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Community socioeconomic status and disparities in mortgage lending: An analysis of Metropolitan Detroit

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Abstract

This note examines the effects of community socioeconomic status on mortgage lending patterns in Metropolitan Detroit. Data from 2000 HMDA reports and the 2000 U.S. Census are analyzed using multiple regression. The results from this analysis have two important implications for research on mortgage lending. First, they indicate that the effects of variables linked to a community's socioeconomic status on mortgage lending patterns are highly intercorrelated. As a result, variations in mortgage lending appear to be the result of the combined effects of a number of socioeconomic variables acting together. Second, the results from this analysis indicate that the socioeconomic status of a community is positively correlated with mortgage lending activity. In other words, a decline in neighborhood socioeconomic status is significantly correlated with a decline in mortgage lending.

1. Community socioeconomic status and the lending gap

This note examines the effects of community socioeconomic status on mortgage lending in Metropolitan Detroit. Although the focus of this analysis is on a single metropolitan area, it has implications for the study of mortgage activity nationally as well as public policy that grows out of such research. This is the case since this article focuses on a central debate in the fair lending literature, which involves the influence of a community's racial composition, income level, and related socioeconomic variables on mortgage lending patterns. Past research has tended to be polarized around two viewpoints on the role of socioeconomic variables in the lending process. Some have argued that both historically and contemporaneously race has played a central role in the lending process (Coffey & Gocker, 1998; Dedman, 1988; Holloway & Wyly, 2001; NTIC, 2003; Shlay, 1988, 1989; Squires & O'Connor, 2001; Turner, Ross,

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Galster, & Yinger, 2002; Wyly & Holloway, 1999). Others contend that other socioeconomic variables explain away the effects of race in mortgage lending decisions (Hula, 1991; Perle, Lynch, & Horner, 1994; Schill & Wachter, 1993). The debate concerning the role of race in mortgage lending is summed up in recent reviews of the literature, which argue that evidence for mortgage discrimination and redlining is conflicting (Black, 1999; Ross & Yonger, 2002).[1]

After examining the data from Metropolitan Detroit, the findings from this research suggest that this debate has been misdirected. It is argued that the focus on affirming or denying the independent effects of a single variable on mortgage lending has produced two entrenched views in the literature. One view reifies the role of race in the mortgage lending process at the expense of other factors. The other view ignores the manner in which race is interwoven with socioeconomic status in the United States. In contrast to these two viewpoints, this note suggests that in the contemporary context race is one factor in a community's socioeconomic web which impacts mortgage lending decisions.

2. Data and descriptive statistics

The data used for this research come from the Federal Financial Institutions Examination Council's *Home Mortgage Disclosure Act (HMDA) 2000 Data Reports* and the *2000 Census of Population and Housing Summary Tape File 3A*. Independent variables were drawn from 2000 Census data for Metropolitan Detroit which is defined as the area encompassing Wayne, Oakland, and Macomb Counties in the State of Michigan. Measures of race, educational attainment, poverty, income, housing values, the age of the housing stock, and housing tenure were included in the analysis.[2] Descriptions of the independent variables used in the analysis are found in Table 1.

The dependent variable examined in this analysis was constructed using information from 2000 HMDA data for Metropolitan Detroit. The dependent variable measures the ratio of mortgages originated to mortgages denied (conventional, FHA, FSA/RHA, and VA) at the census tract level. Using a ratio produced a more refined dependent variable compared to those found in past research where only mortgage approval rates are examined.[3] The use of a ratio had the advantage of creating standardized measures of institutional lending decisions, which control for deviations in the volume of loans across census tracts. A description of the dependent is found in Table 1.

A map of the quartiles for the dependent variable used in this analysis is presented in Fig. 1. This figure shows that mortgage disparities are spatially concentrated near the City of Detroit, the core city of the metropolitan area. It is noteworthy that on average the value of the dependent variables decreased in census tracts as the proportion of the population that was African American increased. For the dependent, the percentage of the population that was Black in each respective quartile was 61%, 40%, 9%, and 3%.

Along with mapping the spatial distribution of the dependent variable, descriptive statistics were generated for each of the variables used in the analysis. This information is summarized in Table 2. The first two columns of Table 2 display descriptive statistics for Metropolitan Detroit and the City of Detroit. A comparison of these two columns reveals that census tracts in the city had higher concentrations of people: who were African American, living below

Table 1
Independent and dependent variables used in the analysis

Variable name	Variable description
Independent variables	
BLACK	Proportion of the population that is Black by census tract
NOHSEDU	Proportion of the population 25 years and older with less than a high school education by census tract
MDHINC	1999 median household income in dollars by census tract
POVERTY	Proportion of the population with 1999 income below the poverty level by census tract
PUBAID	Proportion of households with public assistance income in 1999
MDVALUE	Median value of owner-occupied housing units by census tract
SAMEH95	Proportion of population over 5 years of age in the same house since 1995
BLTBEF50	Proportion of housing units built before 1950
VACANT	Proportion of housing units vacant by census tract
OWNER	Proportion of occupied housing units owner occupied by census tract
Dependent variable	
NUMRATIO	Ratio of the number of home purchase loans originated to home purchase loans denied in 2000 by census tract (home purchase loans include conventional, FHA, FSA/RHA, and VA)

Sources: Federal Financial Institutions Examination Council. (2000). *Home Mortgage Disclosure Act 2000 Data Reports, Aggregate and Disclosure*. Washington, DC: Federal Financial Institutions Examination Council; U.S. Department of Commerce, Bureau of Census. (2000). *2000 Census of Population and Housing, Summary Tape File 3A*. Washington DC: Data User Services Division.

Table 2
Means for Metro Detroit, City of Detroit, NUMRATIO < 1, and NUMRATIO < 1 by relationship to City of Detroit

	Metro Detroit (N = 1,163)	City of Detroit (N = 314)	NUMRATIO < 1 (N = 145)	Inside Detroit NUMRATIO < 1 (N = 86)	Outside Detroit NUMRATIO < 1 (N = 59)
Summary information					
Total population	4,043,467	951,270	417,835	222,053	195,782
Total housing units	1,638,427	375,096	168,219	87,674	80,545
Independent variables					
BLACK	0.2781	0.8177	0.5834	0.8569	0.1940
NOHSEDU	0.1966	0.3171	0.3121	0.3725	0.2260
MDHINC	$50,701	$28,928	$31,275	$22,949	$43,411
POVERTY	0.1237	0.2784	0.2654	0.3480	0.1459
PUBAID	0.0491	0.1225	0.1084	0.1530	0.0440
MDVALUE	$131,007	$60,457	$64,566	$43,947	$94,631
SAMEH95	0.5843	0.5922	0.5487	0.5852	0.4967
BLTBEF50	0.2872	0.5738	0.4497	0.6436	0.1619
VACANT	0.0595	0.1113	0.1090	0.1411	0.0625
OWNER	0.7068	0.5216	0.5424	0.4414	0.6886
Dependent variable					
NUMRATIO	6.97	1.80	0.56	0.54	0.59

Sources: Federal Financial Institutions Examination Council. (2000). *Home Mortgage Disclosure Act 2000 Data Reports, Aggregate and Disclosure*. Washington, DC: Federal Financial Institutions Examination Council; U.S. Department of Commerce, Bureau of Census. (2000). *2000 Census of Population and Housing, Summary Tape File 3A*. Washington, DC: Data User Services Division.

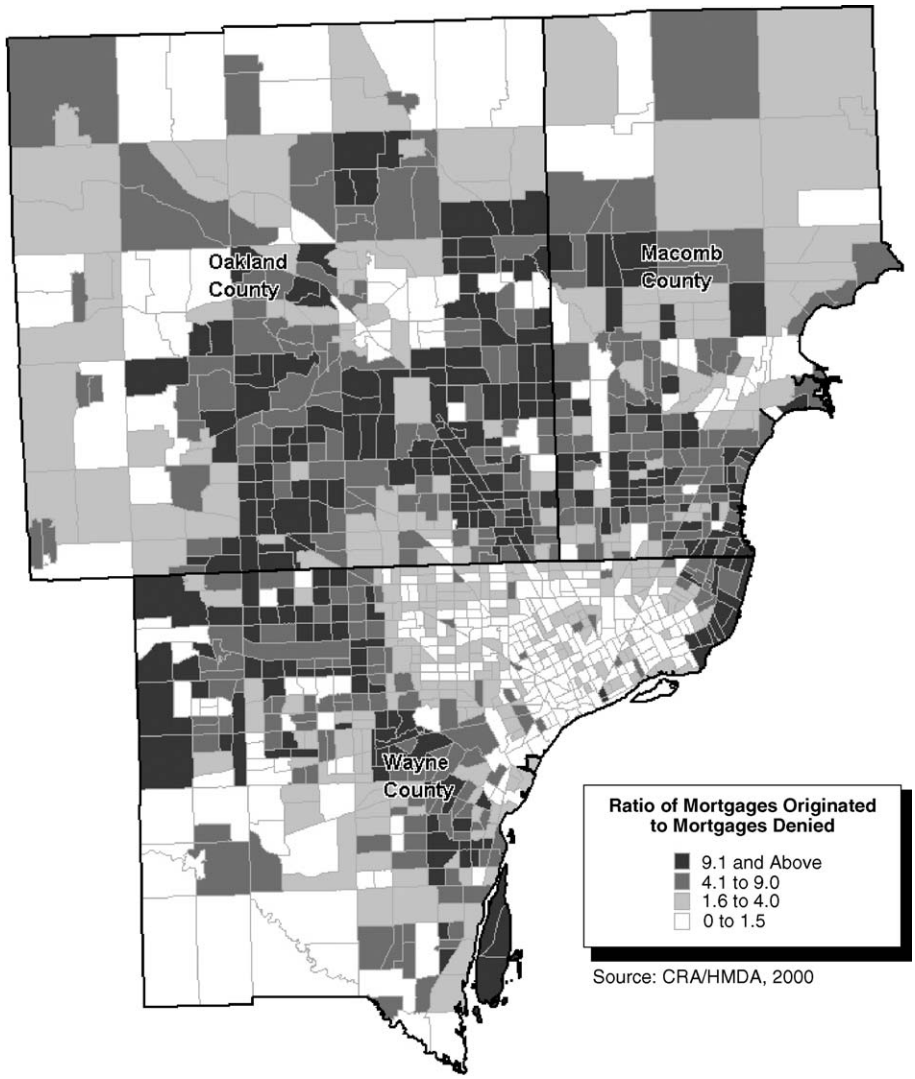

Fig. 1. 2000 Home Mortgage Disclosure Act data by Metropolitan Detroit census tracts.

the poverty level, receiving public assistance, and without a high school diploma. In part, these population characteristics help to explain depressed median household incomes in the city. A comparison of housing characteristics in the metropolitan area and the city add to our understanding of mortgage lending patterns. Median housing values were substantially lower in the city. In part, this can be attributed to the age of the city's housing stock, elevated vacancy rates, and lower rates of homeownership. Yet, it is notable that despite these characteristics, residential stability was slightly higher in the city than in the metropolitan area as a whole.[4] A comparison of the metropolitan area and the City of Detroit along the dependent variable used in this analysis reveals the possible effects that population and housing characteristics have on mortgage lending. In the metropolitan area, there were 6.97 mortgages originated for

every mortgage denied. In the City of Detroit there were only 1.80 mortgages originated for each mortgage denied.

The third last column of Table 2 presents descriptive statistics for census tracts in the metropolitan area where the value of the dependent variables was less than 1. The characteristics of this subsample are strikingly similar to those of the City of Detroit. Two aspects of this subsample should be highlighted. First, the proportion of the population that was black is smaller in the subsample than in the City of Detroit. This discrepancy is a reflection of the degree to which census tracts with poor lending performance were concentrated in two geographically distinct parts of the metropolitan area, the urban core and the exurban fringe. Second, the average ratio reported for the dependent variable was far below 1 in the third column of Table 2. This highlighted the degree to which lending patterns in this subsample were noticeably different than both the City of Detroit and the Detroit metropolitan area.

In last two columns of Table 2, descriptive statistics are reported for census tracts where the value of the dependent variable is further subdivided. This was done so that census tracts with poor lending performance in the City of Detroit could be compared to similar tracts outside of the city. As a result, these two columns provide a comparative view of lending disparities in the urban core and the exurban fringe. A number of important distinctions between the subsets of census tracts in the urban core and the exurban fringe are revealed. Census tracts in the urban core had higher concentrations of people who were African American, living in poverty, receiving public assistance, and without a high school diploma. Moreover, median household incomes were lower in the urban core than those in the exurban fringe. Housing characteristics also differ between the subsets of census tracts in the urban core and the exurban fringe. Housing in the urban core was older and less expensive. There were also higher rates of vacancy in the urban core and lower rates of homeownership. Nevertheless, residential stability was noticeably higher in the urban core.

Despite similarities in mortgage lending, housing markets in the urban core and the exurban fringe seems to be shaped by different constraints. In the urban core poor lending performance seems to be a reflection of a community's socioeconomic status, while on the urban fringe poor lending performance may have been a characteristic of housing markets that were in formation. If this was the case, lending disparities in the urban core would be considered more perennial, and subsequently of greater concern to urban scholars. In order to examine these issues in greater detail, multivariate regression models were run comparing the independent variables to the dependent variable used in the analysis. The results of this analysis are discussed in the next section of this note.

3. Multivariate analysis

Initially, bivariate and multivariate regression analysis was conducted using the independent and dependent variables identified in Table 1. After examining the regression models from that analysis, it was discovered that several of the independent variables were intercorrelated. The intercorrelated variables included: BLACK, NOHSEDU, MDHINC, POVERTY, PIBAID, MDVALUE, and OWNER. The presence of intercorrelated variables impeded the ability to draw accurate inference regarding the effects of those variables on the dependent variable. To

Table 3
Regression models for the effects of population and housing characteristics on NUMRATIO

Variable name	NUMRATIO
COMSES	−4.293*** (−.480)
SAMHM95	5.533* (.074)
BLTBEF50	2.214 (.063)
VACANT	−1.136 (−.007)
Constant	3.119*
R^2	.215***

Sources: Federal Financial Institutions Examination Council. (2000). *Home Mortgage Disclosure Act 2000 Data Reports, Aggregate and Disclosure*. Washington, DC: Federal Financial Institutions Examination Council; U.S. Department of Commerce, Bureau of Census. (2000). *2000 Census of Population and Housing, Summary Tape File 3A*. Washington, DC: Data User Services Division. Standardized coefficients (β) are in parentheses next to unstandardized coefficients. COMSES is a component extracted using factor analysis. This component accounts for 71% of the variance in BLACK, NOHSEDU, MDHINC, POVERTY, PUBAID, MDVALUE, and OWNER. *$p < .05$, **$p < .01$, ***$p < .001$.

address this issue, the intercorrelated variables were subjected to principal component factor analysis. Through this analysis a single component was extracted which explained 71% of the variance in all of the intercorrelated variables.[5] This component, COMSES, functioned as a measure of community socioeconomic status. It was entered into subsequent regression models with the remaining independent variables.

The results of the multivariate analysis comparing community socioeconomic status, neighborhood stability, and the age of housing stock to the dependent variable are shown in Table 3. The unstandardized and standarized multivariate regression coefficients for the effects of the independent variables on the dependent variable are reported. One multivariate regression model is presented in Table 3. This model focuses on the ratio of mortgages originated to mortgages denied.

Two findings from the model in Table 3 should be highlighted. First, an examination of the standardized coefficients indicates that community socioeconomic status had the strongest influence on the ratio of mortgages originated to mortgages denied in a census tract after applying statistical controls. The regression coefficient for this variable was significant at the .001 level. The results of this analysis indicate that after controlling for other factors, a decrease in community socioeconomic status led to a decrease in the ratio of mortgages originated to mortgages denied. Although the effects of individual dimensions of community socioeconomic status could not be separated from one and other, the combined effects of these variables had a significant influence on mortgage lending patterns. Second, the only other variable that significantly affected the number of mortgages in a census tract was the proportion of the population living in the same house since 1995. The regression coefficient for this variable was significant at the .05 level. This result indicated that after controlling for other variables, the ratio of mortgages originated to mortgages denied increased as the proportion of the population living in the same house since 1995 increased. To a slight degree, neighborhood stability mediated against the negative effects of community socioeconomic status on mortgage lending outcomes. An R^2 value of .215 was reported for the first model.

This indicated that 21.5% of the variance in the number of mortgages received across census tracts was attributed to the variables used in this model.

4. Discussion and implications

The results from this analysis indicate that a decrease in a community's socioeconomic status will be correlated with poor mortgage lending outcomes. The results also indicated that neighborhood stability enhances lending performance, and to some extent, counteracts the negative effects of community socioeconomic status. In addition to these general findings, the findings from this analysis help to distinguish between the causes of poor lending performance in the urban core versus the exurban fringe. Two aspects of this distinction are noteworthy. One is that the means reported in Table 2 for each of the independent variables subjected to principal component factor analysis contrasted. In general, measures of community socioeconomic status were lower in urban core census tracts with poor lending performance compared to similar tracts in the exurban fringe. This finding was re-enforced by the results from regression analysis. Community socioeconomic status appears to be more closely tied to poor lending outcomes in the urban core, while poor performance on the exurban fringe seems to be a characteristic of a housing market in formation. This distinction leads one to conclude that lending disparities in the urban core are more perennial and warrant greater attention by researchers and policymakers. The other noteworthy finding relates to the need to use principal component factor analysis in this research. In large part, this highlights the degree to which individual elements of a community's socioeconomic status cannot be examined outside of the local context in which they are embedded. Variables such as race, income, housing values, and homeownership rates are part of a community's socioeconomic web and do not seem to affect redlining independently.

Notes

1. This research was supported by a Summer Faculty Research Support Award from the State Policy Center in the College of Urban Labor and Metropolitan Affairs at Wayne State University. Additional acknowledgments go to Jason Booza for GIS assistance and Lari Warren-Jeanpiere for assistance with database development.
2. The independent variables used in this analysis were selected in order to replicate multivariate models used in past research on mortgage discrimination.
3. This analysis focuses on loans originated rather than the total number of loans approved in order to discount the possible effects of double counting duplicate applications for the same property in the analysis. This decision was made in response to the organization of HMDA data, which includes categories for loans "approved but not accepted" and "applications withdrawn".
4. The proportion of residents living in the same home since 1995 is used as a measure of residential stability in this analysis.
5. Since only one component was extracted with an eigenvalue greater than 1, verimax rotation could not be performed.

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