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AN ANALYSIS OF REGIONAL DIFFERENCES IN RACIAL DISCRIMINATION IN THE HOME MORTGAGE LENDING INDUSTRY

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"An Analysis of Regional Differences in Racial Discrimination in the Home Mortgage Lending Industry"[+]

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I. Introduction

National attention has recently been focused on allegations of racial discrimination in home mortgage lending by banks and thrifts.[1] These allegations have been spawned by a recent study by the Board of Governors of the Federal Reserve System [5] which summarizes borrower characteristics from data collected pursuant to the revised Home Mortgage Disclosure Act.[2] While the Board's study was cautious about drawing the conclusion that differentials between rejection rates for mortgages between whites and non-whites was due to discrimination, the study did indicate that the rejection rates for blacks, Hispanics, and American Indians were substantially above those for whites and Asian-Americans. Moreover, applicants trying to purchase homes in low or moderate income neighborhoods were rejected more frequently than those wishing to purchase homes in higher income neighborhoods, which might indicate the continuing practice of "redlining" by banks and thrifts.[3] The study did control for income. It did not, however, take into account individual applicants' asset levels, debt burdens, employment histories, and credit histories, nor did the study take into account whether or not the property an applicant was seeking to purchase was

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[1]See, for example, the articles in the Arizona Republic [1] and The Wall Street Journal [12].

[2]The Home Mortgage Disclosure Act was amended on June 15, 1989. See discussion of H.R. 1278.

[3]Redlining refers to lenders' practice of refusing mortgage applications to purchase property in a specific geographic neighborhood, usually a low-income neighborhood.

adequately valued. Such data are not currently available, as the lending institutions are not required to report such information.

The issue of racial discrimination in mortgage lending is not new. It has surfaced several times over the last twenty years. Media attention on the issue in the mid-1970's led to passage of the Home Mortgage Disclosure Act (HMDA) of 1975 and the Community Reinvestment Act (CRA) of 1977. These were both expanded in scope in 1989, again as a response to public criticism that the original versions were not stringent enough.[4]

HMDA requires all financial institutions engaged in home mortgage lending to publicly disclose the disposition by race, marital status, gender, and income, of all mortgage and home improvement loan applications received. Institutions must also disclose the geographic location (by census tract) in which the property is located, as well as the socioeconomic characteristics of that neighborhood. The CRA obligates banks and thrifts to make a concerted attempt to meet the credit needs of all residents within their communities, both those in upper-income areas and those in low and moderate income areas.

Early studies in the 1970's (c.f. Black, et. al. [3]; Hutchinson, et. al. [11]) on racial discrimination in mortgage lending were inconclusive, or were unable to detect discrimination except to a limited extent. Studies done in the 1980's on this issue yielded somewhat stronger evidence of

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[4]See, for example, the series run in the Atlanta Constitution [2] and the Detroit Free Press [7]. Also see Yinger [13].

discrimination, though these studies were sometimes controversial.

A series run by the Atlanta Constitution [2] in 1988 indicated that banks and thrifts issued substantially more home purchase loans per single-family housing unit in predominantly white neighborhoods than in predominantly minority neighborhoods. However, a Federal Reserve Board analysis [9] of the Atlanta Constitution study concluded that the disparity could be explained by other factors, such as higher turnover rates of property in white neighborhoods compared to minority neighborhoods, or by lenders' perceptions of default risk of each group of applicants.

Key studies on lending discrimination by Gabriel and Rosenthal [10] and by Canner, Gabriel and Woolley [6] focused on the effect of lenders' perceptions of default risk on the probability of individuals obtaining conventional versus government backed mortgage loans. The authors concluded that neighborhoods that have a high proportion of minorities are characterized by a high proportion of mortgage loans that are FHA insured. To a large extent this seems to be explained by lenders' perceptions of default risk.[5] However, after controlling for default risk, the studies still indicated that

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[5]In the absence of government guaranteed mortgage loans, borrowers with high default risk would be rationed out of the credit market. Thus, FHA guaranteed loans make it worthwhile for lenders to make loans to borrowers who are less creditworthy. From the borrowers standpoint, however, an FHA loan is more expensive than a conventional loan.

race effects persisted. It could not be determined, however, whether these race effects were due to lender bias or to other factors such as preferences for government backed mortgages, market specialization of lenders, or steering by real estate agents.

One problem inherent in all of these studies on the issue of mortgage lending discrimination is that data on rejected applicants were not available prior to 1991 because lenders were not required to report this under HMDA as it stood prior to the 1989 amendment. Beginning in 1990, lending institutions were required to report the characteristics of applicants and of census tracts in which properties for which mortgages were sought for all mortgage loan applications, both those accepted and rejected. This data set was made available to the public in the fall of 1991. The availability of this new data is likely to yield more information concerning racial discrimination.

The Wall Street Journal recently conducted a study [12] using the new data, which examines disparities in the approval rates for whites and blacks. The results, which were broken down by state and by lending institution, indicated that rejection rates for blacks were much higher than for whites for virtually all states. These disparities still existed when the researchers held income and loan size constant, and also in cases when the borrowers' income was large relative to loan size.

In our study, we will attempt to ascertain whether or not there are significant differences in approval rates for home

mortgage applications between blacks and whites once certain factors other than race have been accounted for. We have chosen to limit the study to these two racial groups because a cursory examination of the evidence indicates that the disparities between approval rates for these two groups are greater than for other groups. Our study departs from previous studies in that we are conducting our tests using data aggregated by state, with average income for each racial group, characteristics of the housing market, and health of the banking industry considered for each case. We will use regression analysis to estimate the effects on approval rates for blacks versus whites of each of these factors.

Our data on acceptance rates come from the disclosures of financial institutions pursuant to the amendment to HMDA. The data are broken down by race and state. In addition, data on the demographic and economic characteristics of states were obtained from the 1980 Census of Population and Housing. The data on the health of the banking industry for each state were obtained from a Wall Street Journal article about Resolution Trust Corporation properties held in each state.

II. Model Specification

In order to test for racial discrimination in the approval of home mortgages it is necessary to have data concerning the disposition of loan applications for a sample. The HMDA data provides this type of information, as indicated in the last section, and our intent is to develop models which can use this

data to test statistically for the presence of racial discrimination. Important in proving discrimination using statistical methods is to be able to control for other factors influencing loan approval in the model. This we intend to do by using multivariate procedures. However, the information available concerning the applicants is limited and so it is not possible to consider all relevant determinants of approval.

The modelling approaches vary based on the nature of the data available. If, and when, HMDA data are released for individual applications it would be possible to specify a choice model with a binary (e.g., 1 if loan approved, 0 if not) dependent variable. Such an approach would use characteristics of the applicant (e.g., income and credit rating) and introduce a binary race variable to test for the presence of racial discrimination. At some point this may be a viable option and we intend to pursue estimation of such models.

Given that HMDA data has thus far only been made available for states and banks, it is not possible to estimate a choice model with individual applicant data. Therefore, we intend to estimate models which have as the dependent variable the loan approval rate of a particular racial group, in a particular state, for a particular bank. This aggregate approach will be analogous to the micro data model previously indicated and use aggregated independent variables (e.g., average income for a particular racial group in a particular state). This sort of aggregated version of a micro model has a precedent in the

migration literature where most studies are done using states as cases and rates as the dependent variable.

In general, we propose a model with the following specification:

$$(1)\quad APPRATE_{ijk} = f(GROUPCHAR_{ij}, STATECHAR_j, BANKCHAR_k)$$

where $APPRATE_{ijk}$ = loan approval rate of racial group i in state j by bank k

$GROUPCHAR_{ij}$ = characteristics of racial group i in state j

$STATECHAR_j$ = characteristics of state j

$BANKCHAR_k$ = characteristics of bank k

The intent is to use not only the characteristics of the applicants (GROUPCHAR) but also information pertaining to the state and the bank taking the application. While the currently available HMDA data will allow for some specification of each of the three types of characteristics, we do not intend in this paper to consider BANKCHAR.

Given that applicant information has not been released by HMDA, we will use racial group information for each state from the 1980 Census. The equivalent 1990 Census data has not been released but when it is we intend to incorporate it in our model. In particular, we will use the average income (AVEINC), percentage of home ownership (HOMEOWN), and percentage of population (PERPOP) for each of two racial groups, white and

black, for the 50 states and the District of Columbia as found in the 1980 Census. We would hypothesize that each of these variables would increase the probability of loan approval.

In addition, we have included two variables which are the same for each racial group in a particular state j, or $STATECHAR_j$. The first is the percentage change in home prices in the state between 1970 and 1980, HOMPRICG. We expect this to have a positive influence on loan approval since it indicates a strong housing market and less risk of default. However, this variable is ten years out of date and is the one piece of 1980 Census data which may not be reflective of 1990 Census information since housing appreciation patterns in the country are always changing. The final variable is a first attempt to consider what influence bank problems in the state might have on loan approval rates. For this we have what percentage of the housing stock that was held by the Resolution Trust Corporation (BANKPROB) in each state in 1990. We expect states with large percentages to have lower approval rates for each racial group. In a later study we will measure problems for individual banks and determine the extent to which such problems influence loan approval rates.

Before proceeding to estimation of the models, we will provide some indication of racial differences for the variables to be considered. Table 1 gives means, standard deviations and simple correlations which show substantial racial differences using the states as sample observations. The difference in mean

approval rates (APPRATE) would, by itself, suggest that racial discrimination may be present. However, to make such a determination requires that other things be controlled for in a multivariate model. The three independent variables, AVEINC, HOMEOWN and PERPOP, show even greater differences for the two racial groups. If one accepts income and home ownership as legitimate criteria for loan approval, then it may be that differences in white/black approval rates are reflective of the corresponding differences in income and home ownership seen in Table 1.

The correlations in Table 1 are between white and black variables. The values on the diagonal show, as expected, that approval rates and incomes correlate positively for the two racial groups. On the other hand, the -.635 suggests that in states with high white ownership there is low black ownership. This, along with the -.324 correlation between APPRATEW and HOMEOWNB, would be consistent with whites and blacks competing to own a fixed stock of housing in each state. The examination of such issues is, however, beyond the scope of this paper.

III. Estimation Results

In order to estimate the approval rate model, equation (1), specified in the last section we have used ordinary least squares procedures. The results for each racial group are provided in columns (1) - White and (2) - Black of Table 2. As expected, income is positive and the most significant variable for each group. Homeownership works well for whites but not for blacks

and this results in a lower R^2 for blacks. The other variables are generally insignificant but have the hypothesized signs. These weaknesses may be the result of having to use out of date data and only a proxy for bank problems. Consequently, in the remainder of our discussion of the estimation results we will concentrate on the income and homeownership variables.

An alternative model is to use the difference in approval rates (DIFFAPP) as the dependent variable. In column (3) the white and black variables are all used but, again, only the income and home ownership variables prove to be significant. While the signs for income are suggestive that using the difference in income as an independent variable would be viable, the different signs for homeownership suggest, if anything, that the two racial homeownership variables might be summed. Since differencing is more logical, we have differenced all racial independent variables in column (5). The R^2 is lower than for columns (1) and (2), indicating differencing is not the best approach.

Another approach using differences is to include one group's approval rate as an independent variable. We have done this by adding APPRATEB in columns (4) and (6). It's significant negative sign indicates that racial differences in approval rates disappear as the black rate gets higher. Also, the R^2 is higher for these models, as would be expected.

An important statistical issue is whether the same model applies to both whites and blacks. That is, are the coefficients

in columns (1) and (2) of Table 2 equal for each racial group. One way to test this is to pool the data for both groups and add a binary variable (WHITE = 1 if white, 0 if black). The estimation results in Table 3 are based on such a pooled data set of 102 observations. In column (1) the original model is estimated and all variables have the anticipated signs, with most being significant. In column (2) the binary variable is introduced and its coefficient indicates the white group has a 24% higher approval rate. This is similar to the difference in Table 1 but in Table 3 we can say that other variables have been controlled for in the multivariate model. However, the coefficient of WHITE is not statistically significant.

One noticeable difference in Table 3 between column (1) and column (2) is HOMEOWN, which goes from being positive and significant to being negatively insignificant. The reason is that HOMEOWN and WHITE are highly collinear (r = .99). This is confirmed by the increased significance WHITE achieves in column (3) when HOMEOWN is removed. These results raise an interesting issue. If the racial discrimination variable (WHITE) is only significant when HOMEOWN is omitted, the results suggest that approval is based not on race, but on homeownership. This may create a dilemma for blacks in that they cannot be approved until they own more homes but they can't increase ownership without being approved. How, and if, government intervention may be necessary to resolve this dilemma is something to be considered.

While the insignificance of WHITE in column (2) of Table 3 suggests no difference in the intercepts for whites and blacks (i.e., in columns (1) and (2) of Table 2), we have proceeded to test from different slopes in column (4) of Table 3 by interacting WHITE with each independent variable. However, each of these interactions is insignificant, which suggests no difference in the models for whites and blacks.

IV. Conclusion

The recently released HMDA data indicate large racial differences in loan approval rates in all states. Whether such differences are the result of deliberate racial discrimination on the part of financial institutions or the consequence of racial differences in loan criteria has not been resolved, as yet.

While it would be ideal to have details for each loan applicant as to income, employment, credit history, and other loan criteria, this will not be possible even when all the HMDA data are released. In this paper we have used census-based state and race specific group data as a proxy for equivalent individual data. The results show, as expected, that loans are more likely to be approved in states with high income and homeownership and this is true for both racial groups. Also, once income and ownership are accounted for, the racial difference in approval rates is not significant.

The model specified allows for the introduction of bank characteristics and analysis of bank specific approval rates. While the bank problem variable used had the anticipated sign in

most of the results, it was not always significant. Hopefully, data specific to each bank will prove more successful in future work. Also, we hope to be able to eventually obtain individual loan applicant data which would provide a more definitive basis to testing for racial discrimination in the approval of home loans.

Table 1: Descriptive Statistics (n=51)

Racial Group: Variable:	Mean		Standard Deviation	
	White (W)	Black (B)	White (W)	Black (B)
APPRATE	.867	.696	.038	.103
AVEINC	20622	14378	3119	2409
HOMEOWN	.897	.070	.034	.037
PERPOP	.828	.104	.139	.122

Simple Correlations (White - W vs. Black - B)

	APPRATEW	AVEINCW	HOMEOWNW	PERPOPW
APPRATEB	.599	.120	.242	.073
AVEINCB	.520	.709	.314	-.039
HOMEOWNB	-.324	-.079	-.635	-.352
PERPOPB	-.067	.370	-.456	-.726

Table 2: Estimation Results: Unpooled Data (n=51)

Model:	(1)	(2)	(3)	(4)	(5)	(6)
Racial Group:	White	Black	Both	Both	Both	Both
Dependent Variable:	APPRATE	APPRATE	DIFFAPP	DIFFAPP	DIFFAPP	DIFFAPP
Independent Var	Regression Coefficients					
(constant)	.30 (2.02)	.50 (3.60)	-1.23 (-1.91)	.01 (.96)	.17 (.86)	.51 (7.25)
AVEINCW	.000006 (2.99)		.000024 (2.99)	.000008 (2.87)		
HOMEOWNW	.50 (2.79)		1.26 (1.96)	.65 (2.98)		
PERPOPW	-.01 (-.28)		.10 (.71)	-.02 (-.50)		
AVEINCB		.000017 (2.67)	-.000032 (-.367)	-.000004 (-1.29)		
HOMEOWNB		-.30 (-.54)	1.10 (1.79)	.35 (1.67)		
PERPOPB		-.07 (-.43)	-.12 (.62)	-.08 (-1.14)		
BANKPROP	-8.70 (-.94)	-34.57 (-1.27)	15.35 (.66)	-5.19 (-.65)	2.47 (.11)	-.46 (-.06)
HOMEPRICG	.007 (.54)	-.006 (-.17)	.05 (1.14)	.01 (.96)	-.02 (-.64)	-.007 (-.63)
DIFAVINC					.000024 (2.88)	.000006 (2.04)
DIFHMOWN					-.26 (-1.14)	.22 (2.72)
DIFFPOP					.15 (1.74)	-.005 (-.18)
APPRATEB				-.79 (-18.22)		-.78 (-18.15)
F-value	5.82	3.08	2.57	57.19	2.35	71.17
R^2	.39	.25	.33	.93	.21	.91

Table 3: Estimation Results: Pooled Data (n=102)

Model:	(1)	(2)	(3)	(4)	
Dependent Variable:	APPRATE	APPRATE	APPRATE	APPRATE (no interaction)	APPRATE (interaction)
Independent Variable:	Regression Coefficients (t-values in parentheses)				
(constant)	.43 (5.65)	.48 (5.60)	.45 (5.84)	.51 (3.63)	
AVEINC	.000013 (4.96)	.000012 (4.34)	.000012 (4.63)	.000017 (3.47)	-.00001 (-1.72)
HOMEOWN	.10 (3.99)	-.17 (-.80)		-.46 (-1.35)	.01 (.30)
PERPOP	.09 (1.59)	.08 (1.50)	.08 (1.53)	.004 (.05)	-.02 (.13)
BANKPROB	-29.22 (-2.06)	-28.51 (-2.02)	-28.80 (-2.04)	-33.23 (-1.65)	24.52 (.85)
HOMEPRICG	.0045 (.24)	-.002 (-.14)	.002 (.10)	-.005 (-.18)	.01 (.30)
WHITE		.24 (1.30)	.09 (4.14)	-.21 (-.57)	
F-value	33.52	28.41	34.09	16.75	
R^2	.64	.64	.64	.67	

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