The Great Recession and Neighborhood Change: The Case of Los Angeles County

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Abstract

The Great Recession of 2007-2009 and concomitant mortgage crisis may have increased both income inequality and residential segregation. Racial minorities and people living in poverty, on average, had more vulnerable jobs and were more likely to have held subprime mortgages compared to affluent whites. These disproportionate effects of the recession on income and race/ethnic groups combined with patterns of residential segregation suggest that disadvantaged neighborhoods were the most likely to have been affected during the recession. In this paper, we examine the effects of the recession on neighborhood change in Los Angeles County, California. Our research questions are: 1. How well do pre-recession neighborhood characteristics predict housing foreclosure and housing vacancy rates during and after the recession?; 2. How did neighborhood-level foreclosure rates affect neighborhood succession subsequent to the recession?; and 3. What are the overall consequences of neighborhood-level changes due to the recession for residential segregation? We find that those neighborhoods that were worst off before the recession had, as expected, the highest rates of subprime loans, foreclosures, and vacancy rates during the peak of the great recession. Overall, low-income neighborhoods of every race/ethnic category were at high risk, but African American neighborhoods at both the high and the low end of the economic spectrum were at particular risk. We also find that subprime lending and foreclosure rates make small but significant contributions to neighborhood change following the recession, including to racial segregation overall.

Introduction

Between 1970 and 2007, metropolitan areas of the US experienced both increasing income inequality and growing spatial segregation by family income (Reardon and Bischoff 2011). Mixed income neighborhoods became rarer and both affluent and poor enclaves, more common. By 2007, the affluent were more likely to be isolated from other groups than the poor. Race/ethnic segregation patterns also changed: Latino-white and Asian-white segregation increased during this period. While black-white segregation declined between 1990 and 2007, African Americans remained the most segregated race/ethnic group in the US in 2007(Frey 2012). In a change from the past, income segregation *among* black and Latino families increased sharply and these two groups were much more segregated by income than whites by 2007(Reardon and Bischoff 2011).

The full effects of the Great Recession of 2007-2009 are not yet known. However, there is good reason to think that recession and the mortgage crisis may have increased both income inequality and residential segregation. For example, subprime mortgage borrowers were more likely to have lower incomes and to lack assets and family financial assistance if they had trouble making mortgage payments. Lower and middle income workers were also more likely to lose jobs during the recession. Because African Americans and Latinos, on average, had lower incomes and more vulnerable jobs that whites and some groups of Asians before the recession, they were likely to have lost jobs and, if they were homeowners, to have subprime mortgages. Figure 1 shows the percentage of high interest rate mortgages[3] (as a proxy for subprime mortgages) by race/ethnicity and income group.

[3] Defined as having an APR at least 3 percentage points higher than the interest rate of U.S. Treasury securities of the same maturity.

If the recession disproportionately affected income and race/ethnic groups, given patterns of residential segregation, we might expect that among neighborhoods with high rates of homeownership, those with lower income and higher proportions of African American and Latino residents were more likely to have suffered from the recession than others. Given the importance of the mortgage crisis in this recession, the negative effects of job loss and mortgage default in these neighborhoods is likely to have had a multiplier effect, since foreclosures on a few houses can drive down the price of other houses in the neighborhood, putting other mortgages "under water" and leading to more foreclosures.

In this paper, we examine the effects of the Great Recession on neighborhood changes in Los Angeles County, California. Our goal is to answer three questions:

1. How well do pre-recession neighborhood characteristics – in particular, income level, race/ethnicity, and immigrant status – predict housing foreclosure and housing vacancy rates during and after the recession?
2. How have neighborhood-level foreclosure rates affected neighborhood transition (i.e., compositional changes) subsequent to the recession?
3. What are the overall consequences of neighborhood-level changes due to the recession for residential segregation by income and race/ethnicity?

Theoretical Approach

Our analysis is based on two previous literatures. The first is the extensive literature on residential segregation. For most of the twentieth century, academic debate and research on residential segregation focused primarily on race and ethnicity. Causes of racially-based residential segregation include a long history of formal and informal exclusionary practices

(including laws and regulations, restrictive covenants, redlining, and the concentration of affordable housing in poor and non-white areas), discriminatory attitudes and practices, residential preferences, and gentrification (Bobo 2000; Lee, Reardon et al. 2008; Massey and Denton 1993; Quillian 2002; Wilson 1987). More recently, Massey et al. (2009) have suggested that income and social class segregation have become increasingly important, perhaps due to implementation of anti-discrimination laws, changes in racial prejudice, and increasing average incomes for African Americans and other ethnic minority groups.

The second literature we draw on examines the causes of neighborhood succession and persistence. This literature suggests that affluent neighborhoods persist for several reasons, including the ability of the affluent to capture a disproportionately large share of public services (e.g., good schools and streets) and to purchase privatized versions of these services, residential stability and home ownership, and the ability of residents to cooperate in maintaining the quality and safety of their neighborhoods (Durlauf 1996; Massey and Eggers 1993; Sampson 2011). The aging of neighborhood housing stock and other structural factors may also be important (Dwyer 2007). Poverty and social disadvantage, on the other hand, tend to concentrate in declining neighborhoods because those with the fewest resources are unable to escape declining conditions (see for example Skogan 1990; Wilson 1987).

Methods

We rely on census tract-level data from the 2000 and 2010 decennial censuses and the 2008-2012 American Community Survey's 5-year estimates to describe Los Angeles County neighborhoods in terms of race, poverty, nativity, and median age. Data from the U.S. Department of Housing and Urban Development (HUD) provide three measures of housing risk

by census tract: high cost mortgages per 100 mortgages in 2004-2006, estimated foreclosure start rates[4] per 100 mortgages during the peak of the housing crisis (Jan 2007-June 2008), and vacancy rates per 100 addresses as of June 2008 (2014).

All analyses are performed using census tracts – defined using 2010 boundaries -- with OLS regression modeling. In cases where the 2000 tract areas are not equivalent to the 2010 tract areas, neighborhood characteristics from 2000 were area-weighted to match the 2010 areas.

To examine how well pre-recession characteristics predicted the effects of the recession (question 1), we model rates of high-cost loans, foreclosure starts, and vacancy rates separately using pre-recession neighborhood characteristics as independent variables in bivariate and multivariate models.

Our second goal is to assess the effects of foreclosure rates in changing the composition of neighborhoods (question 2). This objective is complicated by the fact that some neighborhoods are likely to change composition or remain relatively the same over time regardless of economic conditions and of the effects of the recession. Furthermore, the characteristics of individual neighborhoods over time are generally serially correlated because people stay in or move to neighborhoods with residents similar to themselves.

To take account of this normal process of stasis and change, we present two sets of multivariate regression models. First, we model of 2010 neighborhood characteristics and include 2000 characteristics as control variables, with rates of high-cost loans, foreclosure starts, and vacancy as the independent variables of interest in separate models. These models allow us to estimate change over time given 2000 characteristics.

[4] Foreclosure starts, also called default notices, are an indicator of overall foreclosure rates. Mortgage holders begin the foreclosure process by filing a public notice of default about 3-6 months after the first missed mortgage payment, and these notices are counted as "foreclosure starts." Not all foreclosure starts end in foreclosure but many do.

In a second set of models, we also estimated the variation from predicted neighborhood change by predicting 2010 neighborhood composition based on 2000 characteristics. The difference between the predicted characteristics and the actual observed 2010 characteristics represents the degree to which a neighborhood experienced an unusual amount of change. We label this measure "variation from predicted change." We use this measure as the outcome in multivariate regressions, with rates of high-cost loans, foreclosure starts, and vacancy as the key independent variables, to indicate the amount of change with occurred beyond what might normally have been expected given county-wide changes that took place across the same period.

For the final research question, we estimate pre- and post-recession levels of segregation at the county and regional level. Our interest here is in distribution of several race/ethnic groups within and across census tracts, relative to the distribution in the county overall—or evenness (Massey and Denton 1988). We use five major race/ethnic groups in all our analysis: Latinos, whites, blacks, Asians, and "others," a category which includes the small shares of population who self-reported as being Pacific Islander, Native American, multiethnic, or "other" on the US census. We primarily rely on Thiel's multigroup entropy index (*H)* as our measure of segregation (Iceland 2004). We also present the index of dissimilarity (*D)* at the county level.

D describes the proportion of group members that would have to move in order to achieve an even distribution of that group across census tracts (Massey and Denton 1988). It ranges from 0 to 1 with 0 representing even distribution between two groups, and 1 meaning that all minority group members would need to move in order to produce evenness. *H* is a measure of the difference between the distribution of groups within a small unit and the countywide average (Iceland 2004; Thiel 1972). Like *D*, Thiel's *H* ranges from 0-1. At the tract level, 0 indicates that

the tract has the same race/ethnic distribution as the county overall and 1 indicates that the tract contains only one group, or maximum segregation.

H has several advantages over *D*: it can be calculated for individual tracts; it can account for multiple race/ethnic groups in a single measure; and it is robust to the relative size of the groups in the whole population. Capturing segregation across several race/ethnicity categories is central to our task here, as Los Angeles County has long had strong representation from four major race/ethnic groups—whites, blacks, Latinos, and Asians.

The formula we used to calculate *H* for each census tract, taken from Iceland (2004), is:

$$H_t = \{\text{Mean } [P_g * \ln(1/P_g)]\} - \{\text{Mean } [p_g * \ln(1/p_g)]\} / \{\text{Mean } [P_g * \ln(1/P_g)]\}$$

Where H is the level of multiethnic segregation for the tract, $_t$

p is the within-tract share of each of 5 major race/ethnic groups, $_g$

P is the county-level share of the group

Results

Descriptive statistics are given in Table 1. Los Angeles County underwent substantial secular change from 2000 to 2010, becoming overall more predominantly Latino and Asian, and with whites and blacks losing population shares. During the years leading up to the housing crisis, an average of nearly 1 in 4 loans was high-cost, with 75% of all loans being high-cost in some neighborhoods. The mean of 2007-2008 foreclosure starts was 6.4% of all mortgages within the tract, and the mean of June 2008 vacancy rates was 1.2% of all addresses within the tract. Figure 2 provides a visual representation of tract-level foreclosure start rates, which were

highly concentrated in South Los Angeles along the corridor between downtown and the ports of Los Angeles & Long beach – a traditionally African American neighborhood which has become increasingly Latino over the past 20 years. Another hotspot occurs in the more populous part of the San Fernando Valley and to a smaller degree, East Los Angeles – both of which large high proportions of their population who are Latino.

As expected, nearly all the census 2000 tract characteristics included in our model strongly predicted neighborhood-level high-cost loans and foreclosure starts per 100 mortgages in the peak of the recession (Table 2). In addition, poverty showed a significant interaction with both percent black and percent Latino such that the worst-performing neighborhoods were high in poverty *and* minority race/ethnic status. Overall, our models explained 61% of total variation in foreclosure rates and 66% of the variation in high-cost loan rates. Pre-recession neighborhood characteristics also significantly predicted vacancy rates, but the total variance explained was substantially lower at about 8%.

Predicted foreclosure rates from these models suggest an intriguing pattern. Neighborhoods in the highest quartile for Latino population experienced foreclosure rates of 8.2 per 100 home loans, while those in the lowest quartile for Latino population experienced half that number of foreclosed loans. A clear gradient appears between the proportion Latino and the foreclosure rate (see Figure 3). A similar, expected gradient appears for percent white, poverty, median age, and nativity status.

However, a distinct U-shaped curve is present for black neighborhoods. Neighborhoods in the lowest quartile for proportion black have nearly as much risk for predicted foreclosure rate (6.3 per 100 loans) as do those at the highest quartile (7.8 per 100 loans), with lower levels observed at the two middle quartiles.

Turning to the results from question 2, we first show the relationships between 2000 and 2010 neighborhood characteristics alone (Table 3). Although it is not a major focus of this paper, these results provide insight as to how much neighborhoods change vs. stay the same over one decade. Neighborhood characteristics in 2000 are strong predictors of what the same places would look like in 2010. The most stable neighborhood characteristics are, by far, race/ethnic composition. For example, proportion black in 2000 alone predicted 93% of the variance in neighborhood proportion black in 2010. We did not observe distinctive trends in terms of what kinds of neighborhoods had the most variation from predicted change—e.g., the relationship between the proportion of residents in poverty and greater than predicted neighborhood change between 2000 and 2010 was weak.

Models of 2010 neighborhood characteristics on foreclosure rates, high-cost loan rates, and vacancy rates are shown in Tables 4a and 4b. There is one model for each outcome variable[5] (shown at the top) and only the result for the key independent variable (foreclosure start rate, high cost loan rate, vacancy rate) is shown. These models all control for a range of 2000 neighborhood characteristics[6], producing estimates of the ***net*** change in neighborhoods attributable to recession-era housing risk variables. Overall the models show consistent relationships between both foreclosure and high-cost loan rates and changes in neighborhoods. For example, the first cell of Table 4a indicates that for every 1% increase in foreclosure start rates, we can expect to see almost 1% increase in poverty rate, net of pre-recession neighborhood characteristics. Generally we see a pattern of foreclosure rates predicting which neighborhoods became more disadvantaged. Specifically, higher foreclosure rates are associated with shifts

[5] We ran similar models which included all three housing risk indicators as independent variables in a single model, but results are not shown here.

[6] The pre-recession controls in these models include: the race/ethnic profile, median age, and proportion of residents in poverty, native-born, under age 18.

towards higher poverty and higher proportions black and Latino, and lower proportions white, Asian, and native-born. Likewise, more high-cost loans predict neighborhoods that became more disadvantaged over time. Relationships between vacancy rates and neighborhood change are inconsistent, but we do see significant relationships between higher vacancy rates and neighborhoods that become more white and native born, and less Latino given 2000 characteristics. However, these models cannot account for countywide secular changes.

Tables 5a and 5b show results of separate regression models of greater than predicted change on housing risk indicators—models which do account for secular change in the county, but which can't tell whether the neighborhood changed in the direction of improved/declined overall socioeconomic status. Generally speaking, the within-tract rates of foreclosure starts and high cost loans are significant, but somewhat small, predictors of variation from predicted neighborhood change. For example, although the first cell of Table 5a shows that foreclosure start rates were significantly associated with the higher than normal change in % poverty, the coefficient shows that a 1% increase in the foreclosure start rate is related to only a 0.2% increase in *greater than predicted* % poverty in the tract. Although this seems like quite a small relationship, consider that we are talking about only the portion of change that could not be predicted by overall secular change in the county—the available variance is substantially reduced by the models' design. Areas with high foreclosure rates or high-cost loan rates showed larger than predicted shifts in poverty, black, and Latino race, but less than predicted shifts in % native-born, median age, % non-Hispanic white and % Asian race. Vacancy rates were not systematically related to greater than predicted neighborhood change.

Finally we turn to the question of overall consequences of the housing crisis for race/ethnic segregation. The dissimilarity index (*D)* shows an overall measure of the evenness of any two

groups in the county as a whole. Table 6 shows that *D* ranged from 0.30 for white/other segregation to 0.69 for white/black segregation in 2000. Overall, *D* remained fairly stable between 2000 and 2010. Where it changed, it decreased slightly, indicating that the population became somewhat more evenly distributed. Thiel's *H* at the county level also showed slightly decreased segregation over this interval, dropping from 0.299 in 2000 to 0.290 in 2010. Although this is a small change, it is consistent with the overall trend over the past several decades (Iceland 2004). However, the overall segregation pattern of the county is not our main interest here, so we turn to measures of relative evenness that can be calculated at the tract level.

Figure 4 shows race/ethnic concentration for the four major race/ethnic groups of the county, by quintile within each group. Note that the colors are consistent across groups, but the actual percentages represented by each color are quite different depending on the overall population distribution. There are notably more Latinos and whites than either blacks or Asians. This map gives us a sense of where the concentration of each group lies. For whites, we see concentrations in the coastal areas and the rural northern part of the county, and a distinct lack of whites in South Los Angeles especially. For blacks there is a concentration in the central/south region, including the corridor going south to the Ports of Los Angeles and Long Beach. Asian populations are concentrated in a pattern that rings the downtown region, particularly to the North and East of downtown/East LA. Latinos are concentrated most heavily in South and East Los Angeles.

Figure 5 shows a map of Los Angeles County census tracts with colors indicating Thiel's *H* in 2010. The map shows that the most segregated parts of the county are south and east of downtown, the coastal region of Malibu, and coastal areas south of the LAX airport. Comparing Figures 4 and 5, we can see that using an index of evenness gives a more multidimensional

picture of segregation patterns. The most segregated areas (those where a large portion of the population is just one race/ethnic group) are those that Figure 4 showed as being white and Latino.

Table 7 shows the result of predicting 2010 levels of race/ethnic segregation, using Thiel's *H* as the measure, with housing risk indicators as key independent variables. *H* from 2000 is included as the control variable, so the models give the association between housing risk indicators and *H* for 2010 net of *H* for 2000. Results show that, given the same level of 2000 segregation, foreclosure rates and high-cost loan rates were significantly associated with higher levels of multigroup race/ethnic segregation in 2010. For example, in the top panel, the coefficient indicates that given *H* for 2000, for each 1% increase in foreclosure rates within the tract, we can expect an increase in Thiel's *H* of 0.017. For perspective, the standard deviation for tract-level *H* in 2010 was 0.250, so this coefficient is quite small but nonetheless significant. Also, Thiel's *H* overall dropped by a margin of just 0.009 between 2000 and 2010; so an increase of 0.017 could be interpreted as substantial in the context of overall segregation changes in this period. Similarly, a 1% increase in the within-tract rate of high-cost loans was associated with Thiel's *H* that was 0.003 points higher in 2010, given 2000 *H*. Vacancy rate, on the other hand, predicted decreased segregation.

Discussion

Our results suggest that the neighborhoods worst-hit in the Great Recession were those which already had the least resources: poor and minority neighborhoods. This is consistent with past research on the processes of residential segregation and neighborhood succession.

Furthermore, significant interactions show a nonlinear relationship between the percent black, poor, and housing risk during the recession. We observed that both high-income and low-income black neighborhoods were at high risk during the recession. This result is likely to be related to the *wealth* gap between blacks and other groups in the United States. African Americans, due to a long history of discrimination in access to homeownership, have on average less wealth than other groups (Oliver and Shapiro 1995; Taylor, Kochhar et al. 2011). In the mortgage market, less wealth means paying more for a loan, even at the same level of income. But, during the pre-recession years when subprime lending was commonplace, higher income individuals could obtain relatively large (but high-cost) loans even in the absence of equity or other savings. When the economic crisis hit, people began to lose their jobs and inflated housing values began to decline. Black homeowners in Los Angeles were more likely to have high-value, high-cost loans *and* less equity, family resources, and other savings pools which would have allowed them to avoid foreclosure during a financial crisis such as job loss. Thus blacks at both ends of the income spectrum were hard-hit by foreclosures; and strong black/nonblack patterns of segregation had the effect of concentrating these foreclosures in certain neighborhoods, which may have exacerbated the problem by further depressing housing prices themselves.

Our results show substantial stability in neighborhood characteristics between 2000 and 2010, especially in race and ethnic composition. However, we also find that housing risk – as measured by foreclosure starts and high cost loans – was associated with some types of compositional change. Areas with higher housing risk increased their level of disadvantage compared with other neighborhoods: housing risk was associated with increases in the percent of the neighborhood population that was in poverty, black and Latino. In addition, housing risk

was associated with greater change in the percent population in poverty, black, and Latino than was predicted by countywide change.

Finally, we have shown that at the tract level, race/ethnic segregation was increased by within-tract levels of high-cost loans and foreclosure rates. The positive association between foreclosure rates and high-cost loans and multigroup segregation suggests that subprime lending practices did, at least in the short term, strengthen the pre-existing patterns of neighborhood selectivity.

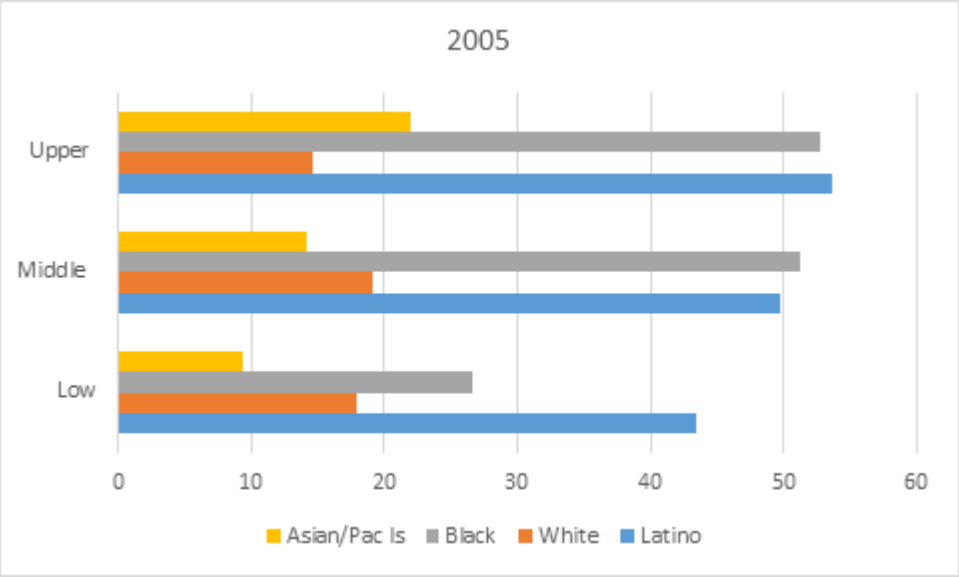
Our analysis has several important limitations. First, our tract-level analysis assumes independence of observations, in this case independence of tracts from one another. Of course, this is not the case—census tracts show distinct higher order geospatial patterns and are not independent of one another at all. This issue can be addressed by performing spatial regression or controlling for spatial autocorrelation, which we plan to perform as a next analytic step. Based on past experience with census data in Los Angeles County, we expect that the overall pattern of results will hold but show reduced magnitude and significance.

Another planned step for this analysis involves latent variable modeling of census tracts. Jones and Hu (2014) have been successful in applying latent variable analysis to classify the census tracts of Los Angeles County into unobserved types. We plan to attempt this same latent variable analysis method using both 2000 tracts and 2010 tracts to assess whether there were neighborhoods or types of neighborhoods that "flipped," or if new classes of neighborhoods arose following the recession.

Describing these trends for the second largest metropolitan area in the United States is an important contribution to explaining how neighborhoods shifted in race/ethnic makeup, and how they maintained and consolidated wealth during one of the largest macro-level shocks to the

economy in modern history. Further exploration of the apparent non-linear relationship between neighborhood proportion black race and foreclosure rate could potentially shed light on the role of within-race economic segregation in overall neighborhood segregation patterns.

Figure 1. High Interest Home Purchase Loans as a Percent of All Home Purchase Loans by Race/Ethnicity and Income Level, Los Angeles Metro Area



Source: Analysis of Home Mortgage Disclosure Act Data from the Federal Financial Institutions *Examination* Council by www.diversitydata.org

Figure 2. Foreclosure start rates per 100 mortgages by tract, Los Angeles County

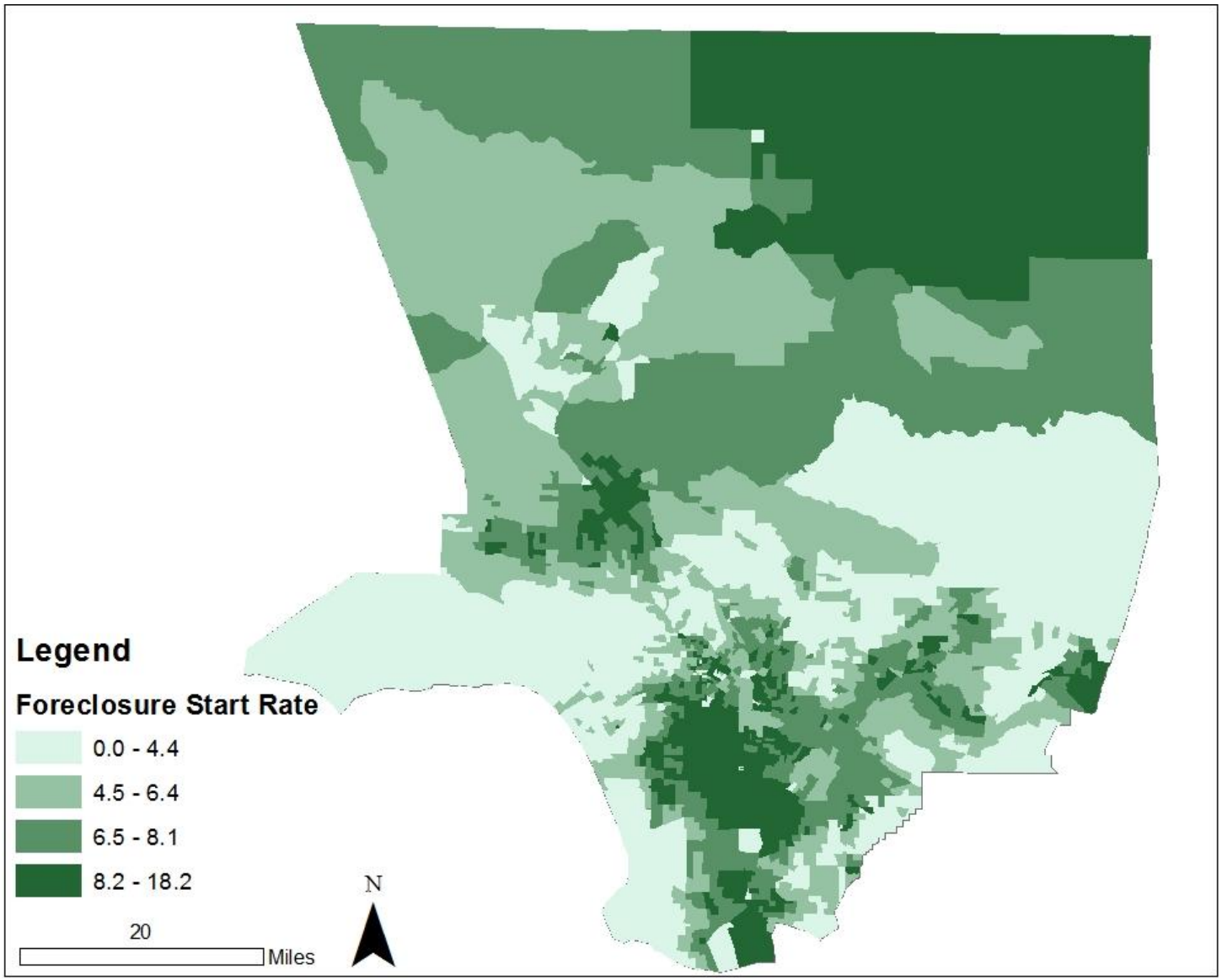


Figure 3. Predicted foreclosure rates per 100 mortgages, by quartile of census tract race/ethnic characteristics

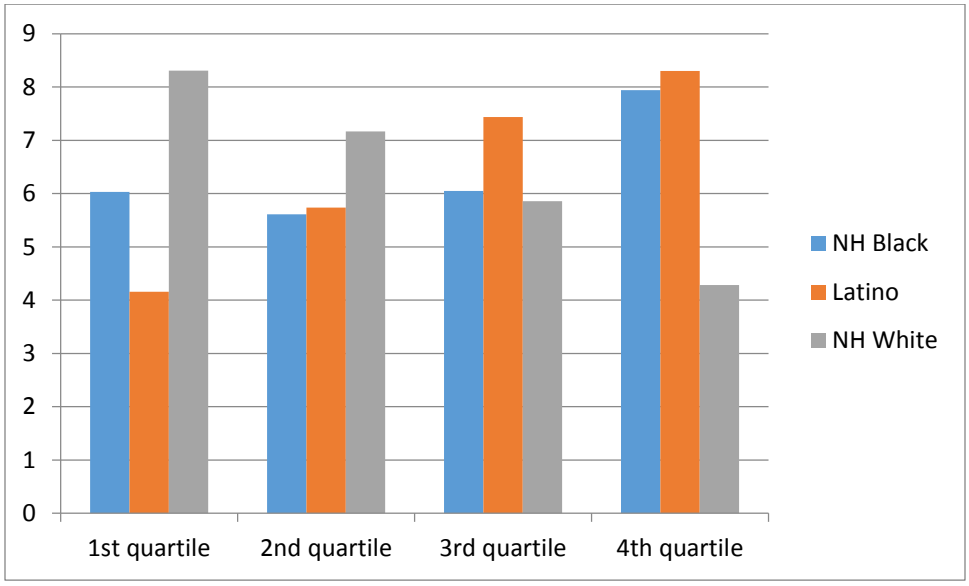


Figure 4. Race/Ethnic Density, by within-group quintile, Los Angeles County, 2000

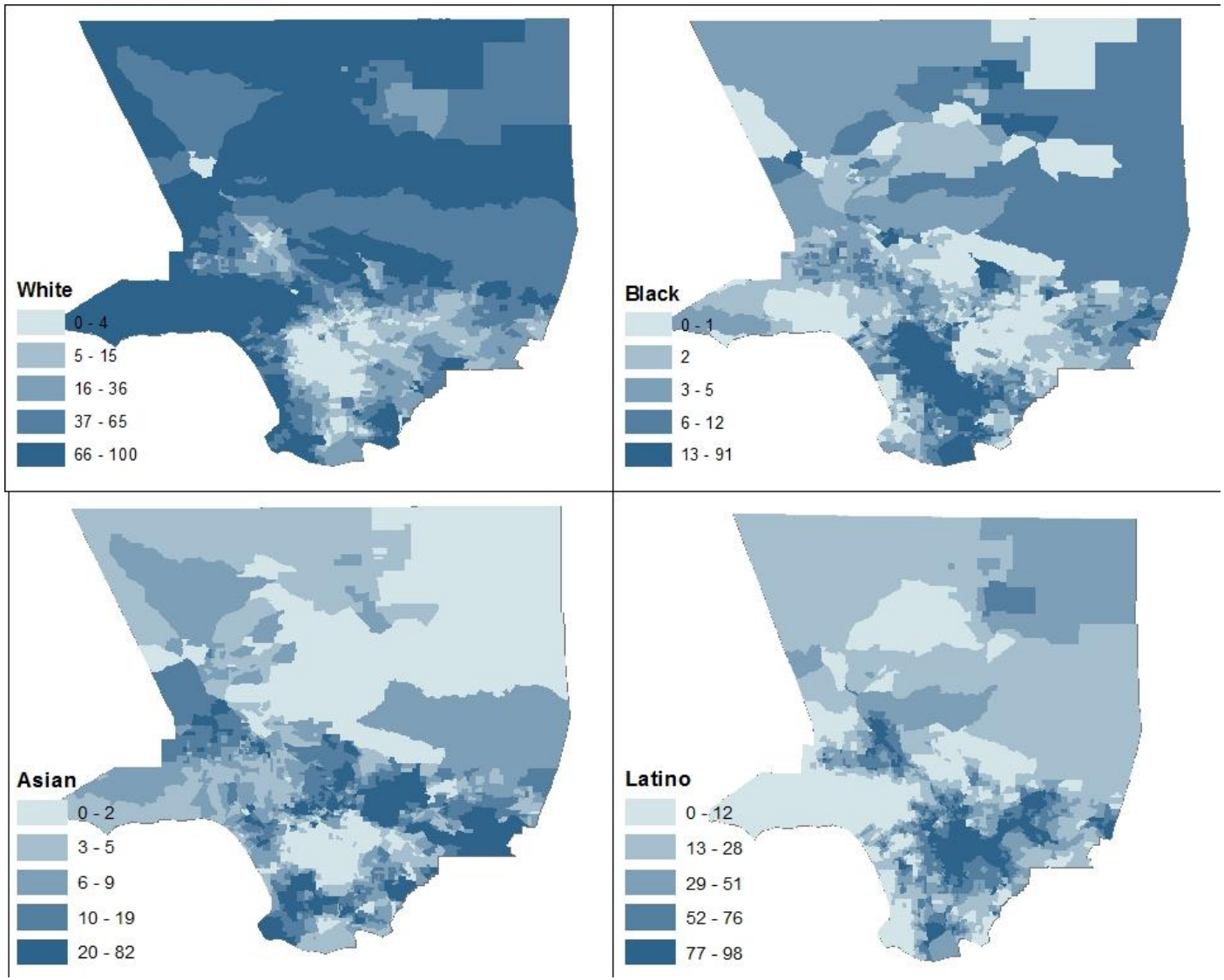


Figure 5. Thiel's *H* Index by tract, Los Angeles County, 2010

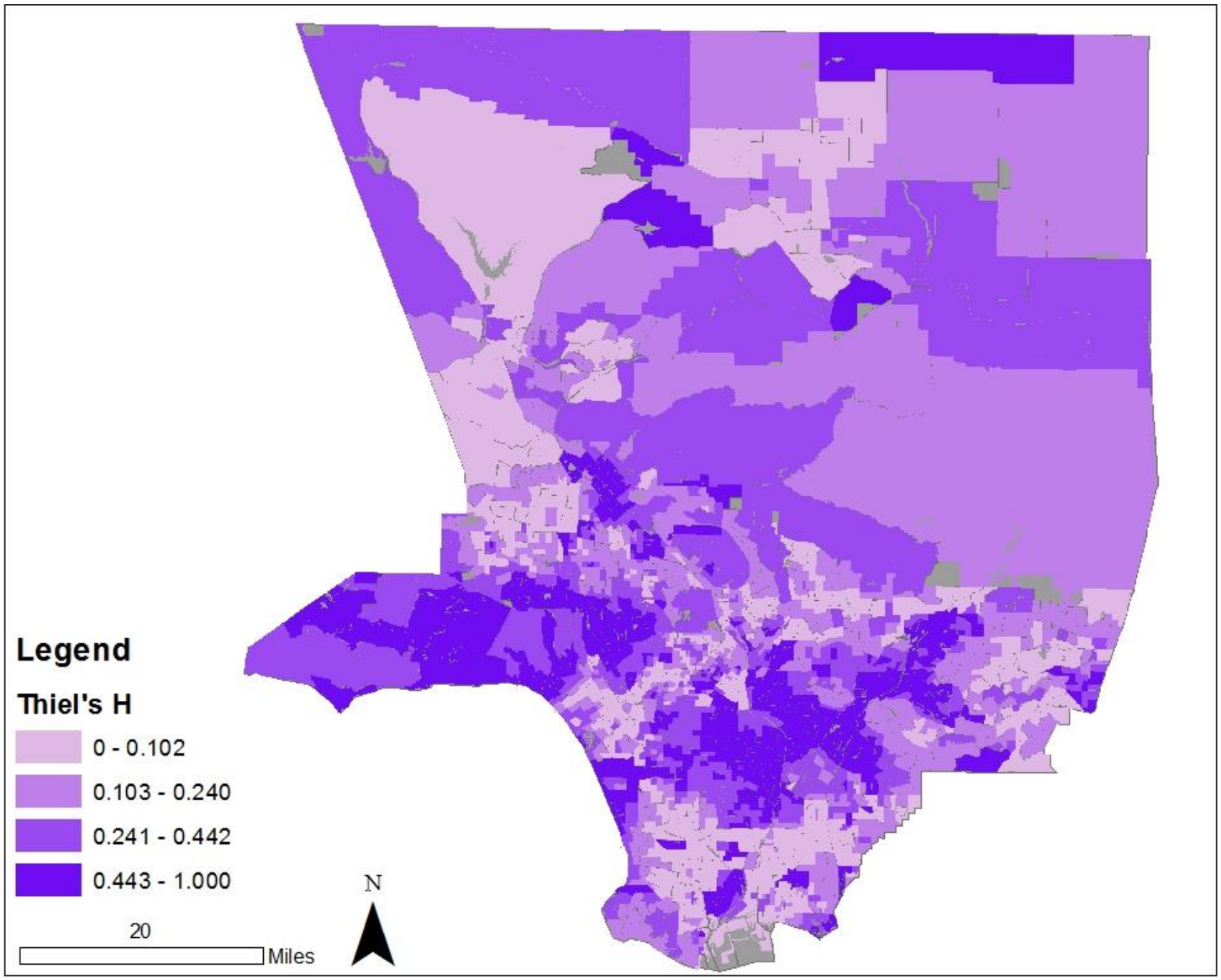


Table 1. Descriptive statistics of census tracts in Los Angeles County

	Mean of Tracts (SD)	
High-cost loans per 100 mortgages, 2004-2006	24.0 (12.7)	
Foreclosure starts per 100 mortgages, Jan 2007-June 2008	6.4 (2.4)	
Vacancy rate per 100 addresses, June 2008	1.2 (1.7)	
	2000	2010
% Poverty	16 (13)	18 (13)
Race/Ethnicity		
% Latino	44 (29)	47 (29)
% Black	9 (15)	8 (13)
% White (ref)	32 (28)	29 (27)
% Asian	11 (14)	13 (15)
% Other	3 (2)	3 (2)
% Native Born	63 (17)	64 (16)
Median Age (yrs)	32.4 (7.0)	35.3 (7.2)
% under 18 years	27 (9)	27 (9)

Table 2. Coefficients of OLS regression of 3 housing risk measures as predicted by 2000 neighborhood characteristics (n=2582 census tracts)

	High-Cost Loans	**Foreclosure Starts**	**Vacancy Rates**
Poverty	0.053*	0.014**	0.035***
Native Born	0.121***	0.022***	0.028***
Median Age	-0.276***	-0.031***	0.023**
Race/Ethnicity			
% Latino	0.287***	0.056***	0.009***
% Black	0.187***	0.043***	-0.008
% White (ref)	-	-	-
% Asian	-0.029*	-0.002	-0.005
% Other	0.614***	0.134***	0.098***
Poverty X Black Race	0.005***	0.000*	0.000
Poverty X Latino Race	3.817***	1.516***	-2.461***
Constant	3.257	1.04	-0.177
R2-Adj	0.658	0.607	0.083
Prob > F	0.0000	0.0000	0.0000

* = significant at $\alpha < 0.05$ ** = significant at $\alpha < 0.01$ ** = significant at $\alpha < 0.001$

Table 3. Variance explained (R-squared statistics) from OLS regression of 2010 neighborhood characteristics on 2000 neighborhood characteristics (n=2582 census tracts)

DV	**Bivariate Model***	**Multivariate Model****
	Variance Explained (R^2)	Variance Explained (R^2)
2010 % Poverty	0.577	0.590
2010 % Native Born	0.513	0.564

2010 Median Age	0.567	0.603
2010 % White	0.849	0.874
2010 % Black	0.925	0.928
2010 % Asian	0.900	0.903
2010 % Latino	0.885	0.898

Note 1: Bivariate models include only the corresponding 2000 census tract characteristic, for example the model of 2010 % poverty includes only 2000 poverty.

Note 2: Multivariate models include the corresponding 2000 census tract characteristic and other 2000 characteristics; for example the model of % poverty in 2010 includes % poverty, % native born, median age, and the race/ethnic profile for the same tract in 2000.

Table 4a. Coefficients of OLS regression of 2010 neighborhood characteristics by housing risk indicators, controlling for 2000 characteristics (n=2582 census tracts)

	2010 % Poverty	**2010 % Native Born**	**2010 Median Age**
Foreclosure start rate	0.711***	-0.532***	-0.504***
Constant	14.823	49.407	20.953
R2-Adj	0.597	0.568	0.616
Prob > F	0.000	0.000	0.000
High-cost loan rate	0.162 ***	-0.159***	-0.123***
Constant	15.362	49.305	20.630
R2-Adj	0.597	0.568	0.618
Prob > F	0.000	0.000	0.000
Vacancy rate	-0.017	0.639***	0.040
Constant	16.652	48.477	19.676
R2-Adj	0.590	0.568	0.604
Prob > F	0.000	0.000	0.000

* = significant at $\alpha < 0.05$ ** = significant at $\alpha < 0.01$ ** = significant at $\alpha < 0.001$

Note: models control for 2000 % poverty, % native born, median age, % of population under age 18, and race/ethnic characteristics of the neighborhood. In each model, nearly every control variable significantly predicted 2010 characteristics.

Table 4b. Coefficients of OLS regression of 2010 neighborhood characteristics by housing risk indicators, controlling for 2000 characteristics (n=2582 census tracts)

	2010 % White	2010 % Black	2010 %Asian	2010 % Latino
Foreclosure start rate	-1.083***	0.179***	-0.325***	0.880
Constant	41.941	1.337	6.964	9.140
R2-Adj	0.889	0.928	0.904	0.902
Prob > F	0.000	0.000	0.000	0.000
High-cost loan rate	-0.330***	0.039***	-0.053***	0.288***
Constant	41.786	1.452	6.733	9.586
R2-Adj	0.892	0.928	0.903	0.905
Prob > F	0.000	0.000	0.000	0.000
Vacancy rate	0.437***	0.063	-0.105	-0.287**
Constant	39.442	1.547	6.587	9.720
R2-Adj	0.886	0.928	0.903	0.901
Prob > F	0.000	0.000	0.000	0.000

* = significant at $\alpha < 0.05$ ** = significant at $\alpha < 0.01$ ** = significant at $\alpha < 0.001$

Note: models control for 2000 % poverty, % native born, median age, % of population under age 18, and race/ethnic characteristics of the neighborhood. In each model, nearly every control variable significantly predicted 2010 characteristics.

Table 5a. Coefficients of OLS regression of variation from predicted neighborhood change by housing risk indicators (n=2582 census tracts)

	Variation from predicted poverty (%)	Variation from predicted Native Born (%)	Variation from predicted Median Age (years)
Foreclosure start rate	0.222***	-0.115	-0.120***
Constant	-1.420	0.738	0.767
R2-Adj	0.004	0.000	0.004
Prob > F	0.001	0.172	0.001
High-cost loan rate	0.043***	-0.036*	-0.026***
Constant	-1.026	0.870	0.618
R2-Adj	0.004	0.002	0.005
Prob > F	0.0001	0.028	0.000
Vacancy rate	-0.017	0.602***	0.045
Constant	0.020	-0.728	-0.054
R2-Adj	0.000	0.010	0.000
Prob > F	0.858	0.000	0.367

* = significant at $\alpha < 0.05$ ** = significant at $\alpha < 0.01$ ** = significant at $\alpha < 0.001$

Note: models control for 2000 % poverty, % native born, median age, % of population under age 18, and race/ethnic characteristics of the neighborhood. In each model, nearly every control variable significantly predicted 2010 characteristics.

Table 5b. Coefficients of OLS regression of variation from predicted neighborhood change by housing risk indicators (n=2582 census tracts)

	Variation from predicted white (%)	Variation from predicted black (%)	Variation from predicted Asian (%)	Variation from predicted Latino (%)
Foreclosure start rate	-0.699***	0.065*	-0.117**	0.450***
Constant	4.479	-0.420	0.751	-2.88
R2-Adj	0.033	0.002	0.003	0.014
Prob > F	0.000	0.0166	0.0020	0.0000
High-cost loan rate	-0.160***	0.012*	-0.016*	0.115***
Constant	3.854	-0.286	0.381	-2.762
R2-Adj	0.046	0.002	0.001	0.024
Prob > F	0.0000	0.0262	0.0331	0.0000
Vacancy Rate	0.506***	0.060	-0.100	-0.315**
Constant	-0.611	-0.072	0.121	0.381
R2-Adj	0.008	0.002	0.001	0.003
Prob > F	0.000	0.026	0.063	0.003

* = significant at $\alpha < 0.05$ ** = significant at $\alpha < 0.01$ ** = significant at $\alpha < 0.001$

Note: models control for 2000 % poverty, % native born, median age, % of population under age 18, and race/ethnic characteristics of the neighborhood. In each model, nearly every control variable significantly predicted 2010 characteristics.

Table 6. Dissimilarity Indices (*D)* for all tracts in 2010 {2000}

	Latino	White	Black	Asian	Other
Latino	0.00 {0.00}				
White	0.64 {0.64}	0.00 {0.00}			
Black	0.52 {0.55}	0.67 {0.69}	0.00 {0.00}		
Asian	0.56 {0.56}	0.51 {0.51}	0.67 {0.69}	0.00 {0.00}	
Other	0.49 {0.47}	0.27 {0.30}	0.51 {0.55}	0.42 {0.41}	0.00 {0.00}

Table 7. Coefficients of OLS regression of 2010 Thiel's *H* at the tract level by housing risk indicators (n=2582 census tracts)

	2010 *H*
Foreclosure start rate	0.017***
2000 *H*	0.847***
Constant	-0.074
R2-Adj	0.757
Prob > F	0.000
High-cost loan rate	0.003***
2000 *H*	0.846***
Constant	-0.042
R2-Adj	0.755
Prob > F	0.000
Vacancy rate	-0.004**
2000 *H*	0.872***
Constant	0.034
R2-Adj	0.728
Prob > F	0.000

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