Proximate Landscapes of Economic Inclusion in Southeastern Pennsylvania*

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Although mainstream banking institutions offer a suite of benefits to patrons, the proportion of U.S. households that are unbanked and underbanked remains persistently high. This study examines the spatial relationship between alternative financial service providers (AFSPs) and banks and neighborhood demographics in southeastern Pennsylvania. Results from spatial regression analyses reveal that AFSPs are disproportionately located in close proximity to neighborhoods with comparatively lower levels of educational attainment and higher rates of subprime mortgage lending, whereas banks are disproportionately located in close proximity to neighborhoods with comparatively higher levels of income and educational attainment and a lower percentage of minority residents. **Key Words: bank access, economic inclusion, spatial regression, unbanked/underbanked, urban inequality.**

儘管主流的银行机构对顾客提供了一套优惠, 但不使用及缺乏银行服务的美国家户, 仍然维持着相当高的比例。本研究检视宾州东南部中, 另类金融服务提供者 (AFSPs) 、银行与邻里人口的空间关係。空间迴归分析的结果显示, AFSPs 不成比例地座落于教育成就相对较低、次级抵押贷款比例相对较高的邻里附近, 而银行则不成比例地座落于所得与教育成就相对较高、少数人口比例较低的邻里附近。 **关键词: 获得银行服务之管道, 经济融合, 空间迴归, 不使用 / 缺乏银行服务, 城市不平等**。

Si bien los bancos comunes ofrecen a sus clientes regulares un portafolio de beneficios, la proporción de hogares de los EE.UU. que carecen de servicios bancarios, o que solo los utilizan parcialmente, se mantiene persistentemente alta. En este estudio se examinan las relaciones espaciales entre proveedores de servicios financieros alternativos (AFSPs) y bancos, y la demografía de vecindarios en el sudeste de Pensilvania. Los resultados obtenidos por análisis espaciales de regresión revelan que los AFSP se hallan desproporcionalmente localizados en estrecha proximidad a vecindarios con niveles de educación comparativamente más bajos y tasas más altas por préstamos hipotecarios de categoría no preferencial, en tanto que los bancos están desproporcionalmente localizados en proximidad cercana a vecindarios con niveles de ingreso y educación comparativamente más altos y con un porcentaje más bajo de residentes de minorías. **Palabras clave: acceso bancario, inclusión económica, regresión espacial, servicio bancario pleno/servicio bancario parcial, desigualdad urbana.**

Access to fair and affordable financial products and services is essential to the long-term asset-building strategies of households and the stability of urban neighborhoods (Sherraden 1991, 2005; Retsinas and Belsky 2005; Blank and Barr 2009; Fernholz 2010). Many Americans, however, lack any formal affiliation with mainstream banking institutions and instead rely on a range of alternative financial service providers (AFSPs)—car title lenders, check cashing outlets, money transmitters, pawn shops, payday lenders, refund anticipation lenders, and rent-to-own establishments—to meet their basic banking and credit needs (Caskey 1994). Although AFSPs might offer convenience to users (Dove Consulting 2000; Andre and Associates 2001), reliance on these services is concerning for a number of reasons. Namely, the price of services offered by AFSPs might be higher than comparable services offered at mainstream financial institutions, possibly representing a financial burden to users (Cover, Fuhrman, and Garshick 2011). Furthermore, the use of AFSPs might discourage the beneficial financial outcomes that a relationship with a bank or credit union could facilitate if these types of services are relied on exclusively as an alternative to mainstream banking services (Carr and Schuetz 2001; Federal Deposit Insurance Corporation [FDIC] 2013b). On the other hand, if banks are absent from certain communities, or if AFSPs meet the needs of consumers in ways that banks do not, the presence of AFSPs might represent an improvement in access to financial services.

Using a Euclidian distance-based approach and multivariate spatial regression analyses, this study investigates the location of check cashing providers and banks insured by the FDIC in the southeastern Pennsylvania region to examine potential differentials in the demographics of neighborhoods that these establishments serve. The results reveal that, in comparison to banks, check cashing providers are disproportionately located in close proximity to neighborhoods with comparatively lower levels of average income and educational attainment and higher rates of subprime mortgage lending. FDIC-insured banks are found to

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be disproportionately located in close proximity to neighborhoods with comparatively higher levels of income and educational attainment and a lower percentage of minority residents. Although this analysis is primarily empirical, the findings carry implications for public policy, including financial inclusion and financial literacy efforts, and could help to further inform discourses on inequality across urban landscapes.

Prolegomena

The use of a savings or checking account at an FDIC-insured bank might be a contributing factor to long-term savings for emergencies, educational attainment, and retirement. Involvement in the mainstream banking system could also coincide with responsible borrowing practices. The establishment of credit history could help ensure future access to credit on fair and affordable terms, such as a prime fixed-rate mortgage, and reduce vulnerability to predatory lending practices. Additionally, the banking system provides a full range of consumer protections that users of nonbank financial services providers do not receive (FDIC 2013b).

The benefits of mainstream banking are not fully realized, however, as many Americans continue to operate outside of the financial mainstream. According to the 2011 National Survey of Unbanked and Underbanked Households conducted by the FDIC (2011), an estimated 8.2 percent of all U.S. households are unbanked, meaning that no one in the household holds a checking account, and an estimated 20.1 percent of all households are underbanked, meaning that, although someone in the household holds a bank account, the household used a nonbank financial service product in the previous year. Research in this area has raised concerns that unbanked individuals are disproportionately from low-income (Kennickell, Starr-McCluer, and Surette 2000) and minority populations (Good 1999), and have achieved less educational attainment than the general population (Booz Allen & Hamilton and Shugoll Research 1997).

Check cashing storefronts first appeared in the 1930s in large cities such as Chicago and New York and were mainly confined to five or six of the largest urban areas of the United States until the early 1970s. The number of check cashing outlets grew rapidly from the early 1980s through the mid-1990s. Growth of the industry slowed slightly in the 1990s, which might be partially explained by a decline in demand for check cashing services as a growing share of wage payments and government transfer payments were made by direct deposit (Prager 2009). The number of check cashing storefronts doubled between 1996 and 2001 (Rhine et al. 2001) and, nationwide, there were an estimated 13,000 check cashing outlets in existence as of 2005 (Prager 2009). According to the Financial Service Centers of America, the national trade association representing nonbank financial service centers, there were more than 13,000 nonbank financial services companies operating nationwide as of September 2008 (FDIC 2009). In addition to small, locally owned shops, the check cashing and payday lending industry is made up of several large corporate entities. The largest check cashing company in the nation has nearly 1,700 locations in thirty-five states and the District of Columbia. The largest publicly traded check cashing company in the nation has about 470 storefront locations (FDIC 2009).

According to Rhine et al. (2001), check cashing outlets nationwide cash more than 180 million checks totaling nearly $60 billion a year. Depending on the establishment, the check issuer, and subject to the limitations of state law, the fees charged to cash a check vary. Check cashers typically charge 1 to 4 percent of the face value of the check (Tescher, Sawady, and Kutner 2007). In some areas, check cashing outlets might charge rates as high as 20 percent to cash personal checks. The percentage charged to cash a personal check is higher because the risk of default is perceived to be much greater when cashing a personal check as compared to a payroll check or a government benefit check (Carr and Schuetz 2001). Higher fees aside, part of the appeal of check cashing providers is that they meet the needs of low-income and minority communities in ways that mainstream financial institutions do not by offering cultural sensitivity, a diverse mix of product offerings, and convenient locations and operating hours (Squires and O'Connor 1998; Kim 2001; Stegman 2001).

Alternative Financial Service Providers and Unbanked Neighborhoods

Prior research on the locations of financial service providers is concerned with the absence of brick-and-mortar bank locations in low-income and high-percentage minority areas (Avery et al. 1997) and the prevalence of AFSPs in these neighborhoods as compared to more affluent white neighborhoods (Stegman and Faris 2003; King et al. 2005). Avery et al. (1997) found that between 1985 and 1995, two thirds of bank branch closures in the United States occurred in low- to moderate-income neighborhoods. The *spatial void hypothesis* suggests that AFSPs are more likely to locate in areas where traditional banking services are underprovided (Temkin and Sawyer 2004; Smith, Smith, and Wackes 2008).

Although payday lending is prohibited by Pennsylvania law, previous studies on the locations of check cashing providers that offer payday loans inform this research. Graves (2003) examined payday lender location data in seven metropolitan areas in Louisiana and Illinois and analyzed their relationship to sociodemographic indicators to quantify the characteristics of populations within a quarter mile of payday lenders. The study found that payday lenders are disproportionately located in census block groups with a higher percentage of low-income and minority (primarily black) residents and in urban neighborhoods that are served by few bank branches. Graves and Peterson

(2005) used geographic information systems (GIS) to establish buffer zones around military bases and found that payday lenders are disproportionately located in close proximity to bases.

A study authored by Temkin and Sawyer (2004) for the Fannie Mae Foundation examined whether AFSPs are disproportionately located in minority and low-income neighborhoods. The study investigated the prevalence of mainstream financial institutions as compared to the concentration of AFSPs in eight major metropolitan counties across the nation. Using census tract-level data, the authors found that AFSPs are disproportionately located in minority and low-income neighborhoods in seven of the eight sites. The study found that AFSPs cluster in neighborhoods that are disproportionately Hispanic in all eight sites. In only two of the sites are AFSPs clustered disproportionately in African American neighborhoods (Temkin and Sawyer 2004).

Prager (2009) examined the nationwide distribution of AFSPs by calculating the number of AFSPs per population for every county in the United States. Estimating separate models for urban and rural areas, the author found that the number of AFSP outlets per capita is significantly related to demographic characteristics, including racial and ethnic composition, age, education level, measures of the population's creditworthiness, and the stringency of state laws and regulations governing the respective industries. The author found that AFSPs are most prevalent in areas where a large percentage of the population is black or lacks a high school diploma, although AFSPs tend to avoid the poorest areas. Counties where a large portion of the population lack a credit score or have a credit score that would place them in the subprime category are found to have a greater density of AFSPs (Prager 2009).

Smith, Smith, and Wackes (2008) examined the spatial clustering of AFSPs in Philadelphia County. The authors found support for the spatial void hypothesis and found that AFSPs are clustered in minority areas. Still, other studies have cast doubt on the spatial void hypothesis, finding instead a complementary relationship between banks and mainstream financial institutions (Stegman and Faris 2003; Apgar and Herbert 2004; Burkey and Simkins 2004; Temkin and Sawyer 2004).

Studies conducted thus far have examined disparities based on the presence or absence of facilities in areal units or buffers (Graves 2003; Temkin and Sawyer 2004; Graves and Peterson 2005), clusters of AFSPs (Smith, Smith, and Wackes 2008), or by the calculating the density of AFSPs per population (Prager 2009). The analysis carried out in this study improves on previous research in this field methodologically by utilizing a Euclidian distance–based approach rather than a spatial coincidence approach. Examining the presence or absence of facilities in areal units or buffers might ignore facilities that exist just outside of the border of an areal unit (Downey 2003; Mennis and Jordan 2005; Kearney and Kiros 2009).

Improving on previous research, the approach of calculating the relationship between the proximity of locations to neighborhoods that exhibit distinct socioeconomic characteristics parallels existing research in the field of environmental justice that has found evidence of environmental inequity, where low-income, minority, and otherwise vulnerable segments of the population bear a greater burden of environmental risk as compared to population groups with higher socioeconomic status (Pollock and Vittas 1995; Boer et al. 1997; Ringquist 1997; Mennis 2005). The Euclidian distance method, where distance is calculated as the mean distance between each raster cell in an areal unit and a point location, has been used in environmental justice research (Raddatz and Mennis 2012). A distance-based analysis allows for the consideration of how far users are required to travel to access a facility, regardless of the areal unit in which it is contained, providing a greater level of certainty to demographic analyses (Mohai and Saha 2006). Although distance-based approaches have been criticized as a proxy for risk in the environmental justice literature (Bowen 2002), distance analysis is an established practice in the field and suitable when additional data are not available (Sadd et al. 1999).

Study Area

The Philadelphia region is vibrant and flourishing in many ways; however, poverty and economic inequality persist in the urban core of the contiguous City and County of Philadelphia. Similar to comparable northeastern urban cores, the City of Philadelphia experienced decline and abandonment in the wake of deindustrialization and other economic and social changes during the latter half of the twentieth century (Frey 2005; Adams et al. 2008). Philadelphia County lost an estimated 21.4 percent of its population between 1940 and 2000, while the surrounding suburban counties experienced high growth rates during this period. Abandonment of housing and an erosion of the tax base in the City of Philadelphia, as businesses and middle-class residents moved from urban areas to the suburbs, contributed to a concentration of poverty in Philadelphia, with a higher than average percentage of poor people residing within high-poverty census tracts defined as 40 percent or more of the population falling below the federal poverty standard (Adams et al. 2008).

The City of Philadelphia is also more racially and ethnically diverse than the rest of the nation, with less than half of its population identifying as white, compared to an estimated 78.1 percent of the entire United States (Adams et al. 2008, 35). Of the top twenty-five most populous counties, Philadelphia has the fourth highest Gini coefficient, a standard measure of inequality, in the nation (0.494). The Gini coefficient for the United States as a whole is 0.467 (U.S. Census Bureau 2012). Furthermore, Philadelphia families that earn less than $30,000 per year pay higher rates for everyday goods and services—including homeownership, utilities, real estate taxes, automobile insurance

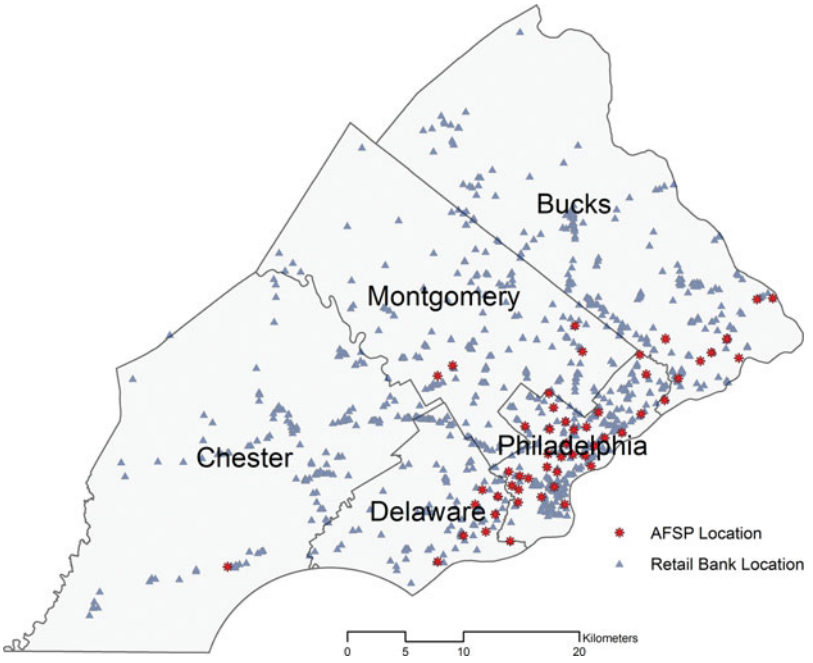

Figure 1 *Study area: Southeastern Pennsylvania bank and alternative financial service provider (AFSP) locations. (Color figure available online.)*

rates, banking fees, grocery prices, and home appliances and furnishings—than more affluent suburban families (Fellowes and Katz 2005).

According to the 2011 National Survey of Unbanked and Underbanked Households conducted by the FDIC, an estimated 6.1 percent of all Pennsylvania households are unbanked and an estimated 18 percent are underbanked, slightly lower than national averages. Philadelphia County, however, has the sixth highest rate of unbanked households—an estimated 14.4 percent unbanked and 23.5 percent underbanked—of all counties with 100,000 or more households in the United States (Corporation for Enterprise Development 2013; see Figure 1).

Data and Methods

Demographic variables and geographical boundaries for the 2010 census tracts of Philadelphia and the surrounding counties (Bucks, Montgomery, Delaware, and Chester) were obtained from the Census Bureau. Data on rates of subprime lending for home purchase loans in 2006 came from Home Mortgage Disclosure Act (HMDA) data that were made available by the Urban Institute (2013).[1] Check casher location data was acquired through the Pennsylvania Department of Banking and Securities (2013). Big box retail and large chain grocery stores were omitted from the data set to focus on smaller entities that provide check cashing services. FDIC-insured bank location data were obtained through the FDIC Summary of Deposits (FDIC 2013a).

Euclidian distance between each census tract in the study area and the nearest check cashing provider, as well as between each census tract and bank location, was determined by creating a raster shapefile of southeastern Pennsylvania census tracts with 10-m cell resolution and then calculating a measure of mean distance for all individual raster cells in each census tract using zonal statistics. Mean distance to nearest check cashing outlet and bank location was log-transformed to approach a normal distribution for the model residuals. Distance to the nearest location is an appropriate measure for this analysis. Rather than using presence or absence, the distance measure takes into account proximity to facilities located outside of the boundaries of the census tract (Downey 2003; Kearney and Kiros 2009). This distance measure provides a continuous dependent variable suitable for ordinary least squares (OLS) regression analysis.

Demographic variables regressed against these distance measures include population density; median household income; percentage of population at or above age sixty-five; percentage black, Asian, and Latino; percentage below poverty; percentage of the population over age twenty-five without a high school diploma; and the percentage of home purchase mortgages that were subprime in 2006. These demographic variables, aside from population density, were chosen as explanatory variables due to their representation of vulnerable populations in both environmental justice and AFSP analyses (Graves 2003; Temkin and Sawyer 2004; Mohai and Saha 2006; Prager 2009). It is hypothesized that all of these explanatory variables,

Table 1 *Number of check cashing locations in southeastern Pennsylvania counties*

Pennsylvania county	Check cashing outlets
Philadelphia	80
Bucks	15
Delaware	13
Montgomery	5
Chester	1

with the exception of median household income, will have negative signs in regression analyses, indicating a shorter distance to check cashing locations and concerns over unequal exposure to AFSPs. Median household income is expected to have a positive relationship with log distance. Population density is included based on the hypothesis that check cashing locations will be more likely to locate in more densely populated areas where they have an opportunity to reach a larger clientele. We hypothesize that areas with higher rates of subprime lending might be located in close proximity to AFSPs, suggesting overlapping landscapes of financial risk. To test whether there is a significant relationship between the mean distance to the nearest check cashing outlet and neighborhood socioeconomic characteristics, OLS regression analyses are performed at the scale of the entire southeastern Pennsylvania five-county region and Philadelphia County alone. The same analysis was also performed for the log Euclidian distance to bank locations at both scales. Results were checked for multicollinearity, outliers, influential observations, and regression assumptions.

Independence of observations and error terms, one of the standard regression assumptions, has rightly become a major concern when examining spatial data similar to those used in this study. The issue is expressed concisely in Tobler's first law of geography, where the closer things are to each other, the more related they are (Chakraborty 2011). This could lead to spatial clustering that violates the assumptions of independent observation and error terms and incorrect interpretations of model outcomes. For this reason, tests were performed to detect spatial autocorrelation using the queen contiguity-based method for defining the spatial weights matrix. Although others have recommended using a distance-based approach to constructing spatial weights matrices (Landry and Chakraborty 2009; Chakraborty 2011), the distance used should be based on a theoretical understanding of the process at hand (Chakraborty 2011). Unfortunately, there is not an existing standard distance measure for how far individuals will travel to use a bank or AFSP. The Moran's I statistic is the standard measure of spatial clustering in an area, demonstrating a statistically significant positive spatial autocorrelation for all four models.

The presence of spatial autocorrelation led to the construction of spatial regression models that consider this violation of regression assumptions. There are generally two options for incorporating spatial autocorrelation into regression equations, the spatial error and spatial lag models (Landry and Chakraborty 2009; Chakraborty 2011; Raddatz and Mennis 2013). The spatial error model associates the autocorrelation with the error term, whereas the spatial lag model associates it with the dependent variable. The choice between these two types of spatial regression models should be determined by the theorization of the spatial process being investigated, but instead most empirical analyses base this decision on the Lagrange Multiplier statistic (Chakraborty 2011). As this statistic was higher for the spatial lag for all four OLS regression models, this was the type of spatial regression model used here.

Results

The majority of check cashing locations are spatially clustered in Philadelphia County, although each of the other counties in the southeastern Pennsylvania region also contains at least one check cashing outlet, as shown in Table 1. Summary statistics for the distance measures and independent variables are presented in Table 2 (for the entire southeastern Pennsylvania region) and Table 3 (for Philadelphia County only). Figure 2 displays choropleth maps of select demographic variables for the region and Figure 3 displays choropleth maps of select demographic variables for Philadelphia County. Looking at Philadelphia alone,

Table 2 *Descriptive statistics for southeastern Pennsylvania*

Variable	*M*	*SD*	Minimum	Maximum
Log of AFSP distance	7.74	1.34	4.26	10.27
Log of bank distance	6.39	0.55	4.41	7.54
Population density	3,318	3,598	1.46	21,394
Median household income	49,988	24,250	0	200,001
Percentage of population over 65	14.37	7.42	0	96.8
Percentage black	21.84	31.33	0	98.7
Percentage Asian	3.38	5.47	0	79.7
Percentage Latino	4.42	9.69	0	88.5
Percentage below poverty	12.31	13.43	0	78
Population 25+ without high school diploma	9.61	8.07	0	59.6
Percentage of subprime purchases	7.42	7.61	0	57.14
Number of tracts (*N*)	975			

Note: AFSP = alternative financial service provider.

Table 3 *Descriptive statistics for Philadelphia*

Variable	*M*	*SD*	Minimum	Maximum
Log of AFSP distance	7.08	0.57	5.63	8.45
Log of bank distance	6.39	0.55	4.41	7.54
Population density	6,368	3,935	1.46	21,394
Median household income	32,931	18,061	0	200,001
Percentage of population over 65	14.1	6.93	0	42.3
Percentage black	43.22	37.28	0	98.7
Percentage Asian	4.1	6.95	0	79.7
Percentage Latino	7.72	14.47	0	88.5
Percent below poverty	22.7	15.25	0	78
Population 25+ without high school diploma	14.88	9.37	0	59.6
Percentage of subprime purchases	10.43	8.97	0	57.14
Number of tracts (*N*)	369			

Note: AFSP = alternative financial service provider.

there is clearly a strong level of spatial clustering for most of the variables. The tracts with the greatest distance to check cashing providers are located in the south, northwest, and upper northeast parts of Philadelphia. These areas are also those with lower population density, lower rates of subprime home purchases, a lower proportion of African American residents, and higher median household incomes. The proportion of the tract's population at or above age sixty-five showed mixed results, as it was lower in the southern and higher in the upper northeast parts of Philadelphia, both of which have a greater distance to check cashing locations.

Looking at southeastern Pennsylvania visually presents similar results, as the majority of the facilities are clustered in Philadelphia, which has a greater population density, lower median household income, lower rates of subprime lending, and a greater proportion of African Americans. The suburban areas outside of Philadelphia have a greater proportion of the population at or above age sixty-five.

Tables 2 and 3 show the descriptive statistics for the variables used in the regression analyses. The two OLS models predicting distance from a check cashing location were both statistically significant, with the results represented in Table 4. The majority of the predictors held the expected sign. At both scales of analysis, tracts with a higher percentage of African Americans, higher rates of subprime lending, and individuals over age twenty-five without a high school diploma were more

Table 4 *Results of ordinary least squares model predicting distance to a check cashing outlet and distance to a bank in southeastern Pennsylvania and Philadelphia County*

	AFSP		Bank	
Variable	Philadelphia	Southeastern Pennsylvania	Southeastern Pennsylvania	Philadelphia
Population density	0.254***	−0.344***	−0.136***	−0.061
Median household income	0.167***	0.065*	0.359***	0.201**
Percentage of population over 65	0.134***	−0.088***	−0.097***	−0.017
Percentage black	−0.204***	−0.206***	−0.054	0.299***
Percentage Asian	0.032	−0.075***	−0.234***	−0.191***
Percentage Latino	−0.056	−0.064**	−0.053	0.059
Percentage below poverty	−0.04	−0.062	−0.036	−0.036
Population 25+ without high school diploma	−0.156***	−0.083**	0.095**	0.151***
Percentage of subprime purchases	−0.076*	−0.134***	−0.064**	−0.039
Adjusted r^2	0.4	0.506	0.265	0.153
F	28.22	112.03	40.015	8.373
Moran's I	0.29*	0.261*	0.106*	0.394*
Akaike's information criterion	463.54	2,421.89	1,654.7	512.36
Lagrange multiplier (lag)	178.335*	1,676.756*	578.342*	158.925*
Robust Lagrange multiplier (lag)	17.837*	169.859*	59.272*	11.813*
Lagrange multiplier (error)	166.145*	1,587.698*	540.623*	151.809*
Robust Lagrange multiplier (error)	5.648**	80.801*	21.193*	4.697**

Note: AFSP = alternative financial service provider.
*$p < .1$.
**$p < .05$.
***$p < .01$.

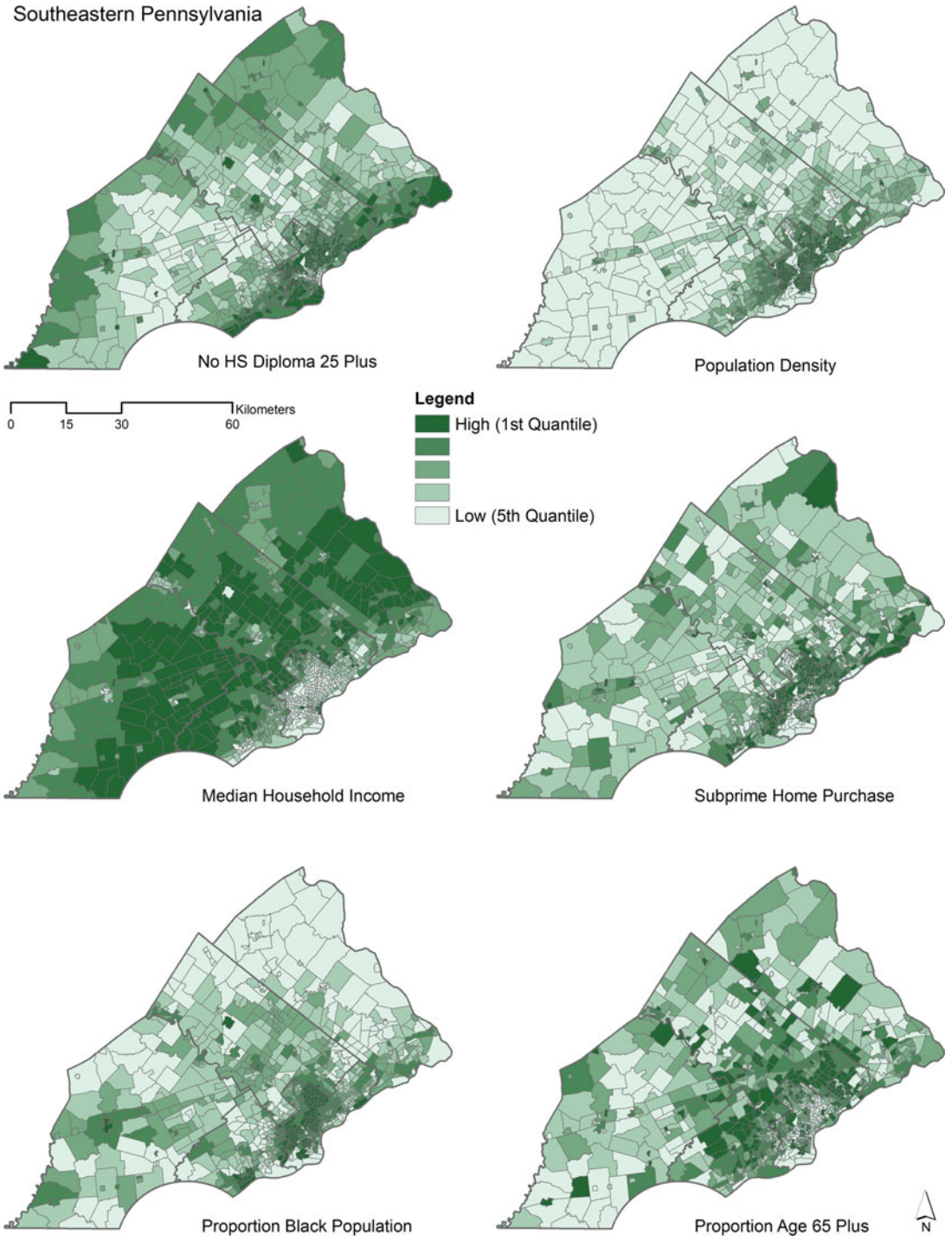

Figure 2 *Philadelphia County demographics. (Color figure available online.)*

likely to live in close proximity to a check cashing facility. As median household income increased, proximity to a check casher also decreased at both scales. The percentage of Asian and Latino residents was not statistically significant for Philadelphia alone, but when examining the entire region, the variable was a statistically significant predictor of decreased distance to a check cashing facility.

The two OLS models predicting distance to a bank are also shown in Table 4. Once again, they were both

Figure 3 *Southeastern Pennsylvania demographics. (Color figure available online.)*

statistically significant. Median household income and the percentage of residents over age twenty-five without a high school diploma were positive and statistically significant at both scales, percentage of Asian population was negative and statistically significant at both scales, and several other explanatory variables were significant at one spatial scale but not the other.

Table 5 *Results of SAR model predicting distance to a check cashing outlet and distance to a bank in southeastern Pennsylvania and Philadelphia County*

	AFSP		Bank	
Variable	**Philadelphia**	**Southeastern Pennsylvania**	**Southeastern Pennsylvania**	**Philadelphia**
Population density	−0.0001*	−0.0000086*	−0.000032*	−0.000027*
Median household income	0.0000008	0.0000004	0.0000055*	−0.000002
Percentage of population over 65	−0.0002	−0.00033	0.00306***	−0.0046
Percentage black	−0.0008	−0.0006	0.00115***	0.00242*
Percentage Asian	0.002	0.000411	−0.00795*	−0.00427
Percentage Latino	−0.00005	−0.0006	−0.00155*	0.0018
Percentage below poverty	−0.0019	−0.000438	0.00306	−0.00128
Population 25+ without high school diploma	−0.0048**	−0.00096	0.00729*	0.00536**
Percent of subprime purchases	−0.0036***	−0.0038*	−0.00059*	−0.0023
Pseudo r^2	0.702	0.953	0.667	0.569
Log likelihood	−122.235	−135.28	−570.475	−171.086
Akaike's information criterion	266.47	292.559	1,162.95	364.173

Note: AFSP = alternative financial service provider; SAR = simultaneous autoregressive models.
*$p < .1$.
**$p < .05$.
***$p < .01$.

As discussed previously, the test statistic for spatial autocorrelation (Moran's I) was positive and statistically significant, as shown in Table 4. This led to the construction of spatial lag models, the results of which are shown in Table 5. In comparison with the OLS models, the Akaike's information criterion decreased for all four models, whereas the r^2 increased, suggesting that the simultaneous autoregressive (SAR) models improved results. Examining the results of the explanatory variables, population density was negative and statistically significant for all four models, suggesting that both check cashing facilities and traditional banks were more likely to be present in more densely populated areas. No other variable was significant across the four models. Median household income and percentage of the population at or above age sixty-five is associated with a shorter distance to banks, although only at the scale of the entire region. At both scales, a higher percentage of black residents is associated with an increase in the distance to the nearest bank. Increase in Asian and Latino populations is associated with a shorter distance to banks at the regional scale. The percentage of residents below the poverty line was not statistically significant in any of the models. The percentage of residents above the age of twenty-five without a high school diploma is associated with a decrease in distance to AFSPs in Philadelphia and an increase in distance from banks at both spatial scales. Finally, higher rates of subprime home purchases are associated with a decrease in distance to check cashers at both scales and a decrease in distance to banks when examining the entire region.

Figure 4 displays the log Euclidian distance between each census tract and the nearest AFSP and bank locations at the regional and county level. To test for potential locations where a spatial void might be present, tracts where the mean absolute Euclidian distance to the nearest AFSPs was less than the mean absolute Euclidian distance to a bank were selected and highlighted in red in Figure 4. The selected tracts have comparatively lower average income and educational attainment, higher population densities, a higher percentage of black residents, and higher levels of subprime lending.

Discussion

This study adds to the debate surrounding disparities in the locations of AFSPs by introducing a new method and new data to examine the distribution of AFSPs in southeastern Pennsylvania. Rather than examining the presence or absence of check cashing providers within areal units or utilizing buffers, a distance-based analysis is used to calculate the mean distance between every 10 m^2 cell within a census tract to the nearest check cashing provider and FDIC-insured bank. This distance-based analysis is then enhanced by the use of spatial regression models to account for spatial dependencies inherent within much geographic data, addressing concerns about incorrect statistical interpretations when such errors are present (Chakraborty 2011).

Comparison of the OLS and SAR models suggests that moving to the spatial lag model improved model fit, as the Aikake's information criterion is lower and the r^2 is higher for all four models. Furthermore, moving to the spatial lag model has reduced the number of explanatory variables that are statistically significant in all models except for that of mean distance to banks at the regional scale. This suggests that incorrect interpretations might be drawn from the results if only applying traditional OLS methods, and therefore only the results of the SAR model are discussed. Although

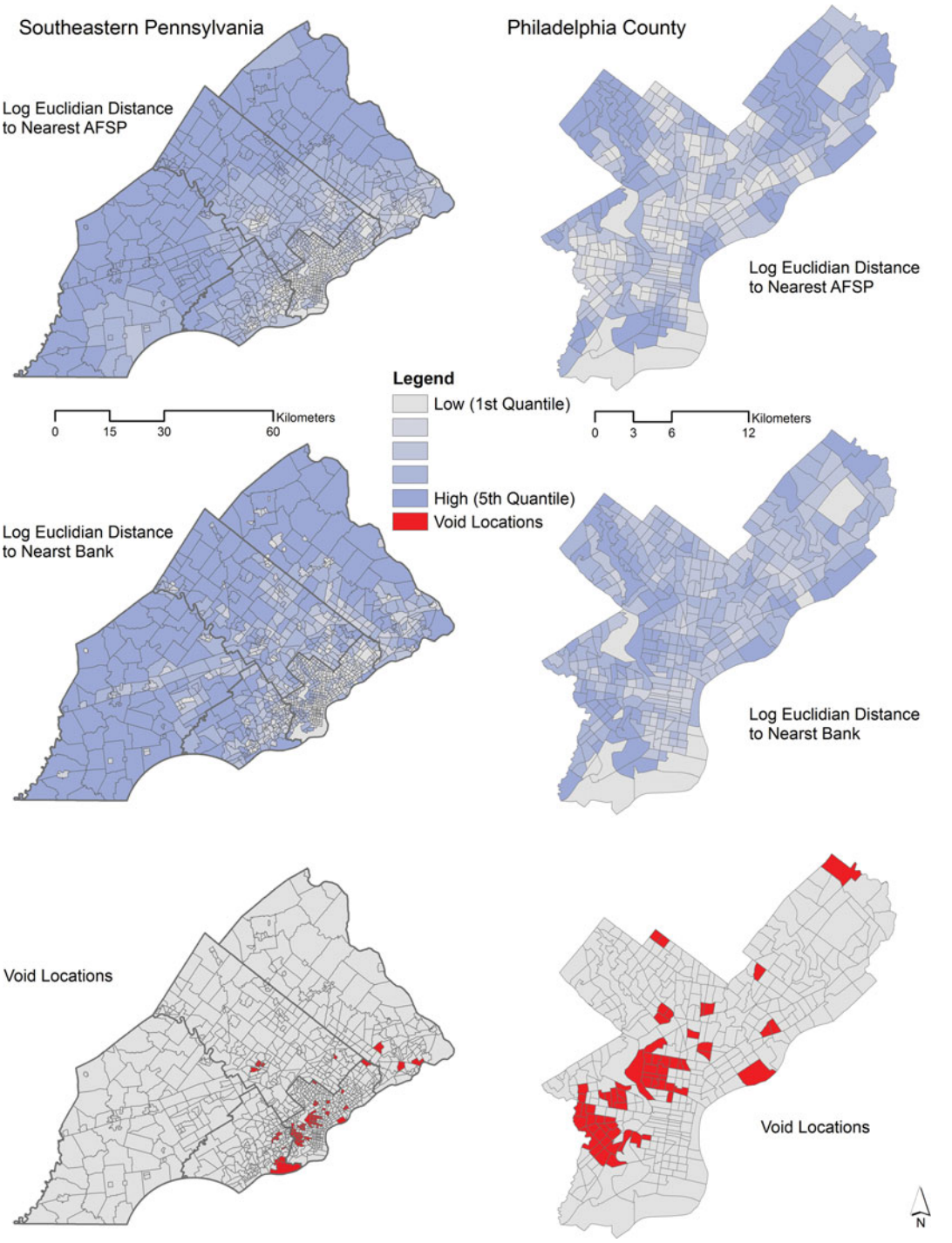

Figure 4 *Log distance to nearest alternative financial service providers (AFSPs), log distance to nearest bank, and void model. (Color figure available online.)*

the conclusions that can be drawn from interpretation of the SAR models are not as strong as those presented by the OLS models, they still suggest the presence of economic inclusion concerns in the region on the basis of income, race, and education.

The results of the analysis suggest that, at both scales of analysis, socioeconomic variables are strong predictors of the locations of AFSPs and banks. Population density was the only variable found to be statistically significant across all four models, with the expected

negative sign indicating that both banks and AFSPs are more likely to be located in more densely populated areas. Median household income and percentage of the population at or above age sixty-five were associated with a shorter distance to banks, although only at the scale of the entire region. Median household income had a positive sign, indicating a greater mean distance for both scales when examining distance to AFSPs, although it was not statistically significant. The percentage of black residents in a tract was positively associated with greater distance from a bank at both spatial scales, suggesting a possible racial component to issues of economic inclusion in the region. A higher proportion of Asian and Latino residents is associated with a decrease in distance to a bank at the regional scale, which could possibly be explained by the higher proportion of banks in Philadelphia, which is also where these two groups of minorities are concentrated in the region. An increase in the proportion of residents above the age of twenty-five without a high school diploma is associated with a decrease in distance to a check cashing facility in Philadelphia but not the larger region. The proportion of residents above the age of twenty-five without a high school diploma predicted a decrease in distance to a bank at both spatial scales. Finally, an increase in the percentage of subprime home purchases is associated with closer distance to AFSPs at both scales and closer distance to banks at the regional scale. Similar to the results for Asians and Latinos, the greater proximity of tracts with high subprime purchases to banks at the regional scale could be explained by a greater concentration of banks in Philadelphia.

Conclusion

This study introduces distance-based measures and spatial regression modeling to investigate economic inclusion through an empirical analysis of the location of check cashing providers, FDIC-insured banks, and census tract demographics at two spatial scales in southeastern Pennsylvania. The results of the statistical analyses suggest that economic inclusion issues are present in the location of check cashing facilities and traditional banks in terms of proximity to at-risk populations, even after controlling for socioeconomic variables.

Several limitations are present in this study. First, derivative variables, such as measures of proximity or concentration, are crude proxies for actual use, and residential proximity should not be considered as the sole contributing factor to the use of check cashing services. An understanding of the users and providers of check cashing services would be greatly enhanced by carrying out more nuanced analyses as data become available. Individual-level data, or data on the income, race or ethnicity, and addresses of users of check cashing providers would be beneficial for understanding what, if any, distinct segments of the population use these services. As noted previously, proximity to check cashing facilities might represent an improvement of financial services for individuals who feel uncomfortable interacting with traditional banks. Banks should strive to be more welcoming, offer more products and service, and market these products and services to all segments of society.

Another limitation or alternative explanation is the issue of zoning and the potential overlap of land use and demographic variables. The AFSP industry has replied to concerns raised in the academic literate, arguing that location decisions are based on zoning, visibility, and nearness to a sizable customer base—similar concerns in the location decisions of any business—not race or ethnicity or level of income of nearby communities (Lehman 2006). Population density was statistically significant across all four models in this study, indicating that both AFSPs and banks are more likely to be located in more densely populated areas. Although controlling for zoning was not practical for this study, as noted by Cover, Fuhrman, and Garshick (2011), we acknowledge that positive association between socioeconomic indicators and the presence of AFSPs could be influenced by the omission of market-related variables that might provide an alternative explanation to location decisions.

Despite the noted limitations, this study contributes to the literature on the spatial distribution of AFSPs and banks, raising concerns about economic inclusion in low-income and minority neighborhoods. Specifically, our study provides evidence that check cashing providers, when compared to FDIC-insured banks, are disproportionately located in close proximity to neighborhoods with comparatively lower levels of average income, lower levels of educational attainment, a higher percentage of minority residents, and higher rates of subprime mortgage lending, even when examined at different spatial scales. FDIC-insured banks are found to be disproportionately located in close proximity to neighborhoods with comparatively higher levels of income and educational attainment and a lower percentage of minority residents. ■

Note

[1] These HMDA data files (http://www.metrotrends.org/natdata/hmda/hmda_download.cfm) and the procedures for constructing them were initially developed by the Urban Institute to support DataPlace (http://www.dataplace.org). The data are licensed under the Open Database License (http:/www.metrotrends.org/natdata/ODbL.cfm).

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