

Credit rationing, deregulation and race in mortgage lending in the United States: 1960–90

H. NACI MOCAN*, W. JAMES SMITH and
WILLIAM K. TEVEBAUGH

*Department of Economics, University of Colorado at Denver, Campus Box 181, P.O. Box 173364, Denver, CO 80217-3364, USA and *The National Bureau of Economic Research, 50E, 42nd Str., 17th Floor, New York, NY 10017-5405, USA*

This paper examines discrimination in mortgage lending in the United States over three decades in 1960 to 1990. We focus on whether deregulation, increased Federal oversight and enhanced competition reduce discrimination as Becker's theory suggests (Becker, 1971). We find that discrimination is evident over the three decades taken together, is prevalent from 1960 to 1980, but is absent in the data from 1980 to 1990. This finding strongly supports Becker's hypothesis. Preferences for discrimination appear to be offset by the higher costs of engaging in them after 1980.

I. INTRODUCTION

Considerable attention has recently focused on discrimination in mortgage lending in the United States. The reason for this scrutiny is clear. Non-Whites applying for mortgage loans are rejected at more than twice the rate of whites.¹ Moreover, a number of carefully constructed empirical studies (Munnell *et al.*, 1992; Gabriel and Rosenthal, 1991; Warner and Ingram, 1982) document large disparities in access to credit for housing among races, even after controlling for default risk.

The purpose of this paper is to examine credit rationing and race over the three-decade period, 1960–90. This contrasts with previous studies which either employ cross-sectional surveys for one year and one geographical area (e.g. Munnell *et al.*, 1992) or examine a period starting in the late 1970s and ending in the early 1980s (e.g. Gabriel and Rosenthal, 1991).

Of particular interest is the effect on credit rationing of major structural changes to the thrift industry in the late 1970s and early 1980s – the thrift crisis, deregulation and increased Federal oversight of racial factors. It is fair to state that the 1980s witnessed changes in the competitive and regulatory structure of the thrift industry which can only be

described as massive. Barriers to entry, in place since the 1930s and aimed at preventing interstate banking and intrastate branching, eroded, spilling competition across and within state lines for the first time in five decades. At the same time, major legislation including the Depository Institutions Deregulation and Monetary Control Act of 1980 and the Garn–St. Germain Depository Institutions Act of 1982 relaxed restrictions on competition in rates and debt instruments.

Enhanced competition coincided in 1980 with more stringent reporting requirements mandating identification of loans by census tract and borrowers by ethnicity and gender. Penalties for thrifts found in non-compliance under the Community Reinvestment Act were potentially severe – denial of rights to mergers and branching. Exclusion from rapidly expanding new markets placed offending thrifts at a competitive disadvantage at a time when the optimal scale of institution was much larger than median size (see for example Noulas *et al.*, 1990) and merger and branching constituted the most cost effective methods of expansion.

In contemplating the effects of such changes, the theory of discrimination (Becker, 1971) offers a straightforward prediction. Enhanced competition and more stringent

¹ See for example, *The Atlanta Constitution*, 1–4, May, 1988 and 22 January, 1989 and the *Detroit Free Press*, July, 1988

enforcement raise the expected cost of indulging prejudicial tastes. Discrimination should decrease.

We investigate the question using the Survey of Consumer Finances (SCF), which reports detailed information on demographic and financial characteristics of loan applicants over the three-decade period, 1960–90. In so doing, we build upon Gabriel and Rosenthal's (1991) (GR hereafter) earlier study of the role of race in credit rationing over the period 1978–83.

GR employ a probit model to test whether non-whites are significantly less likely to obtain conventional as opposed to FHA financing. FHA financing fully insures the lender against default risk, but is typically more expensive and subject to lending ceilings. The FHA, however, also prohibits assessments of credit worthiness on the basis of race, gender, property location and age. Borrowers with higher probabilities of default face tighter credit constraints and thus should be more likely to obtain FHA financing.

If discrimination is absent, applicants of different races should face the same probability of obtaining conventional financing after controlling for credit risk. Using the SCF data for the period 1978–83, GR (1991, p. 379) find, however, that 'race effects in the mortgage market persist for reasons unrelated to borrower default risk'. The clear implication is that nonwhites do not possess equal access to conventional financing.

Adopting GR's methodology, we estimate a probit model for the period 1960–90. The results are instructive. Controlling for various proxies of default risk, race emerges as a significant determinant of access to conventional financing for the entire period. Important differences, however, arise when sub-periods are examined. For purposes of defining sub-periods, the year 1980 stands out as a clear dividing point because it marks the onset of deregulation, heightened competition due to the Reagan recession and the thrift crisis as well as more stringent Federal oversight of lending by race.

Examining the sub-period 1960–79, race again emerges as very highly significant in determining the probability of obtaining conventional financing. In fact, it is the sole significant variable, underscoring race's predominant role in access to conventional financing during this time. Importantly, however, in the later period 1980–90, race is no longer significant. In its place we find variables related to human capital and finances: education, amount of the loan, down payment and the appreciation of the property.

We then formally test for structural change by re-estimating over the whole period, introducing an interaction term between race and a period dummy starting in 1980. The coefficients on the period dummy and race are both signifi-

cant and of opposite signs. We test for offsetting effects by imposing the restriction that the sum of these two coefficients be zero. We cannot reject the hypothesis. The implication is that underlying discrimination, evident in the earlier period, was effectively offset by the effects in the 1980s. This strongly suggests that deregulation and heightened competition in the 1980s increased the cost of engaging in discrimination, thereby, reducing its occurrence – a fact predicted by Becker's theory of discrimination.

II DATA AND MODEL SPECIFICATION

Data for the analysis are drawn from the Federal Reserve Board's 1989 Survey of Consumer Finances² (SCF) which contains detailed information on assets, liabilities, income and demographic characteristics of borrowers for a nationally representative sample of 2843 households. The earliest year in which a new FHA loan is originated is 1960. In each year we restrict the sample to households obtaining loans at or below the FHA ceiling, which yields 425 observations between 1960 and 1990.³

A probit model was estimated using maximum likelihood techniques. The dependent variable is one if the family obtained FHA financing, and zero for conventional financing. We estimate each model twice. First we include those variables, the values of which did not change between the time of loan application and the time of the survey. These are the amount of the down payment (DOWNPAY), the purchasing price of the property (PRICE), the age of the applicant at the time of the application (AGE), and the race of the applicant (MINORITY) – a dichotomous variable that takes the value of one if the applicant is non-white, and zero otherwise. All else being the same, an increase in PRICE should increase the likelihood of obtaining an FHA loan, and an increase in DOWNPAY should decrease it. A positive coefficient of MINORITY indicates that non-whites are more likely to obtain a FHA loan as compared to conventional financing, controlling for the influences of other variables.

In the second specification we include six additional explanatory variables describing income, wealth, employment, property valuation and educational characteristics of the borrower. INCOME is the total pre-tax household income from all sources, including wages, salaries, interest payments, rents, dividends, unemployment or workers' compensation, social security, pensions, child support and alimony. WEALTH reports total household wealth and includes saving, checking and money market accounts, IRAs, mutual funds, the value of stocks and bonds and the

² 1989 SCF data contain information on households that obtained a mortgage in 1990 because the survey covered August 1989 to March 1990.

³ 1990 was the latest year available through the ICPSR at the date of estimation.

value of other assets minus any debt. The number of hours worked over a year (YEARHRS) is used to gauge an applicant's employment prospects. A lower value of YEARHRS is indicative of low labour market attachment, part-time work and frequent layoffs, quits, and unemployment. EDUC is the education of the borrower measured in years of schooling. TURNOVER captures job stability, measured as the number of full-time jobs the borrower held divided by the years in the labour market. APP is the annual appreciation rate of the property. If the location of the property is in an area characterized by a high appreciation in value, lenders may well view higher expected future values favourably when assessing risk. On the other hand, if they expect low appreciation or even depreciation, lenders may require additional protection for the loan in the form of insurance. We expect an inverse relationship between the expected appreciation rate of the property and the probability of obtaining a FHA loan.

It should be noted that the 1989 release as well as the earlier releases of the SCF data contain information about the values of this second set of variables for the survey year. Following GR, we use the current values of these variables as proxies for the ones that prevailed at the time of application. This is reasonable if the current values reported in SCF are highly correlated with values at the time of application and if there is no systematic variation in these variables by race over time. For example, the use of the current income as a proxy of the income at the time of application would create a bias toward finding discrimination if whites' incomes systematically went down after the initiation of the loan, and if non-whites' incomes systematically went up. To the extent that the variation in these variables are random across races it is plausible to use them as proxies for the ones that were recorded on the loan application. The same argument applies to the use of appreciation of the property as an explanatory variable. Expectations prevailing at the time of the initiation of the loan are of course not observed. For this reason, *ex-post* appreciation is used as a proxy for expected appreciation. Given the information available to the lender on historical trends in property appreciation in various locations, the two should converge, apart from a random error.⁴

As additional regressors, we entered spouse's education, number of hours worked over a year and the turnover rate as well as quadratic forms of INCOME, WEALTH and AGE to capture non-linearities. In all specifications, these variables were insignificant and, as a result, were dropped

Table 1. Descriptive statistics

Variables	1960-90	1960-79	1980-90
Age	35.83 (10.81)	34.38 (10.36)	37.27 (11.07)
Price	52 858 82 (39 079 76)	40 933 96 (28 266.51)	64 727.70 (44 446.51)
Downpay	16 480 00 (26 198 77)	13 560 38 (20 249 74)	19 385 92 (30 783 51)
Minority	0.17 (0.38)	0.17 (0.37)	0.18 (0.39)
Wealth	70 148.68 (214 517 40)	85 055.93 (216 969 41)	55 311 41 (211 514 42)
Income	69 637 26 (142 305.44)	84 444 34 (193 690.15)	54 830 19 (51 392 63)
Yearhrs	2037 56 (969 74)	1912 09 (1047 16)	2162.44 (870 64)
Turnover	0.15 (0.10)	0.13 (0.07)	0.17 (0.11)
Education	13.63 (2.85)	13.52 (2.79)	13.74 (2.92)
App	0.18 (0.28)	0.14 (0.15)	0.21 (0.37)
Fha	0.26 (0.44)	0.30 (0.46)	0.23 (0.42)

The values are the sample means. The numbers in parentheses are standard deviations.

from subsequent estimations. A dichotomous variable is included to account for the location of the property (urban versus rural). Due to low variation of the variable in the sample (97% of the properties were in urban areas) the variable was insignificant in all specifications, and therefore was not included in the final specification.

The descriptive statistics of the data are summarized in Table 1. Minorities constitute 17% of the homeowners in the 1960-90 sample. The ratio stands at 17% and 18%, respectively, for the 1960-79 and 1980-90 periods. The FHA loans constitute 26%, 30%, and 23% of the total loans in the periods 1960-90, 1960-79 and 1980-90, respectively.

The average wealth of the applicants was \$85 056 in 1960-79, a value which decreased to \$55 311 during 1980-90. The average price of the property increased from \$40 934 in 1960-79 to \$64 728 in 1980-90. Similarly, the average downpayment increased from \$13 560 to \$19 386 during the same period. Average educational attainment of the buyers remained constant around 13.5 years while average age increased from 34.4 years in 1960-79 to 37.3 in 1980-90.

⁴The variables INCOME, WEALTH, APP, AGE, are identical to the ones used by GR. However, there are differences in functional forms. For example, instead of using the appreciation variable in a continuous form, GR employed a dummy variable which takes the value of 1 if APP is more than 15%, and 0 otherwise. Similarly, they created three dummy variables for age groupings (Age 30-39, Age 40-54, Age 55+), rather than using age as a continuous variable. Lastly, income was the only explanatory variable that entered in natural logarithm. GR used a dichotomous variable which took the value of 1 if the unemployment rate within the borrower's occupation exceeded 7% and 0 otherwise, while we use the number of hours worked over a year (YEARHRS). However, employing the variables according to GR specification did not alter the results.

Table 2 Probit equations of loan choice

Explanatory variables	1960-90		1960-79		1980-90	
	IA	IB	IIA	IIB	IIIA	IIIB
Constant	-0.411 (-1.544)	1.311** (2.324)	-0.034 (-0.091)	1.019 (1.325)	-1.231** (-2.669)	0.669 (0.683)
Age	-0.012* (-1.721)	-0.020** (-2.363)	-0.006 (-0.578)	-0.014 (-1.095)	-0.007 (-0.663)	-0.007 (-0.568)
Price	6.79E-6** (2.257)	0.81E-5** (2.254)	-8.39E-6 (-1.140)	-0.90E-5 (-1.002)	0.18E-4** (3.862)	0.2E-4** (3.572)
Downpay	-1.85E-5** (-3.484)	-0.19E-4** (-3.141)	-1.10E-5 (-0.803)	-0.18E-4 (-1.144)	-0.29E-4** (-4.092)	-0.3E-4** (-3.476)
Minority	0.479** (2.805)	0.382** (2.092)	0.679** (2.715)	0.741** (2.732)	0.348 (1.395)	0.131 (0.470)
Wealth	—	0.34E-6 (0.778)	—	0.69E-6 (1.395)	—	0.68E-6 (0.467)
Income	—	0.9E-8 (0.012)	—	0.61E-6 (0.760)	—	-0.38E-5 (-0.794)
Yearhrs	—	-0.21E-3** (-2.402)	—	-0.20E-3 (-1.578)	—	-0.86E-4 (-0.578)
Turnover	—	-0.446 (-0.576)	—	-1.186 (-0.832)	—	0.354 (0.323)
Education	—	-0.061** (-2.265)	—	-0.005 (-0.137)	—	-0.114** (-2.752)
App	—	-1.393** (-2.539)	—	-1.428 (-1.418)	—	-1.470** (-1.962)
<i>n</i>	424	404	211	203	213	201
Log-likelihood	-227.58	-206.07	-116.00	-107.85	-100.92	-85.56
Cases correct	317	298	151	149	168	163

The dependent variable (Fha) is one if the house is purchased using FHA financing, and zero otherwise. The numbers in parentheses are the *t*-ratios.

*The coefficient is significant at the 10% level or better.

**The coefficient is significant at the 5% level or better

Over the entire period, minorities obtaining FHA financing constituted 43% of all minority mortgage borrowers compared to 23% for non-minorities. During 1960-79, 25% of all non-minority homeowners acquired a FHA loan, while 54% of the minority homeowners belong to the FHA group. In 1980-90, 33% of minority homeowners obtained FHA financing compared with 21% for non-minority homeowners.

III. ESTIMATION RESULTS

Table 2 reports results from estimations of the probit model for the entire 1960-90 period and the two sub-periods.⁵ Column IA demonstrates that AGE, MINORITY, PRICE and DOWNPAY are all statistically significant for the

period of 1960-90. AGE, which is used as a proxy for the human capital of the borrower at the time of application, has a negative coefficient, signifying that an increase in age lowers the probability of obtaining a FHA loan. DOWNPAY and PRICE have negative and positive coefficients, respectively, indicating that an increase in down payment lowers the probability of obtaining a FHA loan, whereas an increase in the purchasing price of the property increases it. MINORITY has a positive and statistically significant coefficient, indicating that non-whites have a greater likelihood of obtaining FHA financing, controlling for downpayment, price of the house and age.

Column IB reports the results of the extended model for 1960-90. Variables used to proxy lender concerns about default risk have the anticipated effect on the type of loan obtained. Once again, higher downpayments and an

⁵In the data set there were two observations where the property value appreciated 900% and 1004% in one year. In both cases the properties were purchased in 1989. In the first case, the purchase price was 35 000 and the value of the property was declared to be 400 000 in 1990. In the second case, the purchase price was 50 000 and the 1990 value was declared 500 000. These seemed to be key punch errors and were dropped from the data set. There were seven additional observations where the annual average appreciation was more than 100%. We also estimated the models excluding these observations. The results, which are available upon request, were virtually the same as the ones reported in the paper.

increase in age reduce the probability of obtaining a FHA loan, while an increase in the price of the property increases it. As is evident in the table, wealth, income and the turnover rate of the borrower have no significant impact on loan type. In contrast, the coefficients on EDUC and YEARHRS and APP are negative and significant, indicating that increases in the years of schooling, the number of hours worked per year and the appreciation of the property reduce the likelihood of obtaining an FHA loan. MINORITY has a positive and significant coefficient as was the case in the model reported in IA, indicating that non-white households are less likely to obtain conventional loans even after controlling for proxies of default risk.

Column IIA reports results for 1960–79 for the model which incorporates age, race, price and downpayment only. The race variable (MINORITY) is again highly significant. In fact, it is the sole significant variable in the model. In column IIB we report estimation results of the extended model. None of the additional variables are significant and, as is the case with column IIA, race is the only determinant, underscoring the primary importance of race in credit rationing over the period 1960–79.

Columns IIIA and IIIB report results for period 1980–90. The results stand in marked contrast to the earlier period. The coefficient on MINORITY switches from highly significant to insignificant. The indication is that non-whites no longer faced a lower probability of obtaining conventional financing after 1980, controlling for other factors.⁶ The determinants which emerge as significant in this later period are ones which capture considerations of human capital and finances, namely the level of educational attainment of the applicant, the downpayment, the price of the house and appreciation.

In Table 2 the row titled 'Cases Correct' reports the number of observations on mortgage type which are predicted correctly. For example, in Column IA, the model predicts 317 of 424 total cases correctly (75%). Overall, the predictive power of the models varies between 72% and 79%.

The contrasting findings for the two periods suggest a structural break, which we formally test for by re-estimating the model for the entire period with the addition of an interaction variable between race and the year in which the mortgage was obtained. More formally, we estimate

$$FHA_j = \alpha + \beta \text{MINORITY}_j + \gamma_i X_{ij} + \delta Z_j + \varepsilon_j \quad (1)$$

where X_{ij} denotes the explanatory variables of the two models reported in Table 2 for the j th family, excluding the MINORITY dummy, $Z_j = \text{MINORITY}_j \times \text{YR80}_j$, where YR80_j is a dichotomous variable which takes the value of

Table 3. Probit equations of loan choice

Explanatory variables	1960–90	
	A	B
Constant	– 0.443* (– 1.657)	1.239** (2.193)
Age	– 1.15E – 2* (– 1.707)	– 0.019** (– 2.251)
Price	7.81E – 6** (2.537)	0.91E – 5** (2.483)
Downpay	– 2.01E – 5** (– 3.697)	– 0.2E – 4** (– 3.322)
Minority	0.818** (3.491)	0.711** (2.90)
Minority × 1980	– 0.653** (– 2.113)	– 0.642** (– 2.015)
Wealth	—	0.36E – 6 (0.827)
Income	—	– 0.48E – 7 (– 0.064)
Yearhrs	—	– 0.19E – 3** (– 2.194)
Turnover	—	– 0.395 (– 0.504)
Education	—	– 0.063** (– 2.332)
App	—	– 1.397** (– 2.546)
<i>n</i>	424	404
Log-likelihood	– 225.32	– 204.01
Cases correct	324	309

The dependent variable (Fha) is one if the house is purchased using FHA financing, and zero otherwise. The numbers in parentheses are the *t*-ratios.

*The coefficient is significant at the 10% level or better.

**The coefficient is significant at the 5% level or better.

one if the mortgage year is 1980 or greater, and zero otherwise. If the purchase is made before 1980 (YR80_j = 0), then Z_j = 0, and the impact of race on the probability of obtaining a FHA loan is β. If the purchase is made on or after 1980, YR80_j = 1 and the impact of race is β + δ. Thus, a negative (positive) value of δ indicates a decrease (increase) in the coefficient of MINORITY, which in turn implies a decline (increase) in discriminatory lending practices after 1980.

Table 3 reports estimation results with the interaction term included. The estimated coefficient of the interaction variable, δ, is – 0.653, and is significant at the 3% level (in the model that includes age, race, downpayment and purchasing price of the property (column A of Table 3)). This

⁶ It should be noted that when we estimate the model using the GR sample of 1978–83, we still find a positive coefficient of race (0.536) in the larger specification with a *t*-ratio of 2.438, which is significant at the 1% level. The coefficient of MINORITY in the narrow specification is 0.621 with a *t*-ratio of 2.984. This result and other estimated coefficients are consistent with the ones reported by GR (these results are available on request).

implies a structural change in 1980 which reduced discrimination. The coefficient of MINORITY (β) is significant with a value of 0.818 and a sign opposite of δ . The same is true in the larger model depicted in column B, where estimated δ and β are -0.642 and 0.711 , respectively.

The relative magnitudes of β and δ raise the interesting possibility that their sum may not be significantly different from zero. If this is the case, the conclusion to be drawn is that changes after 1980 offset the effect of racial bias evident in the earlier period. To test the hypothesis, we imposed the restriction of $\beta = -\delta$ and re-estimated the two versions of model (1). The restricted model corresponding to column A of Table 3 (not reported in the interest of space) possesses a log-likelihood of -225.572 , as compared with the log-likelihood of the unrestricted model of -225.316 , which taken together yield a likelihood-ratio statistic of 0.512 . Similarly, the log-likelihood of the unrestricted model reported in column B of Table 3 is -204.014 , whereas it is -204.053 when the restriction of $\beta = -\delta$ is imposed, generating a likelihood-ratio statistic of 0.072 . We therefore cannot reject the hypothesis that the structural change starting in 1980 offsets the discrimination which prevailed during the prior period. Our interpretation of this result is that the increased costs of engaging in discrimination reduced its occurrence. The latter explanation certainly fits well with Becker's seminal treatment of discrimination.⁷

IV. CONCLUSIONS

This paper focuses on the determinants of credit rationing in the United States over the period 1960–90 using microdata from the Survey of Consumer Finances. We also examine the effects of structural shifts in the 1980s attributable to the thrift crisis, deregulation, increased competition and more stringent federal reporting requirements on discriminatory lending practices.

The evidence strongly supports the view that, prior to 1980, significant discrimination existed in credit rationing with non-whites facing a lower probability of acquiring a conventional loan as compared to their white counterparts, even after controlling for other factors. In fact, race turns out to be the only significant determinant of the mortgage type secured, underscoring the dominant role of race in credit rationing over the period 1960–79.

These results stand in sharp contrast to those from the decade following. In the later period, 1980–90, the evidence

indicates that race no longer constitutes a significant determinant of the probability of obtaining conventional financing. In its place, education, price of the home, downpayment and property appreciation emerge as the significant factors in lending decisions.

We formally test for a structural shift between the sub-periods by introducing an interaction term between the year 1980 and race. The evidence strongly suggests that underlying discrimination in credit rationing is counterbalanced by increased competition and regulatory changes taking place after 1980. These results comport well with the theory of discrimination, which predicts that enhanced competition, greater oversight and stiffer penalties will increase the costs of indulging tastes for racial prejudice and therefore reduce discrimination. If this is the case, and the evidence here suggests that it is, then, to the extent that the thrift crisis and the recession of 1980–82 are responsible for enhanced competition and reduced discrimination, their substantial costs are not without societal benefit.

ACKNOWLEDGEMENTS

The authors would like to thank Daniel I. Rees and Jeffrey Zax for helpful discussions, an anonymous referee for helpful comments, and Alptekin Avcioglu for research assistance. All remaining errors are ours.

REFERENCES

- Becker, G. S. (1971) *The Economics of Discrimination*, The University of Chicago Press, Chicago
- Black, H., Schweitzer, R. and Mandell, L. (1978) Discrimination in mortgage lending, *American Economic Review*, **68**, 186–91
- Gabriel, S. A. and Rosenthal, S. S. (1991) Credit rationing, race, and the mortgage market, *Journal of Urban Economics*, **29**, 371–79
- Munnell, A., Browne, L. E., McEneaney, J. and Tootell, B. (1992) Mortgage lending in Boston: Interpreting HMDA data *Working Paper Series of the Federal Reserve Bank of Boston* 92–7
- Noulas, A. G., Ray, S. C. and Miller, S. M. (1990) Returns to scale and input substitution for large U.S. Banks, *Journal of Money Credit and Banking*, **22**, 94–108
- Rosenblatt, R. (1992) (*Los Angeles Times*) Race disparity in L.A. home loans, *The Denver Post*, 6 September, 1992, 3A
- Schafer, R. (1974) Racial discrimination in the Boston housing market, *Journal of Urban Economics* **6**, 176–96
- Warner, A. and Ingram, J. (1982) A test for discrimination in a mortgage market *Journal of Bank Research*, **13**, 116–24

⁷ It is possible that reduced tastes for discrimination are responsible for the empirical findings but given the timing the cost explanation seems much more plausible

Copyright of Applied Economics is the property of Routledge and its content may not be copied or emailed to multiple sites or posted to a listserv without the copyright holder's express written permission. However, users may print, download, or email articles for individual use.