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Courtney Hundley
University of Louisville

Richard W. Wilson
University of Louisville

John Chenault
University of Louisville, john.chenault@louisville.edu

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School of Community Health Sciences
University of Nevada, Las Vegas

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Courtney Hundley, University of Louisville
Richard W. Wilson, University of Louisville
John Chenault, University of Louisville
Corresponding Author: Courtney Hundley, courtney.hundley@louisville.edu

ABSTRACT

Alternative financial services (AFS) such as payday lenders, pawn brokers, tax refund loans, and check cashers are more prevalent in minority and lower income neighborhoods. These are neighborhoods also found to have disparities in health, compared to more affluent neighborhoods and communities. The focus of this paper is to determine if any relationship exists between use of AFS and health disparities.

Using data from a survey performed by the Federal Deposit Insurance Corporation (FDIC), we compared four banking variables to several measures of health for 85 metropolitan statistical areas (MSA) across the nation. The four banking variables all related to degrees of reliance on alternative financial services. The three health related measures were all-cause mortality, cancer mortality, and drug and alcohol related mortality. The regression analysis controlled for income, education, and relative size of the nonwhite population. We found that for all-cause mortality there is a statistically significant relationship between three of the four banking variables, in particular "Used an AFS" has a strong association with a coefficient of 0.25 and a p-value of 0.001.

The conclusion of this analysis is that when use of AFS increases for an MSA, health status declines, as seen with all-cause mortality. This study adds evidence to establish a finer and often unrecognized dimension of "social determinants of health."

Keywords: Alternative financial services; payday lenders; health disparities; health; social determinants of health

INTRODUCTION

The purpose of this study was to trace the relationship between health status and peoples' use of alternative financial services, such as payday lenders, check cashers, and similar high cost short term loan services. The general hypothesis is that availability and use of alternative financial

services is part of the social determinants of health that affect people to a greater extent in disadvantaged neighborhoods and communities, where deficit health disparities are pronounced.

Prior Research

A disparity often found in disadvantaged communities is a relative lack of banks and credit unions and a relative excess of alternative financial services (AFS) such as payday lenders, check cashers, pawn shops, rent-to-own stores, tax refund loans and auto title loans (Morgan, Pinkovsky, Yang 2016). Alternative financial services are more common in low income and minority communities; it is estimated that there are more payday lenders and related businesses than McDonald's restaurants in the U.S. (Graves and Peterson, 2008).

Data on the social impact of AFS is mixed: some research shows extended indebtedness and bankruptcy associated with AFS transactions while other research shows a net positive effect, helping people with small personal loans to pay bills and manage living expenses, services not available to them through conventional lenders, even if they were nearby (DeYoung 2015). Alternative financial services become part of the structure of disadvantaged communities because segments of the population lack experience with and access to traditional banking institutions that provide routine financial services. Traditional banking institutions provide resources to build assets for lifelong economic growth, making provisions for college expenses, home ownership, loans to support small businesses, pay unexpected medical bills or car repairs, and so forth. AFS providers more typically serve short-term episodes of financial crisis, rather than helping people with long-term financial management.

Several studies have looked into the absence of traditional banks and the concentration of AFSs in particular geographic areas (Smith, Wackes, Smith 2012). A clear geographic distribution of AFS and traditional bank densities has been found. States in the South and the Mountain West of the nation are where AFSs are most heavily concentrated, in particular, Alabama, Kentucky, Mississippi, South Carolina, Tennessee, and Utah,. Banks are almost always more prevalent than AFS, but the range of difference between the two in certain areas is worth noting. In the South, traditional banks were 2.5x more prevalent than AFS, but 15.5x more common in the Northeast (Fowler, Cover, Kleit 2014).

While there is marked variation in the presence of AFS from state to state, with clustering in the South and Mountain West, there is no clear relationship of that variation to AFS use, because even in states that prohibit AFS businesses, consumers have the options of crossing a state line or using an on-line AFS.

Another aspect of the location of AFS is not just the absence of traditional banks, but also substantially lower SES status (Bukey, Simkins 2004). A common theme in prior research is that AFS tend to be more frequent in areas with higher minority, poorer and less educated populations. These financial services were found not to be present in the poorest of geographical areas, but in locations often considered the working poor (Smith, Wackes, Smith 2012; Fowler, Cover, Kleit 2014; Barth, Hamilton, Markwardt 2013; Graves 2003; Freed et al. 2006). In order to use a payday lender, you have to have a job and a paycheck. Evidence is that while not all users of AFS suffer financial harm, many probably do, and these AFS tend to concentrate in neighborhoods where poverty and disadvantaged individuals are more clustered (Zinman 2010; DeYoung et al. 2015; Melzer 2011; Stegman, Faris 2003).

In our prior research (Hundley et al. 2017), we assessed the presence of AFS and associations with disparities in health status by ZIP code for Louisville, KY. A finding of that

study was that ZIPs with a higher concentration of AFS also had higher rates of mortality, and more hospitalizations for heart disease and Type II diabetes. In addition, ZIPs with a higher concentration of AFS also had a high percentage of individuals living in poverty, higher rates of SNAP households, and higher percentage of populations with only a high school diploma or GED. This study builds on the theme of the previous study.

METHODS

Our prior work looked at the relationship of the availability of AFS and health status, using existing data, with no information about actual use of AFS services. This study analyzed self-reported banking-related behavior and how it interacts with health status, within a set of Metropolitan Statistical Areas (MSA) across the U.S. Metropolitan statistical areas consist of the county where a major city is located, as well as the surrounding outlying counties to account for economic flow of consumers and employment. All data analysis in this study is at the level of MSA.

Since 2009, the Federal Deposit Insurance Corporation (FDIC) has performed a survey every two years as a supplement to a larger monthly survey, the Current Population Survey, to assess banking patterns. This is public access data, made available at the MSA level (FDIC 2016). Responses to this survey were used for our analysis, specifically in regards to use of alternative financial services and traditional banks. Health variables used were all-cause mortality, cancer mortality, and drug/alcohol-related deaths. Alcohol and drug-related deaths were due to medical consequences, but did not include unintentional injuries, such as alcohol-related auto crash fatality. The health measures were selected because they have sufficiently large case numbers to enable suitable data analysis. In addition, they are diverse as indicators of community health, and might represent different aspects of health status and health risk.

The health data were obtained from CDC WONDER (Centers for Disease Control and Prevention) and all measures were age-adjusted (CDC WONDER 2017). All-cause mortality was gathered for 2015, cancer mortality was for the year 2013, and drug/alcohol mortality was for 2007-2015. These were the most recent years available for all-cause and cancer mortality, while a range of years was used for drug and alcohol deaths to avoid high rates of suppressed values. Values were suppressed for all-cause mortality and drug/alcohol deaths when the value was less than 10, for the total of the metropolitan statistical area (MSA) or if only one county within the MSA was under 10 (CDC WONDER 2017). For cancer mortality, values were suppressed when the rate or count was less than 16. Suppression is done to protect individual case confidentiality. Data suppression standards varied among the different data sources. CDC WONDER aggregates or provides a clearinghouse for data from many different sources, and for internal reasons those primary sources will establish policies and procedures different from other data sources (e.g. 10 vs 16, cited above).

Demographic data for each MSA were gathered for 2015 from the American Community Survey (ACS). The demographic measures evaluated were median household income (2015 inflation-adjusted), percent non-white, and percent of population over 25 with only a high school diploma/GED.

All banking, health, and demographic data were analyzed at the MSA level. The FDIC survey gathered information by region, state, MSA, and county. MSA was the smallest geographic level with the most complete data; counties had frequent unreported responses, so the basis for this

analysis is on the MSA level. There are 686 MSAs recognized by the US Census Bureau and 272 identified by the sampling process used by the FDIC survey. Some of the data were obtained for the MSA as a whole, while others such as all-cause mortality had to be gathered for each county within each MSA and compiled for an overall MSA total.

Individual responses to the FDIC survey were aggregated by MSA, with 85 MSAs identified and used for this study. (see Figure 1) The 85 MSAs are listed in Table 3, including the rates for the three health status measures. MSAs used were those with responses in the survey that comprised at least 0.20% of the overall sample, or had at least 150 respondents. There were over 70,000 households interviewed, with 39,967 households comprising our study, with respondents in each of the 50 states and the District of Columbia (US Census Bureau CPS 2016). A choropleth map for all-cause mortality was created using ArcGIS version 10.1 (Figure 1). All-cause mortality rate was broken into four quartiles and mapped for the 85 MSAs analyzed.

Table 3. Selected health status measures in 85 metropolitan statistical areas in the U.S.

MSA	All- Cause Mortality Rate	All-Cause Mortality 95% Confidence Interval	Cancer Mortality Rate	Cancer Mortality 95% Confidence Interval	Drug & Alcohol Mortality Rate	Drug/Alcohol Mortality 95% Confidence Interval
Albany-Schenectady-Troy, NY Metro Area	704.3	[688.4,720.3]	175.7	[167.7,184.0]	14.0	[13.2,14.8]
Albuquerque, NM Metro Area	721.2	[704.4,738.0]	142.1	[134.7,149.8]	48.5	[46.9,50.0]
Atlanta-Sandy Springs-Roswell, GA Metro Area	738.3	[730.4,746.1]	160.3	[156.6,164.0]	16.2	[15.8,16.5]
Austin-Round Rock, TX Metro Area	639.8	[626.9,652.7]	137.0	[130.9,143.4]	18.0	[17.3,18.7]
Baltimore-Columbia-Towson, MD Metro Area	766.6	[756.8,776.4]	174.2	[169.5,179.0]	25.3	[24.7,25.9]
Baton Rouge, LA Metro Area	847.7	[827.3,868.0]	178.9	[169.6,188.6]	17.2	[16.3,18.2]
Billings, MT Metro Area	na	na	na	na	na	na
Birmingham-Hoover, AL Metro Area	915.8	[899.0,932.5]	185.1	[177.6,192.8]	26.1	[25.1,27.1]
Boise City, ID Metro Area	697.1	[677.0,717.3]	158.2	[148.5,168.5]	21.8	[20.6,23.0]
Boston-Cambridge-Newton, MA-NH Metro Area	660.2	[653.4,667.0]	157.0	[153.6,160.4]	21.9	[21.4,22.3]
Bridgeport-Stamford-Norwalk, CT Metro Area	576.9	[562.8,591.0]	133.6	[126.8,140.7]	14.5	[13.7,15.4]
Buffalo-Cheektowaga-Niagara Falls, NY Metro Area	797.8	[783.2,812.4]	183.1	[176.2,190.2]	21.2	[20.3,22.1]
Burlington-South Burlington, VT Metro Area	682.7	[649.1,716.4]	na	na	21.7	[19.6,23.7]
Charleston, WV Metro Area	1005.7	[968.5,1042.8]	na	na	47.3	[44.2,50.3]
Charleston-North Charleston, SC Metro Area	759.8	[739.6,779.9]	159.0	[149.7,168.8]	20.2	[19.0,21.3]
Charlotte-Concord-Gastonia, NC-SC Metro Area	790.9	[779.3,802.4]	168.0	[162.6,173.5]	18.7	[18.1,19.3]
Chicago-Naperville-Elgin, IL-IN-WI Metro Area	694.3	[689.1,699.5]	167.9	[165.3,170.5]	16.6	[16.3,16.8]

MSA	All- Cause Mortality Rate	All-Cause Mortality 95% Confidence Interval	Cancer Mortality Rate	Cancer Mortality 95% Confidence Interval	Drug & Alcohol Mortality Rate	Drug/Alcohol Mortality 95% Confidence Interval
Cincinnati, OH-KY-IN Metro Area	836.5	[824.6,848.3]	180.0	[174.5,185.7]	34.0	[33.1,34.7]
Cleveland-Elyria, OH Metro Area	781.2	[770.4,791.9]	174.4	[169.3,179.5]	24.3	[23.6,25.0]
Columbia, SC Metro Area	820.5	[800.6,840.3]	179.6	[170.4,189.3]	18.7	[17.7,19.7]
Columbus, OH Metro Area	840.3	[826.7,854.0]	175.4	[169.4,181.5]	24.2	[23.5,25.0]
Dallas-Fort Worth-Arlington, TX Metro Area	716.9	[709.9,723.8]	154.9	[151.6,158.3]	14.5	[14.2,14.9]
Denver-Aurora-Lakewood, CO Metro Area	657.4	[647.4,667.3]	137.2	[132.6,142.0]	29.8	[29.1,30.5]
Detroit-Warren-Dearborn, MI Metro Area	802.5	[794.6,810.5]	170.6	[167.0,174.4]	28.7	[28.1,29.2]
Fargo, ND-MN Metro Area	658.7	[624.7,692.6]	na	na	18.1	[16.1,20.1]
Fayetteville-Springdale-Rogers, AR-MO Metro Area	778.4	[753.5,803.4]	na	na	16.3	[15.1,17.6]
Grand Rapids-Wyoming, MI Metro Area	689.8	[674.2,705.4]	149.8	[142.5,157.4]	19.1	[18.2,20.0]
Greenville-Anderson-Mauldin, SC Metro Area	851.9	[833.5,870.2]	172.0	[163.8,180.6]	28.6	[27.4,29.8]
Hartford-West Hartford-East Hartford, CT Metro Area	664.0	[650.9,677.1]	149.2	[143.0,155.6]	20.3	[19.3,21.1]
Houston-The Woodlands-Sugar Land, TX Metro Area	711.1	[703.8,718.5]	159.8	[156.2,163.4]	15.7	[15.3,16.0]
Huntington-Ashland, WV-KY-OH Metro Area	973.2	[944.1,1002.2]	na	na	37.6	[35.5,39.7]
Indianapolis-Carmel-Anderson, IN Metro Area	812.8	[800.2,825.5]	176.7	[170.7,182.8]	24.8	[24.1,25.5]
Jackson, MS Metro Area	876.9	[852.8,901.0]	188.0	[176.9,199.6]	13.7	[12.7,14.7]
Jacksonville, FL Metro Area	784.0	[770.0,798.0]	168.6	[162.0,175.3]	24.4	[23.6,25.3]
Kansas City, MO-KS Metro Area	756.2	[744.7,767.7]	168.6	[163.1,174.2]	19.8	[19.1,20.3]
Knoxville, TN Metro Area	864.6	[846.7,882.6]	187.7	[179.5,196.3]	35.0	[33.6,36.2]
Lafayette, LA Metro Area	838.0	[810.9,865.1]	na	na	18.8	[17.5,20.2]
Las Vegas-Henderson-Paradise, NV Metro Area	737.2	[725.4,749.0]	163.5	[157.8,169.3]	29.7	[28.9,30.4]
Little Rock-North Little Rock-Conway, AR Metro Area	864.7	[843.8,885.6]	179.0	[169.5,188.8]	na	na
Los Angeles-Long Beach-Anaheim, CA Metro Area	581.8	[577.8,585.9]	139.8	[137.7,141.8]	18.8	[18.6,19.1]
Louisville/Jefferson County, KY-IN Metro Area	878.1	[862.6,893.6]	184.0	[176.9,191.3]	26.4	[25.4,27.3]
Manchester-Nashua, NH Metro Area	723.7	[698.7,748.7]	na	na	28.8	[27.0,30.5]
Memphis, TN-MS-AR Metro Area	901.7	[885.3,918.1]	200.8	[193.0,208.8]	na	na

MSA	All- Cause Mortality Rate	All-Cause Mortality 95% Confidence Interval	Cancer Mortality Rate	Cancer Mortality 95% Confidence Interval	Drug & Alcohol Mortality Rate	Drug/Alcohol Mortality 95% Confidence Interval
Miami-Fort Lauderdale-West Palm Beach, FL Metro Area	581.0	[575.7,586.3]	138.4	[135.7,141.0]	17.3	[17.0,17.7]
Milwaukee-Waukesha-West Allis, WI Metro Area	720.2	[707.7,732.7]	169.8	[163.7,176.1]	25.1	[24.3,26.0]
Minneapolis-St. Paul-Bloomington, MN-WI Metro Area	640.2	[631.8,648.5]	151.6	[147.5,155.9]	17.1	[16.7,17.6]
Nashville-Davidson--Murfreesboro--Franklin, TN Metro Area	815.0	[801.5,828.6]	171.1	[164.9,177.5]	22.7	[22.0,23.5]
New Haven-Milford, CT Metro Area	708.1	[692.1,724.1]	156.4	[148.9,164.2]	22.1	[21.0,23.1]
New Orleans-Metairie, LA Metro Area	788.7	[773.6,803.9]	182.9	[175.6,190.5]	27.6	[26.6,28.5]
New York-Newark-Jersey City, NY-NJ-PA Metro Area	604.9	[601.7,608.1]	147.7	[146.1,149.3]	16.2	[16.0,16.3]
North Port-Sarasota-Bradenton, FL Metro Area	607.1	[592.8,621.4]	145.3	[138.7,152.2]	38.2	[36.6,39.9]
Ogden-Clearfield, UT Metro Area	738.9	[715.6,762.2]	130.6	[120.7,140.9]	27.7	[26.3,29.2]
Oklahoma City, OK Metro Area	855.9	[840.2,871.6]	180.3	[173.0,187.8]	30.0	[29.0,31.0]
Omaha-Council Bluffs, NE-IA Metro Area	768.0	[749.8,786.1]	174.0	[165.3,183.1]	16.1	[15.2,17.0]
Orlando-Kissimmee-Sanford, FL Metro Area	665.1	[655.0,675.1]	155.2	[150.3,160.3]	18.3	[17.8,19.0]
Philadelphia-Camden-Wilmington, PA-NJ-DE-MD Metro Area	747.4	[741.0,753.9]	174.5	[171.4,177.7]	26.1	[25.7,26.5]
Phoenix-Mesa-Scottsdale, AZ Metro Area	644.8	[637.7,652.0]	142.8	[139.4,146.3]	29.3	[28.7,29.8]
Pine Bluff, AR Metro Area	1015.7	[955.2,1076.1]	na	na	na	na
Pittsburgh, PA Metro Area	798.7	[788.9,808.5]	171.7	[167.2,176.2]	27.4	[26.7,28.1]
Portland-South Portland, ME Metro Area	723.9	[703.6,744.1]	166.4	[156.7,176.5]	22.1	[20.7,23.4]
Portland-Vancouver-Hillsboro, OR-WA Metro Area	686.6	[676.2,697.0]	160.6	[155.4,165.9]	26.2	[25.5,26.9]
Providence-Warwick, RI-MA Metro Area	731.6	[719.7,743.5]	172.4	[166.5,178.3]	30.2	[29.3,31.1]
Raleigh, NC Metro Area	667.2	[651.5,683.0]	161.6	[153.7,169.9]	12.8	[12.1,13.5]
Richmond, VA Metro Area	779.0	[764.1,794.0]	173.2	[166.2,180.5]	na	na
Riverside-San Bernardino-Ontario, CA Metro Area	688.6	[680.7,696.5]	152.3	[148.5,156.2]	25.0	[24.5,25.5]
Rochester, NY Metro Area	703.5	[689.2,717.8]	165.3	[158.4,172.5]	14.8	[14.0,15.6]
Sacramento--Roseville--Arden-Arcade, CA Metro Area	683.3	[673.0,693.5]	157.2	[152.1,162.3]	27.9	[27.1,28.6]

MSA	All- Cause Mortality Rate	All-Cause Mortality 95% Confidence Interval	Cancer Mortality Rate	Cancer Mortality 95% Confidence Interval	Drug & Alcohol Mortality Rate	Drug/Alcohol Mortality 95% Confidence Interval
St. Louis, MO-IL Metro Area	786.6	[776.9,796.2]	174.5	[169.9,179.1]	na	na
Salisbury, MD-DE Metro Area	751.7	[728.1,775.2]	na	na	23.2	[21.5,24.9]
Salt Lake City, UT Metro Area	733.0	[715.2,750.7]	131.6	[124.0,139.5]	33.2	[32.2,34.5]
San Antonio-New Braunfels, TX Metro Area	734.2	[723.1,745.4]	155.4	[150.2,160.8]	18.3	[17.7,18.8]
San Diego-Carlsbad, CA Metro Area	590.6	[582.5,598.8]	153.0	[148.7,157.4]	24.7	[24.1,25.3]
San Francisco-Oakland-Hayward, CA Metro Area	557.2	[550.8,563.6]	137.4	[134.1,140.7]	20.3	[20.0,20.9]
San Jose-Sunnyvale-Santa Clara, CA Metro Area	508.6	[498.7,518.4]	128.7	[123.6,134.0]	17.0	[16.3,17.6]
Seattle-Tacoma-Bellevue, WA Metro Area	645.9	[637.6,654.1]	152.1	[148.0,156.3]	25.0	[24.5,25.5]
Shreveport-Bossier City, LA Metro Area	915.5	[888.8,942.3]	na	na	20.2	[18.8,21.6]
Sioux Falls, SD Metro Area	694.5	[662.0,727.0]	na	na	17.3	[15.5,19.1]
Tampa-St. Petersburg-Clearwater, FL Metro Area	722.9	[714.5,731.2]	163.7	[159.8,167.8]	34.0	[33.2,34.7]
Tucson, AZ Metro Area	693.0	[678.4,707.5]	148.3	[141.6,155.2]	35.4	[34.1,36.6]
Tulsa, OK Metro Area	858.2	[840.5,875.9]	181.9	[173.8,190.2]	31.3	[30.1,32.5]
Urban Honolulu, HI Metro Area	573.9	[560.5,587.3]	130.4	[123.9,137.3]	15.9	[15.1,16.8]
Virginia Beach-Norfolk-Newport News, VA-NC Metro Area	774.8	[761.7,787.8]	177.3	[171.0,183.8]	16.3	[15.7,17.0]
Washington-Arlington-Alexandria, DC-VA-MD-WV Metro Area	587.4	[581.0,593.8]	140.5	[137.3,143.7]	na	na
Wichita Falls, TX Metro Area	820.0	[798.6,841.4]	160.2	[150.8,170.1]	22.8	[21.5,24.1]
Worcester, MA-CT Metro Area	757.7	[741.1,774.3]	164.5	[156.7,172.6]	24.4	[23.4,25.5]

NA = Not available, either due to confidentiality restrictions or lack of available data. For all-cause mortality only one MSA was omitted, Billings, MT. Twelve MSAs were omitted for cancer mortality, these were Billings, MT, Burlington, VT, Charleston, WV, Fargo, ND, Fayetteville, AR, Huntington, WV, Lafayette, LA, Manchester, NH, Pine Bluff, AR, Salisbury, MD, Shreveport, LA, and Sioux Falls, ND. Seven MSAs were omitted for drug/alcohol related deaths, these were Billings, MT, Little Rock, AR, Memphis, TN, Pine Bluff, AR, Richmond, VA, St. Louis, MO, and Washington D.C., MD.

Four variables from the banking survey were used for our analysis: 1) Unbanked (no bank account, checking or savings), 2) Underbanked (having a bank account and also having used an AFS in the past 12 months), 3) Unsaved (not having saved for unexpected expenses), and 4) Used an AFS (banked and unbanked who have used an AFS in the past 12 months). These were chosen to understand the use of AFS, as well as other banking behavior patterns compared to best practice recommendations for money management.

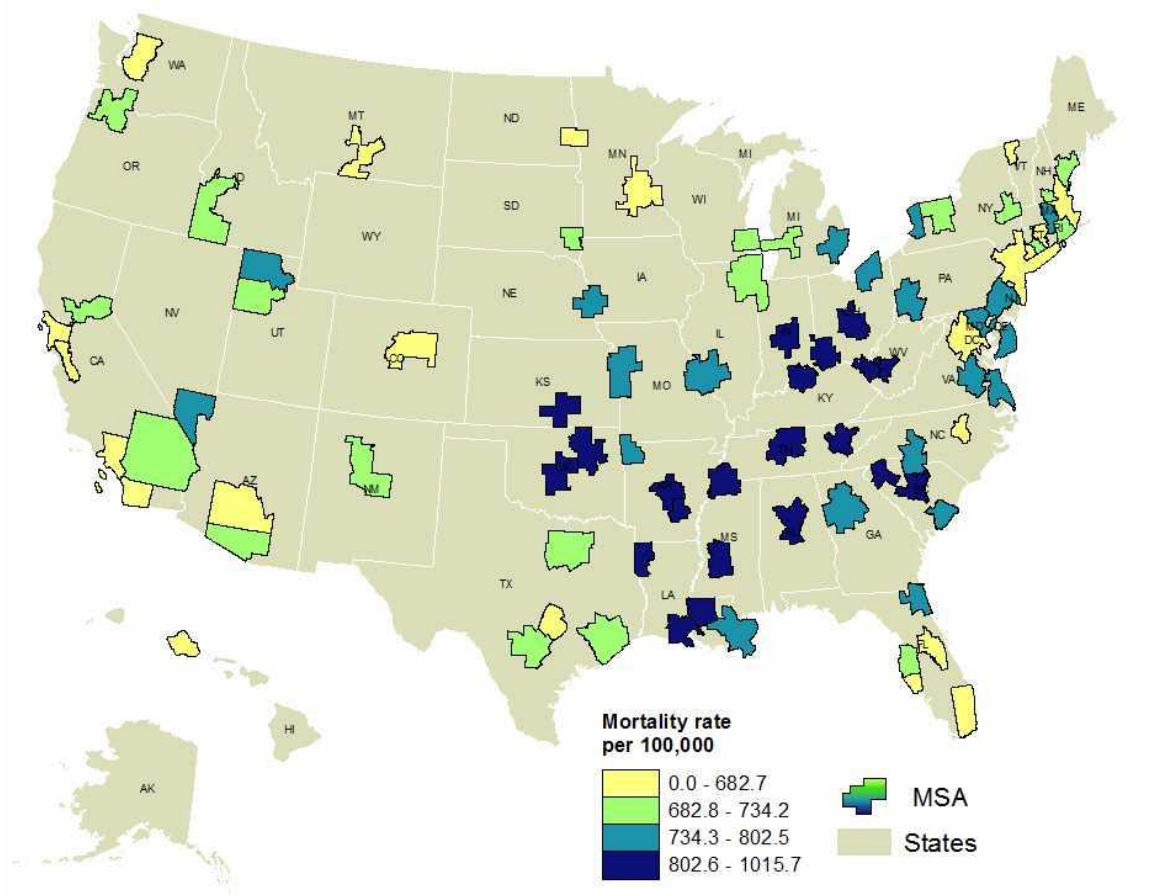
Statistical Analysis

Statistical analysis was performed using the software IBM SPSS Statistics version 24. To analyze the health measures in relation to the banking measures a linear regression was used, controlling for education, race, and median household income. All four banking variables were independently compared with the three health measures. For analysis of the interaction of health measures with demographic measures, a Pearson correlation was performed.

RESULTS

Of the 85 MSAs selected, we found that low percentages of the population were unbanked, with the average being 3.20% (range= 0.64% - 9.03%). For the underbanked variable, the average is 9.42% (range=3.57%-16.48%), and 18.72% (range=6.7%-34.19%) for those who are unsaved. The average of AFS use for MSAs, regardless of banking account status is 11.27% (1.27%-19.35%). It appears that being completely unbanked may not be very common at a little over 3%, but more than 1 in 10 of the FDIC survey respondents engage with AFS to some degree. It also appears to be common for households across the U.S. to have no savings.

Figure 1. All-cause mortality rates for Metropolitan Statistical Areas (MSA) across the United States



For the demographic measures the average percentage of non-white population is 26.99%, the average of those with only a high school diploma or GED is 26.80%, and the average (among the MSAs) median household income is $59,039. As seen in Table 1 the average median household income is higher for MSAs in this study than the national level of $55,775, as is the percentage of non-white population higher in the study's MSAs compared to the national percentage of 22.90% (US Census 2016 Population estimates).
Insert Table 1.

The average all-cause mortality rate for MSAs was 743.69 per 100,000. The average rate for cancer mortality was 162.20 per 100,000. For drug/alcohol deaths, the average rate for MSAs was 23.57 per 100,000. Due to small case numbers, privacy restrictions, and lack of available data in CDC WONDER, several MSAs were excluded from analysis for each health measure (see Table 3). Those omitted from analysis include one MSA excluded for all-cause mortality, twelve for cancer mortality, and seven for drug/alcohol related deaths.

Table 1. Selected demographic variables in U.S. overall compared to 85 metropolitan statistical areas

	% Non-white	Median household income (2015 inflation adjusted)	% High school diploma/GED only
United States	22.90	55,775	29.50
85 MSAs	26.99	59,039	26.80

The results of the regression show that for all-cause mortality there was a statistically significant relationship (alpha = 0.05) for three of the four banking variables (See Table 2). Used an AFS and all-cause mortality had a strong association (0.25, p=0.001). Since Underbanked also includes AFS use, it could be considered a subcategory of the Used AFS variable and it is reasonable that this association was also strong (0.193, p= 0.006). The Underbanked variable (0.211, p=0.013) takes into consideration those who have either a checking or savings account, indicating access to more formal types of credit and the assumption of little AFS use. For Unbanked, Unsaved, and Used AFS the relationship was positive, with a significant association for each. This indicates that in MSAs with a higher percentage of those who are unbanked, underbanked and have used an AFS there is a higher rate for all-cause mortality.

Table 2. Regression coefficients for the interaction of selected banking variables with health status measures, controlling for race, education and income.

Banking variables	**All-Cause Mortality rate per 100,000**		**Cancer Mortality rate per 100,000**		**Drug/alcohol mortality rate per 100,000**	
	Beta	p-value	Beta	p-value	Beta	p-value
Unbanked	0.211	0.013*	0.074	0.526	0.060	0.651
Underbanked	0.193	0.006*	0.135	0.183	-0.134	0.248
Unsaved	-0.052	0.476	-0.055	0.591	0.109	0.344
Used an AFS	0.250	0.001*	0.168	0.119	-0.136	0.273

Controlling for % non-white, % only a high school diploma/GED, Median household income
* Statistically significant

On the other side of this is the Unsaved variable where a negative but not significant relationship was found for all-cause and cancer mortality, with coefficients of -0.052 and -0.055 respectively. Lack of saving seems to be a construct different from the other banking variables, having a different relationship to health status.

The regressions for drug/alcohol deaths had no significant results, indicating the prevalence is more evenly distributed among the population regardless of banking status or use of an AFS.

DISCUSSION

Policies for AFS vary among the states, with 13 states and Washington D.C. prohibiting them. Other states cap the annual percentage interest rate (APR) at 36%. Over 30 states in the nation still allow high interest loans, with six having no limit on the maximum interest allowed (Barth, Hilliard, & Jahera, 2015). These state regulations do not limit online AFS use. For instance, Pine Bluff, AR has an AFS use rate of 19.35%, but the state does not allow the physical presence of these businesses. In addition, data do not show that states prohibiting AFS necessarily have better health. While Raleigh, NC is under the average for our three health measures, Charleston, WV has some of the highest rates for mortality and drug use deaths in the study, yet both do not allow physical AFS locations. Solely prohibiting AFS does not appear to be a solution that solves high interest loan use and the cycle in which customers often become entrapped.

One of the key findings from the FDIC survey is that mobile and internet banking have increased, while bank teller use has decreased (FDIC 2016, Implications). While these shifts in banking for the overall population are occurring, low educated, low-income, and rural residents still rely heavily on bank tellers to access their accounts. Neighborhoods with lower income and less educated populations also happen to be where traditional banks are less likely to be located and more likely for AFS to be located. As seen in Figure 1 the highest all-cause mortality rates are found in the South and Midwest. As noted earlier, the South was found to have a higher prevalence of AFS, with the ratio of banks to AFS lower, leaving the preferred brick and mortar sites for these low income and low education populations to be predominantly businesses offering high interest loans.

To better serve the preference of lower income and lower educated populations, as well as to counter predatory lending, traditional banks need to be encouraged to locate in these areas. One way to achieve this is to implement policies that favor non-profit banking institutions to set up in these neighborhoods, giving community members the physical banking they desire and more accessible lines of credit. Making small dollar loans available at a traditional banking establishment reduces the need for many individuals to rely on AFSs to meet their financial constraints.

In addition, it was found by the FDIC that many banked individuals are not aware of other services that may be provided by their bank, such as a credit card. A suggestion is that a broader reaching marketing/communications plan be implemented by banks to make users more aware of ways to get these lines of credit (FDIC 2016, Implications). One way a communications campaign may benefit current bank customers and potential AFS users is not only announcing the lines of credit available at the bank, but to also compare the payments one would make with a bank line of

credit to one made with an AFS. This would highlight the funds potentially wasted on late fees and exorbitant APRs by using an AFS. An important variable for banks to consider in this effort is language literacy and readability, which are part of the fabric of disadvantaged low-income and minority communities.

Limitations

In this analysis, race was categorized into either white or non-white. This assumes that defined minority groups have more similar health statuses, which is not necessarily the case. For instance, we found that MSAs with higher Asian populations had lower all-cause mortality and cancer mortality. For MSAs with a higher Black population, there was a significant positive correlation for all-cause and cancer mortality. For proportions of both Asians and Blacks there was a significant negative correlation for drug/alcohol deaths. This is a limitation that is recognized, and may impact the analysis due to some minority groups having very different trends in regards the health measures chosen. Future research should find ways to incorporate racial and ethnic differences with more granularity, a step not possible with the data used in this study. In addition to greater understanding of relationships, finer categories of ethnicity would also enable more tailored community interventions,

Another limitation is the existence of policy variations within a single MSA, as some cross state boundaries. Payday lending regulations differ by state with some banning AFS, others capping APRs, and even more allowing for high interest loans. If the city center is located in a state prohibiting AFS and outlying counties of the MSA are in a bordering state allowing high interest loans, this does not eliminate the possibility that individuals may cross state lines within the MSA to obtain the loan (Barth, Hilliard, & Jahera, 2015).

There were limitations in regards to the availability of data. Some MSAs in the study had suppressed values to hide identity of the cases, which led to the exclusion of these cities from analysis. For all-cause mortality, one MSA was excluded, leaving 84 MSAs for analysis. For cancer mortality 73 MSAs were analyzed, and with drug/alcohol deaths there were only 77 MSAs analyzed. Another limitation is the period of the data. The FDIC survey was conducted in 2015. The health data are from a larger period of time with all-cause mortality from 2015, but cancer from 2013 and drug/alcohol deaths from 2007-2015. For cancer, 2013 is the most recent year available and drug/alcohol mortality was drawn from a longer period to decrease the suppression of MSAs from analysis. Another limitation is that the FDIC survey results on banking use are self-reported.

One possible explanation for the lack of statistically significant findings for cancer mortality may be that so many of the MSAs that had suppressed values and were ultimately excluded from the regressions had some of the higher cancer mortality rates. Some of those excluded from the cancer mortality analysis, such as, Pine Bluff, Charleston, Shreveport, and Huntington, had some of the highest all-cause mortality rates, with Pine Bluff having the highest in the MSA sample at 1015.7/100,000. There is a likelihood that MSAs with high all-cause mortality would also have high rates of cancer mortality. For instance, MSAs with all-cause mortality rates above the average also had cancer mortality rates above the average, as found in Birmingham, AL, Cincinnati, OH, Louisville, KY, Knoxville, TN, Memphis, TN, and Tulsa, OK.

CONCLUSION

The overall conclusion of the analysis was that distributed across 85 MSAs in the U.S., there was a positive and statistically significant relationship between three measures of alternative financial services use and all-cause mortality. As the use of AFSs increased, health status, as indicated by all-cause mortality rates declined. The association was not found for the measured variable of saving money and all-cause mortality, nor did the other health status measures have a significant relationship to the banking variables. All interactions controlled for education, income, and the proportion of minority populations.

The study adds evidence to further establish what is meant by "social determinants of health," and what else might be required to address the granularity of that concept. For over a decade, public health advocates have used the term "food desert" to portray the particular challenge faced by residents living in areas with a deficit of full-service grocery stores. The solution to the food desert problem may be nutrition behavior change strategies, but also most certainly policy solutions.

In parallel, some communities are "bank deserts" with a relative lack of traditional banking institutions and a relative excess of alternative financial services, such as payday lenders. Such businesses are called "predatory lenders" as they can be viewed as exploiting the poor and perpetuating poverty for people who have limited recourse to using AFS. When we target the health disparities found in many communities, in addition to general concerns about poverty, deteriorating housing, and systematic inequity, public health advocates should turn to efforts to promote public financial literacy and policy regulations to limit the harm done by payday lenders and their sister businesses. In the same way that health advocates try to resist the influence of unhealthy food purveyors, they should also battle against businesses that make it more difficult for the poor to access healthy food, better housing, and access to health care.

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