

Locational Determinants of Lending Deserts in the Rural United States

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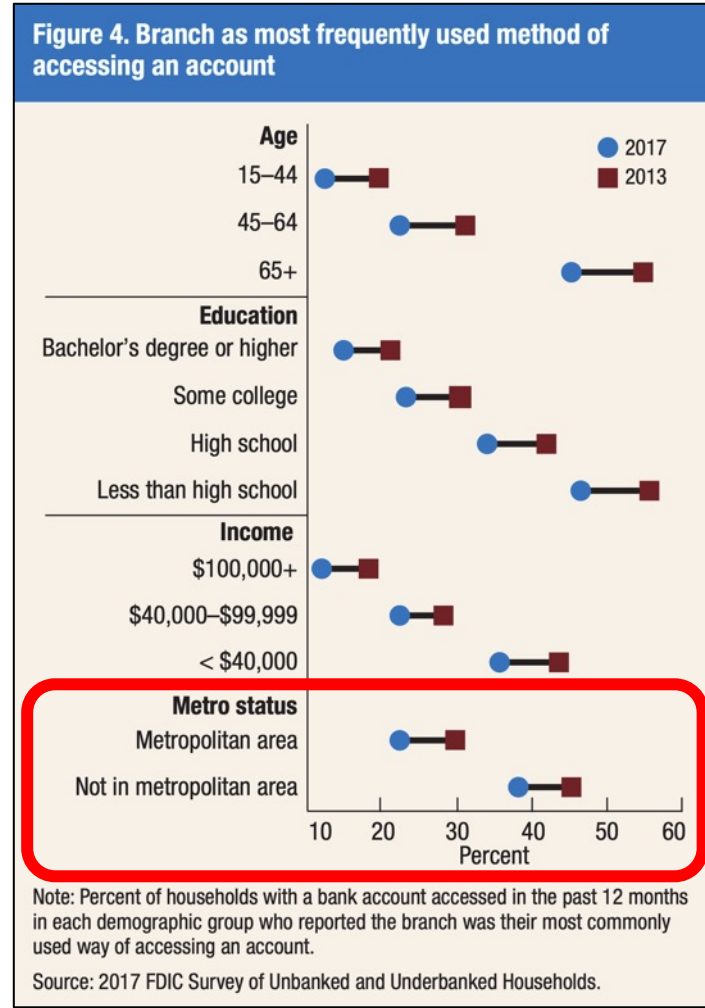
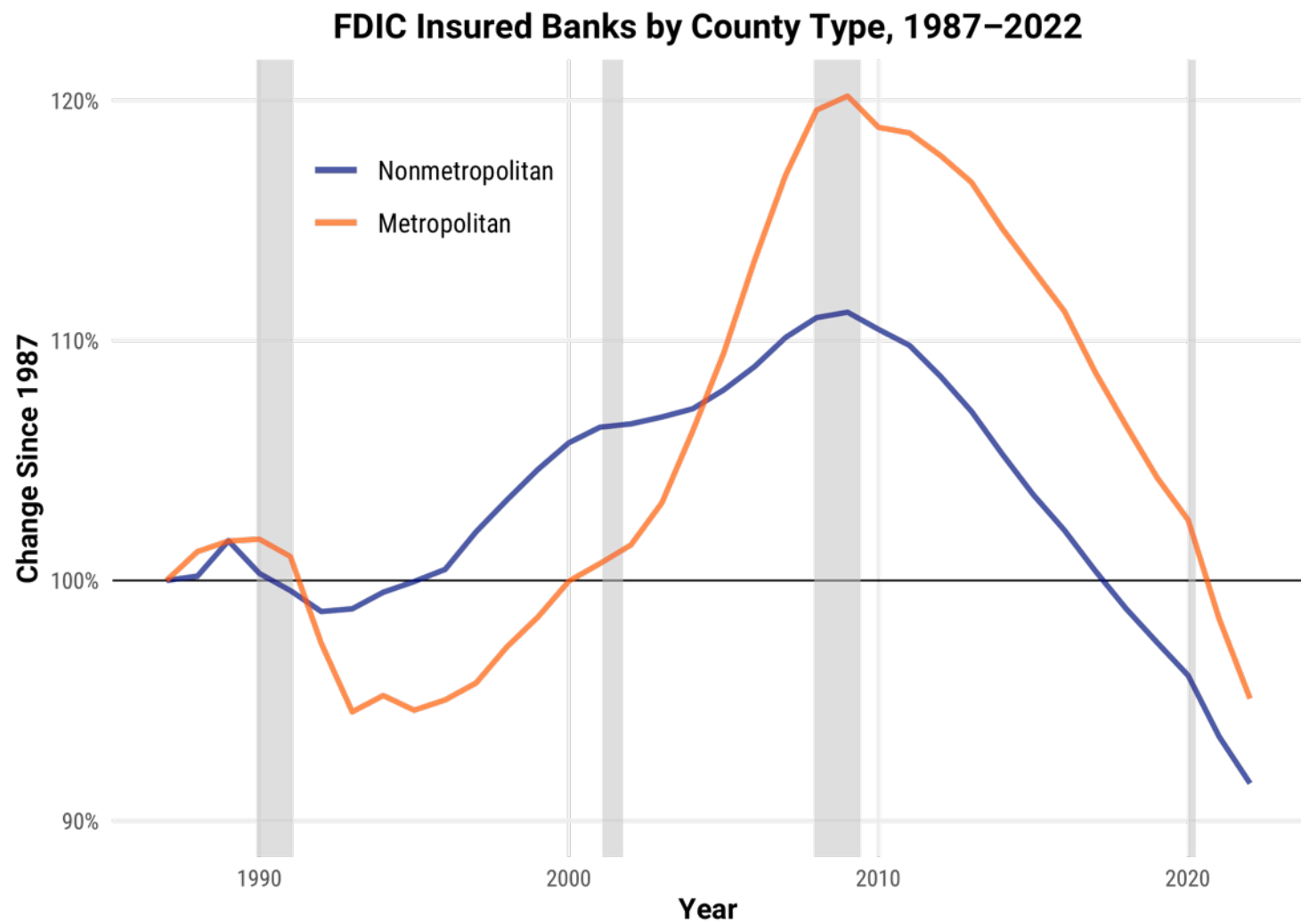
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Setting the Stage



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*While the necessity of visiting the bank has decreased and a number of rural communities have fewer banks, **there still are key roles for bankers to play** in meeting the financial service needs of families, businesses, and communities.*

- Minneapolis Fed rural "listening sessions" report (2018)

*"...the loss of independent local banks has led to a **small business credit constraint** in non-metropolitan economies."*

- Carpenter et al. (2020)

*The loss of **relational lending**, which sustained lending between local banks and local small business startups, has the potential to significantly limit future start-ups in rural America.*

- Mencken and Tolbert (2016)

*While online banking is widespread, **there is still a need for in-person services at a brick-and-mortar location when it comes to applying for loans and other more personalized financial services**. And when it comes to face-to-face meetings with bank tellers and loan officers, session participants emphasized the importance of personal relationships.*

- Minneapolis Fed rural "listening sessions" report (2018)

***Small businesses still depend on in-person banking services despite the proliferation of online alternatives**, and the shrinking of branch networks threatens local economic activity that is key to wealth-building in marginalized communities.*

- National Community Reinvestment Coalition report (2022)

Multi-Step Research Agenda

Exploratory: What are the local and regional characteristics associated with a lack of access to physical lending institutions?

Descriptive: What is the relationship between bank branch closure and regional borrowing activity?

Causal: What is the impact of a bank branch closure on local entrepreneurship (i.e., new business startups and/or expansion of existing businesses)?



Exploratory Analysis Objectives

1. Identify regions that are “lending deserts”—populated areas that are not served by some or all types of lenders—across the continental United States.
2. Identify the demographic, economic, and geographic factors associated with lending deserts' existence.
3. Identify anomalous “lending oases”—places containing lending institution(s) despite our previous model predicting they would be lending deserts.

(Stage 3 still in progress)

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Banking Deserts Become a Concern as Branches Dry Up

July 25, 2017

By [Drew Dahl](#), [Michelle Franke](#)



Although changes in technology have made it easy to conduct some banking transactions from almost anywhere, personal and public benefits are still derived from proximity to a bank branch.

In areas without branches—commonly referred to as “banking deserts”—costs and inconveniences of cashing checks, establishing deposit accounts, obtaining loans and maintaining banking relationships are exacerbated.

The closing of thousands of bank branches in the aftermath of the 2007-09 recession has served to intensify societal concerns about access to financial services among low-income and minority populations, groups that are often affected disproportionately in such situations. These sorts of concerns were expressed recently by, among others, researchers Terri Friedline and Mathieu Despard in an article in *The Atlantic*.¹ We explored these concerns from the perspectives of those living in existing banking deserts as well as those who are dependent on isolated branches that, if closed, would create new deserts.

Existing Banking Deserts

We followed a prominent study by researchers Don Morgan, Maxim Pinkovskiy and Bryan Yang, published in 2016 by the Federal Reserve Bank of New York, in defining deserts as census tracts in which there are no branches within a 10-mile radius from the tracts’ centers.² Tracts are classified as “majority minority” if more than 50 percent

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Banking Deserts

- Defined in a New York Fed study as *“census tracts in which there are no branches within a 10-mile radius from the tracts’ centers.”*

- We expand on this definition:

1. “Banking” → “Lending”

- Expanded definition of the term
- Includes bank branches, credit union branches, and farm credit branches.
- Does NOT include payday lenders

Data

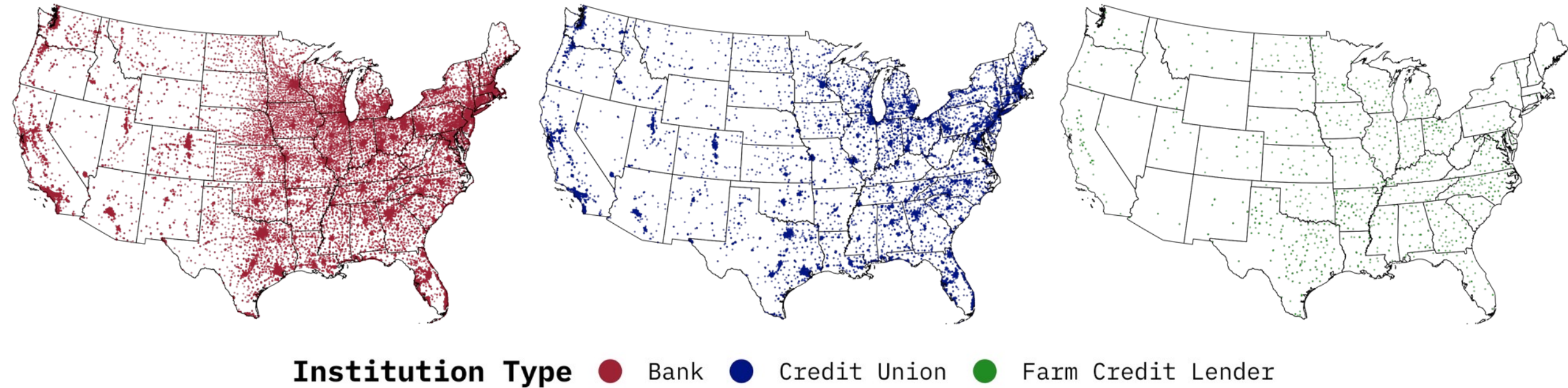
- **Bank branches** → FDIC annual summary of deposits
- **Credit union branches** → NCUA quarterly call reports
- **Farm credit branches** → FCA branch finder data
- **Controls** → Census/ACS, BEA county profiles



National Credit
Union Administration

data axle

Where are the Lending Institutions?



- Result is a shapefile with lender name, type, and location (lat/lon) for 101,093 institutions.
- FDIC data includes \$ deposit totals at the branch level; NCUA data only has financial data at parent institution level; FCA data only includes name/location.

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2. Methodological triangulation

- Distance-based calculation
- Tract-tabulated location quotient
- Multivariate kernel-density estimation

Distance-Based Desert Calculation

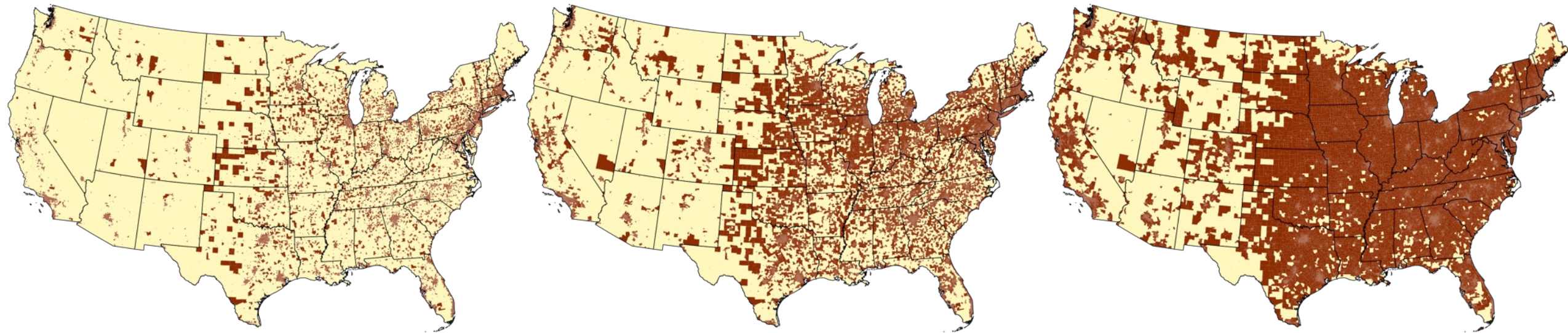
Radius (mi)	1+ Lender(s)	Zero Lenders	% Deserts
2.5	66,389	17,120	20.5%
5	75,934	7,575	9.1%
10	81,968	1,541	1.8%

N = 83,509

2.5-mile radius

5-mile radius

10-mile radius

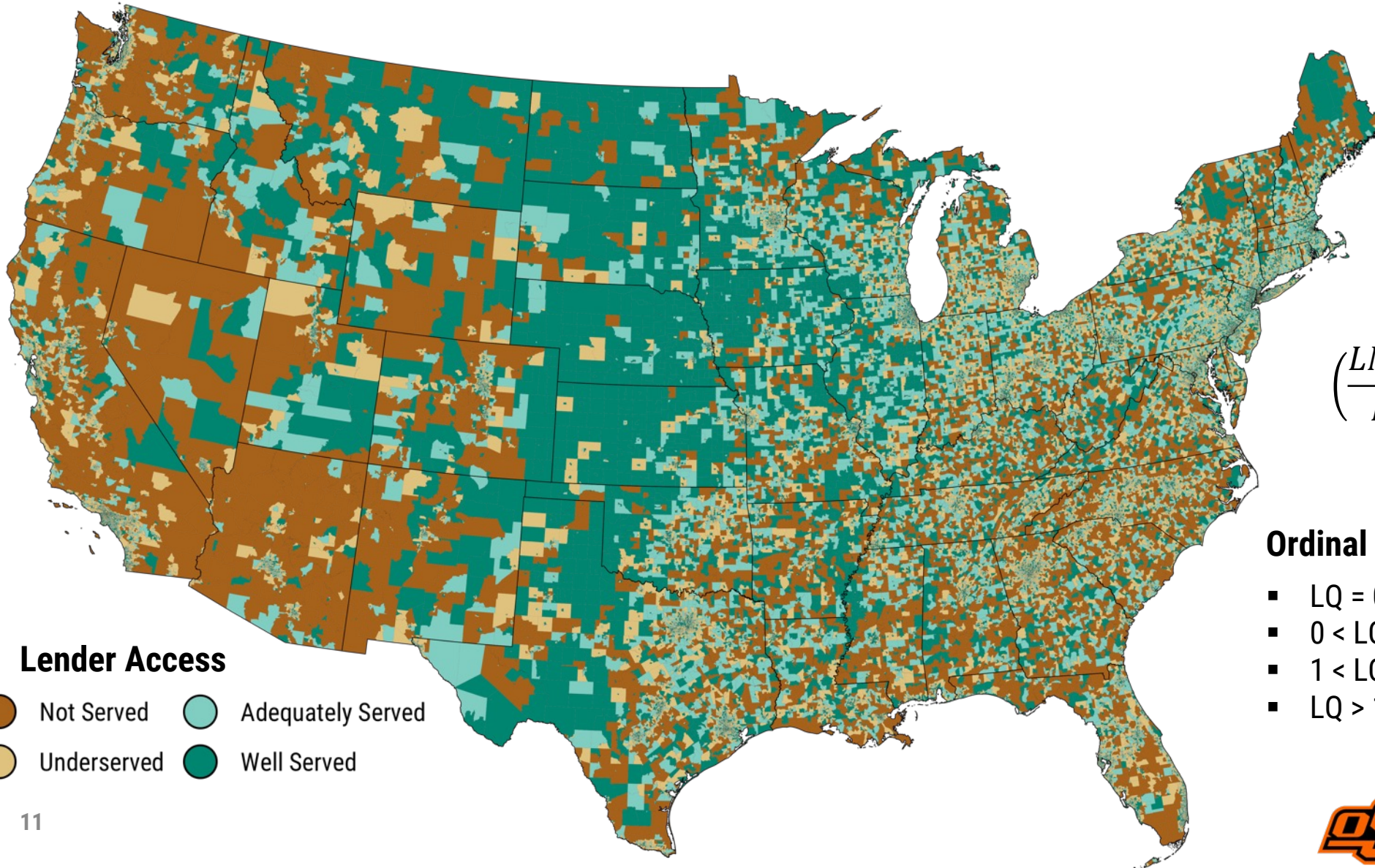


● Served Tract ● Lending Desert



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Tract Tabulated Location Quotient



LQ Calculation

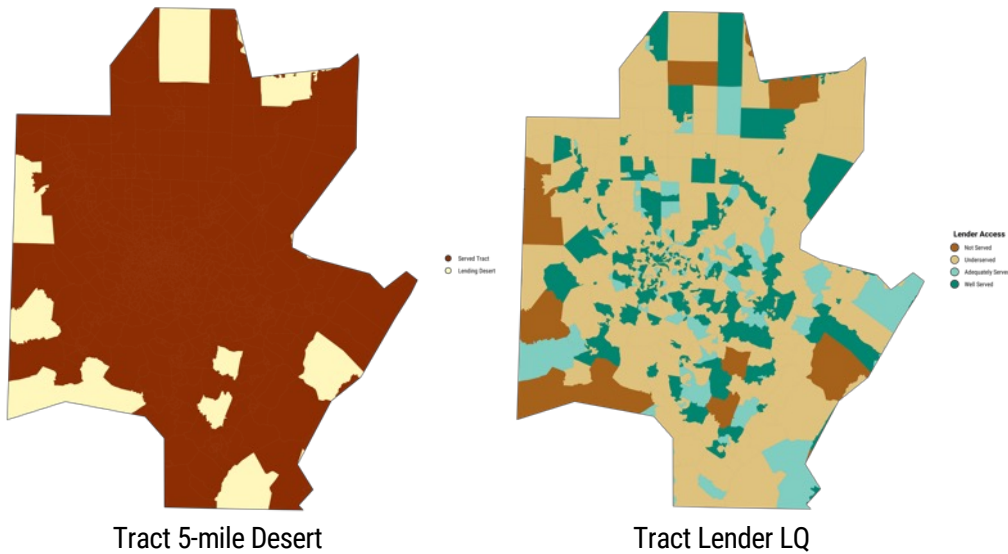
$$\left(\frac{LNDRS_{tract}}{POP_{tract}} \right) \div \left(\frac{LNDRS_{US48}}{POP_{US48}} \right)$$

Ordinal LQ Classification

- LQ = 0 (or 10-mi desert) = **Not Served**
- $0 < LQ < 1$ = **Underserved**
- $1 < LQ \leq 1.5$ = **Adequately Served**
- $LQ > 1.5$ = **Well Served**

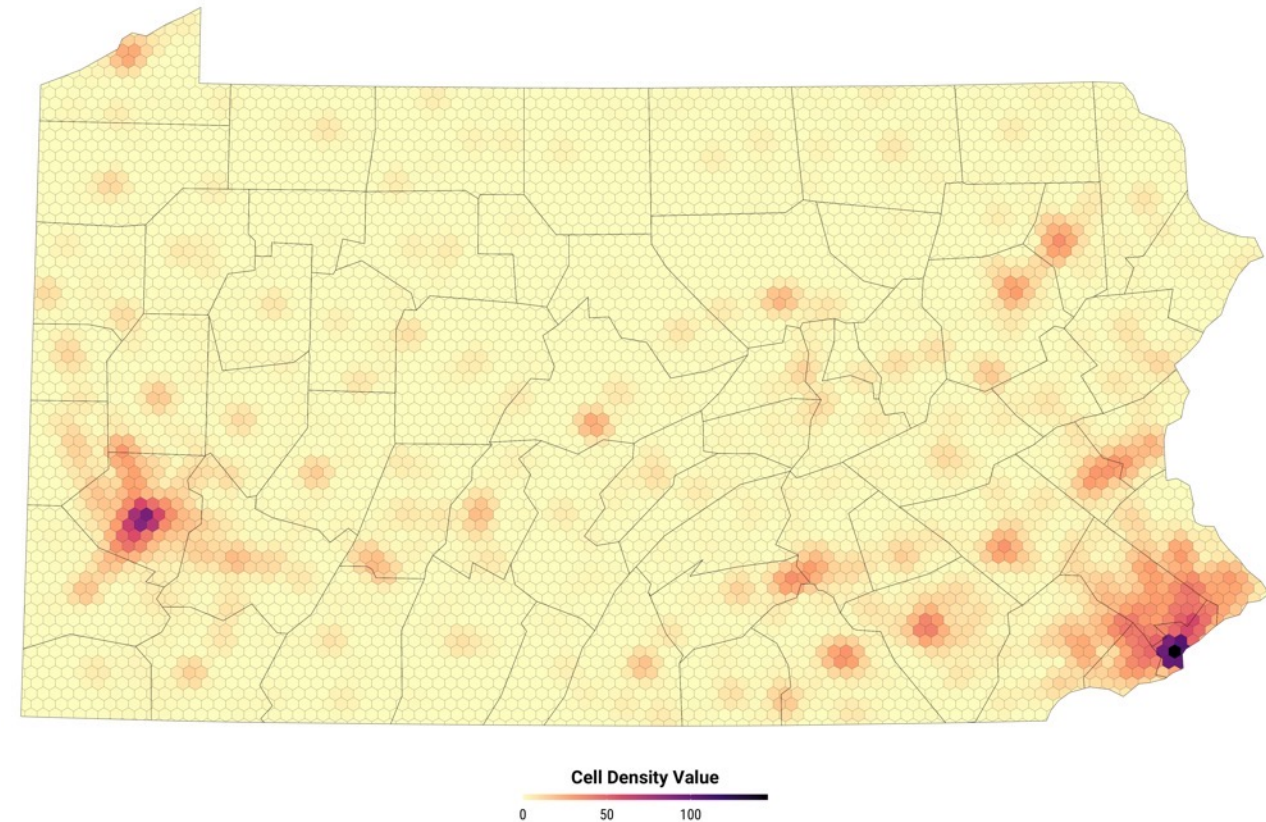
Multivariate Kernel Density Estimation

Pittsburgh, PA Metro Area



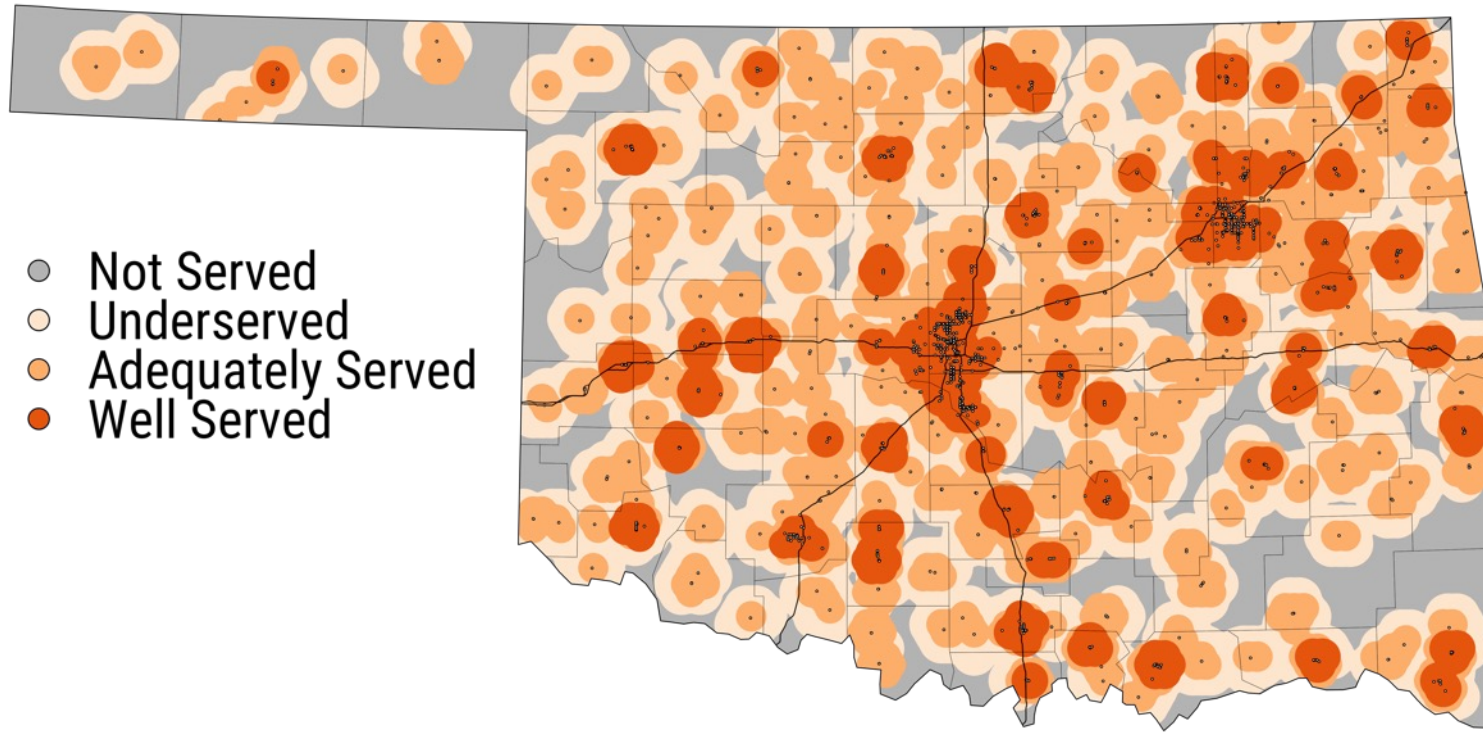
Key drawback: tract boundaries are noisy

Solution: use tessellated grid



Kernel Density Map

Multivariate Kernel Density Estimation (cont'd)



Pros:

- Bank location (rather than tract boundaries) guides polygon shape
- Polygon color (i.e., level of service) is determined by lender density
- Polygon buffer size is determined by inverse population density (adaptive kernel)

Cons:

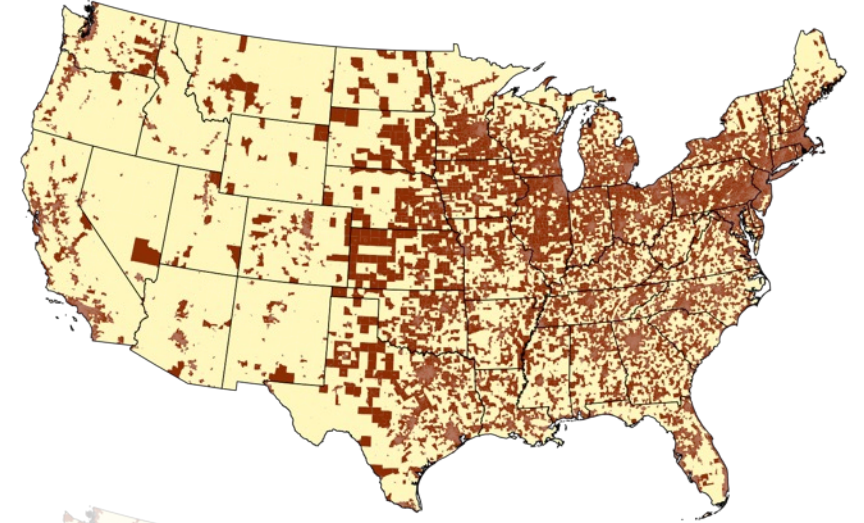
- Polygons do not correspond with existing administrative boundaries

Modifiable aerial unit problem forces us to either **stick with census tracts** or sacrifice analytical precision (i.e., make probabilistic inferences when aggregating block/block group data into smoothed polygons)

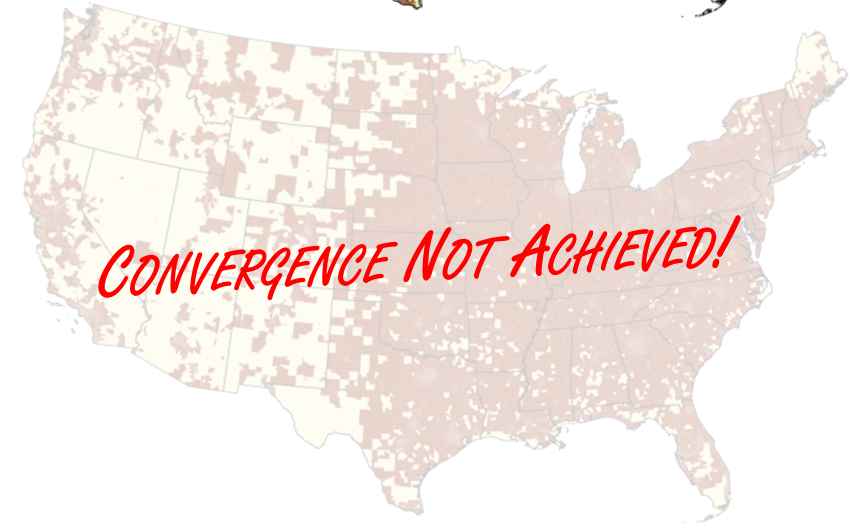
Lending Determinants (preliminary)

	5-Mile Desert Marginal Effect
Metropolitan County	0.00 (0.005)
Farming Dependent County	0.02*** (0.007)
MFG Dependent County	0.01* (0.006)
Amenity Score	-0.01*** (0.002)
Household Density	0.00*** (0.000)
Percent in Poverty	-0.07** (0.028)
Percent Renting	0.14*** (0.019)
Percent with a 45+ Minute Commute	-0.13*** (0.018)
Percent Working from Home	-0.00 (0.036)
Percent with Broadband Access	0.05** (0.022)
Percent 65+	0.00 (0.032)
Percent Under 5	-0.02 (0.075)
Percent Non-White	-0.00 (0.016)
N	14,683

5-mile
Radius
"Deserts"



10-mile
Radius
"Deserts"



Conclusion

Contribution:

- Data product: lenders GIS layer, county lender counts, updated desert measures
- Cartographic product: data-driven heatmap of deserts/oases
- Exploratory analysis: cross-sectional correlates of low brick-and-mortar lending institution access (so far, nothing groundbreaking)

Next steps:

- Expand logit to all 48 continental states
- Implement multinomial logit using **not served**, **underserved**, **adequately served**, **well served** categories
- Move forward → start using FDIC historical data (combined with other historical outcomes) to investigate relationship between bank branch closure and regional borrowing.

Thank you!



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