

Do “Banking Deserts” Even Exist?

Examining Access to Brick-and-Mortar Lending
Institutions in the Continental United States

Andrew J. Van Leuven¹ Dayton Lambert¹ Tessa Conroy²
Kelsey Conley³

¹Oklahoma State University

²University of Wisconsin-Madison

³USDA Economic Research Service

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- 1 Setting The Stage
- 2 Research Objectives
- 3 Banking & Lending Deserts
- 4 Determinants of Lender Presence
- 5 Conclusion



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Setting The Stage

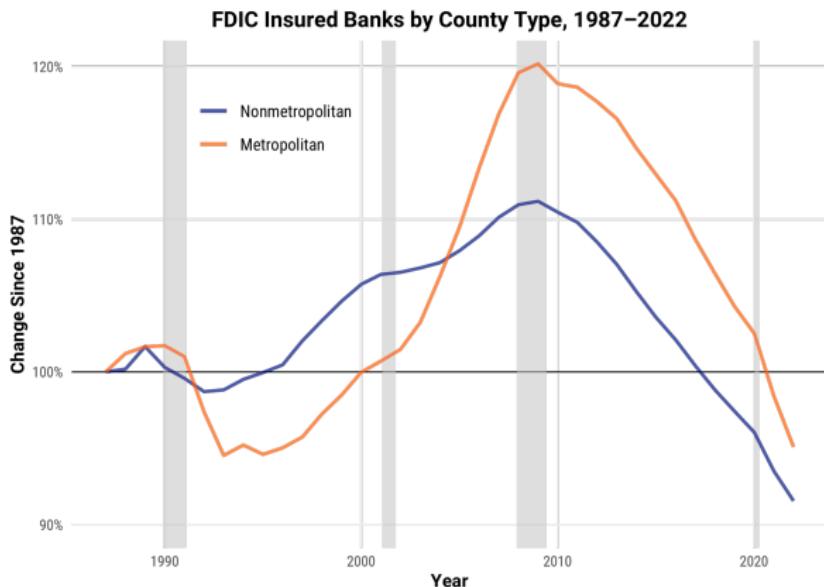
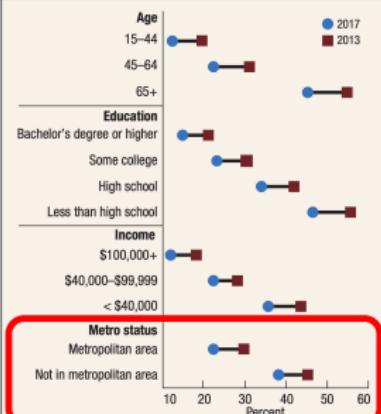


Figure 4. Branch as most frequently used method of accessing an account



Note: Percent of households with a bank account accessed in the past 12 months in each demographic group who reported the branch was their most commonly used way of accessing an account.

Source: 2017 FDIC Survey of Unbanked and Underbanked Households.

Setting The Stage

"Brick-and-mortar branches provide tangible benefits to consumers, especially in low- and moderate-income neighborhoods... The idea is that a physical presence is key because the bank has to interact repeatedly with the community to develop the necessary relationships."

- Ergunor and Moulton (2011)

"...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)



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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

- **Mapping:** Identify regions that are “lending deserts”—populated areas that are not served by some or all types of lenders—across the continental United States.
- **Modeling:** Identify the demographic, economic, and geographic factors associated with lending deserts’ existence.



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Banking Deserts: Improvement #1



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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

Related Topics

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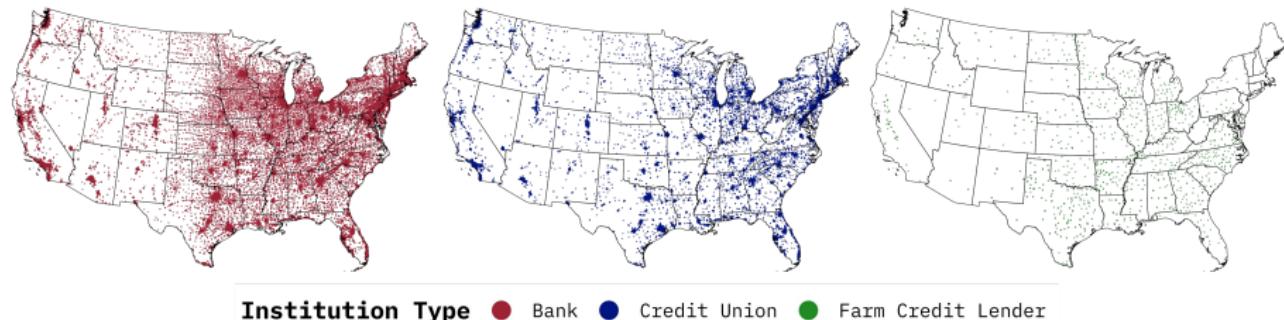
The Regional Economist offers insights on regional, national and international issues. Views expressed are not necessarily those of the St. Louis Fed or Federal Reserve System.

- 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:
 - “Banking” → “Lending”
 - Expanded definition of the term
 - Includes bank branches, credit union branches, and farm credit branches.
 - Does NOT include payday lenders



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Where are the Lending Institutions?



- Data from FDIC, NCUA, and FCA
- 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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Banking Deserts: Improvement #2

The screenshot shows the homepage of the Federal Reserve Bank of St. Louis. At the top, there's a navigation bar with links for About Us, From President Jim Bullard, Publications, For Teachers & Students, Working with Communities, Supervising Banks, Research & Databases, Careers, Events, Museum, Newsroom, and a search icon. Below the navigation is a breadcrumb trail: Home > Publications > Regional Economist. The main title of the article is "Banking Deserts Become a Concern as Branches Dry Up", dated July 25, 2017, by Drew Dahl and Michelle Franke. There are social media sharing icons for Twitter, Facebook, LinkedIn, and Email. The article text discusses how changes in technology have made it easier to conduct banking transactions from anywhere, but personal and public benefits are still derived from proximity to a bank branch. It then goes into detail about the 2007-09 recession and the concerns it raised about access to financial services among low-income and minority populations. The text is attributed to researchers Terri Friedline and Mathieu Despard. A sidebar on the right is titled "Related Topics" and includes "Economic Equity/Inequality" and "Banking". Another sidebar on the right is titled "Subscribe to Regional Economist" and provides a brief description of the publication.

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- We expand on this definition:
 - “Banking” → “Lending”
 - Expanded definition of the term
 - Includes bank branches, credit union branches, and farm credit branches.
 - Does NOT include payday lenders
- Methodological triangulation
 - Distance-based calculation
 - Tract-tabulated location quotient
 - Multivariate kernel-density estimation



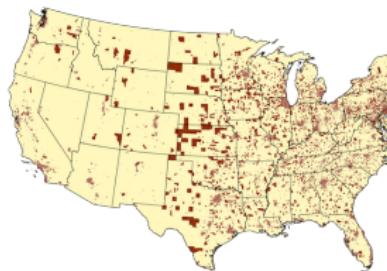
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Distance-Based Desert Calculation

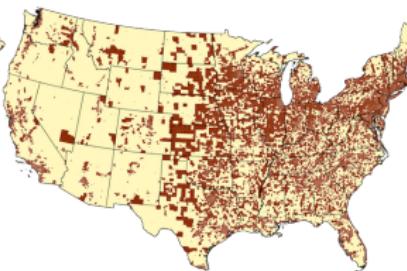
Radius (mi)	1+ Lender(s)	Zero Lenders	% Deserts
2.5	66,389	17,120	20.5%
5	75,934	7,575	9.1%
10	81,968	1,541	1.8%

N = 83,509

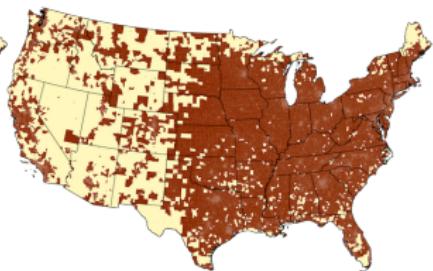
2.5-mile radius



5-mile radius

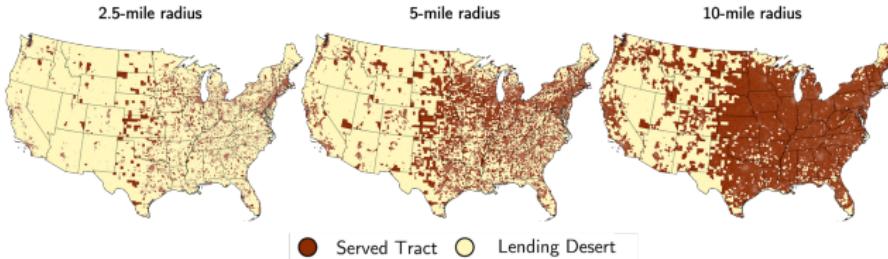


10-mile radius



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Is “lending desert” a useful construct?

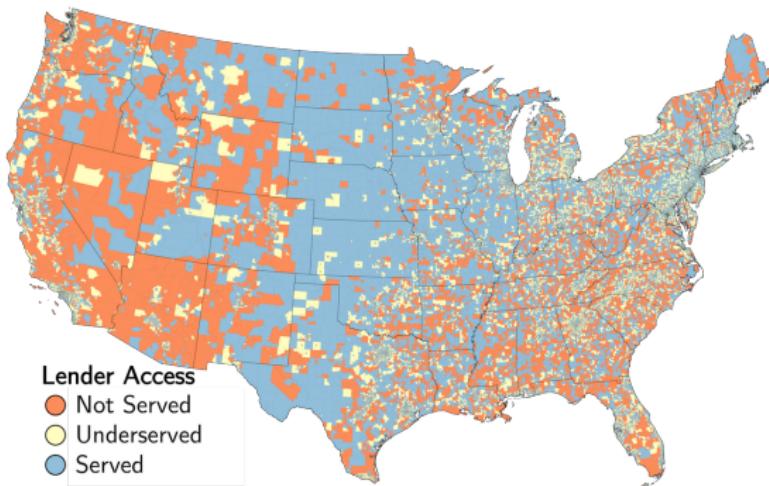


- In all but the worst congestion or terrain, 5 miles is roughly 10-15 minutes.
- 10 miles is no more than 20-30 minutes, especially when served by a highway.
- Unlike other catchy uses of “desert,” it’s safe to say banks/lenders are ubiquitous enough that no one is dying of thirst.
- **How else can we examine access to a brick-and-mortar lending institution?**



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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

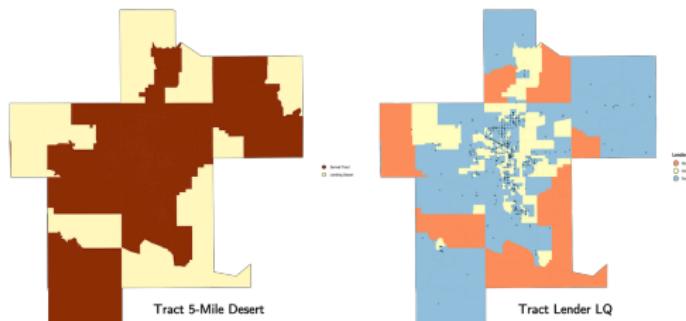
- $LQ = 0$ (or 5-mi desert) = Not Served
- $0 < LQ < 1$ = Underserved
- $LQ \geq 1$ = Served



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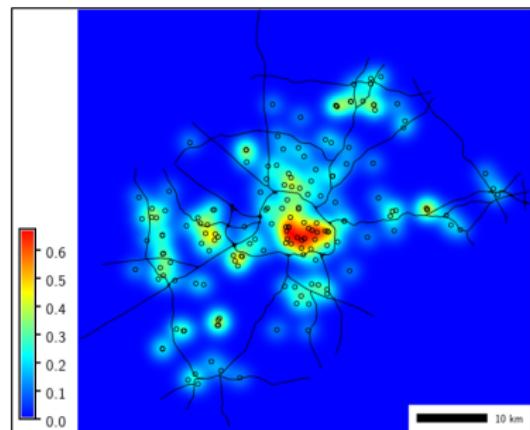
Multivariate Kernel Density Estimation

Oklahoma City, OK Metropolitan Area



Key drawbacks:

- Tract boundaries are noisy, drawn around features like roads, rivers, rail lines, and politically-salient neighborhood borders
- Using tract boundaries forces us to describe lender presence (or absence) according to geographic units that do not conform to bank location patterns

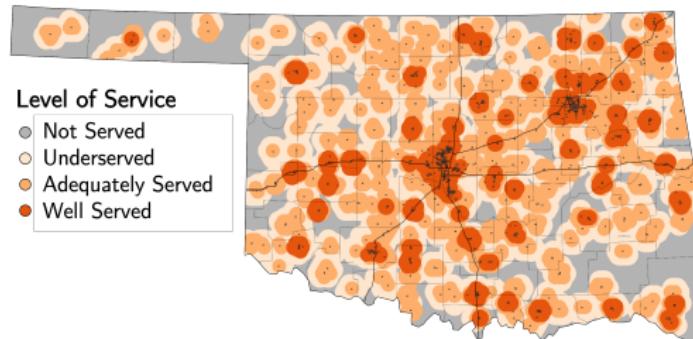


Kernel Density Map: calculates the density of features in a neighborhood around those features

Multivariate Kernel Density Estimation

Pros:

- Bank location (rather than tract boundaries) guides polygon shape
- Polygon color is determined by lender density (in this example, we use discrete “level of service” categories)
- Polygon size is determined by inverse population density (adaptive bandwidth)



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)

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Modeling Lending Deserts

	Logit ($0 = 5\text{-mi Desert}$)
Metropolitan County	0.125*** (0.039)
Farming Dependent County	0.294*** (0.077)
MFG Dependent County	0.141*** (0.048)
Amenity Score	-0.043*** (0.014)
Percent w/Bachelor's or Higher	1.418*** (0.202)
Percent in Poverty	-0.568** (0.264)
Percent Renting	2.871*** (0.182)
Percent with a 45+ Minute Commute	-1.866*** (0.162)
Percent Working from Home	-0.597* (0.331)
Percent with Broadband Access	0.852*** (0.215)
Percent 65+	-0.316 (0.262)
Percent Under 5	-1.135 (0.696)
Percent Non-White	0.463*** (0.131)
Observations	81,168
R ²	0.563

* p<0.10, ** p<0.05, *** p<0.01

Binary outcome variable:

- 0 = Tract is a lending desert
- 1 = Lender(s) present

We use *Firth logit* regression, a penalized model useful for dealing with sparse data (in our case, very few deserts)



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Modeling Lender Level of Service

	Not Served	Underserved	Served
Metropolitan County	0.0031 (0.0021)	0.1530*** (0.0074)	-0.1561*** (0.0075)
Farming Dependent County	-0.0204*** (0.0042)	-0.2933*** (0.0274)	0.3137*** (0.0270)
MFG Dependent County	-0.0044* (0.0023)	-0.0220*** (0.0081)	0.0263*** (0.0083)
Amenity Score	0.0021*** (0.0007)	0.0080*** (0.0022)	-0.0101*** (0.0022)
Household Density	-0.0990*** (0.0080)	0.0404*** (0.0031)	0.0586*** (0.0049)
County Income Per-Capita	-0.0000** (0.0000)	-0.0000** (0.0000)	0.0000*** (0.0000)
Percent with Bachelor's or Higher	-0.0649*** (0.0107)	-0.0903*** (0.0239)	0.1552*** (0.0264)
Percent in Poverty	0.0272** (0.0120)	0.3111*** (0.0247)	-0.3384*** (0.0263)
Percent Renting	-0.1919*** (0.0108)	-0.3913*** (0.0273)	0.5832*** (0.0284)
Percent w/45+ Minute Commute	0.0801*** (0.0073)	0.0113 (0.0409)	-0.0914** (0.0416)
Percent Working from Home	0.0217 (0.0147)	0.1380*** (0.0367)	-0.1597*** (0.0373)
Percent with Broadband Access	-0.0311*** (0.0119)	0.1376*** (0.0288)	-0.1065*** (0.0295)
Percent 65+	-0.0209* (0.0123)	-0.2770*** (0.0404)	0.2980*** (0.0420)
Percent Under 5	0.0310 (0.0310)	0.1065 (0.0698)	-0.1375** (0.0700)
Percent Non-White	-0.0029 (0.0064)	0.3367*** (0.0192)	-0.3338*** (0.0203)

Multinomial Logit

N = 80,462

Adj. R² = 0.195

* p < 0.10

** p < 0.05

*** p < 0.01



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Modeling Lender Count (ZINB)

	Nonmetropolitan	Metropolitan	Contrast
Farming Dependent County	0.629***	0.626***	0.003
MFG Dependent County	0.0695	0.0885**	0.019
Amenity Score	-0.0422***	-0.00417	0.038*
Household Density	-0.00492	-0.00343**	0.001
Percent in Poverty	-2.063***	-1.756***	0.307
Percent Renting	6.092***	2.551***	3.541***
Percent w/45+ Minute Commute	-2.276***	-0.823***	1.453**
Percent Working from Home	-1.454***	0.934***	2.388***
Percent with Broadband Access	1.254***	0.884***	0.369
Percent 65+	3.435***	1.760***	1.675**
Percent Under 5	1.850*	-1.604***	3.454***
Percent Non-White	-0.723***	-1.173***	0.450**



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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 too groundbreaking)

- **Next steps:**

- Explore possibility of computing driving distance (rather than aerial distance) when constructing “desert” measures
- Dig deeper → start using FDIC/CRA historical data to investigate relationship between bank branch closure and regional borrowing
- Causal inference → estimate impact of branch closure on local entrepreneurship (e.g., business startups)



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Selfish Questions

- Anyone have access to longitudinal **dataset of farm credit** branch locations & closures?
- Ideas for how to **specify causal model**? Some sort of staggered DiD (but need to differentiate between n^{th} closure and *final* closure)
- Tie-in with **Extension**? Programming could identify the non-measurable community/local economy benefits of brick-and-mortar lending institutions



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Thank You!

andrew.vanleuven@okstate.edu



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