market economists, and HUD supports the premise that the location of a census tract—whether within a central city or a suburb—has minimal relationship to whether the tract is underserved. Instead, these studies have found that mortgage flows in a census tract are strongly correlated with the minority concentration or median income of that tract. The Urban Institute criticized the continued use of OMB-designated central cities in the goal because it treats all areas in central cities as if they have access problems. However, substantial evidence shows that mortgage access problems are not the same across central city neighborhoods.

Use of the definition advanced by Fannie Mae would add 8,833 central-city tracts to 13,554 central city tracts under this rule's definition. Credit access is not a problem in these added tracts—their average mortgage denial rate is 11 percent, which is one-half of the 22 percent denial rate for central city tracts covered by this final rule.

Freddie Mac Definition. Use of the definition proposed by Freddie Mac would add substantially more tracts and tracts that have lower denial rates than the definition in the final rule. Credit access does not appear to be a problem in the 5,367 tracts added by the Freddie Mac definition. The denial rate for the added tracts is 15 percent, which is only slightly above the 13 percent denial rate for all metropolitan tracts and significantly less than the 21 percent denial rate for metropolitan area tracts covered by this final rule.

B. Underlying Data and Identifying Underserved Areas

1. Introduction and Overview

Data on mortgage credit flows are far from perfect, and issues regarding the identification of areas with inadequate access to credit are both complex and controversial. For this reason, before considering housing needs and past GSE performance, it is essential to define ''underserved areas'' as accurately as possible from existing data. To provide essential background for understanding the final rule's definition of underserved areas for this goal, this section carefully reviews the literature investigating access to credit and reports findings from HUD's analysis of 1993 and 1994 HMDA and Census data bases. The first part of this section discusses research and data analysis in urban areas; the latter part discusses rural areas.

Three main points are made in this section:

- The existence of substantial geographic disparities in mortgage credit is well documented for metropolitan areas. Research has demonstrated that areas with lower incomes and higher shares of minority population consistently have poorer access to mortgage credit, with higher mortgage denial rates and lower origination rates for mortgages. Thus, the income and minority composition of an area is a good method of determining whether that area is being underserved by the mortgage market.
- The research supports a targeted definition. Studies conclude that characteristics of the applicant and the neighborhood where the property is located are the major determinants of mortgage denials and origination rates. Once these characteristics are accounted for, other influences such as location in an OMB-designated central city play only a minor role in explaining disparities in mortgage lending.[3]
- Research on mortgage credit needs in rural areas is not extensive because of the lack of mortgage data. The available research does suggest that income and minority composition identify rural areas that experience housing and mortgage access problems. The lack of mortgage data, however, suggests the use of a broader underserved definition than in metropolitan areas.

2. Evidence About Access to Credit in Urban Areas

The viability of neighborhoods—whether urban, rural, or suburban—depends on the access of their residents to mortgage capital to purchase and improve their homes. While neighborhood problems are caused by a wide range of factors, including substantial inequalities in the distribution of the nation's income and wealth, there is increasing agreement that imperfections in the nation's housing and mortgage markets are hastening the decline of distressed neighborhoods. Disparate denial of credit based on geographic criteria can lead to disinvestment and neighborhood decline. Discrimination and other factors, such as inflexible and restrictive underwriting guidelines, limit access to mortgage credit and leave potential borrowers in certain areas underserved.

a. Early Credit Flow Studies

Most studies of geographical disparities have used Home Mortgage Disclosure Act (HMDA) data. A number of studies using the early HMDA data sought to test for the existence of geographical redlining, which is the refusal of lenders to make loans in certain neighborhoods regardless of the creditworthiness of the individual applicant.[4] Consistent with the redlining hypothesis, these studies found lower volumes of loans going to low-income and high-minority neighborhoods.[5] However, such analyses were criticized because they did not distinguish between demand and supply effects[6]—that is, whether loan volume was low because people in high-minority and low-income areas were unable to afford home ownership and therefore were not applying for mortgage loans, *or* because lenders refused to make loans in these areas. Moreover, the early HMDA data were incomplete because non-depository lenders (e.g., mortgage bankers, who originate most FHA loans) were not included.

Like early HMDA studies, an analysis of deed transfer data in Boston found lower rates of mortgage activity in minority neighborhoods.[7] The discrepancies held even after controlling for income, house values and other economic and non-racial factors that might explain differences in demand and housing market activity.[8]

[3] For the sake of brevity, in the remainder of this appendix, the term ''central city'' is used to mean ''OMB-designated central city.''

[4] Prior to 1990, HMDA data showed only the total number and aggregate dollar volume of loans made in each census tract for depository institutions; no information was reported on individual borrowers or on applications denied.

[5] These studies, which were conducted at the census tract level, typically involved regressing the number of mortgage originations (relative to the number of properties in the census tract) on characteristics of the census tract including its minority composition. A negative coefficient estimate for the minority composition variable was often interpreted as suggesting redlining. For a discussion of these models, see Eugene Perle, Kathryn Lynch, and Jeffrey Horner, ''Model Specification and Local Mortgage Market Behavior,'' *Journal of Housing Research,* Volume 4, Issue 2, 1993, pp. 225–243.

[6] For critiques of the early HMDA studies, see Andrew Holmes and Paul Horvitz, ''Mortgage Redlining: Race, Risk, and Demand,'' *The Journal of Finance,* Volume 49, No. 1, March 1994, pp. 81–99; and Michael H. Schill and Susan M. Wachter, ''A Tale of Two Cities: Racial and Ethnic Geographic Disparities in Home Mortgage Lending in Boston and Philadelphia,'' *Journal of Housing Research,* Volume 4, Issue 2, 1993, pp. 245–276.

[7] Katherine L. Bradbury, Karl E. Case, and Constance R. Dunham, ''Geographic Patterns of Mortgage Lending in Boston, 1982–1987,'' *New England Economic Review,* September/October 1989, pp. 3–30.

[8] Using an analytical approach similar to that of Bradbury, Case, and Dunham, Anne Shlay found evidence of fewer mortgage loans originated in black census tracts in Chicago and Baltimore. See Anne Shlay, ''Not in That Neighborhood: The Effects of Population and Housing on the Distribution of Mortgage Finance within the Chicago SMSA,'' *Social Science Research,* Volume 17, No. 2, 1988, pp. 137–163; and ''Financing Community: Methods for Assessing Residential Credit Disparities, Market Barriers, and Institutional Reinvestment Performance in the Metropolis,'' *Journal of Urban Affairs,* Volume 11, No. 3, 1989, pp. 201–223.