

Discussion:
"A quantitative model of bank merger dynamics"
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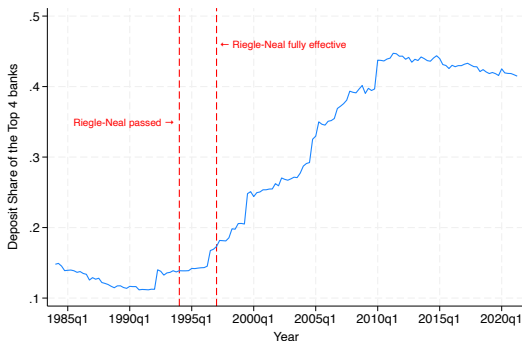
Macro Finance Society Meeting, Philadelphia, 2026

Summary: motivation

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- ▶ US banking sector has become more concentrated:
 - ▶ Top 4 deposit share rose from below 15% to above 40%
 - ▶ Number of banks fell from more than 12,000 to below 4,000
 - ▶ Dominant banks expanded from 4 to 35 states

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- ▶ Concentration matters for aggregate outcomes:
- ▶ Idiosyncratic deposit shocks ν_{it} at large banks $\rightarrow$ agg. effects

$$\Delta L_{it} = \beta_{k(i)} \Delta D_{it} + \zeta_{it} = \beta_{k(i)} \left(\underbrace{\xi_{k(i)} X_{i,t-1} + \nu_{it}}_{=:\Delta D_{it}} \right) + \zeta_{it}$$

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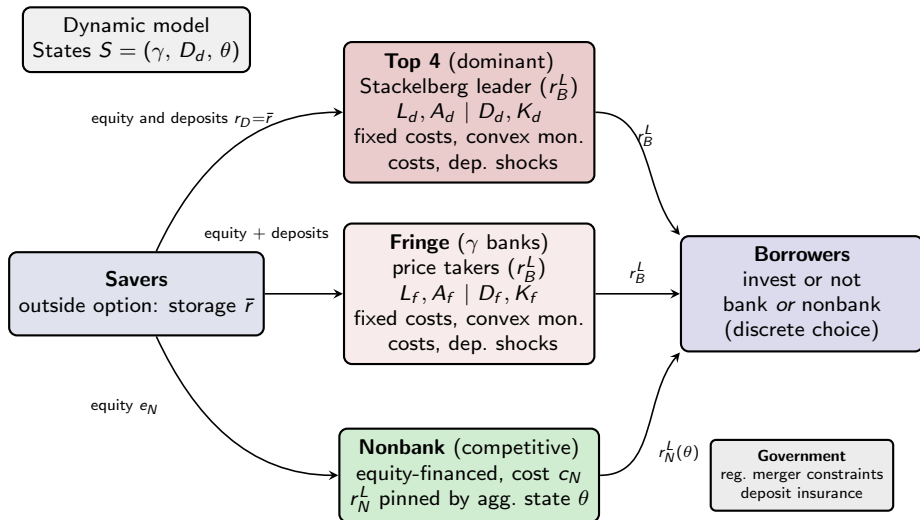
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- ▶ average MPL ($\beta_{k(i)}$ on ν_{it}): about 0.51
- ▶ Top 4 MPL: close to 0.96 in the full sample
- ▶ weakens post Dodd–Frank, especially for the top 4
- ▶ Top 4 idiosyncratic shocks explain $\approx 10\%$ of agg. bank credit var (Gabaix (2011)), weaker post Dodd–Frank

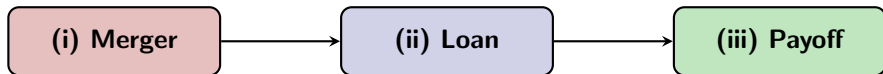
Mergers create large, granular banks whose idiosyncratic shocks & market power affect aggregate credit supply & competition

Summary:

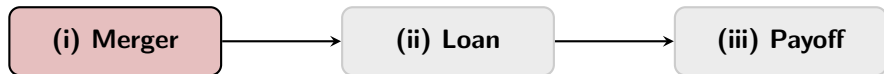
quant. dominant-fringe model w/ endogenous mergers



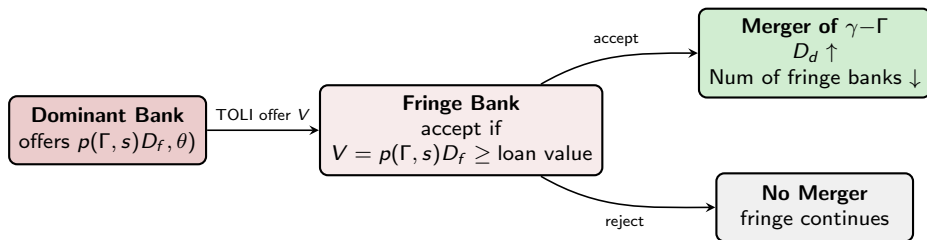
Summary: decision stages within each period



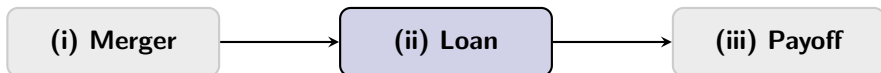
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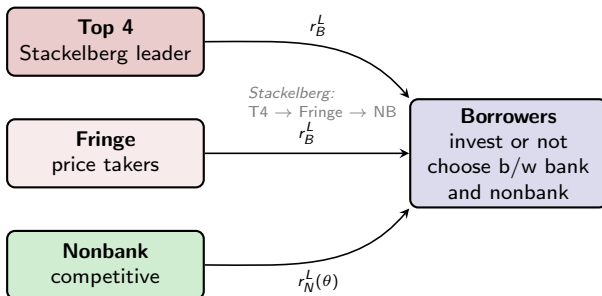
- ▶ Dominant makes take-it-or-leave-it offer to $\gamma - \Gamma$ fringe banks
- ▶ Reg. merger cost: ∞ pre-Riegle–Neal, finite post-RN



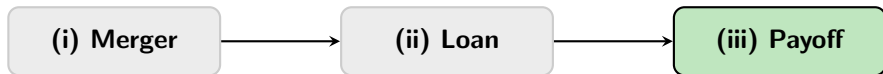
Summary: decision stages within each period



- ▶ Borrower differentiated demand for banks vs. nonbank loans
- ▶ Deposit shocks $D_{it} + \varepsilon_{it}$ allocated to $L_{it} \leq D_{it} + \varepsilon_{it}$ or A_{it} (residual)
- ▶ Stackelberg loan market: T4 $\rightarrow$ fringe
- ▶ d -bank internalizes bank loan mkt effects & faces monitoring costs



Summary: decision stages within each period



- ▶ Loan credit shocks, incumbent profits, dividends realized
- ▶ Entry cost $K_i(1 + \psi_i^e)$, $i \in \{f, d\}$ (fringe and dominant bank)
- ▶ Negative profit banks can either exit or inject equity
- ▶ Endogenous exit: bank exits if continuation value < 0
- ▶ Law of motion: $\gamma' = \Gamma + \gamma_e - \gamma_x$

Summary: main results

Calibration to pre-Riegle–Neal moments; study transition after Riegle–Neal Regulation → concentration → credit supply & stability:

- ▶ Riegle–Neal: big reduction in regulatory merger costs

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Regulation → concentration → credit supply & stability:

- ▶ Riegle–Neal: big reduction in regulatory merger costs
- ▶ Regulation → concentration:

$$D'_d = D_d + (\gamma - \Gamma)D_f, \quad K'_d = K_d + (\gamma - \Gamma)K_f,$$

raising dominant-bank market share and shrinking the fringe

Summary: main results

Calibration to pre-Riegle–Neal moments; study transition after Riegle–Neal
Regulation → concentration → credit supply & stability:

- ▶ Riegle–Neal: big reduction in regulatory merger costs
- ▶ Regulation → concentration:
- ▶ Concentration → credit supply:

Larger d - bank more loan-market power, restricts lending, raises bank loan rates (increasing profits for fringe), and shifts some borrowers to nonbanks

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Regulation → concentration → credit supply & stability:

- ▶ Riegle–Neal: big reduction in regulatory merger costs
- ▶ Regulation → concentration:
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- ▶ Concentration → future mergers:

More mergers leave fewer targets, raise the value of remaining fringe bank value $\Rightarrow$ $\uparrow$ acquisition prices and $\downarrow$ future merger activity

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Regulation → concentration → credit supply & stability:

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- ▶ Concentration → credit supply:
- ▶ Concentration → future mergers:
- ▶ Concentration → risk/stability:

Mergers can stabilize fringe banks by preserving acquisition value, but larger dominant banks make idiosyncratic shocks more aggregate

- ▶ *Key-role of nonbanks and monetary policy effects*

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Experiment: $\uparrow$ deposit rate r^D & the securities return r^A by 25 bps for 2 periods

Mechanism

$r^D \uparrow, r^A \uparrow \Rightarrow$ funding more expensive & securities more attractive $\Rightarrow \downarrow \mathcal{L}_{it}^B$

Bank lending channel

- ▶ Bank lending falls more after merger reform (concentration up)

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with nonbank comp., higher bank loan mark-ups, borrowers $\rightarrow$ nonbanks

Nonbanks mitigate aggregate effect:

nonbank lending falls *less* when nonbank competition is stronger

Existing literature:

- ▶ Calomiris (2000): fragmented US banking sector led to banking *instability* via small banks vulnerable to idiosyncratic shocks
- ▶ Deregulation
 - ⇒ increased concentration, improved banking services at higher costs (Kroszner and Strahan, 1999; Stiroh and Strahan, 2003; Dick, 2006)
 - ⇒ reduced credit supply to small-opaque borrowers (Rice and Strahan, 2010) and credit quality Granja et al. (2022)
- ▶ Kroszner and Strahan (1999) argued deregulation was a state level process that began well before Riegle-Neal

Contribution

What this paper does instead

- ▶ Quantitative lab to study endogenous bank mergers
- ▶ Effects from regulating mergers (extending Corbae-D'Erasmus 2025)
- ▶ Interaction with a growing nonbank sector

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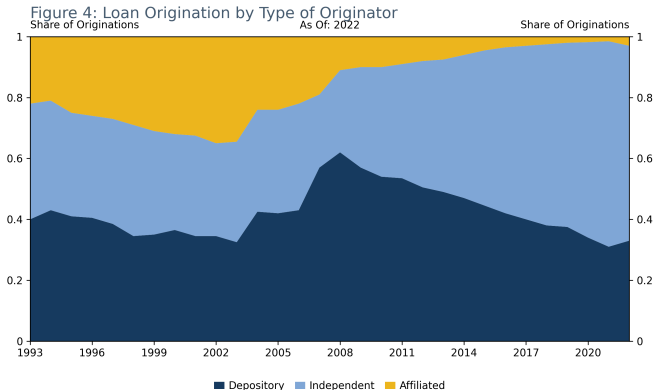
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Comments:

- ▶ Strategic nonbank sector
- ▶ What merger policy would a regulator choose?
- ▶ Empirical motivation

C1: Strategic nonbank sector

- ▶ Analysis of non-banks' role is a key contribution of the paper
- ▶ Nonbanks are now the largest source of mortgage credit



Note: Depositories include credit unions. Independent refers to nonbank mortgage companies. Affiliated refers to nonbank mortgage companies affiliated with a depository institution.

Source: Financial Stability Oversight Council, Report on Nonbank Mortgage Servicing (2024), Figure 4; HMDA public data. Recreated as PNG.

C1: Strategic nonbank sector

- ▶ Model: nonbanks are competitive price-takers

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- Model: nonbanks are competitive price-takers
- Data: nonbanks increasingly concentrated

Top mortgage originators continued to gain market share of purchase and refi volume

Total Originations			Purchase Originations		Refi Originations	
	Total Originations - \$ in bills	2023	2024	YoY Change	Mkt Share - 2023	Mkt Share - 2024
1	United Wholesale Mortgage	107.9	137.8	28%	7.4%	8.3%
2	PennyMac Financial	98.5	115.1	17%	6.8%	6.9%
3	Rocket Mortgage	76.1	95.9	20%	5.2%	5.8%
4	Freedom Mortgage	16.1	72.0	347%	1.1%	4.3%
5	Newrez	36.9	58.6	61%	2.5%	3.5%
Total market originations		1,450.0	1,665.0	21%		
Market share - Top 5					26.5%	28.8%
Market share - Top 10					38.5%	41.5%

Note: purchase + refinance = total originations. Pro forma for Rocket's acquisition of Mr. Cooper, the top five and ten companies' market share of total originations for 2024 was 30% and 43%, respectively.

Source: Fitch Ratings. Inside Mortgage Finance, Copyright 2024. Used with permission.

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- ▶ Borrowers pay a premium to borrow from nonbanks (Buchak et al., 2018)
- ▶ Nonbanks may have market power; respond strategically to dominant bank
- ▶ Next: model strategic nonbank behavior & its interaction with bank mergers

C2: Optimal dynamic merger policy

Why this is first order?

- ▶ $H(\Gamma, s)$ is the policy lever that determines merger activity, concentration, and the future bank size distribution
- ▶ This paper already captures key dynamic forces
 - $\Rightarrow$ Merger reg. costs already a function of the market structure
 - $\Rightarrow$ Merger intensity responds endogenously to changes in the market structure & reg. changes since merger changes $s' = (\gamma', D'_d, \theta') \Rightarrow$ future entry, exit, prices, ...
- ▶ Nonbanks make the policy problem even more state dependent:
 - $c_N \downarrow \Rightarrow$ nonbanks limit banks' pricing power, while merger prospects changes fringe banks' risk-taking incentives
- ▶ So natural to study optimal $H(\Gamma, s)$

C3: MPL regression interpretation

- ▶ MPL interpretation requires ν_{it} to be a deposit *funding* shock

$$\Delta L_{it} = \beta_{k(i)} \xi_{k(i)} X_{it} + \beta_{k(i)} \nu_{it} + \zeta_{it}$$

- ▶ ν_{it} is an *idiosyncratic* shock with a permanent component, due to *mergers* or *geographic expansion*
- ▶ But merger affects future lending opportunities & balance sheet accounting
 $\hat{\beta}_{k(i)} \neq \text{MPL}$ but instead mixture of:
 - ▶ lending out of exogenous deposit inflows, and
 - ▶ mechanical balance-sheet/customer-base expansion from mergers
- ▶ Best interpretation: MPL estimates are *reduced-form correlations*, not causal propensity to lend out of exogenous deposit shocks
- ▶ Suggestion: remove (enough compelling motivating evidence) or isolate exogenous deposit shocks
 - ▶ For an acquirer i , add the target's lagged balance sheet to the acquirer's lagged balance sheet before computing growth
 - ▶ Finding an oil-well windfall shocks (Gilje et al., 2016)

Conclusion

- ▶ Great and timely paper on a first order question
- ▶ *Endogenous merger dynamics!!*
- ▶ Suggestions
 - (+) Expand on strategic nonbank behavior
 - (+) Consider the optimal dynamic merger policy problem
 - (-) Either remove MPL/granularity evidence or isolate ex. deposit shocks

References I

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Smaller comments

- ▶ The timing section separates the loan stage from the payoff stage, but the recursive formulation in Section 6.4 embeds the payoff-stage exit decision inside the loan-stage value function. This is okay as a compressed Bellman representation if x'_i is interpreted as a contingent end-of-period decision made after payoff shocks are realized. However, the notation would be clearer if you introduced a separate payoff-stage value function before substituting it into the loan-stage problem.
- ▶ In the merger stage, it seems confusing to write the purchase value for target banks as $p(\Gamma, s)D_f$, as it could suggest that the acquirer only is paying for deposits and getting equity for free. Rather, it should be stated that $p(\Gamma, s)D_f$ denotes the *total* acquisition price for a fringe bank, expressed per unit of acquired deposits.
- ▶ The model feature that the number of banks falls relative to Gowriskankaran and Holmes (2004) is directly built into the merger technology and hence less a result but an assumption. The contribution is not that mergers reduce the number of firms — that is tautological — but that the model endogenizes the amount of merger activity and asks whether a calibrated merger policy shock can jointly match concentration, bank counts, pricing, and stability.
- ▶ Table 4, Tobin's Q Top 4 model moment $6\times$ larger than data?
- ▶ Puzzled by the deposit interest rate numbers in Table A.1. How can deposit costs be negative from 1984-2019 be negative for the top 4, and so low for the rest (see also A.2). Are you only using transaction deposits, subtracting deposit fees?

Smaller comments ctd

- ▶ K_i is the bank's book equity / initial capital injection.

Bank balance sheet: Assets = Deposits + K_i .

- ▶ P_i is the market price of the equity claim; it is not an additional balance-sheet liability of the bank
- ▶ Therefore, the term in Eq. (16)

$$\int [P_i + \mathbf{1}_{\{e_i=1\}} K_i] \Phi'_i di$$

mixes two different payments:

- ▶ $P_i \Phi'_i$: purchase of the equity claim,
- ▶ $K_i \Phi'_i$: capital injected only if the bank is a new entrant.

Confusing: if P_i = total market value of equity, adding K_i separately risks double counting

Cleaner formulation:

Households buy equity claims at P_i , entry is handled by $v_i(s') - K_i \leq 0$.

$$\gamma_i^e > 0 \quad \Rightarrow \quad v_i(s') = K_i.$$

Alternative keep $P_i + K_i$, but define P_i explicitly as franchise value net of required book equity