Bank Competition for Neighborhood Deposits

Mark J. Kutzbach
FDIC

Gary A. Wagner
UofLouisiana, Lafayette

C. Luke Watson
FDIC

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Motivation: What is the geographic scope of retail banking competition?

- Market definition matters for merger review, financial access, and measurement of local competition
- However, little consensus in banking literature on appropriate geographic unit:
  - e.g., counties, MSAs, zip codes, tracts, Federal Reserve banking markets
- Further, merger reviews are conducted using broad definitions, which implicitly average over customer heterogeneity within the same market
- If households are local in their branch choices, then coarse geographic markets may miss important heterogeneity in competition

Research Approach

We use a model based approach to estimate neighborhood deposit concentration, and then compare our local measure with broader market definitions used in the literature and regulatory analysis

Where We Fit and What We Add

We let household deposit demand reveal the geographic scope of competition

- Prior approaches all assume equal access within broad areas
  counties (Drechsler et al. 2017; Wang et al. 2022), MSAs (Adams et al. 2007; Dick 2008; Ho & Ishii 2011), tracts (Nguyen 2019), zips (Becker 2007); Fed markets (DiSalvo 1999)
- "Bank deserts" counts branches to measure access; we separate access from competition Van Leuven et al. (2024); Hegerty (2016)
- Coarse-market merger screens can miss localized harm Benson, Blattner, Grundl, Kim & Onishi (2024): reduced-form evidence; we provide the structural, residence-based analog
- We estimate a structural spatial demand model for banking services
  Ellickson, Grieco & Khvastunov (2020): future extension using BLP'95 style inversion technique
- Develop methodology to estimate local liquid savings
  Companion paper: Measuring Local Liquid Savings (KWW)

Modeling Approach

We measure competition from the perspective of a representative household depositor in each census tract:

- Each depositor allocates liquid savings across branches and an outside option
  - Each tract has heterogeneous choice set based on tract density and branch locations
- Utility depends on:
  - distance to branch
  - branch characteristics plus bank fixed effects
  - tract characteristics
  - bank-type nesting: local, regional, nationwide
- We estimate tract-to-branch deposit flows and deposit shares, $d_{\ell j}$
- We construct residence-based, tract-level bank concentration measure for household deposits:

$$THHI_\ell = 100 \cdot \sum_{j \in \mathcal{J}_\ell} \left(\frac{d_{\ell j}}{\sum_{k \in \mathcal{J}_\ell} d_{\ell k}} \right)^2$$

Data and Estimation

- **Liquid savings:** SCF + ACS
  - predict household liquid savings in SCF
  - map predictions to ACS households
  - aggregate to PUMAs and allocate to tracts
- **Tract characteristics:** ACS
  - Pop, Median Inc, Pct w/ Car, Pct H.Owner, EPOP, SqMi, Pct Land Devt.
- **Branch deposits and characteristics:**
  - FDIC Summary of Deposits: bank branches
  - Call Reports: bank balance sheets
  - Your Economy Time Series: business locations
- **Geography:**
  - geolocated branches and tract centroids
  - tract-specific branch choice sets based on endogenous search radius

Household l Demand for Branch b

$$\underbrace{d_{lb}^{H}(\theta_H, \rho, \xi)}_{\text{Deposit Share}} = \underbrace{P_l^H(b \mid m(b))}_{\substack{\text{Prob of Choosing b} \\ \text{given choice of group}}} \cdot \underbrace{P_l^H(m(b))}_{\text{Prob of choosing group}} \tag{1}$$

where

$$P_l^H(b \mid m) = \frac{\exp\left(v_{lb}^H/\rho_m\right)}{\sum_{k \in M_{lm}} \exp(v_{lk}^H/\rho_m)}, \tag{2}$$

$$P_l^H(m) = \frac{\left[\sum_{k \in M_{lm}} \exp\left(v_{lk}^H/\rho_m\right)\right]^{\rho_m}}{\exp(v_{l0}^H) + \sum_{m' \in \mathcal{M}} \left[\sum_{k \in M_{lm'}} \exp(v_{lk}^H/\rho_{m'})\right]^{\rho_{m'}}} \tag{3}$$

$$v_{lb}^H = \beta_x^H x_{lb} + Y_b \beta_Y^H + Z_l \beta_Z^H + (x_{lb} \cdot Z_l)\beta_{xZ}^H + (Y_b \cdot Z_l)\beta_{YZ}^H + \xi_{j_b} \tag{4}$$

Estimation

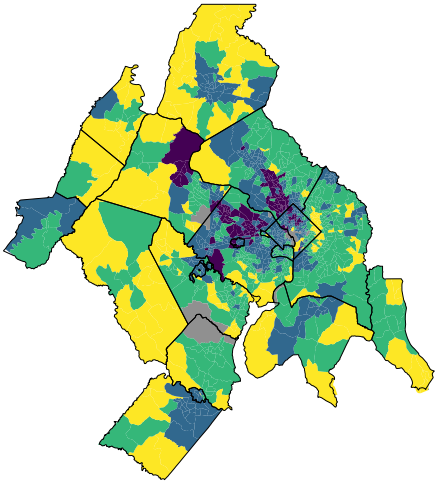
We use the model to predict bank branch deposits, $\hat{D}$, and the aggregate outside share, $\hat{d}$, and then fit the model using regulatory data on deposits at bank branches:

$$\min_{\theta} \left\{ \sum_{b \in \mathcal{B}} \left(\ln(\hat{D}_b(\theta)) - \ln(D_b) \right)^2 + \left(\hat{d}_0(\theta) - d_0 \right)^2 \right\}$$

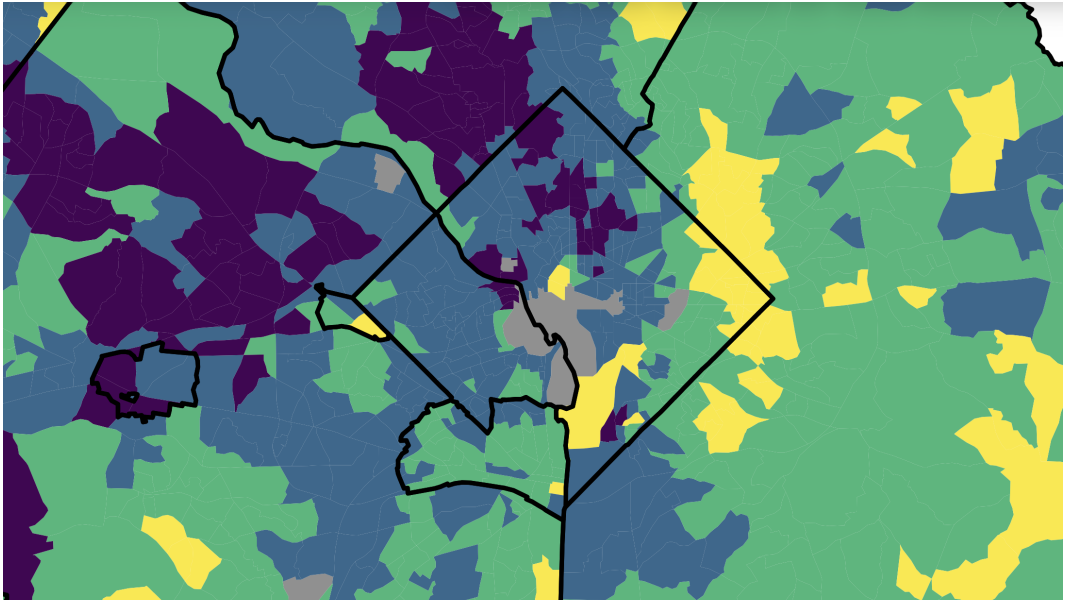
The model is identified under the following assumptions (EGK 2020):

1. Taste preferences and model errors are both uncorrelated with
   (i) store locations & characteristics and
   (ii) consumer characteristics
2. Branch quality and product pricing are at the bank level

DC Metro: FedHHI = 10.9 vs Avg THHI = 18.1

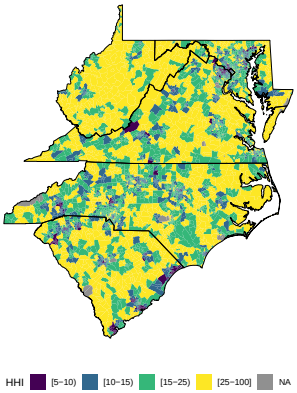


Zoom in on DC

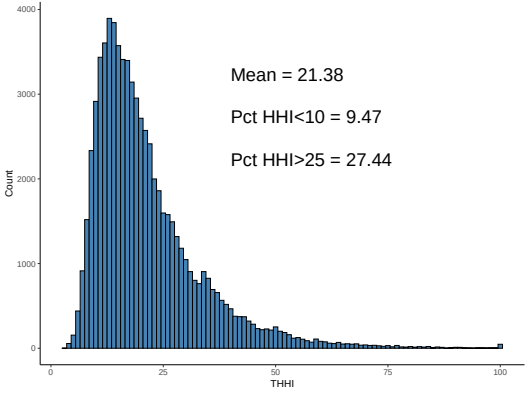


Zoom Out

Fifth District: Avg THHI = 22.0



Nationwide distribution of THHI



- Outside major metros, tracts are markedly more concentrated
- Mean THHI of 21 matches branch-based county HHI (Gödl-Hanisch, FDIC CFR WP 2022)

Key fact #1: Deposit markets are local

- For half of tracts, 50% of deposits go to branches within **1.7 miles**
- For three-quarters of tracts, 90% of deposits stay within **5.9 miles**
- Deposits decay about **12% per mile** from the tract (semi-elasticity -12.2)

	$Q25$	$Q50$	$Q75$	Mean
50% of tract deposits within (mi)	1.2	1.7	3.2	3.0
90% of tract deposits within (mi)	1.8	2.5	5.9	4.7

Implications

Households are very local in their branch choices, so markets defined at MSA or county scale will average over depositors who do not actually compete for the same branches

Key fact #2: Most THHI variation is within standard geographies

- Tract HHI is highly heterogeneous across neighborhoods
- This heterogeneity is not mainly between MSAs
- In the current draft, about **89%** of variation in tract HHI is *within* MSAs rather than *across* MSAs

Geographic Unit	Within	Across
MSA	88–89%	11–12%
County	72%	28%

Implications

For understanding competitive conditions faced by households, it is much more important to know *where within a market* a household lives than simply which MSA it lives in

Key fact #3: Local concentration varies systematically across neighborhoods

- Tract-level concentration is not just a relabeling of population or income
- Lower-income and less-educated neighborhoods tend to face higher concentration
- More branch-dense places tend to be less concentrated
- The model distinguishes *access* from *competition*
  - a tract can have few branches but several competing banks
  - or many branches but mostly from the same bank

Implications

Coarse market measures can hide meaningful neighborhood differences in banking competition and financial access

Merger Simulation

- We simulate *all* pairwise bank mergers within each MSA, holding household preferences, branch locations, and behavior fixed
  - 340 MSAs, more than 315,000 hypothetical mergers
  - isolates the first-order, mechanical effect of consolidation
- Combining two banks' tract shares changes local concentration by:

$$\Delta THHI_{\ell} = 2 \cdot s_{A\ell}\, s_{B\ell} \cdot 10{,}000$$

- HHI increases *only* where both banks draw deposits from the same tract
- For each bank, we measure 'customer distance' using deposit-weighted avg. of tract income, education, age, homeownership
- For each merger, we compare tract-level effects against the standard MSA-level screen

Customer similarity predicts localized merger harm

False negative: pass MSA screen but 10+ tracts w/ $\Delta THHI > 200$

Quartiles of customer distance within each MSA

	Q1 (Most Similar)	Q2	Q3	Q4 (Least Similar)
Mean $\Delta THHI$	**22.66**	7.42	3.02	**1.15**
P90 $\Delta THHI$	52.99	11.88	3.22	0.49
False Negative Rate (%)	**10.01**	2.87	1.00	**0.27**
N Mergers	78,920	78,828	78,747	78,658

Key finding

2.6% of all simulated mergers pass the MSA screen yet raise concentration by >200 HHI points in **10 or more tracts** — and these cluster in the most-similar quartile

Where screens fail: small and rural markets

- False negatives are most likely when banks
  - serve similar customers, but
  - operate spatially segmented branch networks
- Customer substitution is high even when geographic overlap looks modest
- The effect is sharply larger in *small* MSAs:

	Small ($\leq$100 tracts)	Medium	Large ($>$500)
Customer-similarity effect	10.54	3.47	0.41
Within-MSA R^2	0.37	0.26	0.11

Policy implication

Coarse screens understate merger effects precisely outside major metros — the smaller and rural markets where community banks consolidate

Conclusion: Bank Competition for Neighborhood Deposits

- We develop a tract-level measure of retail banking competition from household deposit allocation across nearby branches
- Deposit markets are local: most households' deposits stay within a few miles
- Competition varies sharply *within* conventional markets — 89% of THHI variation is within MSAs, not across them
- Coarse merger screens can miss localized harm, concentrated in mergers between banks with similar customers but segmented networks and/or small, rural markets
- Potential applications include: identifying divestment areas, predicting where branches will close/open, assessing credit effects of bank mergers