The Deposit Business at Large vs. Small Banks

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Purpose of the Paper

- Provide a model and empirical results that the deposit-pricing differentials of large and small banks can best be explained by:
  - **Different production technologies of large and small banks,**
  - **Depositor preferences.**

- We find that large banks:
  - **Offer a broader menu of financial services,**
  - **Locate where depositors have lower deposit-rate elasticities and higher incomes,**
  - **Pay lower deposit rates.**

- **We define product market competition in the classic way:** products differ by characteristics and prices reflect consumer demand for these characteristics.

1. Reduced Form Evidence

Banks Use Uniform Deposit Pricing (RateWatch 2001–2020)

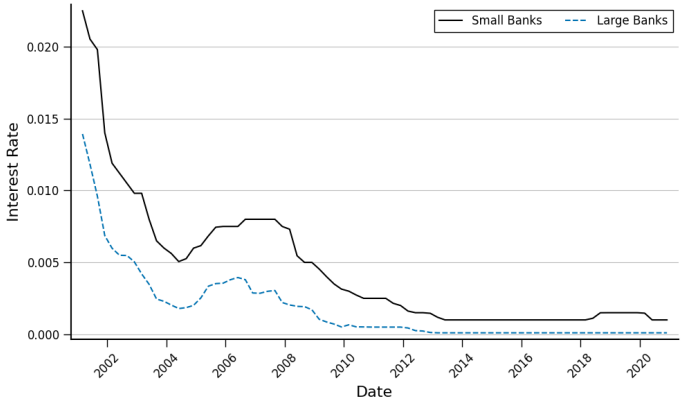
Time and Bank Fixed Effects

	CHECK $2.5K		SAV $2.5K	
FE	Time	Bank×Time	Time	Bank×Time
Observations	52,618,184	51,125,529	54,525,429	52,999,174
R^2	0.351	0.915	0.474	0.942

- Consistent with Radecki (1998); Heitfield (1999); Biehl (2002); Park and Pennacchi (2009); Yankov (2024); Granja and Paixão (2023); Begenau and Stafford (2023).

Large Banks Set Lower Deposit Rates

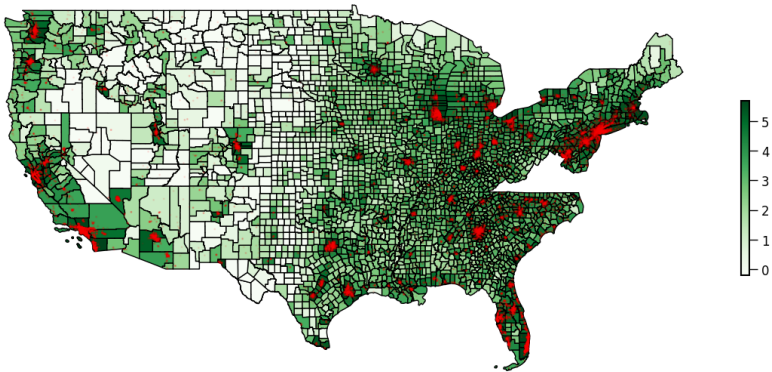
RateWatch: Savings $2.5K



- **Large:** One of the 14 large complex bank holding companies subject to the Supervisory Capital Assessment Program of 2009.
- Small banks provide rates 30 basis points higher on average.

Large vs. Small Banks Serve Distinct Geographies

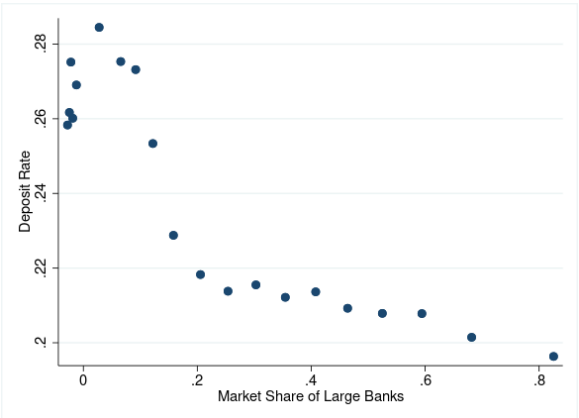
Large banks in high population areas (2019)



- More highly populated areas with higher average incomes, higher house prices, and lower average ages.

Small Banks Offer Lower Rates when Co-Located with Large Banks

RateWatch: Savings $2.5K



- Inconsistent with small banks setting higher rates to compete against large banks.

2. Model

Depositor's Maximization Problem

- **Depositor** i in market k is endowed with \$1 and chooses from $\mathcal{B}_k$ banks to maximize:

$$\max_{j \in \mathcal{B}_k} u_{ijk} = -\alpha_k s_j + \beta_k x_j + \epsilon_{ijk},$$

  - s_j = deposit spread
  - x_j = other financial services
  - $\epsilon_{ijk} \sim F(\epsilon) = e^{-e^{-\epsilon}}$

- The market share for the deposits of bank j in market k is

$$d_{jk} = \frac{\exp(-\alpha_k s_j + \beta_k x_j)}{\sum_{i \in \mathcal{B}_k} \exp(-\alpha_k s_i + \beta_k x_i)}.$$

- With a mass M_k of depositors, the total demand is $D_{jk} = M_k d_{jk}$.

Bank's Maximization Problem

- Bank j chooses other financial services $x_j \in \{0,1\}$, branches $b_{jk} \in \{0,1\}$, and spread s_j

$$\max_{x_j, b_{jk}, s_j} \sum_{k=1}^{K} \left((s_j - c) D_{jk} - \kappa_k \right) \mathbb{1}\{b_{jk} = 1\} - \chi x_j$$

  - c = cost of servicing deposits
  - κ_k = fixed cost to open a branch in k, $b_{jk} = 1$, if and only if $(s_j - c) D_{jk} \geq \kappa$.
  - χ = cost of financial services

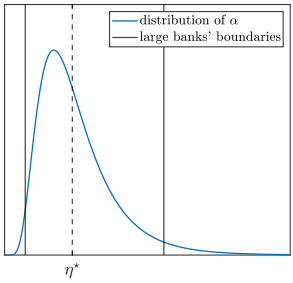
- **Assume: uniform deposit spread s_j across branches**

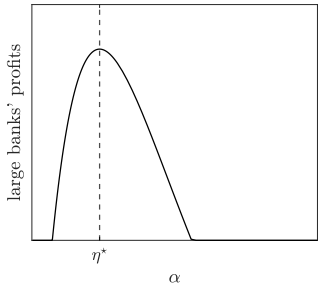
- **Free entry condition pins down the number of banks in each market.**

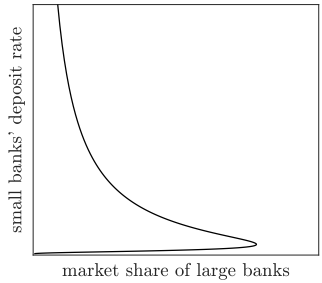
Model Predictions

1. Small banks operate in one market
2. In collocation markets, small banks compete for deposits by offering higher rates
3. Large banks maximize profits by choosing a deposit spread that allows them to open branches in the largest possible number of markets

Large Bank Optimal Profit Elasticity, η^*, and Small Bank Spreads







3. Structural Model: Elasticity Estimation

Estimation: BLP random parameters logit demand model

- **Define markets as 531 county clusters to capture local-branch customer preferences.**
- **Depositor in market k chooses cash, bonds or deposits of bank j to maximize:**

$$U_{i,j,k,t} = \alpha_i \left(r_{j,k,t} - r_t^f \right) + \beta X_{j,k,t} + \xi_{j,k,t} + \epsilon_{i,j,k,t},$$

where

$$\alpha_i = \alpha + \Pi D_i + \sigma \nu_i$$

  - $r_{j,k,t}$ = the deposit rate,
  - $X_{j,k,t}$ = bank characteristics,
  - $\xi_{j,k,t}$ = bank/market fixed effects and unobserved product characteristics,
  - $\epsilon_{i,j,k,t} \sim F(\epsilon) = e^{-e^{-\epsilon}}$ and $\nu_i \sim N(0,1)$.

- **Heterogeneous depositor price sensitivity α_i** as a function of demographics D_i.

Estimation: BLP random parameters logit demand model

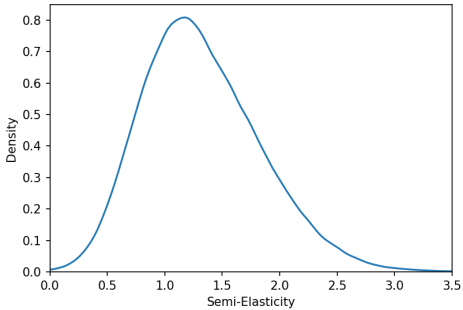
- **Use supply shocks $Z_{j,k,t}$ as instrumental variables (Wang et al., 2022; Dick, 2008).**
  - Ratio of staff salaries to total assets.
  - Ratio of non-interest expenses on fixed assets to total assets.
  - County-level annual wage shock in commercial banking industry.
- Follow Nevo (2000) and Conlon and Gortmaker (2020) to estimate key parameters $\alpha, \beta, \Pi, \sigma$.

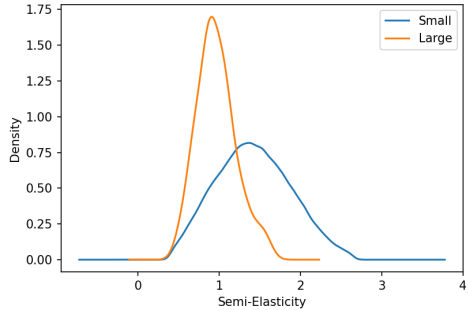
Estimation Results

Parameter		Estimation	SE
Deposit Rate	α	1.171	(0.046)
Large$\times$Market Average Income	β_1	**0.015**	(0.001)
Log(Employee per Branch)	β_2	0.476	(0.019)
Log(Branch Number)	β_3	0.133	(0.016)
Heterogeneous rate Sensitivity:			
Log(Household Income)	Π	**−0.533**	(0.014)
Rate Sensitivity Dispersion	σ	0.957	(0.038)
Observation		296,174	
Adjusted R^2		0.540	

- A one-standard-deviation increase in log income leads to a 0.490 decline in α.
- Banks in San Francisco (avg inc. $135k) can offer deposit rate 1.09% lower than in Champaign (avg inc. $50k) with same satisfaction.

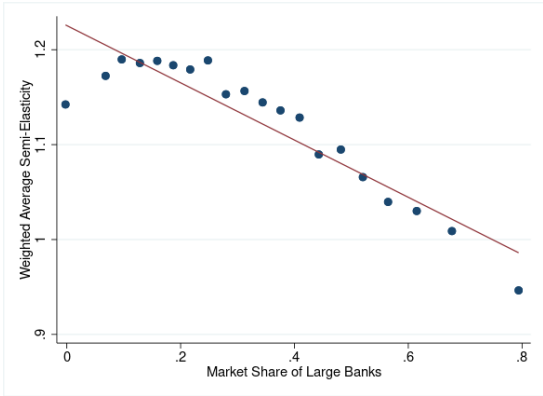
Semi-Elasticity results





- Large banks are concentrated in low-elasticity markets.
- Small banks face higher rate elasticities and larger elasticity variation.

Semi-elasticity and Large Bank Market Share



- Large banks locate in markets with lower elasticities
- Large banks can charge higher spreads because of lower customers' elasticities
- High-income customers have lower elasticities

Conclusions

- Deposit businesses differ at small and large banks.
- We provide model-based and empirical evidence for these differences and their effects on deposit-pricing.
- We find that the key drivers of deposit-pricing differences are:

  $\rightarrow$ **Heterogeneity of product characteristics,**

  $\rightarrow$ **Depositors' preferences.**

- We find that large banks:
  - Offer a broader menu of financial services,
  - Pay lower deposit rates than collocated small banks,
  - Locate where depositors have lower deposit-rate elasticities and higher incomes.

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