
An Analysis of the Effects of the GSE Affordable Goals on Low- and Moderate-Income Families



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Prepared for:
U.S. Department of Housing and Urban Development
Office of Policy Development and Research

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FOREWORD

Since 1993 Fannie Mae and Freddie Mac, the two large government sponsored enterprises (GSEs) that provide a secondary market for conventional home mortgages, have been subject to quantitative goals for the portion of their business that represents mortgages on housing for lower income families and families in underserved areas. The GSEs have more-or-less steadily increased their performance under the goals. Nevertheless, questions have been raised concerning the ultimate effects of the goals on low- and moderate-income families and underserved neighborhoods. This study seeks to address such questions by providing a conceptual framework for the impacts of the goals and through statistical analysis.

Although it is difficult to sort out the separate effects of simultaneous, multiple economic forces and public programs within urban areas, and data sources are limited, this study finds evidence that the goals have helped to make homeownership more attainable for low- and moderate-income families. The authors trace this to expanded GSE market shares in areas with higher concentrations of target groups, as well as to lower interest rates in local markets where the GSEs have a relatively substantial presence. In addition, the study finds that the GSEs have helped to increase overall lending volumes to lower income families through their purchases of seasoned loans, an effect that the authors attribute to the goals. Finally, the authors find suggestive evidence that homeownership rates have increased faster for low- and moderate-income families in areas where the GSEs have relatively large market shares.

The study should be of value to policy makers, analysts, and others interested in understanding how the GSEs are fulfilling their public policy mandates. As an initial effort in considering the long-term impacts of the goals, it should provide a useful foundation for researchers wishing to pursue these issues even more deeply.

A handwritten signature in cursive script, reading "Lawrence L. Thompson". The signature is written in dark ink and is centered on the page.

Lawrence L. Thompson
General Deputy Assistant Secretary for Policy
Development and Research

TABLE OF CONTENTS

EXECUTIVE SUMMARY	vii
CHAPTER 1: INTRODUCTION AND BACKGROUND.....	1
Economic Factors	5
The Community Reinvestment Act.....	5
CHAPTER 2: CAPITAL MARKET LITERATURE REVIEW.....	7
Interaction Between the GSEs and the Primary Mortgage Market	7
Impact of GSEs on Mortgage Operations	8
Impact of GSEs on Mortgage Underwriting.....	9
Underwriting and Collateral Quality.....	12
Underwriting and Borrower Capacity	12
Underwriting and Borrower Credit	13
Automated Underwriting.....	14
Impact of the GSEs on Mortgage Interest Rates	14
Mortgage and Capital Market Linkages	15
The Rationale for the Affordable Housing Goals.....	18
Credit Rationing Models.....	18
Empirical Evidence of Credit Rationing.....	20
Effects of the GSEs' Goals on Targeted Families.....	21
What Have We Learned?.....	22
CHAPTER 3: CONCEPTUAL MODEL OF THE EFFECTS OF THE GSE REACTION TO AFFORDABLE GOALS ON TARGETED FAMILIES.....	24
Conceptual Model	24
Implications For Empirical Analysis.....	27
CHAPTER 4: EMPIRICAL ANALYSIS.....	28
Question 1: Changes in Share of Mortgage Credit Provided	28
Question 2: GSE Market Shares and Target Groups.....	33
Question 3: GSE Market Shares and Interest Rates	39
Question 4: Mortgage Flow Model	42
Capital Market Outcome Summary	49

Question 5: Homeownership Rates and GSE Market Share: Is There a Relationship? .	50
1992 Homeownership Rates for the Eight MSAs	52
1992-1996/8 Changes in Homeownership Rates	53
Homeownership Rates in Geotargeted Areas.....	56
Question 6: National Analysis of GSE Market Shares and Homeownership Rates	59
Homeownership Summary.....	63
CHAPTER 5: SUMMARY OF RESULTS	65
REFERENCES.....	68
ANNEX A	75
ANNEX B	93
ANNEX C	99

EXECUTIVE SUMMARY

The Federal Housing Enterprises Financial Safety and Soundness Act (FHEFSSA) of 1992 was enacted, in part, to establish incentives for Fannie Mae and Freddie Mac¹ to increase their service to low- and moderate income families and neighborhoods. The legislation required that the U.S. Department of Housing and Urban Development (HUD) set affordable housing goals. Under FHEFSSA, HUD established a (1) a low- and moderate-income goal which mandates that a certain proportion of units in properties mortgaged with loans purchased by the GSEs be owned or rented by occupants with an income less than or equal to area median; and (2) a geographically targeted goal, which requires that a percentage of units mortgaged by loans bought by the GSEs be located in metropolitan-area census tracts with a median family income less than or equal to 90 percent of area median, or with a minority population proportion of at least 30 percent and a tract median income less than or equal to 120 percent of area median (slightly different rules apply in nonmetropolitan areas). The act also sets a special affordable goal for mortgages where family income is less than or equal to 60 percent of area median or less than or equal to 80 percent of area median and located in low-income areas. In its October 31, 2000 final rule, HUD set the low-mod goal at 50 percent, the underserved area goal at 31 percent, and the special affordable goal at 20 percent [U.S. Department of Housing and Urban Development, 2000a].

Two other FHEFSSA provisions create incentives for the GSEs to take steps to ensure that they improve their service to underserved markets. The act includes a mandate that the GSEs "lead the industry in affordable lending" and also prohibits the GSEs from discriminating based on prohibited factors, such as a borrower's race, ethnicity or gender, in their loan purchase activities. Rather than just providing general market liquidity, the GSEs under FHEFSSA are expected to take a leading role in serving lower income and minority families by meeting quantitative percentage of business targets, initiating demonstrations and partnerships that facilitate affordable lending, and scrutinizing their underwriting standards and purchasing activities to ensure that they comply with fair lending requirements.

The purpose of this report is to assess the extent to which the GSEs' responses to FHEFSSA have had their intended effect: are low- and moderate-income families now better off as a result of the affordable housing goals? We followed three principles to answer this question: (1) we based our analysis on a solid theoretical foundation developed after a thorough literature review; (2) we narrowed the research scope to

¹ In this report we refer to Fannie Mae and Freddie Mac as the GSEs, or government sponsored enterprises.

capital market outcomes, which include GSE market shares and effective borrowing costs, and housing market outcomes, which include low- and moderate-income homeownership rates; and (3) we relied on readily available secondary data sources to conduct empirical analyses of the two categories of outcomes.

Our analysis of capital and housing market outcomes is complicated by the fact that FHEFSSA was not the only change in the U.S. housing market after 1992. The economy grew at a record pace, increasing incomes for families distributed throughout the income scale. In addition, mortgage rates declined over the decade. These two factors contributed to the ability of traditionally underserved groups—especially lower income and minority families—to achieve homeownership. In addition, lenders subject to the Community Reinvestment Act introduced new affordable lending products that make it easier for wealth- and income-constrained families to qualify for mortgages. Moreover, lenders were subject to an increased level of fair lending scrutiny in the wake of studies which found higher rates of rejections for minority loan applicants, even after controlling for factors such as borrower credit [Wyly and Holloway, 1999].

During this period, in response to FHEFSSA, the GSEs also made significant changes which had the effect of reducing the effective cost of borrowing for traditionally underserved borrowers. Fannie Mae and Freddie Mac adopted more flexible underwriting guidelines, such as lower downpayment requirements, and they introduced affordable mortgages that allowed borrowers to qualify with even less equity, higher front- and back-end ratios² and less than perfect credit histories [Fannie Mae, 2000, Freddie Mac]. Beyond underwriting changes, the GSEs introduced automated underwriting systems and encouraged lenders to use credit scores when evaluating loan applications. These technological changes, according to the GSEs, make underwriting fairer, faster and cheaper [Fannie Mae], although some industry observers are not convinced that automation increases homeownership opportunities for underserved markets [Temkin, et al. 2001, Madison, 1999]. At the time of this writing, HUD is conducting a review of the GSEs' automated underwriting systems in order to examine the extent to which they comply with fair lending laws.

Our underlying working hypothesis throughout this report is that Fannie Mae and Freddie Mac, after FHEFSSA, made significant changes to their business practices which, in effect, reduced the effective cost of borrowing even without affecting the contract interest rates paid by borrowers. This is a critical difference between the mortgage market and other types of industries. Lenders operating in the prime mortgage market typically do not charge very different contract interest rates. Rather

² The front-end ratio is calculated by dividing an applicant's expected monthly house payment, including principal and interest, taxes and insurance by his or her monthly income. The back-end ratio is calculated by dividing a borrower's total monthly debt obligations (including house payment) by his or her monthly income.

than use a price mechanism, lenders use underwriting standards to identify borrowers who represent relatively high risks to the lender, given prevailing interest rates. By purchasing loans originated with more flexible underwriting guidelines related to downpayment and debt-to-income ratio requirements, Fannie Mae and Freddie Mac lower effective borrowing costs. The result of the GSEs' responses to FHEFSSA is that lenders that sell loans to Fannie Mae and Freddie Mac now offer a wider array of conventional loan products with more flexible underwriting guidelines.³ Consequently, a higher proportion of borrowers should be able to qualify for such loans, which should create attendant higher homeownership rates for target groups. This is the working assumption we developed from our theoretical model, and empirically tested.

Our empirical analysis, though preliminary in nature, suggests that the GSE affordable goals help to make homeownership more attainable for target families. We arrive at this conclusion for the following reasons. In our assessment of the effects of the affordable goals on capital markets, we find that the GSE share of the conventional conforming market increased since 1995, and especially for lower income borrowers and neighborhoods. This suggests that the affordable housing goals have an impact on the purchase decisions of Fannie Mae and Freddie Mac, though the GSEs' share of the conventional conforming market is also affected by refinance mortgage volumes. This is an important finding, since we also find that interest rates are lower in markets in which Fannie Mae and Freddie Mac purchase a higher proportion of conventional loans. Therefore, borrowers face lower costs as a result of the affordable housing goals, to the extent that the goals increase GSE participation in the conventional market.

Our analysis identifies another benefit of the affordable housing goals. Overall lending volume in a metropolitan area increases when the GSEs purchase seasoned loans. The additional liquidity that lenders receive when selling these loans results in more mortgage lending activity. It is likely that the GSEs, and particularly Fannie Mae, purchase more seasoned loans as a result of the goals, since these mortgages may have been originated with guidelines that did not meet GSE standards for newly-originated home purchase loans. In response to the goals, Fannie Mae and Freddie Mac purchase seasoned loans that demonstrate acceptable levels of performance, and these funds are recycled by lenders into more lending volume.⁴ These outcomes are consistent with the idea that the affordable housing goals, among other things, provide

³ The GSEs can influence costs associated with the mortgage transaction, such as introducing automated systems that reduce underwriting, processing and appraisal costs. However, mortgage rates, while affected by GSE purchases, are set by supply and demand conditions in the capital markets, and not solely by the GSEs.

⁴ Bunce [2000a] finds that Fannie Mae, more than Freddie Mac, purchased seasoned loans between 1996 and 1998. Bunce also finds that seasoned loans purchased by the GSEs are disproportionately originated on properties that meet the affordable housing goals criteria.

an incentive for Fannie Mae and Freddie Mac to increase the share of their business dedicated to borrowers and properties in traditionally underserved markets.

Our results, based on analyzing homeownership rate changes between 1992 and 1998 in eight metropolitan areas, suggest that the GSEs' responses to the affordable housing goals described above are having favorable impacts on low-income and minority homeownership rates. Though only based on a sample of eight metropolitan statistical areas (MSAs) included in the American Housing Surveys of 1992, 1996 and 1998, and so not at all definitive, we find that homeownership rates increased at a faster rate for low-income families when compared to all families. Moreover, in a subset of MSAs, minority homeownership rates also grew faster when compared to overall homeownership changes in those MSAs. Some of this increase is due to other factors, such as higher overall incomes, lower interest rates, changes to CRA enforcement procedures, and increased outreach efforts by lenders. However, there is evidence which suggests that the goals are having their intended effect: in our sample of eight MSAs, homeownership rates for low-income families increased by an average of 6.8 percentage points in MSAs where the GSE market share for conventional loans exceeded 40 percent. This increase was about four times the average 1.6 percentage point increase for MSAs where the GSE market share was less than 30 percent. Similarly, during the 1990s, homeownership rate changes were greater for low-income minorities in cities where the GSEs had a large market share. This suggests that the GSEs' responses to the affordable goals in our eight sample MSAs had an effect on homeownership rates over and above those attributable to economic factors and lenders' responses to CRA. The recent 2000 census data will allow for a more thorough analysis of the effect of the goals on homeownership rates, but our assessment using eight cities is indicative of a possible relationship between them.

We also examined the affordable housing goal effects in a larger sample of MSAs. In analyzing homeownership rate changes between 1991 and 1997 in 80 cities, we found that the GSEs, by purchasing loans originated to low-income families, helped to reduce the disparity between homeownership rates for lower and higher income families. This suggests that the liquidity created when the GSEs purchase loans originated to low-income families is recycled into more lending targeted to lower income homebuyers.

The housing market outcomes summarized above are consistent with the idea that the GSEs, by responding to the affordable housing goals, are making homeownership possible for more lower income and minority families. The empirical results, we believe, suggest that the underwriting changes, experiments and partnerships developed by Fannie Mae and Freddie Mac since 1992 are having favorable effects. We realize, however, that our results are not definitive: they are based on available data that does not provide the level of detail necessary to conduct a fully controlled national assessment. Moreover, there is continuing controversy surrounding

the idea that the GSEs may or may not be "leading the market" in terms of affordable lending. Our results do not comment on this controversy.⁵ We find evidence that suggests the affordable housing goals are having favorable impacts on lower income families, and it seems reasonable to assume that the GSEs, by increasing their efforts to meet the higher percentage of business targets set in HUD's new rule, will be able to increase homeownership opportunities even more in traditionally underserved markets.

⁵ For more on this topic, see Fannie Mae (2000) and Freddie Mac (2000) for their criticisms of HUD analyses that indicate the GSEs are not leading the market in affordable lending. HUD's position is presented in HUD (2000a) and Bunce (2000a).

CHAPTER 1 INTRODUCTION AND BACKGROUND

The purpose of this project is to assess the extent to which the affordable housing goals, adopted as part of the 1992 Federal Housing Enterprises Financial Safety and Soundness Act (FHEFSSA), had positive effects on low- and moderate-income families. We conducted our research in three separate stages. In the first phase of the study, we reviewed the literature that is the most relevant for developing models that explicate how the GSEs' affordable housing goals (AHGs) affect targeted groups. In the second phase of this project, we developed a conceptual model to examine the effect of the GSE affordable housing goals on the mortgage market. During the third stage, we conducted empirical analyses based on the theoretical model developed as part of the second phase.

The three-stage research strategy provided an opportunity to narrow the scope of our analysis in order to create a tractable set of researchable issues. Rather than assess all of the potential effects of the GSEs' responses to the goals, we concentrated our analysis on two major areas: (1) capital market outcomes, such as mortgage credit price and quantity changes for targeted borrowers; and (2) housing market outcomes, as defined by homeownership rate changes among low- and moderate-income and minority families. We chose these outcomes because they represent effects that are central to the GSEs' stated objective, which is to make homeownership possible for as many families as is possible.⁶ We believe, then, that the goals should be examined by considering their impact on Fannie Mae's and Freddie Mac's business practices related to serving targeted families, and the resulting observable changes to homeownership rates for target group members.

Our underlying working hypothesis throughout this report is that Fannie Mae and Freddie Mac, after FHEFSSA, made significant changes to their business practices which, in effect, reduced the effective cost of borrowing even without affecting the

⁶ Fannie Mae's website, describes the company as follows: "For most of us, a home is more than simple shelter, or a good investment. A home of our own is a dream come true, and symbolizes who we are. At Fannie Mae, the home symbolizes who we are, too. Our public mission, and our defining goal, is to help more families achieve the American dream of homeownership. We do that by providing financial products and services that make it possible for low-, moderate- and middle-income families to buy homes of their own. Since Fannie Mae began in 1968 we have helped more than 30 million families achieve the American dream of homeownership." Freddie Mac, on its website, describes the company in the following manner: "Freddie Mac is a shareholder-owned corporation whose people are dedicated to improving the quality of life by making the American dream of decent, accessible housing a reality. We accomplish this mission by linking Main Street to Wall Street—purchasing, securitizing and investing in home mortgages, and ultimately providing homeowners and renters with lower housing costs and better access to home financing. Since our inception, Freddie Mac has financed one out of every six homes in America."

contract interest rates paid by borrowers. This is a critical difference between the mortgage market and other types of industries. Lenders operating in the prime mortgage market typically do not charge very different contract interest rates. Rather than use a price mechanism, lenders use underwriting standards to identify borrowers who represent relatively high risks to the lender, given prevailing interest rates. By purchasing loans originated with more flexible underwriting guidelines related to downpayment and debt-to-income ratio requirements, Fannie Mae and Freddie Mac lower effective borrowing costs. The result of the GSEs' responses to FHEFSSA is that lenders that sell loans to Fannie Mae and Freddie Mac now offer a wider array of conventional loan products with more flexible underwriting guidelines.⁷ Consequently, a higher proportion of borrowers should be able to qualify for such loans, which should create attendant higher homeownership rates for target groups. This is the working assumption we developed from our theoretical model, and empirically tested.

We expect the goals to have an impact on homeownership rates because of the large market presence of the GSEs. In 1999, Fannie Mae and Freddie Mac purchased \$549 billion in single family mortgages, representing 42 percent of that total market for that year [Office of Federal Housing Enterprise Oversight, 2000]. Since so many loans are sold to the GSEs, primary lenders, including commercial banks, thrifts, and especially mortgage companies—which sell all of their loans to the secondary market—have strong incentives to adopt the GSEs' underwriting and appraisal guidelines. While Fannie Mae and Freddie Mac do not originate mortgages, their underwriting guidelines strongly influence whether a mortgage applicant can qualify for a prime conventional mortgage loan [MacDonald, 1995].

By the late 1980s, many housing advocates and government officials believed that Fannie Mae and Freddie Mac's guidelines were too restrictive, especially in light of the benefits received by the GSEs [Advisory Commission on Regulatory Barriers to Affordable Housing, 1991]. According to MacDonald [1995], the GSEs' underwriting guidelines at that time favored borrowers—mainly white suburban homebuyers—who qualified for "plain vanilla mortgages."

Congress enacted the Federal Housing Enterprises Financial Safety and Soundness Act (FHEFSSA) in 1992 in part, to require that the GSEs increase the share of the business dedicated to the purchase of mortgages originated on properties in underserved neighborhoods. As a result, the legislation mandated that the U.S. Department of Housing and Urban Development (HUD) set affordable housing goals. Under FHEFSSA, HUD established a (1) a low- and moderate-income goal that

⁷ The GSEs can influence costs associated with the mortgage transaction, such as introducing automated systems that reduce underwriting, processing and appraisal costs. However, mortgage rates, while affected by GSE purchases, are set by supply and demand conditions in the capital markets, and not solely by the GSEs.

mandates a certain proportion of units in properties mortgaged with loans purchased by the GSEs be owned or rented by families with incomes less than or equal to 100 percent of area median; and (2) a geographically targeted goal, which requires that a percentage of units mortgaged by loans bought by the GSEs are located in metropolitan-area census tracts with a median family income less than or equal to 90 percent of area median, or with a minority population proportion of at least 30 percent and a tract median income less than or equal to 120 percent of area median. In nonmetropolitan areas, eligible counties are those with a median family income less than 95 percent of the greater of the state or national nonmetropolitan area median income. The legislation also included a special affordable goal for mortgages covering housing units where family income is less than or equal to 60 percent of area median or less than or equal to 80 percent of area median and located in low-income areas. In its final rule [HUD, 2000a], HUD set the low-mod goal at 50 percent, the underserved area goal at 31 percent, and the special affordable goal at 20 percent.

FHEFSSA contained two other provisions that are relevant to this research: a mandate that the GSEs "lead the industry in affordable lending" and language which prohibits the GSEs from discriminating based on prohibited factors, such as a borrower's race, ethnicity or gender, in their loan purchase activities. Rather than just providing liquidity, the GSEs under FHEFSSA are expected to take a leading role in serving lower income and minority families by meeting quantitative percentage of business targets and initiating demonstrations and partnerships that facilitate affordable lending.

There is some evidence that the affordable goals (AHGs) are having an effect. About 39 percent of home purchase borrowers served by Fannie Mae in 1999 had an income less than 100 percent of area median, up from 29 percent in 1993. Freddie Mac's purchases of home purchase loans followed a similar pattern: about 40 percent the borrowers it served in 1999 had an income less than area median, up from 28 percent in 1993 [Bunce, 2000a]. Moreover, the proportions of loans purchased by the GSEs that were originated to African-American and Hispanic borrowers have increased since 1993. In 1999, African-Americans accounted for 3.4 percent of home purchase borrowers served by Fannie Mae, up from 2.7 percent in 1993; Freddie Mac's proportion of African American homebuyers served in 1999 was 3.5 percent, up from 2.0 percent in 1993 [Bunce, 2000b]. Similarly, Hispanics comprised 6.0 and 5.5 percent of homebuyers served by Fannie Mae and Freddie Mac, respectively in 1999, up from 1993 percentages for Fannie Mae and Freddie Mac of 3.8 and 3.1 percent, respectively [Bunce, 2000b].

These trends are consistent with other studies which have found that the GSEs, since 1992, initiated a number of activities to increase their ability to purchase a greater share of loans originated to lower income borrowers [Listokin and Wyly, 2000, Temkin, et al., 2001]. By introducing greater flexibility into their standard underwriting guidelines, offering special affordable lending products, and conducting underwriting experiments,

the GSEs can serve more lower income and minority borrowers. Moreover, the GSEs developed automated underwriting systems and suggested that underwriters use credit history scores. These two tools, according to Fannie Mae and Freddie Mac, make mortgage lending more affordable and objective, reducing the possibility of discrimination in the lending process and reducing costs associated with underwriting loans, though some industry observers are not convinced that automation increases homeownership opportunities for underserved markets [Fannie Mae, 2000, Temkin, et al. 1999, Madison, 1999]. In fact, HUD is now conducting a review of the GSEs' automated underwriting systems in order to examine the extent to which they comply with fair lending laws.

The U.S. homeownership rate increased dramatically during the same time that the GSEs implemented the underwriting changes described above. As of the fourth quarter of 2000, 67.5 percent of American families owned their own home—up from 64.0 percent in 1993. Most of this gain results from large increases in homeownership rates for traditionally underserved markets: members of minority groups and low- and moderate income families. Between 1993 and 2000, the number of conventional home purchase loans originated to African-American borrowers increased by 122 percent; the increase for Hispanics was 147 percent. These gains are impressive, especially compared to the 35 percent gain of such loans originated to non-Hispanic whites during the same period.

Lending in minority neighborhoods also increased during the 1990s: conventional mortgage loan originations in predominantly minority census tracts increased by 117 percent between 1993 and 2000, compared to 72 percent for overall conventional lending volume in MSAs. The pattern is similar for lower income borrowers. Between 1993 and 2000, conventional loans to buyers with an income less than 80 percent of local area median income increased by 97 percent, compared with 65 percent for high-income (over 120 percent of area median income) homebuyers. Similarly, conventional lending volume in low- and moderate-income census tracts increased by 113 percent, or forty percentage points higher than the increase in overall MSA conventional lending volume [FFIEC, 2001].

To what extent did the GSEs' activities, in response to FHEFSSA's mandated affordable housing goals, contribute to homeownership rate gains among previously underserved markets in the 1990s? Any analysis of this question must take into account low interest rates and the strong U.S. economy, which helped to increase incomes and wealth for all families, including those in lower income categories, as well as the effect of the Community Reinvestment Act.

Economic Factors

The median family income for all families increased during the 1990s, particularly for African-Americans and Hispanics. In real terms, the median income for African-American families grew almost 50 percent, from \$21,423 in 1990 to \$31,778 in 1999. The increase was slightly less for Hispanic families, from \$23,341 in 1990 to \$31,663 in 1999. Moreover, the median income for families with earnings in the lowest 20 percent of the total distribution increased, in real terms from \$9,833 in 1990 to \$13,320 in 1999 [U.S. Census Bureau]. These increases make it easier for lower income and minority families to achieve homeownership, increasing the demand for owner-occupied housing. Interest rates in the 1990s declined as well, from over 10 percent at the start of the decade to as low as seven percent in 1999 [Mortgage Bankers Association].

That higher incomes and lower interest rates explain some of the increase in homeownership in the U.S. during the 1990s is beyond dispute. But these trends do not fully explain the increase in homeownership rates during the past decade. In a study of homeownership rate changes in the 1990s, Bostic and Surette [2000:1] write: "[T]he last decade has seen significant innovation among mortgage lenders, including technological and information-based advances that have improved their ability to assess risk...Such developments may have made it easier for families to qualify for a mortgage to purchase a home." Indeed, the Joint Center for Housing Studies [2000] reported that loans with more flexible underwriting guidelines helped to offset rising home prices, especially mortgages that allow for relatively low downpayments.

The Community Reinvestment Act

The Community Reinvestment Act, adopted in 1977, requires federally-regulated depository institutions to help meet the credit needs of local communities in which they have branches. CRA examination procedures create strong incentives for lenders to originate as many loans as possible to creditworthy low- and moderate-income borrowers and in low- and moderate-income neighborhoods. Therefore, lenders subject to CRA offer low- and moderate-income borrowers a range of mortgage choices, including FHA, conventional, and targeted affordable products in order to maximize origination volumes in areas that count in a CRA examination [Williams, 1999].

What is the effect of CRA? According to the National Community Reinvestment Coalition [1999], lenders have committed \$1 trillion in reinvestment funds between 1977 (when CRA was adopted) and 1998. The overwhelming majority of these commitments have been signed since 1996: \$917 billion have been committed in that period, primarily due to the large number of bank mergers that have been proposed since 1996, which have given community advocates an opportunity to raise CRA challenges to these mergers.

There is some evidence that these agreements are having a favorable impact on lending activities within underserved markets. In their study, Litan, Retsinas, Belsky, and Haag [2000], after analyzing lending patterns between 1993 and 1998, found that CRA has had a significant impact in enhancing (low- and moderate-income) lending. Similarly, Schwartz [1998], in his study of lenders that signed CRA agreements, found that such lenders appear to be more responsive than other banks to the credit needs of minority and low-income households and neighborhoods. Banks that signed CRA agreements (again, a subset of lenders that are subject to the Act) have significantly higher rates of mortgage application approvals for disadvantaged households and neighborhoods. Williams [1999], in a study of lending in Indiana, found that lenders subject to CRA are much more likely to originate loans to lower income families and in census tracts with lower median incomes.

Higher incomes, lower interest rates and more aggressive lending, prompted by CRA requirements, are important factors contributing to the increased level of homeownership among lower income and minority families. The purpose of this report is to establish, to the extent possible, the additional effect of the GSE responses to the affordable housing goals on target families. In the next chapter we review the literature related to credit and housing market outcomes, and use this review as a basis for a conceptual model we explicate in Chapter 3. Chapter 4 presents the results of our empirical analysis, and we conclude with a summary of findings in Chapter 5.

CHAPTER 2

CAPITAL MARKET LITERATURE REVIEW

This chapter summarizes the literature that is relevant for analyzing the effects of the GSEs' affordable goals on capital market outcomes. Our purpose is to set a framework for how the GSEs' affect the primary mortgage market, which will provide direction for how to analyze the impact of the affordable housing goals. Thus, the first part of this review concentrates on establishing the interaction between the GSEs and the primary mortgage market. We discuss the impact of the GSEs on mortgage operations and the effect of GSE mortgage underwriting guidelines. We conclude the first part with a discussion of the empirical evidence that establishes a linkage between the GSEs and the primary mortgage market.

After establishing a background that clearly demonstrates the importance of the GSEs to the primary mortgage market, the second part of the literature review focuses on the need and rationale for the affordable housing goals. Implicit in the creation of the affordable housing goals is the notion that the mortgage markets are not meeting the demands for credit from all potential borrowers, specifically lower income and minority borrowers. As a result, the affordable housing goals are designed to ensure that credit is being extended to those areas that otherwise might not have access to conventional mortgage credit. Thus, the second part of the literature review discusses the concept of credit rationing in the mortgage market. In this part, we survey the literature on credit rationing models and discuss the empirical evidence for credit rationing. From this survey, we anticipate establishing a framework for measuring the impact of the affordable housing goals and assessing whether the goals have achieved their objectives.

In the third part of the literature review, we survey previous studies of the affordable housing goals. This section will help establish the current state of knowledge regarding the relationship between the GSEs and the affordable housing goals. From this survey, we will then be able to identify areas where additional information or analysis is warranted.

Finally, the fourth part of the literature review will summarize the findings from the survey. Based on this survey, at the end of the chapter we identify six research questions that will form the basis of our analysis. These research questions cover areas where information and analysis is lacking.

Interaction Between the GSEs and the Primary Mortgage Market

The purposes of the GSEs' affordable housing goals are to increase conventional mortgage credit to low- and moderate-income borrowers and to properties located in geographically targeted areas. However, the GSEs do not directly provide credit to

consumers in the primary market. Thus, any steps initiated by the GSEs to comply with these goals must be filtered through other mortgage market institutions. Therefore, it is important to understand the relationship between the GSEs and primary mortgage market institutions in order to assess exactly how the activities of the GSEs change the behavior of these institutions, and how these changes ultimately affect targeted borrowers.

The first part of this section discusses the impact of the GSEs on mortgage operations. Our literature survey finds that the GSEs have had a significant impact on the development of the primary mortgage market. One area of particular importance where the GSEs have a direct impact on mortgage credit is through their underwriting guidelines for the mortgages they purchase. Thus, the second part of the survey focuses on the literature on mortgage underwriting with particular attention to the risks inherent to mortgage contracts and the mechanisms for controlling these risks. Only by understanding the underwriting process in the primary market can one effectively analyze the impact of the GSEs. In this part we also discuss recent developments in automated underwriting that have resulted from GSE activities. The third part of this section surveys the impact of GSE operations on mortgage interest rates. Finally, we conclude this section with a brief survey of the empirical evidence establishing a link between GSE activities and the primary mortgage markets.

Impact of GSEs on Mortgage Operations

The explosive growth in the mortgage market during the 1990s has resulted in an unbundling of the various operations in the traditional primary mortgage market. Van Order [1996] notes that in addition to increasing the flow of funds into the primary mortgage market, the GSEs have helped unbundle the primary mortgage market activities. The operation of the mortgage market involves four primary activities: origination, servicing, managing credit risk, and raising funds to finance mortgages. Van Order [1996] points out that the GSEs along with the private mortgage insurers (PMIs) serve the market by taking some of the credit risk (i.e. they provide credit enhancements to secondary market investors). The GSEs purchase mortgages from primary market originators and either hold them in portfolio, issuing corporate debt to fund the purchases, or resell the mortgages into the secondary market as mortgage-backed securities. In both cases, investors in the mortgage backed securities and the GSE debt receive the GSEs' guarantee to ensure timely payment. As a result, the GSEs' impact on determining who receives mortgage credit is indirect. The GSEs do not originate mortgages and thus do not determine whether an individual borrower receives a mortgage. Rather, they set guidelines that determine the types of mortgages acceptable for purchase, indirectly influencing the lender's decision on whether to extend credit. Primary market lenders are required to fund mortgages that do not meet the GSE

underwriting guidelines through other sources, such as new deposits and non-agency conduits that package and sell loans to secondary market investors.

The GSEs play a significant role in providing liquidity to the operation of the mortgage market, but do so without assuming a large share of credit risks. Canner, Passmore, and Surette [1996] and Canner and Passmore [1995] point out that once an institution agrees to bear the credit risk, finding institutions to originate, fund or purchase mortgages is not an issue. Rather, it is the bearer of credit risk that is the critical participant in the mortgage market. Directly related to the role of the GSEs in providing mortgage credit to the affordable housing spectrum, Canner, Passmore, and Surette [1996] and Canner and Passmore [1995] compile statistics on GSE mortgage activity by location and income group. In order to isolate the effect on lower income and minority borrowers, they report the percentage of loans purchased by the GSEs of 'FHA eligible' mortgages. 'FHA eligible' mortgages are loans that fall under the FHA qualifying loan limits, which is lower than the conventional loan limits and thus presumably captures most of the affordable housing spectrum. They report that, for 1995, 10 percent of mortgages purchased by the GSEs were located in lower income census tracts and nine percent of mortgages purchased were from minority borrowers. In contrast, Canner, Passmore, and Surette [1996] found that 15 percent of the mortgages backed by FHA were in lower income census tracts and 13 percent were from minority borrowers. Furthermore, Canner, Passmore, and Surette noted that the GSEs accounted for only four percent of FHA eligible mortgages extended to lower income census tracts when expressed in terms of risk-adjusted dollars.

Based on this survey, we can conclude that the GSEs have had a significant impact on the development of the modern primary mortgage market. However, as a result of this development, the market has fragmented with specialized institutions developing to capitalize on economies of scale for specific functions within the mortgage origination process. As a result, it is unclear whether the GSEs ability to influence the primary market has increased or decreased.

Impact of GSEs on Mortgage Underwriting

Given that the GSEs have a significant impact on the availability of credit in the mortgage market, their underwriting guidelines help determine the type of mortgage credit available to different types of borrowers. In order to understand fully the connection between the effects of the affordable housing goals on targeted groups, it is important to consider the mechanism by which the GSEs affect the decisions made by lenders in the primary market. The GSEs establish guidelines, which are used by mortgage originators to identify creditworthy borrowers. Therefore, underwriting guidelines are based on the factors that have been identified to affect a borrower's loan payment performance.

The primary sources of mortgage risk are default and prepayment. Default is the term applied to any borrower action that violates the mortgage contract and is most often associated with non-payment of the mortgage payment due. The mortgage literature recognizes that borrowers may default for both financial and non-financial reasons. Financially induced default occurs when the collateral value falls below the present value of the mortgage. When the property is worth less than the debt, the borrower has an incentive to exercise the inherent 'put' option contained in the mortgage contract and transfer property ownership to the lender. Non-financial default is most often associated with an exogenous factor affecting the borrower's ability to make the scheduled mortgage payments, such as a job loss, divorce, or medical expenses. The impact of these 'trigger-events' on mortgage default is controversial with many economists arguing that rational borrowers (ignoring transaction costs) will not default when the value of the house is greater than the value of the mortgage. So the default risk associated with making residential mortgage loans can be attributed to two sources: (1) the volatility in house prices over time (and the associated likelihood that house prices will fall below loan values); and (2) borrowers' capacity to repay the mortgage debt.

The second major source of risk to the lender, prepayment, refers to the borrower repaying the mortgage principal prior to the loan maturity.⁸ This risk is closely associated with changes in interest rates. During periods of declining interest rates, borrowers have financial incentives to repay their current mortgage in order to refinance at lower interest rates and reduce their effective borrowing costs. Prepayment may also occur for non-financial reasons such as job transfers or divorce.

Research in mortgage pricing models now widely accepts the notion that prepayment and default risks are linked (see Kau and Keenan [1995] for an excellent overview of the development of mortgage pricing models). In this context, prepayment is modeled as a call option and default is modeled as a put option. Together, these options describe the borrower's right to terminate the mortgage contract. Furthermore, prepayment and default are substitutes and thus cannot be valued in isolation since prepaying a mortgage cancels the ability to default and vice versa.

Giliberto and Thibodeau [1989] develop a theoretical model of mortgage termination for fixed-rate loans and provide an empirical test of the model's prepayment aspect. The model relates the probability that a household prepays its residential mortgage to both financial and economic variables. The primary financial variables included in the model measure the value of the "embedded options" present in conventional fixed-rate mortgage loans. The primary economic variables included in the model measure the household's propensity to prepay for housing consumption

⁸ Unlike commercial property mortgages, single-family property loans can be repaid at any time (either in part or in full), and usually without prepayment penalties.

adjustment or employment reasons. The main empirical finding is that increased interest rate volatility significantly decreases prepayment probability. In addition, Giliberto and Thibodeau find some statistical evidence to support the hypothesis that prepayment rates increase with increases in household income and household size, and they vary by age of household head as well as regionally. Empirical studies by Deng [1997], Deng, Quigley and Van Order [1994], Ambrose and Capone [1998, 1999], and Ambrose and LaCour-Little [2001] have modeled the probability of default and prepayment jointly in an effort to test the theoretical implications of the mortgage pricing models. Their results confirm that financial factors (interest rates and house prices) are the primary determinants of mortgage terminations.

In analyzing the financial risks associated with mortgages, consensus exists that the interaction between house prices and interest rates determines most default and prepayment decisions (but there is a growing literature on the effect that “trigger events” have on mortgage default). For example, comparative static analyses on mortgage pricing models (e.g. Kau, et al. [1992]) clearly demonstrate the positive relationship between house price volatility and the probability of mortgage default. As a result, mortgage-underwriting guidelines focus on limiting or controlling lender exposure to adverse shifts in property values. The role of ‘trigger-events’ on default is less well understood, however. Lenders still attempt to limit exposure to borrowers with significant probabilities associated with default trigger events by underwriting borrower credit quality. Credit quality is usually measured by examining the borrower's ability to pay the mortgage debt (income), the borrower's previous payment history (credit), and the borrower's wealth level.

Empirical studies of mortgage default have attempted to isolate the factors (both financial and trigger-event) that lead to borrower default. For example, Ambrose and Capone [1998] document that borrowers with high LTVs at origination who subsequently default are twice as likely to terminate the mortgage in foreclosure than borrowers with low origination LTVs. Furthermore, their analysis confirms that the probability of foreclosure is highly dependent upon changes in financial risk factors (interest rates and house values).

Vandell and Thibodeau [1985] examine the influence that a variety of loan and non-loan characteristics have on the probability of residential mortgage default. Their paper presents a theoretical model of residential default that incorporates (1) homeowner equity; (2) payment levels relative to income; (3) current and expected neighborhood housing market conditions; (4) economic conditions; (5) homeowner wealth; (6) borrower characteristics that proxy for variability in income or “trigger events”; and (7) transactions costs. The parameters of the model were estimated using disaggregate loan history data obtained from a Dallas Federal Savings and Loan Association. The research identified several non-loan characteristics (e.g. instability of

household income and neighborhood conditions) that contribute to the likelihood of mortgage default.

While mortgage originators are concerned with borrower default risk, it is interesting to note that the majority of credit risk is not born by the originator, but rather by the mortgage insurer. In the case of conventional mortgages, private mortgage insurance (PMI) companies carry this risk. PMIs insure against losses associated with default up to a contractually established percentage, in effect, taking the second-loss position behind the borrower. As a result, the PMIs serve as review underwriters by determining whether to insure a particular mortgage. The underwriting review evaluates both borrower creditworthiness and the collateral quality. Canner, Passmore, and Surette [1996] estimate that 20 percent of conventional mortgages originated or purchased in 1995 were backed by private mortgage insurance. However, they also note that 35 percent of the mortgages purchased by the GSEs were backed by PMIs.

Given that borrower equity and credit risk characteristics are closely related to loan performance, institutions use mortgage underwriting to ensure that default risk is below maximum acceptable levels. Underwriting is the process of evaluating the three 'Cs' of lending: collateral quality, borrower capacity (ability to repay the loan), and borrower credit (willingness to repay the loan).

Underwriting and Collateral Quality

Using insights from option pricing models linking borrower default to property values, it is widely understood that lenders view collateral as a critical factor in the underwriting process. In this context, collateral refers not only to the value of the property and its potential price volatility, but also to the level of equity maintained by the borrower (the LTV). Since the affordable housing goals contain a geographic dimension, it is important to assess the risk associated with property values in geotargeted census tracts. In a recent study, Archer, Gatzlaff, and Ling [1996] found that a property's census tract group (neighborhood) explains only about 12 percent of the residual variation in property appreciation that is not explained by metro-wide changes in prices. This implies that volatility in house prices is mostly the result of individual property characteristics and citywide trends, not neighborhood effects. Thus, assuming the GSEs maintain a geographically diverse portfolio, the impact of geographic variation in property values can be reduced through diversification.

Underwriting and Borrower Capacity

Equally important to verifying the collateral in loan underwriting is determining the borrower's capacity or ability to repay the loan. Capacity refers to verifying that the borrower has the necessary income or wealth to be able to make the scheduled mortgage payments. Underwriting guidelines established by the GSEs set various

payment-to-income ratios that are designed to insure that borrowers have sufficient financial resources and income to make the required mortgage payments. One area of concern with respect to recent mortgage discrimination literature is the use of alternative sources of income or verification of borrower debt capacity. For example, minority borrowers often have non-traditional sources of income and thus, as part of the their affordable housing programs, the GSEs now accept some alternative measures of borrower capacity.

Underwriting and Borrower Credit

The final part of the underwriting process involves determining the borrower's willingness to repay the debt. Usually this requires analyzing the borrower's credit history under the theory that previous payment pattern is an indicator of future payment. In order to speed up the underwriting process, lenders, with the active assistance of the GSEs, are developing mortgage scoring models that incorporate the borrower's credit history and capacity into the underwriting decision. Avery, Bostic, Calem and Canner [1999] present a detailed discussion of credit scoring models and credit risk as it applies to the underwriting process. As part of their analysis, they examine the performance of credit scoring models in predicting borrower delinquency and default. Avery, et al. find that delinquency rates are substantially higher for borrowers with lower credit scores. For example, they report that the default rate on newly originated mortgages with 'low' credit scores is 10.9 percent compared to a 0.9 percent default rate for mortgages originated with 'high' credit scores. Furthermore, they note that borrowers with 'low' credit scores accounted for only 1.5 percent of all newly originated mortgages but comprised 17 percent of those loans that entered default. However, the data also indicated that the vast majority of borrowers with 'low' credit scores did not default—with only 4.4 percent of 'low' scoring borrowers defaulting. With implications for the affordable housing goals, Avery, et al. also report the credit score distribution by income class, racial group, and geography. Since credit history is a significant component to the mortgage origination process, Avery et al. point out that 33 percent of the households living in areas with low family incomes have low credit scores whereas only 17 percent of households living in areas with high incomes have low credit scores. The implication is that for the GSEs to increase their mortgage purchase activity in low-income areas, they may have to accept a higher proportion of borrowers with low credit scores.

Finally, Avery et al. present preliminary results on the performance of loans originated under Freddie Mac's affordable housing program (the Affordable Gold program). The Affordable Gold program provides flexibility in the underwriting process allowing lenders to examine compensating factors for borrowers with low credit scores, non-traditional income sources, or high LTVs. Freddie Mac reports that the delinquency rate for mortgages originated in 1994 under the Affordable Gold program is approximately four times higher than that of a peer group of mortgages that were

originated to using the company's standard guidelines. Avery, et al. report similar experiences from MGIC and GE Capital Mortgage Insurance Corporation on their affordable housing programs.

Automated Underwriting

As alluded to earlier, both GSEs have spent considerable resources developing automated underwriting systems that they license to mortgage originators. Lenders use these systems to insure that mortgages they originate will be acceptable to the GSEs for purchase. There is little systematic research on the effects of automated underwriting on the mortgage finance system. The GSEs claim that borrowers benefit from the savings brought about from faster mortgage application processing times, and that the systems evaluate loans in a more standard manner when compared to manual underwriters [Freddie Mac]. Some mortgage observers are skeptical of such claims, and HUD is studying the GSE systems to ensure they comply with fair lending laws.

In one of the few research studies on automated underwriting systems, Passmore and Sparks [1997] develop a theoretical model of the mortgage screening process that takes into account the adverse selection problem between mortgage originators and securitizers. Surprisingly, their model suggests that the decrease in costs of underwriting stemming from automated underwriting makes mortgage securitization more difficult because it increases the potential for adverse selection. However, Linneman and Wachter [1989] note that automated credit scoring systems may reduce the emphasis on downpayment to control default and thus could result in an increase in mortgage credit to targeted groups. In fact, Fannie Mae argues that automated underwriting allowed the company to introduce its Flex 97 product, which requires a borrower only place a three percent downpayment if he or she has an excellent credit history [Fannie Mae, 1997].

Impact of the GSEs on Mortgage Interest Rates

Having established that the GSEs have had a significant impact on the structure and operation of the primary mortgage market, we now examine whether GSE operations are also transmitted to the consumers through mortgage interest rates. Early research on the mortgage market attempted to demonstrate that the GSEs would have no long-term impact on the mortgage market. For example, Meltzer [1974] and Arcelus and Meltzer [1973] argued that the actions by the GSEs in providing greater liquidity to the mortgage markets would be offset by private lender reactions and thus GSEs would have no effect on mortgage and housing markets.

However, more recent studies have documented that GSE activity does result in lower interest rates to borrowers. Van Order [1996] points out that the secondary mortgage market increases the flow of funds to the primary mortgage market.

Traditionally, lenders used funds raised from deposits to fund loan originations with their profit margin determined by the spread between the interest rate charged on loans and the interest rate paid to depositors. Thus, to increase their loan portfolios, lenders had to attract additional funds through deposits. The introduction of the secondary mortgage market helped sever the link between loan originations and deposits. Lenders who sell mortgages in the secondary market are able to use the funds raised to originate new mortgages without attracting new depositors.

The size of the GSEs' respective mortgage operations, together with the 'implicit' Federal guarantee arising from their Federal charters, results in a significant cost advantage over other private institutions.⁹ Using this cost advantage, the GSEs have the ability to purchase mortgages from originators at more favorable rates than non-GSE portfolio lenders. Thus, the GSEs provide greater security at lower cost to mortgage investors than could be obtained directly from the originating lenders. This results in lower interest rates for mortgages that qualify to be purchased by the GSEs since greater demand exists in the credit market for securities carrying the GSE guarantee. Empirically, Hendershott and Shilling [1989] and Cotterman and Pearce [1996] have documented that mortgages falling under the conforming loan limit have interest rates between 25 and 40 basis points below mortgages above the conforming loan limit. The authors regard this loan rate differential as direct evidence of the benefits of the GSEs in providing greater liquidity to the mortgage market.

Mortgage and Capital Market Linkages

We now turn to a discussion of how the GSEs facilitate the transfer of funds between the broader credit markets and the primary mortgage markets. We also discuss relevant research that has empirically examined this link.

The link between the primary mortgage market and the credit market is now well established. A number of studies dating back to the 1980s have examined the extent to which the primary mortgage market is "integrated" with broader credit markets, i.e., the extent to which mortgage rate changes are correlated with changes in other interest rates in the broader economy. These studies used as data information related to the deregulation of the financial markets in the 1970s and the switch in Federal Reserve Board monetary policy in 1979 allowing interest rates to float freely. Coinciding with the deregulation in financial markets, the GSEs experienced significant growth in their secondary mortgage market operations. Thus, this created a natural experiment to test the integration between credit and mortgage markets.

⁹ For example, Ambrose and Warga [1996] calculated that between 1991 and 1994 the yield on 'AAA' rated finance industry debt was 85 basis points higher than similar GSE issued debt, giving the GSEs a 30-75 basis point cost advantage over non-government sponsored financial institutions.

Early studies attempted to show that growth in the secondary market resulted in greater integration. For example, in one of the first tests Hendershott, Shilling and Villani [1983] compared mortgage returns to Treasury securities. They found that the yield spread between mortgages and Treasuries increased over the period from 1970 to 1982 and attributed their finding to increases in the value of the call option (prepayment) and to increases in the level of interest rates during this period. Using the causality methods developed by Granger [1986], Schintzel [1986] examined the link between bank deposit rates and mortgage rates. His results indicated that deposit rates caused mortgage rates to change in the period from 1970 to 1978, which corresponds to the period of financial deregulation. However, he found that the opposite holds for the period between 1978 and 1984, corresponding to the period after financial markets were deregulated. Schintzel's results imply that after deregulation, the link between local funds supply and demand was severed.

Confirming Schintzel's results, Haney [1988] examined the correlation between the Treasury and mortgage markets (based on GNMA bond equivalent yields). Haney's results suggest that the secondary market is integrated with the bond market, but the primary market remains segmented. However, other studies have pointed out that this finding is based on methodological flaws.¹⁰

In a further refinement of the methods employed by previous research, Roth [1988], using standard regression analysis, also noted that deregulation of the credit markets and growth in secondary markets increased integration. Similarly, Devaney and Pickerill [1990] used regression analysis to show that the correlation between the mortgage and credit markets increased during the 1980s. Finally, Hendershott and Van Order [1989] tested market integration between the primary and secondary markets using conventional mortgage rates and GNMA rates. Their results indicated that integration increased with growth in secondary markets.

Unfortunately, most of these early studies on integration suffered from various methodological flaws that limited their ability to separate the effects of financial deregulation from growth in the secondary market. Recent studies have used more sophisticated econometric models to isolate the impact of financial deregulation from the growth in the secondary market. Results indicate that deregulation was the primary cause for integration—not the growth in the secondary market. For example, Goebel and Ma [1993] developed a theoretical supply and demand model that predicts the impact of a policy intervention on price. They tested this model using Granger causality methods and showed that the mortgage and credit markets were well integrated prior to the growth in the secondary mortgage market. The implication is that the GSEs' impact on the mortgage market, through their secondary market operations, is not as strong as

¹⁰ See Goebel and Ma [1993].

previously suggested. Rather, their results imply that the primary mortgage market is well integrated into the credit markets. Similarly, McGarvey and Meador [1991], using a linear feedback method, examined the integration of mortgage credit and housing starts. Their results indicate that feedback from mortgage credit to housing starts has declined since 1978.

Most recently, Kolari, Fraser, and Anari [1998] used cointegration methods to examine the effects of securitization on yield spreads in the primary mortgage market. In contrast to the results reported by Goebel and Ma, the findings of Kolari, et al. appear to support the earlier studies showing that the GSEs do have a significant impact on the mortgage market. Their simulation results indicate that a 10 percent increase in the level of mortgage securitization (as a proportion of total originations) would decrease the yield spreads on home loans by as much as 20 basis points, with the effects being long-term. The Kolari et al. [1998] results are consistent with other research showing that securitization reduces interest costs. For example, Black, Garbade and Silber [1981] found that a 20 percent increase in GNMA's securities resulted in a 16 basis point reduction in the FHA loan rate while Hendershott and Shilling [1989] found that conventional mortgage rates are 30 basis points lower than non-conforming mortgage rates.

Finally, the wave of bank consolidations that have occurred during the 1990s may have a dramatic impact on the historic linkage between the GSEs and the primary mortgage market. For example, Avery, Bostic, Calem, and Canner [1999] examine the implications of banking industry consolidation on the mortgage market, with particular emphasis on the funds available for lower-income and minority borrowers. The authors note that during the 1990s, growth in the secondary mortgage market coincided with the consolidation occurring in the banking industry. One concern is that bank consolidation will result in a shift away from lending by institutions with local offices and thus lead to a shift in lending decision authority from local underwriters to those with less knowledge about local needs. However, consolidation may also improve the flow of funds to underserved areas by allowing financial institutions to realize greater economies of scale or geographic portfolio diversification. To the extent that larger financial institutions have greater access to capital and technology, larger banks may be in a position to increase market share of mortgage originations. As a result, the GSEs may find that they must negotiate with a few large originators who effectively become the price setters with respect to underwriting standards. The implication is that the ability of the GSEs to influence origination activity via underwriting guidelines may be diminished in an era of large national banks. However to date, results reported by Avery et al. indicate that consolidation has not had a negative impact on mortgage credit to targeted groups; rather, their results are consistent with the theory that large banks do respond to CRA regulations with respect to mortgage lending.

The Rationale for the Affordable Housing Goals

As stated earlier, the purpose of this study is to examine the impact of the GSE affordable housing goals on the mortgage market. An implicit assumption in the enactment of the AHGs is the idea that the current conventional mortgage market is not meeting the credit needs of all potential borrowers. Before assessing the impact of these goals it is instructive to examine the literature on credit rationing to determine how the markets may fail to provide adequate credit to all borrowers. Thus, in this section we first survey the literature for models of mortgage credit rationing with the goal of understanding the framework for how GSEs and the secondary market either exacerbate or reduce the problem of credit rationing. We then examine the literature for empirical evidence of credit rationing.

In addition to the price (e.g. effective borrowing cost for the borrower or expected yield for the lender/investor) and quantity (e.g. loan amount), mortgage credit is traded with numerous non-interest rate terms (e.g. term to maturity and loan to value ratio or down payment, among others). These loan characteristics also determine whether a borrower obtains mortgage credit at prevailing market contract rates of interest.

Credit rationing occurs when the demand for mortgage credit exceeds the supply of funds for any given interest rate quoted by the lender. Consequently, mortgage credit is allocated to borrowers via some non-price mechanism. With mortgage credit, the rationing mechanisms include down payment (e.g. wealth) constraints, required payment to income ratios, and other underwriting standards. This situation may arise when prevailing market contract interest rates fail to compensate lenders for the risks associated with originating a mortgage. Credit rationing can also occur when secondary market underwriting requirements (e.g. large down payment requirements) prevent otherwise creditworthy borrowers from obtaining mortgage credit.

Credit Rationing Models

Theoretical models of mortgage lending have suggested that non-price rationing of mortgage credit may occur due to information asymmetries regarding default risk (see Jaffee and Russell [1976], Stiglitz and Weiss [1981] and Vandell [1982, 1984]).¹¹ Information asymmetries exist because borrowers know more about their credit risk than lenders. Stiglitz and Weiss [1981] develop a model showing that mortgage markets in equilibrium can be characterized by credit rationing. Their model rests upon the assumption (not unrealistic) that information asymmetries exist regarding true borrower default risk. In order to deal with this asymmetry, lenders use a variety of screening

¹¹ With the growing use of credit scoring models, the paradigm developed by these models may be less applicable. However, credit scoring models were not well developed during the period covered in this study and thus these model provide an appropriate framework for our analysis.

devices (underwriting standards) to identify low risk borrowers. Lender screening devices can include collateral quality tests, borrower credit history checks as well as the loan interest rate. Borrower responses to lender screening, however, are not static. One of the fundamental outcomes of the Stiglitz and Weiss model is that lenders may find profits declining as borrower risk increases as interest rates increase. One of the fundamental points of these models is that credit rationing does not result from a market failure. Rather, credit rationing results from imperfections in the transmission of information and the inability of lenders to assess borrower true risk. Vandell [1982, 1984] notes that information asymmetries between borrowers and lenders and institutional factors that force asymmetric sharing of default losses may also lead to credit rationing.

Racial discrimination in the mortgage market is often closely tied to the concepts of credit rationing. In one of the few studies to examine the effect of the secondary market on racial discrimination, Van Order [1996] constructs a macroeconomic model of a hypothetical secondary mortgage market that is segmented by race. In this hypothetical model, the secondary market agency is assumed to discriminate against minorities by refusing to purchase loans originated by minorities. Thus, the model assumes that the demand function for mortgage funds is the same for minorities as for non-minorities, but there are two separate supply functions: one for minorities and a second for non-minorities. As a result of the secondary market agency, at any given interest rate, the supply of funds available for non-minority borrowers exceeds the supply of funds available to minority borrowers. Van Order uses the model to illustrate that secondary market purchases of mortgages increase the flow of funds available to minority borrowers, even if secondary market institutions (predominately the GSEs) were to discriminate and purchase only non-minority loans. Van Order argues that secondary market institutions reduce interest rates paid by non-minority borrowers and that secondary market purchases of non-minority mortgages free up funds that primary lenders *can* make available to minority households. The key assumption in this analysis is that primary lenders view minority and non-minority loans as (albeit imperfect) substitutes so that a decline in the non-minority cost of borrowing will ultimately reduce interest rates for minority borrowers. However, if primary lenders *do not* view minority and non-minority loans as substitutes, then secondary market purchases of non-minority loans will only increase the spread between minority and non-minority loans—keeping interest rates for minority loans fixed while reducing interest rates for non-minority loans. That is, if portfolio lenders discriminate, then secondary market purchases of non-minority loans will have no effect on the supply of funds available to minority borrowers. The relevant empirical question is "What is the elasticity of substitution for minority and non-minority loans among primary lenders?"

Empirical Evidence of Credit Rationing

Several empirical studies have validated these theoretical models of credit rationing. For example, Duca and Rosenthal [1991] use data on borrower choices between FHA and conventional mortgages to test for an increase in FHA mortgage originations during periods of rising default risk. This result confirms the theoretical prediction that credit rationing will increase during periods of economic uncertainty. Gabriel and Rosenthal [1991] confirm their results by finding that lender concerns about default risk do have an impact on the type of mortgage borrowers obtain. Again, this suggests that lenders ration credit by steering borrowers with higher default risk to fully insured FHA loan products. Furthermore, Rosenthal, Duca and Gabriel [1991] also document that significant differences exist in the housing demand elasticities between borrowers opting for government insured mortgages versus those choosing conventional mortgages.

As Stiglitz and Weiss, Jaffee and Russell and Vandell note, institutional factors may lead to credit rationing in the mortgage market. Specifically, lenders may not charge differential interest rates for reasons that are prohibited, such as a borrower's race or ethnicity. In addition, State and Federal fair lending laws may prohibit charging different interest rates if it is shown that this has a *disparate impact* on minority borrowers. This could result from lenders setting interest rates based on credit scores. If minorities have lower credit scores, and so are rated as more risky borrowers, pricing based on credit risk would lead them to receive loans with higher interest rates. In this situation, credit scoring would have an *adverse impact* on minority borrowers. This does not mean however, that this practice necessarily constitutes unlawful disparate impact discrimination. If a business necessity is served, the use of a credit scoring system in loan-level pricing may not have a disparate impact. Even if credit scores do accurately predict loan performance, however, their use could still result in a disparate impact *if* there are alternative methods that serve the same business necessity (in this case to provide information about a borrower's creditworthiness) but have smaller adverse impact on protected classes.¹² Furthermore, political pressure to avoid the appearance of discrimination may prevent lenders from charging differential interest rates. As a result, lenders offer all borrowers who meet the minimum underwriting qualifications the same interest rate, resulting in credit rationing to borrowers who fail to meet these minimum requirements.

In addition to regulatory and political pressure, other institutional factors have traditionally discouraged lenders from charging differential interest rates. For example, the first GNMA pass-through program required that all government-backed mortgages

¹² For more information on this issue, see: Noto, Thomas, J. 1999. "Reducing the risk of risk-based pricing." *ABA Bank Compliance*, vol. 20, no. 7:9-12.

have the same interest rate. Later, the GNMA II program provided lenders with the flexibility of having a 200-basis point spread. More recently, however, the GSEs have started implementing risk-based pricing at the wholesale level. For example, both Fannie Mae and Freddie Mac will price loans by LTV and credit score at the request of the originator. Interestingly, such activities may create incentives for originators to increase underwriting standards in order to obtain lower guarantee fees on loans purchased that are higher credit quality. Alternatively, originators could offer higher quality borrowers discounts. Regardless, the net impact will be higher interest rates for lower quality borrowers.

Effects of the GSEs' Goals on Targeted Families

In the previous sections of this literature review, we have discussed the relationship between the GSEs and the primary mortgage market and have identified the potential means by which the GSEs impact the mortgage market, either directly or indirectly. We have also discussed the rationale for the affordable housing goals. Thus, we conclude the literature review with a section that discusses the current evidence on the affordable housing goals and their impact. Based on this survey of the current state of knowledge, we find that little empirical evidence exists that either directly measures or indirectly suggests the potential effect of the GSE affordable housing goals on the mortgage markets.

Prior to implementation of the final GSE affordable housing goals, HUD's Office of Policy Development and Research prepared an Economic Analysis [1995] regarding the projected impact that these regulations would have on the GSEs. In this analysis, HUD noted that the goals were set conservatively and would be attainable under a range of economic scenarios. For example, HUD noted that the goals were not mutually exclusive and thus the required level of additional purchases is not as great as it would be if the goals were independent. HUD also noted that the goals were generally consistent with current GSE mortgage purchase activity. Using a credit risk model to assess the effects of the housing goals on the profit level and financial condition of the GSEs, HUD reported that the return on equity on goals-related purchases was estimated to be between 1 to 4 percent lower than "baseline" purchases, most likely because of the higher risks associated with these loans, despite the GSEs' use of credit enhancements [U.S. Department of HUD, 2000b].

In their analysis of the potential demand for affordable housing, Galster, et al. [1995] estimated that approximately 16 percent of the 20.3 million low- or moderate-income renter households were better qualified for homeownership than half of the renter households who actually became homeowners. This suggests that a significant number of lower income households exist for which the GSE affordable housing programs could help make homeownership possible. HUD notes that in 1993 and 1994 the pool of low-risk potential homebuyers was approximately 12 times larger than the

annual volume of comparable borrowers served by the GSEs during the same period. Furthermore, Bunce and Scheessele [1996] found that the GSEs' purchases of mortgages from lower income borrowers and underserved neighborhoods fell short of the corresponding shares of other market participants. Canner, et al. [1996] found that in 1995 the GSEs accounted for 14 percent of the mortgage credit extended to lower-income borrowers.

Evidence suggests that the GSEs' mortgage purchase activities have a direct impact on the supply of credit to lower income borrowers. In their analysis of the potential consequences of privatizing the GSEs, Wachter, Follain, Linneman, Quercia and McCarthy [1996] assume that the "agency status" bestowed upon GSEs reduces mortgage interest rates by 50 basis points and that privatizing the GSEs would eventually result in tighter underwriting standards. They assume that more stringent underwriting standards would increase typical downpayments from 10 percent to 15 percent. Using simulation analysis they conclude that these changes would increase housing costs for all homeowners by three percent and reduce homeownership rates by an average of two percent for all households. In addition, they report that these changes would have more impact on targeted groups, reducing homeownership rates by 10 percent or more for low-income and minority households.

Moreover, Temkin, et al. [2001] and Listokin and Wyly [2000] point out that the GSEs altered their underwriting guidelines significantly after 1992, when FHEFSSA was enacted. In contrast to GSE standards of the late 1980s, the GSEs' current standard guidelines allow borrowers to qualify for a 95 percent LTV mortgage (up from a maximum LTV of 90 percent). Allowable house payment-to-income (28 percent) and total debt-to-income ratios (36 percent) are higher as well, up from 25 and 28 percent respectively. In addition, the GSEs will now purchase loans from borrowers who do not have a formal or perfect credit history. Borrowers may still qualify for a GSE standard mortgage despite some lapsed payments, so long as they provide compensatory factors [Listokin and Wyly, 2000]. These underwriting changes make it easier for income and wealth constrained borrowers to qualify for standard conventional loans. During the 1990s the GSEs made other changes to make homeownership more obtainable: emphasizing a borrower's income stability, allowing appraisers more flexibility in choosing comparable sales and allowing collateralized loans as a source of borrower funds.

What Have We Learned?

This chapter presented a survey of various methods by which the GSEs affect the mortgage market. The survey uncovered an extensive literature that recognizes the interaction between the GSEs and the primary mortgage market. Since the GSEs do not originate mortgages in the primary market, it is important to recognize that GSE actions will have second order impacts on the primary markets. Thus, the measurable

outcomes of GSE purchase activities resulting from the affordable housing regulations must be viewed in light of the filtering that takes place between the GSE activity and the primary mortgage market. For example, the GSEs' impact on mortgage interest rates is a second order effect transmitted through the primary market lenders.

The first part of the literature survey discussed the complex relationship between the GSEs and the primary mortgage market. From this survey, we learned that the competitiveness of the primary market determines the extent to which savings resulting from GSE secondary market actions are transmitted to borrowers. Assuming that the primary mortgage market is characterized by significant competition, a reasonable assumption in most markets, then it is reasonable to assume that most of the cost savings associated with GSE secondary market actions will be transmitted to borrowers. However, it should be pointed out that competition in targeted areas may be significantly less than in non-targeted areas. Thus, primary market institutions, in targeted areas with few competitors, could potentially capture the cost reductions resulting from GSE secondary market actions. Similarly, the effect of changes in GSE underwriting guidelines must be viewed in conjunction with mortgage insurer underwriting standards.

The second part of the literature review covered the rationale for the affordable housing goals. Since the enactment of the affordable housing goals implicitly assumes a breakdown in the mortgage market, this section presented an overview of the credit rationing literature. From this literature, we discussed the GSEs' operations in light of a market in which credit rationing exists. From this discussion, the third section of the literature review presented an overview of the current state of knowledge concerning the impact of the affordable housing goals on the mortgage market.

Based on the limited information available concerning the impact of the affordable housing goals, we have identified the following questions that will guide our analysis. First, we will analyze whether GSE mortgage purchase activities have changed over time in response to the introduction of the affordable housing goals. Second, the analysis will examine whether GSE mortgage purchase activities have met the affordable housing goals objective of increasing credit to targeted groups. Third, the analysis will also focus on the impact of GSE mortgage purchase activities on the relative price of mortgage credit. Fourth, to follow up on this, the analysis will focus on whether targeted areas are receiving greater capital as a result of the GSE goals. The impact of an increase in mortgage credit can also be measured through the level of homeownership and thus our analysis will examine whether homeownership rates for targeted groups are related to GSE mortgage purchase activities. And finally, the analysis will examine the impact of the affordable housing goals on the national homeownership rates for the targeted groups. In the next chapter, we present a unified framework that will allow us to quantify these research questions.

CHAPTER 3

CONCEPTUAL MODEL OF THE EFFECTS OF THE GSE REACTION TO AFFORDABLE GOALS ON TARGETED FAMILIES

The purpose of this section is to introduce a conceptual model that describes the role of the GSEs in the mortgage market. We use this theoretical discussion as a foundation for the empirical analysis presented in Chapter 4.

Conceptual Model

The purpose of the secondary market is to provide an efficient mechanism to transfer credit from the financial markets to the primary mortgage market. After reviewing the literature on the operation of the mortgage market, the conceptual model presented in Van Order [1996] provides the most complete description of how the primary and secondary markets interact. Thus, in this section we extend his analysis to examine the effect of the GSE affordable housing goals on the mortgage market—including the GSEs, the primary market lenders, and the private mortgage insurers. We follow Van Order [1996] and assume that the secondary mortgage markets have the effect of increasing the flow of credit to the primary mortgage market. Later, we discuss the implications of this assumption.

The ability of a lender to sell mortgages into the secondary market frees up credit allowing it to originate additional mortgages without requiring additional deposits or capital. As Van Order points out, loans sold to the secondary market do not have to be same type as loans either retained in portfolio or new originations. Thus, lenders could sell higher risk loans to the secondary market while retaining lower risk loans in portfolio. Below, we present a more formal model of a segmented market that closely follows and then extends the Van Order analysis.

We begin by assuming that 2 groups of borrowers exist (A , B) with A borrowers being designated as non-targeted and B borrowers being targeted. For the first part of the analysis, we assume that both sets of borrowers have identical default probabilities and that lenders have a preference for non-targeted A borrowers. Later, we will relax these assumptions and discuss the implications. As a result of the lender preference for A borrowers, lenders will extend credit to B borrowers if interest rates on B loans are relatively high, thus rationing the supply of credit to targeted borrowers. For the purposes of our discussion, the reason for lender preference for A borrowers is irrelevant. The preference for A borrowers could be due to a variety of factors, including overt discrimination against B borrowers, or alternatively, lender preferences for non-targeted borrowers could result from difficulties in overcoming information asymmetries for targeted borrowers. As a result, our analysis examines the effect that the GSEs have on a market segment whose access to mortgage credit is rationed.

Van Order [1996] assumes that each group has its own supply and demand curves and that loans from each group are imperfect substitutes. As a result, interest rates are not necessarily identical and thus we assume that $r_B > r_A$. Note, that here we refer to interest rates as the total effective cost of borrowing, including underwriting requirements.¹³ By defining interest rates as the total effective cost of borrowing, we recognize that lenders have a variety of mechanisms for rationing credit. For example, lenders can impose strict underwriting standards with respect to credit quality that effectively ration credit to targeted borrowers while keeping contract interest rates identical for all borrowers who receive credit. Thus, lenders can alter borrowing costs by either relaxing or tightening underwriting standards as well as by changing contract interest rates. In practice, lenders do not vary contract interest rates across borrowers seeking the same loan terms. Rather, lenders control for borrower risk by altering underwriting standards. This may adversely impact one group over another.

Markets clear when demand and supply are equal and the supply curves are a function of interest rates in both markets ($S_A(r_A, r_B); S_B(r_B, r_A)$). Since the supply of funds in each market is a function of interest rates in both markets, lenders will move funds from one market to the other if interest rates are sufficiently great. Therefore, we assume that the supply of mortgage capital in one market increases with that market's interest rate; conversely, the supply of mortgage capital in one market declines as the interest rate in the other market increases. This relationship is expressed more formally below:

$$\frac{\partial S_B}{\partial r_B} > 0; \frac{\partial S_B}{\partial r_A} < 0; \frac{\partial S_A}{\partial r_A} > 0; \frac{\partial S_A}{\partial r_B} < 0$$

In addition, we assume that the loans originated in one market are imperfect substitutes for loans in the other market. This implies that a 1 percent reduction in r_A leads to a less than 1 percent reduction in r_B , or more formally:

$$0 < \frac{\partial r_A}{\partial r_B} < 1; 0 < \frac{\partial r_B}{\partial r_A} < 1.$$

Now we introduce the secondary market into the model, noting that the lender's return on holding a mortgage-backed security is $r_S + \delta$ where δ is the lender's private value of the liquidity provided by holding a mortgage-backed security rather than the mortgage itself and r_S is the guaranteed rate offered by the GSE to swap a mortgage for a mortgage-backed security. The value of the liquidity provided by the GSEs includes

¹³ Underwriting standards influence effective borrowing costs in two ways. First, borrowers who fail to meet minimum requirements are denied credit, effectively making the price of mortgage credit infinite. Second, borrowers who contribute less than 20 percent equity are required to purchase mortgage insurance, thereby raising effective borrowing costs.

the reduction in risk associated with swapping individual mortgages for a diversified mortgage pool, as well as the actual liquidity arising from the ability to more easily trade a rated GSE security than an individual mortgage. In order to induce the lender to sell the mortgage into the secondary market, the return to securitizing must be greater than the expected return to holding the mortgage in portfolio ($r_{S+\delta} > r_i, i=A,B$). Van Order [1996] introduces the secondary market in the least advantageous manner to the targeted group by assuming that the secondary market only purchases mortgages from the non-targeted group. In doing so, the model shows that even under the most extreme and unrealistic circumstances, the GSEs still increase the supply of credit to the target market. Thus, Van Order notes that expanding the supply of funds to the non-targeted market results in an increase in funds to the targeted market as well. As a result, both r_A and r_B are reduced, albeit with a greater reduction in r_A than in r_B (due to the assumption of imperfect substitution).

Now we extend the model by relaxing the assumption regarding GSE preferences for non-targeted borrowers. Thus, we assume that the secondary market expresses no preference for one group or the other. As a result, the GSEs also purchase targeted group loans causing interest rates on targeted group loans to fall even further.

The introduction of the GSE affordable housing goals should result in greater purchases of loans from targeted groups (assuming that the affordable housing goals were set above existing purchase levels). As a result, we should see a greater reduction in mortgage interest rates (either contract rates or underwriting criteria, or both) to targeted borrowers after the introduction of the affordable housing goals. The assumption of a decline in interest rates following introduction of the GSE housing goals, however, is predicated upon two assumptions: first, that the GSEs expand the supply of funds and second, that targeted and non-targeted borrowers have identical risk profiles. In order to expand the supply of mortgage funds, however, the GSEs must attract additional credit by offering investors a higher rate of return or utilize greater leverage to extend the reach of existing capital. Thus, if we assume identical risk profiles, then a secondary effect of the affordable housing goals will be an increase in the use of GSE leverage, everything else equal.

Now consider the impact of relaxing the assumption that the GSEs increase the supply of mortgage credit. We note that if the size of the mortgage market remains constant, then a shift in mortgage supply from non-targeted to targeted borrower groups would produce a decline in mortgage rates for targeted borrowers while increasing rates for non-targeted borrowers. Such a shift will have implications for the second assumption regarding borrower risk. As Stiglitz and Weiss point out, increasing mortgage interest rates will result in a shift in the risk profile as borrowers take on riskier projects to generate higher expected returns, violating the assumption of equal risks across borrower groups.

Up to this point, we have assumed that credit risk between both groups is equal and that lenders have an unobserved rationale for preferring non-targeted borrowers to targeted borrowers. We now relax the assumption of equal credit risk and note that a differential in credit quality may provide an explanation for lender preference for non-targeted borrowers, especially if lenders are unable to utilize risk based pricing. If targeted borrowers have higher default probabilities, then GSE purchase activities in targeted areas may increase the overall risk profile of conventional mortgages (assuming no expansion of funds). One must look to who bears the credit risk burden to determine the impact of a shift in risk. As Canner and Passmore [1995] point out, the majority of the credit risk associated with conventional mortgage loans is not borne by the GSEs, but is rather carried by PMIs. Thus, to the extent that GSE purchase activity increases the risk profile of borrowers in the conventional mortgage market, then we would expect to see a corresponding increase in PMI premiums. As a result, it is unclear whether the expansion of mortgage credit to targeted borrowers would result in lower borrowing costs.

Implications For Empirical Analysis

GSE purchasing activity may influence the primary mortgage market in (at least) two ways. First, by increasing the supply of mortgage credit to (either targeted or non-targeted) borrowers, GSE purchases may lower effective borrowing costs. Second, if credit rationing exists in the primary mortgage market, then housing goals that require GSEs to alter the quantity of targeted loans purchased may simply increase the supply of mortgage credit available for targeted borrowers *without having any effect on mortgage interest rates*. Consequently, more targeted households could obtain mortgages at prevailing market interest rates—fewer targeted households would be “rationed-out” of the primary mortgage market. In this environment, the observable implication of the GSE affordable housing goals would be an increase in homeownership rates for targeted households. Therefore our empirical analysis of the GSE affordable housing goals will include analyses of the effect of GSE purchases on (1) the price of mortgage credit; and (2) rates of homeownership for targeted households.

CHAPTER 4

EMPIRICAL ANALYSIS

The conceptual model presented in Chapter 3 identifies a theoretical link between the changes made by the GSEs in response to the FHEFSSA affordable housing goals, capital and housing markets. As discussed in Chapter 3, the goals should result in more GSE purchases of loans originated to target group members, which is accomplished by reducing the effective cost of borrowing as a result of changing underwriting guidelines. In effect, the GSEs, in response to the goals, change their underwriting standards and reduce the number of target group members that are rationed out of the conventional mortgage market; this increases the proportion of the GSEs' book of business that consists of lower income borrowers.

Therefore, the changes in underwriting guidelines resulting from the goals have the greatest effect on the ability of low- and moderate-income families to become homeowners, therefore we should observe an increase in homeownership among target families after the goals take effect. Based on this premise, we identified six empirical research questions examine the impact of the affordable housing goals on the mortgage market and on target population homeownership rates. These questions are:

1. Do GSE market shares change over time?
2. Have GSE market shares increased in areas with higher concentrations of target groups?
3. Do the GSEs have the ability to alter/affect mortgage rates in markets where they are active?
4. Is more capital flowing to targeted areas as a result of the GSE goals?
5. Is the change in metropolitan area homeownership rates for target groups related to GSE market share?
6. Have the GSE AHGs influenced target population homeownership rates nationally?

Question 1: Changes in Share of Mortgage Credit Provided

As outlined in the conceptual model, changes in GSE purchase activity can be reflected in changes in mortgage market shares. Furthermore, after controlling for growth in the market, changes in GSE purchase activity will also affect FHA and portfolio lender market shares. For example, an increase in GSE purchase activity will result in a decline in portfolio lender market shares, all else being equal, as the GSEs compete for conventional mortgages. Looking at the competition between conventional and FHA

market segments, if the GSEs alter their underwriting criteria to accept riskier loans, then GSE market shares will increase while FHA market shares decline. Assuming that the GSEs do not have a preference for one borrower group over another (after controlling for risk differentials), then the conceptual model suggests that market shares should be similar between target and non-target borrower groups.

Market shares are estimated as simply the number (or dollar volume) of mortgages sold to the GSEs in any particular area relative to the total number (or dollar volume) of mortgages originated in that area. We utilize the Home Mortgage Disclosure Act (HMDA) database to identify mortgages originated by MSA and determine their final disposition. From a practical standpoint, HMDA can be utilized to calculate GSE market shares from 1993 to 1999. Unfortunately, under-reporting of GSE purchases in the HMDA database is a significant problem. Bunce, et al. [1995] estimated a 21 percent error rate for GSE purchases in 1994 and a 15 percent error in 1995, and, Bunce and Scheessele [1996] report that approximately 20 percent of FHA originations are under-reported in HMDA. Assuming that the under-reporting documented by Bunce et al. [1995] is random, we utilize HMDA to calculate GSE market shares of conventional mortgage market starting in 1995.

Table 1 reports the average GSE market shares of the conventional market in metropolitan areas for both loan volume and loan number.¹⁴ We segment the primary market according to borrower income and race in order to determine whether the GSEs are differentially serving particular borrower segments. The F-statistics test the hypothesis that the market shares are equal across years for each category. Based on these statistics, we can reject the hypothesis of equality across years for all borrower categories. For example, in Table 1 Panel A we see that the average GSE market share ranged from a low of 32 percent in 1995 to a high of 45 percent in 1998.

Year	All	Inc < 60%	60-80%	80-100%	100-120%	> 120%	Minority
1995	0.3207	0.3176	0.2574	0.2934	0.3182	0.3310	0.2729
1996	0.3780	0.3928	0.2999	0.3402	0.3695	0.3887	0.3192
1997	0.3678	0.3341	0.2900	0.3351	0.3638	0.3970	0.2964
1998	0.4537	0.4304	0.3697	0.4146	0.4434	0.4790	0.3730
1999	0.3868	0.3436	0.3275	0.3679	0.3924	0.4213	0.3171
F-stat.	99.4000	6.8100	68.6400	81.2000	85.3600	153.2500	30.4000

¹⁴ Market shares are calculated using conventional conforming purchase and refinance owner occupied loans (excluding manufactured housing loans) originated in each metro area.

Panel B: Total Number of Loans							
Year	All	Inc < 60%	60-80%	80-100%	100-120%	> 120%	Minority
1995	0.2766	0.2433	0.2246	0.2596	0.2864	0.3044	0.2243
1996	0.3178	0.2997	0.2565	0.2955	0.3238	0.3458	0.2579
1997	0.3013	0.2560	0.2484	0.2863	0.3131	0.3448	0.2320
1998	0.3862	0.3441	0.3227	0.3653	0.3929	0.4287	0.2998
1999	0.3198	0.2727	0.2804	0.3164	0.3400	0.3664	0.2500
F-stat.	45.6300	13.2400	46.7300	49.9300	47.1300	82.3000	10.6500

This pattern of a spike in market shares purchased by the GSEs in 1998 is consistent across all subcategories. Examining the total mean market shares based on volume across income groups, we see that the mean GSE market shares of loans originated to borrowers with incomes above 120 percent of metropolitan area median income is consistently above the overall average. However, with the exception of the 100 to 120 percent group in 1999, the yearly mean GSE market share for all other income groups is below the yearly overall mean GSE market share. This pattern is also present when examining the market shares based on number of loans with the mean GSE market shares for the three bottom income groups being below the overall mean market shares for all years.

In Table 2, we report the mean GSE market shares after subtracting subprime loans from the market. The purpose of eliminating subprime loans from the denominator is to reflect the market in which the GSEs have traditionally operated.¹⁵ Fannie Mae and Freddie Mac have only recently increased their efforts to serve borrowers who do not meet standard “A level” credit underwriting standards. While the GSEs plan to serve more of these types of borrowers, their efforts were relatively modest in the mid- to late-1990s, a time when subprime lending volumes increased dramatically [Temkin, 2000]. With subprime loans eliminated from the market share calculations, the average percent of the market that the GSEs purchase increases significantly.

Table 2. GSE Market Shares (HMDA files, excluding subprime)							
Panel A: Total Dollar Volume							
Year	All	Inc < 60%	60-80%	80-100%	100-120%	> 120%	Minority
1995	0.3376	0.3482	0.2843	0.3167	0.3373	0.3413	0.2938
1996	0.4065	0.4413	0.3415	0.3766	0.4003	0.4066	0.3550
1997	0.4182	0.4154	0.3557	0.3947	0.4147	0.4286	0.3559
1998	0.5034	0.5091	0.4460	0.4799	0.4959	0.5070	0.4450
1999	0.4575	0.4392	0.4301	0.4578	0.4655	0.4652	0.4065
F-stat.	273.1500	70.7100	252.9100	253.0300	218.9900	234.4200	166.9800

¹⁵ HUD’s GSE Rule eliminated only the “B” and “C” portion of the subprime market from the GSEs’ market universe. HUD estimated the “B” and “C” market as one-half of the total subprime market and thus HUD’s market share analysis would be between the market shares reported in Tables 1 and 2.

Panel B: Total Number of Loans							
Year	All	Inc < 60%	60-80%	80-100%	100-120%	> 120%	Minority
1995	0.3020	0.2818	0.2555	0.2877	0.3108	0.3189	0.2513
1996	0.3551	0.3553	0.3004	0.3357	0.3594	0.3684	0.2981
1997	0.3627	0.3412	0.3153	0.3501	0.3702	0.3837	0.2958
1998	0.4490	0.4361	0.3995	0.4333	0.4498	0.4628	0.3768
1999	0.4042	0.3824	0.3826	0.4079	0.4169	0.4164	0.3451
F-stat.	213.1000	121.2800	198.2100	190.2300	156.8000	164.4000	119.7300

For example in Panel A, we report the GSE market shares for total mortgage volume. Unlike in Table 1, we now see that the mean GSE market shares for the lowest income group are either above or very close to the overall averages. As in Table 1, we also see that average market shares for the highest income group are above the overall average across all years with the market shares for the income groups between 60 percent and 100 percent of AMI being below the overall average.

Given that the affordable housing goals are designed to promote mortgage funds to geo-targeted areas that are classified as being historically underserved by the mortgage market, we also calculated the average market shares of GSE purchased loans in areas that are classified as underserved.¹⁶ Table 3 reports the average GSE market shares for underserved areas including subprime borrowers. One of the most striking results is that the average GSE underserved market shares are significantly lower than the total market. For example, Panel A reports that in 1998 the average GSE underserved market share was 35 percent while in Table 1 the average GSE total market share was 45 percent. The gap narrows somewhat at the highest income group; however, GSE underserved market shares average 8.5 percent lower than GSE market shares for the total market. The gap is widest for the lowest income group at 11.4 percent and is narrowest for the highest income group at 5.2 percent. This is consistent with the GSEs seeking to mitigate risk in underserved areas by purchasing loans from higher income borrowers located in underserved areas.

Table 3. GSE Market Shares (HMDA files, Underserved)							
Panel A: Total Dollar Volume							
Year	All	Inc < 60%	60-80%	80-100%	100-120%	> 120%	Minority
1995	0.2783	0.2326	0.2309	0.2671	0.2954	0.3286	0.2129
1996	0.2801	0.2336	0.2311	0.2674	0.2964	0.3330	0.2138
1997	0.2808	0.2338	0.2311	0.2674	0.2967	0.3340	0.2138
1998	0.3504	0.3027	0.2946	0.3364	0.3630	0.4043	0.2661
1999	0.2947	0.2467	0.2539	0.2923	0.3208	0.3560	0.2253
F-stat.	4.8500	2.7700	6.2500	7.3400	8.2100	11.4200	1.6100

¹⁶ “Underserved” is the term introduced by HUD to describe geographically targeted census tracts as defined in Chapter 1. Ambrose and Pennington-Cross (APC) [1999] found that, on average, 27 percent of loans originated in census tracts in the MSAs they studied were from underserved areas. However, substantial variation exists across MSAs, ranging from 0 percent to 74 percent.

Panel B: Total Number of Loans							
Year	All	Inc < 60%	60-80%	80-100%	100-120%	> 120%	Minority
1995	0.2189	0.1796	0.1958	0.2227	0.2448	0.2720	0.1715
1996	0.2196	0.1800	0.1959	0.2230	0.2455	0.2742	0.1719
1997	0.2200	0.1801	0.1959	0.2230	0.2457	0.2753	0.1720
1998	0.2850	0.2380	0.2540	0.2903	0.3120	0.3479	0.2160
1999	0.2352	0.1945	0.2168	0.2463	0.2703	0.3003	0.1844
F-stat.	5.3600	4.2300	6.1000	7.5500	9.5400	14.4200	2.1900

However, the differences are strikingly different when the subprime portion of the market is excluded from the analysis. Table 4 reports the average GSE market shares for the underserved market without subprime loans. Again, as in Table 2, we see an increase in the average GSE market shares as the portion of the market in which the GSEs traditionally have not played a role is removed. Comparison of Tables 3 and 4 shows that overall GSE market shares increase 6.1 percent on average when the subprime loans are excluded from the analysis. Reflecting the growth in the subprime market between 1995 and 1999, the difference between the market shares with and without subprime loans increases from 1.4 percent in 1995 to 10.3 percent in 1999. Thus, given the growth in the subprime market, it is clear that any analysis of GSE lending activity will lead to very different results depending on whether one controls for the effect of subprime borrowing.

Table 4. GSE Market Shares (HMDA files, Underserved--No Subprime)							
Panel A: Total Dollar Volume							
Year	All	Inc < 60%	60-80%	80-100%	100-120%	> 120%	Minority
1995	0.2924	0.2427	0.2469	0.2854	0.3131	0.3407	0.2243
1996	0.3144	0.2654	0.2695	0.3064	0.3346	0.3613	0.2422
1997	0.3541	0.3253	0.3062	0.3421	0.3672	0.3840	0.2794
1998	0.4309	0.4036	0.3880	0.4252	0.4393	0.4536	0.3551
1999	0.3982	0.3653	0.3753	0.4053	0.4220	0.4207	0.3335
F-stat.	174.0200	171.4900	152.3700	134.8000	123.7900	79.8100	98.4100
Panel B: Total Number of Loans							
Year	All	Inc < 60%	60-80%	80-100%	100-120%	> 120%	Minority
1995	0.2370	0.1934	0.2154	0.2442	0.2659	0.2893	0.1852
1996	0.2558	0.2120	0.2354	0.2630	0.2856	0.3058	0.2011
1997	0.2938	0.2615	0.2665	0.2954	0.3164	0.3309	0.2326
1998	0.3685	0.3331	0.3404	0.3746	0.3869	0.4029	0.2956
1999	0.3387	0.3069	0.3273	0.3502	0.3673	0.3687	0.2848
F-stat.	170.8800	188.6600	128.4600	118.7800	119.3000	90.2000	94.5400

Analyzing raw market shares does not directly determine whether the GSEs' affordable housing goals have had the desired effect. However, the evidence does indicate that GSE purchase activity of new mortgages increased between 1995 and 1999, possibly in response to the AHG mandate. For example, in Table 4 (underserved-no subprime market) the average GSE market share of mortgage dollar volume has increased steadily from 29 percent in 1995 to 39 percent in 1999, while the average GSE market share in number of loans has increased from 24 percent in 1995 to 34 percent in 1999. Finally, analysis of average GSE market shares for both total and underserved markets clearly shows that GSE market shares do vary over time. Thus, we now turn to a more thorough analysis of the variation in GSE market shares in an effort to determine whether the change in market shares resulted from the GSE AHG.

Question 2: GSE Market Shares and Target Groups

In the previous section, we determined that GSE market shares do vary over time. Thus, in this section we turn to a causal examination of whether GSE market shares have increased in areas with higher concentrations of target groups. We continue to examine the behavior of the four GSE market share variables discussed in the preceding section, namely, total market share including subprime, total market share excluding subprime, total underserved market share including subprime, and total underserved market share excluding subprime. We continue to perform aggregated analysis, analysis for five borrower income categories relative to AMI, and analysis for minority borrowers.

To determine whether the GSE market shares calculated above (and thus purchase activity) have changed in response to the AHGs, we follow the methodology outlined by Ambrose and Pennington-Cross [APC, 2000]. APC [2000] examine the impact of demographic and market characteristics on market share for the GSEs and other financial institutions, after controlling for differences in economic risk across individual MSAs. They examine the impact of lending, housing, and labor market risks at the local level. Because we adopt a similar methodology to APC's we next discuss their approach in detail, noting the differences between APC's earlier approach and the one used in this analysis.

APC [2000] focus on three aspects of the lending environment. First, because lenders and mortgage insurers utilize homeowner equity as one method of quantifying risk, they include the conventional mortgage loan-to-value (LTV) ratio averaged across loans reported by the Federal Housing Finance Board's Monthly Interest Rate Survey (MIRS).¹⁷ Since LTV is such an important component of underwriting, it can be argued

¹⁷ The FHFB's MIRS covers approximately three percent of all conventional, single family, purchase money mortgages granted. In 1995 MIRS included 128,782 loans reported by 253 savings associations, 17 (mostly large) mortgage companies, 130 commercial banks, and 35 savings banks. 33 MSAs are reported

that LTV and mortgage choice are jointly determined. In order to control for this endogenous relationship, we estimate LTV via an instrumental variables regression and utilize the predicted LTVs (*LTV*) in subsequent regressions. Second, APC include the average annual effective interest rate from MIRS as an indicator of the cost of borrowing.¹⁸ The effective interest rate proxies for the financial strain homebuyers experience making monthly payments, and we use this variable (called *PRICE*) in our analyses. Finally, APC include variables that control for state laws regarding borrower rights. Regional differences in borrower judicial rights may impact GSE market shares to the extent that states with laws granting borrowers greater protection from lender foreclosure actions lower the perception of default costs. Thus, to the extent that these differences are not captured in mortgage interest rates, the GSEs may attempt to reduce their market shares of higher risk loans in areas granting borrowers greater protection from foreclosure. To control for differences in state foreclosure laws, we classify states based on judicial versus non-judicial foreclosure laws and deficiency versus non-deficiency judgment states.¹⁹ Specifically, Q_1 indicates states that have non-judicial foreclosure available and allow lenders to obtain deficiency judgments;²⁰ Q_2 indicates states that have non-judicial foreclosure available but do not allow deficiency judgments;²¹ Q_3 indicates states that require judicial foreclosure and allow deficiency judgments;²² and finally Q_4 indicates states that require judicial foreclosure and do not allow deficiency judgments.²³

In addition to lender underwriting standards, APC also include measures of economic risk factors. Empirical studies of credit risk have demonstrated a negative relation between house price appreciation and default loss.²⁴ Thus, APC estimate the

quarterly and for each state. We will use the MSA information where available and state level information otherwise. Since FHA loans are not covered in the survey and FHA loans tend to have higher LTVs, the MSA LTVs reported by MIRS will understate the actual loan-to-value ratios.

¹⁸ Effective interest rates will vary across MSAs in response to systematic differences in risk associated with local economic factors as well as variations in legal default protections afforded lenders.

¹⁹ Judicial foreclosure requires lenders seek a court order to foreclose on property while non-judicial laws create a more expedited foreclosure process. Anti-deficiency statutes are state laws that limit the ability of lenders to seek deficiency judgments against borrower assets or income to cover default losses.

²⁰ Q_1 indicate AL, AR, DC, GA, HI, MO, IA, MA, MD, MI, MS, RI, NE, NH, NM, NV, NY, TN, UT, VA, WV, WY, CO.

²¹ Q_2 indicate AK, AZ, CA, ID, OK, ME, MN, MT, NC, OR, SD, TX, WA.

²² Q_3 indicate CT, DC, FL, IL, IN, KS, KY, NJ, OH, PA, SC, VT.

²³ Q_4 indicate LA, ND, WI.

²⁴ See Capozza, Kazarian, & Thomson [1997], Deng & Calhoun [1997], and Ambrose & Capone [1998].

percentage change in local house prices using the Freddie Mac MSA Repeat Sales Index where increases in house prices indicate areas that are experiencing economic growth and lower risk. APC also include the overall volatility in the local housing market as an additional measure of local economic stability. Finally, APC include the yearly change in the local unemployment rate and the average unemployment rate for each MSA over the last ten years as measures of economic risk.

Thus following APC, we estimate the percentage change in local house prices (*HPI_CHG*) over the last year using the OFHEO MSA Repeat Sales Index where increases in house prices indicate areas that are experiencing economic growth and lower risk. We also estimate the overall volatility (*VOLATIL*) in the local housing market as an additional measure of local economic stability using the volatility parameters reported by OFHEO.²⁵ This variable tests whether greater volatility, regardless of price appreciation or depreciation, indicates greater risk to lenders. Economic risk is also associated with the level (*UNEMP_RT*) of and changes in local unemployment (*CHG_U*), as measured by the yearly change in the local unemployment rate as well as household income in the MSA (*INCOME*).

To test whether GSE market shares are correlated with the concentration of targeted borrower groups as defined by the AHGs, we follow APC and include the percentage of underserved census tracts multiplied by year dummy variables (*UND95-99*).²⁶ If regulations requiring greater investment in these areas are successful, then market shares of conventional lenders and the GSEs should reflect these efforts. By interacting the underserved percentage (which is constant for each MSA) with a time trend, we test whether GSE purchase activity has shifted in response to the AHG regulations.

To summarize, we estimate the following model:

$$Y_{it} = \beta_0 + \beta_1 C_{it} + \beta_2 P_i + \beta_3 M_i * T + \varepsilon_{it} \quad (1)$$

²⁵ The variance in house price growth rates from the OFHEO Repeat Sales Index is estimated as

$$\hat{\sigma}_t^2 = \hat{A}t + \hat{B}t^2$$

where A and B are the ordinary least squares regression estimates of the second stage weighted repeat sales procedure, and t is the number of quarters from the beginning of the series.

²⁶ “Underserved” is the term introduced by HUD to describe census tracts with minority populations exceeding 30 percent of the total and with median family income at or below 120 percent of the area median, or census tracts with median family income at or below 90 percent of the area median [HUD, 1995]. APC [1999] found that, on average, 27 percent of loans from census tracts in an MSA are classified as underserved. However, substantial variation exists across MSAs ranging from 0 percent to 74 percent.

where: Y_{it} is a vector of "market share" variables discussed in the previous section,²⁷ the β_j 's are vectors of parameters to be estimated, C_{it} is a matrix of variables reflecting the lending environment (LTV, effective interest rate, and state default laws), P_i is a matrix of MSA economic risk factors (house price change, housing market volatility, unemployment rate, change in unemployment rate and household income), M_i^*T is a matrix of underserved percentages interacted with time dummy variables, and ε_{it} is an identically and independently distributed random error term. We estimate the model using four alternative GSE market share variables: total market share including subprime, total market share excluding subprime, total underserved market share including subprime, and total underserved market share excluding subprime.

Table 5 reports the estimated coefficients for the variable that represents a proxy for the impact of the AHGs (year dummy variables multiplied by the percentage of tracts that are underserved, M_i). To conserve space and highlight the variables of interest, we only report the coefficients for the interaction variables with coefficients that are significantly different from zero (at the five percent level) highlighted in bold. Each of the four panels in Table 5 reports seven sets of logit regression results (represented by the seven columns) based on a particular market share definition, with each column reporting the results for one income or minority subgroup.

Panel A: Total Number of Loans Including Subprime							
Coefficients	All	Inc < 60%	60-80%	80-100%	100-120%	> 120%	Minority
UND95	-0.0067	0.0052	-0.0195	-0.0156	-0.0131	-0.0060	-0.0190
UND96	0.0011	0.0054	-0.0100	-0.0069	-0.0039	0.0039	-0.0111
UND97	-0.0025	0.0039	-0.0121	-0.0102	-0.0063	-0.0009	-0.0129
UND98	-0.0060	-0.0034	-0.0151	-0.0113	-0.0075	-0.0025	-0.0130
UND99	-0.0021	-0.0003	-0.0103	-0.0068	-0.0037	0.0011	-0.0093
Panel B: Total Number of Loans Excluding Subprime							
	All	Inc < 60%	60-80%	80-100%	100-120%	> 120%	Minority
UND95	-0.0037	0.0096	-0.0142	-0.0113	-0.0098	-0.0050	-0.0146
UND96	0.0063	0.0106	-0.0017	0.0002	0.0022	0.0068	-0.0034
UND97	0.0024	0.0090	-0.0039	-0.0030	-0.0004	0.0018	-0.0067
UND98	0.0000	0.0032	-0.0063	-0.0041	-0.0014	0.0002	-0.0076
UND99	0.0023	0.0045	-0.0028	-0.0007	0.0018	0.0028	-0.0045

²⁷ For example, GSE very-low-income (0-60 percent of AMI) purchases as a percentage of all very-low-income mortgages in the conventional conforming market.

Panel C: Total Number of Loans in Underserved Tracts Including Subprime							
	All	Inc < 60%	60-80%	80-100%	100-120%	> 120%	Minority
UND95	-0.0067	-0.0044	-0.0170	-0.0136	-0.0090	-0.0025	-0.0149
UND96	-0.0052	-0.0036	-0.0152	-0.0118	-0.0067	-0.0003	-0.0122
UND97	-0.0040	-0.0027	-0.0135	-0.0106	-0.0059	0.0005	-0.0111
UND98	-0.0107	-0.0109	-0.0190	-0.0168	-0.0105	-0.0047	-0.0149
UND99	-0.0060	-0.0071	-0.0131	-0.0090	-0.0077	0.0001	-0.0112
Panel D: Total Number of Loans in Underserved Tracts Excluding Subprime							
	All	Inc < 60%	60-80%	80-100%	100-120%	> 120%	Minority
UND95	-0.0075	-0.0052	-0.0189	-0.0154	-0.0104	-0.0035	-0.0178
UND96	-0.0011	0.0008	-0.0103	-0.0080	-0.0020	0.0016	-0.0074
UND97	-0.0002	0.0021	-0.0090	-0.0064	-0.0021	0.0024	-0.0089
UND98	-0.0045	-0.0037	-0.0116	-0.0095	-0.0042	-0.0013	-0.0110
UND99	-0.0013	-0.0021	-0.0073	-0.0022	-0.0018	0.0022	-0.0092
Note: Coefficients in Bold are statistically significant at the 5 percent level.							

In Panel A, we report the results for the total GSE market shares (including subprime). If the GSE Affordable Housing Goals are having the desired impact, then we expect to find a positive coefficient on the underserved market proxy. That is, as the percentage of underserved census tracts in an MSA increases we expect to find an increase in the GSEs' market share. Furthermore, over time we would expect to see an increase in the coefficient values reflecting greater sensitivity to the underserved market in later years. However, contrary to expectations and consistent with the results reported in the previous section, we see that all the coefficients for the 60-80 percent and 80-100 percent of AMI categories are significantly negative indicating that, for those income groups, the total market shares are systematically lower as the percentage of underserved census tracts in the MSA increases. While we can reject the null hypothesis that the coefficients across time are equal, there does not appear to be any discernable pattern in the coefficients that would suggest that GSE purchase activity in underserved areas is increasing or decreasing. However, we also note the positive coefficient for the lowest and highest income categories in 1996 indicating that GSE market shares of loans to the lowest and highest income groups were higher in 1996 in areas with a greater proportion of the market being underserved. This effect is more pronounced when the subprime loans are removed from the analysis (Panel B). Here we note that the underserved coefficients for 1995-1997 for the lowest income group are statistically positive, while the coefficients for the middle income groups are largely insignificant. This suggests that GSE market shares for the lowest income group did increase in areas with higher proportion of the market being underserved. However, we also note that the effect appears to dissipate by 1998 with the model coefficients becoming insignificant in 1998 and 1999. Again, we are unable to discern any pattern in the coefficients within

each income class across the years. We also note that these results are consistent with GSE market share becoming more concentrated in “served” areas—that is, the positive coefficients are consistent with the GSEs purchasing greater volume of “served” mortgages in MSAs with higher proportions of underserved census tracts. In order to separate this effect, we next examine the proportion of “underserved” market share.

Turning to the analysis of the underserved market (Panels C and D), we find that all the statistically significant coefficient estimates are negative. These results are counter to our expectations regarding the impact of the GSE Affordable Housing Goals. Again, if the GSE AHG are having the desired impact, then we would expect to find a positive coefficient on the underserved market proxy. The results, however, suggest that GSE underserved market shares are actually lower in metropolitan areas that have a higher proportion of underserved tracts. In other words, the results are consistent with GSE market shares of the underserved market being higher in areas with small underserved markets. This is counter to our expectations concerning the impact of the AHG. Consistent with the results in the previous section, the effect is less pronounced when the subprime market is excluded.

It appears, based on the results in Panels C and D that, after controlling for various local economic risk characteristics, GSE market shares in general are lower in areas with higher proportions of underserved census tracts. These results are consistent with the GSEs setting target goals for purchasing loans from underserved areas in each MSA and not setting a target number for each underserved census tract. For example, if (one scenario) the GSEs set a specific target number of underserved loans to purchase in each MSA, then the greater the number of underserved census tracts in an MSA, the lower the GSE underserved market share in that MSA. However, if (a second scenario) the GSEs target a fixed percentage of the market in each census tract, then the greater the number of underserved census tracts, the larger the GSE underserved market share in that MSA. With the exception of the lowest income group (Panel B), it appears that the GSEs' pattern of mortgage purchases is consistent with the first scenario. However, the GSEs note that they purchase mortgages from large nationwide mortgage lenders and thus do not specifically target purchases on a metro by metro basis.

While statistically significant, the parameter estimates suggest that the actual effect of the variables is relatively small. For example, in Panel D the statistically significant coefficient for all borrower categories in 1998 implies that a one percentage point increase in the proportion of census tracts that are underserved in an MSA results in a half percentage point decline in the GSE's underserved market share, holding all else constant.²⁸ As a numerical example, this means that the difference in GSE market

²⁸The marginal probability estimate is 0.995 (e^{β}).

share between an MSA with 57 percent of underserved tracts and one with 58 percent underserved tracts will be 0.5 percentage points. In basis points terms, this implies that a 100 basis point change (1 percentage point) causes a 50 basis point reduction (0.50 percentage points) in GSE market share. Across all panels, none of the coefficients imply that a 100 basis point change in the underserved proportion of the market results in more than a seventy basis point change in the GSE market shares.

Turning to the impact of the proportion of underserved census tracts in a market on the GSEs' market share of minority loans, we find a consistently significant and negative relationship as shown in the last column of Table 5. This result is counter to our expectation. Given that minorities tend to make up higher proportions of underserved census tracts, our working hypothesis was that GSE purchases of loans originated to minorities should increase in areas that have greater proportions of underserved areas. However, the statistically negative coefficients on the underserved variables in the right hand column of Table 5 suggest that GSE market shares of minority loans are actually lower in areas with high proportions of underserved census tracts. This result holds even when we examine the GSE market share of minority borrowers in underserved areas. The implication is that the GSE minority loan purchases are concentrated in non-underserved areas. Unfortunately, the results of this section cannot distinguish whether this result is produced by GSE programs and underwriting guidelines or by other institutional lending patterns (such as private mortgage insurer preferences). As a result, one must caution that the minority market share results do not suggest that the GSEs actively engage in discriminatory mortgage purchases.

Overall, the coefficients for the control variables have the expected sign and are significant. For example, we note that GSE market shares tend to be greater in areas with lower unemployment rates and higher house price appreciation rates. This is consistent with the findings of Ambrose and Pennington-Cross [2000]. However, the log-likelihood ratio statistics indicate that the models' explanatory power is generally low. Thus, the results from this model should be interpreted with caution.

Question 3: GSE Market Shares and Interest Rates

To determine the impact of GSEs on mortgage interest rates, it is necessary to collect average mortgage costs that include the contract interest rate, points, origination fees, and insurance premiums, and LTV ratios at the census tract level over time. With this data, we can regress the average interest rates against the LTV and GSE market shares. If the GSE purchase activity does lower interest rates in the primary market, then we should find a negative coefficient on GSE market share indicating that census tracts with higher market shares have lower interest rates.

The ability of this research design to answer the questions of GSE impact on mortgage rates is directly related to the ability to collect micro-level data. As discussed in Chapter 3, the true measure of the GSEs' impact is not on the contract rates, but rather is reflected in the total mortgage cost to the borrower. Such costs are normally conceptualized as the effective cost of borrowing and include the mortgage contract rate, points, origination fees, and mortgage insurance premiums, as well as maturity and loan-to-value. Thus, a formal analysis of the impact of GSE activity on borrower costs would require collection of a dataset that included all components of borrower effective cost. The analysis could then be conducted at the census tract level (to account for different price levels for submarkets), by aggregating the individual borrower loan costs and terms.

Unfortunately, micro-level data on mortgage costs by census tract are unavailable. For example, HMDA does not report mortgage terms on accepted loans and the GSE PUDB does not contain detailed borrower cost information. Since data are publicly unavailable at the census tract level, as an alternative we use interest rates and market shares at the MSA level. We collect mortgage interest rates at the MSA level from MIRS and thus regress average MSA interest rates (that include the contract rate and other up-front points and fees) against GSE market shares (controlling for other economic and demographic factors).

The MIRS data are based on a monthly survey of lenders that are asked to report the terms and conditions on all conventional, single-family, fully amortized, purchase-money loans closed during the last five working days of the month. The data thus exclude FHA-insured and VA-guaranteed mortgages, refinancing loans, and balloon loans. The data are based on 143,397 reported loans from 512 lenders, representing savings associations, mortgage companies, commercial banks, and mutual savings banks. The interest rate in MIRS includes the amortization of initial fees and charges over a 10-year period, which is the historical assumption of the average life of a mortgage loan and thus represents the effective cost of the loan to the borrower. The data are weighted to reflect the shares of mortgage lending by lender type as reported in the US Department of Housing and Urban Development's Survey of Mortgage Lending Activity. Again, if GSE purchase activity (measured by GSESHARE) does lower interest rates in the primary market, then we should find a negative coefficient on GSE market share variable indicating that MSAs with higher market shares have lower interest rates. The disadvantage of using MIRS is that the data quality is suspect since the survey is only conducted over the last five business days of the month.

As in the previous section, we follow the lead of APC [2000] and include the LTV predicted from an instrumental variables regression to control for the endogenous

relationship between interest rates and LTV.²⁹ We also include variables, $Q_2 - Q_4$, that control for state laws regarding borrower rights. These variables classify states based on judicial versus non-judicial foreclosure laws and deficiency versus non-deficiency judgment states. Since these laws affect borrower default probabilities, we expect to find interest rate differentials across regions that reflect borrower default rights.³⁰

In addition to lender underwriting standards, we also include the measures of economic risk that were identified in the previous section. These factors included the percentage change in local house prices over the last year (*CHG_HPI*) using the OFHEO MSA Repeat Sales Index, the overall volatility in the local housing market (*VOLATIL*), changes in local employment, as measured by the yearly change in the local unemployment rate (*CHG_U*), the unemployment level (*UNEMP_RT*), area income (*INCOME*), and dummy variables that reflect the judicial foreclosure laws ($Q_2 - Q_4$) for the MSA.

As a weak test of whether mortgage interest rates are correlated with targeted borrower groups as defined by the AHGs, we include the percentage of underserved census tracts interacted with year dummy variables. If lenders view borrowers from these areas as riskier, then effective interest rates should increase as the proportion of the market that is defined as underserved increases. By interacting this variable with yearly dummy variables, we test whether mortgage interest rates have shifted in response to the AHG regulations.

Table 6 reports the ordinary least squares (OLS) regression results on interest rates, as reported in MIRS. Consistent with our predictions, we find significantly negative coefficients on GSE market shares (*GSESHARE*) for the 60-80 percent, 80-100 percent, and 100-120 percent income categories, suggesting that effective interest rates for borrowers in these income groups declined as GSE market shares increased. This result confirms the findings of Cotterman and Pearce [1996] and Hendershott and Shilling [1989] that conforming loans have lower interest rates than jumbo loans. Thus, as the GSE market share increases, the percentage of conforming loans in the market must also increase, resulting in a negative coefficient.

However, for the lowest income group (less than 60 percent of AMI), we find a significantly positive coefficient indicating that interest rates actually increased for this group as market shares increased. This finding is consistent with the empirical results regarding average house price volatility reported by Ambrose, Buttimer, and Thibodeau [2001]. Their analysis examined the relationship between underlying house price volatility and expected interest rates. They found that house price volatility displayed a

²⁹ The predicted LTV is from the same instrumental variables regression utilized in the previous section.

³⁰ See Ambrose, Buttimer, and Capone [1997].

U-shape pattern with homes in the lowest and highest price categories having the highest price volatility. Thus, our finding of an increase in interest rates with an increase in GSE market shares at the lowest income group is consistent with the secondary market pricing the perceived riskiness of lower priced homes.

Variable	Type of borrower						
	All	Inc < 60%	60-80%	80-100%	100-120%	> 120%	Minority
INTERCEPT	8.5469***	8.4609***	8.5911***	8.5974***	8.5946***	8.5392***	8.5959***
GSESHARE	-0.1441	0.1908***	-0.4644***	-0.4072***	-0.3353***	-0.1095	-0.4313***
YEAR96	-0.1196	-0.1230	-0.1379	-0.1360	-0.1323	-0.1201	-0.1303
YEAR97	-0.1179	-0.1280	-0.1241	-0.1216	-0.1252	-0.1179	-0.1225
YEAR98	-0.7328***	-0.7842***	-0.7040***	-0.7138***	-0.7258***	-0.7379***	-0.7127***
YEAR99	-0.5808***	-0.6079***	-0.5623***	-0.5745***	-0.5851***	-0.5839***	-0.5727***
INCOME	-9.61E-06**	-9.88E-06**	-8.28E-06**	-8.65E-06**	-9.00E-06**	-9.68E-06**	-8.68E-06**
Estimated LTV	-0.0025*	-0.0028**	-0.0034**	-0.0032**	-0.0029**	-0.0025*	-0.0034**
UND95	-0.0013	-0.0020	-0.0016	-0.0015	-0.0014	-0.0014	-0.0017
UND96	-0.0009	-0.0014	-0.0014	-0.0013	-0.0010	-0.0010	-0.0016
UND97	-0.0001	-0.0003	-0.0009	-0.0006	-0.0003	-0.0001	-0.0008
UND98	0.0015	0.0013	0.0010	0.0013	0.0015	0.0015	0.0010
UND99	0.0930	0.0700	0.0956	0.0983	0.0982	0.0900	0.0816
CHG_U	0.2924	0.2513	0.2852	0.2916	0.2870	0.2862	0.2498
HPI_CHG	-0.0092	-0.0058	-0.0112	-0.0113	-0.0109	-0.0087	-0.0088
UNEMP_RT	-0.0053***	-0.0056	-0.0040***	-0.0041***	-0.0045***	-0.0054**	-0.0046**
VOLATIL	-0.1463***	-0.1639***	-0.1301***	-0.1341***	-0.1378***	-0.1487***	-0.1304***
Q ₂	-0.0479***	-0.0371***	-0.0524***	-0.0539***	-0.0527***	-0.0474***	-0.0542***
Q ₃	-0.0417***	-0.0479*	-0.0474***	-0.0483***	-0.0442***	-0.0422**	-0.0403***
Q ₄	8.5469	8.4609	8.5911	8.5974	8.5946	8.5392	8.5959
R ²	0.533	0.534	0.545	0.541	0.538	0.532	0.542
***-significant at the 1% level.							
**-significant at the 5% level.							
*-significant at the 10% level.							

In analyzing the effects of the underserved variables, we find that none of the variables that proxy for the size of the underserved market (*UND95-99*) are significant in explaining the interest rate variable. This confirms our suspicion that any impact of the affordable housing goals on effective mortgage interest rates is limited. As a result, we turn our attention to examining the impact of the AHG on total mortgage volume in the next section.

Question 4: Mortgage Flow Model

The ability of a lender to sell mortgages into the secondary market frees up credit, allowing it to originate additional mortgages without requiring additional deposits or capital. As Van Order points out, loans sold to the secondary market do not have to be same type as loans either retained in portfolio or new originations. Thus, lenders

could sell higher risk loans to the secondary market while retaining lower risk loans in portfolio.

Two recent studies have examined the linkage between GSE market shares and aspects of the affordable housing goals. First, Ambrose and Pennington-Cross [1999] examine the spatial distribution of GSE market shares for "FHA eligible" mortgages. The purpose of restricting the analysis to the "FHA eligible" market segment was to highlight the competition between the conventional and government insured mortgage markets. The APC study examines the variation in market shares controlling for differences in local economic risk as well as differences in market structures by including three variables that capture differences in borrower race (percent of loan applications by minorities), traditional credit supply (percent of loans in underserved census tracts), and market racial segregation. Consistent with previous research, Ambrose and Pennington-Cross [1999] find that the FHA market shares increase as the proportion of minority loan applicants increases. However, their analysis also indicates that for conventional mortgages (excluding subprime), GSE purchase activity also increases as the percent of minority applications in an MSA increases and that GSE market shares are higher in areas with higher percentages of loans originated in underserved census tracts. Ambrose and Pennington-Cross attribute this to the presence of the affordable housing goals.

In a second paper, Ambrose and Pennington-Cross [2000] also examine the distribution of all conventional purchase mortgage market shares. In considering the entire conventional market, APC [2000] segment the GSE purchase activity into explicit market shares for Fannie Mae and Freddie Mac. Interestingly, they find that for all conventional mortgages, GSE market shares actually decline as the proportion of population in underserved census tracts increases. They also find differences between Fannie Mae and Freddie Mac with respect to the racial make-up of the applicant pool. Their results show that Fannie Mae's market share increases as the percent of population of non-whites increases, while Freddie Mac's market share slightly decreases. However, APC note that their results should not be used to infer that the GSEs are not meeting their affordable housing goals since their study only considers new purchase mortgages and not GSE purchases of seasoned loans.

Although tangentially related, neither of these studies explicitly examined the impact of the AHGs on the mortgage markets. The central question for HUD is whether the GSE affordable housing goals have increased the supply of mortgage credit to geo-targeted areas. At the conceptual level, the research question is fundamentally a question of supply and demand.

We begin by assuming that the supply and demand for mortgage funds in an area is given by:

$$D_{it} = \alpha_1 P_{it} + \beta_1 X_{it} + u_{it} \quad (\text{demand function}) \quad (1)$$

$$S_{it} = \alpha_2 P_{it} + \beta_2 X_{i2t} + \delta_2 I_i + u_{i2t} \quad (\text{supply function}) \quad (2)$$

where X_{i1t} and X_{i2t} are sets of exogenous variables determining demand and supply in area i , respectively, I_i is a dummy variable indicating whether area i is a geo-targeted area, and P_{it} is the price of mortgage funds in area i . Although we do not observe the actual amount of funds demanded or supplied, we do observe X_{i1t} , X_{i2t} , P_{it} , I_i and the quantity of loans originated, Q_{it} . If we assume that the market is in equilibrium, then

$$Q_{it} = D_{it} = S_{it} \quad (3)$$

and the demand and supply functions form a simultaneous-equations system with Q_{it} and P_{it} being endogenous.

This form of supply and demand model was first formulated by Fair and Jaffee [1972] in their study of the housing market. In order to study whether the market was in disequilibrium, Fair and Jaffee replaced the equilibrium condition with the equation:

$$Q_{it} = \text{Min}(D_{it}, S_{it}). \quad (4)$$

If $D_{it} > S_{it}$, then the quantity of loans originated is on the supply function, and if $D_{it} < S_{it}$, then the quantity of loans originated is on the demand function. In this model, the price of mortgage funds is now exogenous.

Following Fair and Jaffee (1972), we can classify Q_{it} as either being on the demand or supply curve by observing the sign on the change in the price of mortgage funds from one period to the next. Thus, if $\Delta P_{it} = P_{it} - P_{it-1} > 0$, then excess demand for funds exists and we observe $Q_{it} = S_{it}$. However, if $\Delta P_{it} < 0$ then excess supply exists and we observe $Q_{it} = D_{it}$. Furthermore, if we assume that the change in price is proportional to excess demand, then we have

$$\Delta P_{it} = \gamma (D_{it} - S_{it}). \quad (5)$$

Thus, our model for mortgage funds consists of equations (1), (2), (4), and (5):

$$\begin{aligned} D_{it} &= \alpha_1 P_{it} + \beta_1 X_{i1t} + u_{i1t} \\ S_{it} &= \alpha_2 P_{it} + \beta_2 X_{i2t} + \delta_2 I_i + u_{i2t} \\ Q_{it} &= \text{Min}(D_{it}, S_{it}) \\ \Delta P_{it} &= \gamma (D_{it} - S_{it}) \end{aligned} \quad (6)$$

which can be estimated via maximum likelihood.

Since the GSE geographically targeted affordable housing goals are primarily geo-targeted to the census tract level, ideally we would like to estimate (6) at the census tract level. Thus, Q would be the aggregate amount of mortgage credit originated in a

census tract. Given that census tract units are supposed to be roughly equivalent in terms of population, if all census tracts were homogenous, then they would have equivalent demand for mortgage credit. However, census tracts are not homogenous. For example, a census tract dominated by older persons (or higher incomes) will have a significantly different housing demand curve than a census tract with a younger (or lower income) population profile. Similarly, the supply of mortgage funds is not necessarily equal across all areas. Although lenders are prohibited from discriminating against geographically defined areas (redlining) based on demographic factors, it is within their discretion to use economic risk factors in determining the amount of capital to place at risk in a particular area.

Unfortunately, much of the data necessary to specify the economic characteristics X_1 and X_2 in (6) are not available at the census tract level, so we must empirically aggregate to the MSA level for analysis. By focusing the analysis at the MSA level, we are able to control for spatial variation in local economic risk. Moving to the MSA level necessitates altering the geo-targeted indicator variable in (2) to an MSA level variable. Specifically, to test whether GSE market shares at the MSA level are correlated with targeted borrower groups as defined by the AHGs, we include the percentage of underserved census tracts in the MSA. If regulations requiring greater investment in these areas are successful, then market shares of conventional lenders and the GSEs should reflect these efforts.

In order to specify the model, we assume that demand for mortgage credit at the MSA level is a function of economic and demographic characteristics. Specifically, mortgage demand is often dependent upon average borrower income, house price volatility and growth, and interest rates (median effective interest rates). Empirical studies of credit risk have demonstrated a negative relation between house price appreciation and default loss. As in the previous sections, we estimate the percentage change in local house prices over the last year (*HPI_CHG*) using the OFHEO MSA Repeat Sales Index where increases in house prices indicate areas that are experiencing economic growth and lower risk. We also include the overall volatility (*VOLATIL*). Since *HPI_CHG* controls for the trend of house price appreciation for the MSA, we estimate the volatility in the house price series using the volatility parameters reported by OFHEO.³¹ This variable tests whether greater volatility, regardless of price appreciation or depreciation, indicates greater risk to lenders.

³¹ The variance in house price growth rates from the OFHEO Repeat Sales Index is estimated as

$$\hat{\sigma}_t^2 = \hat{A}t + \hat{B}t^2$$

where A and B are the ordinary least squares regression estimates of the second stage weighted repeat sales procedure, and t is the number of quarters from the beginning of the series.

We also include demographic variables, such as the average age in the MSA (*AVEAGE*) and the MSA population growth rate (*POPGROW*). In order to capture variation in demand resulting from differences in area demographics, we include measures of the ethnic make up of the MSA. If minorities have preferences for certain types of lenders or mortgage products then locations with higher concentrations of minority groups may have different primary mortgage market demand functions. Thus, we include the percent of the population that is non-white (*MINORITY*) to indicate the net effect of these forces.

The supply of mortgage credit is also a function of local economic risk factors (unemployment and house price variation and growth) and interest rates (median effective interest rate). To control for the size of the market, we include the overall MSA population. We do not include demographic characteristics in the supply equation since it is illegal for financial institutions to engage in redlining geographic areas based on tract demographics. By including the percent of underserved census tracts in an MSA in the supply equation we are able to directly test for whether mortgage lenders, and the GSEs in particular, have responded to the goal's emphasis on increasing conventional mortgage credit to underserved areas during periods of excess demand.

Finally, we note that loan quantity is measured as the total MSA loan volume of mortgages originated (both purchase and refinance) as reported in HMDA. However, the theoretical model developed by Van Order [1996] suggests that a substitution effect may occur as the GSEs purchase seasoned loans from portfolio lenders thereby increasing the availability of credit in the primary mortgage market. As a result, GSE operations in the secondary market that are not reflected in the market share analysis of the previous sections could have a substantial impact on the availability of credit to underserved mortgage markets. To test for this effect, we include the volume of loans originated in a prior calendar year that were purchased by the GSEs in each MSA as reported in the GSE PUDB. A positive coefficient for the seasoned loan variable would support the hypothesis that GSE purchase activity in the seasoned loan market does have a substitution effect in the primary mortgage market. As an estimate of the volume of the primary mortgage market, we use the log of the total volume of purchase and refinance loans reported in the Home Mortgage Disclosure Act (HMDA) database for the years 1995 to 1999. This provides an overall picture of the primary mortgage market for 308 MSAs. Since the Van Order model predicts that GSE activity can produce a substitution effect as lenders sell conventional loans to the GSEs and then originate new mortgages, we include the subprime market in the total loan volume to capture any substitution effect of lenders chasing higher yields by swapping prime conventional mortgages for new subprime originations. Table 7 provides the descriptive statistics for the variables utilized in the model.

Table 7. Descriptive Statistics					
Variable	N	Mean	Std Dev	Minimum	Maximum
Dollar Volume of Mortgages	880	1,106,395,732.00	1,995,289,946.00	31,534,832.05	20,882,269,252.00
PRICE	880	7.53	0.35	6.63	8.64
INCOME	880	37,327.70	7,638.66	2,346.48	175,930.35
AVERAGE	880	35.33	2.57	27.46	47.53
UNEMP_RT	880	4.75	2.57	1.20	19.00
UND96	880	10.65	19.34	0.00	79.37
UND97	880	10.89	19.44	0.00	79.37
UND98	880	10.92	19.44	0.00	79.37
UND99	880	10.20	19.21	0.00	79.37
MINORITY	880	22.33	16.89	1.84	95.75
VOLATIL	880	25.36	6.40	7.01	50.73
POP	880	448,464.61	530,059.06	56,859.00	3,746,059.00
POPGROW	880	0.01	0.01	-0.03	0.06
HPL_CHG	880	0.04	0.03	-0.08	0.23

Table 8 provides the parameter coefficients for the non-linear full information maximum likelihood estimation of the mortgage supply and demand system given in equation (6). The parameter estimates for the variables that affect demand are reported in the top half of Table 8 and are labeled *D0* through *D8*, with variable descriptions in the label column. Intuitively, the model's parameter estimates appear plausible. For example, the *PRICE* parameter estimate (*D1*), which is the interest rate measure in MIRS, is negative in the demand model. This means that the demand for mortgage credit declines with an increase in the price, consistent with a downward sloping demand curve. The other parameter estimates on the demand side are consistent with our expectations: population growth (*POPGROW* or *D3*) leads to an increase in the demand for mortgage funds while increases in average age (*AVGAGE* or *D5*) and minority population (*MINORITY* or *D7*) correspond to declines in demand. Higher average incomes (*INCOME* or *D6*) also correspond to higher levels of mortgage demand.

The parameter estimate for the coefficient of proportionality, (*GAMMA* or *G1*), also provides evidence that the model is consistent with economic theory. The parameter estimate is significantly different from zero. This means, as shown earlier in equation (6), that the mortgage market is not in perfect equilibrium at all times. Moreover, the parameter estimate's negative value indicates that the interest rate changes to clear the market. This means that the interest rate increases when the demand for mortgage capital exceeds supply, and conversely, declines when supply exceeds demand.

Table 8. Nonlinear FIML Model Results					
	Parameter Estimate	Standard Error	t-Value	Pr > t	Label
Demand Model:					
D0	92.31464	7.7941	11.84	<.0001	INTERCEPT
D1	-10.1364	0.9634	-10.52	<.0001	PRICE
D2	-1.17818	0.1478	-7.97	<.0001	YEAR
D3	26.07008	3.7818	6.89	<.0001	POPGROW
D4	1.515703	0.3465	4.37	<.0001	VOLATIL
D5	-0.02673	0.00869	-3.08	0.0021	AVGAGE
D6	0.000022	3.89E-06	5.55	<.0001	INCOME
D7	-0.02076	0.00335	-6.19	<.0001	MINORIT
D8	2.380301	2.2747	1.05	0.2956	HPI_CHG
G1	-0.25091	0.0618	-4.06	<.0001	GAMMA
Supply Model:					
s0	-72.6603	21.6906	-3.35	0.0008	INTERCEPT
s1	8.927782	2.4981	3.57	0.0004	PRICE
s2	1.388583	0.3507	3.96	<.0001	YEAR
s3	1.772245	0.2308	7.68	<.0001	POPGROW
s4	-1.19476	0.5207	-2.29	0.0219	VOLATIL
s5	-0.06506	0.0118	-5.54	<.0001	UNEMP_RT
s6	2.551075	2.1606	1.18	0.2379	HPI_CHG
s7	0.001909	0.00282	0.68	0.4985	UNDSERV
s8	0.244738	0.0345	7.1	<.0001	LOG SEASONED LOANS
s9	0.011594	0.0226	0.51	0.6077	UNEMP
N 1,357					
Log Likelihood: -638.4869					

The parameter estimates of the effect of the variables on the supply of the mortgage credit market are reported on the bottom half of Table 8 and labeled *S0* through *S9*. The effect of interest rates, as indicated by the positive and significant parameter estimate for the variable *S1*, is consistent with our expectations. The supply of mortgage credit increases as rates increase, indicating an upward sloping supply curve. Other parameter estimates on the supply side are consistent with standard economic theory. Mortgage supply increases as the potential market increases (*POPGROW* or *S3*). We also see that supply declines as house price volatility and unemployment rates rise (*S4* and *S5* respectively), again consistent with lender responses to shifts in local economic risk. Somewhat surprisingly, neither the change to the house price index (*HPI_CHG* or *S6*) nor the change in unemployment rate (*S9*) is significant. The coefficient for seasoned loans (*LOG SEASONED LOANS* or *S8*) is positive and significant, suggesting that an increase in GSE purchases of seasoned loans in an MSA results in an increase in the total mortgage origination volume in the MSA. This confirms the substitution effect implied by the theoretical model, in which lenders use the liquidity from selling one type of mortgage to increase lending for the entire market.

The findings described above provide us with some confidence that our simultaneous supply/demand model is correctly specified. Therefore, it is noteworthy that the variable of interest in examining the impact of the GSE affordable housing goals, (*UNDSERV* or *S7*), is not statistically significant. This finding suggests that we cannot reject the null hypothesis that the proportion of census tracts in an MSA that meet the AHG's underserved market definition has no effect on mortgage supply. This means that we cannot make a definitive assessment of the affordable housing goal's effect on mortgage supply. This finding, however, is not the sole determinant of the effect of the affordable housing goals on mortgage supply. As discussed earlier, seasoned loan purchases do have a significant effect on the amount of mortgage supply at the MSA level. There is some evidence that the GSEs (especially Fannie Mae) purchase seasoned loans as a method to meet the affordable targets. Therefore, our findings suggest that such purchases are recycled by lenders for more mortgage lending, thereby increasing overall liquidity in a metropolitan area's mortgage market.

Capital Market Outcome Summary

To summarize, we presented an empirical analysis of GSE mortgage purchase activity in response to the affordable housing goals that is consistent with the hypotheses developed from the theoretical model of the mortgage market. Our analysis identified four questions or issues relevant to capital markets. First, do GSE market shares change over time? The empirical results affirm that GSE market shares do change over time, presumably in response to both market and institutional factors. In general we find an overall increase in GSE market shares across time.

Given that we found evidence that GSE market shares do vary across time, we next analyzed the question of whether GSE market shares increased in areas with higher concentrations of target groups. After controlling for economic, demographic, and institutional factors, we determined that GSE market shares are lower in areas with higher proportions of underserved census tracts. This result is consistent with GSEs setting target goals for purchasing loans from underserved areas rather than setting target goals for each underserved census tract.

In response to issues raised in a study by the U.S. General Accounting Office [1998], we also addressed the question of whether the GSEs have the ability to alter/affect mortgage interest rates. Consistent with our predictions, we find that effective interest rates declined in areas with higher GSE market shares. This is consistent with the conforming/jumbo loan rate differential reported by Cotterman and Pearce [1996] and Hendershott and Shilling [1989]. However, we do not find any evidence that mortgage interest rates vary according to the percentage of underserved census tracts in a particular area.

Finally, turning to question four, we analyzed whether GSE purchase activity leads to a substitution effect that results in greater capital flowing to targeted areas. We addressed this question by estimating a mortgage supply/demand model. The empirical mortgage flow results do not support a direct relationship between mortgage volume and the proportion of underserved census tracts in an MSA after controlling for other supply and demand factors. However the results are consistent with the expectations developed in our model of the mortgage market regarding the substitution effect of GSE purchase activity on the primary mortgage market.

Question 5: Homeownership Rates and GSE Market Share: Is There a Relationship?

The GSEs, by increasing their purchasing activity in underserved markets, should help to increase homeownership rates for low- and moderate-income families and in geo-targeted neighborhoods. We have analyzed the influence that GSE purchasing activity has had on homeownership rates for targeted groups in two ways. First, we use metropolitan American Housing Survey (AHS) data for eight cities to compute homeownership rates for all households, by income and by minority status, at two points in time during the 1990s. Metropolitan areas surveyed in 1992, the year before HUD adopted the affordable housing goals, provide the baseline for our analysis. Four metropolitan areas were surveyed in 1992 and again in 1996: Cleveland, Indianapolis, Memphis and Oklahoma City. Four cities were surveyed in 1992 and again in 1998: Birmingham, Norfolk, Providence and Salt Lake City. The large sample sizes in the metropolitan surveys allow us to estimate homeownership rates for: (1) all households; (2) low- and moderate- income households (households with incomes below the HUD established area median income); (3) white households; (4) minority households; (5) low- and moderate-income white households and (6) low- and moderate-income minority households. We then compare changes in homeownership rates for targeted groups to GSE market shares during the period. While this descriptive analysis is suggestive of the influence that GSE purchases have had on homeownership rates, eight metropolitan observations is too few to conduct detailed statistical analysis of the GSE impact. Second, to address Question 6 we use national AHS data to examine the influence that GSE purchases have had on homeownership rates for the 80 largest metropolitan areas in the US. We compute homeownership rates for all households and for low- and moderate- income households in 1991 and again in 1997 and relate changes in homeownership rates to GSE purchasing activity.

The results for our metropolitan analysis of the effect that GSE purchases have had on homeownership rates are contained in Annexes A and B and are summarized in Tables 9, 10 and 11. Annex A lists estimates of the total number of households and homeownership rates, by income and minority status, for each of sixteen MSA AHSs (eight in 1992, four in 1996 and four in 1998). Annex B provides aggregate

homeownership rates for the four cities surveyed in 1992 and again in 1996 and for the four cities surveyed in 1992 and again in 1998. Tables 9-11 summarize the information in the exhibits. For example, Annex A.1 provides AHS estimates of the number of households and homeownership rates for Birmingham, AL in 1992. The top half of Annex A.1 lists estimates of the total number of households, by income category, tenure, and minority status. The bottom half of Annex A.1 provides homeownership rates. According to the AHS, there were 357,645 households in Birmingham in 1992. Of these, 248,471 owned their residence (for a homeownership rate of 69.5 percent). 214,401 households had incomes below the area median income. 127,746 of these households owned their own home, yielding a low- and moderate-income homeownership rate of 59.6 percent. The difference, or spread, between the all-household homeownership rate and the low- and moderate-income homeownership rate in Birmingham in 1992 was 9.9 percentage points. Of the 357,645 households in Birmingham in 1992, 260,044 were white and 97,600 were minority. Homeownership rates were 75.8 percent for white households and 52.7 percent for minority households. The spread between white and minority homeownership rates for Birmingham in 1992 was 23.0 percentage points. The spread between low- and moderate-income white households and low- and moderate-income minority households was 21.9 percent.

There are sixteen tables in Annex A. The first eight are for the eight MSAs surveyed in 1992. Annexes A.9 through A.12 are for the four cities surveyed again in 1996. Annexes A.13 through A.16 are for the four MSAs surveyed in 1992 and again in 1998. Annex A.13 indicates there was little change in the total number of households in Birmingham from 1992 to 1998—the total number of households in 1998 was estimated to be 358,755 (an increase of 0.3 percent). The all-household homeownership rate increased slightly to 70.4 percent over the 1992-1998 period, an increase of 0.9 percentage points. The low- and moderate-income household homeownership rate increased 1.5 percentage points over the same period. White households increased their rates of homeownership faster than minority households (for both all- and low- and moderate-income households). Consequently, the spread between white and minority homeownership rates in Birmingham *increased* between 1992 and 1998. The spread between white and minority household homeownership rates increased by 2.1 percentage points (from 23.1 to 25.2) for all households and by 4.4 percentage points (from 21.9 to 26.3) for low- and moderate-income households.

Annex B presents exhibits which show aggregate homeownership rates, by income and minority status, for the eight cities surveyed in the two AHS MSA cycles. Annex B.1 provides 1992 estimates of all households located in the four MSAs surveyed in 1992 and 1996 (i.e. Cleveland, Indianapolis, Memphis and Oklahoma City). Annex B.1 also provides the four MSA aggregate homeownership rates, by income and minority status, for these places in 1992. Annex B.2 provides 1992 estimates of all households located in the four MSAs surveyed in 1992 and 1998 (Birmingham, Norfolk, Providence

and Salt Lake City). Annex B.3 provides aggregate homeownership rates for the four cities surveyed in 1996 while Annex B.4 provides aggregate homeownership rates for the four cities surveyed in 1998. Annex B.1 indicates that the homeownership rate for all households residing in Cleveland, Indianapolis, Memphis and Oklahoma City in 1992 was 64.9 percent. The rate of homeownership for low- and moderate-income households in these cities in 1992 was 51.9 percent. The difference in homeownership rates between all households and low- and moderate-income households was 13 percentage points. The spread in homeownership rates between white households and minority households was 26 percentage points (the rate was 70.5 percent for white households and 44.5 percent for minority households). The spread for low- and moderate-income white and low- and moderate-income minority households was 23.4 percentage points.

Tables 9 and 10 summarize the homeownership rate information contained in Annexes A and B. Table 9 provides a summary for the four metropolitan areas surveyed in 1992 and 1996 (Cleveland, Indianapolis, Memphis and Oklahoma City) while Table 10 summarizes information for the four places surveyed in 1992 and 1998 (Birmingham, Norfolk, Providence and Salt Lake City). These tables also compute the differences, or spreads, in rates of homeownership between all- and low- and moderate-income households, between white and minority households, between low- and moderate-income white and low- and moderate-income minority households and for these groups over time.

1992 Homeownership Rates for the Eight MSAs

Homeownership rates for these eight MSAs in 1992 averaged about 65 percent for all households and about 51.5 percent for low- and moderate-income households (Tables 9 and 10). The range of homeownership rates for all households was narrow, with Norfolk reporting the lowest rate (61.1 percent) and Birmingham the highest rate (69.5 percent). Spreads between the all-household and the low- and moderate-income household homeownership rates averaged about 13.4 percent, with Birmingham reporting the lowest spread (9.9 percentage points) and Salt Lake City the highest (15.1 percentage points). White households reported homeownership rates of 69.7 percent, while 45.3 percent of minority households were homeowners. The spread between white and minority household homeownership rates was highest in Providence (38.4 percentage points) and lowest in Memphis (19.9 percentage points). Low- and moderate-income white households reported homeownership rates of about 57 percent, while low- and moderate-income minority households reported homeownership rates of about 35.3 percent. Spreads between low- and moderate-income white households and low- and moderate-income minority households were also highest in Providence (36.5 percentage points) and lowest in Memphis (15.9 percentage points) and averaged about 21.7 percentage points for the eight MSAs.

Table 9. Homeownership Rates for AHS MSAs Surveyed in 1992 and 1996									
MSA	All		White Households		Minority Households		Spreads		
	Households	LMI	All	LMI	All	LMI	All HH - LMI	White - Minority	LMI White - LMI Minority
1992 Surveys									
Birmingham	65.5	52.3	72.8	60.8	39.4	29.7	13.2	33.4	31.1
Norfolk	66.5	54.5	70.3	58.7	44.1	35.7	12.0	26.2	23.0
Providence	62.7	48.4	70.3	56.0	50.4	40.1	14.3	19.9	15.9
Salt Lake City	63.5	51.1	66.7	54.5	45.0	35.3	12.1	21.7	19.2
Total	64.9	51.9	70.5	58.2	44.5	34.8	13.0	26.0	23.4
1998 Surveys									
Birmingham	67.0	54.4	73.6	61.7	41.7	33.4	12.6	31.9	28.3
Norfolk	67.3	54.9	70.4	58.3	48.9	38.3	12.4	21.5	20.0
Providence	65.3	52.0	73.9	59.6	52.9	44.7	13.3	21.0	19.9
Salt Lake City	66.8	56.3	70.6	60.8	51.0	41.2	10.5	19.6	19.6
Total	66.7	54.4	72.1	60.2	48.2	39.2	12.3	23.9	21.0
1992-1998 Changes									
Birmingham	1.5	2.1	0.8	0.9	2.3	3.7	-0.6	-1.5	-2.8
Norfolk	0.8	0.4	0.1	-0.4	4.8	2.6	0.4	-4.7	-3.0
Providence	2.6	3.6	3.6	3.6	2.5	4.6	-1.0	1.1	-1.0
Salt Lake City	3.3	5.2	3.9	6.3	6.0	5.9	-1.9	-2.1	0.4
Total	1.8	2.5	1.6	2.0	3.7	4.4	-0.7	-2.1	-2.4

1992-1996/8 Changes in Homeownership Rates

Homeownership rates increased by about two percentage points over the 1992 – 1996/8 period for households located in these eight metropolitan areas. The homeownership rate for all households residing in the four places surveyed in 1992 and 1996 (e.g. Cleveland, Indianapolis, Memphis, and Oklahoma City) increased from 64.9 percent in 1992 to 66.7 percent in 1996, an increase of 1.8 percentage points (Table 9). The homeownership rate for all households residing in metropolitan areas surveyed in 1992 and 1998 increased by 2.4 percentage points over the 1992-1998 period (from 64.6 percent to 67.0 percent). Salt Lake City reported the largest increase in the rate of homeownership for all households (5.7 percentage points), while Indianapolis reported the lowest increase (0.8 percentage points).

Homeownership rates increased faster for low- and moderate-income households. The aggregate homeownership rate for low- and moderate-income households in the four cities surveyed in 1992 and 1996 was 51.9 percent in 1992 and 54.4 percent in 1996, an increase of 2.5 percentage points for the four year period. Similarly, homeownership rates for low- and moderate-income households in

Birmingham, Norfolk, Providence and Salt Lake City increased from 50.9 percent in 1992 to 54.3 percent in 1998, an increase of 3.4 percentage points. Salt Lake City reported the largest increase in low- and moderate-income household homeownership rates—from 52.7 percent in 1992 to 61.3 percent in 1998, an increase of 8.6 percentage points. It should be noted, however, that Salt Lake City has a relatively small proportion of minority households. In 1992, only 8.7 percent of Salt Lake City households were minority households.

MSA	All		White Households		Minority Households		Spreads		
	Households	LMI	All	LMI	All	LMI	All HH - LMI	White - Minority	LMI White - LMI Minority
1992 Surveys									
Birmingham	69.5	59.6	75.8	67.1	52.7	45.2	9.9	23.1	21.9
Norfolk	61.1	46.9	67.8	54.1	46.1	34.9	14.2	21.7	19.2
Providence	61.5	46.9	64.8	50.8	26.4	14.3	14.6	38.4	36.5
Salt Lake City	67.8	52.7	70.0	54.7	49.2	35.4	15.1	20.8	19.3
Total	64.6	50.9	69.0	55.8	46.4	35.8	13.7	22.6	20.0
1998 Surveys									
Birmingham	70.4	61.1	77.9	70.9	52.7	44.6	9.3	25.2	26.3
Norfolk	62.7	48.6	70.5	56.6	47.1	36.9	14.1	23.4	19.7
Providence	63.2	49.2	67.3	54.0	33.6	22.8	14.0	33.7	31.2
Salt Lake City	73.5	61.3	76.2	64.4	52.6	43.0	12.2	23.6	21.4
Total	67.0	54.3	72.7	60.6	47.7	38.0	12.7	25.0	22.0
1992-1998 Changes									
Birmingham	0.9	1.5	2.1	3.8	0.0	-0.6	-0.6	2.1	4.4
Norfolk	1.6	1.7	2.7	2.5	1.0	2.0	-0.1	1.7	0.5
Providence	1.7	2.3	2.5	3.2	7.2	8.5	-0.6	-4.7	-5.3
Salt Lake City	5.7	8.6	6.2	9.7	3.4	7.6	-2.9	2.8	2.1
Total	2.4	3.4	3.7	4.8	1.3	2.2	-1.0	2.4	2.6

Salt Lake City also reported the largest increase in homeownership rate for white households—from 70.0 percent in 1992 to 76.2 percent in 1998, an increase of 6.2 percentage points. Providence and Oklahoma City reported the largest increases in minority household homeownership rates. In Providence, the rate of homeownership for minority households increased from 26.4 percent in 1992 to 33.6 percent in 1998, an increase of 7.2 percentage points over the six-year period. In Oklahoma City, the rate of homeownership for minority households increased from 45.0 percent to 51.0 percent, an increase of 6 percentage points.

While rates of homeownership increased for minority households, there is some spatial variation in the computed rates of increase. Spreads between white and minority household homeownership rates *decreased* by two percentage points for the four cities

surveyed in the 1992-1996 AHS MSA cycle but *increased* by over two percentage points for the four cities surveyed in the 1992-1998 AHS cycle. For example, in Indianapolis, the spread in the homeownership rate between white and minority households decreased by 4.7 percentage points over the 1992-1996 period (from 26.2 percentage points in 1992 to 21.5 percentage points in 1996). Providence exhibited a similar trend over the 1992-1998 period where the spread between white and minority households decreased from 38.4 percentage points to 33.7 percentage points. Alternatively, spreads in homeownership rates between white and minority households increased by 2.8 percentage points in Salt Lake City and by 2.1 percentage points in Birmingham. Spreads between low- and moderate-income white and low- and moderate-income minority households' homeownership rates exhibited similar trends.

Is the spatial variation in the rate of changes in homeownership related to GSE purchases? If GSE purchases stimulate homeownership, then MSAs with greater GSE market shares are likely to experience greater increases in rates of homeownership. While eight observations are too few to conduct a rigorous statistical analysis of the relationship between GSE purchases and homeownership rates, it will be informative to examine what has happened in these eight places. We utilize the same market shares calculated in the previous sections for these eight MSAs to analyze the impact on homeownership.

To examine the relationship between GSE purchases and rates of homeownership for all, low- and moderate-income, and low- and moderate-income minority households, we partition the metropolitan areas according to their average GSE market shares over the period. We classify metropolitan areas into three categories—one with less than 30 percent GSE market share, a second category for MSAs with between 30 and 40 percent GSE market share and a third category for MSAs with more than 40 percent GSE market share. Two cities had GSE shares below 30 percent (Cleveland and Providence), four places had shares between 30 and 40 percent (Birmingham, Indianapolis, Memphis, and Norfolk), and the remaining two cities had shares exceeding 40 percent (Oklahoma City and Salt Lake City).

For each classification of GSE market share, the rates of change in homeownership were averaged for all households, low- and moderate-income households and low- and moderate-income minority households. The results are provided in Table 11. For all households, homeownership rates increase by about 1.5 percentage points in places where GSEs had less than 40 percent market shares. In Oklahoma City and Salt Lake City—MSAs where the GSEs had market shares exceeding 40 percent—homeownership rates increased by 4.5 percentage points, nearly three times higher than the other cities. For low- and moderate-income households, homeownership rates increased by about 2 percentage points in places where the GSEs purchased less than 40 percent of the mortgages but increased by 6.8 percentage points in places where the GSEs had more than a 40 percent share.

Table 11. Change in Homeownership Rates (in %), 1992-1996/8 By GSE Market Shares (Purchases), Income, Minority Status			
Households	GSE Market Share		
	< 30%	30%-40%	> 40%
All	1.6	1.5	4.5
Low- and moderate-income	2.2	1.7	6.8
Low- and moderate-income minority	4.6	2.3	6.5

Finally, the increase in homeownership rates for low- and moderate-income minority households was also highest in places where the GSEs had more than a 40 percent market share.

Homeownership Rates in Geotargeted Areas

The analysis of homeownership rates for the eight metropolitan areas surveyed in 1992 provides evidence that rates of homeownership increased for all households between 1992 and 1996/8 and rates of homeownership increased faster for low- and moderate-income households. We now turn to an analysis of rates of homeownership in geotargeted areas within the same eight metropolitan areas. We estimate homeownership rates for all households and for low- and moderate-income households, by race and by income for the eight metropolitan areas surveyed by the AHS in 1992. Annex C contains estimates of the number of households and rates of homeownership for the eight metropolitan areas for 1992 and again for either 1996 or 1998. Tables 12 and 13 below summarize this information.

Overall, homeownership rates in geotargeted areas for these eight metropolitan areas (Birmingham, Cleveland, Indianapolis, Norfolk, Memphis, Oklahoma City, Providence and Salt Lake City) are lower than homeownership rates for the entire metropolitan area. This is true for all households residing in geotargeted areas as well as for low- and moderate-income households residing in geotargeted areas. The average rate of homeownership for all geotargeted households is about 13.1 percentage points below the metropolitan area average rate (51.7 percent vs. 64.8 percent). For low- and moderate-income households, the spread declines to 8 percentage points (the rate of homeownership for low- and moderate-income households in the entire metropolitan area is 51.4 percent while the rate of homeownership for geotargeted low- and moderate-income households is 43.4 percent). The difference in homeownership rates between minority households and geotargeted minority households is even smaller. The spatial spread declines to 2.6 percentage points for all minority households and to 0.4 percentage points for low- and moderate-income minority households. So the rate of homeownership for low- and moderate-income minority households living in geotargeted areas is about the same as the rate of homeownership for all low- and moderate-income minority households, regardless of where they live.

Table 12. Homeownership Rates for AHS MSAs Surveyed in 1992 and 1996 Geotargeted Census Tracts									
			White Households		Minority Households		Spreads		
MSA	All Households	LMI	All	LMI	All	LMI	All HH - LMI	White - Minority	LMI White - LMI Minority
1992 Surveys									
Cleveland	45.9	37.7	54.7	46.0	36.2	29.2	8.2	18.5	16.8
Indianapolis	54.9	48.8	60.0	54.4	41.2	35.1	6.1	18.8	19.3
Memphis	54.7	44.6	64.0	54.5	49.7	40.4	10.1	14.3	14.1
Oklahoma City	57.2	51.5	60.7	55.5	44.7	38.7	5.7	16.0	16.8
Total	52.3	44.7	59.1	52.2	42.6	35.0	7.6	16.5	17.2
1996 Surveys									
Cleveland	50.1	42.2	59.5	51.3	38.7	32.8	7.9	20.8	18.5
Indianapolis	53.7	47.4	57.1	51.3	44.6	37.4	6.3	12.5	13.9
Memphis	56.0	48.5	67.4	59.7	50.7	44.2	7.5	16.7	15.5
Oklahoma City	54.4	49.2	58.4	54.2	45.0	38.3	5.2	13.4	15.9
Total	53.1	46.2	59.4	52.9	44.7	38.1	6.9	14.7	14.8
1992-1996 Changes									
Cleveland	4.2	4.5	4.8	5.3	2.5	3.6	-0.3	2.3	1.7
Indianapolis	-1.2	-1.4	-2.9	-3.1	3.4	2.3	0.2	-6.3	-5.4
Memphis	1.3	3.9	3.4	5.2	1.0	3.8	-2.6	2.4	1.4
Oklahoma City	-2.8	-2.3	-2.3	-1.3	0.3	-0.4	-0.5	-2.6	-0.9
Total	0.8	1.5	0.3	0.7	2.1	3.1	-0.7	-1.8	-2.4

While geotargeted homeownership rates increased for the four areas surveyed again in 1996 (Cleveland, Indianapolis, Memphis and Oklahoma City), the rate of increase was slower than metropolitan area-wide increases in homeownership rates. The average rate of homeownership for all geotargeted households (in the four places surveyed in 1996) increased 0.8 percentage points between 1992 and 1996—from 52.3 percent in 1992 to 53.1 percent in 1996. However, the metropolitan area average rates of homeownership increased 1.8 percentage points between 1992 and 1996 for these places (from 64.9 percent to 66.7 percent). Consequently, the spread between the rate of homeownership for all households and geotargeted households increased from 12.6 percentage points to 13.6 percentage points between 1992 and 1996. For low- and moderate-income households, the spatial spread increased from 7.2 percentage points to 8.2 percentage points between 1992 and 1996.

Table 13. Homeownership Rates for AHS MSAs Surveyed in 1992 and 1998 Geotargeted Census Tracts									
			White Households		Minority Households		Spreads		
MSA	All Households	LMI	All	LMI	All	LMI	All HH - LMI	White- Minority	LMI White - LMI Minority
1992 Surveys									
Birmingham	64.4	58.0	73.9	69.1	52.5	45.9	6.4	21.4	23.2
Norfolk	48.9	38.2	54.4	44.0	42.9	32.8	10.7	11.5	11.2
Providence	35.8	27.6	40.6	32.4	18.0	11.4	8.2	22.6	21.0
Salt Lake City	49.1	39.9	51.2	41.9	35.8	28.5	9.2	15.4	13.4
Total	51.1	42.1	55.4	46.7	43.3	34.7	9.0	12.1	12.0
1998 Surveys									
Birmingham	62.6	56.5	75.8	71.9	51.9	45.5	6.1	23.9	26.4
Norfolk	49.7	40.1	59.4	48.5	40.2	33.1	9.6	19.2	15.4
Providence	37.9	30.1	43.6	35.5	24.6	18.6	7.8	19.0	16.9
Salt Lake City	54.7	48.8	58.3	52.5	40.3	34.9	5.9	18.0	17.6
Total	51.7	43.9	58.8	50.9	41.9	35.1	7.8	16.9	15.8
1992-1998 Changes									
Birmingham	-1.8	-1.5	1.9	2.8	-0.6	-0.4	-0.3	2.5	3.2
Norfolk	0.8	1.9	5.0	4.5	-2.7	0.3	-1.1	7.7	4.2
Providence	2.1	2.5	3.0	3.1	6.6	7.2	-0.4	-3.6	-4.1
Salt Lake City	5.6	8.9	7.1	10.6	4.5	6.4	-3.3	2.6	4.2
Total	0.6	1.8	3.4	4.2	-1.4	0.4	-1.2	4.8	3.8

Rates of homeownership for geotargeted minority households also increased between 1992 and 1996 (from 42.6 percent in 1992 to 44.7 percent in 1996), but not as fast as entire metropolitan area minority rates of homeownership. Like the result for all households, the spatial spread in homeownership rates increased between 1992 and 1996—from 1.9 percentage points in 1992 to 3.5 percentage points in 1996. Similarly, the spatial spread in homeownership rates for low- and moderate-income minority households increased by 1.3 percentage points between 1992 and 1996.

The results are similar for the four areas surveyed again in 1998 (Birmingham, Norfolk, Providence and Salt Lake City). That is, rates of homeownership in geotargeted areas increased between 1992 and 1998 for all households (from 51.5 percent to 51.7 percent), for low- and moderate-income households (from 42.1 percent to 43.9 percent), and for low- and moderate-income minority households (from 34.7 percent to 35.1 percent), but not as fast as homeownership rates for like households located outside geotargeted areas. Consequently, the spatial spread (the difference between the homeownership rate for households in the entire metropolitan area and the homeownership rate for households residing in geotargeted areas) went up about two

percentage points between 1992 and 1998. Minority homeownership rates in geotargeted areas declined between 1992 and 1998 (from 43.3 percent to 41.9 percent).

In sum, analysis of homeownership rates for households residing in geotargeted areas reveals that while rates of homeownership increased between 1992 and 1996/8, rates of homeownership for households residing outside geotargeted areas increased faster. Consequently, between 1992 and 1996/8 the spatial spread in homeownership rates increased by between one and two percentage points for all households, for low- and moderate-income households, and for minority households.

Question 6: National Analysis of GSE Market Shares and Homeownership Rates

The Table 11 results suggest that homeownership rates increased faster in metropolitan areas where the GSEs had the larger market shares. To investigate this relationship more formally, we compute metropolitan area homeownership rates using the National AHS. The National AHS is designed to make inference about the nation's housing stock, not about the stock in any one metropolitan area. Consequently, metropolitan area sample sizes can be rather small (e.g. less than 40 observations). To address this sampling issue, we limit our national analysis of homeownership rates to the 80 largest MSAs, where size is defined as the number of households residing in the metropolitan area in 1991. For each MSA, we compute homeownership rates for all households and for low- and moderate-income households, where a low- and moderate-income household has an income below the HUD defined area median income. We compute metropolitan area homeownership rates for 1991 and for 1997 and relate spatial variation in homeownership rates, in changes in homeownership rates over time, and in spreads in homeownership rates to GSE activity.

The results for our national analysis of the influence that GSE purchases have had on homeownership rates are provided in Tables 14-18, which present results for five regression models. In each model, GSE market share is measured as the number of loans purchased by the GSEs, rather than the loan dollar volume. We also have empirical results that use loan volume to define GSE market shares, but the empirical results are very similar to the results reported here. The correlation between the number of loans purchased by the GSEs and loan volume is 0.9775. The empirical specifications include socio-economic/demographic variables that control for variation in other determinants of homeownership. The socio-economic/ demographic variables included here are defined earlier in the section titled "Mortgage Flow Model."

Table 14. Regression Results			
Dependent Variable: 1997 Homeownership Rate for All Households in the MSA			
Variable	Parameter Estimate	Standard Error	t Value
INTERCEPT	0.53218	1.62085	0.33
MS_T_N	-0.136	0.18003	-0.76
INCOME	0.0000023	0.00000275	0.83
LTVHAT	-0.01055	0.02509	-0.42
UND97	-0.00386	0.0014	-2.76
CHG_U	-0.10799	0.11872	-0.91
CHG_HPI	0.60609	0.48282	1.26
PRICE	0.12329	0.0994	1.24
UNEMP_RT	0.01323	0.00751	1.76
VOLATIL	0.00033419	0.00248	0.13
Q ₂	-0.02558	0.03238	-0.79
Q ₃	0.02495	0.02889	0.86
Q ₄	-0.00858	0.0646	-0.13
R Square:	0.3682		
F Value:	3.1111		

The model in Table 14 relates spatial variation in homeownership rates for all households in 1997 to GSE market shares (*MS-T-N*). The model in Table 15 relates 1997 spatial variation in homeownership rates for low- and moderate-income households to GSE market shares (*MS_TLY-N*) controlling for changes in relevant socio-economic/demographic variables. The model in Table 16 relates *changes* in homeownership rates over the 1991-1997 period for all households to GSE market shares while the model in Table 17 relates *changes* in homeownership rates for low- and moderate-income households to GSE market shares.

Finally, the model in Table 18 relates variation in the spread between the all household and the low- and moderate-income household homeownership rates to GSE market shares. This model also empirically examines the hypothesis that all loan purchases, not just low- and moderate-income loan purchases, will increase low- and moderate-income homeownership rates. We examine this hypothesis by separating the GSE market share variable into two components—one for the market share of low- and moderate-income loans purchased by the GSEs and a second for all other loans purchased by the GSEs.

Tables 14 and 15 indicate that 1997 rates of homeownership (for both all households and for low- and moderate-income households) are higher in metropolitan areas with lower percentages of underserved census tracts, as indicated by the parameter estimate for the variable *UND97*. None of the other variables in these models are statistically significant at conventional levels.

Table 15. Regression Results				
Dependent Variable: 1997 Homeownership Rates for MSA Low- and Moderate-Income Households				
Variable	Parameter Estimate	Standard Error	t Value	Pr > t
INTERCEPT	0.36369	1.82478	0.2	0.8427
MS_TLY_N	-0.08301	0.20057	-0.41	0.6803
INCOME	2.07E-06	3.09E-06	0.67	0.5069
LTVHAT	-0.00434	0.02821	-0.15	0.8783
UND97	-0.00418	0.00158	-2.65	0.0101
CHG_U	-0.03144	0.13263	-0.24	0.8134
CHG_HPI	0.73529	0.55087	1.33	0.1867
PRICE	0.06537	0.112	0.58	0.5615
UNEMP_RT	0.01111	0.0085	1.31	0.1961
VOLATIL	0.000588	0.00279	0.21	0.8336
Q ₂	-0.01628	0.03604	-0.45	0.6531
Q ₃	0.04994	0.03256	1.53	0.1300
Q ₄	0.02338	0.0724	0.32	0.7478
R-Square:	0.3501			
F Value:	2.8700			

The results in Tables 16 and 17 suggest that this model fails to explain spatial variation in homeownership rate *changes* over the 1991-1997 period, either for all households (Table 16) or for low- and moderate-income households (Table 17). In both cases, the regression equation F-statistic (1.16 in Table 16 and 0.96 in Table 17) fails to reject the null hypothesis that all estimated coefficients are jointly equal to zero.

Table 18 presents empirical results for the model that relates *changes* in the spread between the all household and the low- and moderate-income household homeownership rates. As indicated in the table, there is a statistically significant (at the .05 level) inverse relationship between the GSEs' market share of conventional loans originated to low- and moderate-income borrowers (*MS_TLY_N*) and the change in homeownership disparities between low- and moderate-income and higher income households. While the statistical results are weak, they provide some indication that only GSE purchases of low- and moderate-income loans reduce the spread between rates of homeownership for all households and for low- and moderate-income households. GSE purchases of non-low- and moderate-income loans have no influence on the homeownership rate of low- and moderate-income households, over and above the influence that these purchases have on homeownership rates for all households.

Table 16. Regression Results			
Dependent Variable: 1991-1997 Changes in Homeownership for All Households			
Variable	Parameter Estimate	Standard Error	t Value
INTERCEPT	0.09469	0.81658	0.12
MS_TLY_N	-0.10994	0.0907	-1.21
INCOME	-1.57E-07	1.39E-06	-0.11
LTVHAT	-0.00032	0.01264	-0.03
UND97	-0.0004	0.000704	-0.57
CHG_U	-0.07239	0.05981	-1.21
CHG_HPI	0.29982	0.24324	1.23
PRICE	-0.00062	0.05007	-0.01
UNEMP_RT	0.00491	0.00379	1.3
VOLATIL	-0.00026	0.00125	-0.21
Q ₂	-0.02815	0.01631	-1.73
Q ₃	-0.02325	0.01455	-1.6
Q ₄	-0.03636	0.03255	-1.12
R- Square:		0.1788	
F Value:		1.1600	

Table 17. Regression Results				
Dependent Variable: 1991-1997 Changes in Homeownership for LMI Households				
Variable	Parameter Estimate	Standard Error	t Value	Pr > t
INTERCEPT	0.34095	1.04139	0.33	0.7444
MS_TLY_N	0.05706	0.11446	0.5	0.6198
INCOME	-1E-06	1.77E-06	-0.57	0.572
LTVHAT	0.00406	0.0161	0.25	0.8017
UND97	-0.0008	0.000899	-0.89	0.3749
CHG_U	0.02809	0.07569	0.37	0.7118
CHG_HPI	-0.07519	0.31438	-0.24	0.8117
PRICE	-0.06479	0.06392	-1.01	0.3146
UNEMP_RT	-0.00192	0.00485	-0.4	0.6932
VOLATIL	-0.00194	0.00159	-1.22	0.2272
Q ₂	-0.03985	0.02057	-1.94	0.0571
Q ₃	-0.02315	0.01858	-1.25	0.2173
Q ₄	-0.01442	0.04132	-0.35	0.7282
R- Square:		0.1528		
F Value:		0.9600		

Table 18. Regression Results				
Dependent Variable: 1991-1997 Changes in the Spread Between All Household and LMI Homeownership Rates				
Variable	Parameter Estimate	Standard Error	t Value	Pr > t
INTERCEPT	-0.21067	0.81241	-0.26	0.7962
MS_TLY_N	-0.30032	0.13139	-2.29	0.0256
MS_THY_N	0.1103	0.11667	0.95	0.348
INCOME	9.72E-07	1.38E-06	0.7	0.4836
LTVHAT	-0.00332	0.01259	-0.26	0.7931
UND97	0.000455	0.000703	0.65	0.5194
CHG_U	-0.09784	0.05965	-1.64	0.106
CHG_HPI	0.44784	0.2468	1.81	0.0743
PRICE	0.047	0.05097	0.92	0.36
UNEMP_RT	0.00612	0.0038	1.61	0.1117
VOLATIL	0.00193	0.00125	1.55	0.1266
Q ₂	0.00938	0.01619	0.58	0.5647
Q ₃	-0.00127	0.01453	-0.09	0.9306
Q ₄	-0.01443	0.03275	-0.44	0.661
R-Square:		0.2364		
F Value:		1.5000		

Homeownership Summary

An examination of the eight cities surveyed by the 1992 metropolitan AHS provides evidence that homeownership rates increased over the 1992-1996/8 period for all households, and increased at a higher rate for low- and moderate-income households. Rates of homeownership for low- and moderate income households residing in these eight cities increased by about 3 percentage points over the 1992-1996/8 period, about 50% faster than rates of homeownership for all households in these cities. Rates of homeownership for geotargeted households in these eight cities also increased over the 1992-1996/8 period, but not as rapidly as the rate of increase in homeownership for similar households residing outside the geotargeted neighborhoods. While the eight metropolitan AHS provide precise estimates of area homeownership rates, by income and race, eight observations is too few to analyze the determinants of the observed spatial variation in either the rates of homeownership or in the changes in homeownership rates over the 1992-1996/8 period.

Our analysis also provides a preliminary attempt to examine whether the observed spatial variation in rates of homeownership during the 1990s is related to spatial variation in GSE purchasing activity. We estimate metropolitan area rates of homeownership for all households and for low- and moderate-income households using the 1991 and 1997 National AHS. We then relate homeownership rates, changes in homeownership rates, and spreads between the all-household and the low-and moderate-income household homeownership rates to GSE purchasing activity, controlling for other variables likely to influence homeownership.

Our national analysis indicates that rates of homeownership (for both all-households and for low-and moderate-income households) are inversely related to the percent of the metropolitan area that is underserved. We find no statistical relationship relating changes in rates of homeownership between 1991 and 1997 to GSE purchasing activity or to other socio-economic variables. Finally, we find some statistical evidence that GSE purchases of low-and moderate-income mortgages reduced the disparity in homeownership rates between low- and moderate-income and all households.

The national results are preliminary and are intended to suggest the type of analysis that can be performed with more accurate estimates of homeownership rates. Metropolitan area specific homeownership rates were estimated from the National AHS with as few as 40 sample observations in a city. Consequently, these estimated rates of homeownership have a large sampling variance. More precise estimates of homeownership rates can be computed (for many more places) when 2000 Census data becomes available.

CHAPTER 5

SUMMARY OF RESULTS

The purpose of this report is to assess the effects of the GSE affordable housing goals on low- and moderate-income families and underserved areas. As discussed in Chapter 1, we conducted our research in three separate stages. In the first phase of the study, we reviewed the literature that is the most relevant for developing models that explicate how the GSEs' affordable housing goals affect targeted groups. This review is presented in Chapter 2. In the second phase of this project, we developed a conceptual model, outlined in Chapter 3, to examine the effect of the GSE affordable housing goals on the mortgage market. During the third stage, we conducted empirical analyses based on the theoretical model developed as part of the second phase. The results of this analysis are presented in Chapter 4.

The three-stage research strategy provided an opportunity to narrow the scope of our analysis in order to create a tractable set of researchable issues. Rather than assess all of the potential effects of the GSEs' responses to the goals, we concentrated our analysis on two major areas: (1) capital market outcomes, such as mortgage credit price and quantity changes for targeted borrowers; and (2) housing market outcomes, as defined by homeownership rate changes among low- and moderate-income and minority families. We chose these outcomes because they represent effects that are central to the GSEs' stated objective, which is to make homeownership possible for as many families as is possible. We believe, then, that the goals should be examined by considering their impact on Fannie Mae's and Freddie Mac's business practices related to serving targeted families, and the resulting observable changes to homeownership rates for target group members.

Using the conceptual model from Chapter 3, we identified six empirical research questions that can potentially examine the impact of the AHGs on the mortgage market and on target population homeownership rates. These questions are:

1. Do GSE market shares change over time?
2. Have GSE market shares increased in areas with higher concentrations of target groups?
3. Do the GSEs have the ability to alter/affect mortgage rates in markets where they are active?
4. Is more capital flowing to targeted areas as a result of the GSE goals?
5. Is the change in metropolitan area homeownership rates for target groups related to GSE market share?

6. Have the GSE AHGs influenced target population homeownership rates nationally?

Based on our empirical analyses, presented in Chapter 4, we find the following answers to these questions.

Question 1. Do GSE Market Shares Change Over Time? Our analysis of the GSE share of the conventional conforming mortgage market, using HMDA data, finds that GSE market shares changed between 1995 and 1999. We used these years as our study period because we believe that HMDA data contains reporting errors prior to that time, so any analysis of market share using earlier data may provide a misleading picture. This finding is consistent with the idea that the affordable housing goals created incentives for the GSEs to change their underwriting guidelines so that more borrowers qualify for loans that are saleable to Fannie Mae and Freddie Mac. This explanation, though, is not the only possible reason for this observed pattern. As discussed in Chapter 2, the GSEs' ability to purchase loans is conditional on the activities of primary lenders. Therefore, it may be that the GSEs increased their share of the primary conventional market as borrowers relied less on adjustable rate mortgages and other products that are less likely to be purchased by the GSEs. Also, the GSEs' share of the market tends to increase during period with high refinance activity, such as 1998-1999.

Question 2. Do GSE Market Shares Increase in Areas with Higher Concentrations of Target Groups? Our empirical analysis of this question centered on assessing the relationship between GSE market share at the MSA level and the proportion of MSA census tracts that met the definition of underserved areas. Our multivariate regressions found that GSE market share was lower in MSAs where a higher proportion of census tracts met the underserved definition. This result is not too surprising: it is unlikely that Fannie Mae and Freddie Mac set purchase targets for individual census tracts. Rather, the GSEs can only purchase mortgages originated by primary lenders, and these originations are influenced by GSE underwriting guidelines.

Question 3. Do the GSEs have the ability to alter/affect mortgage rates in markets where they are active? The empirical results of over 300 MSAs suggest that effective interest rates are inversely related to GSE market share. Overall, MSAs with higher GSE market shares have lower effective interest rates. However, we do not find that mortgage interest rates are affected by the share of MSA census tracts that meet the underserved definition. Therefore, our results may simply confirm previous research on the differential between jumbo and conventional loan rates, since GSE market share will be influenced by the proportion of loans originated below the conforming limit.

Question 4. Is more capital flowing to targeted areas as a result of the GSE goals? In order to address this question, we conducted a full information maximum likelihood estimation of a simultaneous supply and demand model. Our results suggest that there is not a direct link between total mortgage lending volume and the proportion

of an MSA's census tracts that meet the underserved definition. However, it does appear that GSE seasoned loan purchases are recycled by lenders into more mortgage lending.

Question 5. Is the change in metropolitan area homeownership rates for target groups related to GSE market share? Our analysis of eight MSAs that were included in the American Housing Survey in 1992 and then again in either 1996 and 1998 suggests that homeownership rates for lower income and minority families increased faster in MSAs with higher GSE market shares. This result should be interpreted with caution, since it is based on only a small sample.

Question 6. Have the GSE AHGs influenced target population homeownership rates nationally? In analyzing homeownership rate changes between 1991 and 1997 in 80 cities, we found that the GSEs, by purchasing loans originated to low-income families, helped to reduce the disparity between homeownership rates for low-income and higher income families. This suggests that the liquidity created when the GSEs purchase loans originated to low-income families is recycled into more targeted lending efforts, which help make homeownership possible for an even larger number of traditionally underserved group members.

These empirical results suggest that the GSEs, by increasing their market share of the conventional conforming market, are making it easier for lower income families to become homeowners. Note, however, that these findings are not definitive, and will benefit from further analysis with tenure information contained in the 2000 Census. While the empirical results are mixed, studies of the GSEs' underwriting changes discussed in Chapter 2 indicate that Fannie Mae and Freddie Mac initiated many changes to their standard underwriting guidelines that make it easier for income- and wealth-constrained borrowers to qualify for conventional mortgages. Moreover, Fannie Mae and Freddie Mac, since FHEFSSA, introduced new affordable lending programs, underwriting experiments and developed partnerships with organizations that increase the ability of lenders to originate loans that are saleable to the GSEs. These activities are an important addition to the housing finance system's ability to serve a broader range of homebuyers, and help to account for the growth in homeownership rates for lower income and minority families.

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ANNEX A

Annex A.1

Number of Households and Homeownership Rates for Selected AHS MSAs

Birmingham 1992										
Income Class	Total			White			Minority			
	Own	Rent		Own	Rent		Own	Rent		
< 60% AMI	129,515	69,111	60,404	75,829	47,319	28,510	53,686	21,792	31,894	
60%-80% AMI	36,434	23,337	13,097	26,004	17,419	8,585	10,430	5,918	4,511	
80%-100%AMI	48,452	35,298	13,154	39,296	29,925	9,371	9,156	5,373	3,783	
<100%AMI	214,401	127,746	86,655	141,129	94,663	46,466	73,272	33,083	40,188	
100%-120% AMI	28,461	21,442	7,019	21,914	17,564	4,350	6,546	3,878	2,669	
120%-160% AMI	37,962	30,242	7,720	30,100	24,020	6,080	7,862	6,222	1,640	
>160%AMI	76,821	69,041	7,780	66,901	60,754	6,147	9,920	8,287	1,633	
>100%AMI	143,244	120,725	22,519	118,915	102,338	16,577	24,328	18,387	5,942	
TOTAL	357,645	248,471	109,174	260,044	197,001	63,043	97,600	51,470	46,130	
Homeownership Rates										
Income Class	All			White			Minority			Spread
< 60% AMI	53.36%			62.40%			40.59%			21.81%
60%-80% AMI	64.05%			66.99%			56.74%			10.25%
80%-100%AMI	72.85%			76.15%			58.68%			17.47%
<100%AMI	59.58%			67.08%			45.15%			21.92%
100%-120% AMI	75.34%			80.15%			59.24%			20.91%
120%-160% AMI	79.66%			79.80%			79.14%			0.66%
>160%AMI	89.87%			90.81%			83.54%			7.27%
>100%AMI	84.28%			86.06%			75.58%			10.48%
TOTAL	69.47%			75.76%			52.74%			23.02%

Annex A.2

Number of Households and Homeownership Rates for Selected AHS MSAs

Cleveland 1992									
Income Class	Total	White		Minority		White		Minority	
		Own	Rent	Own	Rent	Own	Rent	Own	Rent
< 60% AMI	273,690	120,949	152,741	183,974	97,630	86,344	89,716	23,319	66,397
60%-80% AMI	99,805	61,136	38,669	79,741	53,758	25,984	20,063	7,378	12,686
80%-100%AMI	74,820	52,224	22,596	61,683	46,438	15,245	13,136	5,786	7,350
<100%AMI	448,315	234,309	214,006	325,398	197,826	127,573	122,915	36,483	86,433
100%-120% AMI	61,864	47,185	14,679	52,178	40,863	11,315	9,686	6,321	3,364
120%-160% AMI	84,421	71,481	12,940	72,214	63,020	9,195	12,207	8,462	3,745
>160%AMI	127,452	120,131	7,321	114,289	109,134	5,154	13,164	10,997	2,167
>100%AMI	273,737	238,797	34,940	238,681	213,017	25,664	35,057	25,780	9,276
TOTAL	722,052	473,106	248,946	564,079	410,843	153,237	157,972	62,263	95,709
Homeownership Rates									
Income Class	All		White		Minority		Spread		
< 60% AMI	44.19%		53.07%		25.99%		27.08%		
60%-80% AMI	61.26%		67.42%		36.77%		30.64%		
80%-100%AMI	69.80%		75.28%		44.05%		31.24%		
<100%AMI	52.26%		60.80%		29.68%		31.11%		
100%-120% AMI	76.27%		78.31%		65.26%		13.06%		
120%-160% AMI	84.67%		87.27%		69.32%		17.95%		
>160%AMI	94.26%		95.49%		83.54%		11.95%		
>100%AMI	87.24%		89.25%		73.54%		15.71%		
TOTAL	65.52%		72.83%		39.41%		33.42%		

Annex A.3

Number of Households and Homeownership Rates for Selected AHS MSAs

Indianapolis 1992									
Income Class	Total	Own		Rent		White		Minority	
		Own	Rent	White	Rent	White	Rent	Minority	Own
< 60% AMI	186,844	85,964	100,880	146,784	74,293	72,491	40,061	11,672	28,389
60%-80% AMI	75,680	47,338	28,342	64,078	41,475	22,603	11,602	5,863	5,739
80%-100%AMI	52,545	38,536	14,009	46,967	35,636	11,331	5,577	2,900	2,678
<100%AMI	315,069	171,838	143,231	257,829	151,404	106,425	57,240	20,435	36,806
100%-120% AMI	45,134	35,661	9,473	40,368	32,287	8,081	4,765	3,373	1,392
120%-160% AMI	63,937	55,507	8,430	58,750	51,823	6,927	5,187	3,683	1,503
>160%AMI	74,341	68,549	5,792	69,143	64,129	5,014	5,198	4,420	779
>100%AMI	183,412	159,717	23,695	168,261	148,239	20,022	15,150	11,476	3,674
TOTAL	498,481	331,555	166,926	426,090	299,643	126,447	72,390	31,911	40,480
Homeownership Rates									
Income Class	All		White		Minority		Spread		
< 60% AMI	46.01%		50.61%		29.14%		21.48%		
60%-80% AMI	62.55%		64.73%		50.53%		14.19%		
80%-100%AMI	73.34%		75.87%		52.00%		23.88%		
<100%AMI	54.54%		58.72%		35.70%		23.02%		
100%-120% AMI	79.01%		79.98%		70.79%		9.19%		
120%-160% AMI	86.82%		88.21%		71.00%		17.20%		
>160%AMI	92.21%		92.75%		85.03%		7.72%		
>100%AMI	87.08%		88.10%		75.75%		12.35%		
TOTAL	66.51%		70.32%		44.08%		26.24%		

Annex A.4

Number of Households and Homeownership Rates for Selected AHS MSAs

Memphis 1992									
Income Class	Total	Own		White		Minority		Rent	
		Own	Rent	Own	Rent	Own	Rent		
< 60% AMI	138,986	56,064	82,922	61,101	30,535	30,566	77,885	25,530	52,355
60%-80% AMI	45,215	26,731	18,484	29,082	17,875	11,207	16,132	8,856	7,276
80%-100%AMI	37,703	24,598	13,105	25,078	16,182	8,896	12,625	8,416	4,209
<100%AMI	221,904	107,393	114,511	115,261	64,592	50,669	106,642	42,802	63,840
100%-120% AMI	26,697	19,622	7,075	17,075	12,136	4,939	9,623	7,486	2,136
120%-160% AMI	43,438	34,622	8,816	33,125	26,039	7,086	10,313	8,583	1,730
>160%AMI	75,301	68,775	6,526	62,273	57,284	4,990	13,028	11,492	1,537
>100%AMI	145,436	123,019	22,417	112,473	95,459	17,015	32,964	27,561	5,403
TOTAL	367,340	230,412	136,928	227,734	160,051	67,684	139,606	70,363	69,243
Homeownership Rates									
Income Class	All		White		Minority		Spread		
< 60% AMI	40.34%		49.97%		32.78%		17.20%		
60%-80% AMI	59.12%		61.46%		54.90%		6.57%		
80%-100%AMI	65.24%		64.53%		66.66%		-2.13%		
<100%AMI	48.40%		56.04%		40.14%		15.90%		
100%-120% AMI	73.50%		71.07%		77.79%		-6.72%		
120%-160% AMI	79.70%		78.61%		83.23%		-4.62%		
>160%AMI	91.33%		91.99%		88.21%		3.78%		
>100%AMI	84.59%		84.87%		83.61%		1.26%		
TOTAL	62.72%		70.28%		50.40%		19.88%		

Annex A.5

Number of Households and Homeownership Rates for Selected AHS MSAs

Norfolk 1992									
Income Class	Total	White		Minority		White		Minority	
		Own	Rent	Own	Rent	Own	Rent	Own	Rent
< 60% AMI	186,770	69,967	116,803	102,441	46,328	56,113	84,329	23,639	60,690
60%-80% AMI	74,498	42,223	32,275	53,578	32,092	21,486	20,920	10,131	10,789
80%-100%AMI	55,914	36,529	19,385	42,057	28,729	13,328	13,856	7,800	6,056
<100%AMI	317,182	148,719	168,463	198,076	107,149	90,927	119,105	41,570	77,535
100%-120% AMI	48,555	37,969	10,586	35,491	28,082	7,409	13,064	9,887	3,177
120%-160% AMI	66,464	54,694	11,770	51,252	42,239	9,012	15,213	12,455	2,758
>160%AMI	80,631	71,847	8,784	69,551	62,706	6,845	11,081	9,141	1,940
>100%AMI	195,650	164,510	31,140	156,294	133,027	23,266	39,358	31,483	7,875
TOTAL	512,832	313,229	199,603	354,370	240,176	114,193	158,463	73,053	85,410
Homeownership Rates									
Income Class	All		White		Minority		Spread		
< 60% AMI	37.46%		45.22%		28.03%		17.19%		
60%-80% AMI	56.68%		59.90%		48.43%		11.47%		
80%-100%AMI	65.33%		68.31%		56.29%		12.02%		
<100%AMI	46.89%		54.09%		34.90%		19.19%		
100%-120% AMI	78.20%		79.12%		75.68%		3.44%		
120%-160% AMI	82.29%		82.41%		81.87%		0.54%		
>160%AMI	89.11%		90.16%		82.49%		7.67%		
>100%AMI	84.08%		85.11%		79.99%		5.12%		
TOTAL	61.08%		67.78%		46.10%		21.67%		

Annex A.6

Number of Households and Homeownership Rates for Selected AHS MSAs

Oklahoma City 1992									
Income Class	Total			White		Minority			
		Own	Rent	Own	Rent	Own	Rent		
< 60% AMI	139,744	59,414	80,330	109,624	50,233	59,390	30,120	9,180	20,939
60%-80% AMI	47,826	28,227	19,599	40,809	25,087	15,723	7,017	3,141	3,876
80%-100%AMI	44,166	30,662	13,504	39,629	28,263	11,366	4,537	2,399	2,138
<100%AMI	231,736	118,303	113,433	190,062	103,583	86,479	41,674	14,720	26,953
100%-120% AMI	31,031	22,541	8,490	27,993	20,602	7,391	3,038	1,939	1,099
120%-160% AMI	46,449	36,162	10,287	41,075	32,420	8,656	5,373	3,742	1,631
>160%AMI	71,017	64,545	6,472	65,686	60,039	5,647	5,331	4,506	825
>100%AMI	148,497	123,248	25,249	134,754	113,061	21,694	13,742	10,187	3,555
TOTAL	380,233	241,551	138,682	324,816	216,644	108,173	55,416	24,907	30,508
Homeownership Rates									
Income Class	All		White		Minority		Spread		
< 60% AMI	42.52%		45.82%		30.48%		15.34%		
60%-80% AMI	59.02%		61.47%		44.76%		16.71%		
80%-100%AMI	69.42%		71.32%		52.88%		18.44%		
<100%AMI	51.05%		54.50%		35.32%		19.18%		
100%-120% AMI	72.64%		73.60%		63.83%		9.77%		
120%-160% AMI	77.85%		78.93%		69.64%		9.28%		
>160%AMI	90.89%		91.40%		84.52%		6.88%		
>100%AMI	83.00%		83.90%		74.13%		9.77%		
TOTAL	63.53%		66.70%		44.95%		21.75%		

Annex A.7

Number of Households and Homeownership Rates for Selected AHS MSAs

Providence 1992									
Income Class	Total	Own		Rent		White		Minority	
		Own	Rent	White	Rent	Own	Rent	Own	Rent
< 60% AMI	145,377	53,289	92,088	125,284	51,509	73,775	20,093	1,780	18,313
60%-80% AMI	57,749	32,848	24,901	53,530	31,821	21,709	4,220	1,027	3,193
80%-100%AMI	41,555	28,498	13,057	39,170	27,485	11,686	2,385	1,013	1,372
<100%AMI	244,681	114,635	130,046	217,984	110,815	107,170	26,698	3,820	22,878
100%-120% AMI	31,472	26,114	5,358	29,681	24,629	5,053	1,790	1,485	305
120%-160% AMI	47,696	39,996	7,700	45,345	38,325	7,020	2,351	1,670	680
>160%AMI	56,865	53,419	3,446	54,961	51,747	3,214	1,904	1,672	232
>100%AMI	136,033	119,529	16,504	129,987	114,701	15,287	6,045	4,827	1,217
TOTAL	380,714	234,164	146,550	347,971	225,516	122,457	32,743	8,647	24,095
Homeownership Rates									
Income Class	All		White		Minority		Spread		
< 60% AMI	36.66%		41.11%		8.86%		32.25%		
60%-80% AMI	56.88%		59.45%		24.34%		35.11%		
80%-100%AMI	68.58%		70.17%		42.47%		27.69%		
<100%AMI	46.85%		50.84%		14.31%		36.53%		
100%-120% AMI	82.98%		82.98%		82.96%		0.02%		
120%-160% AMI	83.86%		84.52%		71.03%		13.49%		
>160%AMI	93.94%		94.15%		87.82%		6.34%		
>100%AMI	87.87%		88.24%		79.85%		8.39%		
TOTAL	61.51%		64.81%		26.41%		38.40%		

Annex A.8

Number of Households and Homeownership Rates for Selected AHS MSAs

Salt Lake City 1992									
Income Class	Total	Own		White		Rent		Minority	
		Own	Rent	Own	Rent	Own	Rent		
< 60% AMI	114,728	47,753	66,975	98,826	43,637	55,190	15,902	4,116	11,786
60%-80% AMI	51,437	32,188	19,249	47,642	30,160	17,482	3,795	2,029	1,766
80%-100%AMI	43,767	30,590	13,177	40,706	28,671	12,035	3,062	1,919	1,142
<100%AMI	209,932	110,531	99,401	187,174	102,468	84,707	22,759	8,064	14,694
100%-120% AMI	35,929	29,438	6,491	33,395	27,718	5,677	2,535	1,720	815
120%-160% AMI	53,899	46,534	7,365	51,253	44,171	7,082	2,646	2,363	283
>160%AMI	66,907	62,008	4,899	62,965	58,477	4,487	3,942	3,531	411
>100%AMI	156,735	137,980	18,755	147,613	130,366	17,246	9,123	7,614	1,509
TOTAL	366,667	248,511	118,156	334,787	232,834	101,953	31,882	15,678	16,203
Homeownership Rates									
Income Class	All		White		Minority		Spread		
< 60% AMI	41.62%		44.16%		25.88%		18.27%		
60%-80% AMI	62.58%		63.31%		53.47%		9.84%		
80%-100%AMI	69.89%		70.43%		62.67%		7.76%		
<100%AMI	52.65%		54.74%		35.43%		19.31%		
100%-120% AMI	81.93%		83.00%		67.85%		15.15%		
120%-160% AMI	86.34%		86.18%		89.30%		-3.12%		
>160%AMI	92.68%		92.87%		89.57%		3.30%		
>100%AMI	88.03%		88.32%		83.46%		4.86%		
TOTAL	67.78%		69.55%		49.18%		20.37%		

Annex A.9

Number of Households and Homeownership Rates for Selected AHS MSAs

Cleveland 1996									
Income Class	Total	White		Minority		Own	Rent	Own	Rent
		Own	Rent	Own	Rent				
< 60% AMI	321,608	155,387	166,221	228,128	130,136	97,992	93,481	25,251	68,229
60%-80% AMI	94,398	57,274	37,124	73,760	47,537	26,224	20,637	9,737	10,900
80%-100%AMI	73,973	53,766	20,207	61,056	46,384	14,672	12,918	7,383	5,535
<100%AMI	489,979	266,427	223,552	362,944	224,057	138,888	127,036	42,371	84,664
100%-120% AMI	66,689	54,218	12,471	58,167	49,061	9,106	8,522	5,158	3,364
120%-160% AMI	93,030	80,869	12,161	79,569	70,656	8,913	13,461	10,213	3,247
>160%AMI	122,849	116,264	6,585	113,219	107,783	5,437	9,630	8,481	1,149
>100%AMI	282,568	251,351	31,217	250,955	227,500	23,456	31,613	23,852	7,760
TOTAL	772,547	517,778	254,769	613,899	451,557	162,344	158,649	66,223	92,424
Homeownership Rates									
Income Class	All		White		Minority		Spread		
< 60% AMI	48.32%		57.05%		27.01%		30.03%		
60%-80% AMI	60.67%		64.45%		47.18%		17.27%		
80%-100%AMI	72.68%		75.97%		57.15%		18.82%		
<100%AMI	54.38%		61.73%		33.35%		28.38%		
100%-120% AMI	81.30%		84.35%		60.53%		23.82%		
120%-160% AMI	86.93%		88.80%		75.87%		12.93%		
>160%AMI	94.64%		95.20%		88.07%		7.13%		
>100%AMI	88.95%		90.65%		75.45%		15.20%		
TOTAL	67.02%		73.56%		41.74%		31.81%		

Annex A.10

Number of Households and Homeownership Rates for Selected AHS MSAs

Indianapolis 1996									
Income Class	Total	Own		White		Minority		Rent	
		Own	Rent	Own	Rent	Own	Rent	Own	Rent
< 60% AMI	233,417	110,854	122,563	187,143	94,819	92,324	46,275	16,036	30,239
60%-80% AMI	76,206	45,425	30,781	63,973	40,255	23,717	12,233	5,170	7,063
80%-100%AMI	65,906	49,913	15,993	60,426	46,612	13,814	5,481	3,302	2,179
<100%AMI	375,529	206,192	169,337	311,542	181,686	129,855	63,989	24,508	39,481
100%-120% AMI	46,960	36,470	10,490	41,806	33,180	8,626	5,154	3,290	1,864
120%-160% AMI	67,401	59,396	8,005	61,016	54,540	6,475	6,386	4,856	1,530
>160%AMI	101,934	96,082	5,852	92,779	87,364	5,416	9,155	8,718	437
>100%AMI	216,295	191,948	24,347	195,601	175,084	20,517	20,695	16,864	3,831
TOTAL	591,824	398,140	193,684	507,143	356,770	150,372	84,684	41,372	43,312
Homeownership Rates									
Income Class	All		White		Minority		Spread		
< 60% AMI	47.49%		50.67%		34.65%		16.01%		
60%-80% AMI	59.61%		62.92%		42.26%		20.66%		
80%-100%AMI	75.73%		77.14%		60.24%		16.89%		
<100%AMI	54.91%		58.32%		38.30%		20.02%		
100%-120% AMI	77.66%		79.37%		63.83%		15.53%		
120%-160% AMI	88.12%		89.39%		76.04%		13.35%		
>160%AMI	94.26%		94.16%		95.23%		-1.06%		
>100%AMI	88.74%		89.51%		81.49%		8.02%		
TOTAL	67.27%		70.35%		48.85%		21.49%		

Annex A.11

Number of Households and Homeownership Rates for Selected AHS MSAs

Memphis 1996									
Income Class	Total	Own		Rent		White		Minority	
		Own	Rent	White	Minority	Own	Rent	Own	Rent
< 60% AMI	146,535	66,041	80,494	59,690	31,990	27,700	86,845	34,051	52,794
60%-80% AMI	55,904	32,665	23,239	31,755	20,476	11,279	24,149	12,189	11,960
80%-100%AMI	37,082	25,846	11,236	25,531	17,268	8,263	11,552	8,579	2,973
<100%AMI	239,521	124,552	114,969	116,976	69,734	47,242	122,546	54,819	67,727
100%-120% AMI	32,114	24,073	8,041	20,385	16,060	4,325	11,728	8,013	3,715
120%-160% AMI	50,184	40,434	9,750	35,931	30,109	5,822	14,253	10,325	3,928
>160%AMI	79,742	73,157	6,585	63,727	59,288	4,439	16,015	13,868	2,146
>100%AMI	162,040	137,664	24,376	120,043	105,457	14,586	41,996	32,206	9,789
TOTAL	401,561	262,216	139,345	237,019	175,191	61,828	164,542	87,025	77,516
Homeownership Rates									
Income Class	All		White		Minority		Spread		
< 60% AMI	45.07%		53.59%		39.21%		14.38%		
60%-80% AMI	58.43%		64.48%		50.47%		14.01%		
80%-100%AMI	69.70%		67.64%		74.26%		-6.63%		
<100%AMI	52.00%		59.61%		44.73%		14.88%		
100%-120% AMI	74.96%		78.78%		68.32%		10.46%		
120%-160% AMI	80.57%		83.80%		72.44%		11.36%		
>160%AMI	91.74%		93.03%		86.59%		6.44%		
>100%AMI	84.96%		87.85%		76.69%		11.16%		
TOTAL	65.30%		73.91%		52.89%		21.03%		

Annex A.12

Number of Households and Homeownership Rates for Selected AHS MSAs

Oklahoma City 1996									
Income Class	Total	Own		White		Minority		Rent	
		Own	Rent	Own	Rent	Own	Rent	Own	Rent
< 60% AMI	136,638	63,656	72,982	99,069	50,729	48,340	37,569	12,927	24,642
60%-80% AMI	66,999	45,498	21,501	53,485	37,874	15,612	13,513	7,624	5,889
80%-100%AMI	35,635	25,566	10,069	31,519	23,389	8,130	4,115	2,177	1,939
<100%AMI	239,272	134,720	104,552	184,073	111,992	72,082	55,197	22,728	32,470
100%-120% AMI	29,184	20,780	8,404	24,561	18,132	6,429	4,623	2,648	1,975
120%-160% AMI	49,760	41,921	7,839	43,972	37,243	6,729	5,789	4,678	1,111
>160%AMI	67,934	60,351	7,583	57,507	51,637	5,870	10,427	8,714	1,713
>100%AMI	146,878	123,052	23,826	126,040	107,012	19,028	20,839	16,040	4,799
TOTAL	386,150	257,772	128,378	310,113	219,004	91,110	76,036	38,768	37,269
Homeownership Rates									
Income Class	All		White		Minority		Spread		
< 60% AMI	46.59%		51.21%		34.41%		16.80%		
60%-80% AMI	67.91%		70.81%		56.42%		14.39%		
80%-100%AMI	71.74%		74.21%		52.90%		21.30%		
<100%AMI	56.30%		60.84%		41.18%		19.66%		
100%-120% AMI	71.20%		73.82%		57.28%		16.55%		
120%-160% AMI	84.25%		84.70%		80.81%		3.89%		
>160%AMI	88.84%		89.79%		83.57%		6.22%		
>100%AMI	83.78%		84.90%		76.97%		7.93%		
TOTAL	66.75%		70.62%		50.99%		19.63%		

Annex A.13

Number of Households and Homeownership Rates for Selected AHS MSAs

Birmingham 1998									
Income Class	Total	White		Minority		White		Minority	
		Own	Rent	Own	Rent	Own	Rent		
< 60% AMI	146,763	84,067	62,696	87,184	60,625	26,559	59,579	23,442	36,136
60%-80% AMI	39,209	25,476	13,733	26,916	18,823	8,093	12,294	6,653	5,641
80%-100%AMI	32,694	23,961	8,733	22,939	17,672	5,267	9,754	6,288	3,466
<100%AMI	218,666	133,504	85,162	137,039	97,120	39,919	81,627	36,383	45,243
100%-120% AMI	30,377	22,239	8,138	21,535	16,215	5,320	8,842	6,024	2,818
120%-160% AMI	37,093	30,919	6,174	29,669	24,802	4,868	7,425	6,117	1,307
>160%AMI	72,619	66,002	6,617	64,332	58,609	5,723	8,287	7,394	893
>100%AMI	140,089	119,160	20,929	115,536	99,626	15,911	24,554	19,535	5,018
TOTAL	358,755	252,664	106,091	252,575	196,746	55,830	106,181	55,918	50,261
Homeownership Rates									
Income Class	All		White		Minority		Spread		
< 60% AMI	57.28%		69.54%		39.35%		30.19%		
60%-80% AMI	64.97%		69.93%		54.12%		15.82%		
80%-100%AMI	73.29%		77.04%		64.47%		12.57%		
<100%AMI	61.05%		70.87%		44.57%		26.30%		
100%-120% AMI	73.21%		75.30%		68.13%		7.17%		
120%-160% AMI	83.36%		83.60%		82.38%		1.21%		
>160%AMI	90.89%		91.10%		89.22%		1.88%		
>100%AMI	85.06%		86.23%		79.56%		6.67%		
TOTAL	70.43%		77.90%		52.66%		25.23%		

Annex A.14

Number of Households and Homeownership Rates for Selected AHS MSAs

Norfolk 1998									
Income Class	Total	Own		White		Minority		Rent	
		Own	Rent	Own	Rent	Own	Rent	Own	Rent
< 60% AMI	217,887	89,548	128,339	119,408	61,057	58,351	98,480	28,491	69,989
60%-80% AMI	70,205	39,985	30,220	47,163	27,901	19,262	23,042	12,084	10,958
80%-100%AMI	58,291	38,878	19,413	39,340	27,670	11,669	18,951	11,207	7,743
<100%AMI	346,383	168,411	177,972	205,911	116,628	89,282	140,473	51,782	88,690
100%-120% AMI	48,751	36,373	12,378	33,437	25,760	7,677	15,314	10,613	4,701
120%-160% AMI	69,450	57,791	11,659	54,371	46,020	8,350	15,080	11,771	3,309
>160%AMI	99,396	90,988	8,408	81,777	76,436	5,342	17,618	14,552	3,066
>100%AMI	217,597	185,152	32,445	169,585	148,216	21,369	48,012	36,936	11,076
TOTAL	563,980	353,563	210,417	375,496	264,844	110,651	188,485	88,718	99,766
Homeownership Rates									
Income Class	All		White		Minority		Spread		
< 60% AMI	41.10%		51.13%		28.93%		22.20%		
60%-80% AMI	56.95%		59.16%		52.44%		6.72%		
80%-100%AMI	66.70%		70.34%		59.14%		11.20%		
<100%AMI	48.62%		56.64%		36.86%		19.78%		
100%-120% AMI	74.61%		77.04%		69.30%		7.74%		
120%-160% AMI	83.21%		84.64%		78.06%		6.58%		
>160%AMI	91.54%		93.47%		82.60%		10.87%		
>100%AMI	85.09%		87.40%		76.93%		10.47%		
TOTAL	62.69%		70.53%		47.07%		23.46%		

Annex A.15

Number of Households and Homeownership Rates for Selected AHS MSAs

Providence 1998									
Income Class	Total	Own		White		Rent		Minority	
		Own	Rent	Own	Rent	Own	Rent		
< 60% AMI	161,789	69,364	92,425	134,276	65,011	69,265	27,513	4,353	23,160
60%-80% AMI	38,872	22,166	16,706	33,950	20,192	13,758	4,921	1,973	2,948
80%-100%AMI	36,623	25,300	11,323	32,861	23,371	9,490	3,762	1,929	1,834
<100%AMI	237,284	116,830	120,454	201,087	108,574	92,513	36,196	8,255	27,942
100%-120% AMI	32,357	24,806	7,551	30,116	23,191	6,924	2,242	1,615	627
120%-160% AMI	46,676	38,937	7,739	42,771	35,922	6,849	3,904	3,015	889
>160%AMI	63,134	59,327	3,807	60,081	56,963	3,118	3,053	2,364	689
>100%AMI	142,167	123,070	19,097	132,968	116,076	16,891	9,199	6,994	2,205
TOTAL	379,451	239,900	139,551	334,055	224,650	109,404	45,395	15,249	30,147
Homeownership Rates									
Income Class	All		White		Minority		Spread		
< 60% AMI	42.87%		48.42%		15.82%		32.59%		
60%-80% AMI	57.02%		59.48%		40.09%		19.38%		
80%-100%AMI	69.08%		71.12%		51.28%		19.84%		
<100%AMI	49.24%		53.99%		22.81%		31.19%		
100%-120% AMI	76.66%		77.01%		72.03%		4.97%		
120%-160% AMI	83.42%		83.99%		77.23%		6.76%		
>160%AMI	93.97%		94.81%		77.43%		17.38%		
>100%AMI	86.57%		87.30%		76.03%		11.27%		
TOTAL	63.22%		67.25%		33.59%		33.66%		

Annex A.16

Number of Households and Homeownership Rates for Selected AHS MSAs

Salt Lake City 1998									
Income Class	Total	Own		White		Minority		Rent	
		Own	Rent	Own	Rent	Own	Rent	Own	Rent
< 60% AMI	136,260	72,631	63,629	112,635	63,928	48,708	23,624	8,703	14,921
60%-80% AMI	52,628	36,220	16,408	47,002	33,021	13,981	5,626	3,199	2,427
80%-100%AMI	47,462	35,951	11,511	42,532	33,162	9,370	4,930	2,789	2,141
<100%AMI	236,350	144,802	91,548	202,169	130,111	72,059	34,180	14,691	19,489
100%-120% AMI	40,489	33,471	7,018	37,204	31,344	5,861	3,284	2,127	1,157
120%-160% AMI	58,545	51,537	7,008	53,758	48,039	5,719	4,787	3,498	1,289
>160%AMI	75,250	71,837	3,413	70,003	67,172	2,831	5,247	4,665	582
>100%AMI	174,284	156,845	17,439	160,965	146,555	14,411	13,318	10,290	3,028
TOTAL	410,634	301,647	108,987	363,134	276,666	86,470	47,498	24,981	22,517
Homeownership Rates									
Income Class	All		White		Minority		Spread		
< 60% AMI	53.30%		56.76%		36.84%		19.92%		
60%-80% AMI	68.82%		70.25%		56.86%		13.39%		
80%-100%AMI	75.75%		77.97%		56.57%		21.40%		
<100%AMI	61.27%		64.36%		42.98%		21.38%		
100%-120% AMI	20.97%		84.25%		64.77%		19.48%		
120%-160% AMI	88.03%		89.36%		73.07%		16.29%		
>160%AMI	95.46%		95.96%		88.91%		7.05%		
>100%AMI	89.99%		91.05%		77.26%		13.78%		
TOTAL	73.46%		76.19%		52.59%		23.59%		

ANNEX B

Annex B.1

1992 Number of Households and Homeownership Rates for MSAs Surveyed in 1992 and 1996

MSAs Surveyed in 1992 and 1996									
Income Class	Total			White			Minority		
	Own	Rent		Own	Rent		Own	Rent	
< 60% AMI	739,264	322,391	416,873	501,483	252,691	248,791	237,782	69,701	168,080
60%-80% AMI	268,526	163,432	105,094	213,710	138,195	75,517	54,814	25,238	29,577
80%-100%AMI	209,234	146,020	63,214	173,357	126,519	46,838	35,875	19,501	16,375
<100%AMI	1,217,024	631,843	585,181	888,550	517,405	371,146	328,471	114,440	214,032
100%-120% AMI	164,726	125,009	39,717	137,614	105,888	31,726	27,112	19,119	7,991
120%-160% AMI	238,245	197,772	40,473	205,164	173,302	31,864	33,080	24,470	8,609
>160%AMI	348,111	322,000	26,111	311,391	290,586	20,805	36,721	31,415	5,308
>100%AMI	751,082	644,781	106,301	654,169	569,776	84,395	96,913	75,004	21,908
TOTAL	1,968,106	1,276,624	691,482	1,542,719	1,087,181	455,541	425,384	189,444	235,940
Homeownership Rates									
Income Class	All			White			Minority		
	Spread								
< 60% AMI	43.61%			50.39%			29.31%		
60%-80% AMI	60.86%			64.66%			46.04%		
80%-100%AMI	69.79%			72.98%			54.36%		
<100%AMI	51.92%			58.23%			34.84%		
100%-120% AMI	75.89%			76.95%			70.52%		
120%-160% AMI	83.01%			84.47%			73.97%		
>160%AMI	92.50%			93.32%			85.55%		
>100%AMI	85.85%			87.10%			77.39%		
TOTAL	64.87%			70.47%			44.53%		
	25.94%								

Annex B.2

1992 Number of Households and Homeownership Rates for MSAs Surveyed in 1992 and 1998

MSAs Surveyed in 1992 and 1998									
Income Class	Total	Own		Rent		White		Minority	
		Own	Rent	White	Rent	White	Rent	Minority	Own
< 60% AMI	576,390	240,120	336,270	402,380	188,793	213,588	174,010	51,327	122,683
60%-80% AMI	220,118	130,596	89,522	180,754	111,492	69,262	39,365	19,105	20,259
80%-100%AMI	189,688	130,915	58,773	161,229	114,810	46,420	28,459	16,105	12,353
<100%AMI	986,196	501,631	484,565	744,363	415,095	329,270	241,834	86,537	155,295
100%-120% AMI	144,417	114,963	29,454	120,481	97,993	22,489	23,935	16,970	6,966
120%-160% AMI	206,021	171,466	34,555	177,950	148,755	29,194	28,072	22,710	5,361
>160%AMI	281,224	256,315	24,909	254,378	233,684	20,693	26,847	22,631	4,216
>100%AMI	631,662	542,744	88,918	552,809	480,432	72,376	78,854	62,311	16,543
TOTAL	1,617,858	1,044,375	573,483	1,297,172	895,527	401,646	320,688	148,848	171,838
Homeownership Rates									
Income Class	All		White		Minority		Spread		
< 60% AMI	41.66%		46.92%		29.50%		17.42%		
60%-80% AMI	59.33%		61.68%		48.53%		13.15%		
80%-100%AMI	69.02%		71.21%		56.59%		14.62%		
<100%AMI	50.87%		55.77%		35.78%		19.98%		
100%-120% AMI	79.60%		81.33%		70.90%		10.43%		
120%-160% AMI	83.23%		83.59%		80.90%		2.69%		
>160%AMI	91.14%		91.86%		84.30%		7.57%		
>100%AMI	85.92%		86.91%		79.02%		7.89%		
TOTAL	64.55%		69.04%		46.42%		22.62%		

Annex B.3

1996 Number of Households and Homeownership Rates for MSAs Surveyed in 1992 and 1996

MSAs Surveyed in 1992 and 1996									
Income Class	Total	Own		Rent		White		Minority	
		Own	Rent	White	Rent	Own	Rent	Own	Rent
< 60% AMI	838,198	395,938	442,260	574,030	307,674	266,356	264,170	88,265	175,904
60%-80% AMI	293,507	180,862	112,645	222,973	146,142	76,832	70,532	34,720	35,812
80%-100%AMI	212,596	155,091	57,505	178,532	133,653	44,879	34,066	21,441	12,626
<100%AMI	1,344,301	731,891	612,410	975,535	587,469	388,067	368,768	144,426	224,342
100%-120% AMI	174,947	135,541	39,406	144,919	116,433	28,486	30,027	19,109	10,918
120%-160% AMI	260,375	222,620	37,755	220,488	192,548	27,939	39,889	30,072	9,816
>160%AMI	372,459	345,854	26,605	327,232	306,072	21,162	45,227	39,781	5,445
>100%AMI	807,781	704,015	103,766	692,639	615,053	77,587	115,143	88,962	26,179
TOTAL	2,152,082	1,435,906	716,176	1,668,174	1,202,522	465,654	483,911	233,388	250,521
Homeownership Rates									
Income Class	All		White		Minority		Spread		
< 60% AMI	47.24%		53.60%		33.41%		20.19%		
60%-80% AMI	61.62%		65.54%		49.23%		16.32%		
80%-100%AMI	72.95%		74.86%		62.94%		11.92%		
<100%AMI	54.44%		60.22%		39.16%		21.06%		
100%-120% AMI	77.48%		80.34%		63.64%		16.70%		
120%-160% AMI	85.50%		87.33%		75.39%		11.94%		
>160%AMI	92.86%		93.53%		87.96%		5.58%		
>100%AMI	87.15%		88.80%		77.26%		11.54%		
TOTAL	66.72%		72.09%		48.23%		23.86%		

Annex B.4

1998 Number of Households and Homeownership Rates for MSAs Surveyed in 1992 and 1998

MSAs Surveyed in 1992 and 1998									
Income Class	Total			White			Minority		
	Own	Rent	Own	Rent	Own	Rent	Own	Rent	
< 60% AMI	662,699	315,610	347,089	453,503	250,621	202,883	209,196	64,989	144,206
60%-80% AMI	200,914	123,847	77,067	155,031	99,937	55,094	45,883	23,909	21,974
80%-100%AMI	175,070	124,090	50,980	137,672	101,875	35,796	37,397	22,213	15,184
<100%AMI	1,038,683	563,547	475,136	746,206	452,433	293,773	292,476	111,111	181,364
100%-120% AMI	151,974	116,889	35,085	122,292	96,510	25,782	29,682	20,379	9,303
120%-160% AMI	211,764	179,184	32,580	180,569	154,783	25,786	31,196	24,401	6,794
>160%AMI	310,399	288,154	22,245	276,193	259,180	17,014	34,205	28,975	5,230
>100%AMI	674,137	584,227	89,910	579,054	510,473	68,582	95,083	73,755	21,327
TOTAL	1,712,820	1,147,774	565,046	1,325,260	962,906	362,355	387,559	184,866	202,691
Homeownership Rates									
Income Class	All			White			Minority		
< 60% AMI	47.62%			55.26%			31.07%		
60%-80% AMI	61.64%			64.46%			52.11%		
80%-100%AMI	70.88%			74.00%			59.40%		
<100%AMI	54.26%			60.63%			37.99%		
100%-120% AMI	76.91%			78.92%			68.66%		
120%-160% AMI	84.61%			85.72%			78.22%		
>160%AMI	92.83%			93.84%			84.71%		
>100%AMI	86.66%			88.16%			77.57%		
TOTAL	67.01%			72.66%			47.70%		

ANNEX C

Number of Households and Homeownership Rates in Geotargeted Areas

Annex C.1: Birmingham in 1992

Income Class	Total			White			Minority		
	Own	Rent		Own	Rent		Own	Rent	
< 60% AMI	88,718	45,988	42,730	42,546	27,273	15,273	46,172	18,715	27,457
60%-80% AMI	22,114	14,523	7,591	12,058	8,618	3,440	10,056	5,905	4,151
80%-100%AMI	23,933	17,708	6,225	15,829	12,790	3,039	8,104	4,918	3,186
<100%AMI	134,765	78,219	56,546	70,433	48,681	21,752	64,332	29,538	34,794
100%-120% AMI	13,454	9,895	3,559	7,916	6,196	1,720	5,538	3,699	1,839
120%-160% AMI	17,393	14,282	3,111	11,387	9,515	1,872	6,006	4,767	1,239
>160%AMI	18,672	16,305	2,367	13,111	11,556	1,555	5,561	4,749	812
>100%AMI	49,519	40,482	9,037	32,414	27,267	5,147	17,105	13,215	3,890
TOTAL	184,284	118,701	65,583	102,847	75,948	26,899	81,437	42,753	38,684
<div style="border: 1px solid black; padding: 5px; display: inline-block;">Homeownership Rates</div>									
Income Class	All		White		Minority		Spread		
< 60% AMI	51.84%		64.10%		40.53%		23.57%		
60%-80% AMI	65.67%		71.47%		58.72%		12.75%		
80%-100%AMI	73.99%		80.80%		60.69%		20.11%		
<100%AMI	58.04%		69.12%		45.91%		23.20%		
100%-120% AMI	73.55%		78.27%		66.79%		11.48%		
120%-160% AMI	82.11%		83.56%		79.37%		4.19%		
>160%AMI	87.32%		88.14%		85.40%		2.74%		
>100%AMI	81.75%		84.12%		77.26%		6.86%		
TOTAL	64.41%		73.85%		52.50%		21.35%		

Number of Households and Homeownership Rates in Geotargeted Areas

Annex C.2: Cleveland in 1992

Income Class	Total			White			Minority			
	Own	Rent		Own	Rent		Own	Rent		
< 60% AMI	156,425	49,472	106,953	73,577	27,918	45,659	82,848	21,554	61,294	
60%-80% AMI	38,815	19,176	19,639	22,034	12,726	9,308	16,781	6,450	10,331	
80%-100%AMI	27,945	15,384	12,561	16,886	11,098	5,788	11,059	4,286	6,773	
<100%AMI	223,185	84,032	139,153	112,497	51,742	60,755	110,688	32,290	78,398	
100%-120% AMI	21,850	15,469	6,381	14,964	11,656	3,308	6,886	3,813	3,073	
120%-160% AMI	20,207	14,805	5,402	11,387	9,050	2,337	8,820	5,755	3,065	
>160%AMI	19,895	16,651	3,244	11,442	9,710	1,732	8,453	6,941	1,512	
>100%AMI	61,952	46,925	15,027	37,793	30,416	7,377	24,159	16,509	7,650	
TOTAL	285,137	130,957	154,180	150,290	82,158	68,132	134,847	48,799	86,048	
<div style="border: 1px solid black; padding: 5px; display: inline-block;">Homeownership Rates</div>										
Income Class	All			White			Minority			Spread
< 60% AMI	31.63%			37.94%			26.02%			11.93%
60%-80% AMI	49.40%			57.76%			38.44%			19.32%
80%-100%AMI	55.05%			65.72%			38.76%			26.97%
<100%AMI	37.65%			45.99%			29.17%			16.82%
100%-120% AMI	70.80%			77.89%			55.37%			22.52%
120%-160% AMI	73.27%			79.48%			65.25%			14.23%
>160%AMI	83.69%			84.86%			82.11%			2.75%
>100%AMI	75.74%			80.48%			68.33%			12.15%
TOTAL	45.93%			54.67%			36.19%			18.48%

Number of Households and Homeownership Rates in Geotargeted Areas

Annex C.3: Indianapolis in 1992

Income Class	Total			White			Minority		
	Own	Rent		Own	Rent		Own	Rent	
< 60% AMI	46,573	61,287	107,860	73,647	36,255	37,392	34,213	10,318	23,895
60%-80% AMI	20,797	15,119	35,916	26,355	16,238	10,117	9,561	4,559	5,002
80%-100%AMI	12,878	7,779	20,657	16,613	10,977	5,636	4,044	1,901	2,143
<100%AMI	80,248	84,185	164,433	116,615	63,470	53,145	47,818	16,778	31,040
100%-120% AMI	11,227	3,923	15,150	12,009	8,927	3,082	3,141	2,300	841
120%-160% AMI	13,417	4,373	17,790	13,927	10,762	3,165	3,863	2,655	1,208
>160%AMI	10,599	2,407	13,006	10,385	8,664	1,721	2,621	1,935	686
>100%AMI	35,243	10,703	45,946	36,321	28,353	7,968	9,625	6,890	2,735
TOTAL	115,491	94,888	210,379	152,936	91,823	61,113	57,443	23,668	33,775
Homeownership Rates									
Income Class	All		White		Minority		Spread		
< 60% AMI	43.18%		49.23%		30.16%		19.07%		
60%-80% AMI	57.90%		61.61%		47.68%		13.93%		
80%-100%AMI	62.34%		66.07%		47.01%		19.07%		
<100%AMI	48.80%		54.43%		35.09%		19.34%		
100%-120% AMI	74.11%		74.34%		73.23%		1.11%		
120%-160% AMI	75.42%		77.27%		68.73%		8.55%		
>160%AMI	81.49%		83.43%		73.83%		9.60%		
>100%AMI	76.71%		78.06%		71.58%		6.48%		
TOTAL	54.90%		60.04%		41.20%		18.84%		

Number of Households and Homeownership Rates in Geotargeted Areas

Annex C.4: Norfolk in 1992

Income Class	Total			White			Minority		
	Own	Rent		Own	Rent		Own	Rent	
< 60% AMI	36,560	74,524	111,084	18,941	26,070	45,011	17,619	48,454	66,073
60%-80% AMI	14,411	19,885	34,296	7,743	12,048	19,791	6,668	7,837	14,505
80%-100%AMI	15,330	13,087	28,417	9,788	8,232	18,020	5,542	4,855	10,397
<100%AMI	66,301	107,496	173,797	36,472	46,350	82,822	29,829	61,146	90,975
100%-120% AMI	14,855	6,375	21,230	7,420	4,131	11,551	7,435	2,244	9,679
120%-160% AMI	19,601	6,854	26,455	11,868	4,360	16,228	7,733	2,494	10,227
>160%AMI	18,646	4,285	22,931	12,998	2,812	15,810	5,648	1,473	7,121
>100%AMI	53,102	17,514	70,616	32,286	11,303	43,589	20,816	6,211	27,027
TOTAL	119,403	125,010	244,413	68,758	57,653	126,411	50,645	67,357	118,002

Homeownership Rates

Income Class	All	White	Minority	Spread
< 60% AMI	32.91%	42.08%	26.67%	15.41%
60%-80% AMI	42.02%	39.12%	45.97%	-6.85%
80%-100%AMI	53.95%	54.32%	53.30%	1.01%
<100%AMI	38.15%	44.04%	32.79%	11.25%
100%-120% AMI	69.97%	64.24%	76.82%	-12.58%
120%-160% AMI	74.09%	73.13%	75.61%	-2.48%
>160%AMI	81.31%	82.21%	79.31%	2.90%
>100%AMI	75.20%	74.07%	77.02%	-2.95%
TOTAL	48.85%	54.39%	42.92%	11.47%

Number of Households and Homeownership Rates in Geotargeted Areas

Annex C.5: Memphis in 1992

Income Class	Total			White			Minority		
	Own	Rent		Own	Rent		Own	Rent	
< 60% AMI	93,077	34,539	58,538	23,998	11,904	12,094	69,079	22,635	46,444
60%-80% AMI	24,487	14,705	9,782	10,071	6,308	3,763	14,416	8,397	6,019
80%-100%AMI	17,986	11,213	6,773	6,341	3,829	2,512	11,645	7,384	4,261
<100%AMI	135,550	60,457	75,093	40,410	22,041	18,369	95,140	38,416	56,724
100%-120% AMI	12,688	9,603	3,085	4,224	3,159	1,065	8,464	6,444	2,020
120%-160% AMI	17,297	13,442	3,855	8,575	6,402	2,173	8,722	7,040	1,682
>160%AMI	20,494	18,160	2,334	10,746	9,340	1,406	9,748	8,820	928
>100%AMI	50,479	41,205	9,274	23,545	18,901	4,644	26,934	22,304	4,630
TOTAL	186,029	101,662	84,367	63,955	40,942	23,013	122,074	60,720	61,354

Homeownership Rates

Income Class	All	White	Minority	Spread
< 60% AMI	37.11%	49.60%	32.77%	16.84%
60%-80% AMI	60.05%	62.64%	58.25%	4.39%
80%-100%AMI	62.34%	60.38%	63.41%	-3.02%
<100%AMI	44.60%	54.54%	40.38%	14.17%
100%-120% AMI	75.69%	74.79%	76.13%	-1.35%
120%-160% AMI	77.71%	74.66%	80.72%	-6.06%
>160%AMI	88.61%	86.92%	90.48%	-3.56%
>100%AMI	81.63%	80.28%	82.81%	-2.53%
TOTAL	54.65%	64.02%	49.74%	14.28%

Number of Households and Homeownership Rates in Geotargeted Areas

Annex C.6: Oklahoma City in 1992

Income Class	Total			White			Minority		
	Own	Rent		Own	Rent		Own	Rent	
< 60% AMI	85,278	39,236	46,042	61,905	31,100	30,805	23,373	8,136	15,237
60%-80% AMI	25,493	14,758	10,735	20,616	12,326	8,290	4,877	2,432	2,445
80%-100%AMI	22,358	14,608	7,750	19,018	12,965	6,053	3,340	1,643	1,697
<100%AMI	133,129	68,602	64,527	101,539	56,391	45,148	31,590	12,211	19,379
100%-120% AMI	11,964	7,899	4,065	9,884	6,522	3,362	2,080	1,377	703
120%-160% AMI	15,914	11,298	4,616	12,814	8,860	3,954	3,100	2,438	662
>160%AMI	15,550	13,188	2,362	13,587	11,910	1,677	1,963	1,278	685
>100%AMI	43,428	32,385	11,043	36,285	27,292	8,993	7,143	5,093	2,050
TOTAL	176,557	100,987	75,570	137,824	83,683	54,141	38,733	17,304	21,429

Homeownership Rates

Income Class	All	White	Minority	Spread
< 60% AMI	46.01%	50.24%	34.81%	15.43%
60%-80% AMI	57.89%	59.79%	49.87%	9.92%
80%-100%AMI	65.34%	68.17%	49.19%	18.98%
<100%AMI	51.53%	55.54%	38.65%	16.88%
100%-120% AMI	66.02%	65.99%	66.20%	-0.22%
120%-160% AMI	70.99%	69.14%	78.65%	-9.50%
>160%AMI	84.81%	87.66%	65.10%	22.55%
>100%AMI	74.57%	75.22%	71.30%	3.92%
TOTAL	57.20%	60.72%	44.68%	16.04%

Number of Households and Homeownership Rates in Geotargeted Areas

Annex C.7: Providence in 1992

Income Class	Total			White			Minority					
	Own	Rent		Own	Rent		Own	Rent				
< 60% AMI	58,475	11,990	46,485	43,767	11,226	32,541	14,708	764	13,944			
60%-80% AMI	16,424	6,280	10,144	13,303	5,682	7,621	3,121	598	2,523			
80%-100%AMI	10,616	5,293	5,323	8,662	4,392	4,270	1,954	901	1,053			
<100%AMI	85,515	23,563	61,952	65,732	21,300	44,432	19,783	2,263	17,520			
100%-120% AMI	5,960	3,797	2,163	4,811	3,071	1,740	1,149	726	423			
120%-160% AMI	9,002	5,730	3,272	7,762	4,874	2,888	1,240	856	384			
>160%AMI	6,747	5,298	1,449	6,279	5,061	1,218	468	237	231			
>100%AMI	21,709	14,825	6,884	18,852	13,006	5,846	2,857	1,819	1,038			
TOTAL	107,224	38,388	68,836	84,584	34,306	50,278	22,640	4,082	18,558			
Homeownership Rates												
Income Class	All			White			Minority			Spread		
< 60% AMI	20.50%			25.65%			5.19%			20.46%		
60%-80% AMI	38.24%			42.71%			19.16%			23.55%		
80%-100%AMI	49.86%			50.70%			46.11%			4.59%		
<100%AMI	27.55%			32.40%			11.44%			20.97%		
100%-120% AMI	63.71%			63.83%			63.19%			0.65%		
120%-160% AMI	63.65%			62.79%			69.03%			-6.24%		
>160%AMI	78.52%			80.60%			50.64%			29.96%		
>100%AMI	68.29%			68.99%			63.67%			5.32%		
TOTAL	35.80%			40.56%			18.03%			22.53%		

Number of Households and Homeownership Rates in Geotargeted Areas

Annex C.8: Salt Lake City in 1992

Income Class	Total			White			Minority		
	Own	Rent		Own	Rent		Own	Rent	
< 60% AMI	61,692	20,415	41,277	50,559	17,946	32,613	11,133	2,469	8,664
60%-80% AMI	22,856	10,322	12,534	20,313	9,377	10,936	2,543	945	1,598
80%-100%AMI	18,955	10,522	8,433	17,082	9,509	7,573	1,873	1,013	860
<100%AMI	103,503	41,259	62,244	87,954	36,832	51,122	15,549	4,427	11,122
100%-120% AMI	12,422	8,706	3,716	11,237	8,061	3,176	1,185	645	540
120%-160% AMI	13,394	9,567	3,827	12,321	8,765	3,556	1,073	802	271
>160%AMI	12,479	10,109	2,370	11,132	9,134	1,998	1,347	975	372
>100%AMI	38,295	28,382	9,913	34,690	25,960	8,730	3,605	2,422	1,183
TOTAL	141,798	69,641	72,157	122,644	62,792	59,852	19,154	6,849	12,305

Homeownership Rates

Income Class	All	White	Minority	Spread
< 60% AMI	33.09%	35.50%	22.18%	13.32%
60%-80% AMI	45.16%	46.16%	37.16%	9.00%
80%-100%AMI	55.51%	55.67%	54.08%	1.58%
<100%AMI	39.86%	41.88%	28.47%	13.41%
100%-120% AMI	70.09%	71.74%	54.43%	17.31%
120%-160% AMI	71.43%	71.14%	74.74%	-3.61%
>160%AMI	81.01%	82.05%	72.38%	9.67%
>100%AMI	74.11%	74.83%	67.18%	7.65%
TOTAL	49.11%	51.20%	35.76%	15.44%

Number of Households and Homeownership Rates in Geotargeted Areas

Annex C.9: Birmingham in 1998

Income Class	Total	Own	Rent	White	Own	Rent	Minority	Own	Rent
< 60% AMI	82,260	42,414	39,846	32,558	22,690	9,868	49,702	19,724	29,978
60%-80% AMI	16,450	10,342	6,108	7,699	5,242	2,457	8,752	5,100	3,652
80%-100%AMI	13,469	10,615	2,854	6,595	5,748	847	6,874	4,867	2,007
<100%AMI	112,179	63,371	48,808	46,852	33,680	13,172	65,328	29,691	35,637
100%-120% AMI	12,006	8,778	3,228	5,275	4,149	1,126	6,731	4,629	2,102
120%-160% AMI	10,358	8,994	1,364	5,461	4,859	602	4,897	4,135	762
>160%AMI	11,650	10,339	1,311	7,811	6,855	956	3,838	3,484	354
>100%AMI	34,014	28,111	5,903	18,547	15,863	2,684	15,466	12,248	3,218
TOTAL	146,193	91,482	54,711	65,399	49,543	15,856	80,794	41,939	38,855
Homeownership Rates									
Income Class	All	White	Minority	Spread					
< 60% AMI	51.56%	69.69%	39.68%	30.01%					
60%-80% AMI	62.87%	68.09%	58.27%	9.81%					
80%-100%AMI	78.81%	87.16%	70.80%	16.35%					
<100%AMI	56.49%	71.89%	45.45%	26.44%					
100%-120% AMI	73.11%	78.65%	68.77%	9.88%					
120%-160% AMI	86.83%	88.98%	84.44%	4.54%					
>160%AMI	88.75%	87.76%	90.78%	-3.02%					
>100%AMI	82.65%	85.53%	79.19%	6.34%					
TOTAL	62.58%	75.75%	51.91%	23.85%					

Number of Households and Homeownership Rates in Geotargeted Areas

Annex C.10: Cleveland in 1996

Income Class	Total			White			Minority		
	Own	Rent		Own	Rent		Own	Rent	
< 60% AMI	55,198	101,812	157,010	75,526	34,072	41,454	81,482	21,125	60,357
60%-80% AMI	20,826	17,286	38,112	19,607	11,879	7,728	18,505	8,947	9,558
80%-100%AMI	18,099	9,902	28,001	18,181	12,183	5,998	9,819	5,915	3,904
<100%AMI	94,123	129,000	223,123	113,314	58,134	55,180	109,806	35,987	73,819
100%-120% AMI	14,731	5,344	20,075	15,102	11,522	3,580	4,973	3,209	1,764
120%-160% AMI	21,143	5,772	26,915	16,822	13,461	3,361	10,094	7,683	2,411
>160%AMI	13,421	2,824	16,245	11,513	10,102	1,411	4,732	3,320	1,412
>100%AMI	49,295	13,940	63,235	43,437	35,085	8,352	19,799	14,212	5,587
TOTAL	143,418	142,940	286,358	156,751	93,219	63,532	129,605	50,199	79,406
Homeownership Rates									
Income Class	All		White	Minority	Spread				
< 60% AMI	35.16%		45.11%	25.93%	19.19%				
60%-80% AMI	54.64%		60.59%	48.35%	12.24%				
80%-100%AMI	64.64%		67.01%	60.24%	6.77%				
<100%AMI	42.18%		51.30%	32.77%	18.53%				
100%-120% AMI	73.38%		76.29%	64.53%	11.77%				
120%-160% AMI	78.55%		80.02%	76.11%	3.91%				
>160%AMI	82.62%		87.74%	70.16%	17.58%				
>100%AMI	77.96%		80.77%	71.78%	8.99%				
TOTAL	50.08%		59.47%	38.73%	20.74%				

Number of Households and Homeownership Rates in Geotargeted Areas

Annex C.11 Indianapolis in 1996

Income Class	Total	Own		Rent		White		Minority		Own		Rent	
		Own	Rent	White	Minority	Own	Rent	Own	Rent				
< 60% AMI	120,091	51,880	68,211	83,355	38,778	44,577	36,736	13,102	23,634				
60%-80% AMI	35,704	18,367	17,337	26,382	14,905	11,477	9,322	3,463	5,859				
80%-100%AMI	22,175	14,141	8,034	18,363	12,045	6,318	3,812	2,096	1,716				
<100%AMI	177,970	84,388	93,582	128,100	65,728	62,372	49,870	18,661	31,209				
100%-120% AMI	15,522	9,815	5,707	12,109	7,962	4,147	3,413	1,853	1,560				
120%-160% AMI	17,771	14,230	3,541	14,107	11,413	2,694	3,664	2,817	847				
>160%AMI	14,877	12,969	1,908	10,603	8,999	1,604	4,272	3,969	303				
>100%AMI	48,170	37,014	11,156	36,819	28,374	8,445	11,349	8,639	2,710				
TOTAL	226,140	121,402	104,738	164,919	94,102	70,817	61,219	27,300	33,919				

Homeownership Rates

Income Class	All	White	Minority	Spread
< 60% AMI	43.20%	46.52%	35.67%	10.86%
60%-80% AMI	51.44%	56.50%	37.15%	19.35%
80%-100%AMI	63.77%	65.59%	54.98%	10.61%
<100%AMI	47.42%	51.31%	37.42%	13.89%
100%-120% AMI	63.23%	65.75%	54.29%	11.46%
120%-160% AMI	80.07%	80.90%	76.88%	4.02%
>160%AMI	87.17%	84.87%	92.91%	-8.04%
>100%AMI	76.84%	77.06%	76.12%	0.94%
TOTAL	53.68%	57.06%	44.59%	12.47%

Number of Households and Homeownership Rates in Geotargeted Areas

Annex C.12: Memphis in 1996

Income Class	Total			White			Minority		
	Own	Rent		Own	Rent		Own	Rent	
< 60% AMI	42,245	56,818	99,063	24,121	13,454	10,667	74,943	28,792	46,151
60%-80% AMI	15,341	11,462	26,803	9,073	5,798	3,275	17,729	9,542	8,187
80%-100%AMI	10,784	4,383	15,167	6,134	4,219	1,915	9,033	6,565	2,468
<100%AMI	68,370	72,663	141,033	39,328	23,471	15,857	101,705	44,899	56,806
100%-120% AMI	9,427	4,172	13,599	4,715	3,286	1,429	8,885	6,141	2,744
120%-160% AMI	12,792	4,173	16,965	7,578	6,237	1,341	9,387	6,554	2,833
>160%AMI	14,462	1,586	16,048	8,062	7,208	854	7,986	7,254	732
>100%AMI	36,681	9,931	46,612	20,355	16,731	3,624	26,258	19,949	6,309
TOTAL	105,051	82,594	187,645	59,683	40,202	19,481	127,963	64,848	63,115
Homeownership Rates									
Income Class	All		White		Minority		Spread		
< 60% AMI	42.64%		55.78%		38.42%		17.36%		
60%-80% AMI	57.24%		63.90%		53.82%		10.08%		
80%-100%AMI	71.10%		68.78%		72.68%		-3.90%		
<100%AMI	48.48%		59.68%		44.15%		15.53%		
100%-120% AMI	69.32%		69.69%		69.12%		0.58%		
120%-160% AMI	75.40%		82.30%		69.82%		12.48%		
>160%AMI	90.12%		89.41%		90.83%		-1.43%		
>100%AMI	78.69%		82.20%		75.97%		6.22%		
TOTAL	55.98%		67.36%		50.68%		16.68%		

Number of Households and Homeownership Rates in Geotargeted Areas

Annex C.13: Norfolk in 1998

Income Class	Total			White			Minority		
	Own	Rent		Own	Rent		Own	Rent	
< 60% AMI	42,600	85,500	128,100	51,937	22,208	29,729	76,163	20,392	55,771
60%-80% AMI	18,342	17,757	36,099	21,036	10,994	10,042	15,062	7,348	7,714
80%-100%AMI	15,779	11,471	27,250	13,844	8,863	4,981	13,406	6,916	6,490
<100%AMI	76,721	114,728	191,449	86,817	42,065	44,752	104,631	34,656	69,975
100%-120% AMI	12,506	6,293	18,799	9,319	6,762	2,557	9,480	5,744	3,736
120%-160% AMI	18,417	5,112	23,529	14,602	11,961	2,641	8,927	6,456	2,471
>160%AMI	20,736	4,037	24,773	16,230	14,661	1,569	8,542	6,075	2,467
>100%AMI	51,659	15,442	67,101	40,151	33,384	6,767	26,949	18,275	8,674
TOTAL	128,380	130,170	258,550	126,968	75,449	51,519	131,580	52,931	78,649
Homeownership Rates									
Income Class	All		White		Minority		Spread		
< 60% AMI	33.26%		42.76%		26.77%		15.99%		
60%-80% AMI	50.81%		52.26%		48.79%		3.48%		
80%-100%AMI	57.90%		64.02%		51.59%		12.43%		
<100%AMI	40.07%		48.45%		33.12%		15.33%		
100%-120% AMI	66.52%		72.56%		60.59%		11.97%		
120%-160% AMI	78.27%		81.91%		72.32%		9.59%		
>160%AMI	83.70%		90.33%		71.12%		19.21%		
>100%AMI	76.99%		83.15%		67.81%		15.33%		
TOTAL	49.65%		59.42%		40.23%		19.20%		

Number of Households and Homeownership Rates in Geotargeted Areas

Annex C.14: Oklahoma City in 1996

Income Class	Total			White			Minority		
	Own	Rent		Own	Rent		Own	Rent	
< 60% AMI	81,280	34,460	46,820	52,680	25,303	27,377	28,600	9,157	19,443
60%-80% AMI	32,954	19,858	13,096	23,936	14,894	9,042	9,017	4,963	4,054
80%-100%AMI	14,786	9,152	5,634	11,844	7,730	4,114	2,941	1,422	1,519
<100%AMI	129,020	63,470	65,550	88,460	47,927	40,533	40,558	15,542	25,016
100%-120% AMI	10,906	6,812	4,094	7,973	5,002	2,971	2,934	1,810	1,124
120%-160% AMI	14,310	10,171	4,139	11,663	8,186	3,477	2,647	1,985	662
>160%AMI	12,843	10,396	2,447	9,362	7,430	1,932	3,482	2,967	515
>100%AMI	38,059	27,379	10,680	28,998	20,618	8,380	9,063	6,762	2,301
TOTAL	167,079	90,849	76,230	117,458	68,545	48,913	49,621	22,304	27,317

Homeownership Rates

Income Class	All	White	Minority	Spread
< 60% AMI	42.40%	48.03%	32.02%	16.01%
60%-80% AMI	60.26%	62.22%	55.04%	7.18%
80%-100%AMI	61.90%	65.27%	48.35%	16.91%
<100%AMI	49.19%	54.18%	38.32%	15.86%
100%-120% AMI	62.46%	62.74%	61.69%	1.05%
120%-160% AMI	71.08%	70.19%	74.99%	-4.80%
>160%AMI	80.95%	79.36%	85.21%	-5.85%
>100%AMI	71.94%	71.10%	74.61%	-3.51%
TOTAL	54.37%	58.36%	44.95%	13.41%

Number of Households and Homeownership Rates in Geotargeted Areas

Annex C.15: Providence in 1998

Income Class	Total			White			Minority		
	Own	Rent		Own	Rent		Own	Rent	
< 60% AMI	64,534	16,134	48,400	42,814	13,233	29,581	21,719	2,901	18,818
60%-80% AMI	12,473	5,072	7,401	9,041	3,987	5,054	3,431	1,085	2,346
80%-100%AMI	9,447	4,784	4,663	6,578	3,547	3,031	2,868	1,236	1,632
<100%AMI	86,454	25,990	60,464	58,433	20,767	37,666	28,018	5,222	22,796
100%-120% AMI	6,042	3,310	2,732	4,864	2,665	2,199	1,177	645	532
120%-160% AMI	8,144	6,165	1,979	6,500	5,020	1,480	1,643	1,144	499
>160%AMI	5,399	4,712	687	4,380	3,874	506	1,019	838	181
>100%AMI	19,585	14,187	5,398	15,744	11,559	4,185	3,839	2,627	1,212
TOTAL	106,039	40,177	65,862	74,177	32,326	41,851	31,857	7,849	24,008

Homeownership Rates

Income Class	All	White	Minority	Spread
< 60% AMI	25.00%	30.91%	13.36%	17.55%
60%-80% AMI	40.66%	44.10%	31.62%	12.48%
80%-100%AMI	50.64%	53.92%	43.10%	10.83%
<100%AMI	30.06%	35.54%	18.64%	16.90%
100%-120% AMI	54.78%	54.79%	54.80%	-0.01%
120%-160% AMI	75.70%	77.23%	69.63%	7.60%
>160%AMI	87.28%	88.45%	82.24%	6.21%
>100%AMI	72.44%	73.42%	68.43%	4.99%
TOTAL	37.89%	43.58%	24.64%	18.94%

Number of Households and Homeownership Rates in Geotargeted Areas

Annex C.16: Salt Lake City in 1998

Income Class	Total			White			Minority		
	Own	Rent		Own	Rent		Own	Rent	
< 60% AMI	29,498	41,207	70,705	25,085	29,817	54,902	15,804	4,414	11,390
60%-80% AMI	12,354	7,767	20,121	10,434	6,118	16,552	3,568	1,920	1,648
80%-100%AMI	9,942	5,414	15,356	8,488	3,954	12,442	2,913	1,453	1,460
<100%AMI	51,794	54,388	106,182	44,007	39,889	83,896	22,285	7,787	14,498
100%-120% AMI	6,469	3,680	10,149	5,667	3,012	8,679	1,469	802	667
120%-160% AMI	7,443	2,186	9,629	6,493	1,485	7,978	1,651	950	701
>160%AMI	8,322	1,066	9,388	6,960	776	7,736	1,651	1,361	290
>100%AMI	22,234	6,932	29,166	19,120	5,273	24,393	4,771	3,113	1,658
TOTAL	74,028	61,320	135,348	63,127	45,162	108,289	27,056	10,900	16,156

Homeownership Rates

Income Class	All	White	Minority	Spread
< 60% AMI	41.72%	45.69%	27.93%	17.76%
60%-80% AMI	61.40%	63.04%	53.81%	9.23%
80%-100%AMI	64.74%	68.22%	49.88%	18.34%
<100%AMI	48.78%	52.45%	34.94%	17.51%
100%-120% AMI	56.89%	65.30%	54.59%	10.70%
120%-160% AMI	77.30%	81.39%	57.54%	23.85%
>160%AMI	88.65%	89.97%	82.43%	7.53%
>100%AMI	76.23%	78.38%	65.25%	13.13%
TOTAL	54.69%	58.29%	40.29%	18.01%