Obstacles to Household Financial Inclusion: Do Branch Accessibility and Bank Size Matter?

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Banking mergers and acquisitions often are associated with the goal of enhancing the efficiency of the combined organization. However, achieving such benefits may involving closing some brick-and-mortar branches in overlapping markets of the merged entities, leading to concerns about reduced access to banking services in affected neighborhoods (although branch closings are unrelated to mergers as often as they are related).[1] Similarly, large banks acquiring small banks are sometimes viewed unfavorably, in that small banks are thought to have greater knowledge and expertise about the local markets they serve.

But are the data consistent with assertions that branch closures, including those associated with mergers, harm household financial inclusion? Are financially vulnerable households indeed more susceptible to becoming unbanked in areas where banks have been closing branches, or in areas with a declining number of smaller banks?

Overview

This research note addresses these questions by conducting a detailed examination of recent patterns and trends in household financial inclusion across U.S. urban areas (metropolitan or micropolitan statistical areas) and across rural portions of states. It explores the factors associated with variation across geographic areas in the proportion of households that are unbanked, defined as no one in the household having a checking or savings account at a bank or credit union. In addition, it examines whether evolving accessibility of bank branches or a changing mix of large versus small banks helps explain why some localities saw greater improvement in financial inclusion between 2013 and 2019 than others. The analysis relies primarily on data from the FDIC Survey of Household Use of Banking and Financial Services merged with data on the structure of local banking markets from the FDIC Summary of Deposits database.

The analysis indicates that neither a reduction in bank branches nor an increase in the proportion of branches owned by large banks over this period has a material effect on household financial inclusion. Rather, material drivers are mobile access (through use of smartphones) and the level of financially disadvantaged people (measured by educational level) in the area.

We find that percent unbanked across metropolitan areas is strongly related to the demographic composition of a metropolitan area. Areas with a larger percent Black, Native American, or foreign-born non-citizen populations have a larger unbanked share. Percent unbanked also increases with percent of households that are low-income (under $50,000) or lack a high-school diploma and, in the more recent data, the percentage of households lacking a smartphone.

[1] *See, e.g.*, Jad Edlebi, Bruce C. Mitchell, and Jason Richardson, "The Great Consolidation of Banks and Acceleration of Branch Closures Across America," National Community Reinvestment Coalition, February 2022.

Consistent with the notion that mobile banking promotes financial inclusion, change in percent unbanked is inversely related to the change in share of households with a smartphone. It also is inversely related to percent without a high school diploma, which suggests that financial inclusion gains between 2013 and 2019 were concentrated among households that were most financially disadvantaged a priori.

In the remaining discussion, we describe the data sources and preparation and present details on the analysis procedures and results.

Data Sources and Preparation

The analysis relies on multiple data sources. Estimates of the percentage of the population that is unbanked in 2013 and 2019, by Core-Based Statistical Area and non-CBSA portions of states are from the FDIC Survey of Household Use of Financial Services (applying 2013 CBSA definitions from the U.S. Office of Management and Budget.)[2] These are calculated as weighted percentages, using the weights assigned to each observation in the data.

The FDIC survey dataset also provides information on demographic, economic, and other household characteristics. These include whether the household possesses a smartphone; whether it has high-speed internet access; and the respondent's age, race or ethnicity, gender, marital status, and employment status.[3]

In addition, from S&P Global Market Intelligence we obtain geographical and population data of U.S. Census tracts (including tract centroid location, state, county, and tract populations for 2013 and 2019, and whether the tract is rural, urban, or mixed).[4] We map the county-level population data into CBSA and non-CBSA portions of states again using the NBER crosswalk.

Annual banking structure data, including geocoded locations of all bank branches and the corresponding state, county, and CBSA, the identity of the institution to which the branch belongs, and total deposits booked at the branch are drawn from the FDIC Summary of Deposits database.[5] To ensure consistency with the objective of assessing household financial inclusion, we filter the data to include only full-service, brick-and-mortar or retail offices of insured depository institutions.[6]

Branch coverage measures. Three alternative measures of bank branch accessibility in a geographic area based on the SOD data are considered. The first, branch density, is simply the number of branches per 10,000 residents in a geographic area. The other two are measures of branch accessibility: average distance to the nearest branch and percentage of the population that resides in a "banking desert."

The average distance measure is constructed as follows. At the Census tract level, we approximate the average distance of tract residents to their nearest bank branch as the number of miles between the centroid of the tract and the nearest branch location, using the listing of Census tract centroid locations

[2] CBSAs include both metropolitan and micropolitan statistical areas.
[3] We again weight each observation, using the weights assigned to each observation in the data, when aggregating these variables to the CBSA level.
[4] Annual population estimates are derived by S&P Global Market Intelligence in partnership with Claritas.
[5] The SOD data utilize 2013 MSA definitions and provide annual snapshots as of June 30.
[6] The SOD data incorporates five categories of insured depository institution: "national member banks", "state member banks", "state nonmember banks", "saving banks and savings and loans", "credit unions", and "state and federally chartered thrifts"

from S&P Global alongside the SOD data on location of U.S. bank branches. We then calculate the weighted average of tract-level distances by CBSA, weighting by tract population.[7]

A banking desert is defined to be a Census tract whose centroid is greater than a specified, threshold distance to the nearest bank branch. These thresholds are 10 miles for rural, five miles for mixed, and two miles for urban Census tracts.[8] Total population of a CBSA (or non-CBSA portion of a state) is then allocated between the banking desert areas and other parts of the CBSA (or rural region), using the 2013 HUD USPS Zip Code Crosswalk Files to allocate Census tracts to CBSAs. See Appendix 1 for additional details.

Mix of small and large banks. Using the SOD data, we define two alternative measures of small bank relative to large bank presence in a geographic area for a given year. These are: the share of the area's bank branches belonging to banking institutions with less than $5 billion in total deposits, and the share of the area's bank branches belonging to banking institutions with less than $10 billion in total deposits.

Regression Analysis: Variation in Percent Unbanked Across Metropolitan Areas

The first part of our analysis explores factors associated with differences in percent unbanked across metropolitan areas by estimating regression equations. For this analysis, which is conducted separately for 2013 and 2019, datasets described above are merged by CBSA and year. CBSAs with fewer than 20 household observations in a single survey year are excluded from the regression sample to mitigate noise from measurements based on few observations.[9]

Table 1 shows mean values from the 2013 and 2019 regression samples for percent unbanked, the branch coverage measures, small bank share, and selected demographic and economic variables. Notably, between 2013 and 2019, the mean of percent unbanked declined from 7 percent to 5.2 percent, indicating improved financial inclusion. Digital inclusion improved dramatically, as indicated by the mean of the share of households without a smartphone dropping from 27.6 percent to 9.7 percent.

Household economic status improved between 2013 and 2019, with the mean share of households with incomes less than 125 percent of the poverty level declining from 21.3 to 17.1 percent. On average across metropolitan areas, branch accessibility declined and small bank share of branches decreased. Mean and standard deviation of Black and of Native American population shares increased between 2013 and 2019, primarily reflecting the effect of sampling variation on which CBSAs are included in each sample.[10]

Table 2 shows pairwise correlations among the potential explanatory variables listed in Table 1, by sample year. Because of the substantial correlation among the branch coverage measures and small bank share, we estimate five separate regression equations where each is tested individually. Also, because share of households with incomes greater than $50,000 is highly correlated with share of survey respondents without high school diplomas as well as with the branch coverage measures, we exclude it from our baseline regression model. Later, we test robustness of the results to including it.

[7] For this calculation, tracts are assigned to counties based on centroid location, and in turn to MSAs using the NBER crosswalk.
[8] While metropolitan areas are composed mostly of urban Census tracts, they also contain some mixed and rural tracts. For instance, all CBSAs in the 2019 sample and nearly all in the 2013 sample have at least one rural tract.
[9] The sample for this analysis consists of 180 metropolitan areas. No micropolitan areas or rural areas satisfy the minimum sample size criterion.
[10] Farmington, New Mexico is an outlier in the 2019 sample, with two-thirds of survey respondents identifying as Native American. To prevent this observation from having undue influence on the regression analysis, we cap Native American population share at 0.3 in the regression sample. The summary statistics in Table 1 incorporate this cap.

Table 1: Sample Summary Statistics

	2019			2013		
Variable	**Mean**	**Median**	**Std Dev**	**Mean**	**Median**	**Std Dev**
Unbanked	0.051	0.041	0.048	0.071	0.065	0.057
No smartphone	0.097	0.091	0.055	0.276	0.267	0.089
Black	0.130	0.090	0.130	0.120	0.083	0.122
Native American	0.014	0.000	0.031	0.010	0.000	0.020
Foreign-born non-citizen	0.047	0.035	0.053	0.049	0.034	0.054
Age below 30	0.136	0.133	0.073	0.137	0.131	0.068
No high school diploma	0.087	0.074	0.066	0.105	0.098	0.067
Income above $50,000	0.543	0.550	0.117	0.459	0.457	0.113
Banking desert population share	0.065	0.050	0.057	0.055	0.041	0.052
Avg distance to nearest branch	2.013	1.879	0.936	1.805	1.716	0.653
Branches per 10,000 residents	2.339	2.308	0.638	2.722	2.726	0.687
Small bank share (<$10b)	0.414	0.370	0.212	0.503	0.500	0.177
Small bank share (<$5b)	0.360	0.313	0.207	0.441	0.430	0.182
Number of observations	220			232		

Table 2: Correlation Matrices

2019												
Variables	**(1)**	**(2)**	**(3)**	**(4)**	**(5)**	**(6)**	**(7)**	**(8)**	**(9)**	**(10)**	**(11)**	**(12)**
(1) No Smartphone	1.000											
(2) Black	-0.052	1.000										
(3) Native American	0.080	-0.111	1.000									
(4) No HS degree	0.218	0.050	-0.017	1.000								
(5) Age Below 30	-0.252	0.010	-0.019	0.001	1.000							
(6) Foreign-Born Non-Citizen	0.010	-0.203	-0.095	0.400	0.021	1.000						
(7) Avg Distance to Nearest Branch	0.229	-0.021	0.338	0.131	-0.057	-0.188	1.000					
(8) Branches Per Capita (10,000)	0.151	0.028	-0.164	-0.145	-0.076	-0.321	-0.057	1.000				
(9) Desert Share of Pop	0.138	0.019	0.112	0.171	-0.031	-0.014	0.718	-0.231	1.000			
(10) Small Bank Share ($10b)	0.243	-0.015	0.112	0.146	0.099	-0.202	0.252	0.369	0.041	1.000		
(11) Small Bank Share ($5b)	0.215	-0.019	0.113	0.123	0.110	-0.217	0.246	0.342	0.000	0.937	1.000	
(12) Income Above $50,000	-0.209	-0.240	-0.144	-0.414	-0.127	0.095	-0.309	0.064	-0.239	-0.220	-0.199	1.000

2013												
Variables	**(1)**	**(2)**	**(3)**	**(4)**	**(5)**	**(6)**	**(7)**	**(8)**	**(9)**	**(10)**	**(11)**	**(12)**
(1) No Smartphone	1.000											
(2) Black	0.009	1.000										
(3) Native American	0.034	-0.099	1.000									
(4) No HS degree	0.035	0.158	-0.185	1.000								
(5) Age Below 30	-0.260	0.115	0.041	0.019	1.000							
(6) Foreign-Born Non-Citizen	-0.266	-0.140	-0.154	0.330	0.040	1.000						
(7) Avg Distance to Nearest Branch	0.247	0.043	0.070	0.159	0.058	-0.185	1.000					
(8) Branches Per Capita (10,000)	0.060	0.021	-0.001	-0.147	-0.111	-0.317	-0.096	1.000				
(9) Desert Share of Pop	0.091	-0.008	0.103	0.139	0.043	0.066	0.736	-0.283	1.000			
(10) Small Bank Share ($10b)	0.161	-0.064	0.138	0.021	0.109	-0.272	0.312	0.326	0.061	1.000		
(11) Small Bank Share ($5b)	0.165	-0.056	0.089	-0.033	0.117	-0.257	0.283	0.326	0.010	0.915	1.000	
(12) Income Above $50,000	-0.275	-0.246	0.021	-0.482	-0.138	0.149	-0.291	0.063	-0.150	-0.161	-0.091	1.000

Regression model estimation. We estimate tobit regression models with percent unbanked as the dependent variable.[11] Heteroscedasticity in the data (noisier measurements for smaller metropolitan areas) is addressed by clustering standard errors in relation to the log of CBSA population.[12] Tables 3 and 4 present the regression equation estimates for 2013 and 2019, respectively.

The results suggest that household financial inclusion has become more strongly tied to digital inclusion in more recent years, likely due to the expanding role of mobile banking.[13] In 2019, the proportion of households that were unbanked was larger in areas where a larger proportion of households lacked a smartphone, and this relationship is statistically significant at the 1 percent level in all five equations. In 2013, however, the relationship between percent unbanked and percent without a smartphone, while positive, is weaker and not statistically significant in any of the equations.

Percent unbanked increases with the proportion of the population that is Black or foreign-born non-citizen. It also increases with the percent of survey respondents that lack a high-school diploma, a proxy for those that are financially disadvantaged or lack financial skills.

In 2013, the share of unbanked households is larger in metropolitan areas where a larger share of the adult population is under age 30. This relationship does not carry over into 2019, however. A possible interpretation is that high unemployment rates for young adults in the wake of the 2007-2009 recession may have delayed establishment of banking relationships for this population.[14]

Comparatively little explanatory power is indicated for the branch coverage measures or mix of large versus small banks. The sole exception is an inverse relationship in 2013 between the unbanked share of households and branches-per-capita, which is statistically significant at the 10 percent level. This relationship does not persist into 2019. These findings are consistent with the view that digital banking has become a more important factor affecting household financial inclusion compared to brick-and-mortar branches.

[11] The tobit model is used to estimate linear relationships between variables when there is either left or right censoring in the dependent variable. In our context, there are multiple MSAs with zero unbanked households reported from the survey. In the 2019 sample, 32 MSAs have zero unbanked households; in the 2013 sample, 22 MSAs have zero unbanked households.

[12] Clustering affects the standard errors and variance-covariance matrix of the estimators but not the estimated coefficients. It relaxes the usual requirement that the observations be independent by specifying that the standard errors allow for intragroup correlation. To put it another way, the observations are independent across clusters of the natural log of the population, but not necessarily within the clusters.

[13] According to the FDIC survey data, just 9.5 percent of banked households in 2015 reported that mobile banking was the primary method of accessing their accounts, ranking fourth behind online banking, bank teller, and ATM. In 2019, mobile banking was the top ranked method, with 34 percent indicating it to be their primary method. See FDIC_2019_SurveyReport-book, p. 4.

[14] For instance, for persons aged 15-24 in the United States, the unemployment rate was 18.8 percent in January 2010 and remained elevated at 16.8 percent as of January 2013. For persons aged 25 to 29 it was 11.8 percent in January 2010 and as of January 2013 was 9.1 percent. (Source: Federal Reserve Economic Data.)

Table 3: Tobit Estimation Results for Unbanked – 2019

Dependent Variable: Unbanked share of households					
Explanatory variables	**Estimated coefficients (standard errors in parenthesis)**				
	1	2	3	4	5
No smartphone	0.1939*** (0.0668)	0.1889*** (0.0687)	0.1966*** (0.0667)	0.1839*** (0.0687)	0.1836*** (0.0684)
Black	0.1402*** (0.0290)	0.1394*** (0.0291)	0.1395*** (0.0289)	0.1431*** (0.0290)	0.1434*** (0.0289)
Native American	0.3157*** (0.0842)	0.3472*** (0.0771)	0.3297*** (0.0746)	0.3248*** (0.0762)	0.3216*** (0.0771)
Age below 30	0.0893* (0.0498)	0.0887* (0.0490)	0.0893* (0.0497)	0.0792 (0.0506)	0.0779 (0.0508)
Foreign-born non-citizen	0.1815** (0.0784)	0.1859** (0.0760)	0.1730** (0.0748)	0.1938** (0.0793)	0.1997** (0.0800)
No high school diploma	0.2437*** (0.0675)	0.2526*** (0.0668)	0.2467*** (0.0676)	0.2380*** (0.0696)	0.2345*** (0.0699)
Avg distance to nearest branch	0.0021 (0.0041)				
Branches per 10,000 residents		0.0042 (0.0059)			
Banking desert population share			0.0216 (0.0694)		
Small bank share (<$10b)				0.0183 (0.0173)	
Small bank share (<$5b)					0.0214 (0.0189)
F-statistic	15.11	14.55	14.46	15.79	15.72
Pseudo R-squared	-0.1969	-0.1977	-0.1966	-0.1991	-0.2000
Number of Observations	220	220	220	220	220

Table 4: Tobit Estimation Results for 2013

Dependent Variable: Unbanked share of households					
Explanatory variables	**Estimated coefficients (standard errors in parenthesis)**				
	1	2	3	4	5
No smartphone	0.0905 (0.0552)	0.0826 (0.0533)	0.0867 (0.0549)	0.0796 (0.0547)	0.0773 (0.0546)
Black	0.1840*** (0.0300)	0.1837*** (0.0293)	0.1843*** (0.0299)	0.1896*** (0.0296)	0.1896*** (0.0296)
Native American	0.0977 (0.1573)	0.0724 (0.1585)	0.0954 (0.1582)	0.0660 (0.1614)	0.0777 (0.1596)
Age below 30	0.1934*** (0.0651)	0.1797*** (0.0638)	0.1903*** (0.0648)	0.1770*** (0.0646)	0.1740*** (0.0642)
Foreign-born non-citizen	0.2139** (0.0985)	0.1789* (0.1031)	0.2229** (0.0951)	0.2497** (0.1010)	0.2499** (00986)
No high school diploma	0.3314*** (0.0642)	0.3197*** (0.0639)	0.3256*** (0.0630)	0.3111*** (0.0634)	0.3161*** (0.0632)
Avg distance to nearest branch	-0.0032 (0.0047)				
Branches per 10,000 residents		-0.0103* (0.0060)			
Banking desert population share			-0.0160 (0.0686)		
Small bank share (<$10b)				0.0273 (0.0205)	
Small bank share (<$5b)					0.0305 (0.0194)
F-statistic	13.96	15.52	14.22	14.59	14.77
Pseudo R-squared	-0.2393	-0.2471	-0.2387	-0.2425	-0.2439
Number of Observations	232	232	232	232	232

Robustness checks. To assess robustness of these findings, we first re-estimated the regression equations swapping in share with income above $50,000 for share without a high school diploma. The area income measure

has a statistically significant, inverse relationship to percent unbanked, while other estimated coefficients show little change.

Next, we appended the latter variable to the baseline regression specifications from Tables 3 and 4. The results are shown in Appendix 2. We observe marginal differences in statistical significance for some of the original variables, while the added variable exhibits a positive and statistically significant relationship to proportion of households that are unbanked in each of the estimated equations. Notably, in the 2013 equation with branches per capita, that variable is no longer statistically significant.

We also tested robustness of the baseline regression to inclusion of other variables derived from the FDIC survey data. Share of households that lack internet access at home is not statistically significant when included in place of share without a smartphone. The proportion of survey respondents 65 years of age or older is less strongly related to percent banked than the proportion aged 30 or less. The share of survey respondents that are single female heads of household; the proportion that are married; and the share that are unemployed are not statistically significant when appended to the baseline equations and have no important effect on the results.

Change in Percent Unbanked by Area Categories

A simple approach to analyzing the change in household financial inclusion is to compare the change in percentage of unbanked households between two recent distinct periods across categories of geographic areas. This approach allows for simple tabular or visual presentation of relationships; however, unlike the multivariate analysis presented further below, it does not control for factors that may affect financial inclusion other than the categorical distinctions.[15]

Using this approach, a previous BPI research note demonstrated that the increasing number of banking deserts has not been associated with an increased percentage of unbanked households. Here, we carry the analysis further, assessing the potential role of changes in branch density, in average distance to the nearest bank branch, and in the mix of large versus small banks. Our analysis focuses on the change in the proportion of households that were unbanked between 2013 and 2019, to separate it from the immediate effects of the economic recession that ended in 2009.

Branch density. In Table 5 we slot metropolitan areas into two groups based on change in branch density: areas with a material decrease in branch density between 2013 and 2019 and those with little change.[16] There are too few metropolitan areas with an increase in branch density to include those as another comparison group. Also, nearly all rural areas fall into the category of little change, ruling out a comparison across rural areas.

[15] Moreover, this approach potentially allows for inclusion of all geographic areas from the FDIC survey data for the cross-year comparisons, not just those that individually have enough household observations in each year.
[16] We define little change as between -0.3 and 0.3, which is about plus or minus 10 percent of the mean branch density.

Table 5: Change in Unbanked Share versus Change in Branch Density

Urban areas

Change in branch density	Range across survey CBSAs		Unbanked share		Change in unbanked	Number of survey CBSAs	Number of survey observations		2013 branch density		2020 branch density	
	min	max	2013	2020			2013	2020	median	mean	median	mean
Decrease	-1.34	-0.30	0.076	0.051	-0.025	184	20,992	17,126	2.83	2.88	2.31	2.34
Little change	-0.30	0.23	0.079	0.056	-0.023	67	7,924	6,543	2.34	2.42	2.07	2.23

The table shows that there is no evidence that declining branch density is associated with worse financial inclusion outcomes. Areas with a decrease in branch density and those with little change in density experienced similar declines in the proportion of households that are unbanked (2.5 and 2.3 percentage points, respectively), where the difference is not statistically significant.

Average distance to the nearest branch. Table 6 provides a similar analysis which slots urban and rural areas, respectively, into two groups based on change in average distance to the nearest bank branch: those with an increase in average distance to the nearest branch and those with little change.[17] Note that there are too few metropolitan or rural areas with a decrease in average distance to include those as another comparison group.

Most urban and most rural areas had little change in average distance to the nearest branch.[18] The proportion of unbanked households declined from 7.8 percent to 5.2 percent for the urban cohort and from 6.9 to 5.8 percent for the rural cohort of areas characterized by little change in average distance.

For the relatively few areas that had a material increase in average distance to the nearest branch, the proportion of households that are unbanked is little changed between 2013 and 2019 and it was already systematically lower compared to other areas as of 2013. The proportion of unbanked households increased from 5.3 to percent to 5.7 percent for the urban cohort and from 5.2 to 5.3 percent for the rural cohort of areas characterized by material increase in average distance, with neither of these increases being statistically significant.

Table 6: Change in Unbanked Share versus Change in Average Distance

Urban areas

Change in average distance to nearest branch	Range across survey CBSAs		Unbanked share		Change	Number of survey CBSAs	Number of survey observations		2013 average distance (survey)		2020 average distance (survey)	
	min	max	2013	2020			2013	2020	median	mean	median	mean
Little change	-0.25	0.25	0.078	0.052	-0.025	219	27,621	22,411	2.45	2.56	1.34	1.44
Increase	0.26	1.13	0.053	0.057	0.004	32	1,284	1,378	1.19	1.31	2.59	2.94

[17] The range of little change is between -0.25 and 0.25 for urban areas and between -0.5 and 0.5, which is roughly plus or minus 10 percent of the median average distance.

[18] Only 32 urban areas and eight rural areas had a material increase in average distance to the nearest branch, compared to 219 urban areas and 37 rural areas with no material change.

Rural areas

Change in average distance to nearest branch	Range across areas in survey		Unbanked share		Change in unbanked	Number of survey areas	Number of survey observations		2013 average distance (survey)		2020 average distance (survey)	
	min	max	2013	2020			2013	2020	median	mean	median	mean
Little change	-0.45	0.41	0.069	0.058	-0.011	37	9,417	7,522	4.31	5.36	4.87	5.64
Increase	0.51	2.84	0.052	0.053	0.001	8	2,045	1,436	4.55	13.48	10.84	16.25

Small bank share. Table 7 presents the results from slotting metropolitan area based on change in small banks' share of branches. Small banks here are defined as those with less than $10 billion in total deposits.

For this analysis, metropolitan areas first are slotted into ranges based on small bank share. The lowest range is where less than 20 percent of area branches belong to small banks, and the top range is where more than 80 percent of area branches belong to small banks. The intermediate ranges are defined by 15-percentage-point increments of small bank share between 20 and 80. Metropolitan areas that remain in the same range are categorized as having little change between 2013 and 2019, while those that transition to a lower or higher range are categorized as having a decrease or increase, respectively.[19] The full transition matrix is shown in Appendix 3.

Table 7: Change in Unbanked Share versus Change in Small Bank Share

Urban areas

(10 billion total deposits criterion)						
Change in small bank share	Unbanked share		Change	Number of CBSAs (survey)	Number of survey observations	
	2013	2020		2013	2013	2020
Increase	0.087	0.049	-0.038	22	1,324	940
Little change	0.077	0.055	-0.022	119	13,436	11,340
Decrease	0.075	0.050	-0.025	112	14,227	11,475

We see no indication that a decline in small bank share is associated with worse financial inclusion outcomes. Areas where the share of small banks saw little change had similar reductions in their percentage of unbanked households as areas with a decline in small bank share (2.2 and 2.5 percentage points, respectively, with the difference not statistically significant).

A relatively small number of metropolitan areas experienced an increase in small bank share. These areas had a relatively large decline in the proportion of unbanked households (3.8 percentage points). Notably, the increase in small bank share was almost entirely a consequence of closing of branches by large banks.[20]

Thus, the comparatively large decline in proportion of households for this cohort is, in fact, inconsistent with the notion that branch closings by large banks harm financial inclusion. A plausible conjecture is that the drop in the proportion of unbanked households and the branch closings by large banks in these areas reflect a common factor, such as expansion of online and mobile banking.

[19] In the case of rural areas, there is insufficient change in small bank shares to allow for meaningful comparisons.
[20] The cohort of CBSAs with an increase in small bank share had 2,016 branches belonging to large banks and 2,439 branches belonging to small banks in 2013. The number of branches of large banks declined to 1,493 while the number of branches of small banks remained roughly the same at 2,470 in 2019.

Regression Analysis: Factors Associated with Change in Percent Unbanked

Next, we examine in a multivariate analysis which factors may have materially promoted or impeded improvement in household financial inclusion between 2013 and 2019. The analysis confirms the lack of any important association between the branch accessibility and small bank share measures and changes in financial inclusion.

For this analysis, we focus on dynamic metropolitan area characteristics—those that evolve substantially between 2013 and 2019—as these may directly affect households' access to or benefit from having a bank account. However, we also consider more static area characteristics (measured as of 2013) because of their potential relationship to how the unbanked population in an area responds to changing economic conditions or to outreach efforts by banks.

Sample size is more of a constraint for this analysis than for the cross-sectional regressions because fewer metropolitan areas have a sufficiently large sample in both years. Thus, there are 177 CBSAs with at least 20 observations in both years.

Exploring alternative specifications, we identify the following variables as materially related to change in percent unbanked. These are: change in the share of households with incomes below $30,000; change in the share of households without a smartphone (grouped into ranges); change in the share that are foreign-born non-citizens; and the proportion in 2013 lacking a high-school diploma. Table 8 reports the mean, median, and standard deviation for these variables; for change in unbanked share of households; and for change in the branch coverage and small bank share measures.

Table 8: Summary Statistics for 2013-2019 Changes

Variable	Mean	Median	Std Dev
Change in proportion unbanked	-0.021	-0.020	0.052
Change in proportion of foreign-born non-citizen	-0.005	-0.002	0.040
Change in proportion with income below $30,000	-0.076	-0.069	0.101
Proportion without a high school degree (2013)	0.105	0.100	0.062
Less than 8% decrease in proportion without a smartphone	0.119	0.000	0.324
8% to 25% decrease in proportion without a smartphone	0.672	1.000	0.471
25% or greater decrease in proportion without a smartphone	0.209	0.000	0.408
Change in average distance	0.095	0.085	0.148
Change in branch density	-0.407	-0.382	0.212
Change in share residing in a banking desert	0.005	0.002	0.015
Change in share of small banks (<$10 billion)	-0.081	-0.071	0.121
Change in share of small banks (<$5 billion)	-0.073	-0.054	0.107
Number of observations	177		

Table 9 presents the results from five separate regression equations where each of the branch coverage and small bank share measures is tested individually. Little explanatory power is indicated for change in the branch coverage measures or in the mix of large versus small banks.

The analysis indicates that change in percent unbanked bears a strong, positive association with change in the share of households with incomes below $30,000. While this estimated relationship likely reflects a positive contribution of local area income growth to financial inclusion, it also captures and controls for effects of sampling variation, and therefore should be interpreted with caution.

In other words, to the extent that lower-income households in a CBSA are oversampled in 2013, the proportion that are lower-income and the proportion that are unbanked will be overestimated for 2019. In this case, both the reduction in proportion of lower-income households and the reduction in the unbanked between 2013 and 2019

will tend to be overestimated.[21] Thus, to some extent, change in proportion of lower-income households will inversely correlate with change in unbanked share of households across CBSAs only because of sampling variation.

Digital inclusion, as represented by share of households with a smartphone, also appears to play a role. Metropolitan areas with substantial improvement in digital inclusion (at least 8-percentage-point increase in share of households without a smartphone) had significant gains in financial inclusion. This finding is consistent with the view that having a smartphone enhances the benefit or lowers the cost of having a bank account, thereby supporting financial inclusion. It highlights the importance of the digital inclusion factor and is consistent with an expanding role of mobile banking.

Decreases in percent unbanked between 2013 and 2019 were larger in metropolitan areas where a comparatively large share of survey respondents (in 2013) lacked a high school diploma. This finding suggests that larger financial inclusion gains were achieved in areas with higher concentrations of financially disadvantaged households. The analysis also indicates that an increase in foreign-born non-citizens is associated with an increase in the proportion of households that are unbanked.

These findings are robust to including change in the area unemployment rate between 2013 and 2019, measured using either the FDIC survey data or using county-level data downloaded from the U.S. Bureau of Labor Statistics (aggregated to CBSA level using the NBER crosswalk). Unemployment change is not statistically significant and has no material effect on other estimated coefficients when added to the regression equations. This robustness check suggests that change in smartphone ownership truly captures a digital inclusion effect and not an effect of local economic conditions.

We also checked robustness of these regression results to inclusion of percent Black and percent under age 30 from the 2013 survey data. Neither of these were statistically significant when added to the regression, nor did their inclusion have any important impact on other estimated coefficients. The proportion of survey respondents with incomes above $50,000 is less strongly related to change in percent banked than the proportion with incomes below $30,000. In addition, the results are robust to including change in the percent of respondents without a high school diploma.[22]

[21] Similarly, to the extent that lower-income households are oversampled in 2019, both the reduction in the proportion of lower-income households and the reduction in unbanked share will tend to be underestimated.

[22] The estimated coefficient on 2013 share without a high school diploma is essentially unchanged with inclusion of the latter variable. This robustness result provides evidence that the estimated relationship between share without a high school diploma in 2013 and change in percent unbanked is not an artifact of sampling variation.

Table 9: Regression Results for 2013-2019 Change in Unbanked

Dependent Variable: Change in proportion of unbanked households					
Explanatory variables	**Estimated coefficients (standard errors in parenthesis)**				
	1	2	3	4	5
Less than 8% Decrease in Portion without Smartphone	0.0413*** (0.0127)	0.0412*** (0.0128)	0.0414*** (0.0129)	0.0407*** (0.0125)	0.0410*** (0.0126)
Change in share of foreign-born non-citizen	0.1622** (0.0813)	0.1615** (0.0820)	0.1626** (0.0813)	0.1614* (0.0821)	0.1621* (0.0826)
Percent without High School Degree (2013)	-0.1486* (0.0790)	-0.1479* (0.0777)	-0.1486* (0.0793)	-0.1436* (0.0790)	-0.1416* (0.0798)
Change in percent with income below $30,000	0.1516*** (0.0395)	0.1520*** (0.0401)	0.1520*** (0.0412)	0.1575*** (0.0409)	0.1556*** (0.0406)
Change in average distance to nearest branch	0.0008 (0.0240)				
Change in branches per capita (10,000)		-0.0018 (0.0182)			
Change in banking desert population share			0.0793 (0.2805)		
Change in small bank share (<$10b)				-0.0240 (0.0235)	
Change in small bank share (<$5b)					-0.0276 (0.0279)
Intercept	0.0023 (0.0074)	0.0017 (0.0094)	0.0023 (0.0071)	0.0005 (0.0074)	-0.0000 (0.0078)
R-squared	0.2196	0.2197	0.2197	0.2226	0.2228
Number of Observations	177	177	177	177	177

Concluding Comments

The view that bank mergers harm household financial inclusion has recently gained traction among advocates of stricter merger policies. Exploring the factors associated with variation across geographic areas in the proportion of households that are unbanked and those associated with the widespread gains in financial inclusion achieved between 2013 and 2019, we find no support for this view.

In other words, branch accessibility and mix of small versus large banks don't seem to merit much concern. Rather, the findings suggest that improving the economic status of households with low levels of education and income, expanding digital inclusion, and strengthening outreach efforts to minority populations would be most effective at reducing the unbanked population.

Appendix 1: Calculating the Banking Desert Share of CBSA Population

We allocate total CBSA population between banking desert Census tracts and other areas in a CBSA by applying the following procedure. First, we map each Census tract in the CBSA to the ZIP code level using the HUD USPS Tract to ZIP Crosswalk, and then from ZIP to CBSA level using the ZIP to CBSA Crosswalk. Where a Census tract straddles more than one ZIP code (or, respectively, a ZIP code crosses a CBSA boundary), the crosswalk provides for an allocation of the Census tract (ZIP code) population based on the share of residential addresses within each resulting segment of the tract (ZIP code).

A small number of desert branches were not matched in the crosswalk file because the HUD cannot geocode some tracts with 5-digit zip codes. As stated on the HUD, "HUD is unable to geocode a small number of records that we receive from the USPS. As a result, there may be some 5-digit USPS ZIP codes that will not be included in these crosswalk files. Less than 1% of the total number of active 5-digit ZIP codes in the country are excluded from the current version of the crosswalk files." The ZIP to CBSA crosswalk was manually edited to no longer include subdivisions, since the HUD is more granular. Edits were made using both the U.S. Bureau of Labor Statistics and Proximity One. Other changes include recoding Boston, MA (MSA 14484) to 14454, since 14484 no longer exists; and changing Litchfield, CT (MSA 45860), Hilo, HI (MSA 25900), and Kauai, HI (MSA 28180) to non-MSA (99999) in the crosswalk.

Appendix 2: Re-estimation with Inclusion of "Income above $50,000"

Dependent Variable: Unbanked share of households (2019)					
Explanatory variables	**Estimated coefficients (standard errors in parenthesis)**				
	1	2	3	4	5
No Smartphone	0.1652** (0.0669)	0.1509** (0.0686)	0.1649** (0.0671)	0.1521** (0.0688)	0.1510** (0.0685)
Black	0.1209*** (0.0283)	0.1203*** (0.0281)	0.1211*** (0.0282)	0.1244*** (0.0281)	0.1247*** (0.0281)
Native American	0.2775*** (0.0886)	0.2917*** (0.0803)	0.2759*** (0.0789)	0.2685*** (0.0791)	0.2649*** (0.0801)
Age Below 30	0.0591 (0.0508)	0.0580 (0.0504)	0.0591 (0.0508)	0.0510 (0.0520)	0.0492 (0.0522)
Foreign-Born Non-Citizen	0.2236*** (0.0816)	0.2448*** (0.0819)	0.2245*** (0.0787)	0.2435*** (0.0840)	0.2503*** (0.0845)
No High School Diploma	0.1620** (0.0755)	0.1621** (0.0750)	0.1618** (0.0762)	0.1519* (0.0778)	0.1477* (0.0780)
Income Above $50,000	-0.1038** (0.0418)	-0.1059** (0.0411)	-0.1037** (0.0406)	-0.1019** (0.0409)	-0.1022** (0.0409)
Avg Distance to Nearest Branch	-0.0003 (0.0042)				
Branches Per Capita (10,000)		0.0054 (0.0058)			
Banking Desert Pop Share			-0.0036 (0.0659)		
Small Bank Share (<$10b)				0.0160 (0.0164)	
Small Bank Share (<$5b)					0.0199 (0.0179)
F-statistic	15.33	15.17	15.44	15.96	15.97
Pseudo R-squared	-0.2198	-0.2224	-0.2198	-0.2222	-0.2232
Number of Observations	220	220	220	220	220

Dependent Variable: Unbanked share of households (2013)					
Explanatory variables	**Estimated coefficients (standard errors in parenthesis)**				
	1	2	3	4	5
No Smartphone	0.0635 (0.0547)	0.0563 (0.0530)	0.0586 (0.0543)	0.0520 (0.0545)	0.0481 (0.0544)
Black	0.1742*** (0.0298)	0.1752*** (0.0290)	0.1749*** (0.0297)	0.1802*** (0.0295)	0.1805*** (0.0294)
Native American	0.0900 (0.1497)	0.0625 (0.1522)	0.0887 (0.1498)	0.0558 (0.1544)	0.0652 (0.1525)
Age Below 30	0.1634*** (0.0629)	0.1518** (0.0624)	0.1597** (0.0631)	0.1474** (0.0630)	0.1421** (0.0629)
Foreign-Born Non-Citizen	0.2667*** (0.1025)	0.2349** (0.1099)	0.2800*** (0.1007)	0.3015*** (0.1045)	0.3062*** (0.1035)
No High School Diploma	0.2414*** (0.0697)	0.2357*** (0.0695)	0.2355*** (0.0695)	0.2235*** (0.0706)	0.2247*** (0.0704)
Income Above $50,000	-0.1032** (0.0427)	-0.0917** (0.0419)	-0.1001** (0.0420)	-0.0961** (0.0416)	-0.0991** (0.0418)
Avg Distance to Nearest Branch	-0.0052 (0.0047)				
Branches Per Capita (10,000)		-0.0091 (0.0060)			
Banking Desert Pop Share			-0.0328 (0.0667)		
Small Bank Share (<$10b)				0.0253 (0.0200)	
Small Bank Share (<$5b)					0.0314 (0.0193)
F-statistic	12.93	14.05	13.27	13.53	13.83
Pseudo R-squared	-0.2548	-0.2597	-0.2535	-0.2564	-0.2587
Number of Observations	232	232	232	232	232

Appendix 3: Transition Matrix for Small Bank Share

Transition matrix using Survey CBSAs							
Fraction of CBSA that is small Banks (<10billion)		**2020**					
		<.20	**>=.20 & <.35**	**>=.35 & <.50**	**>=.50 & <.65**	**>=.65 & <.80**	**>=.80**
2013	**<.20**	11	2	0	0	0	0
	>=.20 & <.35	27	16	6	0	0	0
	>=.35 & <.50	3	34	25	4	0	0
	>=.50 & <.65	2	13	16	34	6	0
	>=.65 & <.80	0	0	2	13	23	4
	>=.80	0	0	0	0	1	9