U.S. Department of Housing and Urban Development
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Equal Credit Opportunity: Accessibility to Mortgage Funds by Women and by Minorities

Volume I

Final Technical Report

EQUAL CREDIT OPPORTUNITY ACCESSIBILITY TO MORTGAGE FUNDS BY WOMEN AND BY MINORITIES

Volume I

by

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FOREWORD

When the Office of Policy Development and Research began its Women and Mortgage Credit Project, we were motivated by our awareness that, in the past, mortgage lenders had discriminated against women. Indeed, lenders themselves have acknowledged their past practice of discounting wives' incomes.

In addition, research on homeownership had also indicated that women were much less likely to purchase homes than men with similar incomes. Was this because women were being discriminated against?

Until recently, it was impossible to test directly for discrimination in the mortgage market because we did not have the necessary data. Then several states -- among them, California and New York -- began to require state-regulated lending institutions to maintain data, including rejected applications, that would permit monitoring of lending practices on the basis of both sex and race. (This happened even before the implementation of the reporting requirements of the Equal Credit Opportunity Act.) So while continuing to urge women and minorities to enter the mortgage market, we decided, as part of the research component of the Women and Mortgage Credit Project, to examine the newly available data.

Note that only two states are involved. Note also that the study cannot tell us whether there is discrimination at the pre-application stage, with lenders discouraging women and minorities from even applying for a mortgage. But with these cautions observed, the study reveals little evidence of discrimination against women in the mortgage market or of the discounting of wives' incomes.

On the other hand, the study shows continued widespread discrimination against minorities and, to our surprise, some evidence of discrimination against "male-only" applicants.

This two-volume report also puts the lie to another assumption -- that social science research only tells you what you already know. It does not. Read on.

Donna E. Shalala
Assistant Secretary
for Policy Development
and Research

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Chapter 1

INTRODUCTION

A variety of Federal and state statutes currently make it illegal for banking institutions to discriminate in the granting of mortgage loans on the basis of certain characteristics of the borrower such as race, sex, or marital status or on the basis of certain characteristics of the property, such as the arbitrary use of age or location.[1] These laws reflect two social concerns, one relating to individual justice and the other to the viability of urban neighborhoods.

Generally accepted concepts of justice require that individuals not be treated adversely just because they happen to share certain characteristics of a group. Membership in certain groups, especially those defined by the color of a person's skin, has in the past resulted in differential treatment. This concept of justice and its historic violations have led to laws that prohibit discriminatory lending on the basis of certain unacceptable categories while allowing differentiation based on other factors related to the riskiness of the loan such as applicant income or net wealth. The Federal Equal Credit Opportunity Act (as amended, March 23, 1976) embodies this concept of fairness:

> It shall be unlawful for any creditor to discriminate against any applicant, with respect to any aspect of a credit transaction -
>
> (1) on the basis of race, color, religion, national origin, sex or marital status, or age (provided the applicant has the capacity to contract);
>
> (2) because all or part of the applicant's income derives from any public assistance program; or
>
> (3) because the applicant has in good faith exercised any right under the Consumer Credit Protection Act.[2]

Laws requiring disclosure of mortgage lending by census tract or zip code, encouraging financial institutions to "help meet the credit needs of the local communities in which they are chartered consistent with the safe and sound operation of such institutions,"[3] or making discrimination on the basis of the age or location of a building illegal[4] emanate from the concerns of community activist groups. These groups believe that lending institutions contribute to the declining quality of life in certain urban neighborhoods by refusing to grant mortgages even though demand exists, or by granting mortgages with less favorable terms even though the expected yield and risk of loss are the same as in other neighborhoods. Older neighborhoods are usually alleged to be the target of these practices, which are commonly referred to as "redlining." As a consequence, this alleged practice may have its most severe effect on minority groups who tend to be concentrated in redlined areas.

This study uses mortgage application data to examine the extent to which urban mortgage lenders discriminate on the basis of prohibited borrower characteristics and the extent to which allegations by anti-redlining groups are valid. Its focus on the lender's decision-to-lend rather than on the aggregate volume of lending by geographic area, an outcome that reflects both supply and demand factors, differentiates this study from most previous studies.[5] Multivariate statistical analysis is used to determine the impact of the discrimination variables on the probability that a loan will be denied or modified, and the terms of mortgage credit, controlling for objective measures of risk.

The bankers' mortgage lending decision is only one link in a chain of decisions that determine the extent to which decent housing is accessible to minorities and women. Other actors in the urban housing market allegedly have major impacts on the ability of women and minorities to buy homes. Among these actors are real estate brokers who may steer buyers away from or toward certain neighborhoods on the basis of race, sex, or marital status; real estate appraisers who may underappraise certain types of property in a discriminatory manner; or insurance companies who may refuse to sell fire insurance to certain geographic areas or to categories of homeowners.[6] The analysis of the role of these actors (with the exception of appraisers) is outside the scope of this study. Their interaction with mortgage lenders must be kept in mind, however, when interpreting the results of this study. For example, a finding that banks do not appear to discriminate against minorities in making mortgage loans might be due to advance screening by real estate brokers who tell their minority clients that they should not even apply for a bank loan.

THE RESIDENTIAL LENDING PROCESS

A banking institution's decision to make a loan for the purchase of a single family house and the terms on which that loan is made are part of a complex portfolio decision. At one level, the bank must determine the appropriate portion of its assets to hold in the form of mortgages on residential property. The demand for residential mortgages from the bank influences this composition decision through its impact on the expected rate of return and risk on this type of investment relative to alternative types. In addition, liquidity needs, lender attitudes toward risk, and regulatory constraints all play major roles in this decision. Regulatory constraints may affect the portfolio composition directly, as in the case of the requirement that savings and loan associations invest a certain percentage of their assets in real estate, or indirectly, as when a binding usury law applies to certain types of investments such as instate mortgages on one-to-four family houses but not to other types.

At a second level, the lender must determine which applications for loans on specific properties to accept and the terms on which the loans will be made. Those applications of acceptable quality are approved as requested or with modification subject to sufficient funds being available in the portfolio for this type of investment; other applications are rejected.

Both the credit worthiness of the borrower and the security offered by the property influence the quality of the application. The individual's credit worthiness generally depends on such factors as his or her current and expected future income, employment experience and prospects, net wealth, and credit history. The more credit worthy the borrower, the lower is the probability that he or she will default on the loan. As a reflection of the market value of the property, the appraised value measures the property's value as collateral. The greater the collateral in relation to the size of the loan, the less is the risk of loss to the bank in the event of foreclosure.

Uncertainty plays a major role in the lending decision. On the basis of current and past information about the borrower and the property, the lender must project the ability of the borrower to make timely payments in the future and must assess the probability that the value of the property will fall short of the outstanding loan at some future date. As discussed below, this uncertainty may lead banks to develop operating procedures that have discriminatory effects.

Uncertainty is not the only explanation for discriminatory lending, however. The following sections present the range of allegations commonly made against conventional mortgage lenders. These include allegations of discrimination on the basis of both the characteristics of the mortgage applicant and the location of the property.

DISCRIMINATION ON THE BASIS OF THE CHARACTERISTICS OF THE BORROWER

Although mortgage loans are fully secured by specific properties, banking institutions pay close attention to the credit worthiness of the borrower when evaluating mortgage applications. The quality of the collateral protects the lender against loss in a foreclosure situation, but foreclosure is costly and has the potential for creating bad will in the community. Hence, to reduce the probability of delinquency and to minimize the possibility of foreclosure, banks usually perform thorough credit analyses of mortgage applicants.

This was not always the case; for example, during the 1920s, when short maturity, balloon payment loans prevailed, bankers were more concerned with the quality of the collateral than with the credit worthiness of the borrower. Not until the 1930s with the shift to longer maturity amortized loans did bankers introduce borrower ratings and personal interviews. Since World War II, most banks have recognized that borrower characteristics contribute significantly to the riskiness of the loan.

Banks use "objective" factors such as income, net wealth, and credit histories to determine the credit worthiness of the borrower. Representatives of women's and minority groups allege, however, that even the application of these "objective" factors leaves room for discriminatory treatment, especially when banks are not required to explain the reasons for rejection. Banks may, for example, define income differently for different applicants, fail to follow up on adverse credit reports that may be incorrect, or vary the maximum acceptable ratio of monthly payment-to-monthly income or other criteria depending on certain characteristics of the borrower.

The importance of the applicant's personal interview with the loan officer of the bank leaves additional leeway for subjectivity in the loan evaluation process. Subjective evaluation has a relevant and valuable place in lending decisions. The loan officer is assessing hard to measure qualities such as the applicant's strength of attachment to the property, motivation, character, reputation, and stability of family life.[7] This subjectivity of the evaluation process combined with the importance to the lender of borrower characteristics, however, provides a situation in which banks could discriminate, if they wished, against certain categories of borrowers. Whether based on racial prejudice or outdated stereotypes, discrimination against minority, female, or unmarried applicants runs counter to accepted notions of social justice and is now illegal.

Discrimination on Basis of Sex or Marital Status

Married Women. Women's groups complain that married women are treated unfairly by traditional mortgage lending criteria related to the measurement of household income. As documented by several surveys in the early 1970s, mortgage lenders often explicitly discounted the wife's income by 50 percent or more when evaluating mortgage applications.[8] Fifty percent discounting means that a banker treats an application from a two-worker household having $20,000 in annual income with 40 percent contributed by the wife as comparable to that from a single earner household having $16,000 in annual income, all other factors held constant. Such a procedure apparently represents a rule of thumb solution to the problem of estimating the probability distributions of future income for two-earner households.

Although income discounting was apparently widely used, specific practices varied across banks and across applicants. A 1973 study by the U.S. Commission on Civil Rights found that several Hartford banks, for example, treated wives with professional jobs differently from wives with other jobs.[9] In addition, the study found that banks were more likely to discount the wife's earnings if she were of childbearing age or if the household contained preschool children. In some cases the bank might require a "baby letter" to count any of the wife's income at all. A "baby letter" is a physician's statement which attests to the wife's or husband's sterility, their use of approved birth control methods, or their willingness to terminate pregnancy.[10]

The view that the possibility of pregnancy increases the riskiness of the loan is not restricted to the lenders of conventional mortgages. Indeed, pre-1973 standards for VA loans state clearly that the mere possibility of pregnancy is a reason for discounting a wife's income.[11] Although VA policy was changed in July 1973, attitudes changed more slowly as evident from the late 1973 view of a VA official that it is "un-American to count a woman's income" and the only case in which a woman's income could be counted would be if she were "to have a hysterectomy."[12] FHA policy traditionally has been less restrictive in this regard than VA policy; the FHA criterion for fully counting the income of working wives states that "income and motivating interest may normally be expected to continue throughout the early period of mortgage risk."[13] It is, however, somewhat vague, leaving room for individual interpretation.

The practice of income discounting can be criticized on the grounds of being unwise bank policy, having discriminatory effects, and being inconsistent with generally accepted concepts of social justice.

Many groups have argued that 50 percent or more income discounting represents bad bank policy because it is based on outdated stereotypes of the role of women in the labor force. These groups argue that changing social conditions and liberal maternity leave policies, render obsolete the assumption implicit in income discounting that married women have little long run commitment to remaining in the labor force.[14] A recent HUD-sponsored study provides statistical evidence in support of this argument. Using Parnes data on household incomes between 1966 and 1970, the study found that the 50 percent rule represents over-discounting of second earner incomes.[15] This would be even more true today in light of continued changes in the role of women in the labor force during the 1970s.[16] In addition, a simple rule of thumb calling for 50 percent or any other fixed discount is not likely to incorporate fully the differences in both the expected level and the variance of income for different household types.

Second, critics of income discounting have emphasized its undesirable discriminatory effects. Since non-white wives tend to contribute more to household income than do white wives, for example, income discounting has a potentially serious impact on the ability of minority households to obtain mortgage credit.[17] Discounting related to whether the wife is of childbearing age may be undesirable because of its differential impact on young households.

Finally, and most fundamentally, the practice of income discounting can be criticized for its use of expectations about group behavior in the evaluation of individual applications. From the bank's perspective, the absence of good applicant-specific data other than current income, employment history, and credit record may make this approach the most rational solution to the difficult problem of projecting an applicant's future income and ability to pay debts. From society's perspective, however, this approach runs counter to the generally accepted concept of justice that people should be treated as individuals instead of as group members; in particular, they should not be categorized into disadvantageous classifications.

The Equal Credit Opportunity Act (ECOA) prohibits sex-based classifications, and makes income discounting illegal under federal law. The Federal Reserve Board's Regulation B relating to equal credit opportunity explicitly rules out the use of "assumptions or aggregate statistics relating to the likelihood that any group of persons will bear or rear children or, for that reason, will receive diminished or interrupted income in the future."[18] The Federal Home Loan Bank Board's nondiscrimination guidelines rule out income discounting even more explicitly:

> A practice of discounting all or part of either spouse's income where spouses apply jointly is a violation of section 527 of the National Housing Act. As with other income, when spouses apply jointly for a loan, the determination as to whether a spouse's income qualifies for credit purposes should depend upon a reasonable evaluation of his or her past, present, and reasonably foreseeable economic circumstances.[19]

Single Women. Women's groups believe that lenders discriminate against the single woman (single, divorced, widowed, or separated) because of their prejudicial attitudes toward women. It is alleged that these attitudes are based on outdated myths that women are inherently unstable, are incapable of conducting their own affairs, and need the protection of a male; that the divorced woman must be emotionally unstable; and that the inability of an unmarried female to find a man demonstrates that something must be wrong with her.[20]

In addition to outright denial on the basis of sex, illegal under ECOA, women's groups believe that banks discriminate in more subtle ways such as imposing so many additional requirements on female applicants that they either withdraw their applications or suffer unacceptable financial burdens. These requirements include the payment of all outstanding debts, the purchase of mortgage insurance, the taking of monthly payments directly from the applicant's pay check, and the co-signing of the mortgage by an appropriate male.[21]

Female applicants may also be adversely affected by lender evaluation policies that, while not necessarily designed to discriminate against women, have the effect of doing so. The exclusion from the loan evaluation process of alimony, child support payments and public assistance is one such policy because of the importance of these income categories to single female applicants. According to the Federal Reserve Board's Regulation B implementing the Equal Credit Opportunity Act, a lender must now "consider alimony and child support payments as income to the extent that they are likely to be consistently made."[22] The regulations go on to state the factors that the bank may consider in determining the likelihood of consistent payments. Lender treatment of alimony or child support is likely to be most problematic for the separated person, for whom the spouse's liability is unclear.

The Federal Reserve Board Regulations also explicitly state that public assistance income must be fully counted as income. Although not explicitly a woman's issue since men receive public assistance as well as women, the higher incidence of female headed families on welfare would make exclusion of such income a particularly serious problem for women.

Women may also be treated unfavorably because of insufficient credit records. An unmarried woman, for example, may have no credit record because of past discrimination against her by consumer credit companies while a divorced woman may have no credit record in her own name.[23] Thus, unmarried, divorced or separated women may not qualify for mortgages even though they have adequate income and wealth.

Finally, banks have been criticized for discriminating on the basis of marital status.[24] Women's groups view this alleged discriminatory behavior as an outcome of bankers' prejudicial attitudes toward women and criticize it for its potential impact on women who are disproportionately single.[25] It should be noted, however, that ECOA makes discriminatory lending behavior on the basis of marital status illegal independent of the sex of the applicant.[26] One interesting question is whether banks discriminate against applications involving any unmarried or separated applicants, whether such applicants be male or female or both male and female applying jointly.

Racial Discrimination

In the past, racial prejudice has clearly been a factor in the lending decisions of banks.[27] Mortgage lenders played a key role in the racial discrimination practiced by all segments of the real estate industry, including the enforcement through 1948 of a restriction in the deed on the race of future purchasers. Racial discrimination in mortgage lending is clearly illegal under the 1968 Civil Rights Act. However, recent studies employing multivariate statistical techniques on individual applicant information indicates that this law has not eliminated racial discrimination in mortgage lending.

Glenn Lowry's study based on a six-metropolitan area sample of mortgage applications from the summer and fall of 1977 supports the hypothesis that some subgroups of the non-white population are discriminated against.[28] In particular, Lowry found that nonwhites seeking to purchase very expensive homes and nonwhites with tenuous financial positions seeking to buy modest homes suffered significant disadvantages compared to similarly situated whites. He also found evidence of wide variation in lenders' treatment of racial minorities both across regions and among lenders within a given region.

The mortgage lending decisions during 1976 and 1977 of mutual savings banks in five New York metropolitan areas were recently studied by Robert Schafer.[29] The study concludes that minority applicants in the four largest areas experienced substantial racial discrimination in the mortgage lending process. Consistently across the four largest metropolitan areas, black applicants were, on average, twice as likely to have their mortgage application denied as were similarly situated whites. Only in the New York City area, however, was there evidence of substantial discrimination against other minorities (Asians and Hispanics).

GEOGRAPHIC DISCRIMINATION

At the heart of the current redlining debate is the allegation that lenders sometimes evaluate loan applications on the basis of the property's location without looking at the applicant's credit worthiness or the value of the specific property as collateral. In its simplest form, redlining refers to the delineation of whole neighborhoods within which lenders refuse to grant mortgage credit. While outright refusal to lend is one form of redlining, antiredlining groups point to several indirect tactics such as unfavorable terms and systematic underappraisal of property that could have the same effect.

The terms of the loan (i.e., loan-to-value ratio, maturity, interest rate, discount points, and closing costs) can be made so unfavorable as to make any offered loan unacceptable to a creditworthy applicant. If the applicant were trying to purchase a property for its market value of $40,000 and a bank only offered a 40 percent-of-value loan, the applicant would face the difficult task of raising $24,000. As a result, the applicant might not be able to purchase the property, and the net effect could be the same as if the bank had refused to lend in the area.

If the property were underappraised, (e.g., at $20,000 with a market value of $40,000), the size of the loan would be limited. Using this tactic, a lender could offer the potential borrower a loan of only $16,000 using the conventional loan-to-value ratio of 80 percent. Again, the net effect could be to prevent the applicant from purchasing the property. Allegations of underappraisal are frequently made by community organizations concerned with mortgage lending in their neighborhoods. Antiredlining groups also allege that the lenders frequently justify lower appraisals by applying more rigid structural standards or other appraisal criteria (e.g., minimum house width, use of asbestos shingles, minimum number of bedrooms and bathrooms, minimum garage size, mixed or inharmonious land uses) to properties in redlined areas. They also say that lenders, through their appraisal staff, presume that certain buildings are economically obsolescent even though a market for them still exists. Another common allegation is that banks stall the appraisal until the purchase and sale contract has expired.

For the purposes of this study redlining is defined as follows:

> Redlining is the refusal to lend, or the granting of mortgages with less favorable terms, even though the expected yield and risk of loss are the same as they are for mortgages granted in other areas.

To implement any redlining tactic, lending institutions or some other entity, such as insurance companies, would have to identify the areas to be redlined. Two of the criteria most frequently alleged to be used to differentiate among neighborhoods for these purposes are age of housing and race. People living in neighborhoods having a significant proportion of old housing stock or black or minority households have indicated that they believe that banks are redlining their neighborhoods.

Previous Redlining Studies. A multitude of studies by community groups in large cities throughout the United States examining the geographic distribution of loans granted by banking institutions purport to provide support for redlining claims. None of these studies, however, -- even the most carefully done -- provide clear evidence on the redlining phenomenon as defined above.[30] The major difficulty arises from their failure either to recognize or to control statistically for the non-redlining measures banks may legitimately use to make either no or only a few loans in specific geographic areas. These include: the lack of adequate demand for mortgage loans in an area, relatively few creditworthy applicants, external risks (e.g., widespread vandalism or nearby vacant buildings) that greatly threaten the value of the property, and decisions by entities beyond the control of lenders such as real estate brokers and insurance companies.

Most previous studies, especially those by community activist groups, can be criticized as well for their failure to make the distinction between neighborhood disinvestment and redlining, a distinction particularly important for policy purposes. It would be fair to say that redlining is at least a contributing factor to disinvestment in those neighborhoods where redlining results in an arbitrary withdrawal of funds. Neighborhood disinvestment, however, can take place in the absence of any redlining by banks. For example, property values may fall in a neighborhood because the housing stock is obsolete (i.e., the rooms and apartments are small with inadequate open play space for children) and the households' real incomes have increased enough to allow them to buy or rent houses or apartments elsewhere with larger rooms and more open space. If an area is considered very risky (e.g., high foreclosure rate, high rate of fire loss, large property tax arrearages) and banks are no longer lending there, it is difficult to determine whether their decision to stop lending in the area preceded and precipitated the decline, accelerated an already existing decline, or occurred subsequent to the decline.

Robert Schafer's study of New York mutual savings banks includes controls for the various legitimate considerations upon which lenders may base their decision.[31] While this study found widespread evidence of discrimination against individual minority applicants, the findings on redlining were mixed. Allegations that particular neighborhoods were redlined in the Rochester and Syracuse metropolitan areas were contradicted and there was very little evidence of redlining in Buffalo. In the Albany-Schenectady-Troy area, the results were consistent with the redlining allegations in two neighborhoods and contradictory in six others. In the greater New York City area, the results contradict the allegation for two neighborhoods and are inconclusive for five others. Attempts to test the allegation that older neighborhoods were redlined proved inconclusive in all five metropolitan areas.

STUDY OUTLINE

This study examines empirically the extent to which mortgage applicants are discriminated against because of their sex, race, marital status, or age or because of the neighborhood (age, racial composition, or geographic area) in which their property is located. To examine this issue, detailed information is needed first, on the objective factors such as the creditworthiness of individual applicants and the security value of the property that legitimately affect the mortgage lending decision and, second, on the characteristics of the applicant or the property that constitute illegal discrimination. Fortunately, California and New York state laws require state-regulated banks to maintain this detailed information on all mortgage applications.[32] With the exception of the pilot study being conducted concurrently with this study by the Federal Home Loan Bank, no other comparable data set is available.[33]

The California and New York data sets are not identical; both have strengths and weaknesses. The New York recording form includes, for example, marital status, net wealth, and years at present occupation, all of which are omitted from the California form. While the New York form records house purchase price and income in interval form only, California provides much more precise and detailed information on these variables including the separate incomes of the applicant and co-applicant where applicable. In addition, the California form provides information on the final terms of the mortgage contract which, except for the loan-to-value ratio, is not available in New York. By relying on both data sources, this study can focus on a broader range of issues than would be possible with a single data set. In particular, the New York information makes possible a test of discrimination on the basis of marital status while the California data set permits an examination of discriminatory behavior in the treatment accorded secondary income, the setting of mortgage terms, and the appraisal practices.

Two other major advantages flow from the use of two separate data sets. First, a wide variety of lending institutions can be analyzed and compared. The California data cover all state-chartered savings and loan associations in California, while the New York data apply to state chartered commercial banks, savings and loan associations, and mutual savings banks. To the extent possible, the New York data are analyzed separately by type of bank.

Second, the data cover a wide range of economic conditions. The rapid economic growth and booming housing market in California contrast sharply with the situation in New York state. In addition, a wide variety of metropolitan areas can be studied in both states, allowing large areas to be compared with small and rapidly growing areas with slowly growing. For example, the San Jose metropolitan area is growing more rapidly than the rest of California because of the growth of the high technology firms in the "Silicon Valley." And in New York, the Rochester area's economy is much better off than that of the rest of the state.

An important consequence of the variety of banks and economic conditions covered by the two data sources is the potential generalizability of the results. Results that are consistent across such a wide variety of circumstances will provide a firm foundation for the formulation of national policy.

The next chapter discusses the theoretical bases for the models estimated in the following chapters. Models are presented to analyze three issues:

1. Appraisal practices;
2. Decisions to approve, modify, or deny a mortgage application;

3. Mortgage credit terms (interest rate, loan-to-value ratio, maturity period, downward loan modifications, and loan fees).

Chapters 3 to 5 present the results for California savings and loan associations. In Chapter 3, the lending decision is analyzed by considering four outcomes to a loan application: approved as applied for, increasing the requested loan amount prior to approval, decreasing the requested loan amount prior to approval, and denial. Chapter 4 contains an analysis of the conditions under which mortgage credit is extended; that is, the interest rate, loan amount, maturity period, and loan fees. Appraisal practices are analyzed in Chapter 5, using information on denied as well as approved mortgage applications.

Chapters 6 and 7 present the results for state regulated lenders in New York State. Chapter 6 is devoted to the analysis of four outcomes to a mortgage application: approval as applied for, modification prior to approval, denial, and withdrawal. Chapter 7 analyzes downward modifications in the requested loan amount.

Footnotes - Chapter 1

1. Equal Credit Opportunity Act (as amended March 23, 1976), Public Law 93-495, Title VII; Federal Home Loan Bank Board, CFR Title 12, Ch. V, Subchapter B, Part 528 (effective 7-1-78); California Business and Transportation Agency, Department of Savings and Loans, Subchapter 4 of Chapter 3, Title 21, "Regulations Pursuant to the Housing Financial Discrimination Act of 1977" (May 13, 1979); and New York, Executive Law §296-9(1976).

2. Equal Credit Opportunity Act, Public Law 93-495, Title VII, Section 701 (March, 1976).

3. Public Law 95-128, 95th Cong., 1st sess. (October 12, 1977).

4. Federal Home Loan Bank Board, C.F.R. Title 12, Ch. V, Subchapter B, Part 528.

5. Two major exceptions are Glenn C. Lowry, "An Analysis of Discrimination in Mortgage Lending," Working Paper No. 42, Banking Research Center, (Evanston, Ill.: Northwestern University, 1977); and Robert Schafer, Mortgage Lending Decisions: Criteria and Constraints (Cambridge,MA.: MIT-Harvard Joint Center for Urban Studies, 1978).

6. There is some evidence that each of these actors participate in discriminatory behavior. See U.S. Department of Housing and Urban Development, "Background and Initial Findings of the Housing Market Practices Survey," (Washington, D.C.: 1978); U.S.

Department of Housing and Urban Development, Insurance Crisis in America (Washington, D.C.: 1978); and United States v. the American Institute of Real Estate Appraisers, et al., Civil Action No. 76 C1448 (N.D. ILL., 1976) (complaint and settlement agreement with the American Institute of Real Estate Appraisers and the National Association of Realtors).

7. See, for example, Willis Bryant, Mortgage Lending (New York: McGraw-Hill 1962), ch. 5; and United States Commission on Civil Rights, Mortgage Money: Who Gets It? A Case Study of Mortgage Lending Discrimination in Hartford, Connecticut, (Clearinghouse Publication 48, June 1974), ch. 3.

8. A 1971 Federal Home Loan Bank survey of savings and loans found that more than half the respondents would count less than fifty percent of the income of a wife, age 25, with 2 school age children with full time secretarial position. A 1972 U.S. Saving and Loan League survey found that only 28 percent of the surveyed lenders would count wife's income fully. Only 6 out of 14 respondents from 9 lending institutions in the Hartford, Connecticut area, said they would fully count the wife's income even under favorable conditions. These surveys are cited or reported in a variety of sources including National Council of Negro Women, Inc. Women and Housing: A Report on Sex Discrimination in Five American Cities (U.S. Department of Housing and Urban Development, June 1975), and U.S. Commission on Civil Rights, Mortgage Money: Who Gets It?

9. U.S. Commission on Civil Rights, Mortgage Money: Who Gets It?, Ch. 4, Table 8.

10. Ibid., p. 42.

11. See, for example, testimony by William L. Taylor, "Economic Problems of Women," Hearings Before the Joint Economic Committee, U.S. Congress, 93rd Congress, 1st session (Washington, D.C.: United States Government Printing Office, 1973), p. 196 and p. 176.

12. Ibid.

13. U.S. Department of Housing and Urban Development, Mortgage Credit Analysis Handbook for Mortgage Insurance on One to Four-Family Properties (1972), sec. 1-22.

14. For example, see Taylor testimony, 1973 Joint Economic Committee Hearings.

15. U.S. Department of Housing and Urban Development, Women in the Mortgage Market (Washington: U.S. Government Printing Office, 1976). Even though the study gives insufficient attention to the variance of income, its general conclusion that realistic projections would lead to less than 50 percent discounting is probably valid.

16. Between 1947 and 1964, the labor force participation rate of women in the age group twenty-five to thirty-four increased about three-tenths of a percentage point per year. Between 1964 and 1977, the participation rate rose at a rate of 1.7 percentage points per year. See Ralph E. Smith, Women in the Labor Force in 1990 (Washington: The Urban Institute, March 1979), p. 11 and passim.

17. See, for example, testimony by Taylor, 1973 JEC Hearings, p. 195; U.S. Commission on Civil Rights, Mortgage Money: Who Gets It?, ch. 4; and National Council of Negro Women, Inc., Women and Housing, p. 71.

18. Federal Reserve Board, Regulation B, 12 C.F.R. 202.6 (Effective March 23, 1977).

19. Federal Home Loan Bank Board, Nondiscrimination Guidelines, C.F.R. Title 12, Ch. V, Part 531.8.

20. National Council of Negro Women, Inc., Women and Housing, pp. 53, 63, 66.

21. Ibid., pp. 61-65.

22. Federal Reserve Board, Regulation B, 12 C.F.R. 202.6 (effective March 23, 1977).

23. National Council of Negro Women, Inc., Women and Housing, pp. 64-66.

24. See, for example, Taylor testimony, 1973 JEC Hearings; and U.S. Commission on Civil Rights, Mortgage Money: Who Gets It, Ch. 4.

25. Taylor testimony, 1973 JEC Hearing.

26. The U.S. Court of Appeals for the District of Columbia has ruled that the Equal Credit Opportunity Act requires a savings and loan association to aggregate the incomes of an unmarried couple in determining their creditworthiness in processing a joint mortgage application. Markham v.Colonial Mortgage Service Co., Associates, Inc. (August 2, 1979) as reported in the Housing and Development Reporter, August 20, 1979, pp. 279-80.

27. See generally, Charles Abrams, Forbidden Neighbors (New York: Harper, 1956); and Davis McEntire, Residence and Race (Berkeley, California: University of California, 1960).

28. Glenn C. Lowry, "An Analysis of Discrimination in Mortgage Lending," Banking Research Center, Working Paper No. 42 (Evanston, Ill.: Northwestern University, 1978).

29. Robert Schafer, Mortgage Lending Decisions: Criteria and Constraints (Cambridge, MA.: MIT-Harvard Joint Center for Urban Studies, 1978).

30. For a thorough review of the redlining literature, see A. Thomas King, "Redlining: A Critical Review of the Literature with Suggested Research," Federal Home Loan Bank Board, Draft, 1978.

31. Robert Schafer, op. cit.

32. California, Business and Transportation Agency, Department of Savings and Loan, Loan Register Report; New York, Banking Department, Supervisory Procedure G-107.

33. The Comptroller of the Currency and the FDIC conducted a large-scale survey of mortgage lending applications at 300 lending institutions around the country, but the quality of the data was disappointing. For example, participation was voluntary and only 176 of the 300 institutions selected actually participated. The survey consisted of a two-part form; one part to be completed by the lender and the other to be completed by the applicant. Although banks sent in 13,613 parts and applicants 10,287, only 5,107 matched. And only 138 of the matches were rejected applications.

Since March 23, 1977, the Federal Reserve Board (Regulation B) has required member banks to "request" information on the race, national origin, sex, marital status, and age of applicants for "consumer credit relating to the purchase of residential real property." Unfortunately, Regulation B only requires that the applicant and joint applicant be "asked, but not required" to supply this information.

CHAPTER 2

MODEL DEVELOPMENT

The access to mortgage credit of women, minorities, old people, and those trying to purchase houses in allegedly red-lined areas may be limited or restricted in at least four ways. First, a lender may discourage certain potential borrowers from submitting a formal application for a mortgage. Second, after the borrower has submitted a formal application, the person authorized by the lending institution to estimate the value of, or appraise, the property may differentially and systematically underappraise certain types of properties relative to others. Underappraisal of this type reduces the maximum loan amount below what it would be with non-discriminatory appraisal. Third, the lender may use its loan application evaluation process to discriminate systematically against certain types of applicants with the result that such applicants face higher probabilities of loan denial or adverse modification than similarly situated applicants who are not discriminated against. Fourth, the lender may arbitrarily impose harsher mortgage loan terms (e.g. higher interest rates, shorter maturity periods, and higher loan fees) on some applicants relative to others. In cases where the potential borrower cannot afford the harsher terms, this practice may have impacts similar to those of outright loan denial.

This study deals with three of these four ways that lenders may limit the access to mortgage credit. Since our data base includes only formal applications, we are unable to examine the first method, pre-screening by lenders. This is unfortunate;

many allege that pre-screening, although illegal when it has adverse impacts on applicants from the groups of interest, is a widespread method of lender discrimination. To the extent that our results provide evidence of discrimination at the subsequent stages of the lending process, they suggest that discriminatory pre-screening may exist as well. The reverse is not true, however; absence of evidence supporting charges of discrimination related to formal applications does not imply a lack of discrimination at the pre-application stage.

The following sections present the general form of the models used in our empirical analysis of both the California and New York data sets. First, we outline a portfolio choice model of the lending decision. Second, we discuss the decision-to-lend models, models that predict the probabilities of various loan application outcomes such as denial, approval with modification, and approval with no modification. Third, we present three sets of mortgage term models: a downward modification model; a simultaneous model of the interest rate, term-to-maturity, and loan-to-value ratio; and a loan fee model. Finally, we conclude the chapter with an outline of our appraisal model.

PORTFOLIO CHOICE MODEL

Upon receiving an application for a mortgage, a lender must decide whether to approve the application as received, approve it with some modification in terms, or turn it down. Lenders may discourage the submission of formal applications from applicants they belive will likely be denied. Applicants may also withdraw their applications prior or subsequent to a lender's decision. (See Figure 2-1 for an illustration of these decisions.)

A lender's decision on a mortgage application can be viewed as a function of borrower characteristics, the quality of the collateral, and the requested terms as expressed in the following model:

$$P_{ij} = f(B_j, C_j, T_j) \qquad (2.1)$$

where P_{ij} = probability of outcome i (ranging from approval as applied for to denial) on the j^{th} application;

B_j = vector of borrower characteristics, such as income and net wealth;

C_j = vector of property characteristics that describe the quality of the collateral, and

T_j = vector of the requested terms of the mortgage.

As noted in Chapter 1, this lending decision should be viewed in a portfolio choice context.

Borrower characteristics

The bank is concerned with the return it will earn on each mortgage loan. For any given loan terms, the net income received by the bank in any year t of the loan contract depends on whether or not the borrower makes the scheduled payments on time. This, in turn, depends on certain characteristics of the borrower such as his/her income in year t. A simple linear relationship between the probability of default in year t (P_t) and borrower

Figure 2-1

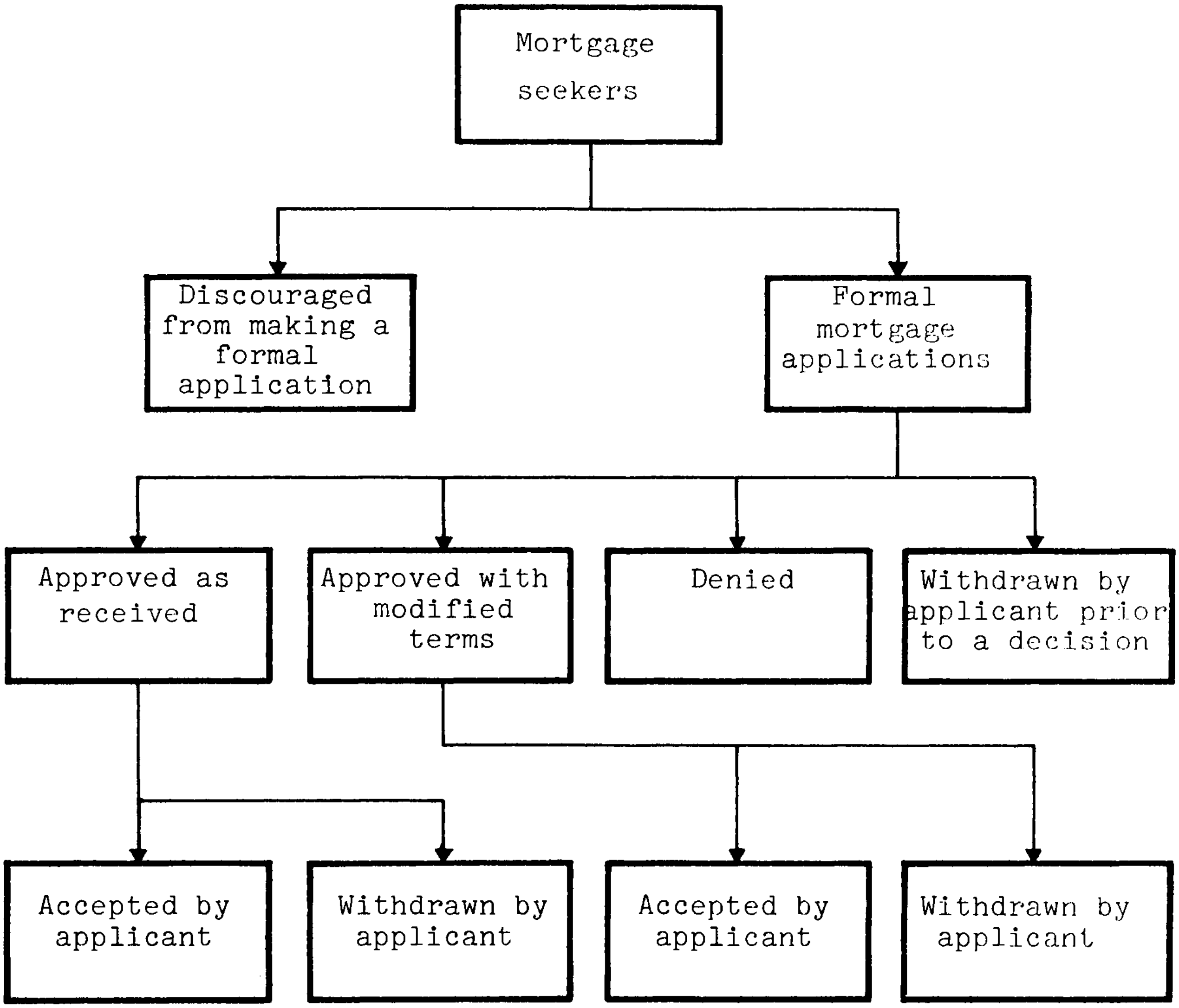


Figure 2-1

Mortgage Applications and Lender Decisions characteristics in year t (Y_t) is shown in Figure 2-2.[1]

From the perspective of the banker at the time of mortgage application, the characteristics of the borrower in year t are unknown. At best, Y_t is a random variable with a known distribution. Figure 2-3 shows two probability distributions of, for example, household income in year t where household A's income has a smaller variance than household B's income, while expected incomes of the two households are the same.[2]

The banker wants to maximize the return on his portfolio constrained by his attitude toward risk as measured by the variance of the return. The dollar return (R_t) of a mortgage in year t is a random variable with mean, ER_t, and variance, $E(R_t-ER_t)^2$. We can express the expected return as:

$$ER_t = X\left[1-P(Y_t)\right] + X'P(Y_t)$$

where X = return if no default, and

X' = return if borrower defaults for all or part of year (net of costs of collecting payments).

Given our linear specification of $P(Y_t)$, it can easily be shown that ER_t is a linear function of $\overline{Y}_t$ and $E(R_t-ER_t)^2$ is a linear function of $E(Y_t-\overline{Y}_t)^2$.[3] Hence, the expected return on the mortgage in year t and its variance depend on the mean and variance of the household's income in year t. The banker will be concerned with the return in each year of the mortgage contract; we will keep the analysis simple, however, by focusing on a single year t.[4]

The preceding discussion implies that the higher the ex-

Figure 2-2: Probability of Default

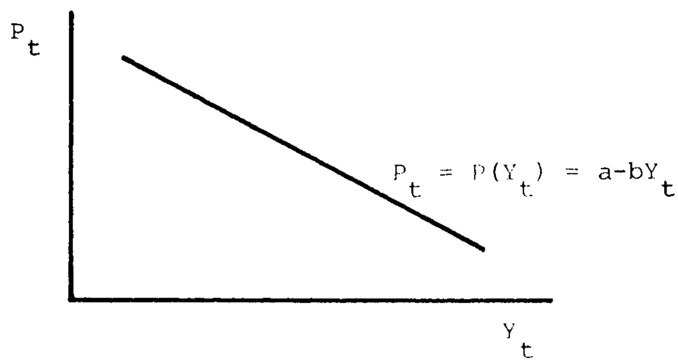
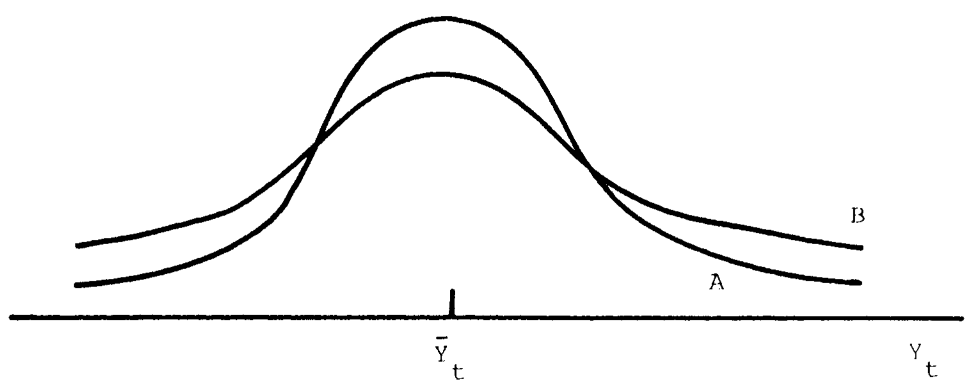


Figure 2-3: Probability Distributions of Household Income



pected value of certain borrower characteristics such as income in year t, the higher the quality (Q) of the loan, while the greater the variance, the lower the quality. Hence, we have:

$$Q = Q(\overline{Y}_t, \mathrm{Var}Y_t), \tag{2.3}$$

with $\dfrac{\partial Q}{\partial \overline{Y}_t} > 0$ and

$$\frac{\partial Q}{\partial \mathrm{Var}Y_t} < 0.$$

Two issues arise in this context. First, the banker does not know $\overline{Y}_t$ and $\mathrm{Var}Y_t$ at the time of the mortgage decision and thus must project them. Second, the way in which $\overline{Y}_t$ and $\mathrm{Var}Y_t$ combine to determine quality depends on the banker's attitude toward risk.

Projection of borrower characteristics. At the time of the lending decision, the banker only has information on the current and past characteristics of the borrower. With this information, the banker might use current values of characteristics such as net wealth or income as a proxy for future expected values. The projection of future variances is more difficult; the applicant's previous employment stability represents one crude measure that might be used for this purpose.

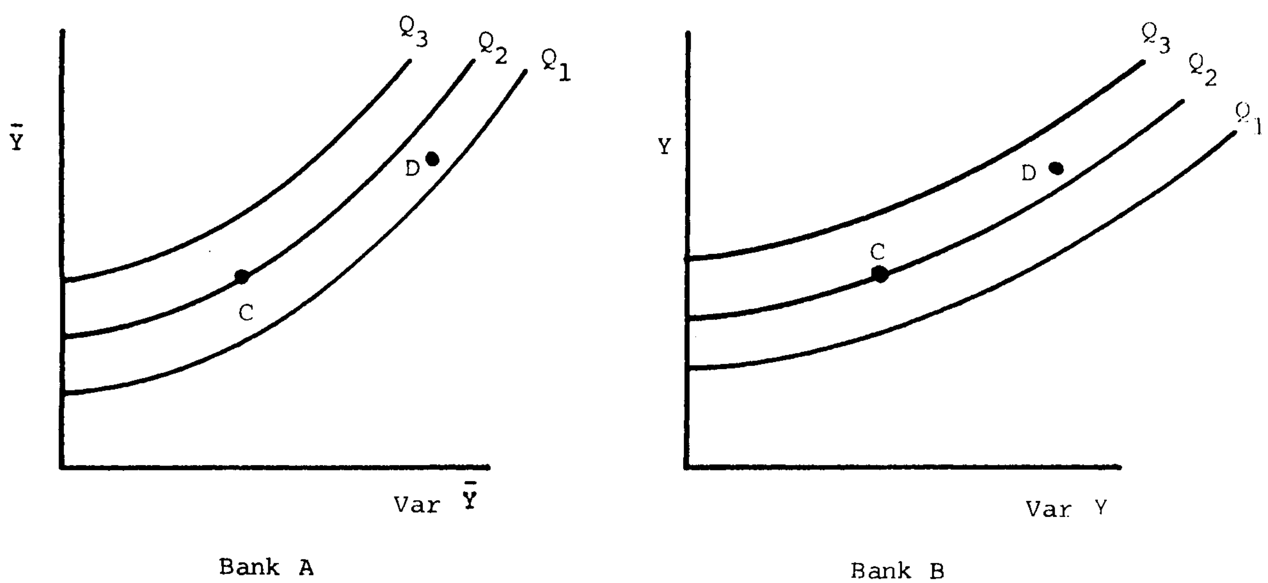
The limited information on which to base projections for individual households may induce bankers, in some cases, to simplify their task by categorizing applicants into groups. This allows them to use group projections, for which information may be available, rather than individual projections, to determine the quality of an application. To the extent that an applicant household is not typical of the group in which it has been categorized or that the group projections are based on outdated stereotypes, the banker's estimate of the quality of the application will be in error. This use of group projections is discussed further below in the context of the discrimination variables.

Banker attitudes toward risk. The functional relationship between $\overline{Y}_t$, $VarY_t$, and the quality of the application reflects the banker's subjective attitudes toward risk. Figure 2-4 represents two sets of iso-quality contours. Each contour represents a different quality level. Since quality increases with $\overline{Y}$ and decreases with VarY, quality rises with moves in a northwesterly direction. Bank A is more risk averse than bank B in that it is willing to give up more $\overline{Y}$ for a given reduction in VarY than is the other bank.

The points C and D represent two different households. Although the projected mean income of D is higher than that for C, the projected variance of D is higher, thereby increasing the risk associated with lending to D. For example, household C might represent a white married male engineer while D, a white married male self-employed entrepreneur. Whether D is preferred to C or vice-versa depends on the banker's attitudes toward risk. The more risk averse banker (bank A in Figure 2-4) prefers C while the more risk neutral banker (bank B in Figure 2-4) prefers D.

The preceding discussion yields two major implications for the current study. First, measures of borrower charac-

Figure 2-4: Lender Attitude Toward Risk



teristics (B_j) should, as far as possible, include measures of variance as well as measures of expected value. Second, different types of banks should, as far as possible, be analyzed separately because of their potentially different attitudes toward risk taking.

Customer Relationship. One additional, potentially important, borrower characteristic remains to be mentioned: the borrower's relationship to the lending bank. Because lenders' portfolio composition decisions may affect their deposits and hence the total size of their investment portfolio, profit maximization may in some instances induce banks to give priority in lending decisions to their own depositors. This appears to be common practice, for example, in connection with bank loans to business firms during periods of tight credit. In this situation, business loan recipients might be required to maintain a given level of compensating balances on deposit at the lending banks, a practice which lowers the effective cost to the bank of making the loan. Whether this customer relationship is equally important for mortgage lenders is not known. To the extent that it exists at all, preferential mortgage lending based on the depositor relationship is likely to be most prevalent when mortgage funds must be rationed by non-price means either because of a credit crunch or because of a binding usury law.

Quality of the Collateral

The quality of the collateral can be viewed analogously to the borrower characteristics. The probability that a bank will foreclose in year t is determined by the probability that the borrower will default in year t and bank policy toward foreclosure. In the event of foreclosure in year t, the return to the bank on the loan depends on the value of the collateral in year t, the outstanding loan balance, and the costs of foreclosure.

Hence, at the time of the mortgage application, the lender must project distributions of the property value for future years of the mortgage contract. The current market value of the property is presumably the best single measure of the expected value of the property. It does not, however, incorporate fully the variance in the expected value of the property. To the extent that house buyers are concerned about future salability and uncertainty, market values will reflect both market expectations about the future salability of individual properties and the certainty with which those expectations are held. The more uncertain buyers are about the future expected sales price of a property, the more its market value will be discounted. However, market values do not reflect all the risks borne by lenders because mortgagors and mortgagees may have different expectations about the useful life of the property or the future viability of the neighborhood and are likely to discount uncertainties at different rates.

Some of these differences between mortgagors and mortgagees may be reflected in differences between the appraised value and the sales price. For example, appraisers might value properties below the sales price because lenders use a longer time horizon than the purchaser (mortgage applicant) when predicting events that might affect the future value of the property, because lenders attach more weight than the purchaser to the uncertainty associated with housing market externalities (i.e. the effects on the market value of any given property of the conditions of surrounding properties and the neighborhood), or because the lender lacks control over decisions of the purchaser (e.g. maintenance) that will affect the property's future value. Thus, from the perspective of the lender, the appraised value may be a better proxy than the sales price for the future value of the property.

In addition to appraised value, lenders are likely to pay particular attention to neighborhood factors in determining the quality of the collateral. Measures such as the average income in the neighborhood or the extent of housing code violations, for example, might be used as proxies for the expected outlook for the neighborhood while the rate of change of income or of population might be used as proxies for the variance associated with that expected outlook; such measures assume that the greater the past instability, the greater the expected variance in the future.

Hence, as in the case of borrower characteristics, when examining the quality of the collateral (for any given terms of the mortgage, including the loan to value ratio), the lender needs to project both the expected future value of the property and the variance of that future value in order to project the expected rate of return and variance of a specific mortgage. One additional complication should be noted. The future value of the property may influence the return to the bank in two ways, first directly through its impact on the sales value in the event of foreclosure and second indirectly through its impact on borrower decisions. If the value of the property should decline below the outstanding loan amount, the borrower, regardless of his/her ability to make loan payments, may decide to default, thereby hastening foreclosure.

Loan Terms

The final element of the portfolio choice model is the lender's choice of terms. The decision-to-lend model, as specified in Equation 2-1 includes as independent variables the terms as requested by the borrower. These might include the borrower's requested interest rate (presumably the lowest market rate of interest, consistent with the other terms), maturity period, and the loan-to-value ratio. Holding other factors constant, the higher the interest rate, the greater is the expected return to the lender, while the longer the maturity period or the higher the loan-to-value ratio, the greater is the risk associated with the loan.

If, after evaluating a mortgage application, the lender decides that the loan would represent an unacceptable risk in relation to the expected return, the lender can choose either to refuse to grant the loan at all or to modify the terms to bring the return in line with the risk. Raising the interest rate is generally the simplest way of making the terms more favorable to the lender, but in some states may be ruled out by binding usury laws. In addition, lenders may decrease the loan amount below the requested amount, thereby decreasing the loan-to-value ratio. Variations in the maturity period of the loan are more difficult to interpret. On the one hand, shortening the maturity period would appear to reduce the riskiness of the investment to the bank since short term events are more predictable than long term events. On the other hand, the shorter maturity may increase the risk, other factors held constant, by increasing the size of the monthly payments in relation to income.

<u>Summary</u>

The previous discussion can be summarized as follows. A complete model of the outcome of a nondiscriminatory lending decision process would include:

a) Current or past characteristics of the applicant representing both the expected level and the variance of future characteristics (for example, current income, current net wealth, employment history, and credit history).

b) Characteristics representing the applicant's relationship to the lending bank (for example, whether or not applicant is a depositor at the bank).

c) Characteristics of the property and its neighborhood representing the expected value of the property and variance of its value (for example, appraised value, neighborhood income, change in neighborhood income, population, change in population, average housing prices).

d) Requested terms (for example, interest rate, loan to appraised value ratio, and maturity period).

Although the variables are listed separately in the above outline, their potential interaction should be noted. For example, borrower income interacts with the requested terms as a determinant of the quality of the application. The question is whether household income will be sufficient to permit the household to make the required monthly payments which are determined jointly by the interest rate, loan amount, and the maturity period.

These portfolio choice considerations apply to all aspects of the decision-to-lend process.[5] This process can be divided into two parts. First, for all applications the lender must decide whether to grant the loan as requested, to grant it after modifying the loan amount, or to deny it. Second, for all approved loans, the lender must set the terms of the mortgage contract. In the next section, we focus on the first stage of the process.

DECISION MODEL

Using data from individual mortgage applications on the borrower characteristics and quality of collateral variables listed above and on the outcome of the decision process (e.g.

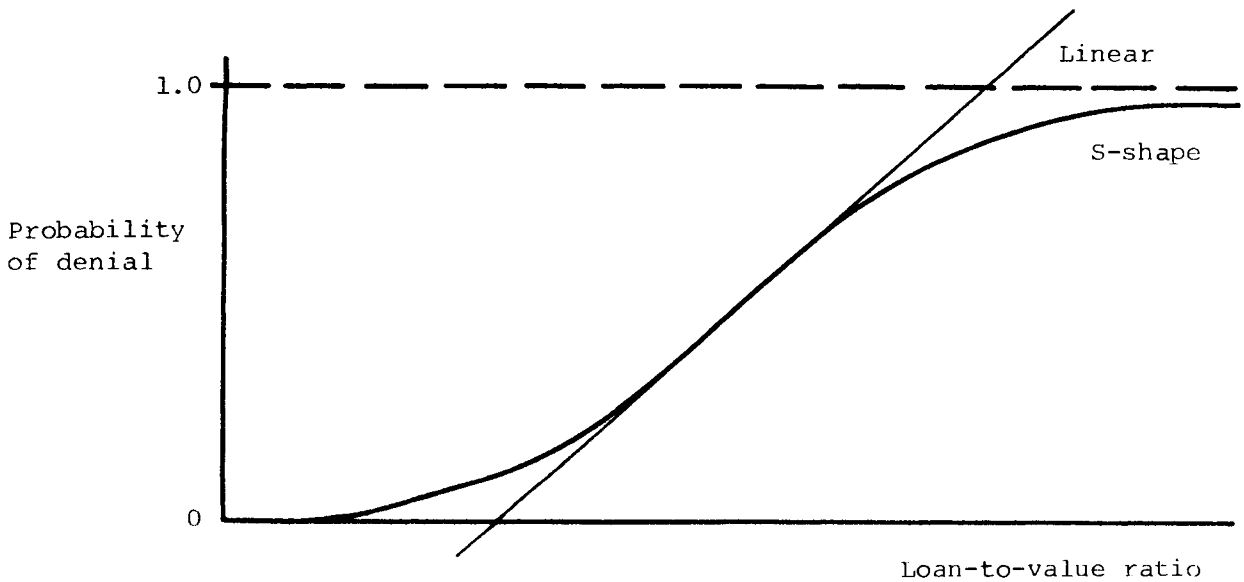
deny, accept, or modify), models of the first stage of the landing decision can be estimated. Two major types of models are available for this purpose: linear and S-shaped models. Although easier and cheaper to estimate than S-shaped models, linear models have three major drawbacks: first, the predicted probabilities may fall outside the zero-to-one range reasonable for probabilities; second, each variable is constrained to have a constant marginal impact on the probability that a certain action will be taken; and third, linear models do not simultaneously account for the possibility of more than two outcomes. The first two points are illustrated by the line labeled "linear" in Figure 2-5 in which the probability of denial is depicted as a function of the requested loan-to-value ratio.

An appropriately specified S-shaped curve allows the probability to approach zero and one assymptotically, and allows an independent variable's marginal impact on the probability of an outcome to vary with the probability of that outcome. For example, a given increase in the réquested loan-to-value ratio has an smaller impact on the probability of denial for low or high denial probabilities than for intermediate probabilities.

The specific technique used in this study involves estimating S-shaped curves using multinomial logit analysis. By estimating the logarithm of the odds rather than the probability directly, the logit model has an S-shaped form that remains within the zero-to-one bounds of probability.

In addition, this technique allows the simultaneous con-

Figure 2-5: S-Shaped Versus Linear Model



sideration of more than two outcomes. If there are four outcomes, three independent equations can be estimated within the constraint that the sum of the probabilities of all four outcomes must be one. Therefore, one outcome becomes the reference point for calculating the odds. More specifically,

$$\ln\left(\frac{P_i}{P_1}\right) = \beta X \qquad \text{for } i = 2,3,4 \tag{2.4}$$

and

$$\sum_{i=1}^{4} P_i = 1 \tag{2.5}$$

where P_i is the probability of the i^{th} outcome, X is a vector of explanatory variables, and β is a vector of parameters. All four choices are tied together simultaneously through P_1 and Equation 2.5. Ideally, the vector X should include all the variables discussed above in the context of the portfolio choice model. In other words, X would include borrower characteristics, property and neighborhood characteristics, and requested terms.

Discrimination

As discussed in Chapter 1, prejudicial attitudes of bankers or standard operating procedures designed to reduce costs or to simplify the evaluation of applications may lead lenders to make mortgage lending decisions that discriminate illegally against some borrowers. To ascertain whether discrimination on the basis of sex, marital status, age, or property location exists at the first stage of the lending process, we can add variables measuring those characteristics to the multinomial logit model and test for their statistical significance.

The nature of statistical hypothesis testing makes it difficult to prove that discrimination exists. If the discrimination variables are not statistically significant, it can be inferred that discrimination is not a factor, provided that the discrimination variables are correctly specified and that they are not correlated with any relevant variables excluded because of inadequate information. If the discrimination variables are statistically significant, on the other hand, we can only state that the results are consistent with the existence of discriminatory behavior. The extent to which a result is interpreted as support for the hypothesis of discrimination depends on the completeness of the rest of the model; that is, on how well the model controls for the nondiscriminatory factors that enter into the decision to lend.

Sex. To test for discrimination by mortgage lenders on the basis of the sex of the applicant or applicants, we first define the following three categories of applications:

1) Female only: no male applicant

2) Male-female: one male applicant and one female applicant

3) Male only: no female applicant

Categories 1 and 3 include both individual and joint applications (the joint applicant is often referred to as the co-applicant) while category 2, by definition, includes only joint applications.

The simplest form of sex discrimination could be examined by adding to the portfolio choice model variables for two of these three categories, using the excluded category as a base. In other words, two variables might be added, one denoting whether the application is female only and the other male only. The coefficients of these two variables in the probability of denial equation would then measure the impact of an all female or all male application on the probability of denial compared to the more traditional male-female application, controlling for other relevant factors.

Testing for discrimination on the basis of sex is complicated by the fact that lenders, to the extent they discriminate, may not discriminate equally against all members of a particular sex. For example, consider the finding of a statistically insignificant coefficient on the female-only variable in the probability of denial equation. On the one hand, this may reflect a true absence of discrimination against female applicants; on the other hand, it may also be consistent with discrimination against some female applicants, such as those of childbearing age, but not against others. To test this more subtle hypothesis, the model would need to be respecified with two female sex variables, one denoting that at least one of the female applicants is of childbearing age and the other that none of the female applicants is of childbearing age.

The allegations relating to sex discrimination outlined in chapter 1 indicate the desirability of working with a more detailed breakdown that takes account of whether or not the female applicant is in the childbearing age range or is employed. The distinction between working and non-working female applicants reflects the allegation that bankers may discriminate against applications where part of the income comes from an allegedly unreliable source, the earnings of the working woman. The break-down between childbearing and non-childbearing age females captures the potential distinction made by bankers between those women for whom the threat of pregnancy increases the probability that they will leave the labor force or will incur additional expenses and those for whom little threat is present.

To implement this disaggregated model, one type of applicant would again be excluded from the model and used as the base and separate variables defined for all the remaining types of applicants. In general, we exclude the type of applicant least likely to be discriminated against; in this case, it is the joint application from a male-female couple with the woman beyond childbearing age. The employment status of women applicants is treated differently in New York than in California. In New York, we only know whether or not the female applicant works while in California we know the actual income earned by all applicants. Therefore, in New York the working status of women is analyzed by adding this factor to the description of the types of applicants; the base would then be a joint application from a male-female couple with a nonworking woman beyond childbearing age. The feasibility of this approach in any particular data set depends on the numbers of the observations from the various types of applicants; in many cases data limitations may require types of applications to be consolidated.

The allegation of income discounting can be tested more explicitly in California where information on the separate incomes of the applicant and the co-applicant is available. With such data, models can be specified that allow explicitly for differential treatment of the income of the primary and secondary workers. In addition, these models can be used to test the hypothesis that lenders treat the income of the secondary worker differently for female workers than for male workers.

Marital Status. The basic application categories relating to marital status are constructed as follows:

1) Unmarried: at least one applicant unmarried, none separated,

2) Separated: at least one applicant separated,

3) Married: No applicant unmarried or separated,

where an unmarried applicant is one who is either single (never married), divorced, or widowed. Analogously to the sex discrimination case, the simplest test for marital discrimination involves including in the portfolio choice model variables representing two of the three categories; the category "married" is the logical choice as a base since applications by married couples represent the traditional type of mortgage application.

Again, such a simple specification may be inadequate to detect discrimination on the basis of marital status where such discrimination interacts with discrimination of other types. As a related point, this simple specification does not permit a test of the hypothesis that unmarried women are discriminated against vis-à-vis unmarried men. Hence, the final model specifications interact the marital status categories with sex of the applicant, and where data are adequate, with the age of the female applicant. Marital status data are available only for New York.

Race of Applicant. The allegations of discriminatory lending on the basis of the race of the applicant are tested by including separate variables for each non-minority racial category sufficiently represented in the particular sample. In some samples, black and other minorities are the only feasible categories; in others, the "other minorities" category can be subdivided into Hispanics and Asians.[6] The non-minority category, used as the base, includes all those applicants for which no applicant is a member of a racial minority.

Age of Applicant. Applicants are grouped into one of five age categories to test for age-based discrimination. The categories are:

1) Under 25 years,
2) 25 to 34 years,
3) 35 to 44 years,
4) 45 to 54 years,
5) 55 or more years.

The middle age (35 to 44) group has been selected to serve as the base because applicants in that group are least likely to be discriminated against.

Property Location or Neighborhood Factors. Redlining allegations are examined in two ways. First, the geographic area containing the property is identified through dummy variables. In the New York and a few of the California metropolitan areas, we are able to test local allegations that certain neighborhoods are redlined by lenders. In the other metropolitan areas, we are only able to compare lending decisions in the central city(s) to those in the surrounding suburbs. In all cases, a suburban area is the base for comparison.

Second, neighborhood characteristics such as the racial composition or the age of the neighborhood are included to test for discrimination against largely minority or very old neighborhoods. It should be noted that the results for the age of the neighborhood measure are likely to be ambiguous because of its correlation with objective measures of the risk of loss (such as the condition of specific property) that may have been excluded. Although this is likely to be the case in the New York models, the California models include the age of the specific property. Therefore, the age of the neighborhood measure (fraction of housing built before 1940) probably provides a reasonably clear test of discrimination against old neighborhoods in California. At the same time, the exact meaning of the coefficients of the building age variables is probably ambiguous because they could represent risk factors (e.g., building condition) or discrimination (e.g., against old buildings).

MORTGAGE TERMS MODELS

Whether or not illegal discrimination exists at the loan decision stage, institutional lenders may discriminate in the setting of mortgage terms. This section describes three models relating to terms: (1) a model of downward adjustments of loan amounts for modified loans, (2) a complete model of mortgage terms for all approved loans, and (3) a model of loan fees. With the exception of the loan fee model, the portfolio choice considerations outlined at the beginning of this chapter are applicable.

Modified Loan Amount

The decision to lend model predicts the probabilities of a range of outcomes, one of which involves modifying the loan amount. The discrimination variables in the modification equation are hard to interpret, however, because some applicants may be more aggressive than others in seeking large loans, and the equation does not distinguish between large and small modifications. To supplement the modification model, we restrict the sample to loans that are modified downward and estimate a model of the dollar amount of modification. Defining MODOWN as the requested amount minus the granted amount (a positive number), the model can be expressed as follows:

$$\text{MODOWN} = f(\text{REQLOAN, RISK, DISC}) \qquad (2.6)$$

where REQLOAN is the requested loan amount,

RISK is the risk of the loan as measured by a vector of financial characteristics of the borrower and the property, given the requested terms,[7] and

DISC is a vector of discrimination variables.

The higher the requested loan, all other factors held constant, the larger the dollar amount of the modification is likely to be. Risk factors enter positively since the higher the risk associated with the requested terms, the greater is the incentive for the lender to reduce the risk by reducing the size of the loan. Finally, a finding of a positive sign on one or more of the discrimination variables would be consistent with the hypothesis of discriminatory behavior. For example, a positive sign on the variable representing applicants over 54 years old would imply that, among those applicants whose applications are modified downward, old people on average experience larger modifications *ceteris paribus* than the 34-45 year old reference group. Provided the other variables included in the equation adequately control for the risk of loss, such a finding can be interpreted as discriminatory behavior by lenders rather than as a reflection of excessive loan demands by that age group.

Since this model has very few data requirements beyond those needed to estimate the decision-to-lend models, it can be estimated in both New York and California in any metropolitan area with a sufficient number of downward modified applications. The specific variables included as measures of risk or discriminatory behavior will vary across the two states and across metropolitan areas.

Interest Rate, Maturity Period, and Loan-to-Value Ratio

Having decided to grant mortgage credit, the lending bank must set the terms of the mortgage contract, including the interest rate, maturity, and loan-to-value ratio. The final terms reflect the complex interaction of borrower and lender preferences, objective measures of risk, and possibly discriminatory behavior on the part of the lending institution. It should be noted that both lenders and borrowers may be willing to make trade-offs among the three terms. For example, a lender may charge an above average interest rate as compensation for the additional risk associated with a longer than average maturity or a higher than average loan-to-value ratio, or may be willing to increase the loan amount, leading to a higher loan-to-value ratio, in return for a shorter maturity period. Similarly, a borrower may prefer a higher interest rate combined with a long maturity period to a lower interest rate combined with a short maturity. Hence, a complete model of mortgage terms should incorporate the simulataneous determination of the three variables. Consequently, a system of simultaneous equations is needed to analyze the three jointly determined mortgage terms.

The following three equations summarize the model used in this study:

$$\text{INT} = f(\text{MAT, LTOAV, INT}_m\text{, VRM, RISK, DISC}) \qquad (2.7)$$

$$\text{MAT} = h(\text{INT, LTOAV, REQMAT, RISK, DISC}) \qquad (2.8)$$

$$LTOAV = g(INT, MAT, RLTOAV, RISK, DISC) \tag{2.9}$$

where

INT is the contract interest rate;

MAT is the maturity period;

LTOAV is the ratio of the granted loan amount to the appraised value of the property;

INT_m is the market rate of interest;

VRM is equal to one if the mortgage is a variable rate mortgage and zero otherwise;

RISK is risk as measured by a vector of financial characteristics of the borrower and the property;

DISC is a vector of discrimination variables;

REQMAT is the requested maturity period; and

RLTOAV is the ratio of the requested loan amount to the appraised value of the property.

The signs of the endogenous variables are hard to predict since they reflect a complex interaction of borrower and lender preferences.

In addition to the three jointly determined endogenous variables (INT, MAT, LTOAV), the model includes market factors (e.g. INT_m and VRM in the INT equation), measures of borrower preference (e.g. REQMAT in the MAT equation and RLTOAV in the LTOAV equation), measures of the riskiness of the loan to the bank as measured by the financial characteristics of the borrower and the property (RISK), and discrimination variables (DISC).

Controlling for maturity term period (MAT) and loan-to-value ratio (LTOAV) and in the absence of discriminatory lending behavior, the contract interest rate (INT) on an approved loan is expected to be higher the higher the market rate of interest, to be lower on variable rate loans than fixed rate loans provided interest rates are expected to continue rising, and to be higher the greater the riskiness of the loan to the bank where risk is measured by the financial characteristics of the borrower and the property. Because borrowers always prefer lower to higher interest rates, controlling for the other mortgage terms, borrower preferences are not included as an explanatory variable in the interest rate equation. Discriminatory lending behavior with respect to contract interest rates can be examined by testing for the statistical significance of each of a vector of variables representing categories of race, sex, marital status, age, location of property, and age and racial composition of the neighborhood. A finding of higher interest rates for any one of these categories would be consistent with the hypothesis of discriminatory behavior.

The logic of the maturity equation is similar to that of the interest rate equation. From the lender's perspective, higher risk legitimately requires harsher terms, in this case shorter maturities. Since discriminatory motives would also lead bankers to impose harsher terms, a finding of shorter maturities associated with any one of the suspect categories would be consistent with the hypothesis of disciminatory behavior, provided the equation were properly specified.

In contrast to the interest rate case, however, where borrowers unambiguously prefer lower interest rates, controlling for the other mortgage terms, different borrowers may prefer different maturities depending on their stage in the life cycle, their expected patterns of future income and the size of their requested loan. Ideally, the borrower's requested maturity should be included explicitly in the maturity equation as indicated in equation 2.8. To the extent that data limitations prevent this preference variable from being correctly measured, the discrimination variables must be interpreted cautiously. For example, if the preference of older people for shorter maturities is not fully captured in the preference variable, a statistical finding that older applicants end up with shorter maturity loans than younger applicants does not necessarily imply that lenders discriminate against old people. On the other hand, even with an imperfectly specified borrower preference variable, a finding that black applicants are given shorter maturity loans on average than similarly situated white applicants might legitimately be interpreted as indicating discriminatory lending behavior unless a convincing case can be made that the maturity preferences of blacks differ significantly from those of similarly situated whites.

Differing wealth positions and other factors may lead borrowers to prefer different loan-to-value ratios. These borrower preferences are represented by the requested loan-to-appraised-value (RLTOAV) variable in the loan-to-value equation. Since RLTOAV data are readily available, misspecification presents less of a problem in this equation than in the maturity equation. As in the other two term equations, higher risk as measured by the financial characteristics of the borrower and the property legitimately leads the banker to impose harsher terms, in this case lower loan-to-value ratios. Discriminatory behavior, to the extent it exists, also leads to lower loan-to-value ratios.

Equations 2.7 to 2.9 can be estimated only for the California data because of the absence of information on mortgage contract terms in the New York data set. Models have been estimated using two stage least squares for each of two years in four California metropolitan areas. It should be noted that the presence of a binding usury law in New York State during the study period would make equation 2.7 largely irrelevant, in any case.

Loan Fees Model

Mortgage lenders may also discriminate by charging some applicants higher loan fees than others simply because of their sex, marital status, race, age; the location of their property; or the age or racial composition of the neighborhood. Since loan fees must be fully paid when the mortgage contract is signed, high loan fees increase the immediate financial burden on these borrowers and, in some cases, may keep them from proceeding with the planned house purchase.

Loan fee information is unavailable for the New York banks; hence the loan fee model outlined here specifically reflects the type of loan fees used by California savings and loan associations. Included in the total loan fees are the average costs to the bank of making the loan, generally assessed as a percent of the loan amount; appraisal, inspection and other fees for services; and charges for title insurance, credit report, and other services related to making loans that are not usually performed by associations to the extent that such charges exceed standard or billed costs for the services. To examine discriminatory behavior in the setting of these loan fees, we can estimate the following model for approved loans:

LOANFEE = f(LOANAMT, PROP, NEIGH, DISC)

where

LOANFEE = the amount of the loan fee,

LOANAMT = the amount of the loan,

PROP = a vector of property characteristics (including appraised value, size of property, and building age),

NEIGH = a vector of neighborhood characteristics (including level and change variables), and

DISC = a vector of discrimination variables.

Since the basic fee is determined as a percentage of the size of the loan, loan amount (LOANAMT) is expected to be an important explanatory variable. Property characteristics (PROP), such as the property's appraised value, physical size, and age, represent the property specific factors that might influence the cost to the bank of making the loan and, hence, the size of the fee charged. The neighborhood variables (NEIGH) represent those neighborhood characteristics that might influence the bank's costs and that can legitimately be passed on to the borrower in the form of higher fees.

It should be noted that variables representing the financial characteristics of the borrower are not included in the model. This exclusion reflects our view that loan fees are not part of the general portfolio choice model outlined above; more specifically, the purpose of loan fees is to recover the legitimate costs of processing loan applications rather than to offset the risk of the loan to the lender.

The discrimination variables, most of which are dichotomous dummy variables, have straightforward interpretations; statistically significant positive coefficients are consistent with the hypothesis that lenders discriminate against certain types of applicants by setting loan fees higher than warranted by the size of the loan and the characteristics of the property.

APPRAISAL PRACTICES MODEL

When a mortgage is applied for on a particular property, the lending institution has an authorized person estimate the value of, or appraise, the property. This appraised value is important because the maximum loan amount that a lender will offer an applicant depends on the appraised value of the property, the lender's policies, and the regulatory restrictions on loan-to-value ratios. The applicant must provide the difference between the purchase price and the loan amount either from his or her own resources, or from secondary sources of financing.

Some neighborhood organizations have alleged that properties in certain neighborhoods are systematically underappraised relative to their market value. If banks were underappraising properties in some neighborhoods relative to other neighborhoods, mortgagors would have to make larger downpayments on houses located in these underappraised neighborhoods. In some instances, the larger downpayment requirements could prevent individuals from purchasing properties in these areas. It is also possible that certain types of applicants (e.g., women or minorities), in contrast to neighborhoods, may be discriminated against.

The proper test of discrimination is not whether appraised values are lower than market values, but whether the ratio of appraised value to market value varies systematically across locations or types of applicants. If appraisals reflected actual market conditions, the ratio of appraised value to market value would be equal to one and should, on average, show no relationship to any particular variable. Therefore, it is important to ascertain why appraised values may differ from market values.

Appraised values may systematically differ from market values for three reasons. First, appraisers may underappraise properties because the consequences of underestimating the value of a property are more acceptable to them than those of overestimating this value. Overestimation increases the chances of actual losses if the borrower defaults on the loan; underestimation decreases those chances. Second, lenders face uncertainty that purchasers do not. Purchasers, as property owners, will make decisions that affect the future market value of the property (e.g., maintenance decisions). This is a source of uncertainty for lenders because they have no control over these decisions. To compensate for this uncertainty, appraisers might value properties lower than their market values. Third, lenders may use a longer time horizon than the market does when predicting events that might affect the future value of the property, which is a security for a long-term investment. These reasons would lead to appraised values being somewhat lower than market values.

Externalities affecting the housing market (i.e., the market value of any given property is affected by the conditions of surrounding properties and the neighborhood) are reflected in uncertainty factors that might lead an appraiser to view a property more conservatively than the market. These externalities should be spatially clustered. For example, building abandonment is more likely to occur in a specific area rather than in randomly distributed areas across the city. An increase in the number of abandoned buildings in an area may signal a future substantial drop in property values. Appraisers might give more weight to this trend than the market because they have a longer time horizon. One result would be a spatial variation in the appraised-value-to-market-value ratio.

Purchase prices are used to measure market value. Although the appraised value may differ from the purchase price in individual cases because of variations in the relative bargaining skills of buyers and sellers, these effects should average out in a large sample.

The model of appraisal practices is

$$AVP = f(PROP, RISK, DISC) \qquad (2.10)$$

where

AVP is the appraised value divided by the purchase price,

PROP is a vector of property characteristics such as structure type,

RISK is a vector of financial and neighborhood characteristics used to measure risk, and

DISC is a vector of discrimination variables.

California appraisal practices are analyzed with data on denied as well as granted mortgage applications. In New York, purchase price information is insufficiently detailed to allow an analysis of appraisal practices.

CONCLUSION

We have described three general approaches for analyzing the criteria used by lenders in processing mortgage applications:

1. lender action on the application (approve, modify, or deny);
2. credit terms for approved and modified applications, including a model of the amount by which requested loan amounts are reduced; a simultaneous three-equation model of the interest rate, maturity, and loan-to-value

ratio; and a model of loan fees; and

3. appraisal practices.

We have endeavored to properly specify these models in this chapter. As we move into the following chapters that contain empirical estimates of the models, data limitations sometimes prevent us from fully implementing the proper specification. For example, a measure of market interest rates is unavailable for use in the California interest rate equation.

Footnotes - Chapter 2

1. A logistic relationship would be preferable to this simple linear relationship, but is difficult to deal with mathematically.

2. This can be proved as follows:

$$\begin{aligned}
\bar{R}_t = ER_t &= X - (X-X')EP_t \\
&= X - (X-X')E(a-bY_t) \\
&= X - a(X-X') + b(X-X')\bar{Y}_t
\end{aligned}$$

$$\begin{aligned}
\text{and } \mathrm{Var}R_t &= E(R_t-ER_t)^2 \\
&= E[X-(X-X')P_t-X+(X-X')\ EP_t]^2 \\
&= E[X-(X-X')[a-bY_t]-X+(X-X')(a-b\bar{Y}_t]^2 \\
&= b^2(X-X')^2E(Y_t-\bar{Y}_t)^2
\end{aligned}$$

It should be noted that the link between the variance of income and the variance of the portfolio return is more complex in the case of a non-linear probability of default function.

3. Note that we are simplifying the analysis by ignoring the covariances between Y_t and Y_j for all years of the contract $t \neq j$.

4. It should be noted that the variance of household income for a two-earner household may be lower than that for a single earner household. For example, consider a two-earner male-female household where the income of the male in year t is Y_m and that for the female is Y_f. Then the

variance of total household income in year t can be expressed as:

$$\text{Var}\ (Y_m + Y_f) = \text{Var}\ Y_m + \text{Var}\ Y_f + 2\ \text{Cov}\ (Y_m Y_f)$$

A negative covariance between Y_m and Y_f will reduce the variance of the sum below the sum of the individual variances.

5. The statement in the text should be qualified to exclude loan fees. See the discussion of the loan fee model below.

6. In some instances in the empirical work, blacks cannot be separated out, and in others, Asians are included in the base.

7. It should be noted that the term "risk" is being used slightly differently here than in the portfolio model as presented above. Here, it refers to all objective factors influencing either the expected return or the variance of that return; above it was used specifically to refer to the variance.

Chapter 3

DECISION TO LEND IN CALIFORNIA

The evaluation of applications for loans on specific properties to distinguish the different risks of loss among them represents a major part of the residential lending process. In general, lenders approve those applications having the lower risks of loss provided there are enough funds in the portfolio for this type of investment; the other applications are rejected. (Although this description of the lending process indicates sequential steps, the actual process is interactive. For example, if most of its residential mortgage applications have high risks of loss, a bank may decide to reduce that portion of its portfolio available for residential mortgages). When receiving an application for a mortgage, a lender must decide whether to approve the application as received, approve it with some modification in terms, or turn it down. Lenders may discourage the submission of formal applications from applicants who, they believe, will likely be denied. Applicants may also withdraw their applications prior or subsequent to a lender's decision.

In Chapter 2, a lender's decision on a mortgage application was viewed as a function of the creditworthiness of the borrower, the quality of the collateral, and the requested terms of the mortgage. In this chapter, we report estimates of this decision to lend model for California.

DATA BASE AND MODEL DESCRIPTION

All state-regulated savings and loan associations in California must maintain detailed data on mortgage applicants. The state's department of savings and loan prescribes the form of the information through its Loan Register Report. The report form contains the following information: total family income, income of applicant and coapplicant, purchase price of subject property, whether or not the subject property will be owner occupied, sex of the applicant and coapplicant, race or national origin of applicant and joint applicant, age of the applicant and joint applicant, type of loan, requested loan amount, appraised value, type of structure, living area, year built, number of residential units in the building, action taken by lender, granted loan amount, interest rate and maturity period for granted loans, loan fees and discounts, whether or not the interest rate is variable, and the census tract in which the property is located.

Four types of lender action on mortgage applications are identifiable on the Loan Register Reports: approved as applied for, approved with a loan amount less than requested, approved with a loan amount larger than requested, and denied. There is no information on withdrawals by the applicant. Cases where the lenders offered a loan amount less than requested and the applicant rejected it are not separately identified. It is presumed that these have been treated as denials.

The lack of information on applicants who were discouraged from making a written application could create a methodological problem for this study. Under the California regulations, each state-regulated savings and loan association is required to prepare a Loan Register Report for all written applications for mortgages on residential properties. It appears, however, that this regulation does not clearly delineate the circumstances under which a written application is required. However, the regulation may act to minimize the practice of informal screening, although the opposite effect, obviously, is also possible. As long as there are an adequate number of modified approvals and denials among the written applications, the explanation for these actions should reflect the bases for discouraging written applications. For example, if the analysis of denials indicates the existence of racial discrimination, discrimination is also a likely factor in deciding which applicants should be discouraged from applying. A lender would not likely discriminate against formal applicants and not against informal ones. However, if the statistical analysis does not indicate the existence of discrimination, it is still possible that lenders use a different set of criteria, including sex or race, in their informal screening of applicants.

This study analyzes applications for conventional mortgages to finance the purchase of single-family houses for owner-occupancy during 1977 and 1978 in 16 metropolitan areas. The Loan Register data are supplemented by 1970 census data, and income and household estimates from income tax returns, matched to each response using the census tract number. In some areas (Anaheim-Santa Ana-Garden Grove, City of Los Angeles, Sacramento, San Diego, San Jose, and Stockton) additional information from local surveys were added to the Loan Register data.

Model Description

In general, four outcomes of the lending behavior of California savings and loan associations can be studied: approved as applied for, approved with a loan amount less than requested (modified down), approved with a loan amount larger than requested (modified up), and denied. The lender's decision depends on the creditworthiness of the borrower, the quality of the collateral, and the requested terms of the mortgage. Various measures of financial and neighborhood characteristics are used to capture the influence of these factors.

The financial characteristics are the requested loan amount in relation to annual income and the ratio of the requested loan amount to the appraised value of the property. We experimented with several specifications of the effect of household income on lender decisions including income as a continuous variable, several income categories with dummy variables, requested loan to income ratio, several categories of the requested loan to income ratio with dummy variables, and a variable equal to the positive values of the requested loan to income ratio minus 2.5 and zero when this difference is negative. Since the latter variable captured the effect of income better than any of the others, the equations containing it are reported here. Risk of loss to the lender and, hence, the probability of adverse action, should rise as the amount of the requested loan rises relative to either income or appraised value. Ideally, these two financial measures should be supplemented by measures representing the stability of the applicant's income, his/her credit history, or his/her net wealth. Unfortunately, the California data set does not include any of this information. In addition, no information is available on the applicant's relationship with the lending bank.[1]

Neighborhood characteristics are included to control for risk of loss in the value of property resulting from housing market externalities. Although it would be ideal to include direct measures of these externalities such as whether or not the subject property is adjacent to a vacant building, this is generally impossible because the requisite information is unavailable. Therefore, neighborhood conditions are proxied by measures of the income of residents, change in income and population, and in a few areas sales price, change in sales price and vacancy rates. Risk of loss should be lower in neighborhoods with a larger proportion of high income residents. In general, neighborhoods with larger increases in average income and population should have rising property values and less risk of loss in value. High vacancy rates should also signal a larger risk of loss.

The measures of neighborhood characteristics are calculated for the census tracts containing the subject property. This is true for the fraction of households with high income (FHI) in all metropolitan areas using 1970 census data with four exceptions. FHI for the Anaheim-Santa Ana-Garden Grove, Sacramento, San Diego and San Jose metropolitan areas is calculated at the census tract level from a special census in 1975. Other supplemental variables from local surveys, such as sales price, vacancy rate, and more recent income and population data, are also calculated at the census tract level (see Table 3-1). A major source of current data on income and population is federal income tax returns which have been summarized at the ZIP code level for nearly all the metropolitan areas under study. The ZIP code level of aggregation is less desirable than the census tract level because it includes a larger geographic area and, as a result, is a less accurate measure of the condition of the market in the immediate neighborhood surrounding the property.

The California model only includes one requested term (loan to appraised value ratio) because information on interest rate and maturity period are only available for granted loans.

Two of the four lender actions have clear meaning: approved as applied for and denial. The other two (modification down and modification up) are somewhat ambiguous. One of the four must be selected as the reference to which the other three will be compared. Since it is important that this reference action have a clear meaning in relation to all other actions, the job falls to applications that are approved as applied for (i.e., approval with the loan-to-appraised value and loan amount requested by the borrower).

The likelihood of a lender deciding to deny an application for a conventional mortgage loan should increase as an applicant's requested loan to income ratio increases and as the quality of the collateral decreases (e.g., as the requested loan-to-appraised value ratio increases). Differences in the risk of loss associated with the borrower and the subject property may be offset, to some extent, by modifications in the terms of the mortgage (i.e., interest rate, maturity and down

Table 3-1

Geographic Aggregation and Year of Observation
for the Neighborhood Characteristics*

Study Area**	FHI	Other Income Variables	Population Change	Sales Price Variables	Vacancy Rate
Anaheim-Santa Ana-Garden Grove	CT75	CT75	CT7075	NA	NA
Bakersfield	CT70	ZIP7576	ZIP7076	NA	NA
Fresno	CT70	ZIP7576	ZIP7076	NA	NA
Los Angeles-Long Beach	CT70	ZIP7576	ZIP7076	NA	NA
Los Angeles City	CT70	ZIP7576	ZIP7076	CT7377	NA
Modesto	CT70	NA	NA	NA	NA
Oxnard-Ventura	CT70	ZIP7576	ZIP7076	NA	NA
Sacramento	CT75	CT75	CT75	NA	NA
Salinas-Monterey	CT70	ZIP7576	ZIP7076	NA	NA
San Bernardino-Riverside-Ontario	CT70	ZIP7576	ZIP7076	NA	NA
San Diego	CT75	ZIP7576 CT75	ZIP7076	NA	NA
San Francisco-Oakland	CT70	ZIP7576	ZIP7076	NA	NA
San Jose	CT75	ZIP7576	ZIP7076	NA	CT76
Santa Barbara	CT70	ZIP7576	ZIP7076	NA	NA
Santa Rosa	CT70	ZIP7576	ZIP7076	NA	NA
Stockton	CT75	NA	CT7075	CT7677	CT7075
Vallejo-Napa	CT70	ZIP7576	ZIP7076	NA	NA

* CT indicates census tract; ZIP indicates ZIP Code Area. The numbers following CT and ZIP are the last two digits of the year(s) of observation. Complete definitions are given in Appendix A. NA indicates that the data was not available.

** Metropolitan area in all areas except the City of Los Angeles.

payment). Unfortunately, the only information on modification is change in the requested loan amount.

It is more difficult to relate each of the independent variables to a lender's decision to modify the terms. For example, downward modification could be the result of an applicant's request (e.g. desire to maximize equity in house and revised plans as to the amount of household funds that can be allocated to this function).

To ascertain whether discrimination on the basis of sex, race, marital status or age of the applicant, or property location exists in mortgage lending, variables along the lines discussed in Chapter 2 are also included in the models. One of the distinct advantages of the California over the New York data is that the incomes of the applicant and co-applicant are reported separately, which permits analysis of discriminatory treatment of secondary income. The variables measuring the racial composition of the neighborhood are calculated for census tracts in the case of the fraction black and the fraction Spanish in all study areas.[2] The fraction Asian is calculated for ZIP Code areas. These racial composition variables are based on 1970 data with the following exceptions: Sacramento and San Jose (all three at the census tract level for 1976); and Stockton (reduced to two census tract measures for 1975).

Sample Characteristics

The samples have been limited to applications for conventional mortgages on single family residences intended to be owner-occupied. Applications for federally assisted mortgages have been excluded because the involvement of a third party, the government, substantially affects the decision-making process, and the Loan Register does not identify which actor was making the decision. In addition, there are not enough observations to analyze separately such applications. Multifamily and non-owner-occupied properties are excluded because the Loan Register contains insufficient information to control for their investment income as a factor in the lending process. Applications that indicated they were for refinancing or for home improvement loans have also been excluded because they do not involve a property transaction and the Loan Registry generally lacks the information necessary to analyze these decisions. Again, only a small percentage of the forms were affected. The final sample sizes (after eliminating forms with critical nonresponses) are summarized in Table 3-2. Multinomial logit models are estimated for every metropolitan area in each year.

RESULTS

The multinomial logit estimates of lender behavior are reported in Appendix B. (Complete variable definitions are presented in Appendix A.) The following discussion presents the implications of these results for a typical application and key variations in its characteristics.

We have defined the typical application as having a requested loan amount that is less than two and one half times the applicant household's annual income (82 to 96 percent of all applications). The typical application is also from an all-white household (68 to 93 percent of all applications), an applicant between the ages of 35 and 44 (22 to 29 percent of

Table 3-2

Number of Observations by Metropolitan Area and Year:
California Savings and Loan Associations

Study Area*	1977	1978
Anaheim-Santa Ana-Garden Grove	16,672	12,542
Bakersfield	1,722	1,646
Fresno	3,173	2,850
Los Angeles-Long Beach	38,398	34,792
Los Angeles City	14,060	13,662
Modesto	1,885	1,558
Oxnard-Ventura	4,631	3,970
Sacramento	5,163	4,884
Salinas-Monterey	1,860	1,530
San Bernardino-Riverside-Ontario	2,606	2,038
San Diego	7,628	7,508
San Francisco-Oakland	24,766	21,608
San Jose	9,887	7,691
Santa Barbara	1,401	1,254
Santa Rosa	3,419	3,307
Stockton	2,432	2,381
Vallejo-Napa	1,884	1,866

* Metropolitan areas in all cases except the City of Los Angeles.

all applications), a male-female couple with the female applicant beyond childbearing age (22 to 35 percent of all applications), and with no secondary income (83 to 86 percent percent of all applications). These characteristics were selected because they describe a household which is least likely to be the target of discrimination, if any exists. Therefore, they do not always represent a plurality of all applications. The age of applicant and the age of the woman characteristics are selected from a desire to compare childbearing to nonchildbearing women.

The typical application is also defined to have the average values of all the continuous variables for applications in the metropolitan area being studied: requested loan to appraised value ratio, fraction high income households, income and population change, age of neighborhood, and racial composition of neighborhood. These values are summarized in Table 3-3. In addition, the building is assumed to be new (8 to 38 percent of all applications), and the property is located in a suburb.

The treatment accorded applications with characteristics different than the typical application are compared to the treatment received by the typical application. The treatment is measured by the probability of a given decision such as denial or downward modification.[3]

Table 3-3

Mean Values of Continuous Variables by California Metropolitan Area: 1977

Metropolitan Area	RLTOINC	RLTOAV	FHI	INC1976	DINC7675	DINC7570	DHH7675	DHH7570	PRE1940	FBLACK	FSPANISH	FASIAN
Anaheim-Santa Ana-Garden Grove	0.071	0.76	0.61[a]	18.14[b]	NA	4.85[c]	NA	5.74[c]	0.06	0.01	0.09	0.01
Bakersfield	0.013	0.81	0.26	14.10	0.91	3.43	0.86	2.65	0.11	0.06	0.09	0.01
Fresno	0.036	0.80	0.20	13.14	0.88	2.64	-0.16	3.55	0.14	0.01	0.13	0.02
Los Angeles-Long Beach	0.061	0.78	0.31	14.42	1.10	1.62	-0.15	1.87	0.15	0.04	0.12	0.02
Modesto	0.016	0.79	0.17	NA	NA	NA	NA	NA	0.19	0.003	0.07	NA
Oxnard-Ventura	0.059	0.76	0.31	14.63	1.07	1.09	1.30	10.36	0.06	0.02	0.13	0.02
Sacramento	0.032	0.78	0.42[a]	13.43[b]	NA	2.12[c]	NA	1.62[c]	0.13	0.02	0.03	0.03
Salinas-Monterey	0.086	0.78	0.20	12.84	0.83	2.98	0.39	1.91	0.16	0.06	0.14	0.04
San Bernardino-Riverside-Ontario	0.030	0.79	0.23	13.01	1.23	2.36	1.42	2.28	0.13	0.03	0.11	0.01
San Diego	0.080	0.79	0.39[a]	18.82[b]	0.98	5.31	0.99	3.17	0.10	0.02	0.09	0.01
San Francisco-Oakland	0.072	0.77	0.33	15.59	1.09	2.19	0.56	2.07	0.21	0.06	0.10	0.03
San Jose[d]	0.073	0.76	0.50[a]	15.44	1.12	2.28	1.34	8.72	0.08	0.02	0.09	0.04
Santa Barbara	0.138	0.74	0.24	10.90	0.77	2.11	0.13	-2.48	0.16	0.02	0.13	0.01
Santa Rosa	0.048	0.76	0.17	NA	NA	NA	NA	NA	0.22	0.004	0.05	NA
Stockton[e]	0.014	0.78	0.23[a]	NA	NA	NA	NA	1.25	0.15	0.02	[0.04]	
Vallejo-Napa	0.040	0.78	0.22	NA	NA	NA	NA	NA	0.17	0.05	0.07	NA

a) This data in these metropolitan areas are based on a 1975 survey instead of the 1970 census.
b) This data is based on a 1975 survey with census tract detail instead of the 1976 ZIP Code values from the IRS files.
c) This data is based on a 1975 or 1976 survey and the 1970 census with census tract values instead of the 1975 IRS and 1970 census information with ZIP Code area values.
d) Mean value of the fraction of dwelling units vacant is 0.052 for San Jose.
e) The mean values of additional variables for Stockton are:

Average sales price (1977)	$43.32 thousand
Average change in sales price (1977-1976)	7.80 "
Fraction vacant 1975	0.047
Change in percent vacant (1975-1970)	0.87

In general, we report comparisons in terms of the ratio of the probability of a given decision for an application with certain characteristics to the probability of that decision for the typical application. The probabilities of each decision for the typical application are presented in Tables 3-4 and 3-5 for 1977 and 1978, respectively. They vary considerably across metropolitan areas. It is for this reason that ratios must be used to compare the differential impact of discrimination measures on outcomes across areas.

Since the denial of an application is clearly an adverse decision, the following discussion focuses on these results. Although downward modification has a somewhat ambiguous meaning, the measures of discrimination are unlikely to be strongly correlated with the types of applicants who revise their requested loan amounts downward. Therefore, downward modification results are summarized but should be interpreted cautiously as evidence of adverse action.

Financial Characteristics

The financial characteristics serve the purpose of controlling for the risk of loss associated with the creditworthiness of the applicant, the value of the property, and the requested

Table 3-4

Probability of Various Outcomes for the Typical Application in California: 1977

Study Area[a]	Denial	Modification Down	Modification Up
Anaheim-Santa Ana-Garden Grove	1.49	2.94	4.13
Bakersfield	0.87	[← 3.99 →]	
Fresno	4.41	2.00	1.16
Los Angeles-Long Beach	3.57	4.36	6.37
Los Angeles City	2.47	6.19	4.84
Modesto	3.57	[← 0.42 →]	
Oxnard-Ventura	2.39	1.83	0.85
Sacramento	2.56	3.17	1.13
Salinas-Monterey	2.91	[← 4.89 →]	
San Bernardino-Riverside-Ontario	0.54	2.42	0.85
San Diego	2.35	3.68	4.45
San Francisco-Oakland	2.54	5.54	0.88
San Jose	1.75	2.62	1.18
Santa Barbara	2.81	[← 5.14 →]	
Santa Rosa	0.94	0.83	0.77
Stockton	1.71	[← 1.76 →]	
Vallejo-Napa	1.74	0.54	2.56

a) Metropolitan area in all cases except the City of Los Angeles.

Table 3-5

Probability of Various Outcomes for the Typical Application in California: 1978

Study Area[a]	Denial	Modification	
		Down	Up
Anaheim-Santa Ana-Garden Grove	3.34	4.11	3.02
Bakersfield	1.83	[← 4.49 →]	
Fresno	6.06	3.91	1.35
Los Angeles-Long Beach	3.34	7.22	2.58
Los Angeles City	3.03	7.01	2.27
Modesto	2.94	[← 4.62 →]	
Oxnard-Ventura	1.90	5.49	2.34
Sacramento	2.72	4.74	1.60
Salinas-Monterey	12.04	[← 4.50 →]	
San Bernardino-Riverside-Ontario	1.16	3.01	2.12
San Diego	2.11	5.19	3.34
San Francisco-Oakland	3.53	4.06	3.14
San Jose	2.37	2.45	3.00
Santa Barbara	2.53	[← 3.05 →]	
Santa Rosa	3.03	0.81	1.61
Stockton	2.01	[← 0.50 →]	
Vallejo-Napa	1.01	1.90	0.76

a) Metropolitan areas in all cases except the City of Los Angeles.

loan terms. These variables have the expected relationship to lender behavior and are highly significant across equations. Table 3-6 presents denial ratios for the typical application with variations in its financial characteristics that should make it more likely to be denied. As a result, we expect all the ratios in the table to be greater than one, as most of them are; only one is less than one (Santa Barbara in 1977).

The requested loan to appraised value ratio (RLTOAV) is the most consistent variable; it has a positive coefficient in all the denial and downward modification equations, and a negative coefficient in all the upward modification equations. All but one of the coefficients are large and very significant; the exception is the denial equation for the Salinas-Monterey metropolitan area in 1978. These results indicate that an application is more likely to be denied or modified down, and less likely to be modified up, the higher is the requested loan amount relative to the appraised value of the property.

The coefficients of the requested loan to income ratio variable (RLTOINC) indicate that applications are more likely to be denied or modified down the more this ratio exceeds 2.5. The RLTOINC coefficients are statistically significant at the five or less percent level in all the modified down equations and all but five of the denial equations. In one of the five denial equations the coefficient is statistically significant at the ten percent level. It is not statistically significant at the ten or less percent level in the 1977 equations for the Modesto, San Diego, Santa Barbara and Stockton metropolitan areas.

Table 3-6

Denial Ratios for Several Different Applications Relative to the Typical Applicant (TA) in California: 1977 and 1978[a]

Study Areas[b]	TA with higher RLTOINC (+1)		TA with higher RLTOAV (+0.1)	
	1977	1978	1977	1978
Anaheim-Santa Ana-Garden Grove	2.36**	2.26**	1.98**	1.52**
Bakersfield	4.27**	7.39**	1.74**	2.37**
Fresno	1.56**	2.00**	1.55**	1.27**
Los Angeles-Long Beach	2.46**	2.03**	1.77**	1.62**
Los Angeles City	1.97**	1.72**	1.75**	1.79**
Modesto	1.88	1.92**	1.39**	1.60**
Oxnard-Ventura	2.64**	3.20**	2.03**	1.77**
Sacramento	2.28**	4.09**	2.43**	2.17**
Salinas-Monterey	1.60**	2.05**	1.93**	1.12
San Bernardino-Riverside-Ontario	5.77**	3.31**	1.58**	3.03**
San Diego	1.33	1.86**	1.49**	1.63**
San Francisco-Oakland	2.17**	2.58**	1.66**	1.85**
San Jose	2.59**	2.20**	1.97**	2.11**
Santa Barbara	0.97	2.86**	2.69**	1.81**
Santa Rosa	2.60**	2.79**	1.93**	2.79**
Stockton	1.30	4.03**	2.01**	2.13**
Vallejo-Napa	3.98**	2.06*	3.34**	2.96**

a) The ratio is equal to the probability that an application with the indicated characteristics will be denied divided by the probability that the typical application (TA) will be denied. A single asterisk (*) indicates that the coefficient of RLTOINC or RLTOAV is statistically significant at the five-to-ten percent level. Two asterisks (**) indicates that it is significant at the five or less percent level.

b) Metropolitan areas in all cases except the City of Los Angeles.

At least one of these two financial control variables (RLTOAV and RLTOINC) has a large and statistically significant impact on the lending decision in the direction predicted by the theoretical discussion in Chapter 2 in each metropolitan area for each year. In fact, both variables are statistically significant with the expected signs in all but one of the models where the data is sufficient to separate downward and upward modifications; the San Diego metropolitan area for 1977 is the exception.

Neighborhood Characteristics

The neighborhood characteristics have been included to control for the effect of housing market externalities on the future value of the property securing the loan. The coefficients of these variables are not consistent across metropolitan areas, and are sometimes inconsistent across time within the same metropolitan area. The average income and the change in income over a recent year in an area containing the property have the most consistent coefficients. The average income has the expected negative relationship with the likelihood of denial in 15 of 26 cases. All but two of the negative relationships are statistically significant (five percent level) while only three of the positive relationships are statistically significant.

Contrary to expectations, the change in income between 1975 and 1976 is positively related to the likelihood of denial in 19 of 22 cases and statistically significant in 13 of them. Two of the three negative relationships are statistically significant. This suggests that any recent change in property values, even if it is an increase, is viewed by lenders as an indication of higher risk of loss.

The variable representing the fraction of households with high income in the census tract generally has the expected negative relationship to the likelihood of denial (19 out of 34 cases). Only 8 of these negative coefficients are statistically significant, and six of the positive ones are significant (ten percent level).

The income change between 1970 and 1975 and the change in households between 1975 and 1976 variables for the area containing the subject property have coefficients that are positive approximately as often as they are negative. Coefficients of either sign are equally likely to be statistically significant for these two variables.

The change in households between 1970 and 1975 variable, however, is negative more often (17 out of 26 cases) than it is positive. In addition, nine of the negative coefficients and only four of the positive ones are significant (ten percent level). The negative coefficients indicate that mortgage applications are more likely to be denied if they are secured by properties located in areas that have experienced a decline in population over a period of five years. Population changes over a shorter time period have no consistent relationship to the likelihood of denial.

In a few metropolitan areas, we were able to include additional measures of neighborhood characteristics. The average sales price was positively related to the chance of denial in three of the four cases where it was available; two of these were statistically significant. The change in sales price variable had statistically significant coefficients in all four cases, but they were positive equally as often as they were negative.

The vacancy rate also had mixed results. It had an expected positive relationship with the likelihood of denial in two of four cases, and one of these positive coefficients was the only statistically significant one among the four. In the Stockton metropolitan area, we also had a measure of the change in the vacancy rate. In both years, this variable indicated that application denial was more likely if the property was located in a neighborhood that had a rising vacancy rate. One of the coefficients was statistically significant at the five percent level.

At least one of the neighborhood characteristic variables has a statistically significant (five percent level) coefficient with the expected relationship to the likelihood of denial for each year in all the large metropolitan areas: Anaheim-Santa Ana-Garden Grove, Los Angeles-Long Beach,Sacramento, San Diego, San Francisco-Oakland and San Jose. The performance is more mixed for the smaller metropolitan areas; some have a significant expected relationship in only one year and others in neither year. In the Modesto, Santa Rosa, and Vallejo-Napa metropolitan areas, we had only one neighborhood characteristic (FHI) because none of the more recent sources of data (e.g., geocoded IRS information) provided information for these areas.

Sex

The denial and downward modification ratios for 17 study areas in each of two years are presented in Tables 3-7 to 3-10. Four types of applications are compared to the typical application: male-female applications with the woman of childbearing age and the applicant between 25 and 34 years of age (MFCB25-34); female only applications with no woman of childbearing age (FONLYNCB); female only applications with at least one woman of childbearing age and the applicant between 25 and 34 years of age (FONLYCB25-34); and male only applications (MONLY). Each of these four household types resembles the typical application in all other characteristics.

In the case of households with women of childbearing age, we altered the age of the applicant to make it consistent with having a woman of childbearing age. This was more critical in the case of the female only than in the male-female applications because the applicant in the latter household type is usually the male and he is 3-4 years older on average than the female. As a result, it would not be unreasonable to illustrate a male-female typical application with a woman of childbearing age (MFCB); however, this household type occurs less frequently than the MFCB25-34 one. One consequence of combining sex and age coefficients for two household types (MFCB25-34 and FONLYCB25-34) is that their denial and downward modification ratios depend on both factors. When the age coefficient materially alters the ratio, additional footnotes have been used to alert the reader. Any reader wishing to examine additional sex and age interactions can do so with the help of

Table 3-7

Denial Ratios by Sex for the Typical California Application: 1977[a]

Study Area[b]	MFNCB[c]	MFCB and 25-34	FONLYNCB	FONLYCB and 25-34	MONLY
Anaheim- Santa Ana-Garden Grove	1.00	1.30*	1.25	1.50	1.23
Bakersfield	1.00	1.14[e]	0.00**	0.48	0.19**
Fresno	1.00	1.21	0.55	0.83	1.07
Los Angeles-Long Beach	1.00	0.61**	0.62**	0.72**	0.69**
Los Angeles City	1.00	0.97	1.10	0.84	0.89
Modesto	1.00	0.42**	0.40	0.91	1.14
Oxnard-Ventura	1.00	0.59*	1.50	0.30	0.76
Sacramento	1.00	1.16	0.71	0.79	0.90
Salinas-Monterey	1.00	1.20	1.15	1.47	0.95
San Bernardino-Riverside-Ontario	1.00	1.01[e]	1.11	0.00**	1.73
San Diego	1.00	0.92[d]	2.43**	1.03	1.96**
San Francisco-Oakland	1.00	1.05[e]	1.08	0.85	1.18
San Jose	1.00	0.56**	0.56**	0.42**	0.64**
Santa Barbara	1.00	1.90[g]	1.06	1.15[e]	0.89
Santa Rosa	1.00	1.38	0.59	1.39	1.09
Stockton	1.00	0.37[d]	0.71	1.06[d]	1.00
Vallejo-Napa	1.00	0.22**	0.07**	0.14	0.41*

a) The ratio is equal to the probability that an application with the indicated characteristics will be denied divided by the probability that the typical application will be denied. A single asterisk (*) indicates that the numerator of the ratio is statistically significantly different than the denominator at the five-to-ten percent level. Two asterisks (**) indicates that the difference is significant at the five or less percent level.

Table 3-7 (continued)

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b) Metropolitan areas in all cases except the City of Los Angeles.

c) This is the typical application described in the text. It is the base for calculating the denial ratios. The other applications involve variations from the typical one in one or more characteristics. See Table 3-4 for the probability of denial for the typical application in each area.

d) Since the ratio for MFCB or FONLYCB for the 35 to 44 year old age range of the typical application is greater than one, it is the 25 to 34 year old age coefficient that makes the ratio in the table less than, or closer to, one. The MFCB or FONLYCB coefficient, however, is not statistically significant at the ten or less percent level.

e) Since the ratio for MFCB or FONLYCB for the 35 to 44 year old age range of the typical application is less than one, it is the 25 to 34 year old age coefficient that makes the ratio in the table greater than one. The MFCB or FONLYCB coefficient is not statistically significant at the ten or less percent level.

f) Same situation as in note (d) except the MFCB or FONLYCB coefficient is statistically significant at the ten or less percent level.

g) Same situation as note (e) except the MFCB or FONLYCB ratio for the 35 to 44 age range of the typical application was slightly larger than one.

Table 3-8

Denial Ratios by Sex for the
Typical California Application: 1978[a]

Study Area[b]	MFNCB[c]	MFCB and 25-34	FONLYNCB	FONLYCB and 25-34	MONLY
Anaheim-Santa Ana-Garden Grove	1.00	1.24	1.34	0.86	1.00
Bakersfield	1.00	1.61	1.05	0.80[d]	0.35*
Fresno	1.00	1.21	1.08	0.83	0.77
Los Angeles-Long Beach	1.00	0.76**	0.84	0.55**	1.08
Los Angeles City	1.00	0.92	0.87	0.39**	1.20*
Modesto	1.00	1.35**	0.45	1.79*	0.68
Oxnard-Ventura	1.00	0.77**	1.26	1.40	1.00
Sacramento	1.00	0.89[f]	1.17	1.08*	1.66**
Salinas-Monterey	1.00	0.89[d]	0.86	0.93[d]	0.88
San Bernardino-Riverside-Ontario	1.00	0.82[f]	2.95*	2.00*	1.53
San Diego	1.00	1.12	1.36	1.61	1.23
San Francisco-Oakland	1.00	0.72**	0.92	0.77*	0.95
San Jose	1.00	0.82[d]	0.69	0.46*	0.96
Santa Barbara	1.00	0.92	2.47*	1.07[e]	0.71
Santa Rosa	1.00	0.63**	0.39**	0.41**	0.58**
Stockton	1.00	1.21	2.65*	0.99	0.96
Vallejo-Napa	1.00	1.76	2.38	0.00**	1.78

a) The ratio is equal to the probability that an application with the indicated characteristics will be denied divided by the probability that the typical application will be denied. A single asterisk (*) indicates that the numerator of the ratio is statistically significantly different than the denominator at the five-to-ten percent level. Two asterisks (**) indicates that the difference is significant at the five or less percent level.

Table 3-8 (continued)

b) Metropolitan areas in all cases except the City of Los Angeles.

c) This is the typical application described in the text. It is the base for calculating the denial ratios. The other applications involve variations from the typical one in one or more characteristics. See Table 3-5 for the probability of denial for the typical application in each area.

d) See note (d), Table 3-7, for explanation.

e) See note (e), Table 3-7, for explanation.

f) See note (f), Table 3-7, for explanation.

g) See note (g), Table 3-7, for explanation.

Table 3-9

Downward Modification Ratios by Sex for the Typical California Application: 1977[a]

Study Area[b]	MFNCB[c]	MFCB and 25-34	FONLYNCB	FONLYCB and 25-34	MONLY
Anaheim-Santa Ana-Garden Grove	1.00	0.84[d]	1.02	0.92[d]	1.24
Fresno	1.00	0.81	0.35**	0.41	1.27
Los Angeles-Long Beach	1.00	0.89**	0.97	0.90	0.83**
Los Angeles City	1.00	0.60**	0.73**	0.52**	0.94
Oxnard-Ventura	1.00	0.71	1.19	0.21**	0.70
Sacramento	1.00	0.82[d]	0.92	0.43*	1.09
San Bernardino-Riverside-Ontario	1.00	0.45	1.39	0.42	0.82
San Diego	1.00	0.89	1.00	0.99	0.78
San Francisco-Oakland	1.00	0.67*	0.54**	0.49**	0.67**
San Jose	1.00	0.51**	0.94	0.39**	0.74**
Santa Rosa	1.00	1.42[e]	2.49**	2.15	0.79
Vallejo-Napa	1.00	1.56	3.46	1.20	2.92**

a) The ratio is equal to the probability that an application with the indicated characteristics will be modified downward divided by the probability that the typical application will be modified downward. A single asterisk (*) indicates that the numerator of the ratio is statistically significantly different than the denominator at the five-to-ten percent level. Two asterisks (**) indicates that the difference is significant at the five or less percent level.
b) Metropolitan areas in all cases except the City of Los Angeles.
c) This is the typical application described in the text. It is the base for calculating the downward modification ratios. The other applications involve variations from the typical one in one or more characteristics. See Table 3-4 for the probability of downward modification for the typical application in each area.
d) See note (d), Table 3-7, for explanation.
e) See note (e), Table 3-7, for explanation.
f) See note (f), Table 3-7, for explanation.
g) See note (g), Table 3-7, for explanation.

Table 3-10

Downward Modification Ratios by Sex for the Typical California Application: 1978[a]

Study Area[b]	MFNCB[c]	MFCB and 25-34	FONLYNCB	FONLYCB and 25-34	MONLY
Anaheim-Santa Ana-Garden Grove	1.00	0.82	0.90	0.57	0.80*
Fresno	1.00	0.71[d]	0.99	0.91[d]	1.00
Los Angeles-Long Beach	1.00	0.63**	0.87	0.62**	0.82**
Los Angeles City	1.00	0.66**	0.76**	0.39**	0.73**
Oxnard-Ventura	1.00	0.71	0.93	0.49	0.76
Sacramento	1.00	0.71**	0.71	0.64	0.85
San Bernardino-Riverside-Ontario	1.00	0.94	0.56	0.52	0.60*
San Diego	1.00	0.73[d]	0.71	0.46	0.87
San Francisco- Oakland Oakland	1.00	0.55**	0.63**	0.48**	0.77**
San Jose	1.00	1.03	0.90	0.70	0.83
Santa Rosa	1.00	1.35*	2.81**	0.78	2.35**
Vallejo-Napa	1.00	0.22**	1.50	0.32	0.57

a) The ratio is equal to the probability that an application with the indicated characteristics will be modified downward divided by the probability that the typical application will be modified downward. A single asterisk (*) indicates that the numerator of the ratio is statistically significantly different than the denominator at the five-to-ten percent level. Two asterisks (**) indicates that the difference is significant at the five or less percent level.
b) Metropolitan areas in all cases except the City of Los Angeles.
c) This is the typical application described in the text. It is the base for calculating the downward modification ratios. The other applications involve variations from the typical one in one or more characteristics. See Table 3-5 for the probability of downward modification for the typical application in each area.
d) See note (d), Table 3-7, for explanation.
e) See note (e), Table 3-7, for explanation.
f) See note (f), Table 3-7, for explanation.
g) See note (g), Table 3-7, for explanation.

the denial and downward modification ratios for applications from households of different ages which are discussed in a later section.

When the denial ratio is greater than one, the evidence is consistent with allegations of discrimination against that household type. According to Tables 3-7 and 3-8, denial ratios less than one occur more frequently than denial ratios greater than one for each of the four household types. In addition, more of the ratios less than one are based on statistically significant coefficients than are the ratios greater than one.

The tables of denial ratios indicate that male-female applications with a woman of childbearing age and an applicant between 25 and 34 (MFCB25-34) are statistically significantly more likely to be denied in the Anaheim-Santa Ana-Garden Grove (1977) and Modesto (1978) metropolitan areas than an otherwise similar typical application.[4] The ratios are 1.30 and 1.35, respectively. Older, male-female households with a woman of childbearing age (MFCB) are significantly more likely to be denied in the Sacramento (1978) and San Bernardino-Riverside-Ontario (1978) metropolitan areas, with ratios of 1.48 and 1.12, respectively.[5]

Female only applications with no women of childbearing age (FONLYNCB) are more than twice as likely to be denied than the typical application in San Bernardino-Riverside-Ontario (1978), San Diego (1977), Santa Barbara (1978), and Stockton (1978) metropolitan areas; all four coefficients are statistically significant. The denial ratios for the first three of these four study areas are also greater than one in the other year, but the underlying coefficients are not statistically significant for that year.

Female only applications with at least one woman of child-bearing age and an applicant between 25 and 34 years of age (FONLYCB 25-34) are statistically significantly more likely to be denied in the Modesto (1978), Sacramento (1978), and San Bernardino-Riverside-Ontario (1978) metropolitan areas. The denial ratios of 1.79, 1.08 and 2.00, respectively, indicate relatively large differentials in two of the three study areas.

The tables also indicate that male only households (MONLY) have a significantly harder time having their applications approved than the typical application in the City of Los Angeles (1978) and the Sacramento (1978) and San Diego (1977) metropolitan areas. The chance of denial is 20 to 96 percent more likely for male only applications than the typical application in these three study areas in the indicated years. The San Diego MONLY denial ratio is also greater than one in 1978 but the underlying coefficient is not statistically significant.

The downward modification results are even more inconsistent with sex discrimination allegations than are the denial results. Only 18 of the 96 downward modification ratios (Tables 3-9 and 3-10) are greater than one compared to 57 of the 136 denial ratios. Furthermore, only five of the downward modification ratios in excess of one are based on statistically significant sex coefficients.

Four of these five occur in the Santa Rosa metropolitan area. Female only applications with no woman of childbearing age (FONLYNCB) are more than twice as likely to be modified downward than the typical application in 1977 and 1978. Male-female applications with a woman of childbearing age and an applicant between 25 and 34 years of age (MFCB25-34) and male only applications are 1.35 and 2.35 times as likely to be modified downward as the typical application in 1978.

The fifth downward modification ratio that is significantly above one occurs in the Vallejo-Napa metropolitan area in 1978. Male only applications are nearly three times as likely to be modified downward as the typical application.

Many allegations of sex discrimination assert that lenders discount secondary income, especially when the wage earner is female. Denial and downward modification ratios for two-worker households by sex are compared to the one worker typical application in Tables 3-11 to 3-14. Each worker contributes 50 percent of the household income. In general, these results indicate that income from a second worker is favored in the lender decision process. Perhaps two sources of income reduce the variance of income and hence, the credit risk. Most of the denial and downward modification ratios are less than one.

When the sex of the applicant is examined, two types of applications have denial ratios greater than one more often than less than one. These are applications from male-female and female only households provided there are no women of childbearing age (MFNCB and FONLYNCB, respectively). However, very few of the secondary income coefficients responsible for these ratios in

Table 3-11

Denial Ratios for Applications with 50 Percent Secondary Income by Sex Relative to the Typical Application: 1977[a]

Study Area[b]	MFNCB	MFCB and 25-34	FONLYNCB	FONLYCB and 25-34	MONLY
Anaheim-Santa Ana-Garden Grove	1.34**	0.99	1.66**	1.03	0.44**
Bakersfield	0.66	0.58	0.00[c]	0.25	0.12[c]
Fresno	1.41	1.04	0.78	0.90	1.21
Los Angeles-Long Beach	0.60**	0.55[c]	0.37**	0.63[c]	0.81
City of Los Angeles	0.66	0.63**	0.71	0.54**	0.81
Modesto	0.81	0.33[c]	0.32	0.73	2.27*
Oxnard-Ventura	1.29	0.96	1.95	0.49	0.86
Sacramento	1.02	0.76*	0.72	0.51*	0.64*
Salinas-Monterey	1.32	0.68*	1.48	0.82*	0.56*
San Bernardino-Riverside-Ontario	1.05	1.59	1.17	0.00[c]	3.36*
San Diego	1.02	1.44*	2.47[c]	1.61*	2.16[c]
San Francisco-Oakland	1.33	0.65**	1.42	0.52**	0.84**
San Jose	0.61	0.55[c]	0.34[c]	0.40[c]	0.53[c]
Santa Barbara	2.43**	0.95	2.50**	0.57	0.15**
Santa Rosa	1.80	0.90	1.04	0.92	1.68
Stockton	1.48	0.34[c]	1.06	0.98	0.60
Vallejo-Napa	0.23**	0.38[c]	0.02[c]	0.24	0.58[c]

a) The ratio is equal to the probability than an application with the indicated characteristics will be denied divided by the probability that the typical application will be denied. A single asterisk (*) indicates that the underlying secondary income coefficients that account for the difference between the numerator and the denominator

Table 3-11 (continued)

a) (cont'd) of the ratio are statistically significant at the five-to-ten percent level. Two asterisks (**) indicates that the difference is significant at the five or less percent level. The typical application is described in the text. It has no secondary income and is the base for calculating the denial ratios. The other applications involve variations from the typical one in one or more characteristics. See Table 3-4 for the probability of denial for the typical application in each area.

b) Metropolitan areas in all cases except the City of Los Angeles.

c) The substantial difference of this ratio from 1.00 is largely due to statistically significant sex or age coefficients and not the coefficients of the secondary income variables. However, if one or more asterisks appear with a "c", the secondary income coefficients are also statistically significant. See Tables 3-7 to 3-10 and 3-15 to 3-18 for a summary of the sex and age results.

Table 3-12

Denial Ratios for Applications
with 50 Percent Secondary Income by Sex
Relative to the Typical Application: 1978[a]

Study Area[b]	MFNCB	MFCB and 25-34	FONLYNCB	FONLYCB and 25-34	MONLY
Anaheim-Santa Ana-Garden Grove	1.44*	0.55**	1.91*	0.38**	1.11
Bakersfield	1.56	0.62**	1.65	0.31**	0.62
Fresno	1.17	0.68	1.26	0.49	0.34*
Los Angeles-Long Beach	0.71**	0.54**	0.60**	0.39**	0.81**
City of Los Angeles	0.78*	0.55**	0.67*	0.23**[c]	1.07
Modesto	1.23	0.57	0.53	0.76	0.39
Oxnard-Ventura	1.69	0.68[c]	2.16	1.21	1.13
Sacramento	1.14	1.07	1.34	1.29	1.81[c]
Salinas-Monterey	1.09	0.51**	0.93	0.54**	1.07
San Bernardino-Riverside-Ontario	1.17	1.03	3.42[c]	2.56[c]	0.36**
San Diego	1.44*	0.99	1.96*	1.42	1.12
San Francisco-Oakland	0.93	0.64[c]	1.05	0.59[c]	0.99
San Jose	0.57**	0.57**[c]	0.39**	0.32**[c]	0.99
Santa Barbara	1.26	0.53	3.07[c]	0.61	0.73
Santa Rosa	0.61*	0.67[c]	0.24*[c]	0.44[c]	0.71[c]
Stockton	0.49	0.72	1.33[c]	0.59	0.92
Vallejo-Napa	1.36	0.56	2.83	0.00[c]	1.20

a) The ratio is equal to the probability than an application with the indicated characteristics will be denied divided by the probability that the typical application will be denied. A single asterisk (*) indicates that the underlying secondary income coefficients that account for the difference between the numerator and denominator of

Table 3-12 (continued)

a) (cont'd) the ratio are statistically significant at the five-to-ten percent level. Two asterisks (**) indicates that they are significant at the five or less percent level. The typical application is described in the text. It has no secondary income and is the base for calculating the denial ratios. The other applications involve variations from the typical one in one or more characteristics. See Table 3-5 for the probability of denial for the typical application in each area.

b) Metropolitan areas in all cases except the City of Los Angeles.

c) See footnote (c) to Table 3-11.

Table 3-13

Downward Modification Ratios for Applications with 50 Percent Secondary Income by Sex Relative to the Typical Application: 1977[a]

Study Area[b]	MFNCB	MFCB and 25-34	FONLYNCB	FONLYCB and 25-34	MONLY
Anaheim-Santa Ana-Garden Grove	1.38**	0.58*	1.40**	0.63*	1.09
Fresno	0.84	0.59	0.30[c]	0.29	0.74
Los Angeles-Long Beach	0.95	0.79	0.92	0.81	0.78
City of Los Angeles	0.65**	0.48**	0.47**	0.40**	0.74**
Oxnard-Ventura	0.92	0.79	1.09	0.23[c]	1.06
Sacramento	0.79	0.41**	0.73	0.21**[c]	1.23
San Bernardino-Riverside-Ontario	0.74	0.23*	1.04	0.21*	2.50*
San Diego	1.28	0.41**	1.27	0.46**	0.91
San Francisco-Oakland	0.64**	0.37**[c]	0.34**[c]	0.27**[c]	0.51**[c]
San Jose	0.74	0.52[c]	0.70	0.39[c]	0.64[c]
Santa Rosa	1.50*	0.80**	3.68*[c]	1.23[c]	1.94**
Vallejo-Napa	1.34	2.80	4.58	2.15	7.19**[c]

a) The ratio is equal to the probability that an application with the indicated characteristics will be downward modified divided by the probability that the typical application will be downward modified. A single asterisk (*) indicates that the underlying secondary income coefficients that account for the difference between the numerator and denominator of the ratio are statistically significant at the five-to-ten percent level. Two asterisks (**) indicates that the difference is significant at the five or less percent level. The typical application is described in the text. It has no secondary income and is the base for calculating the downward modification ratios. The other applications involve variations from the typical one in one or more characteristics. See Table 3-4 for the probability of downward modification for the typical application in each area.

b) Metropolitan areas in all cases except the City of Los Angeles.

c) See footnote (c) to Table 3-11.

Table 3 - 14

Downward Modification Ratios for Applications with 50 Percent Secondary Income by Sex Relative to the Typical Application: 1978[a]

Study Area[b]	MFNCB	MFCB and 25-34	FONLYNCB	FONLYCB and 25-34	MONLY
Anaheim-Santa Ana-Garden Grove	0.84	0.52**	0.76	0.36**	0.52**
Fresno	1.61	0.81[c]	1.59*	1.05	1.64*
Los Angeles-Long Beach	0.66**	0.58[c]	0.57**	0.57[c]	0.78[c]
City of Los Angeles	0.62**	0.40**[c]	0.47**	0.23**[c]	0.58**[c]
Oxnard-Ventura	0.50	0.35**[c]	0.47	0.24**[c]	0.66
Sacramento	0.73*	0.91	0.51	0.82	0.63
San Bernardino-Riverside-Ontario	0.51*	0.44*	0.28*	0.25*	0.15**
San Diego	0.82	0.54**[c]	0.58	0.34**[c]	0.58**
San Francisco-Oakland	0.80*	0.48[c]	0.49*[c]	0.42[c]	0.79
San Jose	1.41**	0.46**	1.26**	0.31**	0.68
Santa Rosa	0.90	1.51[c]	2.52[c]	0.88	1.75[c]
Vallejo-Napa	0.45	1.06	0.60	1.51	0.00**

a) The ratio is equal to the probability that an application with the indicated characteristics will be downward modified divided by the probability that the typical application will be downward modified. A single asterisk (*) indicates that the underlying secondary income coefficients that account for the difference between the numerator and denominator of the ratio are statistically significant at the five-to-ten percent level. Two asterisks (**) indicates that they are significant at the five or less percent level. The typical application is described in the text. It has no secondary income and is the base for calculating the downward modification ratios. The other applications involve variations from the typical one in one or more characteristics. See Table 3-5 for the probability of downward modification for the typical application in each area.

b) Metropolitan areas in all cases except the City of Los Angeles.

c) See footnote (c) to Table 3-11.

excess of one are statistically significant at the ten percent level. The following paragraphs summarize the cases of those ratios larger than one that are based on statistically significant secondary income coefficients.

Male-female applicants with no woman of childbearing age (MFNCB) with two equal incomes are 1.34 to 2.43 times as likely to be denied than are typical applicants with no secondary income in the Anaheim-Santa Ana-Garden Grove (1977 and 1978), San Diego (1978), and Santa Barbara (1977) metropolitan areas.[6] These types of applicants are also 1.38 to 1.50 times as likely to receive downward modifications than the typical applicant with only one worker in the Anaheim-Santa Ana-Garden Grove (1977), San Jose (1978) and Santa Rosa (1977) metropolitan areas. Female only households with no women of childbearing age (FONLYNCB) receive essentially the same treatment in these metropolitan areas and the Fresno (1978) area.

Applications from households with women of childbearing age, whether male-female or female only, who have two workers earning equal incomes are approximately 1.50 times as likely to be denied than the typical application with only one worker in only one metropolitan area: San Diego (1977).

Male only applications with two workers earning equal income are more than twice as likely to be denied than the typical application with only one worker in the Modesto (1977) and San Bernardino-Riverside-Ontario metropolitan areas. These applicants are also 1.64 to 7.19 times as likely to be downward modified in the Fresno (1978), San Bernardino-Riverside-Ontario (1977), Santa Rosa (1977) and Vallejo-Napa (1977) metropolitan areas.

Age of Applicant

The denial and downward modification ratios for applicants of various ages are presented in Tables 3-15 to 3-18. The denial ratios indicate that the typical applicant who is 35-44 years old is the most likely to be denied; nearly all the denial ratios for the other four age categories (under 25, 25-34, 45-54, and over 54) are less than 1.00. In addition, nearly half the ratios below one are statistically significant.

The downward modification ratios are substantially below one for the youngest applicants (under 25) and above one for the oldest applicants (over 54). This is the only identifiable pattern in the downward modification results. It indicates that applicants from persons over 54 years of age are more likely to receive downward modifications in their requested loan amount than are applications from similarly situated persons between 35 and 44, and that the reverse is true for applications from persons under 25.

Race

Tables 3-19 to 3-22 present denial and downward modification ratios for typical applications from different racial groups that are otherwise similar. The denial ratios provide strong and consistent evidence that members of minority groups receive unfavorable treatment from California savings and loan associations. The clearest case of discriminatory treatment exists for blacks. Applications from blacks are 1.54 to 7.82

Table 3-15

Denial Ratios by Age of the Applicant
for Typical Applications: 1977[a]

Study Areas[b]	ALT25	A25-34	A35-44[c]	A45-54	AGE55
Anaheim-Santa Ana-Garden Grove	0.85	1.12	1.00	0.83	0.87
Bakersfield	0.90	1.40	1.00	1.04	1.83
Fresno	0.87	1.05	1.00	0.81	1.14
Los Angeles-Long Beach	0.61**	1.08	1.00	0.68**	0.66**
City of Los Angeles	0.75	1.01	1.00	0.61**	0.56**
Modesto	0.60	0.74	1.00	0.50**	0.23**
Oxnard-Ventura	0.69	0.83	1.00	0.49**	0.17**
Sacramento	1.03	1.02	1.00	1.30	1.38
Salinas-Monterey	0.40*	1.12	1.00	0.76	0.41*
San Bernardino-Riverside-Ontario	0.74	1.18	1.00	0.98	0.55
San Diego	0.72	0.89	1.00	0.87	0.88
San Francisco-Oakland	0.63**	1.09	1.00	0.89	0.81
San Jose	1.04	0.92	1.00	0.63**	0.21**
Santa Barbara	0.80	1.87*	1.00	0.66	0.76
Santa Rosa	0.99	1.05	1.00	1.74*	1.04
Stockton	0.19**	0.26**	1.00	0.31**	0.34*
Vallejo-Napa	1.85	0.46**	1.00	0.53	1.41

a) The ratio is equal to the probability that an application with the indicated characteristics will be denied divided by the probability that the typical application will be denied. A single asterisk (*) indicates that the numerator of the ratio is statistically significantly different than the denominator at the five-to-ten percent level. Two asterisks (**) indicates that the difference is significant at the five or less percent level.

Table 3-15 (continued)

b) Metropolitan areas in all cases except the City of Los Angeles.

c) This is the typical application described in the text. It is the base for calculating the denial ratios. The other applications involve variations from the typical one in one or more characteristics. See Table 3-4 for the probability of denial for the typical application in each area.

Table 3-16

Denial Ratios by Age of the Applicant for Typical Applications: 1978[a]

Study Areas[b]	ALT25	A25-34	A35-44[c]	A45-54	AGE55
Anaheim-Santa Ana-Garden Grove	0.80	1.15*	1.00	0.89	0.72**
Bakersfield	0.70	0.76	1.00	1.04	0.78
Fresno	0.95	0.76*	1.00	0.92	0.85
Los Angeles-Long Beach	0.69**	0.88**	1.00	0.89**	0.80**
City of Los Angeles	0.94	0.90**	1.00	0.85*	1.00
Modesto	0.80	0.62*	1.00	1.09	1.75
Oxnard-Ventura	1.56	1.12	1.00	1.05	0.57**
Sacramento	0.83	0.60**	1.00	1.28	1.05
Salinas-Monterey	0.67	0.71	1.00	0.55**	0.79
San Bernardino-Riverside-Ontario	0.80	0.73	1.00	1.37	1.89
San Diego	0.93	1.10	1.00	1.43**	0.94
San Francisco-Oakland	0.78*	0.87**	1.00	1.02	0.79*
San Jose	0.89	0.78**	1.00	0.66**	0.83
Santa Barbara	0.71	1.06	1.00	0.53	1.03
Santa Rosa	0.84	1.06	1.00	1.18	0.64*
Stockton	0.37*	1.15	1.00	0.75	0.45*
Vallejo-Napa	0.22**	0.86	1.00	1.06	0.00**

a) The ratio is equal to the probability than an application with the indicated characteristics will be denied divided by the probability that the typical application will be denied. A single asterisk (*) indicates that the numerator of the ratio is statistically significantly different than the denominator at the five-to-ten percent level. Two asterisks (**) indicates that the difference is significant at the five or less percent level.

Table 3-16 (continued)

b) Metropolitan areas in all cases except the City of Los Angeles.

c) This is the typical application described in the text. It is the base for calculating the denial ratios. The other applications involve variations from the typical one in one or more characteristics. See Table 3-5 for the probability of denial for the typical application in each area.

Table 3-17

Downward Modification Ratios by Age of the Applicant for Typical Applications: 1977[a]

Study Areas[b]	ALT25	A25-34	A35-44[c]	A45-54	AGE55
Anaheim-Santa Ana-Garden Grove	0.43**	0.69**	1.00	0.96	1.18
Fresno	0.54*	0.82	1.00	0.34**	1.05
Los Angeles-Long Beach	0.90	0.96	1.00	1.41**	1.40**
City of Los Angeles	0.90	0.78**	1.00	1.08	1.18
Oxnard-Ventura	0.47**	0.86	1.00	1.13	0.81
Sacramento	0.51*	0.80*	1.00	0.92	0.99
San Bernardino-Riverside-Ontario	0.88	0.52**	1.00	0.88	1.53
San Diego	0.91	0.99	1.00	1.30	1.15
San Francisco-Oakland	0.79	0.73**	1.00	0.90	0.94
San Jose	1.04	0.78**	1.00	1.01	0.80
Santa Rosa	0.91	1.72**	1.00	0.49*	1.63
Vallejo-Napa	0.33*	0.70	1.00	1.00	3.63**

a) The ratio is equal to the probability that an application with the indicated characteristics will be downward modified divided by the probability that the typical application will be downward modified. A single asterisk (*) indicates that the numerator of the ratio is statistically significantly different than the denominator at the five-to-ten percent level. Two asterisks (**) indicates that the difference is significant at the five or less percent level.

b) Metropolitan areas in all cases except the City of Los Angeles.

c) This is the typical application described in the text. It is the base for calculating the downward modification ratios. The other applications involve variations from the typical one in one or more characteristics. See Table 3-4 for the probability of downward modification for the typical application in each area.

Table 3-18

Downward Modification Ratios by Age of the Applicant for Typical Applications: 1978[a]

Study Areas[b]	ALT25	A25-34	A35-44[c]	A45-54	AGE55
Anaheim-Santa Ana-Garden Grove	0.49**	0.82**	1.00	0.70**	1.23
Fresno	0.59*	0.61**	1.00	0.98	1.00
Los Angeles-Long Beach	0.73**	0.78**	1.00	0.96	1.06
City of Los Angeles	0.77*	0.78**	1.00	0.86*	0.94
Oxnard-Ventura	0.52*	0.73*	1.00	0.85	1.16
Sacramento	0.59**	0.94	1.00	1.01	1.00
San Bernardino-Riverside-Ontario	1.01	1.12	1.00	1.63*	0.96
San Diego	0.72*	0.67	1.00	1.19	1.17
San Francisco-Oakland	0.54**	0.80**	1.00	1.14	1.05
San Jose	0.74	0.97	1.00	0.95	1.00
Santa Rosa	0.62	0.75	1.00	1.30	1.17
Vallejo-Napa	0.00**	1.28	1.00	2.31**	2.91**

a) The ratio is equal to the probability that an application with the indicated characteristics will be downward modified divided by the probability that the typical application will be downward modified. A single asterisk (*) indicates that the numerator of the ratio is statistically significantly different than the denominator at the five-to-ten percent level. Two asterisks (**) indicates that the difference is significant at the five or less percent level.

b) Metropolitan areas in all cases except the City of Los Angeles.

c) This is the typical application described in the text. It is the base for calculating the downward modification ratios. The other applications involve variations from the typical one in one or more characteristics. See Table 3-5 for the probability of downward modification for the typical application in each area.

Table 3-19

Denial Ratios by Race of Applicant(s)
for Typical Applications: 1977[a]

Study Areas[b]	White[c]	Black	Spanish	Asian	Other Minority
Anaheim-Santa Ana-Garden Grove	1.00	0.00**	1.20	1.15	1.31
Bakersfield	1.00	7.82**	2.14[e]	5.75**	5.95**
Fresno	1.00	3.13**	1.62*	1.38	2.39**
Los Angeles-Long Beach	1.00	1.54**	1.16*	0.83	1.31[e]
City of Los Angeles	1.00	2.77**	1.08	0.85	1.75*
Modesto	1.00	d	1.08	f	2.88**
Oxnard-Ventura	1.00	2.04	1.50	0.64	1.35
Sacramento	1.00	2.03[e]	1.29	1.19	1.70
Salinas-Monterey	1.00	2.70*	1.89*	0.28*	1.94*
San Bernardino-Riverside-Ontario	1.00	2.72[e]	0.85	0.73	0.71
San Diego	1.00	2.47**	1.01	0.87	0.83
San Francisco-Oakland	1.00	1.56**	1.01	0.98	1.37*
San Jose	1.00	4.16**	1.71**	1.64**	1.21
Santa Barbara	1.00	d	1.54	0.00**	2.12
Santa Rosa	1.00	1.76	1.39	3.13*	2.00
Stockton	1.00	7.29**	2.52*	2.44	1.81
Vallejo-Napa	1.00	4.92**	1.58	2.69[e]	2.09

a) The ratio is equal to the probability that an application with the indicated characteristics will be denied divided by the probability that the typical application will be denied. A single asterisk (*) indicates that the numerator of the ratio is statistically significantly different than the denominator at the five-to-ten percent level. Two asterisks (**) indicates that the difference is significant at the five or less percent level.

Table 3-19 (continued)

b) Metropolitan areas in all cases except the City of Los Angeles.

c) This is the typical application described in the text. It is the base for calculating the denial ratios. The other applications involve variations from the typical one in one or more characteristics. See Table 3-4 for the probability of denial for the typical application in each area.

d) Grouped together with other minorities due to the limited number of observations on this type of household.

e) The numerator is statistically significantly larger than the denominator at the ten percent one-tail level.

f) Grouped together with whites due to the limited number of observations.

Table 3-20

Denial Ratios by Race of Applicant(s)
for Typical Applications: 1978[a]

Study Areas[b]	White[c]	Black	Spanish	Asian	Other Minority
Anaheim-Santa Ana-Garden Grove	1.00	2.37**	1.29[e]	0.75*	1.29
Bakersfield	1.00	4.15**	0.47*	1.31	0.00**
Fresno	1.00	1.81[e]	1.28	0.76	1.51
Los Angeles-Long Beach	1.00	1.69**	1.04	0.79**	1.50**
City of Los Angeles	1.00	2.12**	1.28**	1.11	1.57*
Modesto	1.00	d	1.27	f	1.40
Oxnard-Ventura	1.00	1.34	1.60*	0.97	1.51
Sacramento	1.00	3.44**	1.66*	0.97	2.11**
Salinas-Monterey	1.00	2.12**	1.69**	1.25	2.46**
San Bernardino-Riverside-Ontario	1.00	4.27**	1.54[e]	0.75	0.43
San Diego	1.00	1.95*	1.05	1.32	1.21
San Francisco-Oakland	1.00	1.59**	1.29**	1.16[e]	1.19
San Jose	1.00	2.67**	1.22	0.76	1.79*
Santa Barbara	1.00	d	1.12	0.95	3.60**
Santa Rosa	1.00	0.67	0.69	0.49	0.00**
Stockton	1.00	0.38	0.78	0.50	0.40
Vallejo-Napa	1.00	2.65[e]	2.20	1.35	0.00**

a) The ratio is equal to the probability that an application with the indicated characteristics will be denied divided by the probability that the typical application will be denied. A single asterisk (*) indicates that the numerator of the ratio is statistically significantly different than the denominator at the five-to-ten percent level. Two asterisks (**) indicates that the difference is significant at the five or less percent level.

Table 3-20 (continued)

b) Metropolitan areas in all cases except the City of Los Angeles.

c) This is the typical application described in the text. It is the base for calculating the denial ratios. The other applications involve variations from the typical one in one or more characteristics. See Table 3-5 for the probability of denial for the typical application in each area.

d) See footnote (d) to Table 3-19.

e) See footnote (e) to Table 3-19.

f) See footnote (f) to Table 3-19.

Table 3-21

Downward Modification Ratios by Race of Applicant(s) for Typical Applications: 1977[a]

Study Areas[b]	White[c]	Black	Spanish	Asian	Other Minority
Anaheim-Santa Ana-Garden Grove	1.00	0.95	0.82	1.25	1.15
Fresno	1.00	0.45	0.81	0.88	1.67
Los Angeles-Long Beach	1.00	0.74**	0.98	1.06	1.05
City of Los Angeles	1.00	0.40**	1.19[e]	0.94	1.19
Oxnard-Ventura	1.00	1.32	1.08	1.14	1.76
Sacramento	1.00	0.00**	0.80	0.79	1.53
San Bernardino-Riverside-Ontario	1.00	0.39	1.02	1.36	0.00**
San Diego	1.00	0.59	1.65**	0.63	0.61
San Francisco-Oakland	1.00	0.78	1.10	1.05	0.75*
San Jose	1.00	1.15	1.15	0.97	0.76
Santa Rosa	1.00	1.44	0.79	0.00**	1.61
Vallejo-Napa	1.00	2.23	2.11	2.07	1.53

a) The ratio is equal to the probability that an application with the indicated characteristics will be downward modified divided by the probability that the typical application will be modified downward. A single asterisk (*) indicates that the numerator of the ratio is statistically significantly different than the denominator at the five-to-ten percent level. Two asterisks (**) indicates that the difference is significant at the five or less percent level.
b) Metropolitan areas in all cases except the City of Los Angeles.
c) This is the typical application described in the text. It is the base for calculating the downward modification ratios. The other applications involve variations from the typical one in one or more characteristics. See Table 3-4 for the probability of downward modification for the typical application in each area.
d) See footnote (d) to Table 3-19.
e) See footnote (e) to Table 3-19.
f) See footnote (f) to Table 3-19.

Table 3-22

Downward Modification Ratios by Race of Applicant(s) for Typical Applications: 1978[a]

Study Areas[b]	White[c]	Black	Spanish	Asian	Other Minority
Anaheim-Santa Ana-Garden Grove	1.00	0.53	1.11	0.91	0.87
Fresno	1.00	0.77	1.18	0.47	0.86
Los Angeles-Long Beach	1.00	0.69**	1.07	1.05	1.07
City of Los Angeles	1.00	0.87	1.04	1.05	1.12
Oxnard-Ventura	1.00	0.89	1.16	1.46	0.98
Sacramento	1.00	1.29	1.28	1.16	1.00
San Bernardino-Riverside-Ontario	1.00	3.30**	1.08	2.00[e]	2.38[e]
San Diego	1.00	1.01	1.11	1.23	0.86
San Francisco-Oakland	1.00	0.93	0.84	0.96	0.84
San Jose	1.00	1.09	0.61*	0.72	0.76
Santa Rosa	1.00	0.98	0.74	3.22**	1.17
Vallejo-Napa	1.00	3.71**	0.57	2.09[e]	1.17

a) The ratio is equal to the probability that an application with the indicated characteristics will be downward modified divided by the probability that the typical application will be modified downward. A single asterisk (*) indicates that the numerator of the ratio is statistically significantly different than the denominator at the five-to-ten percent level. Two asterisks (**) indicates that the difference is significant at the five or less percent level.

b) Metropolitan areas in all cases except the City of Los Angeles.

c) This is the typical application described in the text. It is the base for calculating the downward modification ratios. The other applications involve variations from the typical one in one or more characteristics. See Table 3-5 for the probability of downward modification for the typical application in each area.

d) See footnote (d) to Table 3-19.

e) See footnote (e) to Table 3-19.

f) See footnote (f) to Table 3-19.

times as likely to be denied than similarly situated white applicants. This pattern of ratios greater than one holds for all the metropolitan areas in nearly every year. The only exceptions are in the Anaheim-Santa Ana-Garden Grove (1977), Santa Rosa (1978) and Stockton (1978) metropolitan areas. These large differentials in the treatment of black applicants are generally statistically significant; 24 of the 27 denial ratios in excess of one are significant at the ten percent one-tail level. In two metropolitan areas (Modesto and Santa Barbara) the black and other minority applicants had to be grouped together because of limited observations. In these cases, as well, the combined coefficient is greater than one in all four samples and highly significant in two.

The denial ratio evidence is also consistent with allegations that mortgage lenders discriminate against Spanish and other minority applicants: 30 of the 34 denial ratios for Spanish applicants and 27 of the 34 for other minority applicants are greater than one. Approximately half of these ratios in excess of one are statistically significant at the ten percent two-tail level; three more are significant at the ten percent one-tail level. Spanish applicants are as much as 2.5 times as likely to be denied than similarly situated white applicants; other minorities are as much as 5.9 times as likely to be denied.

Applications from Asians receive more favorable treatment than similarly situated white applicants as often as they receive less favorable treatment. Since very few of these differentials are statistically significant at the two-tail ten percent level, it appears that similarly situated Asian and white applicants receive equal treatment with regard to a decision to deny an application. The only results consistent with discrimination against Asian applicants occur in the Bakersfield (1977), San Francisco-Oakland (1978), San Jose (1977) and Santa Rosa (1977) metropolitan areas.

The downward modification ratios in Tables 3-21 and 3-22 are greater than one approximately as frequently as they are less than one for all races. In addition, very few of these differentials are statistically significant. Therefore, there is little evidence that minorities are discriminated against in the decision to modify a requested loan amount downward. The statistically significant exceptions are: black applicants in the San Bernardino-Riverside-Ontario (1978) and Vallejo-Napa (1978) metropolitan areas; Spanish applicants in the City of Los Angeles (1977) and the San Deigo (1977) metropolitan area; Asian applicants in the San Bernardino-Riverside-Ontario (1978), Santa Rosa (1978) and Vallejo-Napa (1978) metropolitan areas; and other minorities in the San Bernardino-Riverside-Ontario (1978) metropolitan area.

Redlining

Three types of redlining allegations have been analyzed: specific neighborhoods that community-based or other organizations have alleged to be redlined, older neighborhoods, and largely minority neighborhoods.

Property location. Information containing allegations that specific neighborhoods are redlined by mortgage lenders was available to us for Los Angeles County and the cities of Oakland and Sacramento. In addition to examining these specific allegations, we also compared lending practices in the central city(s) to those in the surrounding suburbs because of general allegations that lenders favor the suburbs over the older central cities.

The denial and downward modification ratios for Los Angeles neighborhoods are presented in Table 2-23. In general, the results are inconsistent with allegations that the 12 neighborhoods are redlined. There are, however, some important and statistically significant exceptions. The denial and modification ratios are greater than one for the Long Beach-Southwest and San Pedro neighborhoods in both years, with three of the four denial ratios being based on statistically significant (ten percent one-tail level) differentials between these neighborhoods and the Los Angeles County suburbs. In addition, the denial ratios are consistent with redlining allegations and are based on statistically significant differentials in the East L.A.-Boyle Heights-Echo Park (1978) and Pomona (1977) neighborhoods. Similarly, the downward modification ratios support redlining allegations for the Covina-Azusa (1977), Pacoima-San Fernando (1977 and 1978), and Venice-Santa Monica (1978) neighborhoods. However, the downward modification ratios for the portion of the City of Los Angeles that is not alleged to be redlined are also consistent with redlining in both years. Therefore, the redlining

Table 3-23

Denial and Downward Modification Ratios by Property Location: Los Angeles-Long Beach SMSA[a]

Neighborhood	Denial 1977	Denial 1978	Downward Modification 1977	Downward Modification 1978
Allegedly red-lined neighborhoods[b]				
Compton	0.00**	1.04	2.88	1.80
Covina-Azusa	0.00**	1.08	2.62**	0.07**
East L.A.-Boyle Heights-Echo Park	0.57	1.61**	0.77	1.10
Highland Park	1.39	1.30	0.18**	0.30**
Long Beach-Southwest	2.48[d]	1.56[d]	1.19	1.94
Pacoima-San Fernando	0.59	0.97	2.46**	1.58**
Pasadena-North Central	1.17	1.15	1.50	0.64
Pomona	1.99[d]	1.38	0.82	0.92
San Pedro	1.47	2.00**	1.52	1.23
South Central L.A.	1.17	0.86	0.61**	1.19
Venice-Santa Monica	1.24	1.09	0.54	2.47**
West Covina	1.07	0.54	3.82	1.17
Other areas				
Rest of the City of Long Beach	0.96	0.68**	0.84	0.58**
Rest of the City of Los Angeles	1.04	0.93	1.30**	1.09**
Rest of Los Angeles County[c]	1.00	1.00	1.00	1.00

Table 3-23 (continued)

a) The ratio is equal to the probability that an application with the indicated characteristics will be denied or modified divided by the probability that the typical application will be denied or modified. A single asterisk (*) indicates that the numerator of the ratio is statistically significantly different than the denominator at the five-to-ten percent level. Two asterisks (**) indicates that the difference is significant at the five or less percent level.

b) The redlining allegations are derived from Where The Money Is: Mortgage Lending, Los Angeles County (Los Angeles: The Center for New Corporate Priorities, 1975). This report is reprinted in Hearings on the Home Mortgage Disclosure Act of 1975, U.S. Senate, Committee on Banking, Housing and Urban Affairs, 94th Congress, 1st Session (May 5-8, 1975).

c) This is the typical application described in the text. It is the base for calculating the denial or modification ratios. The other applications involve variations from the typical one in one or more characteristics. See Tables 3-4 and 3-5 for the probability of denial or modification for the typical application in area-year.

d) The numerator is statistically significantly larger than the denominator at the ten percent one-tail level.

results are mixed for Los Angeles County. The Los Angeles City model has essentially the same results except that the South Central L.A. denial ratio for 1977 and downward modification ratio for 1978 and the East L.A.-Boyle Heights-Echo Park downward modification ratio while still greater than one are based on statistically significant differentials relative to the rest of the City of Los Angeles instead of suburban Los Angeles County.[7]

The denial and modification ratios by property location in the Sacramento and San Francisco-Oakland metropolitan areas are presented in Tables 3-24 and 3-25. There is no evidence that applications for mortgages on properties in the two neighborhoods alleged to be redlined have a statistically significantly higher chance of denial or downward modification than otherwise similar applications on suburban properties.

Central city denial and downward modification ratios for the typical application are presented in Table 3-26. Only six of these ratios indicate that either denial or downward modification is statistically significantly more likely for mortgage applications on central city properties than for similar applications on suburban properties. These central cities are: Santa Ana (1978 denial ratio), Bakersfield (1977 denial ratio), Ventura (1978)denial and downward modification ratios), Monterey (1977 denial ratio) and San Jose (1978 denial ratio). At the same time, there are 21 ratios indicating that applications on central city properties receive statistically significantly more favorable treatment than similar applications on suburban

Table 3-24

Denial and Downward Modification Ratios by Property Location: Sacramento SMSA[a]

Neighborhood	Denial 1977	Denial 1978	Downward Modification 1977	Downward Modification 1978
Allegedly red-lined neighborhood[b]				
Old Sacramento	0.69	0.28**	1.03	0.46
Other areas				
Rest of Sacramento City	0.76*	0.40**	0.69**	0.66**
Rest of the Sacramento SMSA[c]	1.00	1.00	1.00	1.00

a) The ratio is equal to the probability that an application with the indicated characteristics will be denied or modified divided by the probability that the typical application will be denied or modified. A single asterisk (*) indicates that the numerator of the ratio is statistically significantly different than the denominator at the five-to-ten percent level. Two asterisks (**) indicates that the difference is significant at the five or less percent level.

b) The redlining allegation is derived from Dennis Dingemans, Residential Mortgage Lending Patterns: A Case Study of Sacramento in 1976 (Davis, California: University of California Institute of Governmental Affairs, 1978)

c) This is the typical application described in the text. It is the base for calculating the denial or modification ratios. The other applications involve variations from the typical one in one or more characteristics. See Tables 3-4 and 3-5 for the probability of denial or modification for the typical application in each area-year.

Table 3-25

Denial and Downward Modification Ratios by Property Location: San Francisco-Oakland SMSA[a]

Neighborhoods	Denial 1977	Denial 1978	Downward Modification 1977	Downward Modification 1978
Allegedly red-lined neighborhood[b]				
Central Oakland	0.85	0.65*	0.48**	1.37
Other areas				
Alameda City	0.38**	0.88	0.62	0.93
Berkeley	0.97	1.13	0.24**	1.34
East Oakland	0.57**	0.84	0.46**	1.25
West Oakland	0.80	0.77	0.00**	0.64
Rest of Alameda County	1.00	0.86	0.47**	0.90
Contra Costa County	0.80**	0.72**	0.64**	0.93
Marin County	0.90	0.96	0.76**	1.68**
San Francisco	0.81*	0.56**	1.07	0.86*
San Mateo County[c]	1.00	1.00	1.00	1.00

a) The ratio is equal to the probability that an application with the indicated characteristics will be denied or modified divided by the probability that the typical application will be denied or modified. A single asterisk (*) indicates that the numerator of the ratio is statistically significantly different than the denominator at the five-to-ten percent level. Two asterisks (**) indicates that the difference is significant at the five or less percent level.

b) The redlining allegation is derived from William M. Frej, "Discriminatory Lending Practices in Oakland," in Hearings on the Home Mortgage Disclosure Act of 1975, U.S. Senate, Committee on Banking, Housing and Urban Affairs, 94th Congress, 1st Session (May 5-8, 1975).

c) This is the typical application described in the text. It is the base for calculating the denial or modification ratios. The other applications involve variations from the typical one in one or more characteristics. See Tables 3-4 and 3-5 for the probability of denial or modification for the typical application in each area-year.

Table 3-26

Denial and Downward Modification Ratios for the Typical Application in the Central City(s) Relative to the Suburbs[a]

Metropolitan Area[b]		Denial 1977	Denial 1978	Downward Modification 1977	Downward Modification 1978
Anaheim-Santa Ana-Garden Grove	A	0.64*	0.90	1.15	0.60**
	B	0.84	1.42**	1.04	0.93
	C	0.51**	0.79	0.55**	0.61**
Bakersfield		2.21**	1.23	NA	NA
Fresno		0.63**	0.79*	1.06	0.91
Modesto		0.52**	0.49**	NA	NA
Oxnard-Ventura	A	0.78	0.76	0.62	0.55
	B	0.65	1.68*	0.97	1.47*
Salinas-Monterey	A	0.40**	0.86	NA	NA
	B	3.13**	0.21**	NA	NA
San Bernardino-Riverside-Ontario	A	0.53	0.14**	0.20**	1.72
	B	0.78	0.17**	0.38**	0.30**
	C	2.45	0.80	0.59	0.84
San Diego		1.02	0.76**	0.77**	0.80**
San Jose		0.67**	1.53**	1.14	0.89
Santa Barbara		1.09	0.51	NA	NA
Santa Rosa		1.03	1.15	0.69	0.84
Stockton		0.30**	1.16	NA	NA
Vallejo-Napa	A	1.04	1.10	1.60	0.67
	B	0.82	0.71	0.79	0.68

a) The ratio is equal to the probability that an application with the indicated characteristics will be denied or modified divided by the probability that the typical application will be denied or modified. A single asterisk (*) indicates that the numerator of the ratio is statistically significantly different than the denominator at the five-to-ten percent level. Two asterisks (**) indicates that the difference is significant at the five or less percent level. The typical application is described in the text. It is the base for calculating the denial or modification ratios.

Table 3-26 (continued)

(cont'd) The other applications involve variations from the typical one in one or more characteristics. See Tables 3-4 and 3-5 for the probability of denial or modification for the typical application in each area-year.

b) The three letters refer to the metropolitan areas with more than one central city. In these cases, A refers to the first city in the name of the metropolitan area, B to the second, and C to the third.

properties.

Age of Neighborhood. The allegation that older neighborhoods are redlined is one of the most difficult to analyze because the age of the neighborhood may have high spurious correlations with objective measures of risk of loss arising from housing market externalities (e.g., adjacent vacant buildings). We have attempted to control these objective factors through the neighborhood characteristics variables. This approach is reasonably successful and evidence of multicollinearity is absent, probably due to the large sample sizes. Another problem confronting the age of neighborhood analysis is the possibility of a spurious correlation with the condition of the building being used as security for the loan. Including the age of the specific building should remove this. We have done this in California with no evidence of a remaining multicollinearity problem.[8] The inclusion of the age of the building variables strengthens the interpretation of the age of neighborhood variable (PRE1940) as a redlining measure. However, it is important to emphasize that the age of building results cannot be interpreted as a measure of the extent to which old buildings may be discriminated against because the building age results are probably strongly correlated with the remaining economic life of the building.

The denial and downward modification ratios for typical applications on buildings of various ages are presented in Tables 3-27 to 3-30. These results illustrate the importance of including these variables. Applications for mortgages on

Table 3-27

Denial Ratios by Building Age for Typical Applications: 1977[a]

Study Area[b]	New[c]	BA1-9	BA10-19	BA20-29	BA30-39	BA40-49	BAGE50
Anaheim-Santa Ana-Garden Grove	1.00	0.82**	0.91	1.34*	2.54**	2.23**	4.40**
Bakersfield	1.00	1.63	0.96	0.93	3.57**	0.00**	11.61**
Fresno	1.00	0.66**	0.76	1.06	1.38	1.49	2.36**
Los Angeles-Long Beach	1.00	0.50**	0.74**	0.57**	0.79**	0.85**	1.04
City of Los Angeles	1.00	0.53**	0.67**	0.63**	1.02	1.15	1.26
Modesto	1.00	0.83	1.53	2.45**	1.44	1.99	6.14**
Oxnard-Ventura	1.00	0.53**	0.49**	0.77	1.62	0.94	2.57
Sacramento	1.00	0.66**	0.71**	0.84	2.31**	1.60	1.86
Salinas-Monterey	1.00	0.83	0.52*	1.38	1.52	1.29	2.77
San Bernardino-Riverside-Ontario	1.00	2.26**	2.74**	2.31*	4.31**	15.10**	10.13**
San Diego	1.00	0.48**	0.51**	0.53**	0.63	1.03	0.56
San Francisco-Oakland	1.00	0.63**	0.84*	0.80**	0.98	0.84	1.05
San Jose	1.00	1.21	1.11	2.04**	2.17**	2.39**	4.55**
Santa Barbara	1.00	0.44*	0.64	0.57	0.66	0.40	0.16**
Santa Rosa	1.00	0.75	1.21	1.62	1.12	3.59**	3.81**
Stockton	1.00	0.68	1.73	1.66	2.06	2.66	0.00**
Vallejo-Napa	1.00	0.58	1.29	1.26	0.76	4.15**	0.00**

a) The ratio is equal to the probability that an application with the indicated characteristics will be denied divided by the probability that the typical application will be denied. A single asterisk (*)

Table 3-27 (continued)

(cont'd) indicates that the numerator of the ratio is statistically significantly different than the denominator at the five-to-ten percent level. Two asterisks (**) indicates that the difference is significant at the five or less percent level.

b) Metropolitan areas in all cases except the City of Los Angeles.

c) This is the typical application described in the text. It is the base for calculating the denial ratios. The other applications involve variations from the typical one in one or more characteristics. See Table 3-4 for the probability of denial for the typical application in each area.

Table 3-28

Denial Ratios by Building Age
for Typical Applications: 1978[a]

Study Area[b]	New or 1 Year Old[c]	BA2-10	BA11-20	BA21-30	BA31-40	BA41-50	BAGE51
Anaheim-Santa Ana-Garden Grove	1.00	0.61**	0.85*	0.80	1.66	1.77*	1.01
Bakersfield	1.00	0.80	0.97	0.91	1.26	1.73	1.14
Fresno	1.00	0.81	0.78	0.86	1.04	0.83	0.66
Los Angeles-Long Beach	1.00	1.08	1.12	1.17**	1.24**	1.44**	1.77**
City of Los Angeles	1.00	0.92	0.78*	1.07	1.20	1.28**	1.32**
Modesto	1.00	1.33	2.20**	2.41**	3.61**	2.10*	0.00**
Oxnard-Ventura	1.00	0.83	1.21	1.64	1.24	2.54	4.04**
Sacramento	1.00	0.63**	0.94	1.13	1.45	2.00**	3.02**
Salinas-Monterey	1.00	0.51**	0.54**	0.84	0.42**	1.20	0.68
San Bernardino-Riverside-Ontario-	1.00	0.78	1.45	1.31	5.96**	14.09**	4.29*
San Diego	1.00	1.32**	1.32	1.13	2.25**	1.65*	2.32**
San Francisco-Oakland	1.00	0.82**	0.85**	0.81**	0.91	1.14	1.50**
San Jose	1.00	1.08	1.30*	0.95	0.95	1.51	1.16
Santa Barbara	1.00	1.65	1.29	1.09	4.17**	3.21**	6.28**
Santa Rosa	1.00	1.03	1.20	1.65**	2.90**	4.41**	4.20**
Stockton	1.00	0.53**	1.65	1.01	0.58	0.32*	0.67
Vallejo-Napa	1.00	0.63	0.38*	1.03	0.96	0.49	1.02

Table 3-28 (continued)

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a) The ratio is equal to the probability that an application with the indicated characteristics will be denied divided by the probability that the typical application will be denied. A single asterisk (*) indicates that the numerator of the ratio is statistically significantly different than the denominator at the five-to-ten percent level. Two asterisks (**) indicates that the difference is significant at the five or less percent level.

b) Metropolitan areas in all cases except the City of Los Angeles.

c) This is the typical application described in the text. It is the base for calculating the denial ratios. The other applications involve variations from the typical one in one or more characteristics. See Table 3.5 for the probability of denial for the typical application in each area.

Table 3-29

Downward Modification Ratios by Building Age for Typical Applications: 1977[a]

Study Areas[b]	New[c]	BA1-9	BA10-19	BA20-29	BA30-39	BA40-49	BAGE50
Anaheim-Santa Ana-Garden Grove	1.00	0.84**	0.76**	0.76*	0.10**	0.41**	0.89
Fresno	1.00	1.26	1.07	1.48	1.15	2.29*	3.76**
Los Angeles-Long Beach	1.00	0.66**	0.53**	0.43**	0.60**	0.61**	0.65**
City of Los Angeles	1.00	0.83*	0.67**	0.55**	0.67**	0.65**	0.95
Oxnard-Ventura	1.00	1.20	1.13	1.42	3.62**	2.09	0.00**
Sacramento	1.00	0.95	0.89	1.12	1.41	1.10	0.99
San Bernardino-Riverside-Ontario	1.00	0.88	1.25	0.87	1.91	0.80	2.25
San Diego	1.00	0.71**	0.55**	0.59**	0.60*	0.95	1.19
San Francisco-Oakland	1.00	0.93	0.75**	0.67**	0.83	0.89	0.93
San Jose	1.00	1.07	0.96	0.79	1.13	1.51	1.73
Santa Rosa	1.00	1.07	1.76*	1.47	1.36	1.46	1.01
Vallejo-Napa	1.00	0.60*	0.89	0.68	0.91	0.23*	1.17

a) The ratio is equal to the probability that an application with the indicated characteristics will be modified downward divided by the probability that the typical application will be modified downward. A single asterisk (*) indicates that the numerator of the ratio is statistically significantly different than the denominator at the five-to-ten percent level. Two asterisks (**) indicates that the difference is significant at the five or less percent level.

b) Metropolitan areas in all cases except the City of Los Angeles.

c) This is the typical application described in the text. It is the base for calculating the downward modification ratios. The other applications involve variations from the typical one in one or more characteristics. See Table 3-4 for the probability of downward modification for the typical application in each area.

Table 3-30

Downward Modification Ratios by Building Age for Typical Applications: 1978[a]

Study Areas[b]	New or 1 Year Old[c]	BA2-10	BA11-20	BA21-30	BA31-40	BA41-50	BAGE51
Anaheim-Santa Ana-Garden Grove	1.00	0.93	0.86	1.15	1.07	1.55	1.87
Fresno	1.00	0.82	0.54**	0.82	0.62	0.91	0.97
Los Angeles-Long Beach	1.00	0.69**	0.67**	0.62**	0.67**	0.61**	0.70**
City of Los Angeles	1.00	0.94	0.92	0.63**	0.78**	0.87	0.76**
Oxnard-Ventura	1.00	0.68**	0.65**	0.98	1.25	0.74	1.78
Sacramento	1.00	0.94	1.03	1.19	0.83	0.80	1.47
San Bernardino-Riverside-Ontario	1.00	0.99	1.30	1.41	3.54**	1.20	1.52
San Diego	1.00	0.87*	0.78*	1.08	1.71**	1.67**	1.34
San Francisco-Oakland	1.00	0.79**	0.79**	0.91	0.84*	1.26*	1.18
San Jose	1.00	0.82*	1.05	1.15	0.65	1.80	0.88
Santa Rosa	1.00	2.09**	2.99**	1.89*	2.64**	3.79**	0.58
Vallejo-Napa	1.00	1.34	1.09	0.51	1.06	1.52	2.50

a) The ratio is equal to the probability that an application with the indicated characteristics will be modified downward divided by the probability that the typical application will be modified downward. A single asterisk (*) indicates that the numerator of the ratio is statistically significantly different than the denominator at the five-to-ten percent level. Two asterisks (**) indicates that the difference is significant at the five or less percent level.

b) Metropolitan areas in all cases except the City of Los Angeles.

c) This is the typical application described in the text. It is the base for calculating the downward modification ratios. The other applications involve variations from the typical one in one or more characteristics. See Table 3-5 for the probability of downward modification for the typical application in each area.

older buildings (over 30 years) are much more likely to be denied than similar applications on new buildings. It is also interesting that applications on buildings that are 1 to 9 years old are significantly less likely to be denied than similar applications on new buildings. The downward modification ratios indicate a similar but weaker pattern.

The denial and downward modification ratios for applications on properties located in older neighborhoods are presented in Table 3-31. The reader should note that an older neighborhood has been taken as one with 10 more percentage points of housing built before 1940 (PRE1940) than an average neighborhood. Applications on properties in older neighborhoods are more likely to be denied than similar applications on properties in newer neighborhoods in 20 of the 34 cases, and the differential is statistically significant in 8 of these 20 cases. According to these results, an additional 10 percentage points in the PRE1940 variable increases the chances of denial by 9 to 33 percent. The significant increases occur in the following metropolitan areas: Anaheim-Santa Ana-Garden Grove (1977 and 1978), Bakersfield (1978), Fresno (1977 and 1978), San Francisco-Oakland (1978) and San Jose (1977 and 1978).

The downward modification ratios show a more mixed pattern. Older neighborhoods are about as likely to receive favorable as unfavorable treatment with regard to a decision to modify a requested loan amount downward. There are four cases of statistically significant adverse treatment of older neighborhoods: Anaheim-Santa Ana-Garden Grove (1977), Los Angeles-Long Beach (1977 and 1978) and Vallejo-Napa (1977).

Table 3-31

Denial and Downward Modification Ratios for Typical Applications in Older (+0.10 added to PRE1940) Neighborhoods[a]

Study Area[b]	Denial 1977	Denial 1978	Downward Modification 1977	Downward Modification 1978
Anaheim-Santa Ana-Garden Grove	1.12**	1.18**	1.20**	0.95
Bakersfield	1.13	1.33**	NA	NA
Fresno	1.09**	1.15**	0.98	1.03
Los Angeles-Long Beach	0.92**	1.01	1.08**	1.05**
City of Los Angeles	0.89**	1.02	1.00	0.97**
Modesto	0.99	0.88*	NA	NA
Oxnard-Ventura	1.01	0.92	0.76**	0.96
Sacramento	0.99	1.05	1.01	0.99
Salinas-Monterey	0.99	0.93	NA	NA
San Bernardino-Riverside-Ontario	0.69**	0.78**	0.89	0.73**
San Diego	0.99	1.00	1.00	0.98
San Francisco-Oakland	1.01	1.04**	1.01	0.97*
San Jose	1.09**	1.23**	1.04	0.92
Santa Barbara	1.18	0.92	NA	NA
Santa Rosa	0.93	1.03	0.97	0.93
Stockton	1.15	1.09	NA	NA
Vallejo-Napa	1.10	1.07	1.20**	1.04

a) The ratio is equal to the probability that an application with the indicated characteristics will be denied or modified divided by the probability that the typical application will be denied or modified. A single asterisk (*) indicates that the numerator of the ratio is statistically significantly different than the denominator at the five-to-ten percent level. Two asterisks (**) indicates that the difference is significant at the five or less

Table 3-31 (continued)

(cont'd) percent level. The typical application is described in the text. It has each area's mean value of PRE1940 and is the base for calculating the denial or modification ratios. The other applications involve variations from the typical one in one or more characteristics. See Tables 3-4 and 3-5 for the probability of denial or modification for the typical application in each area. See Table 3-3 for the mean values of PRE1940.

b) Metropolitan areas in all cases except the City of Los Angeles.

Racial Composition of the Neighborhood. The effect of the racial composition of the neighborhood is illustrated by comparing the likelihood of denial and downward modification for typical applications in a neighborhood with a relatively high concentration of a minority population to the respective likelihood in a neighborhood with an average value of the racial composition variables. The relatively high value used in these simulations is the maximum value in the sample minus two standard deviations, providing the result is greater than the mean. The mean and simulation values are summarized in Table 3-32. The denial and downward modification ratios by racial composition of the neighborhood are presented in Tables 3-33 to 3-36. The results vary by race, year, and metropolitan area. Applications on properties located in black or Spanish neighborhoods have higher chances of denial or downward modification than similar applications in neighborhoods with mean values of minorities. The following paragraphs describe the statistically significant (ten percent level) two-tail differentials.

Mortgage applications are more likely to be denied in black neighborhoods than in largely white neighborhoods in the Los Angeles-Long Beach (1978), Modesto (1977), Oxnard-Ventura (1977), Salinas-Monterey (1977), San Diego (1977 and 1978), and San Jose (1977) metropolitan areas. Applications in black neighborhoods are more likely to be modified downward in the Los Angeles-Long Beach (1977) and San Francisco-Oakland (1978) metropolitan areas.

Spanish neighborhoods receive adverse treatment in the decision to deny a mortgage application in the Bakersfield (1978),

Table 3-32

Values of Racial Composition Variables Used in the Simulations Reported in Tables 3-33 to 3-36[a]

Study Area[b]	FBLACK		FSPANISH		FASIAN	
	M	S	M	S	M	S
Anaheim-Santa Ana-Garden Grove	0.01	0.36	0.09	0.46	c	c
Bakersfield	0.06	0.73	0.09	0.48	c	c
Fresno	0.01	0.83	0.13	0.27	c	c
Los Angeles-Long Beach	0.04	0.76	0.12	0.76	0.02	0.14
City of Los Angeles	0.06	0.68	0.11	0.67	0.02	0.14
Modesto	0.003	0.20	0.07	0.34	d	d
Oxnard-Ventura	0.02	0.15	0.13	0.67	c	c
Sacramento	0.02	0.50	0.03	0.29	0.03	0.25
Salinas-Monterey	0.06	0.33	0.14	0.44	c	c
San Bernardino-Riverside-Ontario	0.03	0.62	0.11	0.74	c	c
San Diego	0.02	0.71	0.09	0.54	0.01	0.05
San Francisco-Oakland	0.06	0.75	0.10	0.75	0.03	0.49
San Jose	0.02	0.15	0.09	0.51	0.04	0.24
Santa Barbara	0.02	0.08	0.13	0.25	c	c
Santa Rosa	c	c	0.05	0.09	d	d
Stockton	0.02	0.37	0.04	0.22		
Vallejo-Napa	0.05	0.74	0.07	0.12	d	d

a) The column labeled M is the mean value and the one labeled S is the value used for the simulations reported in Tables 3-33 to 3-36. These S values are equal to the maximum value in the sample minus two standard deviations.
b) Metropolitan areas in all cases except the City of Los Angeles.
c) Maximum value minus two standard deviations is less than the mean value.
d) Data unavailable.

Table 3-33

Denial Ratios by Racial Composition of Neighborhood for Typical Applications (TA): 1977[a]

Study Area[b]	TA[c]	FBLACK	FSPANISH	FASIAN
Anaheim-Santa Ana-Garden Grove	1.00	3.38	0.62**	e
Bakersfield	1.00	2.45	0.15*	e
Fresno	1.00	0.93	1.02	e
Los Angeles-Long Beach	1.00	0.52**	1.27	1.70**
City of Los Angeles	1.00	0.34**	1.26	0.98
Modesto	1.00	4.45*	6.13**	d
Oxnard-Ventura	1.00	8.63**	0.06**	e
Sacramento	1.00	0.61	1.34	2.33**
Salinas-Monterey	1.00	2.41**	1.41	e
San Bernardino-Riverside-Ontario	1.00	5.61	1.90	e
San Diego	1.00	2.61*	1.33	0.88
San Francisco-Oakland	1.00	0.73*	0.50**	0.08**
San Jose	1.00	2.88**	2.74**	0.26**
Santa Barbara	1.00	0.90	1.36**	e
Santa Rosa	1.00	e	1.63**	d
Stockton	1.00	0.20	[← 6.66** →]	
Vallejo-Napa	1.00	1.13	1.00	d

a) See Table 3-32 for the values of FBLACK, FSPANISH and FASIAN. The ratio is equal to the probability that an application with the indicated characteristics will be denied divided by the probability that the typical application will be denied. A single asterisk (*) indicates that the numerator of the ratio is statistically significantly different than the denominator at the five-to-ten percent level. Two asterisks (**) indicates that the difference is significant at the five or less percent level.

b) Metropolitan areas in all cases except the City of Los Angeles.

Table 3-33 (continued)

c) This is the typical application described in the text. It is the base for calculating the denial ratios. The other applications involve variations from the typical one in one or more characteristics. See Table 3-4 for the probability of denial for the typical application in each area.

d) Data unavailable.

e) Maximum value minus two standard deviations is less than the mean value.

Table 3-34

Denial Ratios by Racial Composition of Neighborhood for Typical Applications (TA): 1978[a]

Study Area[b]	TA[c]	FBLACK	FSPANISH	FASIAN
Anaheim-Santa Ana-Garden Grove	1.00	1.36	0.55**	e
Bakersfield	1.00	0.72	2.43**	e
Fresno	1.00	0.35	0.88	e
Los Angeles-Long Beach	1.00	1.18*	1.02	1.00
City of Los Angeles	1.00	1.09	0.93	0.79**
Modesto	1.00	1.63	0.74	d
Oxnard-Ventura	1.00	0.25	4.82	e
Sacramento	1.00	2.23	0.27**	2.09**
Salinas-Monterey	1.00	0.85	0.46*	e
San Bernardino-Riverside-Ontario	1.00	0.33	3.13**	e
San Diego	1.00	1.11*	1.00	0.87
San Francisco-Oakland	1.00	1.19	1.34	0.19**
San Jose	1.00	0.60**	1.30*	0.42**
Santa Barbara	1.00	0.81	0.93	e
Santa Rosa	1.00	e	1.27**	d
Stockton	1.00	1.19	[←— 1.94	—→]
Vallejo-Napa	1.00	0.31	0.99	d

a) See Table 3-32 for the values of FBLACK, FSPANISH and FASIAN. The ratio is equal to the probability that an application with the indicated characteristics will be denied divided by the probability that the typical application will be denied. A single asterisk (*) indicates that the numerator of the ratio is statistically significantly different than the denominator at the five-to-ten percent level. Two asterisks (**) indicates that the difference is significant at the five or less percent level.

b) Metropolitan areas in all cases except the City of Los Angeles.

Table 3-34 (continued)

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c) This is the typical application described in the text. It is the base for calculating the denial ratios. The other applications involve variations from the typical one in one or more characteristics. See Table 3-5 for the probability of denial for the typical application in each area.

d) Data unavailable.

e) Maximum value minus two standard deviations is less than the mean value.

Table 3-35

Downward Modification Ratios by Racial Composition of Neighborhood for Typical Applications (TA): 1977[a]

Study Area[b]	TA[c]	FBLACK	FSPANISH	FASIAN
Anaheim-Santa Ana-Garden Grove	1.00	0.65	0.83	e
Fresno	1.00	0.00**	1.25**	e
Los Angeles-Long Beach	1.00	1.37**	1.27**	1.12
City of Los Angeles	1.00	1.80**	0.96	0.43**
Oxnard-Ventura	1.00	0.11**	2.15	e
Sacramento	1.00	1.63	0.04**	0.98
San Bernardino-Riverside-Ontario	1.00	1.13	2.18	e
San Diego	1.00	1.11	0.28**	1.17
San Fransisco-Oakland	1.00	0.81	0.58**	0.27**
San Jose	1.00	0.51**	1.00	0.54
Santa Rosa	1.00	e	0.87	d
Vallejo-Napa	1.00	0.08	0.84	d

a) See Table 3-32 for the values of FBLACK, FSPANISH and FASIAN. The ratio is equal to the probability that an application with the indicated characteristics will be modified downward divided by the probability that the typical application will be modified downward. A single asterisk (*) indicates that the numerator of the ratio is statistically significantly different than the denominator at the five-to-ten percent level. Two asterisks (**) indicates that the difference is significant at the five or less percent level.

b) Metropolitan areas in all cases except the City of Los Angeles.

c) This is the typical application described in the text. It is the base for calculating the downward modification ratios. The other applications involve variations from the typical one in one or more characteristics. See Table 3-4 for the probability of downward modification for the typical application in each area.

d) Data unavailable.

e) Maximum value minus two standard deviations is less than the mean value.

Table 3-36

Downward Modification Ratios by Racial Composition of Neighborhood for Typical Applications (TA): 1978[a]

Study Area[b]	TA[c]	FBLACK	FSPANISH	FASIAN
Anaheim-Santa Ana-Garden Grove	1.00	1.04	1.11	e
Fresno	1.00	0.94	0.60*	e
Los Angeles-Long Beach	1.00	0.99	0.90	1.16*
City of Los Angeles	1.00	0.89	0.62**	0.80**
Oxnard-Ventura	1.00	0.04	1.30	e
Sacramento	1.00	0.51	0.78	1.11
San Bernardino-Riverside-Ontario	1.00	2.60	0.57	e
San Diego	1.00	1.09	0.77**	1.12
San Francisco-Oakland	1.00	1.38**	0.75	1.49
San Jose	1.00	0.87	1.70**	1.01
Santa Rosa	1.00	e	1.07	d
Vallejo-Napa	1.00	0.25	1.32**	d

a) See Table 3-32 for the values of FBLACK, FSPANISH and FASIAN. The ratio is dqual to the probability that an application with the indicated characteristics will be modified downward divided by the probability that the typical application will be modified downward. A single asterisk (*) indicates that the numerator of the ratio is statistically significantly different than the denominator at the five-to-ten percent level. Two asterisks (**) indicates that the difference is significant at the five or less percent level.

b) Metropolitan areas in all cases except the City of Los Angeles.

c) This is the typical application described in the text. It is the base for calculating the downward modification ratios. The other applications involve variations from the typical one in one or more characteristics. See Table 3-5 for the probability of downward modification for the typical application in each area.

d) Data unavailable.

e) Maximum value minus two standard deviations is less than the mean value.

Modesto (1977), San Bernardino-Riverside-Ontario (1978), San Jose (1977 and 1978), Santa Barbara (1977), and Santa Rosa (1977 and 1978). In the Stockton metropolitan area, applications in other minority neighborhoods, which includes Spanish households, are more likely to be denied in 1977. Downward modifications are also more likely in Spanish neighborhoods in the Fresno (1977), Los Angeles-Long Beach (1977), San Jose (1978), and Vallejo-Napa (1978) metropolitan areas.

Applications on properties in Asian neighborhoods are more likely to be denied than those in white neighborhoods in the Los Angeles-Long Beach (1977), and Sacramento (1977 and 1978) metropolitan areas. Downward modifications are more likely in the Asian neighborhoods of the Los Angeles-Long Beach (1978) metropolitan area.

SUMMARY

The decisions of California savings and loan associations on applications for conventional mortgages on single-family houses being purchased for owner-occupancy are analyzed using a multivariate statistical technique known as the multinomial logit. In general, four possible outcomes are considered simultaneously: approved as applied for, approved after increasing the requested loan amount, approved after decreasing the requested loan amount, and denial. A lender's decision is viewed as a function of the financial characteristics of the borrower, the loan, and the property, and housing market externalities that may affect the future value of the property. Lending in sixteen metropolitan areas is analyzed for 1977 and 1978. The race, sex, and age of the applicant and the location of the property are also included to determine whether they affect mortgage lending decisions after controlling for objective factors.

The objective factors such as the ratios of requested loan to income and to appraised value play a major role in mortgage lending. The vast majority of decisions are based on these criteria. However, there is some strong evidence that certain types of applicants are arbitrarily discriminated against by California savings and loan associations. We interpret a significantly higher chance of denial or downward modification as evidence of discrimination. The following paragraphs summarize our findings on each possible basis of discrimination examined in this chapter.

Sex. There is little evidence of sex discrimination. Households are divided into five categories on the basis of the sex of the applications: male-female nonchildbearing, male-female childbearing, female only nonchildbearing, female only childbearing, and male only. The latter four types are compared to the first which is viewed as least likely to be a target of discrimination. There is evidence consistent with the allegation that each of these four are discriminated against in at least one metropolitan area. However, there is no consistent pattern across metropolitan areas or time. There is no evidence of discrimination in the denial or downward modification decisions on the basis of sex in the Bakersfield, Oxnard-Ventura, Salinas-Monterey, and San Francisco-Oakland metropolitan areas. The only evidence of sex discrimination in the Fresno metropolitan area is that the income of a second worker in male only or female only nonchildbearing households is discounted. In general, income from a second worker is accorded a premium in the lending process.

Male-female childbearing households receive less favorable treatment than similar male-female nonchildbearing households in the Anaheim-Santa Ana-Garden Grove (1977) and Modesto (1978) metropolitan areas. Female only childbearing households receive less favorable treatment from lenders in Modesto (1978), Sacramento (1978), and San Bernardino-Riverside-Ontario (1978), and Santa Rosa (1978). The income from a second worker in either type of childbearing household is discounted in only one area: San Diego (1977).

Female only nonchildbearing households receive adverse treatment in the San Bernardino-Riverside-Ontario (1978), San Diego (1977), Santa Barbara (1978), Santa Rosa (1978), and Stockton (1978) metropolitan areas. In addition, the income from a second worker in this household type is discounted in the Anaheim-Santa Ana-Garden Grove (1977 and 1978), San Diego (1978), San Jose (1978), Santa Barbara (1977), and Santa Rosa (1977) metropolitan areas.

Applications from male only households are more likely to be denied or modified downward in Los Angeles City (1978) and the Sacramento (1978), San Diego (1977) and Vallejo-Napa (1977) metropolitan areas. In addition, the income of second workers is discounted for male only households in the Fresno (1978), Modesto (1977), San Bernardino-Riverside-Ontario (1977), Santa Rosa (1977) and Vallejo-Napa (1977) metropolitan areas.

Age. Contrary to allegations of discrimination against older applicants, those between 35 and 44 years old are more likely to be denied than older or younger applicants. However, older applicants are substantially more likely to be modified downward than the younger applicants.

Race. The evidence of racial discrimination is strong and consistent across metropolitan areas and time. Applications from blacks are 1.54 to 7.82 times as likely to be denied than those from similarly situated whites. Spanish and other minority (excluding Asians) are also heavily discriminated against. Spanish applicants are as much as 2.5 times as likely to be denied than similarly situated whites; other minorities are as much as 5.9 times as likely to be denied. Applications from Asians receive more favorable treatment than similarly situated whites as often as they receive less favorable treatment. However, there is little evidence that minorities are discriminated against in the decision to modify a requested loan amount downward prior to approval.

Redlining. Three types of redlining have been analyzed: specific neighborhoods that have been alleged to be redlined, older neighborhoods, and largely minority neighborhoods.

Information containing allegations that specific neighborhoods are redlined was available to us for Los Angeles County and the cities of Oakland and Sacramento. The results do not support the redlining allegations for Oakland and Sacramento and are mixed for Los Angeles County. The denial results for at least one year are consistent with allegations that the neighborhoods of Long Beach-Southwest, San Pedro, East L.A.-Boyle Heights-Echo Park, and Pomona are redlined. The downward modification results are also consistent with the allegations that the Covina-Azusa, Pacoima-San Fernando and Venice-Santa Monica neighborhoods are redlined. The evidence does not support the redlining allegations for the Compton, Highland Park, Pasadena-North Central, South Central L.A., and West Covina neighborhoods, but is occasionally consistent with a redlining hypothesis in areas that are not alleged to be redlined.

A comparison of lending practices on central city properties to those on suburban properties indicated that the central city properties generally received more favorable treatment than the suburban ones.

Applications on older buildings are much more likely to be denied than similar applications on new buildings, but these results do not necessarily indicate that older buildings are being arbitrarily denied mortgages because the age variable is probably serving as a measure of the remaining economic life of the building. It is important to include the building age measure because it insures that the age of neighborhood variable is not a proxy for the economic life of the building.

Applications on properties located in older neighborhoods are more likely to be denied with significant differentials in the Anaheim-Santa Ana-Garden Grove, Bakersfield, Fresno, San Francisco-Oakland, and San Jose metropolitan areas. Older neighborhoods, however, are about as likely to receive favorable as unfavorable treatment in a decision to modify the requested loan amount downward prior to approval.

Applications for mortgages in black or Spanish neighborhoods have higher chances of denial or downward modification than similar applications in neighborhoods with average concentrations of minorities. The significant differentials between predominately black and largely white neighborhoods occur in the Los Angeles-Long Beach, Modesto, Oxnard-Ventura, Salinas-Monterey, San Diego, San Francisco-Oakland, and San Jose metropolitan areas. The significant Spanish differentials occur in the Bakersfield, Fresno, Los Angeles-Long Beach, Modesto, San Bernardino-Riverside-Ontario, San Jose, Santa Barbara, Santa Rosa, Stockton, and Vallejo-Napa metropolitan areas.

In addition, applications on properties in Asian neighborhoods receive adverse treatment in the Los Angeles-Long Beach and Sacramento metropolitan areas.

Footnotes

1. In New York, the decision to lend models were estimated with and without the net wealth and employment stability measures. The findings were virtually unaffected by leaving out these variables.

2. In the Stockton metropolitan area the fraction Spanish also includes all nonblack minorities.

3. These probabilities can be calculated from the logit estimates using the following relationships.

$$\sum_{j=o}^{c} P_j = 1 \qquad (3.1$$

$$\lambda_j = \mathrm{Ln}(P_j/P_o) = \alpha_j + B_j X \qquad j = 1, \ldots, c \qquad (3.2$$

$$P_j = \exp(\lambda_j)/[1 + \sum_{k=1}^{c} \exp(\lambda_k)] \qquad (3.3$$

$$P_o = 1/[1 + \sum_{k=1}^{c} \exp(\lambda_k)] \qquad (3.4$$

where the P_j's are the conditional probabilities of the j^{th} outcome given a vector of explanatory variables (X), $c + 1$ represents the total number of possible outcomes, and the probability of one outcome is arbitrarily selected as the reference base (P_o).

4. The 1978 ratio for Anaheim-Santa Ana-Garden Grove is greater than one (1.24) but not statistically significant.

5. These ratios are not reported in Table 3-8.

6. The 1977 San Diego and 1978 Santa Barbara denial ratios for MFNCB are also greater than one but the underlying secondary income coefficients are not statistically significant.

7. The City of Los Angeles results are not presented in the text but the underlying equations are reported in Appendix B.

8. We also estimated versions of the multivariate model without the building age variables. Comparison of the two results suggests that an age of neighborhood variable will capture a significant portion of the effect of the building age variables when these are excluded.

CHAPTER 4

TERMS OF MORTGAGE LENDING IN CALIFORNIA

The availability of mortgages is not the only element of mortgage transactions upon which the discrimination debate focuses; representatives of women's groups, minority groups, and community organizations allege that lenders discriminate against certain types of applications by charging higher interest rates and granting mortgages with shorter terms and lower loan-to-value ratios than warranted by the objective characteristics of the applications. Although less direct than outright mortgage denial, discrimination of this form can have equally serious implications for potential borrowers.

We examine discriminatory behavior with respect to the setting of mortgage terms using data for four California metropolitan areas: Fresno, Los Angeles-Long Beach, San Francisco-Oakland, and San Jose. The large number of mortgage loans granted in both Los Angeles-Long Beach and San Francisco-Oakland make them obvious choices for analysis; large sample size assures adequate numbers of applications from the groups of primary interest for this study. Fresno is included as representative of a relatively small metropolitan area for which sufficient data are available for all parts of the terms analysis. In addition, its location in the Central Valley contributes to the generalizability of the results. Finally, San Jose represents a medium-sized metropolitan area undergoing rapid economic growth. For each metropolitan area, separate models were estimated for 1977 and 1978.

This chapter is divided into three sections. The first section presents the results of the interest rate, maturity period, and loan-to-value analysis -- analysis that is limited to California because of the absence of the necessary data in New York. The second section focuses on the pattern of downward modification, the results of which can be compared across states since similar models have been estimated for metropolitan areas in New York. The final section deals with the fees lenders charge applicants for processing loan applications. Again, the analysis is limited to California because of the absence of loan fee data in New York.

INTEREST RATE, MATURITY, AND LOAN-TO-VALUE RATIO

Chapter 2 summarizes our basic approach to modeling the contract interest rate, loan-to-value ratio, and maturity period for all approved mortgages. Starting from the recognition that the three terms are simultaneously determined, each term is modeled as a function of the other two terms and relevant risk, preference, and potential discrimination variables. We begin our analysis of the results with a more detailed discussion of the equation specifications, paying particular attention to the identification problem. We then present the results, focusing primarily, but not exclusively, on the interest rate findings.

Two estimation strategies are possible in the context of simultaneously determined variables. On the one hand, structural equations that explicitly model the simultaneity among the endogenous variables can be estimated directly using the technique of two-stage least squares, provided the equations are identified. On the other, structural equations can be simplified to reduced form equations by substituting for the endogenous variables, leaving the complete set of exogenous variables as the only explanatory variables in each of the individual equations. The two strategies yield identical estimates of the structural parameters in exactly identified systems. In underidentified systems, however, only the latter strategy is feasible and no structural parameters can be derived while in overidentified systems, the reduced form approach leads to multiple estimates of the structural parameters.

Unless they can be used to calculate the structural parameters, reduced form coefficients are inadequate for testing the extent of discriminatory behavior in the setting of mortgage terms. This is illustrated by the following example. Suppose that the reduced form equations imply that, controlling for the other exogenous explanatory factors, black mortgage applicants are charged lower interest rates than white applicants. By itself, this appears to suggest that lenders favor, rather than discriminate against, such applicants. But if it is also true that black borrowers are given shorter maturity loans than similarly situated whites, the interest rate finding would be difficult to interpret. In this case, the issue is whether the interest rate charged black borrowers is sufficiently below that charged white borrowers to offset the fact that interest rates associated with shorter maturity loans are generally below those on longer maturity loans. The relevant question is not whether similarly situated blacks and whites are charged the same interest rate in general, but whether they are charged the same interest rate for comparable types of loans as measured by the loan-to-appraised value and the maturity period.

The preceding discussion emphasizes the importance of estimating structural parameters. Equations 2.7 to 2.9 in Chapter 2 represent one such three-equation structural model of mortgage terms. The technique of two stage least squares could, in principle, be used to obtain consistent estimates of the parameters because each of the equations is either exactly or over-identified according to the order condition of identification.[1] In particular, the interest rate equation is exactly identified because two variables, the requested maturity (REQMAT) and the requested loan-to-appraised value (RLTOAV) are excluded from the equation; the maturity equation is overidentified because the market rate of interest (INT_m), whether or not the mortgage is a variable rate mortgage (VRM), and the requested loan-to-appraised value (RLTOAV) are excluded; and the loan-to-value equation is overidentified because the two interest rate variables and the requested maturity are all excluded.

Unfortunately, data limitations prevent us from estimating the three equation model exactly as specified. First, we do not know the market interest rate because we have no information on the timing of the mortgage contract. Although savings and loan associations report information on the month of the application for the Loan Register, it was deleted from the data made available to us. Absence of this information is unfortunate; rising mortgage rates during the study period suggest that a substantial proportion of the variance of interest rates on individual mortgage contracts during any one year could be explained by a variable representing the month of the contract acting as a proxy for the market interest rate. It should be noted, however, that the exclusion of such a variable from the equation does not necessarily bias the remaining coefficients; it would bias the coefficient of another variable only if that variable were correlated with the excluded variable. Since we have no reason to believe that such correlations are present, especially with respect to any of the discrimination variables, the potential bias is likely to be minimal.

The more serious problem associated with the exclusion of a market interest rate proxy variable relates to the identification issue. Without the market rate of interest in the model, the loan-to-value and maturity equations become potentially difficult to identify. Although two variables are still excluded from each equation, thereby meeting the order condition for exact identification, the fact that one of the two variables in each case has only two values (zero or one) may lead to unacceptably large standard errors of the equation. Unfortunately, nothing can be done to solve this potential problem.

The absence of information relating to the borrower's requested maturity (REQMAT) presents a second data problem. In this case, we cannot simply leave the variable out of the equation; doing so might bias the coefficients of certain discrimination variables in the maturity equation and would keep the interest rate and loan-to-value equations from being identified. Hence, we have introduced the size of the requested loan (REQLOAN) as a proxy for the requested maturity. Since the larger the amount requested by the borrower, the greater his/her incentive is to spread the loan over a longer period of time, we expect the requested maturity and the requested loan to be positively correlated, ceteris paribus. Again, the use of this admittedly imperfect proxy could lead to large standard errors in the other terms equations.

After making these two adjustments, i.e. leaving the market interest rate variable out of the interest rate equation and substituting REQLOAN for REQMAT in the maturity equation, we have estimated equations 2.7 to 2.9 using the technique of two stage least squares. Like the California decision-to-lend model (see Chapter 3), risk (RISK) is measured by a vector of financial characteristics of the borrower and the property, a vector of neighborhood characteristics, and a vector of building age dummies. The discrimination variables (DISC) also replicate exactly those used in the decision-to-lend models. They include variables for the sex, race, or age of the applicant or applicants; secondary income by itself and interacted with the sex of the secondary earner; racial composition and age of the neighborhood; and location of the property.

The results for the four metropolitan areas (eight samples in total) are reported in Appendix B, Tables B-37 to B-46. The interest rate equations are generally satisfactory; in most cases the strong positive effects of the requested loan (REQLOAN) and the requested loan to appraised value (RLTOAV) variables in the other terms equations adequately identify the interest rate equation.

The maturity period and loan-to-appraised value equations are less satisfactory. As noted above, these equations rely in part on the binary variable rate mortgage variable (VRM) for their identification. When this variable fails to exert a significant impact on the contract interest rate and when the interest rate is an important explanatory variable in the maturity or loan-to-value equation, the standard error of the maturity or loan-to-value equation becomes unacceptably large. This occurs most obviously in the 1978 San Francisco maturity equation, where the equation's large standard error reduces the t-statistics of all the explanatory variables to values well below 1. Because of this identification problem, the equation is not reported in the appendix (see Table B-44). Although all the other maturity and loan-to-value equations have been reported, those with large standard errors in relation to the mean of the dependent variable should be interpreted cautiously. In particular, the San Jose (1977) loan-to-value equation should be heavily discounted since the poor performance of the requested loan variable in the maturity equation makes it a weak identifier in the loan-to-value equation.

Control Variables

Endogenous Variables. Most of the endogenous variables emerge as statistically significant explanatory variables, thereby supporting the view that the three terms are determined simultaneously. The impact directions across equations can be summarized as follows:

$$\text{INT}\ (\%) = f(\underset{+}{\text{MAT}},\ \underset{-}{\text{LTOAV}},\ldots)$$

$$\text{MAT}\ (\text{yrs}) = h(\underset{\text{mixed}}{\text{INT}},\ \underset{+}{\text{LTOAV}},\ldots)$$

$$\text{LTOAV}\ (\%) = g(\underset{-}{\text{INT}},\ \underset{\text{mixed}}{\text{MAT}},\ldots)$$

where INT is the contract interest rate,

MAT is the maturity period,

and LTOAV is the loan-to-appraised value ratio.

As indicated by the + sign under MAT in the interest rate equation, the results consistently imply that lenders charge higher interest rates on longer maturity loans. This conclusion is based on the fact that seven of the eight samples yield statistically significant positive coefficients; the remaining sample (Fresno 1977) yields a very small and statistically insignificant negative coefficient.

Somewhat surprisingly, higher loan-to-appraised value ratios lead to statistically significantly lower interest rates in all metropolitan areas other than Fresno where in 1977 a positive relationship is found. This negative relationship requires explanation since it appears to be inconsistent with the view that the larger is the loan amount in relation to the appraised value, the riskier is the loan to the lender. It might be, however, that these lenders are not particularly concerned about the security value of the property because of the rapid growth in housing prices. The housing boom will assure that the sales price of the house at any future date will be sufficient to cover the outstanding loan. Hence, once the lender decides to make the loan, profit considerations lead him/her to make the largest loan possible consistent with other risk factors. This means that lenders will be willing to make the largest loans in relation to market value precisely in those situations that look most favorable; thus, high loan-to-value ratios may be indicative of low, rather than high, risk to the bank and, consequently, may warrant lower interest rates.

Similar logic may explain the positive and statistically significant coefficients on the loan-to-value ratio in the maturity equation across all eight samples; lenders apparently are willing to give larger maturity loans to those same applicants to whom they are willing to make large loans in relation to appraised value. The impact on maturity length of the contract interest rate varies across samples. In three samples (Fresno 1977 and Los Angeles-Long Beach 1977 and 1978), it exerts a statistically significant negative impact; in one (San Francisco-Oakland 1977), a significant positive impact; and in the other three, a statistically insignificant impact.[2] The predominant sign is negative.

In the loan-to-value equation, six of the eight interest rate coefficients are negative (with four of them statistically significant) while most of the maturity coefficients are insignificant.

Taken together, the results for the endogenous variables suggest that the three mortgage terms tend to be adjusted in the same direction. That is, borrowers who are charged higher interest rates are given smaller loans in relation to appraised value and shorter maturities than those charged lower interest rates. Those given higher loans in relation to value are charged lower interest rates and given longer maturities than those given smaller loans in relation to value. If shorter maturity loans are granted, say in response to borrower preferences, however, lower interest rates are charged.

Financial Characteristics. If borrowers and lenders expect mortgage rates to rise, variable rate mortgages should have lower contract interest rates than conventional mortgages. The empirical results, which are consistent with this expectation in seven of the eight samples (the one exception being San Francisco in 1977), suggest that interest rates range from .03 to .23 percentage points lower on variable rate mortgages.

As a proxy for the requested maturity, the size of the requested loan is expected to have a positive impact on the maturity period. With one exception (San Jose 1977), the results support expectations, although in two cases the coefficient is not statistically significant at the 10 percent level. As noted above, the San Jose result causes identification difficulties for the loan-to-value equation.

Not surprisingly, the requested loan-to-appraised-value variable enters the loan-to-value equations positively and with large t-statistics in all eight samples. The average of most of the coefficients indicates that a 10 percentage point difference in the requested loan-to-value ratio leads to a 9.6 percentage point difference in the actual loan-to-value ratio.

The final financial characteristic variable, requested loan to income (RLTOINC) which takes on the value 0 for ratios below 2.5 and the value of the ratio itself minus 2.5 above 2.5, appears in all three sets of equations but exerts its strongest and most consistent impact in the loan-to-value equations. In seven out of eight of those equations, the finding that higher requested loan-to-income ratios lead to lower loan-to-value ratios is statistically significant at the 5 percent level. Somewhat surprisingly, requested loan-to-income has a statistically significant positive impact in only three of the eight interest rate equations, thereby suggesting that the financial characteristics of the borrower sometimes do not directly influence the contract interest rate. It should be noted, however, that they exert a positive indirect impact through the loan-to-value variable which, it will be recalled, enters the interest rate equations with a negative sign. Finally, the requested loan-to-income variable is insignificant in most of the maturity equations.

Neighborhood Characteristics. As in the decision-to-lend models, variables representing both the level and rate of change of neighborhood characteristics are included to control for those characteristics that might legitimately influence the lender's calculations about the profitability of a particular mortgage loan. Many of these variables are statistically significant in one or more of the three terms models. In general, however, very few consistent patterns emerge across the eight samples. The variable representing the fraction of high income households (FHI) exhibits the most consistency across samples. In all eight interest rate equations, higher proportions of high income households lead to lower interest rates; only in Fresno (1977 and 1978) and San Jose (1977) are these results not statistically significant. Moreover, this same variable enters most of the loan-to-value equations with a negative sign as well, although not always statistically significantly.

Building Age. Building age turns out to be a statistically significant determinant of mortgage terms in all of the metropolitan areas under investigation. Table 4-1 summarizes the effects of building age on interest rates. Each entry shows the predicted difference between the interest rate charged on a building with the indicated age and that charged on a new building.[3] Two asterisks (**) indicate that the relevant coefficient is significant at the 5 percent level; one asterisk (*) indicates the 5-10 percent level. The results are striking. In every sample other than Fresno 1977, interest rates are increased, usually by successively larger amounts, as the building age increases.

To put the table entries into perspective, consider the 30-39 year old entry for the Los Angeles-Long Beach area (1978). This indicates that on average interest rates on buildings built 30-39 years before 1977 exceed those on new (or one year old) buildings by one third (.33) of one percentage point. Using an interest rate of 9.75 (close to the sample mean of 9.79), a maturity period of 30 years (close to the sample mean of 29.87), and a $60,000 loan amount, the 0.33 percent higher interest rate results in an additional payment of $174 per year. In this case, the age of the building increases the borrower's yearly payments by approximately 3 percent. Similarly, in houses built 40-49

Table 4-1

Impact of Building Age on Interest Rates for Conventional Mortgages on Owner-Occupied Single Family Houses in Four California Metropolitan Areas: 1977 and 1978[a]

Building Age (yrs)	Fresno 1977	Fresno 1978	Los Angeles-Long Beach 1977	Los Angeles-Long Beach 1978	San Francisco-Oakland 1977	San Francisco-Oakland 1978	San Jose 1977	San Jose 1978
New (base)[b]	—	—	—	—	—	—	—	—
BA1-9	-0.09**	-0.03	0.06**	0.20**	0.04**	0.04	0.01	0.14**
BA10-19	-0.04**	-0.01	0.10**	0.20**	0.05**	0.08**	0.02	0.09**
BA20-29	-0.03	0.00	0.09**	0.23**	0.07**	0.11**	0.15	0.14**
BA30-39	0.02	0.16**	0.16**	0.33**	0.13**	0.16**	0.14**	0.31**
BA40-49	0.00	0.17**	0.25**	0.64**	0.14**	0.22**	0.23**	0.28**
BAGE50	0.02	0.44*	0.54**	1.16**	0.29**	0.36**	0.12	0.30**

a) Each entry shows the predicted difference between the interest rate charged on an application with the indicated characteristics and that charged on an application with the base characteristics. A single asterisk (*) indicates that the relevant difference is statistically significant at the five-to-ten percent level (2-tailed test). Two asterisks (**) indicate that the difference is significant at the five or less percent level.

b) Due to a programming error in the 1978 estimates, building age in the 1978 sample is measured relative to new and one year old buildings, and the other variables are: BA2-10, BA11-20, BA21-30, BA31-40, BA41-50, and BAGE51.

years before 1977, the additional annual payment amounts to $348 and for houses built more than 50 years before 1977, the additional annual payment is $630. Hence, the impact of building age on interest rates in the Los Angeles-Long Beach area has a substantial impact on the financial burdens borne by borrowers. Although the magnitudes are somewhat smaller in the other samples, the conclusion remains the same: borrowers mortgaging older houses pay significantly higher interest rates and bear substantially larger annual costs than those mortgaging new houses.

The interpretation of these findings is problematic. On the one hand, lenders may claim that a property's age represents risk factors (e.g., building condition) that may legitimately be considered in the loan evaluation process. According to this interpretation, the findings imply that lenders consider mortgages on older buildings to be substantially riskier than those on new buildings. On the other hand, to the extent that risk is not related to building age, the findings suggest that lenders in California discriminate against the purchasers of old buildings by imposing harsher terms than otherwise warranted. However, since building age is probably a good proxy for the remaining economic life of the building, the discrimination interpretation is at best a weak explanation.

We find a similar pattern, although slightly less strong statistically, for the impact of building age on the maturity of the loan. In Fresno, for example, in both samples, maturities decrease steadily with building age; the maturity for the very oldest houses being 3.2 and 2.5 years shorter on average than those for new houses. Similar but less pronounced patterns emerge in the San Francisco-Oakland (1977) and the San Jose (1977) samples. In the Los Angeles-Long Beach area, the patterns are U-shaped, with mortgages on the medium aged houses having longer maturities than the newest and the oldest houses.

The results for the loan-to-value ratio are mixed. Lower loans in relation to appraised value, after controlling for the requested loan-to-value ratio, are given on older houses in the Fresno (both years) and San Francisco-Oakland (1977) metropolitan areas. Thus, for these three samples, we conclude that lenders impose harsher terms in all three ways on borrowers purchasing older houses. In the Los-Angeles-Long Beach and San Jose areas, however, the results suggest that borrowers on older houses are given larger loans in relation to appraised value than are borrowers on new homes, thereby offsetting somewhat the other adverse terms imposed on these borrowers.

Discrimination Results

We focus here on the interest rate results for three reasons. First we have the most confidence in the interest rate equations because they are the most clearly identified. Second, the interpretation of the relevant coefficients is unambiguous in the interest rate equations since, for any term to maturity and loan to value ratio, borrowers always prfer lower to higher interest rates. Hence, a statistically significant positive coefficient on a discrimination variable in the interest rate equation provides relatively clear evidence in support of the hypothesis of discriminatory lending practices. In the maturity equation, by contrast, the discrimination variables may reflect borrower preferences for different maturity periods as well as discriminatory lending behavior. Finally, many of the discrimination variables are statistically insignificant in the maturity and loan-to-value equations. Where patterns emerge in the matutiry and loan-to-value equations, they will be noted.

To summarize the results, we show the predicted difference in interest rate associated with the difference between the indicated catetory, e.g. black applicant(s) or applicants under age 25, and the base category, e.g. white applicant(s) or applicants between 35 and 44. Asterisks are used to indicate the statistical significance of the difference. By making assumptions about the term to maturity, the size of the loan, and the interest rate on a base application, each of the interest rate differences can be translated into an impact on the borrower's yearly mortgage payments. For example, starting with a mortgage rate of 9 percent and a 30 year maturity period, a difference of 0.125 percent translates into 11 cents per 100 dollars of the mortgage contract. Hence, a $40,000 mortgage would cost $44 more per year and a $60,000 mortgage would cost $66 more per year.

Sex. The basic sex discrimination results are reported in Table 4-2. The most striking and consistent pattern involves discrimination against male-only applications in both the Los Angeles-Long Beach and San Francisco-Oakland metropolitan areas. The four statistically significant coefficients for these two

Table 4-2

Impact of Sex on Interest Rates for Conventional Mortgages on Owner-Occupied Single Family Houses in Four California Metropolitan Areas: 1977 and 1978[a]

	Fresno		Los Angeles-Long Beach		San Francisco-Oakland		San Jose	
	1977	1978	1977	1978	1977	1978	1977	1978
MFNCB (base)	—	—	—	—	—	—	—	—
MFCB25-34[b]	0.01	0.02	-0.05	-0.03	-0.01	-0.03	-0.04	-0.01
FONLYCB25-34[b]	0.00	0.03	-0.04	-0.08	0.04*	-0.00	0.04	-0.02
FONLYNCB	-0.02	0.01	0.01	-0.09*	0.01	-0.04	-0.04	-0.07
MONLY	-0.07**	0.01	0.03**	0.07*	0.04**	0.07**	0.05	0.03

a) Each entry shows the predicted difference between the interest rate charged on an application with the indicated characteristics and that charged on an application with the base characteristics. A single asterisk (*) indicates that the relevant difference is statistically significant at the five-to-ten percent level (2-tailed test). Two asterisks (**) indicate that the difference is significant at the five or less percent level.

b) These coefficients reflect the effects of both sex and age. See Table 4-4 for the difference between interest rates charged on loans to applicants between 25 and 34 and those charged to applicants between 35 and 44.

areas imply that interest rates charged this type of application exceed those charged otherwise similar male-female applications where the wife is beyond childbearing age by 0.03 to 0.07 percentage points. In San Jose the results are consistent with this finding but are statistically insignificant at the 10 percent level, while in Fresno (1977) we find evidence that this male-only category is favored.

The only other finding consistent with the hypothesis of discrimination is the statistically significant 0.04 percentage point predicted difference in interest rates charged female only applications with at least one female below childbearing age (and the applicant herself between 25 and 34) in the San Francisco-Oakland 1977 sample. Since none of the other differences for this category are statistically significant and four have negative signs, no evidence of widespread discrimination against this group is apparent.

Because of the evidence of interest rate discrimination against male-only applications, it is important to see how this category fares with respect to the other two loan terms, maturity periods and loan-to-value ratios. According to the maturity equations, lenders grant male-only borrowers statistically significantly shorter maturity loans in the Fresno (1977) and San Francisco-Oakland (1977) metropolitan areas. The San Jose (1977 and 1978) and Los Angeles-Long Beach (1978) coefficients are also negative but are statistically insignificant. Hence, unless male applicants have preferences for shorter maturity loans that are not fully controlled for, the results provide some evidence that lenders treat this category of borrower adversely with respect to maturity length as well as with respect to interest rates.

The loan-to-value ratio findings present a slightly different picture. The only statistically significant coefficients for the male-only category imply that members of this group receive higher loans in relation to appraised value than members of the same group in the Los Angeles-Long Beach (1977 and 1978) and San Francisco-Oakland (1978) metropolitan areas.

In addition to testing for outright discrimination based on the sex of the applicant, we tested for discrimination based on differential treatment of secondary income. Across all eight samples, only one statistically significant finding emerges with respect to interest rates. In the San Francisco-Oakland 1978 sample, male-only applications with two workers earning equal incomes are charged interest rates that average 0.13 percentage points more than those charged to similarly situated male-female applications with a non-working wife beyond childbearing age. This differential reflects the combined effects of being male and of having secondary income, both of which are statistically significant in this sample. In contrast to this finding for males, the allegation that lenders discount the secondary income of females is rejected in all cases.

Race. The equations provide substantial evidence that members of minority groups are charged higher interest rates than similarly situated whites. As summarized in Table 4-3, all of the interest rate differentials are greater than or equal to zero

Table 4-3

Impact of Race on Interest Rates for Conventional Mortgages
on Owner-Occupied Single Family Houses
in Four California Metropolitan Areas: 1977 and 1978[a]

Race of Applicant(s)	Fresno		Los Angeles-Long Beach		San Francisco-Oakland		San Jose	
	1977	1978	1977	1978	1977	1978	1977	1978
White (base)	—	—	—	—	—	—	—	—
Black	0.04	0.13*	0.04**	0.06	-0.00	0.01	0.06	0.05
Spanish	0.05**	0.00	0.06**	0.10**	0.06**	0.07**	0.06*	0.03
Asian	0.02	0.03	0.02*	0.06*	0.04**	0.06**	0.03	0.03
Other Minority	0.00	0.03	0.02	0.05	0.05*	0.03	0.08*	0.03

a) Each entry shows the predicted difference between the interest rate charged on an application with the indicated characteristics and that charged on an application with the base characteristics. A single asterisk (*) indicates that the relevant difference is statistically significant at the five-to-ten percent level (2-tailed test). Two asterisks (**) indicate that the difference is significant at the five or less percent level.

and many are statistically significant. The clearest pattern relates to the treatment of Spanish applicants. In all four metropolitan areas, statistically significant differentials emerge with magnitudes ranging from 0.05 to 0.10 percentage points.

The evidence also supports the view that Asians receive adverse treatment, especially in the San Francisco-Oakland and Los Angeles-Long Beach metropolitan areas where all four coefficients are statistically significant. The results for blacks and other minorities are slightly more mixed but are still generally consistent with the hypothesis of discriminatory lending. The interest rate differentials for blacks are statistically significant only in Los Angeles-Long Beach (1977) and Fresno (1978) while those for other minorities are significant in San Francisco-Oakland (1977) and San Jose (1977).

Turning briefly to the maturity equations, we find that lenders in the San Francisco-Oakland area grant loans with statistically significantly shorter maturities to Spanish, Asian, and other minorities than to similarly situated whites. Only in the Los Angeles-Long Beach (1977) area is there evidence that minority groups (blacks and Spanish, in particular) are granted longer maturity loans. Finally, the evidence suggests that in both Los Angeles-Long Beach and San Francisco-Oakland, minorities tend to be granted larger loans in relation to market value than similarly situated whites.

Age. Although the law prohibits discriminatory lending based on the age of the applicant, allegations persist that lenders treat both very young applicants and old applicants adversely. Some support for these allegations is found in Table 4-4. In four of the eight samples, lenders appear to discriminate against applicants under 25 by charging them interest rates that average 0.04 to 0.09 percentage points above those charged similarly situated applicants between the ages of 35 and 44. In addition, lenders apparently charge applicants over 44 higher interest rates. This conclusion is based on four statistically significant positive coefficients for the 45-54 year old age group and two for the greater than 54 age group.

Not surprisingly, the maturity equations provide evidence that applicants over 45 end up with shorter maturities, especially in Los Angeles-Long Beach, San Francisco-Oakland, and Fresno (1978), than applicants between 35 and 44. This result should not necessarily be interpreted as evidence of discriminatory behavior based on age, however, since the outcome may merely reflect the preference of older applicants for shorter maturities. This alternative explanation for the findings cannot be ruled out since data limitations keep us from controlling adequately for the borrower's preferences with respect to maturity length.

In the loan-to-value equations, we find support for the hypothesis that lenders grant loans that are smaller in relation to appraised value to applicants over 45 than to those between 35 and 44.[4]

Redlining. Table 4-5 summarizes the evidence pertaining to allegations that lenders impose harsher terms on applications from older neighborhoods or from neighborhoods with high proportions of minorities. Each entry in the first row of the table

Table 4-4

Impact of Age of Applicant on Interest Rates for Conventional Mortgages on Owner-Occupied Single Family Houses in Four California Metropolitan Areas: 1977 and 1978[a]

Age of Applicant	Fresno		Los Angeles-Long Beach		San Francisco-Oakland		San Jose	
	1977	1978	1977	1978	1977	1978	1977	1978
Less than 25	0.05**	0.05	0.05**	-0.02	0.04**	0.09**	0.02	-0.01
25-34	0.01	0.02	-0.00	-0.04	0.00	-0.00	-0.00	-0.03
35-44 (Base)	—	—	—	—	—	—	—	—
45-54	0.01	0.07**	0.02**	0.10**	0.02*	-0.01	0.05	-0.01
Greater than 54	-0.01	0.06	0.01	0.08*	0.05**	-0.01	0.08	-0.02

a) Each entry shows the predicted difference between the interest rate charged on an application with the indicated characteristics and that charged on an application with the base characteristics. A single asterisk (*) indicates that the relevant difference is statistically significant at the five-to-ten percent level (2-tailed test). Two asterisks (**) indicate that the difference is significant at the five or less percent level.

Table 4-5

Impact of Neighborhood Age and Racial Composition on Interest Rates for Conventional Mortgages on Owner-Occupied Single Family Houses in Four California Metropolitan Areas: 1977 and 1978[a]

	Fresno		Los Angeles-Long Beach		San Francisco-Oakland		San Jose	
	1977	1978	1977	1978	1977	1978	1977	1978
PRE1940 (increase to average +0.10)	-0.01*	-0.14*	-0.01**	-0.04**	-0.01**	-0.00	-0.01	-0.02*
FBLACK (increase to "high")	-0.00	0.23	0.09**	0.24**	0.18**	0.13**	0.06	-0.10*
FSPANISH (increase to "high")	0.03**	0.01	0.15**	0.42**	0.12**	0.21**	0.13*	0.05
FASIAN (increase to "high")	0.00	0.00	-0.06**	-0.14**	-0.06	-0.10	-0.11	0.05

a) Each entry shows the impact on the contract interest rate of increasing each neighborhood variable from its average value to the amount indicated. "High" values of the racial composition variables vary across samples; they are calculated as the maximum value in the sample minus two standard deviations. See Table 3-32 for representative values. A single asterisk (*) indicates that the relevant difference is statistically significant at the five-to-ten percent level (2-tailed test). Two asterisks (**) indicate the difference is significant at the five or less percent level.

represents the predicted impact on the interest rate of an increase of 0.10 in the fraction of housing built before 1940 in the census tract in which the property is located. The entries in the next three rows show the impact associated with an increase in the fraction of a particular minority, say Spanish, in the census tract (or zip code area for the Asian fraction) in which the property is located from the average level to a sample specific "high" level.[5]

The results contradict allegations by community groups that lenders impose harsher terms in older neighborhoods, *ceteris paribus*. In all eight samples, loans on houses in neighborhoods with above average proportions of old houses are found to have lower interest rates than those on houses in neighborhoods with average proportions of old housing. In six of the eight samples, the findings are statistically significant. The appearance that lenders are discriminating on the basis of neighborhood age probably comes from their behavior with respect to building age; as noted above, the evidence suggests the conclusion that lenders consistently charge higher interest rates on older buildings than on new and that the differential increases with the age of the building. However, since age may be proxying building condition, and hence the risk to the lender, we cannot conclude that lenders are discriminating against old buildings.

In contrast to the age of neighborhood finding, the results generally support the hypothesis that lenders impose harsher terms on applications from "high" minority neighborhoods than on applications from average neighborhoods. In both the Los

Angeles-Long Beach and San Francisco-Oakland metropolitan areas, interest rates on loans in "highly" black or "highly" Spanish neighborhoods are substantially and statistically significantly higher than those on loans in neighborhoods with average minority populations. Of all the discriminatory impacts found with respect to interest rates, these interest rate impacts of the racial composition of the neighborhood are among the largest.

In San Jose, the results are mixed, with black areas being favored in 1978 and Spanish areas discriminated against in 1977. Only one finding attains statistical significance in Fresno; in 1977 lenders in that area appear to have discriminated against tracts with above average fractions of Spanish population. In the Los Angeles-Long Beach metropolitan area, zip code areas with above average proportions of Asians appear to be favored with lower interest rates during both years.

Additional evidence of discriminatory lending practices based on the racial composition of the neighborhood can be found in the maturity and loan-to-value equations. Lenders in San Francisco-Oakland (1977), in addition to charging higher interest rates, apparently discriminate against Spanish and black neighborhoods by giving shorter maturity loans and smaller loans in relation to market value. Similar conclusions emerge from the Los Angeles-Long Beach 1978 sample. During 1977, however, lenders in this area gave more favorable terms and loan-to-value ratios to some minority neighborhoods. Although Los Angeles-Long Beach lenders favored Asian areas by giving lower interest rates, they granted smaller loans in relation to market value.

Information available to us permits examination of explicit allegations of redlining in certain neighborhoods of the Los Angeles-Long Beach and San Francisco-Oakland areas.[6] By comparing interest rates in these neighborhoods with those in a reference suburban area, we can determine whether the evidence supports the redlining allegations. The results for Los Angeles-Long Beach are reported in Table 4-6 and for San Francisco-Oakland in Table 4-7.

Of the twelve areas delineated as neighborhoods alleged to be redlined in the Los Angeles-Long Beach metropolitan area, statistically significant findings in support of the redlining hypothesis emerge for at least one of the years in six of the areas. In two of these areas, Pomona and South Central Los Angeles, large and highly significant interest rate differentials are found for both years. In other areas, such as Covina-Azusa, Long Beach-Southwest, and Venice-Santa Monica, the results imply that loans on properties in these areas pay lower interest rates than comparable loans on suburban properties. While the results across all alleged redlined areas are mixed, the finding that the evidence supports the allegations of redlining in certain areas is important; the substantial magnitudes of the interest rate differentials suggest that discrimination of this form cannot be dismissed as being inconsequential.

In San Francisco-Oakland, only one area has been identified as allegedly redlined: Central Oakland. The results are consistent with the redlining hypothesis in that interest rates in this area for both years are substantially and statistically

Table 4-6

Impact of Location on Interest Rates for Conventional Mortgages on Owner-Occupied Single Family Houses in Los Angeles-Long Beach: 1977 and 1978[a]

Neighborhood	1977	1978
Allegedly Redlined Neighborhoods		
Compton	0.02	0.95**
Covina-Azusa	-0.02	-0.43**
East Los Angeles-Boyle Heights-Echo Park	-0.11**	0.01
Highland Park	0.12**	-0.39**
Long Beach-Southwest	0.10	-0.43*
Pacoima-San Fernando	-0.04	-0.16
Pasadena-North Central	0.31**	-0.04
Pomona	0.20**	0.42**
San Pedro	0.01	0.62**
South Central Los Angeles	0.20**	0.30**
Venice-Santa Monica	0.03	-0.26*
West Covina	0.04	-0.27
Other Neighborhoods		
Rest of the City of Long Beach	0.01	-0.04
Rest of the City of Los Angeles	-0.04**	-0.06**
Rest of Los Angeles County (base)	—	—

a) Each entry shows the predicted difference between the interest rate charged on a mortgage loan in the specified location and that charged on a loan in the reference area. A single asterisk (*) indicates that the relevant difference is statistically significant at the five to ten percent level (2-tailed test). Two asterisks (**) indicate that the difference is significant at the five or less percent level.

Table 4-7

Impact of Location on Interest Rates for Conventional Mortgages on Owner-Occupied Single Family Houses in San Francisco-Oakland: 1977 and 1978[a]

Neighborhood	1977	1978
Allegedly Redlined Neighborhood		
Central Oakland	0.24**	0.19**
Other Neighborhoods		
Alameda City	0.03	0.16*
Berkeley	-0.02	-0.15**
East Oakland	0.14**	0.10**
West Oakland	0.30**	0.40**
Rest of Alameda County	0.00	-0.04*
Contra Costa County	0.09**	0.12**
Marin County	0.02	0.02
San Francisco County	-0.06**	-0.13**
San Mateo County (base)	—	—

a) Each entry shows the predicted difference between the interest rate charged on a mortgage loan in the specified location and that charged on a loan in the reference area. A single asterisk (*) indicates that the relevant difference is statistically significant at the five to ten percent level (2-tailed test). Two asterisks (**) indicate that the difference is significant at the five or less percent level.

significantly higher than those in suburban San Mateo County. It should be noted however that the differentials, while large, are not so large as those in West Oakland, toward which allegations of redlining have not been aimed.

DOWNWARD MODIFICATIONS

This section analyzes the differences between requested and granted loan amounts for those applications subject to downward modifications. The specific question addressed here is whether some borrowers experience larger downward modifications than others solely because of membership in groups not legally allowed to be considered by banks in their decision making process. Large downward modifications of loan amounts may yield effects similar to those of loan denial; the applicant may not be able to proceed with the house purchase because he/she cannot raise the additional downpayment necessitated by the bank's decision not to lend the requested amount.

Control Variables

The general form of the model used to test for discriminatory behavior in connection with the determination of loan amounts is discussed in Chapter 2. The equations estimated for California model the downward modification (MODOWN, defined as the requested loan minus the granted loan) as a function of the requested loan amount (REQLOAN); the requested loan to appraised value ratio (RLTOAV); the requested loan to income ratio (RLTOINC); a vector of variables representing the age of the property; a vector of neighborhood characteristics, including level and change variables; and a vector of discrimination variables, including sex, race, and age of applicants, division of income between the applicant and co-applicant, and the age and racial composition of the neighborhood. This model is estimated only for those applications which received loan amounts below that requested.

Additional financial characteristics of the borrower such as the income, net wealth, and employment stability variables included in the New York MODOWN equations are excluded from the California equations for the following reasons: net wealth and employment stability data are not available in the California data set and preliminary analysis for California indicated that income is relevant only in relation to the size of the requested loan. The California MODOWN equations differ from the New York equations as well by the inclusion of the building age dummy variables, data not available for New York. To the extent that building age correctly indicates a building's condition, these variables measure objective factors influencing the risk of the loan to the bank; to the extent that building age is imperfectly correlated with the building's remaining useful life, however, these variables might be capturing discrimination against older buildings.

The estimated equations for the eight separate samples (two years for each SMSA) are reported in Appendix B, Tables B-35 to B-38. All equations are linear and were estimated using ordinary least squares. Sample size ranges from a low of 110 in Fresno to a high of 1,519 in Los Angeles-Long Beach. A small number of observations in the 1977 Fresno sample, combined with a large unexplained variation lead to the conclusion that the 1977 Fresno equation explains a statistically insignificant proportion of the variation in the dependent variable. The other seven equations explain statistically significant proportions of the variation, with the proportions averaging about 25-30 percent.

Size of the requested loan (REQLOAN) and requested loan to income (RLTOINC) are the key control variables. The requested loan amount acts as a scale variable; for any given degree of loan risk as measured by the other control variables, the dollar amount of the modification depends on the size of the loan. The requested loan to income ratio is the bank's primary predictor of the borrower's ability to make timely payments in the future. Beyond a certain point (in the empirical specification, this point is 2.5 times income), the larger the requested loan is in relation to income, the greater is the downward modification needed to bring the actual loan amount in line with borrower income. Both variables have positive impacts on the magnitude of the downward modification, as predicted, and are statistically significant in all eight equations.

The coefficients of requested loan to appraised value (RLTOAV) are less consistent across equations: in three equations they are statistically significant and positive as expected; in three they are positive but not significant; and in two they are negative. The booming California housing market during the study period may partially explain these results; during a period of rising house values, firmly held expectations that housing prices will continue to rise may make loan-to-value ratios a secondary concern for bankers in relation to their primary concern that the borrower have sufficient income to make the monthly payments.

Most of the other control variables have little explanatory power. In a few equations, one or more of the neighborhood variables are significant, but no clear pattern emerges. Some of the building age variables are statistically significant in the Los Angeles-Long Beach and San Jose equations; in both cases the evidence suggests that applications on old buildings are subject to smaller downward modifications than those on new buildings.

Discrimination Results

The finding of a positive coefficient on a discrimination variable indicates that applicants who are members of the group in question (e.g. women, old people, blacks, Spanish, or homebuyers in allegedly redlined neighborhoods) experience larger loan reductions than comparable applicants from the baseline groups. Larger loan reductions translate directly into larger than anticipated downpayments unless the borrower turns to a more expensive second mortgage. In some cases, larger loan reductions may keep the applicant from purchasing the home at all and, thus, may be an indirect way for the bank to deny the loan. Provided the control variables in the MODOWN equations adequately represent the legitimate factors affecting the size of downward modifications, we can interpret statistically significant positive coefficients on any of the discrimination variables as support for the hypothesis of discriminatory behavior.

For each of the eight samples, we have calculated the expected downward modification for a baseline application. This baseline application represents the type that bankers would be least likely to discriminate against: the applicants are a white, male-female couple; the female is beyond childbearing age; all the income is earned by the primary worker; the applicant is between 35 and 44; and the property is in the suburbs.[7] With respect to all other characteristics, the baseline application takes on average values for the particular MODOWN sample involved. In connection with each type of potential discrimination, the predicted downward modification for an application that differs from the baseline application in the discrimination dimension only is reported and compared to the baseline downward modification for that sample. In this way, similarly situated applicants can be compared and the magnitude of the discriminatory differentials can be put into perspective.

Sex. The results by sex are reported in Table 4-8. Each entry represents the predicted amount by which savings and loan associations in each of the eight samples reduce loans for downward modified applications differing from baseline applications only in terms of sex. The numbers in parentheses represent the ratio of the predicted MODOWN for the given sex type to the type included in the base. For example, the second entry in the second column of Table 4-8 indicates that savings and loan associations in Los Angeles-Long Beach reduce the actual loan below the requested loan on average by $7,819 for a downward modified application that differs from the base only in that the female is of childbearing age. The 0.83 in parentheses indicates that this predicted loan reduction is 83 percent of the predicted loan reduction for the base

Table 4-8

Downward Modifications (Dollar Amounts and Ratios) by Sex for Baseline Applications in Four California Metropolitan Areas[a]

<table>
<tr><th>Sex of Applicant(s)</th><th>Fresno</th><th>Los Angeles -Long Beach</th><th>San Francisco -Oakland</th><th>San Jose</th></tr>
<tr><td></td><td colspan="4">1977</td></tr>
<tr><td>MFNCB (base)</td><td>4,603
(1.00)</td><td>9,438
(1.00)</td><td>7,486
(1.00)</td><td>10,434
(1.00)</td></tr>
<tr><td>MFCB 25-34[b]</td><td>4,101
(0.89)</td><td>7,819
(0.83)</td><td>7,212
(0.96)</td><td>5,423**
(0.52)</td></tr>
<tr><td>FONLYCB 25-34[b]</td><td rowspan="2">4,682
(1.02)</td><td>8,222
(0.87)</td><td>4,468
(0.60)</td><td rowspan="2">4,864**
(0.47)</td></tr>
<tr><td>FONLYNCB</td><td>9,095
(0.96)</td><td>7,011
(0.94)</td></tr>
<tr><td>MONLY</td><td>5,427
(1.18)</td><td>8,842
(0.93)</td><td>6,803
(0.91)</td><td>6,358**
(0.61)</td></tr>
<tr><td></td><td colspan="4">1978</td></tr>
<tr><td>MFNCB (base)</td><td>3,173
(1.00)</td><td>11,017
(1.00)</td><td>9,679
(1.00)</td><td>4,727
(1.00)</td></tr>
<tr><td>MFCB 25-34[b]</td><td>6,257*
(1.97)</td><td>8,836
(0.80)</td><td>8,148
(0.84)</td><td>8,994
(1.90)</td></tr>
<tr><td>FONLYCB 25-34[b]</td><td rowspan="2">3,121
(0.98)</td><td>9,106
(0.82)</td><td>7,558
(0.78)</td><td rowspan="2">6,272
(1.33)</td></tr>
<tr><td>FONLYNCB</td><td>11,533
(1.05)</td><td>7,552
(0.78)</td></tr>
<tr><td>MONLY</td><td>3,178
(1.00)</td><td>7,999
(0.73)</td><td>7,497**
(0.77)</td><td>7,000
(1.48)</td></tr>
</table>

a) The entries in the table represent the predicted downward modification (in dollars) for an application similar to the base application in all ways other than the characteristic listed. Numbers in parentheses represent the ratio of the downward modification for an application with the indicated characteristics to the downward modification for the baseline application.

Table 4-8 (continued)

(cont'd) See text for definition of the baseline application. A single asterisk (*) indicates that the numerator of the ratio is statistically significantly different from the denominator at the five-to-ten percent level (using a two-tailed test). Two asterisks (**) indicate that the difference is significant at the five or less percent level.

b) These estimates reflect the effects of both sex and age in that the age of the applicant is reduced to the 25-34 age category. See Table 4-10 for the separate effects of age.

application. The absence of asterisks with this entry indicates that the difference between this and the baseline MODOWN is statistically insignificant. In general, a single asterisk means that the difference is significant at the five to ten percent level, while two asterisks indicate the five percent level using a two-tailed test.

Table 4-8 provides almost no evidence of adverse differential treatment based on the sex of the applicants. Four of the five statistically significant effects imply favorable rather than adverse treatment. Moreover, the signs of the other coefficients are inconsistent across equations indicating no clear pattern of lender behavior.

The one significant finding consistent with discriminatory behavior relates to savings and loan associations in Fresno (1978); lenders in this area appear to reduce loans for male-female couples in which the female is of childbearing age (and the applicant is between 25 and 34) by almost twice the amount they reduce loans for baseline applications, controlling for all other factors.[8] Since this requires an additional downpayment of $3,136, the financial impact on the borrower is substantial.

Lenders might also discriminate by counting secondary income less than primary income when evaluating mortgage applications and deciding what size loan to grant. We can examine this allegation by looking at the impact of the proportion of income earned by the secondary earner on the size of the downward modification. By interacting the proportion of income earned by the secondary earner with the presence of a female secondary earner of childbearing age and with the presence of a female secondary earner beyond childbearing age, we can test the further allegation that bankers treat secondary income earned by females differently from that earned by males.

The results for the four SMSAs examined here do not support the hypothesis that bankers count secondary income less than primary income. Most of the relevant coefficients are statistically insignificant, and a few imply favorable treatment of secondary income. The Fresno 1978 sample provides the exception to this general pattern. The higher the proportion of income from a female secondary earner beyond childbearing age in that sample, the larger is the predicted downward modification.

Race. The findings with respect to differential treatment based on race, summarized in Table 4-9, fail to support the hypothesis of discriminatory behavior. Most of the ratios are less than one, implying that, if anything, lenders modify loans downward by less for members of racial minorities than for similarly situated whites; furthermore, none of the four ratios greater than one is derived from a statistically significant coefficient.

Age. Turning now to the results by age, we find evidence that savings and loan associations reduce loan amounts by more for applicants over 45 than for otherwise comparable younger applicants. (See Table 4-10.) The findings are strongest for Los Angeles-Long Beach (1977 and 1978) and San Francisco-Oakland (1977 and 1978), where applicants in both the 45-54 and the over 54 age groups experienced larger downward modifications than

Table 4-9

Downward Modifications (Dollar Amounts and Ratios) by Race for Baseline Applications in Four California Metropolitan Areas[a]

	Fresno	Los Angeles -Long Beach	San Francisco -Oakland	San Jose
		1977		
White (base)	4,603 (1.00)	9,438 (1.00)	7,486 (1.00)	10,434 (1.00)
Black	3,224[b] (0.70)	12,222 (1.29)	4,771 (0.63)	8,098[b] (0.78)
Spanish	5,306 (1.15)	8,722 (0.92)	5,660 (0.76)	10,081 (0.96)
Asian	—	8,400 (0.89)	6,176 (0.83)	—
Other Minority	—	9,593 (1.02)	5,426 (0.72)	—
		1978		
White (base)	3,173 (1.00)	11,017 (1.00)	9,679 (1.00)	4,727 (1.00)
Black	959[b] (0.30)	8,090* (0.73)	7,103** (0.73)	7,187[b] (1.52)
Spanish	3,012 (0.94)	9,686* (0.87)	8,450 (0.87)	7,778 (1.65)
Asian	—	10,153 (0.92)	7,779** (0.80)	—
Other Minority	—	7,647* (0.69)	9,634 (0.99)	—

a) The entries in the table represent the predicted downward modification (in dollars) for an application similar to the base application in all ways other than the characteristic listed. Numbers in parentheses represent the ratio of the downward modification for an application with the indicated characteristics to the downward modification for the baseline application. See text for definition of the baseline application. A single asterisk (*)

Table 4-9 (continued)

(cont'd) indicates that the numerator of the ratio is statistically significantly different from the denominator at the five-to-ten percent level (using a two-tailed test). Two asterisks (**) indicate that the difference is significant at the five or less percent level.

b) Includes other minorities; Asians are grouped with whites in the base.

Table 4-10

Downward Modifications (Dollar Amounts and Ratios) by Age for Baseline Applications in Four California Metropolitan Areas[a]

Age of Applicant	Fresno	Los Angeles -Long Beach	San Francisco -Oakland	San Jose
		1977		
Younger than 25	3,224 (0.70)	7,925 (0.84)	6,594 (0.88)	7,989 (0.76)
A25-34	3,961 (0.86)	8,761 (0.93)	7,444 (0.99)	9,618 (0.92)
A35-44 (base)	4,603 (1.00)	9,438 (1.00)	7,486 (1.00)	10,434 (1.00)
A45-54	4,456 (0.97)	10,923* (1.16)	10,276** (1.37)	10,753 (1.03)
Older than 54	4,710 (1.02)	12,496** (1.32)	9,678* (1.29)	9,989 (0.95)
		1978		
Younger than 25	6,233 (1.96)	9,795 (0.89)	8,927 (0.92)	6,014 (1.27)
25-34	5,566* (1.75)	10,432 (0.94)	9,689 (1.00)	6,224 (1.32)
35-44 (base)	3,173 (1.00)	11,017 (1.00)	9,679 (1.00)	4,727 (1.00)
45-54	8,361** (2.63)	12,363* (1.12)	11,533** (1.19)	6,415 (1.36)
Older than 54	4,388 (1.38)	11,781 (1.07)	9,762 (1.01)	8,752 (1.85)

a) The entries in the table represent the predicted downward modification (in dollars) for an application similar to the base application in all ways other than the characteristic listed. Numbers in parentheses represent the ratio of the downward modification for an application with the indicated characteristics to the downward modification for the baseline application. See text for definition of the baseline application. A single asterisk (*) indicates that the numerator of the ratio is statistically significantly different from the denominator at the five-to-ten percent level (using a two-tailed test). Two asterisks (**) indicate that the difference is significant at the five or less percent level.

similarly situated applicants between the ages of 35 and 44. This conclusion is based on statistically significant coefficients in six of the eight cases involved. The predicted downward modifications for applicants in these age groups are substantial in absolute amount, ranging from $9,678 for applicants over 54 in the San Francisco-Oakland area during 1977 to $12,496 for applicants over 54 in the Los Angeles-Long Beach area during the same year. The predicted amounts for these two age groups exceed the modification amounts experienced by 35 to 44 year old applicants by up to 37 percent.

In the two smaller metropolitan areas, the results are mixed, especially for the 1977 data. The 1978 results for both Fresno and San Jose, however, indicate a clear, although not generally statistically significant, pattern of larger than warranted downward modifications for applicants over 45. In addition, applicants between the ages of 25 and 34 applying for mortgages in Fresno during 1978 also appear to experience larger downward modifications than 35 to 44 year old applicants.

Redlining. Table 4-11 summarizes the evidence relating to allegations that bankers treat applications from older neighborhoods or with high proportions of minorities differently from those from other neighborhoods. Each entry in the first row of the table represents the predicted change in the downward modification associated with an increase of 0.10 in the fraction of housing built before 1940 in the census tract in which the property is located. The entries in the next three rows show the change in the downward modification associated with an increase

Table 4-11

Changes in Downward Modification (Dollar Amounts) Associated with Changes in the Age and Racial Composition of the Neighborhood[a]

	Fresno		Los Angeles-Long Beach		San Francisco-Oakland		San Jose	
	1977	1978	1977	1978	1977	1978	1977	1978
PRE1940 (increase to average +0.10)	195	-355	386*	212	249	554**	-709	1,352
FBLACK[b] (increase to "high")	17,376	-3,596	-3,895*	6,512	3,343*	4,567	-4,687	-7,460
FSPANISH[b] (increase to "high")	-563	843	3,693**	1,865	-4,785	-4,495	416	3,560
FASIAN[b] (increase to "high")	-163	-442	539	-1,525	-11,510	621	1,796	8,640

a) The entries in the table represent the change in the downward modifications associated with an increase in the neighborhood age or racial composition variable from its average level to the indicated level. "High" levels for the racial composition variables are sample specific. See Table 3-32 for representative values. A single asterisk (*) indicates that the numerator of the ratio is statistically significantly different from the denominator at the five-to-ten percent level (using a two-tailed test). Two asterisks (**) indicate that the difference is significant at the five or less percent level.

b) For representative values of "high" proportion minority by area, see Table 3-32.

in the fraction of a particular minority, say Spanish, in the census tract (or zip code area for Asians) in which the property is located from the average level to a sample specific "high" level.[9] The results for the Los Angeles-Long Beach and San Francisco-Oakland metropolitan areas provide limited support for these allegations; the results for the Fresno and San Jose metropolitan areas provide no support.

Downward modifications increase with the proportion of old housing in both the San Francisco-Oakland and Los Angeles-Long Beach areas during both years, although the positive coefficients are statistically significant in only two of the four samples. In addition, savings and loan associations in the San Francisco-Oakland area appear to treat applications from tracts with higher than average proportions of blacks adversely while savings and loan associations in the Los Angeles-Long Beach area do the same with respect to applications from tracts with higher than average proportions of Spanish. Again, only two of the four coefficients on which these conclusions are based are statistically significant.

Finally, we examine the hypothesis of differential downward modifications in neighborhoods alleged to be redlined in the Los Angeles-Long Beach metropolitan area. Only for this area are the sample sizes sufficiently large to examine this redlining issue. Even here, however, data limitations force us to aggregate all the areas alleged to be redlined into one category. Results from the interest rate equation (and the lender action models in Chapter 3) suggest that such aggregation is undesirable.

Interest rates relative to the reference suburban area varied substantially across the twelve neighborhoods alleged to be redlined. In any case, the results which are reported in Table 4-12 provide no support for the hypothesis that savings and loan associations in Los Angeles-Long Beach reduce loan amounts by more in areas alleged to be redlined than in other areas.

LOAN FEES

The final component of mortgage terms that can be analyzed with the California data are the fees that savings and loan associations charge for making mortgage loans. As developed more fully in Chapter 2, we expect loan fees to be a function of the loan amount, property characteristics, and neighborhood characteristics. In addition, we include variables to test for the existence of discrimination. Implicit in this general model is the view that lenders should set loan fees to cover the administrative costs of making the loan rather than to adjust for the riskiness of the loan. Since borrower income affects the riskiness of the loan (controlling for loan amount) but not the administrative costs, it is not included as an explanatory control variable.

The eight estimated equations are reported in Appendix B, Tables B-47 to B-50. All equations are linear, are estimated using ordinary least squares, and cover all approved loans for which complete data exist. The equations explain from 50 to 75 percent of the variation in the dependent variable.

Table 4-12

Downward Modifications (Dollar Amounts and Ratios) by Location for Baseline Applications in Los Angeles-Long Beach: 1977 and 1978[a]

Property Location	1977	1978
Suburbs (base)	9,438 (1.00)	11,017 (1.00)
Areas Alleged to be Redlined	8,298 (0.88)	11,160 (1.01)
Rest of City of Los Angeles	8,674 (0.92)	11,836 (1.07)
Rest of Long Beach	8,625 (0.91)	8,943 (0.81)

a) The entries in the table represent the predicted downward modification (in dollars) for an application similar to the base application in all ways other than the characteristic listed. Numbers in parentheses represent the ratio of the downward modification for an application with the indicated characteristics to the downward modification for the baseline application. See text for definition of the baseline application.

Control Variables

Reflecting the fact that the basic loan fee is assessed as a percentage of the loan amount, the loan amount exerts a strong and statistically significant positive impact on the size of the loan fee across all eight equations. The coefficients imply that loan fees average slightly over one percent of the loan amount.

The property specific characteristics included in the loan fee equations are the property's appraised value, its size (measured in thousands of interior square feet), and its age (represented by a vector of dummy variables). These variables control for the factors that might affect the appraisal, inspection, escrow, and title insurance costs that associations may legitimately include in loan fees to offset the costs of processing loans.

Appraised value (AV) enters significantly and negatively in all equations other than those for Los Angeles-Long Beach, presumably reflecting economies of scale in the appraisal process. For unknown reasons, higher appraised values are associated with higher loan fees, controlling for all other factors, in the two Los Angeles samples. Economies of scale in the appraisal or inspection process also explain the negative signs of the four statistically significant coefficients of the building age variable (SPACE).

Building age variables enter most consistently and significantly in the Los Angeles-Long Beach and San Francisco-Oakland equations, as shown in Table 4-13. The table entries show the

Table 4-13

Impact of Building Age on Loan Fees for
Four California Metropolitan Areas: 1977 and 1978[a]

Building Age (Number of years before 1977 that house was built)	Fresno 1977	Fresno 1978	Los Angeles-Long Beach 1977	Los Angeles-Long Beach 1978	San Francisco-Oakland 1977	San Francisco-Oakland 1978	San Jose 1977	San Jose 1978
New (base)[b]	—	—	—	—	—	—	—	—
BA1-9	7	-9	19**	20**	30**	8	67**	15**
BA10-19	0	-7	8*	14**	33**	21**	73**	8
BA20-29	-4	-1	9**	22**	38**	35**	77**	4
BA30-39	-62**	-8	14**	29**	38**	38**	58**	8
BA40-49	-93**	-4	21**	40**	46**	44**	47**	2
BAGE50	-90**	1	18**	44**	45**	60**	67**	-40*

a) Each entry shows the predicted difference between the loan fee charged on an application with the indicated characteristics and that charged on an application with the base characteristics. A single asterisk (*) indicates that the relevant difference is statistically significant at the five-to-ten percent level (using a two-tailed test). Two asterisks (**) indicate that the difference is significant at the five or less percent level.

b) Due to a programming error in the 1978 estimates, building age in the 1978 samples is measured relative to new and one year old buildings, and the other variables are: BA2-10, BA11-20, BA21-30, BA31-40, BA41-50, and BAGE51.

difference between the predicted loan fee for a house of the given age compared to a new house, controlling for other factors. A single asterisk indicates statistical significance at the five to ten percent level; a double asterisk indicates statistical significance at the five percent level.

In the San Francisco-Oakland area, loan fees generally increase systematically with building age while in Los Angeles loan fees are higher on average for all older houses relative to new, but the differential is lowest for 10-19 year old houses. In the San Jose area, the results are mixed. During 1977, applications on houses built before 1977 are charged higher loan fees than applications on new houses, but the fees exhibit no other pattern with respect to age of house. During 1978, applications on recently built houses have larger fees while those on the oldest houses have lower fees than those on houses built in 1977 or 1978. In the Fresno metropolitan area, savings and loan associations charged significantly and substantially lower loan fees during 1977 on mortgage applications for houses more than thirty years old than for new houses. Unfortunately, the determination of whether differential loan process costs justify the differences in loan fees associated with building age is beyond the scope of this study.

The loan fee models include as control variables the same neighborhood variables that were included in the California lender action models, but for different reasons. Here the variables are intended to control for any legitimate costs of processing loans while in the lender action models, they control for the riskiness of the loan. The variables include change in income variables (DINC7675 and DINC7570) and change in number of households variables (DHH7675 and DHH7570); 1976 average income (INC1976); the fraction of households with high income (FHI); and in San Jose, the vacancy rate (FVACANTSJ).

Many of the income change and household change variables are statistically significant, but the signs vary across equations, making them hard to interpret and explain. The level variables yield more consistent results. Whenever either 1976 average income or the fraction of high income households is statistically significant, its coefficient in negative. We conclude that in the Los Angeles-Long Beach, San Francisco-Oakland, and San Jose (1978 only) metropolitan areas, borrowers receiving mortgages for houses in higher income areas are charged lower loan fees, ceteris paribus, than comparable borrowers in lower income areas.

Discrimination Results

The finding of a statistically significant positive coefficient on a discrimination variable indicates that applicants who are members of the group in question (e.g. women, old people, blacks, or homebuyers in allegedly redlined neighborhoods) are charged higher loan fees than otherwise comparable applicants. We interpret results of this sort as evidence of discriminatory behavior. This interpretation is straightforward provided the control variables in the loan fee equations adequately represent the factors affecting the costs of processing loans. Even when a relevant factor is left out of the equation, however, higher loan fees associated with a discrimination variable may still indicate discriminatory behavior. This is true provided the left out variable and the discrimination variable are not positively correlated.

For each of the eight samples, we have calculated the expected loan fee for a baseline application. This baseline application represents the type that bankers would be least likely to discriminate against and is defined analogously to baseline applications in the MODOWN section: the applicants are a white, male-female couple; the female is beyond childbearing age; the applicant is between 35 and 44, and the property is located in the suburbs.[10] With respect to all other characteristics, the baseline application takes on average values for the particular LOANFEE sample involved. In connection with each type of potential discrimination, the predicted loan fee for an approved application that differs from the baseline application in the discrimination dimension only is reported and compared to the loan fee for the baseline application for that sample. In this way, similarly situated applicants can be compared and the magnitude of the discriminatory differential put into perspective.

Sex. The results by sex of the application are reported in Table 4-14. Each entry represents the predicted loan fee for applications differing from baseline applications only in terms of the sex of the applicants. The numbers in parentheses represent the ratio of the predicted loan fee for the sex type to the type included in the base. The asterisks, as in previous tables,

Table 4-14

Loan Fees (Dollar Amounts and Ratios) by Sex for Baseline Applications in Four California Metropolitan Areas[a]

Sex of Applicant(s)	Fresno	Los Angeles-Long Beach	San Francisco -Oakland	San Jose
		1977		
MFNCB (base)	620 (1.00)	695 (1.00)	678 (1.00)	690 (1.00)
MFCB25-34[b]	608* (0.98)	703** (1.01)	686* (1.01)	687 (1.00)
FONLYCB25-34[b]	590* (0.95)	707* (1.02)	689* (1.02)	687 (1.00)
FONLYNCB	630 (1.02)	695 (1.00)	684 (1.01)	679 (0.98)
MONLY	658** (1.06)	704** (1.01)	680 (1.00)	686 (0.99)
		1978		
MFNCB (base)	720 (1.00)	843 (1.00)	823 (1.00)	873 (1.00)
MFCB25-34[b]	723 (1.00)	847 (1.00)	827 (1.00)	865* (0.99)
FONLYCB25-34[b]	741 (1.03)	851 (1.01)	826 (1.00)	864* (0.99)
FONLYNCB	718 (0.99)	840 (0.99)	820 (0.99)	859 (0.98)
MONLY	733 (1.02)	848 (1.01)	837** (1.02)	894** (1.02)

a) The entries in the table represent the predicted loan fee (in dollars) for an application similar to the baseline application in all ways other than the characteristic listed. Numbers in parentheses represent the ratio of the loan fee for an application with the indicated characteristics to the loan fee for the baseline application. See text for definition of the baseline application. A single asterisk (*) indicates that the numerator of the ratio is statistically significantly different from the denominator at the five to ten-percent level (using a two-tailed

Table 4-14 (continued)

(cont'd) test). Two asterisks (**) indicate that the difference is significant at the five or less percent level.

b) These estimates reflect the effects of both sex and age in that the age of the applicant is reduced to the 25-34 category. See Table 4-16 for the separate effects of age.

tables, indicate the statistical significance of the relevant coefficients.

Starting with the clearest pattern of statistically insignificant results, we conclude that female only applications in which no applicant is below 34 (FONLYNCB) are charged loan fees no higher on average than those charged baseline applications. In other words, the results contradict allegations that banks discriminate against women in this age group by imposing excessive financial burdens in the form of high loan fees.

The results for female only applications where the applicant is between 25 and 34 years old (FONLYCB) are mixed. Of the four statistically significant coefficients, two indicate higher loan fees and two indicate lower loan fees than those for baseline applications. Moreover, the ratios above one are relatively small; in the Los Angeles-Long Beach (1977) and San Francisco-Oakland (1977) metropolitan areas, loan fees for approved applications of this type exceed those for baseline applications by two percent. A similar pattern emerges for male-female applications that differ from the base only in that the female is of childbearing age and the applicant is between 25 and 34 (MFCB 25-34). Again the magnitudes are small and the signs are mixed.

The only consistent pattern of higher loan fees is found for male only applications (MONLY). In each of the four SMSAs, one of the two samples yields a positive loan fee differential for male only applications relative to the base that is statistically significant at the five percent level. The differential ranges from one precent of the loan fee in Los Angeles-

Long Beach (1977) to six percent of the fee in Fresno (1977).

Race. The findings with respect to differential treatment based on race, summarized in Table 4-15, provide substantial support for the hypothesis of discriminatory behavior. Black applicants are charged higher loan fees than similarly situated whites in the Fresno (1978), Los Angeles-Long Beach (1977 and 1978), San Francisco-Oakland (1978) and San Jose (1977) metropolitan areas.[11] All of the coefficients on which these results are based are statistically significant at the five percent level. The magnitudes of the differentials are relatively large, ranging from three percent of the baseline loan fee in Los Angeles-Long Beach (1977) to sixteen percent in Fresno (1978).

Spanish applicants face statistically significantly higher loan fees in the Los Angeles-Long Beach (1977 and 1978), San Francisco-Oakland (1977) and San Jose (1977) metropolitan areas. Moreover, all eight loan fee ratios exceed one for Spanish applicants. Finally, Asians experience higher loan fees than similarly situated whites in Los Angeles-Long Beach (1977 and 1978) and San Jose (1977). The magnitudes of the statistically significant differentials for Spanish and Asians range from one percent to three percent.

Age. The results by age of the applicant, summarized in Table 4-16, suggest that savings and loan associations in the Los Angeles-Long Beach, San Francisco-Oakland and San Jose metropolitan areas charge higher loan fees on average on approved loans to applicants under 25 than to similarly situated older applicants. Five of the six coefficients on which this conclusion

Table 4-15

Loan Fees (Dollar Amounts and Ratios) by Race for Baseline Applications in Four California Metropolitan Areas[a]

Race of Applicant(s)	Fresno	Los Angeles-Long Beach	San Francisco-Oakland	San Jose
	1977			
White (base)	620 (1.00)	695 (1.00)	678 (1.00)	690 (1.00)
Black	591 (0.95)	719** (1.03)	685 (1.01)	739** (1.07)
Spanish	630 (1.02)	709** (1.02)	691** (1.02)	711** (1.03)
Asian	612 (0.99)	704** (1.01)	680 (1.00)	704* (1.02)
Other Minority	608 (0.98)	698 (1.00)	680 (1.00)	654** (0.94)
	1978			
White (base)	720 (1.00)	843 (1.00)	823 (1.00)	873 (1.00)
Black	832** (1.16)	888** (1.05)	857** (1.04)	910 (1.04)
Spanish	728 (1.01)	869** (1.03)	832 (1.01)	891 (1.02)
Asian	740 (1.03)	870** (1.03)	825 (1.00)	866 (0.99)
Other Minority	742 (1.03)	855 (1.01)	825 (1.00)	871 (1.00)

a) The entries in this table represent the predicted loan fee (in dollars) for an application similar to the baseline application in all ways other than the characteristic listed. Numbers in parentheses represent the ratio of the loan fee for an application with the indicated characteristics to the loan fee for the baseline application. See text for definition of the baseline application. A single asterisk (*) indicates that the numerator of the ratio is statistically significantly different from the denominator at the five to ten-percent level (using a two-tailed test). Two asterisks (**) indicate that the difference is significant at the five or less percent level.

Table 4-16

Loan Fees (Dollar Amounts and Ratios) by Age of Applicant for Baseline Applications in Four California Metropolitan Areas[a]

Age of Applicant	Fresno	Los Angeles-Long Beach	San Francisco-Oakland	San Jose
		1977		
ALT25	582** (0.94)	707** (1.02)	695** (1.02)	711** (1.03)
A25-34	585** (0.94)	695 (1.00)	686** (1.01)	693 (1.00)
A35-44 (base)	620 (1.00)	695 (1.00)	678 (1.00)	690 (1.00)
A45-54	610 (0.98)	691 (0.99)	678 (1.00)	689 (1.00)
AGE55	598 (0.97)	695 (1.00)	688* (1.01)	680 (0.99)
		1978		
ALT25	727 (1.01)	863** (1.02)	839** (1.02)	878 (1.01)
A25-34	720 (1.00)	841 (1.00)	829 (1.01)	856** (0.98)
A35-44 (base)	720 (1.00)	843 (1.00)	823 (1.00)	873 (1.00)
A45-54	730 (1.01)	846 (1.00)	824 (1.00)	863 (0.98)
AGE55	725 (1.01)	838 (0.99)	815 (0.99)	868 (0.99)

a) The entries in this table represent the predicted loan fee (in dollars) for an application similar to the baseline application in all ways other than the characteristic listed. Numbers in parentheses represent the ratio of the loan fee for an application with the indicated characteristics to the loan fee for the baseline application. See text for definition of the baseline application. A single asterisk (*) indicates that the numerator of the ratio is statistically significantly different from the denominator at the five to ten-percent level (using a two-tailed test). Two asterisks (**) indicate that the difference is significant at the five or less percent level.

is based are statistically significant at the five percent level. The average differential is two to three percent of the loan fee for the baseline applicant, which amounts to less than $20 in most cases.

Redlining. Finally, we examine allegations that lenders treat applications from older neighborhoods or from neighborhoods with a high proportion of minorities differently than applications from neighborhoods characterized by average proportions of old housing or racial minorities. To do so, we calculate the differences in loan fees associated with specific differences in the values of the neighborhood variables under investigation. These loan fee differentials are reported in Table 4-17. For the variable representing the fraction of old houses (PRE1940), we report for all samples the change in loan fees associated with a 0.10 increase in the fraction of houses built before 1940. Since the meaning of a "highly" black, Spanish, or Asian neighborhood varies across metropolitan areas, however, the underlying change in the value of each racial composition variable differs across samples.[12] The table entries for each racial composition variable should be interpreted as the difference between the loan fee lenders would charge for a property in a neighborhood with an average proportion of the particular minority group and that charged for a property in a neighborhood with a "high" proportion of that minority.

In three of the four areas, the results contradict the hypothesis that lenders discriminate against older neighborhoods by charging higher loan fees. Only in San Jose (1977) is a

Table 4-17

Changes in Loan Fees (Dollar Amounts) Associated with Changes in the Age and Racial Composition of the Neighborhood in Four California Metropolitan Areas: 1977 and 1978[a]

	Fresno		Los Angeles-Long Beach		San Francisco-Oakland		San Jose	
	1977	1978	1977	1978	1977	1978	1977	1978
PRE1940 (increase to average +0.10)	1	-3	-6**	-7**	-2	-6	4*	4
FBLACK[b] (increase to "high)	-66	-81*	32**	27**	38**	13	-19	50**
FSPANISH[b] (increase to "high")	15	6	-3	13	-10	93**	45**	-24
FASIAN[b] (increase to "high")	-37	-8	-1*	-9	88**	40*	10	-7

a) The entries in the table represent the change in loan fees associated with an increase in the neighborhood age or racial compositiion variable from its average level to the indicated level. "High" levels for the racial composition variables are sample specific. See Table 3-32 for representative values. A single asterisk (*) indicates that the numerator of the ratio is statistically significantly different from the denominator at the five-to-ten percent level (using a two-tailed test). Two asterisks (**) indicate that the difference is significant at the five or less percent level.

b) For representative values of "high" proportion minority by area, see Table 3-32.

higher proportion of old housing associated with a statistically significant positive impact on loan fees.

With respect to the racial composition of the neighborhood, the results are somewhat mixed. Eleven of the twenty-four coefficients are negative; these indicate that, if anything, lenders favor neighborhoods with high proportions of minorities. On the other hand, the evidence strongly supports the hypothesis that lenders charge higher loan fees on properties in neighborhoods with high proportions of blacks in the Los Angeles-Long Beach (1977 and 1978) and San Jose (1978) areas and with high proportions of all three minority groups in the San Francisco-Oakland area. The magnitudes of the differentials are large, especially in San Francisco-Oakland where loan fees in highly Spanish neighborhoods might average $93 more and in highly Asian neighborhoods $88 more than those in neighborhoods with average proportions of minorities.

Using available information defining which geographic areas are alleged to be redlined in the Los Angeles-Long Beach and San Francisco-Oakland areas, we can examine directly the hypothesis that loan fees are higher in allegedly redlined areas than elsewhere in these metropolitan areas.[13] The results are reported in Table 4-18 for Los Angeles-Long Beach and Table 4-19 for San Francisco-Oakland. The table entries show the predicted difference between the loan fee on a house in the specified area and the loan fee in the reference suburban location.

In Los Angeles-Long Beach, we find that loan fees are higher than those in the suburban area in some allegedly redlined areas

Table 4-18

Impact of Geographic Location on Loan Fees in the Los Angeles-Long Beach Metropolitan Area: 1977 and 1978[a]

Neighborhoods	1977	1978
Allegedly Redlined Neighborhoods		
Compton	72	-0
Covina-Azusa-West Covina	156**	223**
East Los Angeles-Boyle Heights-Echo Park	4	17
Highland Park	16	43**
Long Beach-Southwest	22	20
Pacoima-San Fernando	-18*	-44**
Pasadena-North Central	-9	-7
Pomona	163**	116**
San Pedro	26	-36
South Central Los Angeles	-26**	29**
Venice-Santa Monica	-36*	-81**
Other Neighborhoods		
Rest of the City of Long Beach	-1	-0
Rest of the City of Los Angeles	-22**	-31
Rest of Los Angeles County (base)	—	—

a) The entries in the table represent the predicted difference between the loan fee for a house in the specified area and the loan fee for a house in the reference suburban location. A single asterisk (*) indicates that the difference is statistically significant at the five-to-ten percent level (using a two-tailed test). Two asterisks (**) indicate that the difference is significant at the five or less percent level.

Table 4-19

Impact of Geographic Location on Loan Fees in the San Francisco-Oakland Metropolitan Area: 1977 and 1978[a]

Neighborhoods	1977	1978
Allegedly Redlined Neighborhood		
Central Oakland	5	12
Other Neighborhoods		
Alameda City	-7	12
Berkeley	-32**	-30**
East Oakland	-3	17**
West Oakland	-5	56**
Rest of Alameda County	23**	12**
Contra Costa County	29**	29**
Marin County	24**	20**
San Francisco County	-5	-8
San Mateo County (base)	—	—

a) The entries in the table represent the predicted difference between the loan fee for a house in the specified area and the loan fee for a house in the reference suburban location. A single asterisk (*) indicates that the difference is statistically significant at the five-to-ten percent level (using a two-tailed test). Two asterisks (**) indicate that the difference is significant at the five or less percent level.

and lower in others. The most striking evidence of adverse treatment is found for Covina-Azusa-West Covina where loan fees are predicted to be $156 higher in 1977 and $223 higher in 1978 and in Pomona, where loan fees are $163 higher in 1977 and $110 higher in 1978. All four of the coefficients on which these predictions are based are highly statistically significant. Evidence of statistically significant higher loan fees is also found for Highland Park (1978) and South Central Los Angeles (1978) but the magnitudes are much smaller and the effects are less consistent across the two years. It should be noted that the negative loan fee differences found in many of the alleged redlined areas are consistent with the conclusion that loan fees in the city tend on average to be lower than those in the suburbs. Support for this view comes from the finding that loan fees on mortgage loans to purchasers of houses in the areas of Los Angeles City not alleged to be redlined are lower than those in the suburban reference area.

In San Francisco-Oakland, we have more limited information about redlining allegations; Central Oakland is the only area that our source identifies as an allegedly redlined area. While the direction of impact is consistent with the hypothesis of adverse treatment for borrowers in this area, the magnitudes are small and the relevant coefficients statistically insignificant. Hence, for San Francisco-Oakland, we reject the hypothesis of adverse differential treatment for this allegedly redlined area.

SUMMARY

To supplement the decision to lend model presented in Chapter 3, this chapter analyzes the terms of the mortgage contract. Using data on loans approved by state chartered savings and loan associations for four metropolitan areas in California (Fresno, Los Angeles-Long Beach, San Francisco-Oakland, and San Jose), we estimated three sets of mortgage terms models. First, we estimated a simultaneous three equation model of the interest rate, term to maturity, and loan-to-value ratio using the technique of two-stage least squares. Each of the three terms was modeled as a function of the other two terms, borrower preferences, objective measures of risk to the lender, and discrimination variables. Second, we estimated a model of the amount by which lenders modified loan amounts below requested loan amounts for those applications approved after being modified downward. Although these downward modifications are implicit in the loan-to-value equations from the simultaneous model, we chose to estimate them separately as well so that the results can be compared to those for New York State where only the downward modification model can be estimated. Finally, loan fees were modeled as a function of the loan amount, those property and neighborhood factors that might legitimately influence loan fees, and discrimination variables.

After controlling for the non-discriminatory factors influencing mortgage terms, factors that in most cases play major roles, we find substantial evidence that certain types of applicants against whom discrimination is legally prohibited face

substantially harsher mortgage terms than those faced by other applicants. Hence, we conclude that in the setting of mortgage terms, California savings and loan associations pursue policies that in many cases have undesirable discriminatory impacts. The following paragraphs summarize our findings on each possible basis of discrimination examined in this chapter. In interpreting the magnitudes of the adverse differential impacts reported for the various groups, the reader should bear in mind that they represent predicted averages only.

Sex

The strongest result that emerges with respect to discrimination based on the sex of the applicant(s) is that male-only applicants often face harsher terms than similarly situated male-female baseline applicants, while female only applicant(s) do not. This is a surprising and important result in light of allegations of adverse treatment against women rather than against men. The evidence supports the conclusion that lenders charge higher interest rates to male only applicants in San Francisco-Oakland and Los Angeles-Long Beach and give such applicants shorter maturity loans in San Francisco-Oakland (1977) and Fresno (1977). Many of the other signs are consistent with this conclusion, although not statistically significant. In addition, male-only applications tend to be charged higher loan fees than their male-female counterparts. In each of the four areas, one of the two samples yields a positive loan fee differential for male only applications relative to the reference group that is statistically significant at the five percent level. The differential ranges from one percent of the loan fee in Los Angeles-Long Beach (1977) to six percent of the loan fee in Fresno (1977).

Adverse differential treatment of male-only applicants appear to be restricted to interest rates, terms to maturity, and loan fees. In general, the loan-to-value equations do not support the conclusion that male-only applicants receive lower loans in relation to appraised value than other borrowers and the downward modification equations provide no evidence of excessive downward adjustments of the requested loan amount.

Although a few other scattered statistically significant findings of discriminatory behavior based on sex are evident, no other clear patterns emerge. In addition, we find very little evidence of discriminatory treatment based on the income of the secondary earner; only two instances of discrimination emerge. In San Francisco-Oakland (1978), male-only applications in which fifty percent of the total household income comes from a secondary (male) worker are charged interest rates that average 0.13 percentage points more than those charged similarly situated male-female applications with a non-working wife beyond childbearing age. In Fresno (1978), downward modifications increase with the proportion of income from a female secondary earner beyond childbearing age.

<u>Race</u>

The interest rate equations provide substantial evidence that members of minority groups are charged higher interest rates than similarly situated whites. The clearest pattern relates to the treatment of Spanish applicants. In all four metropolitan areas, statistically significant interest rate differentials emerge with magnitudes ranging from 0.05 to 0.10 percentage points. Asians and blacks also pay higher interest rates in many instances. The maturity results are mixed; in San Francisco-Oakland (1977), minorities tend to be given loans with shorter maturities, while in Los Angeles-Long Beach (1977), some are given longer maturities.

Adverse treatment of racial minorities also clearly emerges from the loan fee equations. The evidence suggests that lenders in all four areas charge blacks higher loan fees; that lenders in Los Angeles-Long Beach, San Francisco-Oakland, and San Jose charge Spanish applicants higher fees; and that lenders in Los Angeles-Long Beach and San Jose charge Asians higher loan fees.

Both the loan-to-value equations and the downward modification equations imply that, if anything, minorities are given larger rather than smaller loans in relation to appraised value or to the requested loan amount.

Age of Applicant

We find evidence of adverse treatment against members of two separate age groups. First, young applicants (those under 25) apparently are charged higher loan fees than similarly situated older applicants. In addition, young applicants in four of the eight samples pay interest rates that average 0.04 to 0.09 percentage points higher than those paid by similarly situated applicants between the ages of 35 and 44.

Second, older applicants (those over 44) in many instances also pay higher interest rates than those in the 35-44 age group. In addition, both the loan-to-value equations and the downward modification equations support the view that in the larger metropolitan areas, lenders grant smaller loans in relation to appraised value or to the requested loan amount to older applicants than to those in the 35-44 age group.

Redlining

We examined allegations that California savings and loan associations impose harsher terms in mortgage contracts on properties located in neighborhoods with larger than average proportions of old housing or higher than average proportions of minorities, and in neighborhoods alleged to be redlined.

With respect to the age of the neighborhood, as measured by the proportion of houses built before 1940, we find only limited evidence of adverse treatment. In San Jose (1977), loan fees are higher in older neighborhoods and in two of the four San Francisco-Oakland and Los Angeles-Long Beach samples, lenders modify loans downward by statistically significant amounts more in older neighborhoods than in new neighborhoods. Both with respect to interest rates and loan fees, however, substantial evidence supports the hypothesis that lenders terms are harsher in mortgages on old buildings relative to new. The magnitudes of the differentials related to building age are large and, in many cases, highly statistically significant. They cannot be interpreted as evidence of discriminatory behavior, however, since building age may be serving as a proxy for building condition, and hence risk to the lender.

In contrast to the age of neighborhood finding, the results generally support the hypothesis that lenders charge higher interest rates on applications from "high" minority neighborhoods than on applications from average neighborhoods. In the Los Angeles-Long Beach and San Francisco-Oakland metropolitan areas, interest rates on loans to "highly" black or "highly" Spanish neighborhoods are substantially and statistically significantly higher than those on loans in neighborhoods with average minority populations. In addition, lenders appear to charge higher loan fees on properties in neighborhoods with high proportions of blacks in Los Angeles-Long Beach (1977 and 1978) and San Jose (1978) and with high proportions of all three minority groups in San Francisco-Oakland. Finally, there is limited support for the view that downward modifications are larger in minority neighborhoods.

The results with respect to pure redlining are mixed. Allegations that lenders impose harsher terms in loans on properties in allegedly redlined neighborhoods are supported in only a few of these neighborhoods in Los Angeles-Long Beach. In particular, the Los Angeles-Long Beach neighborhoods of Pomona, South Central Los Angeles, Covina-Azusa, and Venice-Santa Monica pay higher interest rates and Covina-Azusa-West Covina and Pomona pay higher loan fees. Some evidence of adverse terms is also found for the allegedly redlined Central Oakland area of San Francisco-Oakland.

Footnotes - Chapter 4

1. The order condition is a necessary but insufficient condition for identification. See, for example, Robert S. Pyndyck and Daniel L. Rubenfeld, Econometric Models and Economic Forecasts (New York: McGraw-Hill, 1976), Ch. 5.

2. The eighth and missing result is that for the unidentified San Francisco 1978 equation.

3. As indicated in footnote b of Table 4-1, the base for the 1978 estimates is new and one year old houses.

4. This conclusion, it should be noted, is generally consistent with that from the downward modification equations.

5. A "high" proportion of a minority group is calculated as the maximum value of the racial composition variable minus two standard deviations. Representative values of "high" minority populations are presented in Table 3-32.

6. The redlining allegations for Los Angeles County are derived from Where the Money Is: Mortgage Lending, Los Angeles County (Los Angeles: The Center for New Corporate Priorities, 1975). This report is reprinted in Hearings on the Home Mortgage Disclosure Act of 1975, U.S. Senate, Committee on Banking, Housing and Urban Affairs, 94th Congress, 1st Session (May 5-8, 1975). For the San Francisco-Oakland

area, the redlining allegation is based on a study examining mortgage lending in Oakland only. See William M. Frej, "Discriminatory Lending Practices in Oakland," in Hearings on the Home Mortgage Disclosure Act of 1975, U.S. Senate, Committee on Banking, Housing and Urban Affairs, 94th Congress, 1st Session (May 5-8,1975).

7. The baseline reference locations are: the suburbs in Fresno, the non-alleged redline portions and non-central city portions of Los Angeles County in Los Angeles-Long Beach, San Mateo County in San Francisco-Oakland, and the suburbs in San Jose.

8. The calculated impact reflects the effects of both the sex of the applicants and age. See footnote b, Table 4-8.

9. See footnote 5, supra.

10. The reference suburban locations are the same as those for the downward modification results. See footnote 7, supra.

11. The San Jose 1978 result just misses statistical significance.

12. See footnote 5, supra.

13. See footnote 6, supra.

CHAPTER 5

APPRAISAL PRACTICES IN CALIFORNIA

Various organizations have alleged that lenders, or their designated appraisers, discriminate against certain types of properties or applicants in the appraisal process. Since lenders use the appraised value of the property in evaluating loan applications and, specifically, in determining the amount of loan they will offer a creditworthy applicant, an examination of appraisal practices is an important part of a study of discrimination in mortgage lending. In Chapter 2, we outline an appraisal practices model that can be used to test for systematic underappraisal of properties located in certain neighborhoods or offered as security by certain types of applicants (e.g. women or racial minorities). This chapter presents the results of estimating these models in four California metropolitan areas (Fresno, Los Angeles-Long Beach, San Francisco-Oakland, and San Jose) in 1977 and 1978.

MODEL DESCRIPTION

The dependent variable is the appraised value to purchase price ratio for conventional mortgage applications on single family residences, including those denied by lenders. Non-discriminatory variables include property characteristics (structure type and building age), neighborhood characteristics (e.g. percent high income, income level, and change in income and households in the recent past) and a set of binary variables representing the purchase price range of the property. These variables control for factors that legitimately might lead to appraised values that differ systematically from purchase prices because lenders recognize different risks or are more risk averse than the market. Lenders, or their designated appraisers, for example, may undervalue condominiums because insufficient experience with such units leaves them uncertain about the strength of the future resale market. In addition, concern about the effects on housing values of neighborhood externalities may cause lenders to value properties in neighborhoods with potentially adverse externalities lower than the market. The purchase price ranges are included because appraisers may be unable to track price trends for all price ranges with equal accuracy in the rapidly changing California real estate market.

The remaining independent variables are included to test for discrimination on the basis of the sex, race or age of the applicant, property location, and the age or racial composition of the neighborhood.

RESULTS

The models have been estimated with ordinary least squares and are presented in Appendix B. Although the equations estimate appraised value to purchase price ratios, we present the results here in terms of their impact on the downpayment requirement. The impact on downpayment requirement varies with the loan to appraised value ratio. Table 5-1 illustrates these variations for several changes in the appraised value to purchase price ratio. For example, for a house costing $40,000, the downpayment with a loan to appraised value ratio of 80 percent is $8,000. If the appraised value to purchase price ratio were one percent lower (0.99 instead of 1.00), the downpayment required would rise four percent to $8,320. If the appraised value to purchase price ratio were 10 percent lower (0.90 versus 1.00),

Table 5-1

Relationship Between the Appraised Value-to-Purchase Price Ratio and Down Payment Requirements

Change in Ratio of Appraised Value to Purchase Price	Percentage Change in Loan Amount Granted	Percentage Change in Down Payment Requirements: Assuming a 70% Loan-to-Value Ratio	Assuming an 80% Loan-to-Value Ratio	Assuming a 90% Loan-to-Value Ratio
-0.001	-0.1	0.2	0.4	0.9
-0.010	-1.0	2.3	4.0	9.0
-0.100	-10.0	23.3	40.0	90.0
-0.200	-20.0	46.6	80.0	180.0

the downpayment would rise by 40 percent. The percent changes in the downpayment requirement are not affected by the cost of the house, but increase as the loan to appraised value ratio increases. In the previous example, if the loan to appraised value ratio were 90 percent, the downpayment would have increased by 9 and 90 percent, respectively.

Tables 5-2 and 5-3 summarize the results in terms of the percentage change in the downpayment requirements for a loan to appraised value ratio of 80 percent. The asterisks indicate the statistical significance of the corresponding coefficient in the estimated equation in Appendix B. One asterisk indicates significance at between the five and ten percent level and two indicate significance at the five or less percent level.

In general, the appraised value to purchase price ratio varies substantially only with purchase price and building age. Higher priced houses are systematically underappraised relative to houses priced below $30,001. In fact, inspection of the last row in each table, which shows the appraised value to purchase price ratio for the equation's reference point, indicates that it is the under $30,001 houses which are overappraised. The amount of this overappraisal determines the general magnitude of the percentage changes in downpayment; compare the parenthetical figures in the last row to those for the purchase price variables in the corresponding column. The percent changes in downpayment show a distinct and regular pattern of increasing down payments as purchase price rises.

The building age variables show that older buildings (at least one year old in 1977 and at least two years old in 1978) are systematically underappraised and show relatively small variations

Table 5-2

Relationship Between Appraisal Practices and Downpayment Requirements in Four California Metropolitan Areas: 1977[a]

	Percent Increase in Downpayment on an 80% Loan			
	Fresno	Los Angeles-Long Beach	San Francisco-Oakland	San Jose
Structure type				
CONDO	-3.6*	0.4	1.6**	0.4
Purchase price (relative to under $30,001)				
P30-50	6.8**	9.2**	5.2**	6.4**
P50-75	10.0**	12.8**	8.8**	12.4**
P75-100	12.8**	14.4**	11.2**	14.8**
P100-125	9.2**	15.6**	14.0**	18.0**
PGT125	18.8**	18.4**	17.2**	22.0**
Neighborhood characteristics[b]				
FHI (+0.20)	-0.3	-1.1**	-1.0**	-0.9**
INC1976 (+3.0)	-2.4	-0.1	-1.2**	1.2**
DINC7675 (+0.2)	2.0**	-0.0	0.1	-0.8**
DINC7570 (+0.9)	1.1	-0.4**	-0.0	0.4
DHH7675 (+1.0)	-0.2	-0.0	-0.8**	-0.8**
DHH7570 (+5.0)	-2.0**	0.0	0.2**	0.4
FVACANTSJ (+0.03)	--	--	--	0.1
Age of neighborhood[b]				
PRE1940 (+0.20)	-1.4**	-0.6**	-0.6**	-1.0**

Table 5-2 (continued)

	Percent Increase in Downpayment on an 80% Loan			
	Fresno	Los Angeles-Long Beach	San Francisco-Oakland	San Jose
Building age (relative to new buildings)				
BA1-9	5.2**	2.4**	3.2**	10.0**
BA10-19	6.8**	2.4**	3.2**	9.2**
BA20-29	7.6**	2.4**	4.0**	9.2**
BA30-39	12.0**	3.2**	4.4**	10.0**
BA40-49	12.4**	3.2**	4.0**	11.6**
BAGE50	8.4**	6.0**	4.8**	16.0**
Age of applicant (relative to 35-44 years)				
ALT25	-0.8	0.4	-0.4	1.2
A25TO34	0.4	0.1	-0.1	0.8
A45TO54	0.4	0.1	1.2**	0.8
AGE55	1.2	0.4	0.8**	2.0**
Sex of applicant(s) (relative to MFNCB)				
FONLYCB25-34	2.0	1.3**	1.1**	1.2
FONLYNCB	6.4**	0.8*	1.2**	2.4**
MFCB25-34	-0.4	-0.0	0.3	0.4
MONLY	1.2	-0.4**	0.1	-0.1
Race of applicant (relative to white)				
BLACK	-1.6	-0.1	-0.1	1.2
SPANISH	1.6	0.8**	-0.8*	0.8
ASIAN	3.2	0.4*	0.1	0.4

Table 5-2 (continued)

	Percent Increase in Downpayment on an 80% Loan			
	Fresno	Los Angeles-Long Beach	San Francisco-Oakland	San Jose
OMIN	1.2	0.4	0.1	-0.1
Racial composition of neighborhood[b]				
FBLACK (+0.1)	-4.2**	-0.1	-0.04	0.3
FSPANISH (+0.1)	0.6	0.4**	0.2	1.2**
FASIAN (+0.03)[c]	0.7*	-0.04	-0.3**	1.3
Property location[d] (relative to	SUBURBS	SUBURBS	SAN MATEO	SUBURBS)
City of Fresno	0.8	--	--	--
Compton (AR)	--	-4.4	--	--
Covina-Azusa-West Covina (AR)	--	0.1	--	--
East L.A.-Boyle Heights-Echo Park (AR)	--	4.0**	--	--
Highland Park (AR)	--	0.8	--	--
Long Beach-Southwest (AR)	--	1.6	--	--
Pacoima-San Fernando (AR)	--	-0.0	--	--
Pasadena-North Central (AR)	--	-0.8	--	--
Pomona (AR)	--	3.2**	--	--
San Pedro (AR)	--	0.8	--	--
South Central L.A. (AR)	--	-0.1	--	--
Venice-Santa Monica (AR)	--	1.2	--	--

Table 5-2 (continued)

	Percent Increase in Downpayment on an 80% Loan			
	Fresno	Los Angeles-Long Beach	San Francisco-Oakland	San Jose
Rest of the City of Long Beach	--	-1.2**	--	--
Rest of the City of Los Angeles	--	-0.8**	--	--
Alameda County				
Alameda City	--	--	3.6**	--
Berkeley	--	--	2.4**	--
Central Oakland (AR)	--	--	4.4**	--
East Oakland	--	--	2.4**	--
West Oakland	--	--	2.0**	--
Rest of Alameda County	--	--	2.4**	--
Contra Costa County	--	--	0.8**	--
Marin County	--	--	0.4	--
San Francisco	--	--	-0.4	--
City of San Jose	--	--	--	-0.8*
Appraised Value to Purchase Price for Reference Point -- Constant from Equation [e]	1.050 (-20.0)	1.034 (-13.6)	1.013 (-5.2)	1.065 (-26.0)

a) One asterisk (*) indicates that appropriate coefficient in Appendix B is statistically significant at between the five and ten percent level. Two asterisks (**) indicate that the appropriate coefficient is statistically significant at the five or less percent level. These are two-tail tests.

b) These are continuous variables and the numbers in parentheses after the variable name is the change in value used to calculate the impact on downpayment. These changes are approximately equal to the standard deviations of each variable.

Table B-2 (continued)

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c) The standard deviation for the Fresno SMSA is one tenth that in the other SMSAs, and this smaller value has been used for Fresno.

d) An "AR" after a property location indicates the neighborhood has been alleged to be redlined.

e) These ratios apply to an application on a building that is new and neither a condominium or cooperative with a purchase price under $30,001 located in a suburban neighborhood that has zero values of all the continuous variables and the applicants are a male-female couple with a woman beyond childbearing age who is 35-44 years old and white. The numbers in parentheses are the percentage change in downpayment due to the over or under appraisal of this building.

Table 5-3

Relationship Between Appraisal Practices
and Downpayment Requirements
in Four California Metropolitan Areas: 1978[a]

	Percent Increase in Downpayment on an 80% Loan			
	Fresno	Los Angeles-Long Beach	San Francisco -Oakland	San Jose
Structure type				
CONDO	4.4*	1.2**	2.0**	3.2**
Purchase price (relative to under $30,001)				
P30-50	17.6**	14.8**	9.6**	79.6**
P50-75	23.6**	19.2**	15.2**	86.8**
P75-100	32.4**	21.6**	18.4**	88.0**
P100-125	34.4**	22.8**	20.4**	90.8**
PGT125	39.2**	25.2**	24.0**	94.0**
Neighborhood characteristics[b]				
FHI (+0.2)	-0.7	-1.3**	-1.4**	-1.0**
INC1976 (+3.0)	2.4	-0.2	-0.2	1.2**
DINC7675 (+0.2)	-1.8	-0.1	-0.2*	-0.2
DINC7570 (+0.9)	1.8	-0.2*	0.0	0.0
DHH7675 (+1.0)	2.8**	-0.1**	0.0	0.4
DHH7570 (+5.0)	-6.0**	-0.0	-0.1	0.0
FVACANTSJ (+0.03)	--	--	--	-0.2
Age of neighborhood[b]				
PRE1940 (+0.20)	-1.4**	-0.6**	-0.2	-0.1

Table 5-3 (continued)

	Percent Increase in Downpayment on an 80% Loan			
	Fresno	Los Angeles-Long Beach	San Francisco-Oakland	San Jose
Building age (relative to new and one year old buildings)				
BA2-10	13.2**	1.2**	2.4**	2.4**
BA11-20	13.6**	1.2**	2.0**	2.8**
BA21-30	14.4**	2.0**	3.6**	4.0**
BA31-40	14.8**	2.0**	3.2**	6.0**
BA41-50	15.2**	3.6**	4.4**	7.6**
BAGE51	24.8**	5.6**	3.6**	6.8**
Age of applicant (relative to 35-44 years)				
ALT25	-0.4	0.8*	0.8*	-1.2
A25TO34	2.0	0.4	0.4**	-0.4
A45TO54	1.2	0.8**	0.8**	-0.4
AGE55	-0.8	0.4	0.8*	0.4
Sex of applicant(s) (relative to MFNCB)				
FONLYCB25-34	5.2	0.8	2.0**	-2.4**
FONLYNCB	0.4	0.8**	0.8*	2.0**
MFCB25-34	2.8	0.4	-0.0	-0.8
MONLY	2.0	-0.0	-0.4	-0.4
Race of applicant (relative to white)				
BLACK	-2.8	-0.1	0.8	1.6
SPANISH	3.6**	1.6**	0.8**	0.2

Table 5-3 (continued)

	Percent Increase in Downpayment on an 80% Loan			
	Fresno	Los Angeles-Long Beach	San Francisco -Oakland	San Jose
ASIAN	1.6	0.8**	0.8**	-0.4
OMIN	1.2	0.4	-0.4	-1.2
Racial composition of neighborhood[b]				
FBLACK (+0.1)	-5.8**	0.0	0.2*	0.2
FSPANISH (0.1)	0.4	0.6**	0.4**	0.9**
FASIAN (0.03)[c]	2.1**	-0.1	-0.2**	0.3
Property location[d] (relative to	SUBURBS	SUBURBS	SAN MATEO	SUBURBS
City of Fresno	2.8**	--	--	--
Compton (AR)	--	5.6*	--	--
Covina-Azusa-West Covina (AR)	--	-0.8	--	--
East L.A.-Boyle Heights-Echo Park (AR)	--	6.4**	--	--
Highland Park (AR)	--	5.2**	--	--
Long Beach-Southwest (AR)	--	0.4	--	--
Pacoima-San Fernando (AR)	--	1.6*	--	--
Pasadena-North Central (AR)	--	-1.6	--	--
Pomona (AR)	--	6.8**	--	--
San Pedro (AR)	--	2.8*	--	--
South Central L.A. (AR)	--	3.2**	--	--
Venice-Santa Monica (AR)	--	-4.0**	--	--

Table 5-3 (continued)

	Percent Increase in Downpayment on an 80% Loan			
	Fresno	Los Angeles-Long Beach	San Francisco-Oakland	San Jose
Rest of the City of Long Beach	--	-0.8	--	--
Rest of the City of Los Angeles	--	-0.8**	--	--
Alameda County				
Alameda City	--	--	1.6	--
Berkeley	--	--	0.8	--
Central Oakland (AR)	--	--	4.8**	--
East Oakland	--	--	2.4**	--
West Oakland	--	--	6.0**	--
Rest of Alameda County	--	--	1.2**	--
Contra Costa County	--	--	2.0**	--
Marin County	--	--	1.2**	--
San Francisco	--	--	-1.2**	--
City of San Jose	--	--	--	-0.4
Appraised Value to Purchase Price for Reference Point -- Constant from Equation [e]	1.136 (-54.4)	1.052 (-20.8)	1.043 (-17.2)	1.236 (-94.4)

a) One asterisk (*) indicates that the appropriate coefficient in Appendix B is statistically significant at between the five and ten percent level. Two asterisks (**) indicate that the appropriate coefficient is statistically significant at the five or less percent level. These are two-tail tests.

b) These are continuous variables and the numbers in parentheses after the variable name is the change in value used to calculate the

Table 5-3 (continued)

(cont'd) impact on downpayment. These changes are approximately equal to the standard deviations of each variable.

c) The standard deviation for the Fresno SMSA is one tenth that in the other SMSAs, and this smaller value has been used for Fresno.

d) An "AR" after a property location indicates the neighborhood has been alleged to be redlined.

e) These ratios apply to an application on a building that is new and neither a condominium or cooperative with a purchase price under $30,001 located in a suburban neighborhood that has zero values of all the continuous variables and the applicants are a male-female couple with a woman beyond childbearing age who is 35-44 years old and white. The numbers in parentheses are the percentage change in downpayment due to the over or under appraisal of this building.

with building age beyond one year. Although there is a slight upward trend in downpayment as building age rises above one year, it is not as pronounced as the purchase price relationship.

With one exception (1977 Fresno), condominiums and cooperative dwelling units are systematically underappraised. As a result, downpayments on these units are 0.4 to 4.4 percent higher than downpayments on otherwise similar single-family dwellings.

Appraisal practices do not vary greatly with the neighborhood characteristics. Most of these variables have the expected negative relationship with the appraised value to purchase price ratio. DINC7570 is the only substantial deviant, but its positive values are close to zero and statistically insignificant at the ten percent level. Although a little less than half the neighborhood coefficients are statistically significant, all but one imply downpayment changes with magnitudes below 2.5. The exception is DHH7570 for 1978 Fresno (-6.0 percent). A two-percent change in downpayment on a $100,000 house with an 80 percent loan to appraised value ratio is $400. Nearly two-thirds of the changes in downpayment, which are based on standard deviations in the samples, are under 1.0 percent (less than $200 for the $100,000 house).

The remainder of our discussion is devoted to the discrimination measures.

Sex

Male-female applicants with a woman of childbearing age (MFCB) and male only applicants (MONLY) receive approximately the same treatment in the appraisal process as male-female applicants where the woman is not of childbearing age (MFNCB). Only one of these 16 coefficients is statistically significant (1977 Los Angeles-Long Beach), and it (MONLY) is so small in magnitude that downpayment increases by only 0.4 percent, or $40 on a $100,000 house.

The evidence, however, does indicate that the properties of female only applicants with no one of childbearing age (FONLYNCB) are systematically underappraised. All of its coefficients are positive and all but one are statistically significant at the five or ten percent level. Although most of them are relatively small in magnitude, one is quite large (1977 Fresno) and results in a 6.4 percent increase in the downpayment with an 80 percent loan to appraised value ratio. On a $100,000 house, this would be $1,280. The other coefficients lead to a 0.8 to 2.4 percent increase in downpayment.

Female only applicants with someone of childbearing age (FONLY-CB25-34) face statistically significant underappraisal in three cases: 1977 Los Angeles-Long Beach, and 1977 and 1978 San Francisco-Oakland. However, they face significant overappraisals on San Jose properties in 1978. The changes in downpayment are between a 2.0 percent decrease and a 1.6 percent increase.

It is also important to assess the impact of such differentials on the probability of denial. One approach is to assume a constant downpayment and to adjust the requested loan to appraised value ratio. In this way, a 2.5 percent underappraisal, which would have increased downpayment by 10 percent, translates into a requested loan to appraised value ratio of 82.05 instead of 80 percent. As a result, the chances of denial would rise (Chapter 3). In the Los Angeles-Long Beach area, a 2.05 percentage point increase in the requested loan to appraised value ratio would lead to a denial ratio of 1.13 for the typical applicant (Chapter 3). None of the sex or other discrimination variables produce changes in downpayment as large as 10 percent; the largest is 6.4 percent which would increase the requested loan to value ratio by 1.3 percentage points and lead to a denial ratio of 1.08 in the Los Angeles-Long Beach metropolitan area. The 2 percent increases in downpayment that are more common for the discrimination variables in Tables 5-2 and 5-3 would increase the requested ratio by only 0.4 percentage points and lead to a denial ratio of 1.02 in the same metropolitan area, indeed a small effect on the chance of denial.

Race

Appraised value to purchase price ratios for black applicants are not significantly different than those for similarly situated white applicants.

The properties of Spanish applicants, however, tend to be systematically underappraised relative to those of similar white applicants. The largest differential occurs in the Fresno metropolitan area in 1978 -- a 3.6 percent increase in the downpayment. The other differentials are smaller. In the San Francisco-Oakland metropolitan area the evidence is consistent with systematic underappraisal in 1978 but inconsistent in 1977; both coefficients are statistically significant at the ten percent level and approximately equal in magnitude.

The results for Asian applicants parallel those for Spanish applicants but the coefficients are smaller and fewer of them are statistically significant.

There is no support for the proposition that the properties of other minorities are either systematically over- or under-appraised relative to those of similar white applicants.

Age of the Applicant

Although a few of the age coefficients are statistically significant, their magnitudes are small and no pattern of age related under- or over-appraisal is evident.

Redlining

Allegations that specific neighborhoods are redlined were available to us for the Los Angeles-Long Beach and San Francisco-Oakland, but not the Fresno and San Jose, metropolitan areas. The Los Angeles-Long Beach allegations are based on a report reviewing the entire metropolitan area, while those for the San Francisco-Oakland area are based on a study restricted to the City of Oakland.[1]

The results for both years are consistent with these allegations in four cases: East Los Angeles-Boyle Heights-Echo Park, Highland Park, Pomona, and Central Oakland. Systematic underappraisal of properties in these neighborhoods increases downpayments by 3.2 to 6.8 percent.

Properties in older neighborhoods are systematically over-appraised which result in slightly lower downpayments. Although nearly all of the coefficients are statistically significant, their magnitudes are small.

The racial composition of the neighborhood affects appraisal practices in both directions. While a ten percentage point increase in the fraction of the population that is Spanish leads to underappraisal and slight (0.4 to 1.2 percent) increases in downpayments, the same increase in the fraction that is black leads to overappraisal and as much as a 5.8 percent reduction in downpayment. The effect of changes in the fraction Asian are small except in Fresno where there is very little variation in this variable.

SUMMARY

The major differentials in appraisal practices vary with the purchase price and building age. New buildings or buildings selling for less than $30,001 are overappraised. Higher priced buildings are increasingly underappraised relative to those priced under $30,001.

Although there are many household types who receive statistically significant underappraisals of their properties, the magnitudes are generally small and result in less than two percentage point increases in downpayment. Female only applicants with no one of childbearing age are an exception; underappraisal of their properties raises their downpayments by 6.4 percent in the Fresno metropolitan area in 1977. Some of the neighborhoods alleged to be redlined are another exception. Properties in the East Los Angeles-Boyle Heights-Echo Park, Highland Park, and Pomona areas of Los Angeles and in Central Oakland are sufficiently underappraised to raise down payments by 3.2 to 6.8 percent.

Footnotes - Chapter 5

1. The redlining allegations are derived from Where the Money Is: Mortgage Lending, Los Angeles County (Los Angeles: The Center for New Corporate Priorities, 1975) as reprinted in Hearings on the Home Mortgage Disclosure Act of 1975, U.S. Senate, Committee on Banking, Housing and Urban Affairs, 94th Cong., 1st sess. (May 5-8, 1975); and William M. Frej, "Discriminatory Lending Practices in Oakland" in Hearings, ibid.

Chapter 6

DECISION TO LEND IN NEW YORK

The evaluation of applications for loans on specific properties to distinguish the different risks of loss among them represents a major part of the residential lending process. In general, lenders approve those applications having the lower risks of loss provided there are enough funds in the portfolio for this type of investment; the other applications are rejected. (Although this description of the lending process indicates sequential steps, the actual process is interactive. For example, if most of its residential mortgage applications have high risks of loss, a bank may decide to reduce that portion of its portfolio available for residential mortgages). When receiving an application for a mortgage, a lender must decide whether to approve the application as received, approve it with some modification in terms, or turn it down. Lenders may discourage the submission of formal applications from applicants who, they believe, will likely be denied. Applicants may also withdraw their applications prior or subsequent to a lender's decision.

In Chapter 2, a lender's decision on a mortgage application was viewed as a function of the creditworthiness of the borrower, the quality of the collateral, and the requested terms of the mortgage. In this chapter, we report estimates of this decision to lend model.

DATA BASE AND MODEL DESCRIPTION

All state-regulated lenders in New York State are required to maintain detailed data on applicants for mortgages on one-to-four family houses.

The state's banking department prescribes the form of the information through its Equal Housing Opportunity Lender (EHOL) form. The form contains the following information: gross annual income of the applicant, years at present occupation (separate answers for applicant and joint applicant), amount of outstanding debts, monthly debt payments, purchase price of subject property, whether or not the subject property will be owner occupied, race or national origin of applicant and joint applicant, age of the applicant and joint applicant, type of loan, exact dollar amount of the requested loan, requested loan-to-appraised value ratio, action taken by lender, modified loan amount and modified loan-to-value ratio in case of approval with modified terms, reasons for the decision, and the census tract in which property is located. Since April 1977, the EHOL form has also recorded the sex and marital status of the applicant and joint applicant. Many of these items have categorical responses; for example, income is reported as being within one of five possible ranges.

Four types of lender action on mortgage applications are identified on the EHOL forms: approved as applied for, approved after modifications, denied, and withdrawn by the applicant. In many cases, lenders indicated that a modified approval was rejected by the applicant by checking both the modified and withdrawal responses on the form. We were only able to separately analyze rejected modifications in one case: mutual savings banks in the New York and Nassau-Suffolk metropolitan areas

The lack of information on applicants who were discouraged from making a written application could create a methodological problem for this study. Under the New York State Banking Department's

Supervisory Procedure G-107, every banking organization is required to maintain an EHOL form on all written applications, Unfortunately, this regulation does not clearly delineate the circumstances under which a written application is required. However, the regulation may act to minimize the practice of informal screening, although the opposite effect, obviously, is also possible. As long as there are an adequate number of modified approvals, denials, and withdrawals within the formal applications, the explanations for these three actions should reflect the bases for discouraging formal applications. For example, if the analysis of denials indicates the existence of racial discrimination, discrimination is also a likely factor in deciding which applicants should be discouraged from applying. A lender would not likely discriminate against formal applicants and not against informal ones. However, if the statistical analysis does not indicate the existence of discrimination, it is still possible that lenders use a different set of criteria, including sex or race, in their informal screening of applicants.

For this study, EHOL forms were gathered for mortgage applications made between May 1977 and October 1978 at state regulated commercial banks and savings and loan associations with branches located in the five largest metropolitan areas, Albany-Schenectady-Troy, Buffalo, New York-Nassau-Suffolk, Rochester, and Syracuse. Sex and marital status information was a required part of the form throughout this period.

In addition, as part of our earlier study, EHOL forms were collected from all mutual savings banks with branches in these same five areas for all applications filed between May 1976 and October 1977. Since EHOL forms from mutual savings banks in the New York-Nassau-Suffolk area with no branches in Bronx, Kings (Brooklyn), or New York (Manhattan) counties were not analyzed in the earlier study; their analysis is included in this study. Results from the earlier study are shown alongside the present study's results to facilitate an overall picture of lending practices by New York state regulated banks. Since sex and marital status were not required by the EHOL form that was in force during most of the period covered by the mutual savings bank data, we were only able to analyze these factors in one metropolitan area. In the New York-Nassau-Suffolk area a sufficient number of applications using the newer EHOL form are available that discrimination on the basis of sex and marital status can be analyzed.

The EHOL forms are supplemented by 1970 census data matched to each EHOL response using the census tract number provided on the forms, and the National Planning Data Corporation's census tract estimates of 1977 population and 1976 income.

Model Description

In general, four outcomes of the lending behavior of New York banks can be studied: approved as applied for, approved with modifications, denied and withdrawn. The primary form of modification in our samples is an alteration of the loan amount, generally, but not always below the requested amount. Other modifications include adjustment of the maturity period. The lender's decision depends on the creditworthiness of the borrower, the quality of the collateral and the requested terms of the mortgage. Various measures of financial and neighborhood characteristics are used to capture the influence of these factors. The financial characteristics are income, net wealth, years at present occupation, requested loan amount in relation to annual income, and the ratio of the requested loan amount to the appraised value of the property. The risk of loss should decline as the income and net wealth of a household increase. Years at present occupation is included in the belief that it will serve as an indicator of the stability of an applicant's credit-worthiness; the applicant's income and other measures of credit-worthiness should be more stable (have smaller variance) as the years of experience increase.[2] Risk should rise as the amount of requested loan rises relative to income or appraised value. Although experimentation with different measures of the effect of income in California showed that the ratio of requested loan amount to income performed the best, the categorical responses of the New York data prevent replication of the variable used in California. Instead, the New York models include several dummy variables that represent various income categories and one dummy variable that crudely indicates whether or not the loan amount is more than two times annual income.[3]

Neighborhood characteristics are included to control for risk of loss in the value of property resulting from housing market externalities. Although it would be ideal to include direct measures of these externalities such as whether or not the subject property is adjacent to a vacant building, this is generally impossible because the requisite information is unavailable. Therefore, neighborhood conditions are proxied by measures of the income of residents, change in income and population, and mortgage foreclosure and delinquency rates. These variables are calculated for the census tract containing the subject property. Risk of loss should be lower in neighborhoods with more higher income residents and higher in those with higher average foreclosure and delinquency rates. In general, neighborhoods with larger increases in average income and population should have rising property values and less risk of loss in value.

The New York model only includes one requested term (loan to appraised value ratio) because the forms do not provide information on interest rate and maturity period. The interest rate, however, is unlikely to vary much across neighborhoods because the low maximum rate permitted by the New York State usury law applied to nearly all the mortgages covered by the EHOL forms and the credit market was very tight during the period being analyzed.

Two of the four lender actions have clear meaning: approved as applied for and denial. The other two (modification and withdrawal) are somewhat ambiguous. One of the four must be selected as the reference to which the other three will be compared. Since it is important that this reference action have a clear meaning in relation to all other actions, the job falls to applications that are approved as applied for (i.e., approved with the terms requested by the borrower).

The likelihood of a lender deciding to deny an application for a conventional mortgage loan should decrease as an applicant's income and wealth increase. The probability of denial should increase as the quality of the collateral decreases (e.g., as the loan-to-appraised value ratio increases). Differences in the risk of loss associated with the borrower and the subject property may be offset, to some extent, by modifications in the terms of the mortgage (i.e., interest rate, maturity, and down payment).

It is more difficult, however, to relate each of the independent variables to a lender's decision to modify the terms. For example, although it would be natural to expect the probability of modification to increase as income decreases, applications from higher income households trying to maximize their leverage might produce the opposite effect. They may apply for mortgage amounts in excess of what their income justifies in order to secure the largest possible mortgage.

Modifications can be subdivided, as in California, into downward and upward movements in the requested loan amount. In New York, however, nearly all the modifications are downward and separate analysis of upward modifications is not possible. It should be remembered, however, that if such a division were analyzable, the downward category would not be a clear case of adverse action. A downward modification could be the result of an applicant's request (e.g., desire to maximize equity in house and revised plans as to the amount of household funds that can be allocated to this function).

Unlike California, New York modifications can be subdivided into ones that were accepted and ones that were subsequently withdrawn. This division is analyzable in one case (mutual savings banks in the New York-Nassau-Suffolk area). As a result, it is possible to examine Regulation B's definition of adverse action (denials or modifications unacceptable to the applicant). However, it is important to recognize that modifications which have not been accepted by the applicant are not necessarily adverse actions. The bank may have treated the applicant similar to other similarly situated applicants at that bank but the applicant may have received a better offer elsewhere or the sale may have fallen through. When modification is used in the following pages, it includes those withdrawals by the applicant as well as those accepted by the applicant.

The relationship between the independent variables and the applicant's decision to withdraw prior to bank action is even more ambiguous. The application could be withdrawn for a variety of reasons. For example, the lender may have suggested that the application will not be successful or the applicant may have succeeded in obtaining financing from another institution.

To ascertain whether discrimination on the basis of sex, race, marital status or age of the applicant, or property location exists in mortgage lending, variables along the lines discussed in Chapter 2 are also included in the models.

Sample Characteristics

Versions of the preceeding model have been estimated for different types of banks in several metropolitan areas. Small sample sizes limited the ability to look at each type of bank in all five metropolitan areas. All three bank types can be separately analyzed only in the New York-Nassau-Suffolk metropolitan areas. Commercial banks and mutual savings banks can be analyzed in the Buffalo area; mutual savings banks and savings and loan associations in the Rochester area; and mutual savings banks in the Albany-Schenectady-Troy and in the Syracuse metropolitan areas. Commercial banks in three upstate areas (Albany-Schenectady-Troy, Rochester and Syracuse) can be analyzed only if the areas are combined.

Although there is some savings and loan association activity in Buffalo and Syracuse, the sample is too small to analyze.

The samples have been limited to applications for conventional mortgages on properties intended to be owner-occupied. Applications for federally assisted mortgages have been excluded because the involvement of a third party, the government, substantially affects the decision-making process, and the EHOL forms do not identify which actor was making the decision. In any case, there are not enough observations to separately analyze such applications at commercial banks or savings and loan associations.[4] Applications on properties not to be owner-occupied are excluded because most rental properties are not covered by the EHOL forms; as a result, 0.8 to 5.6 percent of the observations are excluded depending on the type of bank and the metropolitan area. Applications that indicated they were for refinancing (i.e., written comment to this effect or nonresponse to the purchase price question) have also been excluded because they do not involve a property transaction and the form lacks the information necessary to analyze these decisions. Again, only a small percentage of the forms were affected. The final sample sizes (after eliminating forms with critical nonresponses) are summarized in Table 6-1.

RESULTS

Our multinomial logit estimates of lender behavior for six bank and metropolitan area combinations are reported in Appendix C. (Complete variable definitions are presented in Appendix A.) Logit estimates for mutual savings banks in four upstate metropolitan areas

Table 6-1

Number of Observations by Bank Type
and Metropolitan Area: New York State

	Number
Albany-Schenectady-Troy SMSA	
Mutual Savings Banks	6,173
Albany-Schenectady-Troy, Rochester and Syracuse SMSAs	
Commercial Banks	2,586
Buffalo SMSA	
Commercial Banks	1,434
Mutual Savings Banks	7,408
New York and Nassau-Suffolk SMSAs	
Commercial Banks	4,919
Mutual Savings Banks	
Large sample without sex and marital status	18,696
Small sample with sex and marital status	4,131
Savings and Loan Associations	2,170
Rochester SMSA	
Mutual Savings Banks	3,047
Savings and Loan Associations	1,304
Syracuse SMSA	
Mutual Savings Banks	2,695

are reported in an earlier study.[5]

The following discussion presents the implications of our current results and those from the earlier study for a typical application and key variations in its characteristics. We have defined the typical application as one from a household with an annual income in the $15,001 to $25,000 range, very good net wealth (i.e., reported assets were two or more cetagories above reported debts), and a wage earner with more than five years in his/her present occupation. These characteristics are typical in the sense that a plurality of applicants possessed these characteristics in all but two cases.[6] The percentage of applicants with income between $15,000 and $25,000 (INC15-25) ranges from 23 to 57, with very good net wealth (VGNW) ranges from 68 to 92, and with more than 5 years experience (OCCGT5) ranges from 59 to 70.

Furthermore, the typical application is from an all-white household (84 to 96 percent of all applications), an applicant between the ages of 35 and 44 (23 to 28 percent of all applications), a male-female couple with the female applicant beyond childbearing age (over 34 years old) and not working (5 to 9 percent of all applications), and married persons (79 to 86 percent of all applications). These characteristics were selected because they describe a household which is least likely to be the target of discrimination, if any exists. Therefore, they do not always represent a plurality of all applications. The major exceptions to the plurality rule are age of applicant and the age and work status of the woman. The selection of these characteristics result from a desire to compare working to nonworking women and childbearing to nonchildbearing women.

Our typical applicant is also defined by the average values of all the continuous variables for applications to that type of bank in the metropolitan area being studied: requested loan to appraised value ratio, fraction high income households, income and population change, foreclosure and delinquency rates, age of neighborhood, and racial composition of neighborhood. These values are summarized in Table 6-2. In addition, requested loan amount is assumed to be less than two times annual income (96 to 98 percent of all applications), and the property is located in a suburb.

The treatment accorded applications with different characteristics than the typical application are compared to the treatment received by the typical application. The treatment is measured by the probability of a given decision such as denial or modification. These probabilities can be calculated from the logit estimates.[7]

In general, we report comparisons in terms of the ratio of the probability of a given decision for an application with certain characteristics to the probability of that decision for the typical application. The probabilities of each decision for the typical application are presented in Table 6-3. They vary considerably by type of bank and across metropolitan areas. It is for this reason that ratios must be used to compare the differential impact of discrimination measures on outcomes across banks and areas.

Since the denial of an application is clearly an adverse decision, the following discussion focuses on these results. Although modification has a somewhat ambiguous meaning, it is clearer than the meaning of a withdrawn application. Therefore, the modification results are summarized and discussed below, but the withdrawal results are only discussed when the equations indicate withdrawal to be more likely for one of the potentially discriminated against groups.

Financial Characteristics

The financial characteristics serve the purpose of controlling for the risk of loss associated with the creditworthiness of the applicant, the value of the property, and the requested loan terms.

Table 6-3

Probability of Various Outcomes for
the Typical Application: New York State

	Denial	Modification	Withdrawal
Albany-Schenectady-Troy SMSA			
Mutual Savings Banks	5.03	3.88	3.06
Albany-Schenectady-Troy, Rochester and Syracuse SMSAs			
Commercial Banks	3.08	5.78	1.29
Buffalo SMSA			
Commercial Banks	4.74	2.66	2.49
Mutual Savings Banks	6.49	4.56	3.80
New York and Nassau-Suffolk SMSAs			
Commercial Banks	9.12	14.42	8.04
Mutual Savings Banks	6.83	17.39	4.81
Savings and Loan Associations	4.38	0.53	0.66
Rochester SMSA			
Mutual Savings Banks	2.81	4.14	3.21
Savings and Loan Associations	3.55	0.68	0.97
Syracuse SMSA			
Mutual Savings Banks	4.71	3.23	2.96

Table 6-2

Mean Values of Continous Variables by Type of Bank and Metropolitan Area

	RLTOAV	FHI	DINC	DPOP	FORRATE	DELRATE	PRE1940	FBLACK
Albany-Schenectady-Troy SMSA								
Mutual Savings Banks	0.80	0.25	4.58	1.97	0.17	2.16	0.47	0.008
Albany-Schenectady-Troy, Rochester and Syracuse SMSAs								
Commercial Banks	0.69	0.30	4.96	2.14	0.52	2.60	0.43	0.007
Buffalo SMSA								
Commercial Banks	0.68	0.26	5.08	1.82	0.04	0.51	0.39	0.009
Mutual Savings Banks	0.73	0.23	4.81	1.80	0.39	0.97	0.39	0.011
New York and Nassau-Suffolk SMSAs								
Commercial Banks	0.69	0.43	5.76	1.73	0.49	2.73	0.39	0.028
Mutual Savings Banks	0.71	0.37	5.89	1.71	0.97	2.67	0.43	0.038
Savings and Loan Assoc.	0.69	0.34	5.70	2.51	1.69	3.09	0.42	0.037
Rochester SMSA								
Mutual Savings Banks	0.70	0.38	5.66	2.53	0.12	2.99	0.36	0.008
Savings and Loan Assoc.	0.73	0.34	5.45	2.48	0.08	2.25	0.42	0.008
Syracuse SMSA								
Mutual Savings Banks	0.77	0.22	4.96	2.43	4.43	7.88	0.40	0.004

In general these variables have the expected relationship to lender behavior and are highly significant. Table 6-4 presents denial ratios for the typical application and variations in its characteristics that should make it more likely to be denied. As a result, the ratios in all but the first column should be greater than one; there are only 9 exceptions.

The requested loan to appraised value ratio is the most consistent variable; it has a positive coefficient in all the denial equations. All but one of these coefficients are large and very significant; the exception occurs for mutual savings banks in Rochester.[8] The coefficients in the modification and withdrawal equations closely follow the same pattern. This positive coefficient indicates that an application is more likely to be denied, modified, or withdrawn the higher the requested loan amount relative to the appraised value of the property.

The income coefficients indicate that the likelihood of denial increases by a statistically significant amount as income decreases except for savings and loan associations in the New York and Nassau-Suffolk metropolitan areas. The income coefficients have mixed signs in the modification and withdrawal equations which is probably due to the ambiguity of these decisions. As a result, the denial equations contain the best information on the performance of the risk measures.

When requested loan amount exceeds two times income, the likelihood of denial should increase. This is the situation in seven

Table 6-4

Denial Ratios for Several Different Applications Relative to the Typical Applicant[a]

	Typical Applicant (TA)[b]	TA with less income (INC10-15)	TA with less net wealth (GNW)	TA with less experience (OCCLT3)	TA with requested loan > 2 times income	TA with higher RLTOAV (+0.10)
Albany-Schenectady-Troy SMSA						
Mutual Savings Banks	1.00	1.50**	1.42**	1.05	1.63**	1.27**
Albany-Schnectady-Troy, Rochester and Syracuse SMSAs						
Commercial Banks	1.00	2.41**	1.79**	1.19	0.23**	1.43**
Buffalo SMSA						
Commercial Banks	1.00	19.08**	1.13	1.11	0.92	5.29**
Mutual Savings Banks	1.00	1.46**	1.28**	1.13	1.52**	1.12**
New York and Nassau-Suffolk SMSAs						
Commercial Banks	1.00	1.54**	0.96	1.52**	1.66*	1.06**
Mutual Savings Banks	1.00	1.25**	1.43**	1.37**	1.57*	1.37**
Savings and Loan Assoc.	1.00	1.13	1.34**	1.18	3.07*	1.14**
Rochester SMSA						
Mutual Savings Banks	1.00	1.72*	1.92	1.29	0.00	1.10
Savings and Loan Assoc.	1.00	1.17**	1.51**	1.34	3.28**	1.30**
Syracuse SMSA						
Mutual Savings Banks	1.00	1.00[c]	1.08	1.03	1.34	1.16**

Table 6-4 (continued)

a) The mutual savings banks estimates are derived from 1976-1977 applications data while the other estimates are based on 1977-1978 mortgage applications. The ratio is equal to the probability that an application with indicated characteristics will be denied divided by the probability that the typical application will be denied. A single asterisk (*) indicates that the coefficients used to estimate the numerator and denominator are statistically significant at the five-to-ten percent level. Two asterisks (**) indicates they are significant at the five or less percent level.

b) This is the typical application described in the text. It is the base for calculating the denial ratios. The other applications involve variations from the typical one in one or more characteristics. See Table 6-3 for the probability of denial for the typical application in each bank type-area.

c) Although there is no statistically significant difference between applicants with $15,001 to $25,000 in annual income and applicants with $10,001 to $15,000 incomes, applicants with lower incomes (under $10,001) are statistically significantly (five percent level) more likely to be denied than higher income applicants.

cases (six of them statistically significant at the ten percent level); the three exceptions are commercial banks in the combined upstate area (the only statistically significant exception) and the Buffalo metropolitan area, and mutual savings banks in the Rochester metropolitan area.

Applications are more likely to be denied the smaller the applicant's net wealth with one exception: commercial banks in the New York-Nassau-Suffolk metropolitan area. In six of the nine cases with the expected negative relationship between the likelihood of denial and net wealth, the coefficients are statistically significant at the five percent level.

Although the coefficients for the years at present occupation variables (reported in Table 6-4) indicate that less experience increases the likelihood of denial in all ten bank type-areas, they are only significant in two (commercial and mutual savings banks in the New York-Nassau-Suffolk metropolitan area).

Neighborhood Characteristics

The neighborhood characteristics have been included to control for the effect of housing market externalities on the future value of the property securing the loan. The coefficients of these variables are not consistent across metropolitan areas. The fraction of households with high income (FHI) and the change in income (DINC) in the census tract containing the property are the most consistent. For example, FHI and DINC have the expected negative relationship with the likelihood of denial in all but three and two cases, respectively. However, these negative relationships are statistically significant (five percent level) in only three bank type-areas for FHI and two for DINC, and the positive relationship is statistically significant for each variable in one bank type-area (savings and loan associations in the New York-Nassau-Suffolk area for FHI and commercial banks in the combined upstate areas for DINC).

Contrary to expectations, the change in population is positively related to the likelihood of denial in most of the bank type-areas and significant in two of them. This may reflect the effect of past instability in future uncertainty. One of the three negative relationships is statistically significant.

The coefficients of the two direct measures of the risk of loss on mortgages in the census tract (the foreclosure and delinquency rates) are the most disappointing. The results indicate that the likelihood of denial decreases more often than it increases when the foreclosure rate rises - a result which is statistically significant (five percent level) in two bank type-areas and contrary to our expectations. It is probably a reflection of foreclosure policies rather than differentials in the risk of loss. Foreclosure policies vary across lenders, even within the same bank type, and frequently exhibit a lender's reluctance to show large losses through the foreclosure route. Consequently, the foreclosure rate may not accurately reflect the risk of loss in lending. The delinquency rate is not subject to the vagaries of bank policy and its coefficients show that the likelihood of denial increases more often that it decreases when the delinquency rate rises. And three of these coefficients are statistically significant at the five percent level. However, the delinquency rate coefficient for savings and loan associations in the New York-Nassau-Suffolk area is significantly negative (smaller chance of denial as delinquency rate rises) at the five percent level.

Fortunately, at least one of the neighborhood characteristics has a statistically significant (five percent level) coefficient with the expected relationship to the likelihood of denial in all but two bank type-areas. In one of the bank type-areas none of the neighborhood characteristics variables have significant coefficients. Also, the savings and loan associations in the New York-Nassau-Suffolk area have three statistically significant neighborhood coefficients in the denial equation that are inconsistent with the risk hypothesis. Commercial banks in the combined upstate area and mutual savings banks in the Albany-Schenectady-Troy metropolitan area have statistically significant coefficients in the denial equation that are consistent and inconsistent with the risk hypothesis.

Sex and Marital Status

Each equation contains nine variables that measure sex and marital status differences across applications. In combination, these coefficients define 13 different types of applications which are used to illustrate the results. Their denial and modification ratios are presented in Tables 6-5 and 6-6.

Table 6-5

Denial Ratios by Sex and Marital Status
for a Typical Application: New York State[a]

	AST-ROCH-SYR	BUF	NYNS			ROCH
	COM	COM	COM	MSB	SLA	SLA
Married						
MFNCBNW[b]	1.00	1.00	1.00	1.00	1.00	1.00
MFNCBW	1.65	2.26*	1.06	1.24	0.54**	0.93
MFCBNW (25-34)	0.58[c]	1.48	0.84	0.70	0.49	1.11
MFCBW (25-34)	0.45[c]	1.01[c]	0.83	0.78[c]	0.50	1.20
FONLY (25-34)	0.35[c]	5.04 **	0.47	2.06 **	0.90[c]	0.00**
MONLY	1.44	3.04*	1.16	2.54**	1.04	2.03**
Unmarried or Separated						
MFNCBNW	1.52	0.84	1.65*	1.29	0.98	3.58**
MFNCBW	2.45	1.91*	1.73*	1.58	0.52**	3.32**
MFCBNW (25-34)	0.86[c]	1.24	1.40 *	0.92[c]	0.48	3.88**
MFCBW (25-34)	0.68[c]	0.85[c]	1.36 *	1.01[c]	0.49	4.18**
FONLYNCB	0.74	1.62	1.00	1.47	0.41	0.54
FONLYCB (25-34)	0.55[c]	0.33	1.04	1.05[c]	0.18	0.46
MONLY	2.22	1.68**	1.41**	1.99**	1.18	1.88**

a) The mutual savings banks estimates are derived from 1976-1977 applications data while the other estimates are based on 1977-1978 mortgage applications. The ratio is equal to the probability that an application with the indicated characteristics will be denied divided by the probability that the typical application will be denied. A single asterisk (*) indicates that the numerator of the ratio is statistically significantly different than the denominator at the five-to-ten percent level. Two asterisks (**) indicates that the difference is significant at the five or less percent level.

The acronyms in the column headings have the following meanings:
Bank type
COM - commercial banks
MSB - mutual savings banks
SLA - savings and loan associations

Table 6-5 (continued)

Metropolitan areas
AST - Albany-Schenectady-Troy
BUF - Buffalo
NYNS - New York-Nassau-Suffolk
ROCH - Rochester
SYR - Syracuse

b) This is the typical application described in the text. It is the base for calculating the denial ratios. The other applications involve variations from the typical one in one or more characteristics. See Table 6-3 for the probability of denial for the typical application in each bank type-area.

c) Since the ratio for MFCB or FONLYCB for the 35 to 44 year old age range of the typical application is greater than one, it is the 25 to 34 year old age range coefficient that makes the ratio in the table less than, or closer to, one. The MFCB or FONLYCB coefficient is not statistically significant at the ten or less percent level.

Table 6-6

Modification Ratios by Sex and Marital Status for a Typical Application: New York State[a]

SEX AND MARITAL STATUS		AST-ROCH-SYR COM	BUF COM	NYNS COM	NYNS MSB	NYNS SLA	ROCH SLA
Married							
MFNCBNW[b]		1.00	1.00	1.00	1.00	1.00	1.00
MFNCBW		0.45**	0.31**	0.98	0.83	3.61**	0.32**
MFCBNW	(25-34)	0.31**	0.56	0.93	0.72	2.92**	3.74
MFCBW	(25-34)	0.39*	0.21**	0.86	0.50**	2.07**	2.01[d]
FONLY	(25-34)	0.00**	0.00**	1.42	0.99	0.00**	3.17
MONLY		0.61	2.49**	0.92	0.78	4.94**	1.3[illegible]
Unmarried or separated							
MFNCBNW		0.56	1.10	0.64**	0.96	1.46	1.06
MFNCBW		0.25**	0.34**	0.63**	0.78	5.27**	0.34**
MFCBNW	(25-34)	0.18**	0.61	0.60**	0.69	4.27**	3.91
MFCBW	(25-34)	0.22*	0.23**	0.55**	0.48**	3.03**	2.09[d]
FONLYNCB		1.00	0.67	0.97	0.80	5.21**	0.71
FONLYCB	(25-34)	0.12**	0.00**	0.80	0.67	1.36	1.71
MONLY		0.75	0.26**	1.09	0.82	2.77[c]	1.21

a) The mutual savings banks estimates are derived from 1976-1977 applications data while the other estimates are based on 1977-1978 mortgage applications. The ratio is equal to the probability that an application with the indicated characteristics will be modified divided by the probability that the typical application will be modified. A single asterisk (*) indicates that the numerator of the ratio is statistically significantly different than the denominator at the five-to-ten percent level. Two asterisks (**) indicates that the difference is significant at the five or less percent level.

The acronyms in the column headings have the following meanings:
Bank type
COM - commercial banks
MSB - mutual savings banks
SLA - savings and loan associations

Table 6-6 (continued)

Metropolitan areas
AST - Albany-Schenectady-Troy
BUF - Buffalo
NYNS - New York-Nassau-Suffolk
ROCH - Rochester
SYR - Syracuse

b) This is the typical application described in the text. It is the base for calculating the modification ratios. The other applications involve variations from the typical one in one or more characteristics. See Table 6-3 for the probability of modification for the typical application in each bank type-area.

c) This ratio is greater than one because of the influence of the male only component and not the marital status.

d) Since the ratio for MFCB or FONLYCB for the 35 to 44 year old range is less than one, it is the 25 to 34 year old age coefficient that makes the ratio in the table greater than one. The MFCB or FONLYCB coefficient is not statistically significant at the ten or less percent level.

The results for the denial equations are inconsistent with the hypothesis that married childbearing women who work (MFCBW) are discriminated against. Although these households have a greater chance of denial than the typical applicant (MFNCBNW) in four of the six bank type-areas, none of these differences are statistically significant at the ten percent level. Married male-female households with a non-working childbearing woman (MFCBNW) are also treated much the same as the typical applicant. There is, however, some evidence that male-female households with a working female beyond childbearing age (MFNCBW) regardless of marital status, are discriminated against by Buffalo commercial banks who are approximately twice as likely to deny their applications than those from otherwise identical typical applicants. This differential is statistically significant at the ten percent level. On the other hand, savings and loan associations in the New York-Nassau-Suffolk area treat these applicants (MFNCBW) more favorably (half the denial rate of the typical application), this differential being statistically significant at the five percent level.

New York-Nassau-Suffolk commercial banks and Rochester savings and loan associations disfavor unmarried or separated male-female couples regardless of the age or work status of the woman. These applicants are 1.36 to 1.73 times as likely to be denied than the otherwise identical typical applicant by New York area commercial banks, and 3.32 to 4.18 times as likely to be denied by the Rochester savings and loan associations.

Unmarried or separated female applicants are not significantly more or less likely to be denied than the typical applicant in any of the bank type-areas, whether or not the woman is in the childbearing years.

Some applications contained responses indicating that the applicant(s) were married but either all female (FONLY) or all male (MONLY). We were surprised by these responses. Some may be from persons not legally separated who are married but choose to live apart from their spouses. In addition, the spouse could be away from the household for various other reasons such as serving a jail sentence or being hospitalized on a long-term basis. However, the large number of male only married households (approximately ten percent of each sample) leads us to suspect that many of these applications involve husbands buying property in their individual names rather than jointly with their wives. Since the actual household status of these applicants is not clear, we decided to estimate coefficients for these categories to see if they receive differential treatment. The female only married applicants are much more likely to be denied than the typical applicant at Buffalo commercial banks and New York area mutual savings banks; the ratios of 5.04 and 2.06, respectively, are both statistically significant at the five percent level. Rochester savings and loan associations, however, virtually never deny female only married applicants in our sample.

The only denial relationships consistent across all six bank type-areas are for male only households; regardless of marital status male only applicants are more likely to be denied. Three of the six denial ratios for male only married households range in value from 2.03 to 3.04 and are statistically significant at the five or ten percent level; these occur for applications at the Buffalo commercial banks, New York area mutual savings banks, and Rochester savings and loan associations. In the case of male only unmarried or separated applicants, it is the sex and not the marital status that accounts for the increased likelihood of denial except in the case of New York-Nassau-Suffolk commercial banks.

The modification ratios summarized in Table 6-6 show that modification of an application from one of the 13 household types is seldom more likely than modification of the otherwise identical typical application. Applications at New York-Nassau-Suffolk savings and loan associations are a major exception; aside from married female only households, modification is much more (1.36 to 5.21 times as) likely for the other household types in Table 6-6 than for the typical applicant. Nearly all these ratios (fifth column of Table 6-6) are statistically significant at the five percent level. Male only married applicants at Buffalo commercial banks are the only other households that are significantly more likely to be modified than the otherwise identical typical applicant. A surprising result is the extent to which many household types are significantly less likely to be modified than the comparable typical applicant.

The withdrawal equations have only two statistically significant coefficients that are consistent with discrimination on the basis of the household types depicted in Table 6-6. Married female only applicants at mutual savings banks in the New York-Nassau-Suffolk area have a withdrawal ratio of 2.19 that is statistically significant at the ten percent level. Unmarried or separated male only applicants at commercial banks in the combined upstate sample also have above average chances of withdrawal.

Race of the Applicant

Table 6-7 presents ratios of the probability of denial for various racial groups relative to the probability of denial for the typical applicant who is white. A denial ratio greater than one indicates that members of that racial group are more likely to be denied than the otherwise identical typical (white) applicant. Applications from blacks are more likely to be denied than those from similarly situated whites in all but one of the ten bank type-areas. The exception occurs at commercial banks in the combined upstate areas, but the difference is not statistically significant at the ten percent level. Although blacks are more likely to be denied than whites at commercial banks in the Buffalo and New York-Nassau-Suffolk areas, these differences are not statistically significant at the ten percent level. Hence, we conclude that commercial banks appear to accord black and white applicants approximately equal treatment.

Mutual savings banks in contrast to the commercial banks, however, are significantly more likely to deny a black applicant than a similarly situated white in four of five metropolitan areas. These differentials are large and statistically significant; the denial ratios range from 1.58 in the New York-Nassau-Suffolk area to 3.61 in the Rochester metropolitan area. Although blacks are also more likely to be denied than whites by mutual savings banks in the Albany-Schenectady-Troy metropolitan area, the difference is not statistically significant at the ten percent level.

Table 6-7

Denial Ratios by Race of the Applicant for Typical Applications[a]

	White[b]	Black	Hispanic	Other Minority
Albany-Schenectady-Troy SMSA				
Mutual Savings Banks	1.00	1.44	[← 1.19 →]	
Albany-Schenectady-Troy, Rochester and Syracuse SMSAs				
Commercial Banks	1.00	0.82	[← 0.35* →]	
Buffalo SMSA				
Commercial Banks	1.00	1.74	[← 0.54 →]	
Mutual Savings Banks	1.00	2.06**	[← 0.87 →]	
New York and Nassau-Suffolk SMSAs				
Commercial Banks	1.00	1.18	1.07	1.35*
Mutual Savings Banks	1.00	1.58**	1.90**	1.35
Savings and Loan Associations	1.00	3.15**	1.78	0.76
Rochester SMSA				
Mutual Savings Banks	1.00	3.61**	[← 1.41 →]	
Savings and Loan Associations	1.00	2.64*	1.01	0.74
Syracuse SMSA				
Mutual Savings Banks	1.00	2.56*	[← 1.04 →]	

Table 6-7 (continued)

a) The mutual savings banks estimates are derived from 1976-1977 applications data while the other estimates are based on 1977-1978 mortgage applications. The ratio is equal to the probability that an application with the indicated characteristics will be denied divided by the probability that the typical application will be denied. A single asterisk (*) indicates that the numerator of the ratio is statistically significantly different than the denominator at the five-to-ten percent level. Two asterisks (**) indicates that the difference is significant at the five or less percent level.

b) This is the typical application described in the text. It is the base for calculating the denial ratios. The other applications involve variations from the typical one in one or more characteristics. See Table 6-3 for the probability of denial for the typical application in each bank type-area.

The evidence from the denial equation is also consistent with discrimination against black applicants by savings and loan associations. The New York-Nassau-Suffolk associations are 3.15 times as likely to deny a black applicant than a similarly situated white. In Rochester, the denial ratio is 2.64. Both are statistically significant at the five and ten percent levels, respectively.

There is less evidence of discrimination against Hispanics and other minorities from the denial equations. Hispanics are significantly more likely to be denied than similarly situated whites in only one bank type-area; mutual savings banks in the New York-Nassau-Suffolk area have a denial ratio of 1.90. New York-Nassau-Suffolk commercial banks are significantly more likely to deny other minorities (largely Asians) than the typical white applicant by a ratio of 1.35. However, commercial banks in the combined upstate area favor Hispanics and other minorities over similar white applicants by a statistically significant margin; the denial ratio is 0.35.

The results from the modification equations are summarized in Table 6-8. Although most of the modification ratios exceed one, very few of the racial differentials are statistically significant at the ten percent level. Black applicants are significantly more likely to be modified than whites at the two types of thrift institutions in the New York-Nassau-Suffolk area; the modification ratio is 1.39 at mutual savings banks and 1.54 at savings and loan associations. Hispanic applicants are also significantly more likely to have their loan requests modified than similarly

Table 6-8

Modification Ratios by Race of the Applicant for Typical Applications: New York State[a]

	White[b]	Black	Hispanic	Other Minority
Albany-Schenectady-Troy SMSA				
Mutual Savings Banks	1.00	0.71	[← 1.38 →]	
Albany-Schenectady-Troy, Rochester and Syracuse SMSAs				
Commercial Banks	1.00	1.51	[← 1.31 →]	
Buffalo SMSA				
Commercial Banks	1.00	2.82	[← 4.23* →]	
Mutual Savings Banks	1.00	1.19	[← 1.80** →]	
New York and Nassau-Suffolk SMSAs				
Commercial Banks	1.00	0.77	0.73	1.17
Mutual Savings Banks	1.00	1.39**	1.07	1.06
Savings and Loan Associations	1.00	1.54**	2.20**	1.34
Rochester SMSA				
Mutual Savings Banks	1.00	0.61	[← 0.78 →]	
Savings and Loan Associations	1.00	1.20	0.00**	1.24
Syracuse SMSA				
Mutual Savings Banks	1.00	0.01	[← 1.01 →]	

Table 6-8 (continued)

a) The mutual savings banks estimates are derived from 1976-1977 applications data while the other estimates are based on 1977-1978 mortgage applications. The ratio is equal to the probability that an application with the indicated characteristics will be modified divided by the probability that the typical application will be modified. A single asterisk (*) indicates that the numerator of the ratio is statistically significantly different than the denominator at the five-to-ten percent level. Two asterisks (**) indicates that the difference is significant at the five or less percent level.

b) This is the typical application described in the text. It is the base for calculating the modification ratios. The other applications involve variations from the typical one in one or more characteristics. See Table 6-3 for the probability of modification for the typical application in each bank type-area.

situated white applicants at the New York-Nassau-Suffolk savings and loan associations, but are significantly less likely to have them modified at the Rochester associations. Hispanics and other minorities are significantly more likely to be modified than whites in the Buffalo metropolitan area; commercial banks have a modification ratio of 4.23 and mutual savings banks have one of 1.80.

The modification decision can be subdivided into modified terms that were accepted by the applicant and modified terms that were followed by the applicant's withdrawal. In the New York-Nassau-Suffolk area, we have a sufficiently large sample of mortgage applications at mutual savings banks to analyze the effect of this refined picture of bank decisions on the racial coefficients if the sex and marital status variables are deleted. The various denial and modification ratios for typical applications are summarized in Table 6-9. These results show that the probability of modification-withdrawal is more likely than modification-acceptance for all three minorities (blacks, Hispanics, and others), but the differential is statistically significant only for Hispanics. All three minorities are significantly more likely to be denied than the typical white applicant, and denial probabilities exceed both modification probabilities. On the basis of this analysis it is clear that separate treatment of the two types of modification may uncover additional differential treatment. In addition, it would be incorrect to group denials and modification-withdrawals together as a single measure of adverse action because differential treatment occuring with regard to one of these decisions could be dampened by equal

Table 6-9

Denial, Modification-Withdrawal and Modification-Acceptance Ratios by Race of Applicant for Mutual Savings Banks (Large Sample) in the New York-Nassau-Suffolk Metropolitan Areas: 1976-1977[a]

Type of Decision	White[b]	Black	Hispanic	Other Minority
Denial	1.00	1.56**	1.55**	1.59**
Modification-Withdrawal	1.00	1.15	1.42**	1.17
Modification-Acceptance	1.00	1.06	0.87	0.88
Withdrawal	1.00	1.22	1.05	4.03

a) The ratio is equal to the probability that an application with the indicated characteristics will be denied, modified, or withdrawn, divided by the probability that the typical application will be denied, modified, or withdrawn. A single asterisk (*) indicates that the numerator of the ratio is statistically significantly different than the denominator at the five-to-ten percent level. Two asterisks (**) indicates that the difference is significant at the five or less percent level.

b) This is the typical application described in the text. It is the base for calculating the denial, modification or withdrawal ratios. The other applications involve variations from the typical one in one or more characteristics. The probabilities of denial, modification-withdrawal, modification-acceptance, or withdrawal for the typical application are 9.15, 3.42, 11.12 and 3.74, respectively. Note that the typical application in this table has no identifiable sex or marital status characteristics.

treatment with respect to the other one. For example, the significantly unfavorable denial ratios for black applicants might not have shown up as strongly if denials and modification-withdrawals had been grouped together.

We have very detailed information on housing code violations, vacant buildings, property tax delinquency and serious fires for each census tract in Bronx, Kings (Brooklyn) and Queens counties. Since we have enough observations from mutual savings banks, we estimated a decision model for just these three counties to take advantage of these finer measures of housing market externalities. The results indicate that blacks, Hispanics and other minorities are all significantly (five percent level) more likely to be denied and to be modified than similar white applicants. This is an indication of even more discrimination against minority applicants by these banks than the results reported in Tables 6-7, 6-8 or 6-9.

Several of the race coefficients in the withdrawal equations are also consistent with discrimination against minorities. In particular, applications from blacks at commercial banks in New York-Nassau-Suffolk, and at savings and loan associations in the New York-Nassau-Suffolk and Rochester metropolitan areas are significantly more likely to be withdrawn than those from similarly situated white applicants. The withdrawal ratios are 1.50, 2.75 and 14.75, respectively. In addition, other minorities are more likely to withdraw their applications at Rochester mutual savings banks and savings and loan associations than are similarly situated whites. The withdrawal ratios are 2.73 and 5.75, respectively.

Table 6-10

Denial Ratios by Age of the Applicant
for Typical Applications: New York State[a]

	Under 25	25-34	35-44[b]	45-54	Over 54
Albany-Schenectady-Troy, Rochester and Syracuse SMSAs					
Commercial Banks	0.49**	0.35**	1.00	0.85	0.56
Buffalo SMSA					
Commercial Banks	0.59	0.67**	1.00	0.59*	0.52*
New York and Nassau-Suffolk SMSAs					
Commercial Banks	1.10	0.94	1.00	1.03	1.07
Mutual Savings Banks	0.65**	0.74**	1.00	0.78**	0.75
Savings and Loan Associations	0.99	0.62**	1.00	1.64*	1.00
Rochester SMSA					
Savings and Loan Associations	1.10	1.11	1.00	1.71*	1.18

a) The mutual savings banks estimates are derived from 1976-1977 applications data while the other estimates are based on 1977-1978 mortgage applications. The ratio is equal to the probability that an application with the indicated characteristics will be denied divided by the probability that the typical application will be denied. A single asterisk (*) indicates that the numberator of the ratio is statistically significantly different than the denominator at the five-to-ten percent level. Two asterisks (**) indicates that the difference is significant at the five or less percent level.

b) This is the typical application described in the text. It is the base for calculating the denial ratios. The other applications involve variations from the typical one in one or more characteristics. See Table 6-3 for the probability of denial for the typical application in each bank type-area.

Age of Applicant

Denial ratios for several age intervals in each bank type-area are presented in Table 6-10. Applicants under 35 years tend to be less likely candidates for denial than the typical applicant who is 35-44 years old. Nine of the twelve denial ratios for ages under 35 are less than 1.00 and six are based on differences statistically significant at the five percent level. The denial ratios for applicants over 44 years are more mixed; three ratios are significantly less than 1.00, and two are significantly greater than 1.00. Applicants between 44 and 55 years of age are more likely to be denied than 35-44 year old typical applicants by savings and loan associations in the New York-Nassau-Suffolk and Rochester metropolitan areas.

The results from the denial equations suggest that younger (under 35) applicants are somewhat less likely to be denied than older applicants (over 44) at commercial banks in the combined upstate area, and at savings and loan associations. However, Buffalo and the combined upstate commercial banks, and New York-Nassau-Suffolk mutual savings banks are most likely to deny 35 to 44 year old applicants. New York-Nassau-Suffolk commercial banks seem to deny applications equally regardless of the applicant's age.

Modification ratios are summarized in Table 6-11. These results vary markedly by metropolitan area. Commercial banks in the combined upstate area and in the New York-Nassau-Suffolk area are significantly less likely to modify young applicants (under 35) while the Buffalo commercial banks are most likely to modify young applicants. New York-Nassau-Suffolk savings and loan associations are most likely to modify the typical applicant (35-44) while the same type of bank in Rochester is least likely to modify this applicant. Mutual savings banks in New York-Nassau-Suffolk are significantly less likely to modify the loan requests of 45 to 54 year old applicants than they are to modify those of similarly situated 35 to 44 year old applicants.

The withdrawal equation for Buffalo commercial banks is the only one that indicates that applications from any age group are significantly more likely to be withdrawn than those from 35-44 year olds. Withdrawal ratios at these banks for applicants in the 25-34 and 45-54 year old age groups are 1.82 and 1.85, respectively.

Table 6-11

Modification Ratios by Age of Applicant for Typical Applications: New York State[a]

	Under 25	25-34	35-44[b]	45-54	Over 54
Albany-Schenectady-Troy, Rochester and Syracuse SMSAs					
Commercial Banks	0.39**	0.60**	1.00	0.79	1.36
Buffalo SMSA					
Commercial Banks	3.12**	0.64	1.00	0.78	0.00**
New York and Nassau-Suffolk SMSAs					
Commercial Banks	0.91	0.91	1.00	1.24**	1.18
Mutual Savings Banks	1.13	0.94	1.00	0.81**	1.13
Savings and Loan Associations	0.67	0.54**	1.00	0.62**	0.78
Rochester SMSA					
Savings and Loan Associations	1.95	2.61**	1.00	4.60**	6.57**

a) The mutual savings banks estimates are derived from 1976-1977 applications data while the other estimates are based on 1977-1978 mortgage applications. The ratio is equal to the probability that an application with the indicated characteristics will be modified divided by the probability that the typical application will be modified. A single asterisk (*) indicates that the numerator of the ratio is statistically significantly different than the denominator at the five-to-ten percent level. Two asterisks (**) indicates that the difference is significant at the five or less percent level.

b) This is the typical application described in the text. It is the base for calculating the modification ratios. The other applications involve variations from the typical one in one or more characteristics. See Table 6-3 for the probability of modification for the typical application in each bank type-area.

Redlining

Three types of redlining allegations have been analyzed: specific neighborhoods that community groups have alleged to be redlined, older neighborhoods, and largely nonwhite neighborhoods.

Property location. Denial and modification ratios for typical applications from a variety of property locations in each of five metropolitan areas are summarized in Tables 6-12 to 6-17. The role of property location in mortgage lending decisions differs among the five metropolitan areas and the type of lender.

In general, the denial ratios provide little evidence consistent with allegations that specified neighborhoods are redlined. The results, however, are consistent with redlining in six cases. New York-Nassau-Suffolk commercial banks are significantly more likely to deny applications on properties in the combined neighborhood of Central Brooklyn and Fort Greene than a similar application on a Suffolk County property; the denial ratio is 2.34 (Table 6-14). Although the other allegedly redlined neighborhoods in the New York-Nassau-Suffolk area have denial ratios greater than one at commercial banks, only the Central Brooklyn-Fort Greene one is statistically significant at the ten percent level.[9] It should be noted that applications on properties in other parts of New York City (Northeast Kings, South Kings, the

Table 6-12

Denial and Modification Ratios by Property Location
for Mutual Savings Banks in the
Albany-Schenectady-Troy Metropolitan Area: 1976-1977[a]

Property Location	Denial	Modification
Allegedly Redlined Neighborhoods		
City of Albany		
Arbor Hill and South End	2.40	5.05
Hudson / Park	12.51**	1.55
West Hill	1.06	1.20
City of Schenectady		
Central State Street	0.51	1.04
Hamilton Hill	1.61	0.01
City of Troy		
Central South	0.50	0.85
Hillside	10.97**	0.62
North Central and 567	0.99	1.03
Other Neighborhoods		
Rest of the City of Albany	1.01	0.60*
Rest of the City of Schenectady	1.24	0.72
Rest of the City of Troy	0.52**	1.50
Rest of Albany County	1.13	1.12
Rest of Schenectady County	1.23	1.16
Rensselaer County outside the City of Troy	0.76	1.51*
Saratoga County[b]	1.00	1.00

Table 6-12 (continued)

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a) The ratio is equal to the probability that an application with the indicated characteristics will be denied or modified divided by the probability that the typical application will be denied or modified. A single asterisk (*) indicates that the numerator of the ratio is statistically significantly different than the denominator at the five-to-ten percent level. Two asterisks (**) indicates that the difference is significant at the five or less percent level.

b) This is the typical application described in the text. It is the base for calculating the denial or modification ratios. The other applications involve variations from the typical one in one or more characteristics. See Table 6-3 for the probability of denial or modification for the typical application in each bank type-area.

Table 6-13

Denial and Modification Ratios by Property Location in the Buffalo Metropolitan Area[a]

Property Location	Commercial Banks Denial	Commercial Banks Modification	Mutual Savings Banks Denial	Mutual Savings Banks Modification
Allegedly redlined neighborhoods				
City of Buffalo				
Black Rock			0.69	1.13
Center City	0.45	0.00**	1.24	3.59*
Filmore-Leroy			0.63	1.90
Industrial			1.76	0.99
West Elmwood	0.99	0.00**	0.41**	1.44
West Side	1.77	4.19	0.80	0.82
Other neighborhoods				
City of Buffalo				
Broadway			0.36**	0.42*
Shiller	0.86	1.04	0.15**	0.55
University			0.43**	0.44**
East Elmwood	0.73	0.16	0.56	0.37
South Buffalo			0.67**	0.87
North Buffalo	0.78	0.37	0.34**	0.65*
City of Niagara Falls	0.60	3.49*	1.06	1.00
Rest of Niagara County	1.23	3.21**	0.89	1.17
City of Lackawanna	1.00	1.00	0.87	0.83
Rest of Erie County[b]			1.00	1.00

a) The mutual savings banks estimates are derived from 1976-1977 applications data while the other estimates are based on 1977-1978 mortgage applications. The ratio is equal to the probability that an application with the indicated characteristics will be denied or modified divided by the probability that the typical

Table 6-13 (continued)

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a) (cont'd) application will be denied or modified. A single asterisk (*) indicates that the numerator of the ratio is statistically significantly different than the denominator at the five-to-ten percent level. Two asterisks (**) indicates that the difference is significant at the five or less percent level.

b) This is the typical application described in the text. It is the base for calculating the denial or modification ratios. The other applications involve variations from the typical one in one or more characteristics. See Table 6-3 for the probability of denial or modification for the typical application in each bank type-area.

Table 6-14

Denial Ratios by Property Location for the New York-Nassau-Suffolk Metropolitan Areas[a]

<table>
<tr><th rowspan="2">Property Location</th><th rowspan="2">Commercial Banks</th><th colspan="2">Mutual Savings Banks</th><th rowspan="2">Savings and Loan Associations</th></tr>
<tr><th>Small Sample</th><th>Large Sample</th></tr>
<tr><td>Allegedly redlined neighborhoods</td><td></td><td></td><td></td><td></td></tr>
<tr><td>South Bronx</td><td>1.41</td><td>1.26</td><td>1.07</td><td>--</td></tr>
<tr><td>Central Brooklyn</td><td rowspan="2">2.34**</td><td rowspan="2">0.52</td><td>0.82</td><td>--</td></tr>
<tr><td>Fort Greene</td><td>2.35**</td><td>--</td></tr>
<tr><td>Park Slope</td><td>1.25</td><td>0.44</td><td>0.69</td><td>--</td></tr>
<tr><td>Crown Heights</td><td rowspan="3">2.00</td><td rowspan="2">0.66</td><td>1.16</td><td>--</td></tr>
<tr><td>East Flatbush</td><td>0.82</td><td>--</td></tr>
<tr><td>Southeast Queens</td><td>1.86</td><td>1.65**</td><td>--</td></tr>
<tr><td>All of the above</td><td>--</td><td>--</td><td>--</td><td>0.37</td></tr>
<tr><td>Other neighborhoods</td><td></td><td></td><td></td><td></td></tr>
<tr><td>North Bronx</td><td>1.09</td><td>0.83</td><td>0.85</td><td>0.57</td></tr>
<tr><td>Northeast Kings</td><td>2.16**</td><td>0.59</td><td>1.40**</td><td>0.65</td></tr>
<tr><td>South Kings</td><td>1.66**</td><td>1.11</td><td>1.03</td><td>0.09**</td></tr>
<tr><td>Rest of Queens</td><td>1.57**</td><td>1.32</td><td>0.96</td><td>0.18**</td></tr>
<tr><td>Nassau</td><td>0.95</td><td>1.24</td><td>0.87**</td><td>0.21**</td></tr>
<tr><td>New York (Manhattan)</td><td>1.32*</td><td>0.41</td><td>1.31</td><td>--</td></tr>
<tr><td>Richmond</td><td>0.60</td><td>0.59**</td><td>0.54**</td><td>0.00**</td></tr>
<tr><td>Rockland</td><td>1.04</td><td>0.32**</td><td>1.36**</td><td>1.02</td></tr>
<tr><td>Westchester</td><td>0.94</td><td>0.62**</td><td>0.46**</td><td>1.54*</td></tr>
<tr><td>Suffolk[b]</td><td>1.00</td><td>1.00</td><td>1.00</td><td>1.00</td></tr>
</table>

Table 6-14 (continued)

a) The mutual savings banks estimates are derived from 1976-1977 applications data while the other estimates are based on 1977-1978 mortgage applications. The ratio is equal to the probability that an application with the indicated characteristics will be denied divided by the probability that the typical application will be denied. A single asterisk (*) indicates that the numerator of the ratio is statistically significantly different than the denominator at the five-to-ten percent level. Two asterisks (**) indicates that the difference is significant at the five or less percent level.

b) This is the typical application described in the text. It is the base for calculating the denial ratios. The other applications involve variations from the typical one in one or more characteristics. See Table 6-3 for the probability of denial for the typical application in each bank type-area (Table 6-9 for the mutual savings banks large sample).

Table 6-15

Modification Ratios by Property Location for the New York-Nassau-Suffolk Metropolitan Area[a]

<table>
<tr><th rowspan="2">Property Location</th><th rowspan="2">Commercial Banks</th><th colspan="2">Mutual Savings Banks</th><th rowspan="2">Savings and Loan Associations</th></tr>
<tr><th>Small Sample</th><th>Large Sample[c]</th></tr>
<tr><td>Allegedly redlined neighborhoods</td><td></td><td></td><td></td><td></td></tr>
<tr><td>South Bronx</td><td>1.08</td><td>0.46</td><td>1.76</td><td>--</td></tr>
<tr><td>Central Brooklyn</td><td rowspan="2">0.45</td><td rowspan="2">1.42</td><td>2.21**</td><td>--</td></tr>
<tr><td>Fort Greene</td><td>5.23**</td><td>--</td></tr>
<tr><td>Park Slope</td><td>0.74</td><td>1.41</td><td>5.77**</td><td>--</td></tr>
<tr><td>Crown Heights</td><td rowspan="3">0.92</td><td rowspan="2">1.56</td><td>3.18**</td><td>--</td></tr>
<tr><td>East Flatbush</td><td>3.79**</td><td>--</td></tr>
<tr><td>Southeast Queens</td><td>1.46</td><td>1.38</td><td>--</td></tr>
<tr><td>All of the above</td><td>--</td><td>--</td><td>--</td><td>2.59</td></tr>
<tr><td>Other neighborhoods</td><td></td><td></td><td></td><td></td></tr>
<tr><td>North Bronx</td><td>0.86</td><td>0.68</td><td>2.01**</td><td>3.49*</td></tr>
<tr><td>Northeast Kings</td><td>2.35**</td><td>1.89**</td><td>3.09**</td><td>2.60</td></tr>
<tr><td>South Kings</td><td>1.33*</td><td>1.21</td><td>1.84**</td><td>3.11**</td></tr>
<tr><td>Rest of Queens</td><td>0.65**</td><td>0.95</td><td>1.29**</td><td>3.09**</td></tr>
<tr><td>Nassau</td><td>0.95</td><td>0.91</td><td>1.03</td><td>4.90**</td></tr>
<tr><td>New York (Manhattan)</td><td>0.83</td><td>1.38</td><td>1.35</td><td>--</td></tr>
<tr><td>Richmond</td><td>1.23</td><td>0.63**</td><td>0.35**</td><td>4.86**</td></tr>
<tr><td>Rockland</td><td>0.99</td><td>0.59**</td><td>0.37**</td><td>4.38**</td></tr>
<tr><td>Westchester</td><td>0.87</td><td>0.39**</td><td>0.35**</td><td>1.84</td></tr>
<tr><td>Suffolk[b]</td><td>1.00</td><td>1.00</td><td>1.00</td><td>1.00</td></tr>
</table>

Table 6-15 (continued)

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a) The mutual savings banks estimates are derived from 1976-1977 applications data while the other estimates are based on 1977-1978 mortgage applications. The ratio is equal to the probability that an application with the indicated characteristics will be modified divided by the probability that the typical application will be modified. A single asterisk (*) indicates that the numerator of the ratio is statistically significantly different than the denominator at the five-to-ten percent level. Two asterisks (**) indicates that the difference is significant at the five or less percent level.

b) This is the typical application described in the text. It is the base for calculating the modification ratios. The other applications involve variations from the typical one in one or more characteristics. See Table 6-3 for the probability of modification for the typical application in each bank type-area (Table 6-9 for the mutual savings banks' large sample).

c) For the mutual savings banks' large sample, this column contains ratios for the action of modification followed by withdrawal.

Table 6-16

Denial and Modification Ratios by Property Location for the Rochester Metropolitan Area[a]

<table>
<tr><th rowspan="2">Property Location</th><th colspan="2">Mutual Savings Banks</th><th colspan="2">Savings and Loan Assoc.</th></tr>
<tr><th>Denial</th><th>Modification</th><th>Denial</th><th>Modification</th></tr>
<tr><td>Allegedly redlined neighborhoods</td><td></td><td></td><td></td><td></td></tr>
<tr><td>Dutchtown</td><td>1.40</td><td>1.06</td><td>0.00**</td><td>0.00**</td></tr>
<tr><td>ZIP Code Area 14621 and the 16th Ward</td><td>0.26</td><td>0.62</td><td>3.48*</td><td>0.00**</td></tr>
<tr><td>Other neighborhoods</td><td></td><td></td><td></td><td></td></tr>
<tr><td>Edgerton/Brown Square/ Cornhill/Park/ Oxford</td><td>1.12</td><td>1.42</td><td rowspan="2">1.99</td><td rowspan="2">7.17**</td></tr>
<tr><td>South Wedge and Swillberg</td><td>0.00</td><td>0.00</td></tr>
<tr><td>Rest of the Primary Target Area</td><td>0.45</td><td>0.76</td><td>1.00</td><td>3.02</td></tr>
<tr><td>Ward 19</td><td>0.32</td><td>0.00</td><td>0.31</td><td>2.03</td></tr>
<tr><td>Rest of the City of Rochester</td><td>0.68</td><td>0.94</td><td>2.64</td><td>1.58</td></tr>
<tr><td>Livingston, Orleans and Wayne Counties</td><td>0.00</td><td>1.32</td><td>4.19</td><td>7.51**</td></tr>
<tr><td>Monroe County outside the City of Rochester[b]</td><td>1.00</td><td>1.00</td><td>1.00</td><td>1.00</td></tr>
</table>

a) The mutual savings banks estimates are derived from 1976-1977 applications data while the other estimates are based on 1977-1978 mortgage applications. The ratio is equal to the probability that an application with the indicated characteristics will be denied or modified divided by the probability that the typical application will be denied or modified. A single asterisk (*) indicates that the numerator of the ratio is statistically significantly different than the denominator at the five-to-ten percent level. Two asterisks (**) indicates that the difference is significant at the five or less percent level.

b) This is the typical application described in the text. It is the base for calculating the denial or modification ratios. The other applications involve variations from the typical one in one or more characteristics. See Table 6-3 for the probability of denial or modification for the typical application in each bank type-area.

Table 6-17

Denial and Modification Ratios by Property Location for Mutual Savings Banks in the Syracuse Metropolitan Area: 1976-1977[a]

Property Location	Denial	Modification
Allegedly redlined neighborhoods		
Brighton	0.00	0.00
Near Northeast (part)	0.00	0.00
Other neighborhoods		
Rest of the Community Development Area	1.94	0.00
Rest of the City of Syracuse	0.79	0.25**
Oswego County	1.60*	0.81
Madison County	1.44	0.89
Onondaga County outside the City of Syracuse[b]	1.00	1.00

a) The ratio is equal to the probability that an application with the indicated characteristics will be denied or modified divided by the probability that the typical application will be denied or modified. A single asterisk (*) indicates that the numerator of the ratio is statistically significantly different than the denominator at the five-to-ten percent level. Two asterisks (**) indicates that the difference is significant at the five or less percent level.

b) This is the typical application described in the text. It is the base for calculating the denial or modification ratios. The other applications involve variations from the typical one in one or more characteristics. See Table 6-3 for the probability of denial or modification for the typical application in each bank type-area.

rest of Queens, and Manhattan) are significantly more likely to be denied by commercial banks than a similar application on a Suffolk county property.

Mutual savings banks are significantly more likely to deny applications on properties located in the Hudson/Park neighborhood of Albany and the Hillside neighborhood of the city of Troy than they are similar applications on suburban Saratoga County properties; the denial ratios are 12.51 and 10.97 respectively (Table 6-12). No other neighborhoods in the Albany-Schenectady-Troy metropolitan area have denial ratios from mutual savings banks that are significantly greater than one. New York-Nassau-Suffolk mutual savings banks treat applications on properties located in Fort Greene in Brooklyn and Southeast Queens less favorably than similar applications on Suffolk County properties.[10]. The denial ratios are 2.35 and 1.65, respectively, and both are based on statistically significant (five percent level) differentials (Table 6-14). However, one of the suburban counties (Rockland) also has a denial ratio from mutual savings banks that is significantly above one. Applications on Northeast Kings properties are also significantly more likely to be denied than those on suburban Suffolk County properties, but this result is expected because of the area's generally weak housing market. However, the property location coefficients in the New York-Nassau-Suffolk mutual savings bank sample change magnitudes and signs between the sample including the sex and marital status variables and the sample without these variables.[11]

Applications at Rochester savings and loan associations are more likely to be denied if the property is located in ZIP Code

Area 14621 or the 16th Ward than if it is located in suburban Monroe County (Table 6-16). The denial ratio of 3.48 is statistically significant at the ten percent level. Although some Rochester areas that are not alleged to be redlined also had denial ratios in excess of one, none of them are statistically significant at the ten percent level.

Mutual savings banks are the only lenders with modification ratios greater than one for allegedly redlined neighborhoods. These occur in the Buffalo and New York-Nassau-Suffolk metropolitan areas. In Buffalo, applications on Center City properties are 3.59 times as likely to be modified as similar applications on suburban Erie County properties. This is the only Buffalo modification ratio in excess of one that is based on a statistically significant (ten percent level) differential. In the New York-Nassau-Suffolk area; applications on properties in New York City, whether or not they are in allegedly redlined neighborhoods, are more likely to be modified than similar applications on Suffolk County properties.

Withdrawal ratios in excess of one occur in a few cases with statistical significance. They exceed one for the allegedly redlined neighborhoods of Central Brooklyn and Park Slope at commercial banks in the New York-Nassau-Suffolk area, but they also exceed one for other areas not alleged to be redlined (e.g., Nassau and Westchester Counties) Savings and loan associations in the same metropolitan area have withdrawal ratios above one for the neighborhoods alleged to be redlined as well as Rockland and Westchester Counties. These inconsistent sets of coefficients offer little support for the redlining allegations.

Neighborhood Characteristics. Denial and modification ratios by the age and racial composition of the neighborhood are summarized in Tables 6-18 and 6-19.

Applications are statistically significantly more likely to be denied in older neighborhoods in four bank type-areas: commercial banks in the combined upstate area, mutual savings banks in the Buffalo and Rochester metropolitan areas, and savings and loan associations in the New York-Nassau-Suffolk area.[12] Although the results are consistent with allegations that lenders avoid old neighborhoods, they may be due to a spurious correlation between the age of the neighborbood and the condition of the specific property. Unlike California, we were unable to separate these two factors because the age of the building is not provided on the New York EHOL forms. Therefore, caution should be exercised in interpreting these and other age of neighborhood results in New York.

All but one of the modification ratios for age of neighborhood exceed one in Table 6-19 indicating that applications on properties in older neighborhoods are more likely to be modified than ones in newer neighborhoods.[13] Seven of the differentials are statistically significant at the five percent level. These results are also consistent with the allegation that lenders redline older neighborhoods but they must not be taken out of context. The caveat presented in the preceding discussion of denial ratios also applies here and is even strengthened because some of the modifications may be maturity period reductions to compensate for the shorter remaining economic lives of older buildings.

Applications on properties in neighborhoods with higher

Table 6-18

Denial Ratios by Age and Racial Composition of Neighborhood: New York State[a]

	Typical Applicant (TA)[b]	TA in Older Neighborhood (+0.10)	TA in a 50 Percent Nonwhite Neighborhood
Albany-Schenectady-Troy SMSA			
Mutual Savings Banks	1.00	1.01	0.00[c]
Albany-Schenectady-Troy, Rochester and Syracuse SMSAs			
Commercial Banks	1.00	1.08**	0.20
Buffalo SMSA			
Commercial Banks	1.00	1.02	0.50
Mutual Savings Banks	1.00	1.12**	0.92
New York and Nassau-Suffolk SMSAs			
Commercial Banks	1.00	1.00	1.33*
Mutual Savings Banks	1.00	1.00	0.93
Savings and Loan Associations	1.00	1.11**	1.49
Rochester SMSA			
Mutual Savings Banks	1.00	1.17**	0.55
Savings and Loan Associations	1.00	1.06	4.25[d]
Syracuse SMSA			
Mutual Savings Banks	1.00	0.99	1.67

Table 6-18 (continued)

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a) The mutual savings banks estimates are derived from 1976-1977 applications data while the other estimates are based on 1977-1978 mortgage applications. The ratio is equal to the probability that an application with the indicated characteristics will be denied or modified divided by the probability that the typical application will be denied or modified. A single asterisk (*) indicates that the numerator of the ratio is statistically significantly different than the denominator at the five-to-ten percent level. Two asterisks (**) indicates that the difference is significant at the five or less percent level.

b) This is the typical application described in the text. It is the base for calculating the denial or modification ratios. The other applications involve variations from the typical one in one or more characteristics. See Table 6-3 for the probability of denial or modification for the typical application in each bank type-area.

c) This ratio is so small because nearly all the applications at mutual savings banks on properties in 50 percent nonwhite neighborhoods in the Albany-Schenectady-Troy metropolitan area are withdrawn.

d) This ratio is high because nearly none of the applications at this bank type-area in 50 percent nonwhite neighborhoods are likely to be withdrawn.

Table 6-19

Modification Ratios by Age and Racial Composition of Neighborhood: New York State[a]

	Typical Applicant (TA)[b]	TA in Older Neighborhood (+0.10)	TA in a 50 Percent Nonwhite Neighborhood
Albany-Schenectady-Troy SMSA			
Mutual Savings Banks	1.00	1.11**	0.01[c]
Albany-Schenectady-Troy, Rochester and Syracuse SMSAs			
Commercial Banks	1.00	0.99	9.42
Buffalo SMSA			
Commercial Banks	1.00	1.19**	0.65
Mutual Savings Banks	1.00	1.10**	0.42
New York and Nassau-Suffolk SMSAs			
Commercial Banks	1.00	1.05**	1.14
Mutual Savings Banks	1.00	1.13**	0.76
Savings and Loan Associations	1.00	1.06**	0.83
Rochester SMSA			
Mutual Savings Banks	1.00	1.03	0.46*
Savings and Loan Associations	1.00	1.02	5.77[d]
Syracuse SMSA			
Mutual Savings Banks	1.00	1.17**	0.09

Table 6-19 (continued)

a) The mutual savings banks estimates are derived from 1976-1977 applications data while the other estimates are based on 1977-1978 mortgage applications. The ratio is equal to the probability that an application with the indicated characteristics will be denied or modified divided by the probability that the typical application will be denied or modified. A single asterisk (*) indicates that the numerator of the ratio is statistically significantly different than the denominator at the five-to-ten percent level. Two asterisks (**) indicates that the difference is significant at the five or less percent level.

b) This is the typical application described in the text. It is the base for calculating the denial or modification ratios. The other applications involve variations from the typical one in one or more characteristics. See Table 6-3 for the probability of denial or modification for the typical application in each bank type-area.

c) This ratio is so small because nearly all the applications at mutual savings banks on properties in 50 percent nonwhite neighborhoods in the Albany-Schenectady-Troy metropolitan area are withdrawn.

d) This ratio is high because nearly none of the applications at this bank type-area in 50 percent nonwhite neighborhoods are likely to be withdrawn.

percentages of nonwhite population are significantly more likely to be denied than similar applications in nearly all white neighborhoods in only one bank type-area: savings and loan associations in the New York-Nassau-Suffolk metropolitan area. This result is consistent with the redlining allegation. Only one modification ratio is statistically significant but it indicates that Rochester mutual savings banks favor older neighborhoods.[14]

Withdrawals are significantly more likely to occur in older neighborhoods at commercial banks in the combined upstate area and mutual savings banks in the Albany-Schenectady-Troy metropolitan areas.[15] The withdrawal ratios are 1.18 and 1.09, respectively. Applications on properties in majority nonwhite neighborhoods are significantly more likely to be withdrawn than similar ones in nearly all white neighborhoods in the mutual savings banks in the Albany-Schenectady-Troy and Rochester metropolitan areas. The ratios are 32.42 and 6.65, respectively.

SUMMARY

In this chapter, decisions on applications for conventional mortgages on owner-occupied one- to four-family houses in five metropolitan areas of New York State are analyzed. The five areas are: Albany-Schenectady-Troy, Buffalo, New York-Nassau-Suffolk, Rochester and Syracuse. In general, four possible outcomes are considered: approval as applied for, approval after modification, denial, and withdrawal.

We view a lender's decision as a function of the financial characteristics of the borrower, requested terms of the loan, and collateral value of the property. Information on the neighborhood surrounding the property, including measures of change over time, are used to reflect the risk of loss associated with a particular property because of the condition of neighborhood properties. Most of these neighborhood measures are based on the Census of Population and Housing. However, detailed information on housing code violations, vacant buildings, property tax delinquency, and serious fires is available for each census tract in Bronx, Kings, and Queens counties. The sex, marital status, age and race of the applicant; the location of the property; and the age and racial composition of the neighborhood are also included to determine whether they affect mortgage-lending decisions after controlling for the other factors. Community organizations and residents identified the neighborhoods that they believed were redlined by lending institutions.

As in California, objective factors play a central role in New York lender decisions on mortgage applications. The likelihood that an application will be denied decreases as income, net wealth, and requested loan to appraised value ratio increase, and when the requested loan exceeds two times income. At least one proxy for the risk associated with the condition of neighboring buildings is significant in each denial equation. High requested loan to appraised value ratios are also major contributors to the modification of a mortgage application prior to approval and an application's withdrawal.

Only two of the lender actions are clear in their meaning: approval as applied for and denial. Modification is ambiguous because, on the one hand, the modification could be a reduction in maturity period to reflect the

the economic life of the building or a decrease in loan amount to reflect an applicant's desire to invest more equity and, on the other, the modification may represent an adverse action. Withdrawals are even more ambiguous because they could be the result of lender discouragement or applicant success at another lending institution. For these reasons, the analysis of discrimination gives more weight to the denial results than to the modification or withdrawal results where approval as applied for serves as the reference point.

Sex and Marital Status. The evidence supports the view that female only households or male-female households with working women, especially with women in the childbearing age, experience some discrimination in lending decisions but that instances of such discrimination are limited. Married female only applicants are more than twice as likely to be denied by Buffalo commercial banks and New York-Nassau-Suffolk mutual savings banks than married male-female applicants with a nonworking woman beyond the childbearing age. Male-female applicants with working women beyond childbearing age (married, unmarried, or separated) are twice as likely to be denied than similar households with a nonworking woman by Buffalo commercial banks.

In contrast to the limited evidence of discrimination against female only or male-female households, we find substantial evidence of adverse treatment of male only households. These households, whether married, unmarried, or separated, are over twice as likely to be denied than similarly situated married male-female households with nonworking women beyond childbearing age at Buffalo commercial banks, New York-Nassau-Suffolk mutual savings banks and Rochester savings and loan associations. In addition, the New York-Nassau-Suffolk commercial banks are more likely to deny applications from unmarried or separated male only households than those of married male-female applicants with a non-working woman past the childbearing age. These same banks and the Rochester savings and loan associations also are from 1.44 to 3.82 times as likely to deny the applications of married or separated male-female households, regardless of the work status or childbearing age of the woman.

The modification results suggest that New York-Nassau-Suffolk savings and loan associations are very likely to modify male-female applications, regardless of marital status, providing the woman is either working or in the childbearing years. Married male only applicants are also very likely to be modified by these lenders.

Race. Considerable evidence supports the allegation that black applicants are denied much more frequently than similarly situated white applicants. Black applicants at mutual savings banks and savings and loan associations are 1.58 to 3.61 times as likely to be denied than similar white applicants. Only one of the seven ratios for lenders of these two types are not statistically significant -- that for mutual savings banks in the Albany-Schenectady-Troy metropolitan area. The statistically significant differentials occur for the following lenders:

mutual savings banks in

Buffalo

New York-Nassau-Suffolk

Rochester

Syracuse;

savings and loan associations in

New York-Nassau-Suffolk

Rochester.

Although two of the three commercial bank ratios indicate black applicants are more likely to be denied, none of these are statistically significant. New York-Nassau-Suffolk commercial banks, however, are significantly more likely to deny other minority (neither black nor Hispanic) applicants than similarly situated white applicants.

New York-Nassau-Suffolk mutual savings banks are also significantly more (nearly twice as) likely to deny Hispanic applicants than similarly situated white applicants.

The modification results indicate that blacks are more likely to be modified by mutual savings banks and savings and loan associations in the New York-Nassau-Suffolk area. The latter are also more likely to modify applications from Hispanics. Commercial and mutual savings banks in Buffalo are more likely to modify applications from other minorities (nonblack).

Age. The evidence suggests that young applicants are less likely to be denied than older ones, but this pattern is statistically significant in only two cases: savings and loan associations in the New York-Nassau-Suffolk and Rochester metropolitan areas. Applicants under 35 and over 44 years old are less likely to be denied than 35 to 44 year old ones at Buffalo commercial banks and New York-Nassau-Suffolk mutual savings banks. Applicants under 35 are also less likely to be denied than older ones by commercial banks in the combined upstate area (Albany-Schenectady-

Troy, Rochester and Syracuse metropolitan areas).

The modification results are mixed. Younger applicants are less likely to be modified by commercial banks in the combined upstate area and the New York-Nassau-Suffolk metropolitan area, while they are more likely to be modified by Buffalo commercial banks, New York-Nassau-Suffolk mutual savings banks and Rochester savings and loan associations.

Redlining. We have evaluated a large number of community-based allegations that lenders have redlined a particular neighborhood. The denial results are consistent with the allegations in only six cases. Commercial banks in New York-Nassau-Suffolk are more likely to deny applications on Central Brooklyn-Fort Greene properties than similar applications on suburban Suffolk County properties. Mutual savings banks in the New York-Nassau-Suffolk area are more likely to deny applications on Fort Greene and Southeast Queens properties. The mutual savings banks in the Albany-Schenectady-Troy area are also more likely to deny applications on Hudson/Park (Albany) or Hillside (Troy) properties than similar ones on suburban Saratoga County properties. Finally, Rochester savings and loan associations are more likely to deny applications on ZIP Code Area 14621 or 16th Ward properties than similar ones on suburban Monroe County properties.

The modification results are consistent with redlining allegations in only one Buffalo neighborhood (Center City) where mutual savings banks are more likely to modify the application than a similar one on a suburban Erie County property. Although mutual savings banks in the New York-Nassau-Suffolk area are more likely to modify applications on properties in several allegedly redlined neighborhoods than applications on Suffolk county properties, these banks are also more likely to modify applications in several neighborhoods that are not alleged to be redlined.

Community organizations have also alleged that older or nonwhite neighborhoods are redlined by mortgage lenders. The denial results are consistent with the age of neighborhood allegations in four instances: commercial banks in the combined upstate area, mutual savings banks in the Buffalo and Rochester metropolitan areas, and savings and loan associations in the New York-Nassau-Suffolk area. It is important to avoid over-interpreting these results because, unlike in our California analysis, we were unable to control for the age of the building. Modification was even more closely tied to the age of neighborhood -- more modifications in older neighborhoods. However, the same caveat applies with added strength because the modification could have been a maturity period reduction to reflect the remaining economic life of the building.

Only one type of lender (commercial banks in New York-Nassau-Suffolk) had significantly higher denial probabilities in largely nonwhite neighborhoods than for similar applications in all white ones.

Footnotes

1. See Robert Schafer, Mortgage Lending Decisions, Criteria and Constraints (Cambridge, Massachusetts: Joint Center for Urban Studies of MIT and Harvard, 1978), Chapters 7, 11 and 12.
2. Unfortunately, the question asking for the information on years at present occupation is vague. It appears that some applicants gave the number of years at the present position and others, the number of years in their present occupation. The possible responses on the form added confusion by having a "not employed" category. As a result, this variable does not perform as consistently as we would like. However, it is an improvement over the California data, which lacks any measure of the stability (or variance) of the individual applicant's creditworthiness.
3. Because of the categorical nature of the responses to the income question, some loan requests in excess of two times income are not covered by this variable.
4. See Robert Schafer, Mortgage Lending Decisions: Criteria and Constraints (Cambridge, Massachusetts: Joint Center for Urban Studies of MIT and Harvard, 1978), Chapters 7, 11 and 12, for a discussion of the mutual savings bank samples.
5. Ibid, Chapter 12.
6. Applications at commercial banks in the Albany-Schenectady-Troy, Rochester and Syracuse metropolitan areas had nearly equal incidences of incomes in the \$15,001 to \$25,000 and

over $25,000 ranges, 42 and 45 percent, respectively, and applications at commercial banks in the New York-Nassau-Suffolk area had most of their applications in the highest income range (74 percent versus 23 percent in the $15,001 to $25,000 range).

7. See Chapter 3, footnote 3, of this report.

8. For the mutual savings bank model for Rochester, see Robert Schafer, Mortgage Lending Decisions, *supra* note 1, Table 12-7.

9. The Central Brooklyn-Fort Greene coefficient is actually significant at the five percent level.

10. The results are the same in the Bronx-Kings-Queens mutual savings banks sample with the more detailed measures of neighborhood externalities.

11. In the Bronx-Kings-Queens mutual savings banks sample, only applications on properties in East Flatbush, Fort Greene, Park Slope and Northeast Kings are more likely to be modified than ones on properties located in the portion of Queens County that is not alleged to be redlined.

12. Mutual savings banks in the Bronx-Kings-Queens sample are also significantly (five percent level) more likely to deny applications on older properties. The denial ratio is 1.06.

13. The modification results for mutual savings banks in the Bronx-Kings-Queens sample are similar to those shown in Table 6-19.

14. However, mutual savings banks in the Bronx-Kinds-Queens sample are more likely to modify applications on properties in largely black neighborhoods; the modification ratio is 1.49. Further-

more, these same banks are also more likely to modify applications on properties in neighborhoods that have had an increase in their nonwhite population. A twenty percentage point increase leads to a modification ratio of 1.25. Both of these effects are statistically significant at the five percent level.

15. This also occurs in the mutual savings banks Bronx-Kings-Queens sample. The withdrawal ratio is small: 1.01.

CHAPTER 7

MORTGAGE TERMS IN NEW YORK STATE

This chapter analyzes the pattern of downward modification of loan amounts by bank type in those New York metropolitan areas for which sufficient data are available. The analysis covers commercial banks, mutual savings banks, and savings and loan associations in the New York-Nassau-Suffolk metropolitan area; savings and loan associations in the Rochester area; and commercial banks in the Albany-Schenectady-Troy, Rochester and Syracuse metropolitan areas. By focusing on the difference between the requested and the granted loan amount for those applications with downward modifications, this chapter supplements the analysis of modification probabilities discussed in Chapter 6. The models in this chapter represent the only analysis of final mortgage terms that can be performed with the New York data set, since interest rate and years-to-maturity data are not available.[1]

The specific question addressed here is whether some borrowers experience larger downward modifications than others solely because of membership in groups not legally allowed to be considered by banks in their decision making process. Large downward modifications of loan amounts may yield effects similar to those of loan denial; the applicant may not be able to proceed with the house purchase because he/she cannot raise the additional down payment necessitated by the bank's decision not to lend the requested amount.

The model used to test for discriminatory bank behavior of this type must adequately control for the factors that banks may legitimately use to determine the size of the downward modification. The control factors included in the modification models reported here are essentially the same as those in the decision-to-lend models of the previous chapter; the only addition is a variable for the size of the requested loan.

In the following sections, we first briefly discuss the performance of the overall equations, focusing on the role of the control variables. We then report the equation implications for the hypothesis of discriminatory lending on the basis of sex and marital status, race, age, and property location. The results support the view that banks in the New York-Nassau-Suffolk metropolitan area discriminate on the basis of age and provide weak support for the hypothesis of discrimination against female applicants.

CONTROL VARIABLES

The estimated equations take the following form:

MODOWN = f (REQLOAN, RLTOAV, BORR, NEIGH, DISC)

where

MODOWN = requested loan amount less granted loan amount,

REQLOAN = requested loan amount,

RLTOAV = the requested loan amount as a fraction of the appraised value,

BORR = a vector of borrower characteristics (including income, net wealth, employment history, and requested loan amount in excess of two times income),

NEIGH = a vector of neighborhood characteristics (including level and change variables),

and DISC = a vector of discrimination variables (including sex, marital status, race, age, location of property, neighborhood age, and racial composition of neighborhood).

The estimated equations for the five separate samples are reported in Appendix C, Tables C-8 and C-9. All equations are linear and were estimated using ordinary least squares. As can be seen from the summary statistics presented in Table 7-1, sample size ranges from a low of 75 for the Rochester savings and loan association sample to a high of 616 for the New York-Nassau-Suffolk commercial bank sample. The fraction of variation explained (R-square) varies from 0.33 for the mutual savings bank sample in New York-Nassau-Suffolk to 0.64 for the savings and loan association sample in Rochester. All equations explain statistically significant proportions of the variation in the dependent variable.

The size of the requested loan (REQLOAN) and the requested loan to appraised value ratio (RLTOAV) are the key control variables. In all but the New York-Nassau-Suffolk commercial bank sample, both variables exert statistically significant and positive effects on the size of the downward modification as expected.

The requested loan amount acts as a scale variable; for any given degree of loan risk as measured by the requested loan to appraised value and other control variables, the dollar amount of the modification depends on the size of the loan. The coefficients of REQLOAN are remarkably similar across the four samples

Table 7-1

Summary Statistics for Downward Modification Equations: New York State[a]

	AST-ROCH-SYR	NYNS			ROCH
	COM	COM	MSB	SLA	SLA
Sample size	90	616	386	179	75
R-square	0.59	0.43	0.33	0.30	0.64
F-statistic	3.86	10.66	4.24	1.97	3.10
P-value	0.0001	0.0001	0.0001	0.0036	0.0003

a) The mutual savings banks equation is based on 1976-1977 mortgage applications data while the other equations are based on 1977-1978 applications. The acronyms in the column headings are:

Bank type
- COM - commercial banks
- MSB - mutual savings banks
- SLA - savings and loan associations

Metropolitan areas
- AST - Albany-Schenectady-Troy
- NYNS - New York-Nassau-Suffolk
- ROCH - Rochester
- SYR - Syracuse

other than the New York-Nassau-Suffolk commercial bank sample and imply that differences of $1000 in the requested loan amount are associated with differences of approximately $100 in the amount by which loans are reduced.

A higher requested loan amount in relation to appraised value also increases the predicted magnitudes of the downward modifications in these four samples. A difference of 10 percentage points in the ratio of the requested loan to appraised value increases the loan reduction by $456 to $1387 across samples, controlling for the size of the requested loan. Consider two applicants each requesting mortgage money for a home appraised at $55,000. If one requested $35,000 and the other $45,000 and if both requests are modified downward, the estimated equation suggest that on average the latter will receive $7805 more than the former, ceteris paribus.[2] In other words, borrowers who ask for larger amounts in relation to appraised value obtain larger amounts, but they receive less than the full amount of the requested difference.

The results for the New York-Nassau-Suffolk commercial bank sample are harder to explain. Again the requested loan variable enters positively as expected (and with a larger magnitude than in the other four samples), but the requested loan to appraised value variable exerts a statistically significant negative impact, contrary to expectations. The mean requested loan-to-appraised value is lower and the size of the requested loan is higher on average and is characterized by greater variation in the New York-Nassau-Suffolk commercial bank sample than in the other four samples. The negative coefficient of RLTOAV may thus reflect a negative correlation between REQLOAN and RLTOAV and some non-linearities not captured by the linear equation specification.[3]

Somewhat surprisingly, very few of the variables representing the financial characteristics of the borrower enter the MODOWN equations significantly. In other words, lenders appear to pay little attention to the income, net wealth, or employment stability of the applicant when deciding how much to reduce loans once it is decided that a loan reduction is in order. Even the size of the loan in relation to income appears to be relatively unimportant; the coefficient of the binary variable measuring whether the requested loan exceeds two times income is statistically insignificant in all but the New York-Nassau-Suffolk commercial bank sample where it has an unexpected negative sign. Unlike the other samples, however, this new York-Nassau-Suffolk commercial bank sample simultaneously implies, consistent with expectations, that applicants with higher income have smaller modification, ceteris paribus. Again, the unexpected negative sign on the requested loan in relation to income variable may reflect a pattern of correlation and nonlinearity not adequately captured by the model.

The final set of control variables, the characteristics of the neighborhood, also have little explanatory power. With the exception of the 1975-1970 change in income (DINC) variable which enters positively in the New York-Nassau-Suffolk commercial bank equation and the foreclosure rate (FORRATE) which enters positively in the New York-Nassau-Suffolk mutual savings bank equation, none of the neighborhood variables are significant in any of the equations.

DISCRIMINATION RESULTS

The finding of a positive coefficient on a discrimination variable indicates that applicants who are members of the group in question (e.g. women, old people, blacks, or homebuyers in allegedly redlined neighborhoods) experience larger loan reductions than comparable applicants from the baseline groups. Larger loan reductions translate directly into large downpayments unless the borrower turns to an expensive second mortgage. In some cases, larger loan reductions may keep the applicant from purchasing the home at all and, thus, may be an indirect way for the bank to deny the loan. Provided the control variables in the MODOWN equations adequately represent the legitimate factors affecting the size of downward modifications, we can interpret statistically significant positive coefficients on any of the discrimination variables as support for the hypothesis of discriminatory behavior.

For each of the five samples, we have calculated the expected downward modification for a baseline application. This baseline application represents the type of application that bankers typically do not discriminate against; the applicants are a married, white, male-female couple; the wife is beyond childbearing age and not working; the applicant is betwen 35 and 44; and the property is in the suburbs.[4] With respect to all other characteristics, the baseline application takes on average values for the particular MODOWN sample involved. In connection with each type of potential discrimination, the predicted downward modification for an application that differs from the baseline application in the discrimination dimension only is reported and compared to the baseline downward modification for that sample. In this way, similarly situated applicants can be compared and the magnitude of the discriminatory differential can be put into perspective.

Sex and Marital Status

The results by sex and marital status are reported in Table 7-2. Each entry represents the predicted amount by which the bankers in each of the five samples reduce requested loan amounts for applications differing from baseline applications only in terms of sex or marital status. The numbers in parentheses represent the ratio of the predicted MODOWN for the indicated sex or marital status type to the type represented by the base. For example, the second entry in the second column indicates that commercial banks in the New York-Nassau-Suffolk metropolitan area reduce the actual loan below the requested loan on average by $4139 for an application that differs from the base only in that the wife is working. The 1.39 in parentheses indicates that this loan reduction is 39 percent higher than that for the base application. The absence of asterisks with this entry indicates that the coefficient on which it is based is statistically insignificant at the ten percent level. In general, a single asterisk means that the relevant coefficient is significant at the five to ten percent level, while two asterisks indicate the five or less percent significance level.

With respect to discrimination based on sex, we find limited

Table 7-2

Downward Modifications (Dollar Amounts and Ratios) by Sex and Marital Status for Baseline Applications: New York State[a]

	AST-ROCH-SYR	NYNS			ROCH
	COM	COM	MSB	SLA	SLA
Sex					
MFNCBNW (BASE)	8249(1.00)	2988(1.00)	6481(1.00)	2840(1.00)	↑ 4403(1.00)
MFNCBW	5101(0.62)*	4139(1.39)	5621(0.87)	4242(1.52)	↓
MFCBW25-34[b]	3636(0.44)	4835(1.62)	4439(0.68)	3739(1.32)	1445(0.33)**
MFCBNW25-34[b]	3233(0.39)	5860(1.96)	5350(0.82)	3886(1.37)	867(0.20)**
FONLYCB	↑ 8751(1.06)	4310(1.44)[b]	5809(0.89)[b]	↑ 4928(1.74)	↑ 1829(0.42)**
FONLYNCB	↓	6321(2.11)*	5628(0.87)	↓	↓
MONLY	5346(0.65)	3721(1.25)	5933(0.92)	4529(1.40)	1967(0.45)**
Marital Status					
MARRIED (BASE)	8249(1.00)	2988(1.00)	6481(1.00)	2840(1.00)	4403(1.00)
SEP	↑ 10156(1.23)	2934(0.98)	8777(1.35)*	↑ 2288(0.81)	↑ 5000(1.14)
UNMAR	↓	3153(1.06)	6091(0.94)	↓	↓

a) The mutual savings banks estimates are based on 1976-1977 mortgage applications data while the other equations are based on 1977-1978 applications. The acronyms used in the column headings are:

Bank type
- COM - commercial banks
- MSB - mutual savings banks
- SLA - savings and loan associations

Metropolitan areas
- AST - Albany-Schenectady-Troy
- NYNS - New York-Nassau-Suffolk
- ROCH - Rochester
- SYR - Syracuse

The entries in the table represent the predicted downward modification (in dollars) for an applicant similar to the base application in all ways other than the characteristic listed. Numbers in parentheses represent the ratio of the downward modification for an application with the indicated characteristic to the downward modification for the

Table 7-2 (continued)

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a) (cont'd) baseline application. See text for definition of the baseline application. A single asterisk (*) indicates that the numerator of the ratio is statistically significantly different from the denominator at the five-to-ten percent level. Two asterisks (**) indicate that the difference is significant at the five or less percent level.

b) These estimates are constructed by adding the effect of reducing the age of the applicant from the baseline range of 35-44 to the 25-34 year old range to the effect related specifically to the sex category of the application.

statistically significant evidence of discriminatory behavior. The one significant finding consistent with discriminatory behavior relates to commercial banks in New York-Nassau-Suffolk, who appear to reduce loans for female only applications with no females under 34 by more than twice the amount they reduce loans for baseline applications. Since this results in an additional downpayment of $3,333, the magnitude is not negligible. Although not statistically significant, the results suggest that these same banks may treat younger female-only applicants adversely as well. Members of this group (FONLYCB, with the applicant between 25 and 34) experience downward modifications 44 percent greater than those faced by baseline applicants.

The finding that commercial banks in the New York-Nassau-Suffolk area modify loans downward more for nonchildbearing female only households than for baseline applications sheds additional light on the Chapter 6 findings of a 0.47 denial ratio and a 1.42 modification ratio (neither of which is based on statistically significant coefficients) for these banks. The explanation appears to be that in many cases the commercial banks have chosen not to deny mortgage loans to nonchildbearing women but instead to modify requested loan amounts downward by amounts not justified by the objective characteristics of the application.

Although the New York-Nassau-Suffolk commercial bank FONLYNCB coefficient is the only statistically significant positive coefficient relating to the sex variables, the positive signs of many of the other female only coefficients should be noted. Ignoring the Rochester savings and loan sample for which all the ratios are well below one, five out of the remaining six ratios for female only applications exceed one.

No similarly consistent pattern emerges for any of the other related variables. On the one hand, upstate commercial banks, Rochester savings and loan associations, and New York-Nassau-Suffolk mutual savings banks appear to favor all six categories other than female only relative to the base; just the reverse is true for the New York-Nassau-Suffolk commercial banks and savings and loan associations.

Turning to the results relating to differential treatment based on marital status, we find evidence to support the view that mutual savings banks in the New York-Nassau-Suffolk metropolitan area discriminate against separated applicants. Specifically, separated applicants applying for mortgages from these banks experience downward modifications that average thirty-five percent larger than those of married couples. Thus, a separated applicant must raise on average an additional $2,296 to make the downpayment just because of his/her marital status, given that the person is chosen for a downward modification in the first place.

No consistent pattern emerges across the other four samples in this regard. The pattern found for the New York-Nassau-Suffolk mutual savings bank sample (i.e. a MODOWN ratio above one for separated applicants and below one for unmarried applicants) suggests that distinguishing between married and separated applicants may be important for the analysis. Unfortunately, data limitations prevent us from doing so in three of the five samples.

Race

The findings with respect to differential treatment based on race, summarized in Table 7-3, generally are inconsistent with the hypothesis of discriminatory behavior in the decision determining the amount by which requested loan amount is to be reduced. Many of the ratios are less than one, implying that, if anything, lenders modify loans downward by less for members of racial minorities than for similarly situated whites; furthermore, none of the three ratios greater than one is derived from a statistically significant coefficient. Recall, however, that minorities may be discriminated against in a more direct fashion; they may be differentially denied the loan (see Chapter 6).

When the results are combined with the denial and modification ratios discussed in Chapter 6, the following picture emerges.

Table 7-3

Downward Modifications (Dollar Amounts and Ratios) by Race for Baseline Applications: New York State[a]

	AST-ROCH-SYR	NYNS			ROCH
	COM	COM	MSB	SLA	SLA
White (Base)	8249(1.00)	2988(1.00)	6481(1.00)	2840(1.00)	4403(1.00)
Black		3673(1.23)	4960(0.77)*	3616(1.27)	
Hispanic	7125(0.86)	2509(0.84)	5365(0.83)	1951(0.69)	3280(0.74)
Other Minority		1910(0.64)	7243(1.12)	2814(0.99)	

a) The mutual savings banks estimates are based on 1976-1977 mortgage applications data while the other equations are based on 1977-1978 applications. The acronyms used in the column headings are:

Bank type
- COM - commercial banks
- MSB - mutual savings banks
- SLA - savings and loan associations

Metropolitan areas
- AST - Albany-Schenectady-Troy
- NYNS - New York-Nassau-Suffolk
- ROCH - Rochester
- SYR - Syracuse

The entries in the table represent the predicted downward modification (in dollars) for an applicant similar to the base application in all ways other than the characteristic listed. Numbers in parentheses represent the ratio of the downward modification for an application with the indicated characteristic to the downward modification for the baseline application. See text for definition of the baseline application. A single asterisk (*) indicates that the numerator of the ratio is statistically significantly different from the denominator at the five-to-ten percent level. Two asterisks (**) indicate that the difference is significant at the five or less percent level.

Bankers are more likely to modify the loan amount on applications from minorities than from whites, but once they decide to modify the loan, lenders do not reduce loan amounts excessively below requested amounts for members of racial minorities. Thus, the evidence presented here is not consistent with the view that bankers use the modification alternative to give minorities harsher loan terms than otherwise warranted. Given denial ratios for minorities consistently above one, we conclude that the evidence is consistent with the view that most bankers in New York State discriminate against minorities by denying loans outright rather than by imposing harsher terms.

Age of the Applicant

Turning now to the results by age, we find evidence that some banks reduce loan amounts by more for applicants over 45 than for otherwise comparable younger applicants. As summarized in Table 7-4, the results support the hypothesis that both commercial banks and savings and loan associations in the New York-Nassau-Suffolk metropolitan area discriminate against applicants between the ages of 45 and 54 and against those over 54. All four coefficients on which this conclusion is based are statistically significant at the five percent level or less. While the direction of impact for applicants in these age groups in the New York-Nassau-Suffolk mutual savings bank sample is consistent with the hypothesis of discriminatory behavior as well, the statistical insignificance of the relevant coefficients makes it impossible to reject the hypothesis that these banks treat older applicants

Table 7-4

Downward Modifications (Dollar Amounts and Ratios) by Age for Baseline Applications: New York State[a]

<table>
<tr><th></th><th>AST-ROCH-SYR</th><th colspan="3">NYNS</th><th>ROCH</th></tr>
<tr><th></th><th>COM</th><th>COM</th><th>MSB</th><th>SLA</th><th>SLA</th></tr>
<tr><td>Under 25</td><td rowspan="2">5704(0.69)**</td><td>3768(1.26)</td><td>6241(0.96)</td><td>3371(1.19)</td><td>4449(1.01)</td></tr>
<tr><td>25-34</td><td>4036(1.35)</td><td>5574(0.85)</td><td>2855(1.01)</td><td>3392(0.77)</td></tr>
<tr><td>35-44(Base)</td><td>8249(1.00)</td><td>2988(1.00)</td><td>6481(1.00)</td><td>2840(1.00)</td><td>4403(1.00)</td></tr>
<tr><td>45-54</td><td rowspan="2">5358(0.65)**</td><td>6083(2.04)**</td><td>7223(1.11)</td><td>4738(1.67)**</td><td>4805(1.09)</td></tr>
<tr><td>Over 54</td><td>7352(2.46)**</td><td>7448(1.15)</td><td>6098(2.15)**</td><td>2475(0.56)</td></tr>
</table>

a) The mutual savings banks estimates are based on 1976-1977 mortgage applications data while the other equations are based on 1977-1978 applications. The acronyms used in the column headings are:

Bank type
- COM - commercial banks
- MSB - mutual savings banks
- SLA - savings and loan associations

Metropolitan areas
- AST - Albany-Schenectady-Troy
- NYNS - New York-Nassau-Suffolk
- ROCH - Rochester
- SYR - Syracuse

The entries in the table represent the predicted downward modification (in dollars) for an applicant similar to the base application in all ways other than the characteristic listed. Numbers in parentheses represent the ratio of the downward modification for an application with the indicated characteristic to the downward modification for the baseline application. See text for definition of the baseline application. A single asterisk (*) indicates that the numerator of the ratio is statistically significantly different from the denominator at the five-to-ten percent level. Two asterisks (**) indicate that the difference is significant at the five or less percent level.

the same as they treat younger applicants. Neither of the upstate samples gives evidence of discrimination against older applicants either; indeed, the commercial banks in the Albany-Schenectady-Troy, Rochester, Syracuse area appear to reduce loans by less for older applicants relative to younger applicants.

For the New York-Nassau-Suffolk commercial banks and savings and loan associations samples, the magnitudes of the predicted downward modifications for applicants over 45 who are otherwise comparable to the baseline applicant are substantial; they range from $4738 for 45-54 year old applicants at savings and loan associations to $7352 for applicants over 55 at commercial banks. The differences between the predicted downward modifications for the applicants over 45 and those for the base applicants show that up to 60 percent of each predicted loan reduction for older applicants represents the effect of age alone.

These findings shed additional light on the denial and modification ratios reported for these New York-Nassau-Suffolk banks in Chapter 6. Denial ratios close to one suggest that the commercial banks do not discriminate against older applicants. The high modification ratios for the two oldest age groups, however, combined with the finding that the commercial banks reduce loans more in the case of older applicants than in the case of younger applicants suggests that the modification ratios indicate discriminatory behavior. In the case of the savings and loan associations, high denial ratios for older applicants directly indicate age discrimination while the large downward loan modifications on applications from older applicants lends further support to the discriminatory behavior hypothesis even though the predicted probabilities of modification are low.

Because of the way the models are specified, the effect of age on the size of the downward modification is invariant with respect to the sex of the applicant. The specification does imply, however, that the effects of sex and age are additive. This additivity is particularly relevant for the New York-Nassau-Suffolk commercial bank sample where larger than warranted downward modifications were found for female only applicants above childbearing age. Combining this finding with the findings by age, the following implications emerge. Commercial banks would reduce the loan amount by $9416, on average, on applications, otherwise similar to the baseline application, from female applicants between 45 and 54 with no childbearing age women and by $11,685 on applications from those female applicants over 54. These modifications are 3.15 and 3.90 times the predicted downward modifications for the male-female baseline application. Thus, the allegation that older women are treated differently from similarly situated younger male-female couples is supported for New York-Nassau-Suffolk commercial banks.

With respect to young applicants, we find little evidence of discriminatory behavior. The one possible exception is the almost statistically significant positive effect for 25-34 year olds in the New York-Nassau-Suffolk commercial bank sample. The direction of impact is mixed across the five samples and none of the positive coefficients are statistically significant at the 10 percent level.

Redlining

Four of the five samples analyzed in this chapter have too few observations to permit examination of the hypothesis of differential downward modifications in neighborhoods alleged to be redlined. Only the New York-Nassau-Suffolk commercial bank sample permits such a test. As reported in Table 7-5, downward modification ratios greater than one occur with respect to applications from only the alleged redlined areas and Manhattan. Although neither of the coefficients on which these ratios are based is statistically significant at the 10 percent (two-tail) level, their magnitudes and their significance at a 10 percent (one-tail) level suggest that they should not be dismissed completely. At most we can say that the evidence weakly supports the view that applicants from areas alleged to be redlined experience greater downward modifications than similarly situated suburban applicants.

Finally, the downward modification data do not support allegations that bankers treat applications from older neighborhoods or from neighborhoods with high proportions of blacks differently than those from other neighborhoods. The only possible exception to this conclusion is found in the Rochester savings and loan association sample where a 10 percentage point increase in the percent black is associated with a $1299 increase in the average downward modification for a baseline applicant. The coefficient just misses statistical significance at the 10 percent level.

Table 7-5

Downward Modifications (Dollar Amounts and Ratios)
by Location for Baseline Applications
at Commercial Banks in
New York and Nassau-Suffolk SMSAs[a]

Suffolk County (base)	2988(1.00)
Alleged redlined areas	5590(1.87)
Northeast Kings	1076(0.36)
South Kings	2002(0.67)
North Bronx	1706(0.57)
Rest of Queens	2513(0.84)
New York County (Manhattan)	5381(1.80)
Richmond (Staten Island)	375(0.13)
Rockland	429(0.14)**
Westchester	1616(0.54)
Nassau	1916(0.64)

a) The estimates are based on 1977-1978 mortgage applications data. The entries in the table represent the predicted downward modification (in dollars) for an applicant similar to the base application in all ways other than the characteristic listed. Numbers in parentheses represent the ratio of the downward modification for an application with the indicated characteristic to the downward modification for the baseline application. See text for definition of the baseline application. A single asterisk (*) indicates that the numerator of the ratio is statistically significantly different from the denominator at the five-to-ten percent level. Two asterisks (**) indicate that the difference is significant at the five or less percent level.

SUMMARY

The evidence does not support the hypothesis that banks in New York State make widespread use of excessive loan reduction as a technique for discriminating against certain types of applications. On the other hand, the evidence supports the view that banks in the New York-Nassau-Suffolk area use this method to discriminate in some instances. The strongest finding is that commercial banks and savings and loan associations appear to discriminate against applicants over 45. When combined with the finding that the commercial banks also treat applications from female only households with no woman of childbearing age adversely, this finding has particularly strong implications for the treatment of older women. Evidence of adverse treatment of separated applicants was found in the mutual savings bank sample. While no discriminatory behavior based on the race of the applicant was discovered, the results weakly suggest that excessive modifications may occur for applicants purchasing properties in areas alleged to be redlined.

Footnotes

1. Since New York State's usury law was binding during our study period, analysis of interest rates would not be fruitful in any case.
2. This calculation is based on a weighted average of the coefficients across the four samples. The 10,000 difference in requested loan increases the downward modification by $960 while the increase in RLTOAV from 0.63 to 0.82 increases the modification by $1235. Hence, the additional amount granted is 7805 (= 10,000 - 2195) instead of $10,000.
3. Because of this unexpected sign of RLTOAV, a variety of alternative model specifications, including non-linear specifications, were estimated for the New York-Nassau-Suffolk commercial bank sample. The results with respect to the discrimination variables were remarkably stable across specifications.
4. In the New York-Nassau-Suffolk metropolitan area, the baseline suburb is Suffolk County and in the Rochester area, it is Monroe County. The combined upstate data base requires two modifications to the baseline application; first, the baseline application is expanded to include those married male-female couples where the wife is beyond childbearing age and is working and second, since no location variables are included in the equation, the base location is the entire study area.

*U.S. GOVERNMENT PRINTING OFFICE : 1980 O-624-909/1818