative effect: deposit growth is 12pp lower in treated branches over the 5 years following the acquisition.

Potential Endogeneity of the Acquirer

- Whether the acquirer is a small or large bank might not be exogenous
- Selection may drive both the acquisition decision and subsequent branch-level outcomes

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 - Differences in customers → zip code economic and demographic characteristics

Summary Statistics: Branch Locations

Panel A: As of Merger Year	Difference	T-stat	Control Mean
Branches per Capita	0.181	0.308	2.858
Deposits	51,862.021	1.624	431,570.775
Pct with AGI < \$25K	-0.000	0.085	0.420
Pct receiving EITC	0.001	0.143	0.157
Ave Credit Score	5.708	1.262	692.708
Pct with Collections Accounts	-0.009	1.149	0.134
Panel B: As of 2000 Census			
Num. Households	192.642	1.666*	7,795.345
Poverty Rate	-0.100	0.39	10.1
Pct with Public Assistance Earnings	-0.083	-1.00	2.623
Pop. Density	0.040	1.067	0.849
Urban Areas	0.005	1.646*	0.134
Pct Black	0.199	0.885	8.539
Pct Hispanic	0.137	0.506	8.203
Pct under Age 25	-0.013	0.093	33.361
Pct 65+	0.168	1.467	13.990
Treated Zip Codes	2053		
Control Zip Codes	2771		

Demographic Trends

No evidence in trends in zip code measures of income.

Dependent Variable:	Ave AGI (1)	Pct AGI < \$25,000 (2)	Pct EITC (3)
Bought by $\text{Large}_z \times \text{Post}_{z,\tau}$	-0.072 (0.279)	0.001 (0.001)	-0.008 (0.037)
MSA-Year FE	Yes	Yes	Yes
Zip FE	Yes	Yes	Yes
Observations	104149	104149	53087
Within R-squared	0.004	0.004	0.001

Potential Endogeneity of the Acquirer

- Whether the acquirer is a small or large bank might not be exogenous
- Selection may drive both the acquisition decision and subsequent branch-level outcomes
 - Differences in customers → zip code economic and demographic characteristics
 - Differences in banks' financial performance → financial statements

Summary Statistics: Branches and Banks

Panel A: Branch Variables	Difference	T-stat	Control Mean
Deposits in MM	9.347	5.461***	41.558
Checking Acct Fee	1.000	0.601	40.13
Checking Acct Minimum	89.375	0.450	356.523
Treated Branches	4947		
Control Branches	8197		
<u>Panel B: Bank Variables</u>			
Infl-adj Assets in MM	732.221	5.708***	712.365
Number of Branches	5.196	6.487***	3.092
Loans/Assets	0.013	1.294	0.625
Pct Cons Loans	0.013	1.207	0.101
Pct Real Estate Loans	0.025	1.600	0.664
Deposits/Liabilities	-0.024	4.333***	0.929
Tier 1 Ratio	-1.580	2.478**	15.170
Net Income/Assets	0.004	5.372***	0.006
Pct Pastdue and NonAcc Loans	-0.004	1.298	0.026
Net Chargeoffs/Loans	-0.002	3.521***	0.006
Treated Banks	656		
Control Banks	1610		

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Instrumental Variables

- Geographic proximity is an important predictor of a bank's acquirer (similar to Granja, Matvos, Seru, 2017).
- In 30% of mergers, the acquirer has a branch in same zip code.
- Instrument for T_b : percentage of branches, across zip codes the target bank operates in, that were owned by large banks as of 1993.
- Exclusion restriction: Percentage of nearby branches owned by large banks in 1993 affects subsequent deposit growth only through its effect on the acquisition decision.
- Instrument for $T_b \times Post_t$: $\widehat{T}_b \times Post_{b,t}$ (Wooldridge, 2010)

More

Bank Consolidation and Deposit Growth

Dependent Variable: Branch Deposit Growth

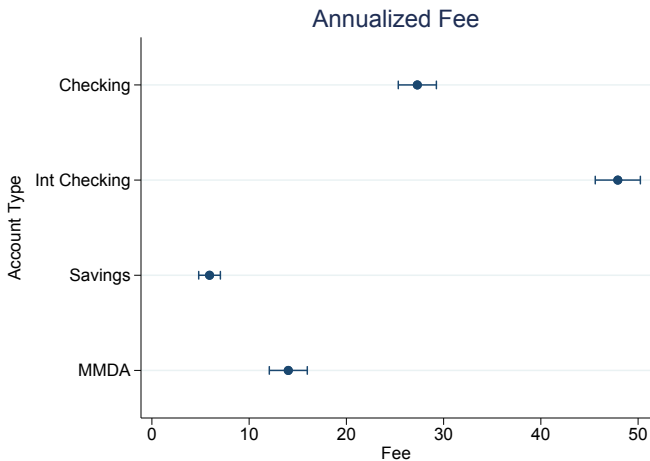
	OLS	IV
Bought by Large _b × Post _{b,τ}	-0.016*** (0.004)	-0.018** (0.008)
MSA-Year FE	Yes	Yes
Branch FE	Yes	Yes
Observations	142642	142642
Within R-squared	0.294	0.295

Deposit growth is 1.8pp lower in treated branches after the acquisition.

Outline

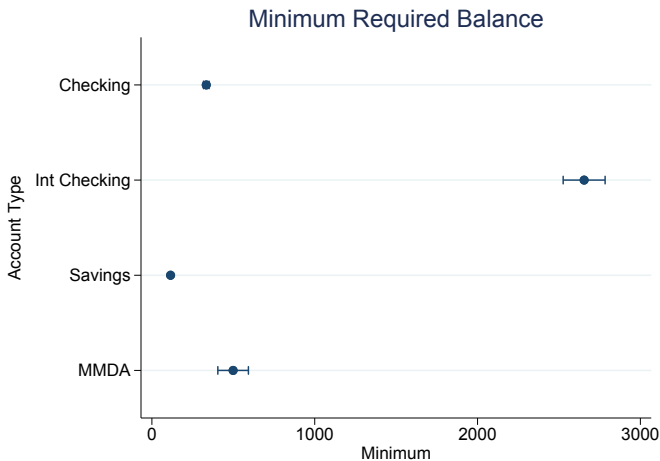
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Differences in Deposit Account Fees



Coefficients and standard errors from a regression of fees on an indicator for large bank and MSA-year fixed effects. [More](#)

Differences in Deposit Account Minimum Balances



Coefficients and standard errors from a regression of required minimum balances on an indicator for large bank and MSA-year fixed effects. [More](#)

Why do Large Banks Have Higher Fees?

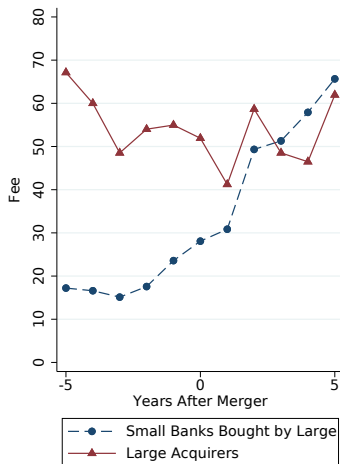
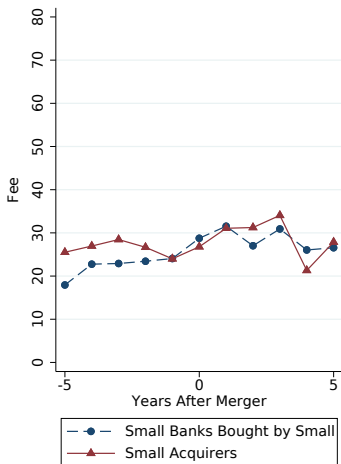
- 1 Differences in access to wholesale funding (Park and Pennacchi, 2009)
 - Large banks have access to wholesale funding sources.
 - Small banks only have access to deposits and equity.
 - Wholesale funding is cheaper than equity.
 - Large banks pay lower rates on deposit accounts (Park and Pennacchi, 2009; Hannan and Prager, 2006). [Rates](#)
- 2 Differences in product characteristics and services provided

No evidence of:

- 3 Differences in efficiency or lack of profit-maximizing behavior (Wheelock and Wilson, 2012; Kovner, Vickery, and Zhou, 2014; DeYoung and Rice, 2004). [More](#)

Checking Account Fees and Required Minimum Balances

Checking Fee



Bank Consolidation and Fees

Dependent Variable:	Regular Checking		Interest Checking	
	Fee (1)	Min (2)	Fee (3)	Min (4)
Bought by Large _b × Post _{b,τ}	25.130*** (6.561)	228.498*** (73.190)	34.609*** (8.502)	623.131** (274.437)
County-Year Fixed Effects	Yes	Yes	Yes	Yes
Branch Fixed Effects	Yes	Yes	Yes	Yes
Observations	28341	26738	31598	30845
Within R-squared	0.002	0.087	0.039	0.051

Annualized fees increase by \$25 and required minimum balances by \$230.

More

Fees and Deposit Growth

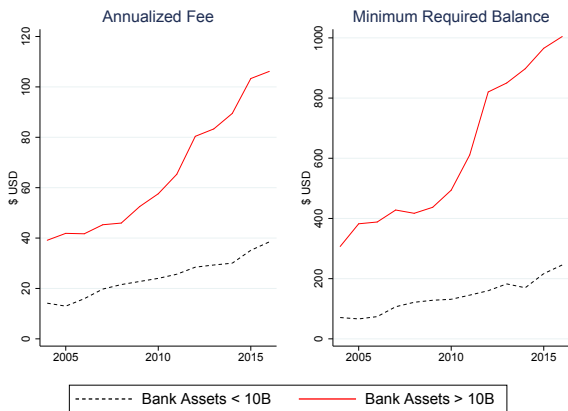
- The effects of consolidation on deposit growth should be stronger in lower-income neighborhoods.
- Test this hypothesis using a triple difference:

$$\text{DepositGrowth}_{i,b,z,t} = \alpha_{m,t} + \beta_i + \phi_\tau + \chi \text{LowInc}_{i,z} \times \text{Post}_{b,\tau} \\ \delta T_b \times \text{Post}_{b,\tau} + \gamma \text{LowInc}_z \times T_b \times \text{Post}_{b,\tau} + \epsilon_{i,b,z,m,t,\tau}$$

Fees and Deposit Growth

Dependent Variable:	Deposit Growth		
	(1)	(2)	(3)
Bought by Large _b × Post _{b,τ}	-0.018*** (0.008)	-0.008 (0.007)	-0.016** (0.008)
I{Pct Poverty Above Med} _z × Bought by Large _b × Post _{b,τ}		-0.011*** (0.004)	
I{Pct with PA Earnings} _z × Bought by Large _b × Post _{b,τ}			-0.012** (0.006)
MSA-Year FE	Yes	Yes	Yes
Branch FE	Yes	Yes	Yes
Observations	142642	123142	123142
Within R-squared	0.15	0.15	0.14

Durbin Amendment



- In 2011, Durbin Amendment to the Dodd-Frank Act capped debit card interchange fees at banks with more than \$10B in assets
- These banks increased fees as a result (Kay et al, 2015; Sarin, 2018)

Fees and Deposit Growth

Dependent Variable:	Deposit Growth			
	(1)	(2)	(3)	(4)
Bought by Large _b × Post _{b,τ}	-0.018*** (0.008)	-0.008 (0.007)	-0.016** (0.008)	-0.015* (0.008)
I{Pct Poverty Above Med} _z × Bought by Large _b × Post _{b,τ}		-0.011*** (0.004)		
I{Pct with PA Earnings} _z × Bought by Large _b × Post _{b,τ}			-0.012** (0.006)	
After 2010 _t × Bought by Large _b × Post _{b,τ}				-0.011* (0.011)
MSA-Year FE	Yes	Yes	Yes	Yes
Branch FE	Yes	Yes	Yes	Yes
Observations	142642	123142	123142	142642
Within R-squared	0.15	0.15	0.14	0.06

Robustness and Alternative Explanations

Results on deposit growth and fees are robust to:

- Changes in customer service post-merger [More](#)
- Alternative instrumental variable and plausibly exogeneous subsets [More](#)
- Increased concentration [More](#)
- Address changes [More](#)
- Different time periods [More](#)

Where Do the Depositors Go?

Where Do the Depositors Go?

Do some depositors who leave the bank exit the banking system?

- Alternative (fringe) banking services: check cashing facilities, reloadable prepaid cards, bill pay outlets
- Proxy for unbanked households: the number of check cashing facilities per 10,000 residents in the zip code
- Data from Infogroup

Bank Consolidation and Check-Cashing Facilities

Dependent Variable:	Check Cashing Facilities Per Capita			
	(1)	(2)	(3)	(4)
Bought by Large _z × Post _{z,τ}	0.045** (0.023)	0.036 (0.023)	0.012 (0.026)	0.011 (0.024)
I{Pct Poverty} _z × Bought by Large _z × Post _{z,τ}		0.056* (0.032)		
I{Pct with PA Earnings} _z × Bought by Large _z × Post _{z,τ}			0.076* (0.016)	
> 1 Branch Acquired _z × Bought by Large _z × Post _{z,τ}				0.081*** (0.031)
MSA-Year FE	Yes	Yes	Yes	Yes
Zip FE	Yes	Yes	Yes	Yes
Observations	105739	105739	105739	105739
Within R-Squared	0.002	0.002	0.002	0.002

[More](#)

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MSA-Year FE	Yes	Yes	Yes	Yes
Zip FE	Yes	Yes	Yes	Yes
Observations	105739	105739	105739	105739
Within R-Squared	0.002	0.002	0.002	0.002

[More](#)

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MSA-Year FE	Yes	Yes	Yes	Yes
Zip FE	Yes	Yes	Yes	Yes
Observations	105739	105739	105739	105739
Within R-Squared	0.002	0.002	0.002	0.002

More

Where Do the Depositors Go?

Do some depositors who leave the bank exit the banking system?

- Alternative (fringe) banking services: check cashing facilities, reloadable prepaid cards, bill pay facilities
- Proxy for unbanked households: the number of check cashing facilities per 10,000 residents in the zip code
- Data from Infogroup
- By 5 years after the merger, increase of approximately 1 facility per 7 zip codes.
- Increase of approximately 1 facility per 3 zip codes in low-income areas and zip codes in which more than 1 branch was acquired, relative to a baseline of 2 facilities per zip code.

Fringe Banking Services and Infogroup

Is there an increase in other fringe banking providers?

- Infogroup collects and digitizes yellow pages information.
- Names and detailed industry information allow me to separate check cashing facilities and payday lenders.
- Check cashing facilities, prepaid cards, and bill pay outlets are deposit account alternatives.
- Payday lenders, pawn shops, and auto title loans are loan alternatives.

Fringe Banking Services and Infogroup

Is there an increase in other fringe banking providers?

Dependent Variable:	Payday Lenders (1)	Other Lenders (2)
Bought by Large _z × Post _{z,τ}	0.013 (0.013)	-0.297 (0.891)
MSA-Year FE	Yes	Yes
Zip FE	Yes	Yes
Observations	105739	105739
Within R-squared	0.001	0.002

Why Do Households Turn to Fringe Banking Services?

Fringe banking services are expensive. Why do households use them, rather than bank accounts?

- Rational explanation: other fees matter too
- Behavioral explanation: underestimate cost of alternative financial services
 - Payday lending and financial literacy (Agarwal et al, 2009, Bertrand and Morse, 2011)
- Other: personal relationships (Servon, 2013)

Robustness and Alternative Explanations

Increase in check cashing facilities is not driven by:

- Trends in income or household characteristics [More](#)
- Financial exclusion due to branch closures [More](#)
- Increases at other small bank branches [More](#)

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Long-run Negative Consequences of Being Unbanked

- Having a bank account improves a household's ability to save, increasing emergency savings and total net worth (Ashraf et al, 2006; Prina, 2013; Celerier and Matray, 2018).
 - Commitment
 - Crime

Long-run Negative Consequences of Being Unbanked

- Having a bank account improves a household's ability to save, increasing emergency savings and total net worth (Ashraf et al, 2006; Prina, 2013; Celerier and Matray, 2018).
 - Commitment
 - Crime
- **Hypothesis: Are households in treated zip codes more likely to experience financial hardship after facing a shock?**

Data on Financial Hardship

- Transunion: random sample of 4 million credit reports, with data on credit accounts, delinquencies, bankruptcies, and other credit events from 2002-2010.
 - Limit to households with low credit score (approximately equivalent to 660 FICO score and below).
 - Households on the edge of the financial system less likely to have credit accounts, mortgages, or loans.
 - Focus on collection accounts: mostly unpaid medical and utility bills.
- Evictions data by zip code from AIRS

Savings and the Unbanked

- Limit to mergers from 2002-2007 and consider financial outcomes of individuals in 2008-2010
- Shock = whether the MSA (zip code) increase in unemployment rate from 2006-2010 (2000-2010) was above the median

$$\begin{aligned} \text{Collection}_i = & \beta \text{Shock}_z + \gamma \text{Treated}_z + \delta \text{Shock}_z \times \text{Treated}_z \\ & + \alpha X_i + \phi Z_z + \alpha_m + \epsilon_{i,z} \end{aligned}$$

Financial Consequences of Being Unbanked: Collection Accounts

Dependent Variable:	Household Had Collection Account			
	2008-2010		2002-2007	
	(1)	(2)	(3)	(4)
Bought by Large _z	-0.006 (0.004)	-0.007* (0.004)	0.000 (0.004)	-0.004 (0.004)
MSA Unempl Shock _m × Bought by Large _z	0.010** (0.004)		-0.002 (0.007)	
Zip Unempl Shock _z		0.009*** (0.003)		0.007* (0.004)
Zip Unempl Shock _z × Bought by Large _z		0.011** (0.005)		0.005 (0.005)
MSA FE	Yes	Yes	Yes	Yes
Age by Credit Score Bucket FE	Yes	Yes	Yes	Yes
Zip Controls	Yes	Yes	Yes	Yes
Observations	224767	224767	224767	224767
Within R-squared	0.181	0.181	0.112	0.112

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	2008-2010		2002-2007	
	(1)	(2)	(3)	(4)
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MSA Unempl Shock _m × Bought by Large _z	0.010** (0.004)		-0.002 (0.007)	
Zip Unempl Shock _z		0.009*** (0.003)		0.007* (0.004)
Zip Unempl Shock _z × Bought by Large _z		0.011** (0.005)		0.005 (0.005)
MSA FE	Yes	Yes	Yes	Yes
Age by Credit Score Bucket FE	Yes	Yes	Yes	Yes
Zip Controls	Yes	Yes	Yes	Yes
Observations	224767	224767	224767	224767
Within R-squared	0.181	0.181	0.112	0.112

Real Consequences of Being Unbanked: Evictions

Dependent Variable:	Percent Households Evicted		Rent Prices	
	(1)	(2)	(3)	(4)
Bought by Large _z	-0.002 (0.002)	-0.001 (0.002)	-118.741 (76.551)	-101.956 (73.222)
MSA Unempl Shock _m × Bought by Large _z	0.004** (0.002)		27.152 (83.147)	
Zip Unempl Shock _z		0.002** (0.0002)		-69.761 (48.612)
Zip Unempl Shock _z × Bought by Large _z		0.004* (0.002)		15.237 (67.959)
MSA FE	Yes	Yes	Yes	Yes
Zip Controls	Yes	Yes	Yes	Yes
Observations	941	941	824	824
Within R-squared	0.263	0.263	0.446	0.446

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Bought by Large _z	-0.002 (0.002)	-0.001 (0.002)	-118.741 (76.551)	-101.956 (73.222)
MSA Unempl Shock _m × Bought by Large _z	0.004** (0.002)		27.152 (83.147)	
Zip Unempl Shock _z		0.002** (0.0002)		-69.761 (48.612)
Zip Unempl Shock _z × Bought by Large _z		0.004* (0.002)		15.237 (67.959)
MSA FE	Yes	Yes	Yes	Yes
Zip Controls	Yes	Yes	Yes	Yes
Observations	941	941	824	824
Within R-squared	0.263	0.263	0.446	0.446

Consequences of Being Unbanked

- Small but economically significant effects:
 - Households in treated zip codes affected by an unemployment shock related to the Great Recession were 1pp more likely to have a collection account.
 - Baseline rate of collection accounts is 20%.
 - Households in treated zip codes affected by an unemployment shock related to the Great Recession were 0.4pp more likely to be evicted.
 - Baseline rate of evictions is 6%.
- Collection accounts mainly driven by unpaid medical bills: Medical
- Results are robust to alternative measures of shocks based on natural disasters. Robustness

Conclusion

- Large banks tend to have higher fees and higher minimum required balances than small banks.
- After a small bank is bought by a large bank, fees and required balances increase, and there is deposit outflow around the time of the merger, especially in areas with more low-income households.
- An increase in check cashing facilities suggests some of these low-income households leave the banking system altogether.
- Subsequently, households in these areas are less able to withstand financial shocks and are more likely to have collection accounts.