c. Recent HMDA Studies—Controlling for Applicant Credit Risk

An important question is whether variations in denial rates reflect lender bias against certain kinds of neighborhoods and borrowers, or simply the credit quality of the potential borrower (as indicated by the applicant's available assets, credit rating, employment history, etc.). The technical improvements offered by recent studies of credit disparities have attempted to control for credit risk factors that might influence a lender's decision to approve a loan. Without fully accounting for the creditworthiness of the borrower, racial differences in denial rates cannot be attributed to lender bias. The best example of accounting for credit risk is the study by researchers at the Federal Reserve Bank of Boston, which analyzed mortgage denial rates.13 To control for credit risk, the Boston Fed researchers included 38 borrower and loan variables indicated by lenders to be critical to loan decisions. The study found that minorities' higher denial rates could not be explained fully by income and credit risk factors. African Americans and Hispanics were about 60 percent more likely to be denied credit than Whites, even after controlling for credit risk characteristics such as credit history, employment stability, liquid assets, selfemployment, age, and family status and composition. Although almost all highly-qualified applicants of all races were approved, differential treatment was observed among borrowers with lesser gualifications.14

A recent HUD study also found mortgage denial rates for minorities to be higher in ten metropolitan areas, even after controlling for credit risk.¹⁵ In

14 This study was the subject of substantial criticism with regard to data quality and model specification, but even after accounting for these problems, the race conclusions were found to persist in a re-estimation of the model by Fannie Mae. See James H. Carr and Isaac F. Megbolugbe, "The Federal Reserve Bank of Boston Study on Mortgage Lending Revisited," Journal of Housing Research, Volume 4, Issue 2, 1993, pp. 277-313 Other criticisms, however, have also been mentioned. For instance, the fact that the credit risk variables included in the model are correlated with the minority variable suggests that the latter may be picking up the effects of still other credit risk variables omitted from the model. See John Straka. "Boston Federal Reserve Study of Mortgage Discrimination," Secondary Mortgage Markets, Volume 10, No. 1, Winter 1993, pp. 8–9, for a useful discussion of other aspects of the Boston Fed study.

¹⁵ Ann B. Schnare and Stuart A. Gabriel, "The Role of FHA in the Provision of Credit to Minorities," ICF Incorporated, prepared for the U.S. addition, the higher denial rates observed in minority neighborhoods were not purely a reflection of the higher denial rates experienced by minorities. Whites experienced higher denial rates in some minority neighborhoods than in some predominantly white neighborhoods.

A more recent reassessment and refinement of the data used by the Federal Reserve Bank of Boston has confirmed the findings of that study.16 William C. Hunter of the Federal Reserve Bank of Chicago also found that race was a factor in denial rates of marginal applicants. While denial rates were comparable for borrowers of all races with "good" credit ratings, among those with "bad" credit ratings or high debt ratios, minorities were significantly more likely to be denied than similarlysituated whites. The study concludes that the racial differences in denial rates are due to a cultural gap between white loan officers and minority applicants, and conversely, a cultural affinity with white applicants.

The two Fed studies and the HUD study concluded that the effect of borrower race on mortgage rejections persists even after controlling for legitimate determinants of lenders' credit decisions. Thus, they give some legitimacy to denial rate comparisons such as those in Tables B.1 and B.2. However, the independent race effect identified in these studies is still difficult to interpret. In addition to lender bias, access to credit can be limited by loan characteristics that reduce profitability 17 and by underwriting standards that have disparate effects on minority and lower income borrowers and neighborhoods.18

d. Recent HMDA Studies—Controlling for Neighborhood Risk and Demand and Tests of the Redlining Hypothesis

Two recent statistical studies sought to test the redlining hypothesis by more completely controlling for differences in

¹⁷Lenders are discouraged from making smaller loans in older neighborhoods. Since upfront loan fees are frequently determined as a percentage of the loan amount, such loans generate lower revenue and thus are less profitable to lenders.

¹⁸ Standard underwriting practices may exclude lower income families that are, in fact, creditworthy. Such families tend to pay cash, leaving them without a credit history. In addition, the usual front-end and back-end ratios applied to applicants' housing expenditures and other ongoing costs may be too stringent for lower income households, who typically pay higher shares of their income for housing than higher income households. neighborhood risk and demand. These studies do not support claims of racially induced mortgage redlining—the explanatory power of neighborhood race is reduced to the extent that the effects of neighborhood risk and demand are accounted for. However, these studies cannot reach definitive conclusions about redlining because of the correlation of neighborhood race with other explanatory variables included in their models.

First, Andrew Holmes and Paul Horvitz used 1988–1991 HMDA data to examine the flow of conventional mortgage originations across census tracts in Houston.¹⁹ Their regression model included as explanatory variables the economic viability of the loan and characteristics of residents of the tract (e.g., house value, income, age distribution and education level), measures of demand (e.g., recent movers and change in owner-occupied units between 1980 and 1990), and measures of credit risk (defaults on governmentinsured loans and change in tract house values between 1980 and 1990). To determine the existence of racial redlining, the model also included as explanatory variables the percentages of African American and Hispanic residents in the tract and the increase in the tract's minority percentage between 1980 and 1990. Most of the neighborhood risk and demand variables were significant determinants of the flow of conventional loans in Houston. The coefficients of the racial composition variables were insignificant which, led Holmes and Horvitz to conclude that allegations of redlining could not be supported, at least in the Houston market.

One of their more interesting findings, however, was that the racial composition variables became significant and negative, thus suggesting the existence of redlining, when they reestimated their model twice, once without the credit risk variables and once without the demand variables. This finding is consistent with earlier credit flow studies that concluded that redlining exists. Holmes and Horvitz caution against relying on findings from these earlier studies because they did not adequately account for differences in neighborhood risk and demand. The authors conclude that "a claim of racially based geographic discrimination in mortgage lending must be based on a consideration of race after taking

¹³ Alicia H. Munnell, Lynn E. Browne, James McEneaney, and Geoffrey M. B. Tootell, "Mortgage Lending in Boston: Interpreting HMDA Data," Federal Reserve Bank of Boston, Working Paper Series, No. 92–7, October 1992.

Department of Housing and Urban Development, April 25, 1994.

¹⁶ William C. Hunter, "The Cultural Affinity Hypothesis and Mortgage Lending Decisions," WP-95–8, Federal Reserve Bank of Chicago, 1995.

¹⁹ Holmes and Horvitz also analyzed the flow of government-insured loans and obtained what are now standard results in the literature—compared with conventional loans, government-insured loans are more targeted to lower income and risky neighborhoods.