Fannie Mae and Freddie Mac in Nonmetropolitan Housing Markets: Does Space Matter?

Heather I. MacDonald
University of Iowa

Abstract

This study investigates variations in government-sponsored enterprise (GSE) market shares among a sample of 426 nonmetropolitan counties in 8 census divisions. Conventional conforming mortgage originations are estimated using residential sales data adjusted to exclude Government-insured and nonconforming loans. Multivariate analysis is used to investigate whether GSE market shares differ significantly by location, after controlling for the economic, demographic, housing stock, and credit market differences among counties that could affect use of the secondary markets. The study also investigates whether Fannie Mae serves nonmetropolitan borrowers who are significantly different from those Freddie Mac serves.

Spatial location contributes significantly to explaining variations in GSE market shares among nonmetropolitan counties, but its effects are specific. One region—nonadjacent West North Central counties—has significantly lower GSE market shares than all others. The disparity persists when we restrict the analysis to underserved counties. The study also suggests significant disparities between the income levels of the borrowers served by each agency, with Freddie Mac buying loans from borrowers with higher income ratios compared with those served by Fannie Mae. An important limitation on any study of nonmetropolitan mortgages is the lack of Home Mortgage Disclosure Act data. More precise conclusions about the extent to which the GSEs mirror primary mortgage originations are impossible.

Study Purpose and Outline

Since the late 1980s, the U.S. housing finance system has been transformed by the growth of mortgage-backed securities. Securitization clearly works effectively to organize investment in standardized mortgages. It lowers costs to homebuyers by spreading out risk and pricing different components of risk separately, and smooths out flows of investment over time and across regions. Access to competitively priced mortgages also sustains property markets and helps communities prosper. Two government-sponsored enterprises (GSEs),

Fannie Mae and Freddie Mac, dominate the secondary market for conventional conforming home mortgages. The benefits they receive from Federal sponsorship are passed on to homebuyers in the form of lower interest rates.[1] In return for the advantages the GSEs enjoy over their competitors, they must play a role in expanding homeownership opportunities for households and in communities traditionally underserved by the conventional housing finance system.[2] Thus, an important policy question is whether all communities enjoy equivalent access to the GSEs (allowing for economic, demographic, and other differences that may affect the sale of mortgages).

Nonmetropolitan housing markets may use the GSEs less than metropolitan housing markets do. Their smaller size, lower level of banking competition, poorer prospects for growth in property values, and reliance on a narrower and perhaps more vulnerable economic base may pose some distinct barriers to securitization. These barriers vary widely among nonmetropolitan housing markets. Different regions face different growth prospects. Counties adjacent to metropolitan areas may have economic prospects that differ from counties remote from metropolitan statistical areas (MSAs). It is unclear whether locational differences can be reduced to differences in economic and demographic characteristics, or whether location plays an additional independent role in shaping development in some nonmetropolitan counties. If space poses barriers to development distinct from, and in addition to, other county characteristics such as size and economic composition, additional affirmative efforts may be necessary to overcome the effects of space. If space has no effect independent of other characteristics, efforts focused on ameliorating the effects of income or race should be sufficient.

This study investigates whether GSE market shares vary significantly for counties in different locations, holding other relevant characteristics constant. In other words, does space matter? GSE market shares are compared for a sample of nonmetropolitan counties adjacent to and remote from metropolitan areas in each of eight census divisions. Differences between Fannie Mae and Freddie Mac are investigated, as are spatial differences among geographically targeted counties. A final question addressed is whether Fannie Mae serves nonmetropolitan borrowers that differ significantly from those served by Freddie Mac.

A rich source of data (collected under the Home Mortgage Disclosure Act [HMDA]) describes the mortgages originated in metropolitan areas. Several studies of the extent to which the GSEs (and other financial institutions) serve traditionally underserved consumers and neighborhoods have been based on HMDA data (Canner and Gabriel, 1992; Canner and Passmore, 1994; Canner, Passmore, and Surrette, 1996; Bunce and Scheessele, 1996). But data for nonmetro areas is almost nonexistent, and very little attention has focused on how well these housing markets are served. The GSEs report all their loan purchases, including those in nonmetro areas, but no baseline data are available on the number of mortgages applied for and originated in nonmetropolitan locations. This study attempts to provide a baseline by estimating the size of the conventional conforming mortgage market in a sample of nonmetropolitan counties. Rather than comparing GSE activity between metropolitan and nonmetropolitan places, this study examines how GSE market shares vary within nonmetropolitan America.[3]

The study represents a first attempt to evaluate GSE activity in nonmetro areas. It is limited by the lack of reliable, consistent data on mortgage originations outside of metropolitan areas. The size of the mortgage market is estimated using residential sales recorded for property tax purposes, with several adjustments to exclude nonconforming mortgages or loans ineligible for GSE purchase. A detailed discussion of how the estimates of mortgage markets were reached is provided in appendix A. The study also uses a variety of other

secondary data sources to control for characteristics of the nonmetropolitan counties in the study area. A sample of 426 nonmetropolitan counties was drawn from 8 of the 9 census divisions. Information on GSE loan purchases was obtained from the GSE Public Use Database, single-family loan-level files. Assembling data on nonmetro mortgage markets is time consuming, so only 1995 loan purchases are examined.

Design of the Study

GSE purchases may vary among nonmetropolitan counties for several reasons. These reasons must be accounted for to determine whether "space matters." The following section, *Recent Research on Rural and Nonmetropolitan Housing and Credit Markets*, reviews previous research on nonmetropolitan and rural economic and demographic trends, and on housing markets and the availability of credit. Evidence on how potential lending barriers differ by region and metro adjacency is discussed. To the extent possible, each characteristic is reflected in the variables included in our analysis. Recent research on the reforms made to GSE purchasing practices and evaluations of the effectiveness of GSE reforms conclude the section. This discussion provides a policy context for the study.

The next section, *What Determines GSE Market Shares in Nonmetropolitan Counties*, begins by describing GSE loan purchasing patterns. There are substantial differences among the study area counties and similarly sharp differences in the GSEs' market shares across nonmetropolitan counties. These differences are explored further in a series of multivariate analyses comparing GSE market shares across counties. Differences between Fannie Mae and Freddie Mac and differences among geographically targeted ("underserved") counties are examined. Finally, we investigate whether the GSEs serve similar nonmetropolitan borrowers. Unfortunately, a comparison of borrowers served by the GSEs with all borrowers obtaining loans in the primary market is not possible. However, we can compare the purchasing patterns of the two GSEs to explore whether they serve different kinds of borrowers.

The final section of the article discusses conclusions and the implications of the findings. Overall, the GSEs have significantly lower market shares in West North Central counties not adjacent to metropolitan areas. Possible explanations for the disparities highlighted in the analysis are explored. Issues for further research are identified. In brief, the analysis shows that space does help explain differences in GSE market shares, but its effects are quite specific.

The Study Area and Sample

Nonmetropolitan counties are diverse. While we can identify housing, credit market, and other problems that present disadvantages to rural dwellers compared with urbanites, there is wide variation within nonmetro America. The study area includes a stratified random sample of nonmetropolitan counties. Two considerations guided the selection of the sample. On the one hand, the sample was designed to mirror the regional distribution of nonmetropolitan counties across the United States. On the other hand, sample sizes had to be sufficient within regions (and particularly between adjacent and nonadjacent counties) to enable comparisons across spatial categories.

The initial sample was drawn by dividing counties defined as nonmetropolitan in 1995 into each of nine census divisions, and dividing them into two cross-cutting categories, adjacent to or remote from a metropolitan area. A random sample of approximately 30 counties was drawn from each category. In 3 census divisions (Mid-Atlantic, New England, and Pacific), there were fewer than 30 counties in some categories. We decided to combine the Mid-Atlantic and New England regions into one (the Northeast).

Exhibit 1

Counties in Sample by Metropolitan Adjacency

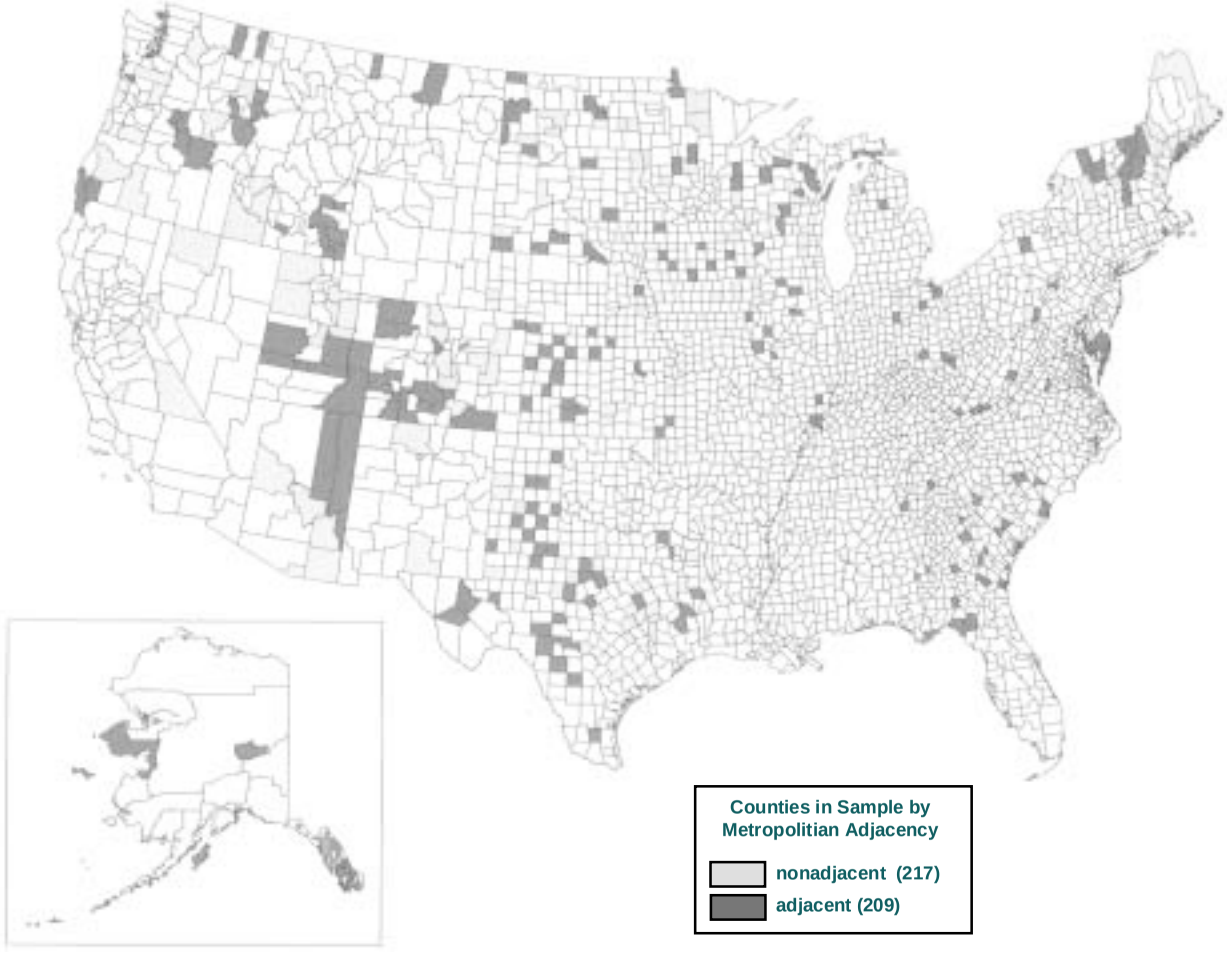


Exhibit 2

Study Area

	Northeast	South Atlantic	West South Central	East North Central	West North Central	Mountain	Pacific	% Sample	% U.S. Counties
Adjacent	25	36	32	33	39	29	15	49.06	43.5
Nonadjacent	15	39	34	30	44	38	17	50.94	56.5
% sample	9.4	17.6	15.5	14.8	19.5	15.7	7.5		
% nonmetro U.S.	4.2	——44.3——		——36.6——		——14.9——			
% sample underserved[a]	47.5	68.8	72.7	47.6	38.6	52.2	40.6	53.5	62.3
% U.S. "underserved"	38.6	73.1	80.7	49.7	59.2	61.9	47.2		
Urban-rural continuum classification for sample counties[b]									
Large urban, adjacent	7	4	3	14	4	4	5	9.6	5.8
Large urban, nonadjacent	3	4	2	2	4	4	5	5.6	5.0
Medium urban, adjacent	13	23	33	20	21	12	5	29.8	26.8
Medium urban, nonadjacent	11	15	13	15	18	22	7	23.7	28.4
Rural adjacent	3	14	6	4	11	7	2	11.0	10.9
Rural nonadjacent	3	10	9	7	25	18	8	18.8	23.1

[a]Underserved rural areas are defined by HUD as nonmetropolitan counties with a median income that is 95 percent or less of the State (or national) nonmetro median income, or as counties with a 30 percent or greater minority population and a median income that is 120 percent or less of the State nonmetro median income.
[b]The urban-rural continuum codes are defined as follows by ERS: 4=urban population of 20,000 or more, adjacent to a metro area; 5=urban population of 20,000 or more, not adjacent to an urban area; 6=urban population between 2,500 and 19,999, adjacent to a metro area; 7=urban population between 2,500 and 19,999, not adjacent to a metro area; 8=rural population (fewer than 2,500 urban) adjacent to a metro area; 9=rural population, not adjacent to a metro area.

Sources: Distribution of all U.S. nonmetropolitan counties by adjacency, region, and urban-rural continuum were obtained from Economic Research Service's 1989 Revised County Typology (1995). Classifications by underserved category were obtained from HUD; distributions for the United States were calculated by the author for all nonmetropolitan counties in each of the census divisions included in the study.

From this point on, the sampling approach fell victim to problems of data collection (described in detail in appendix A). A number of States and counties collected no usable information on residential property sales. Unfortunately, not one State or county in the East South Central region (Alabama, Kentucky, Mississippi, and Tennessee) could provide usable information. Regrettably, we had to drop the East South Central region from our study. In the West South Central region, only Texas and a few counties in Louisiana were able to provide the information, so the West South Central region consists almost entirely of counties in Texas. Once we had identified all the States or counties that could provide us with residential sales data, we redrew a random sample in each of seven census divisions (using the random sampling procedures in SPSS/PC). From that random sample, counties with no residential sales in 1995 (three) were dropped from the study. In two regions (the Northeast and the Pacific) it was impossible to attain our initial goal of at least 30 adjacent and 30 nonadjacent counties. However, these census divisions account for a small proportion of all nonmetropolitan counties.

The final sample includes 426 counties, 209 adjacent to metropolitan areas and 217 nonadjacent. The sample accounts for just more than 18 percent of all nonmetropolitan counties. Exhibit 1 shows the spatial distribution of the sample. Exhibit 2 compares the counties in the sample with all nonmetro counties. The exhibit shows the distribution of counties by census division and adjacency and compares the distribution of sampled counties with the distribution of all nonmetropolitan counties by region. Despite the smaller sample sizes in the Northeast and Pacific regions, those regions are actually overrepresented in our sample compared with all U.S. nonmetropolitan counties. Adjacent counties are also overrepresented compared with the Nation as a whole, but this was necessary to allow for comparison by metro adjacency. Given that metro-adjacent counties are oversampled, it is not surprising that fewer counties in the sample are classified by the U.S. Department of Housing and Urban Development (HUD) as underserved. In one region—the West North Central—only 38.6 percent of the sample is underserved, although they make up 59.2 percent of counties in the region. In other regions the proportions are closer.

The second part of the table reports the distribution of sampled counties along the urban-rural continuum developed by the U.S. Department of Agriculture's (USDA's) Economic Research Service (ERS). The comparable proportions for all nonmetro counties suggest that counties with larger urban centers (with a population of more than 20,000), especially those adjacent to metro areas, are overrepresented in our sample. Nonadjacent counties with no urban population are underrepresented. Overall, though, there is a reasonable correspondence between our sample and nonmetro counties nationwide.

Recent Research on Rural and Nonmetropolitan[4] Housing and Credit Markets

A recent Federal Reserve Board conference concluded that rural borrowers "face less competitive markets with fewer capital suppliers and fewer financial products and services" (Drabenstott and Meeker, 1996). Poorer access to the secondary mortgage markets may present a disadvantage to borrowers and undermine nonmetro housing markets. This section reviews existing research on nonmetro and rural housing problems, on the special problems posed for access to credit in rural and nonmetro communities, and on the role the GSEs play in mortgage markets overall. Nonmetropolitan areas are diverse, and the economic context within which housing and credit markets operate has changed over the past two decades. This section of the report begins by reviewing these broader trends.

Diversity and Change in Nonmetropolitan Economies

The "rural renaissance" of the 1970s, led by income, population, and employment growth (especially in manufacturing), evaporated during the 1980s (Fuguitt, 1991). During that decade, the nonmetro population grew more slowly than that of the Nation as a whole (4.1 percent compared with 9.8 percent) (Cromartie, 1993a). But these trends played out differently in different places. Nonmetro counties adjacent to large metro areas grew 10.5 percent, faster than the Nation as a whole (9.8 percent), reflecting exurban population shifts over the decade (Nelson and Sanchez, 1997). Regionally, growth was concentrated in the South and West. During the 1980s, minorities (particularly Hispanics, Native Americans, and Asians) accounted for half of all nonmetro population growth (Cromartie, 1993b).[5] Overall, minorities accounted for approximately 12 percent of nonmetro residents in 1990. Data for the early 1990s suggest that the population decline has slowed, with only 26.2 percent of counties experiencing a net loss between 1990 and 1994, compared with the 55.5 percent of counties that lost population between 1980 and 1990. Growth occurred in all regions in the early 1990s, although it continued to be concentrated in the West (Beale and Johnson, 1995).

The diversity within rural or nonmetropolitan America complicates policy questions (Drabenstott and Meeker, 1996). Overall, nonmetropolitan counties adjacent to metropolitan areas appear to have fewer barriers to economic development and growth than more remote counties. Easier access to the jobs and business services of neighboring metropolitan areas and population growth from exurbanizing metro residents may stabilize some nonmetro areas (Deavers, 1992; Nelson and Sanchez, 1997). But if the neighboring metro area is small or its economy is troubled, or if the local economy suffers from metropolitan competition, adjacency may not benefit nonmetro residents (Glassmeier and Howland, 1995; MacDonald and Peters, 1994; Deavers, 1992). The growth in retirement and resort communities (3.7 times the rate of nonmetro counties as a whole) and continuing exurbanization of metropolitan residents to surrounding nonmetro areas suggests that some nonmetro or rural communities will thrive over the next decade (Beale and Johnson, 1995). We turn now to consider recent trends in housing markets in nonmetropolitan and rural America.

Nonmetropolitan Housing Problems

Nonmetropolitan housing markets share many problems with metro markets, but face some distinct barriers to providing adequate housing. Housing quality (once the central rural housing problem) has improved, but affordability has worsened. The vacancy rate in the nonmetro housing stock (16 percent) was twice that in the metro stock in 1990, reflecting the large number of nonmetro units used seasonally as vacation homes and for farm workers (Ghelfi, 1993). More remote rural counties (some of which are retirement/destination counties) had the highest vacancy rates. Homeownership rates in 1995 were higher in nonmetro areas (73.5 percent) than in metro areas (62.7 percent) (Whitener, 1997). Interestingly, persistent low-income counties had the highest homeownership rates in 1990 (76.8 percent). In part, this may be because counties in this category are more likely to be rural and remote, without small cities to provide rental housing options (Ghelfi, 1993).[6]

In addition to housing quality and affordability, nonmetro housing markets face other distinct problems. Lack of adequate infrastructure, legal barriers to ownership, a reliance on mobile homes, and depressed local property markets all potentially affect the availability of mortgages and access to the secondary markets.

Housing Quality and Affordability. Between 1970 and 1990, the number of substandard rural housing units (traditionally the most severe rural housing problem) declined by two-thirds. By 1990 only 4.8 percent of rural units were classified as substandard (that is, lacking complete plumbing or overcrowded or both) compared with 5.5 percent of urban units (Housing Assistance Council, 1994). In persistent low-income counties this improvement was especially marked, from 36.6 percent in 1970 to 4.6 percent in 1990 (Ghelfi, 1993). Nevertheless, quality continues to be a problem in some locations. Substandard housing may limit the share of the stock that is "mortgageable" (Wiener and Belden, 1998; Wilson and Carr, 1998).

However, affordability has become a more important problem in nonmetro areas. Nearly one-quarter of nonmetro households (compared with one-third of metro households) were cost burdened in 1995 (that is, they paid more than 30 percent of their income for housing) (Whitener, 1997). In 1989, one in five nonmetro households was cost burdened (Housing Assistance Council, 1994). Of poor nonmetro households, 71 percent were cost burdened. A recent analysis of the 1995 American Housing Survey reports that the number of nonmetro households with "worst case" housing needs[7] rose between 1991 and 1993 and remained at that level in 1995 (about 727,000 households) (HUD, 1998). Increases in worst case housing needs were far greater in metro areas (at 9 percent over the period). Nevertheless, some nonmetro affordability problems are clearly acute; nonmetro "worst case" housing needs increased especially sharply in the Northeast, by 18 percent between 1991 and 1995. Affordability is more severe in metro areas, but it afflicts a significant share of nonmetro residents, too. Ziebarth, Prochaska-Cue, and Shrewsbury (1997) found that significantly more homeowners were cost burdened in isolated rural communities (more than 50 miles from a metro area) than in communities closer to metro areas, largely because of their lower incomes. Discrimination may also restrict housing choice for large families or for minorities in some communities (Ziebarth, Prochaska-Cue, and Shrewsbury, 1995).

Infrastructure and Legal Problems. By definition, rural residents live in lower density settlements, frequently in unincorporated jurisdictions, which makes it difficult (or impossible) to provide infrastructure
collectively (RUPRI, 1997; Ziebarth, Prochaska-Cue, and Shrewsbury, 1997). Higher proportions of units without complete plumbing in more remote rural counties in the West and Mountain States reflect the difficulty of providing services in very low-density regions. Alaska's remoteness and its permanently frozen subsoil make it impossible to supply water and sewer services across much of the region (Ghelfi, 1993). Most rural units rely on septic tanks for waste disposal, but soils are often inadequate for this purpose. Consequently, water supply or water quality problems afflict nearly two-thirds of rural households (Housing Assistance Council, 1994).

Even outside regions of very low population densities, infrastructure investment is difficult for many small communities. Scarce Federal grant funds for infrastructure and a population too small to raise enough funds by issuing bonds limit infrastructure expansion and upgrading (RUPRI, 1997; Duncan, 1996). Few lenders are willing to lend money on a property without access to adequate infrastructure, and the cost of providing individual wells and septic tanks may add substantially to the cost of a home (Ziebarth, Prochaska-Cue, and Shrewsbury, 1997).

Guaranteeing clear title to an owner's land is a related difficulty that many nonmetro communities (especially more remote ones) face. On Native American Trust lands, lenders may not have the legal right to acquire tribal trust or restricted lands through foreclosure (in other words, mortgages would be unsecured). Consequently, conventional

mortgages have been almost unobtainable for new home construction on many tribal lands (Housing Assistance Council, 1994). USDA's Rural Housing Service (RHS) division has developed a pilot program with the GSEs to guarantee loans on Native American land (Fannie Mae, 1997).

Problems with title affect other communities, too. For instance, a case study of homeownership in a rural South Carolina community (now on the fringes of metropolitan Charleston) identified a significant structural barrier to mortgage financing: Land is held by families, or sometimes in the name of a deceased relative. Although all heirs have rights to use the land, obtaining an individual deed to a house lot (required for a mortgage) is difficult (Young, 1997). In communities along the U.S.-Mexico border, the use of contract purchases raises similar problems (Strauss, 1998).

Depressed Property Markets. Rural population declines and the predominance of lower paying jobs have depressed property values, so that new conventional housing construction or substantial rehabilitation often is not justified by the market value of homes (U.S. General Accounting Office, 1993; Duncan, 1996). In turn, the lack of available housing can discourage new employment in a community because employers anticipate difficulty attracting a sufficiently large workforce (Duncan, 1996). Ziebarth, Prochaska-Cue, and Shrewsbury (1995) point out that "a gap in housing construction during a particular decade impacts the overall mix of housing stock in a community." Lack of appropriate housing may be a problem for newcomers and for existing residents as they age.

Lenders are understandably unwilling to make high loan-to-value ratio loans in stagnant markets. Low- and moderate-income homebuyers may be unable to make sufficiently large downpayments. The requirement for a market-based appraisal may also be difficult or impossible to satisfy in small, sparsely settled areas with stagnant property markets (Vandell, 1996; Duncan, 1996; Devaney and Weber, 1993). These are legitimate concerns on the part of lenders, but they also reduce the availability of mortgages in small, less developed communities.

Prevalence of Manufactured Housing. Many of the units added to the rural housing stock in the 1980s were manufactured units. The proportion of the rural population living in manufactured or mobile homes[8] increased from 11.3 percent in 1980 to 16.5 percent in 1990, compared with 6.5 percent of metro homeowners. In 1990, 20 percent of households in more remote rural counties and 22.1 percent in persistent low-income counties lived in manufactured housing (Housing Assistance Council, 1994; Ghelfi, 1993). But this proportion varied widely across regions. Most counties where mobile homes made up more than 25 percent of the housing stock were in the South (Alabama, Florida, Georgia, and Mississippi) and the Mountain States of Arizona, New Mexico, and Nevada (Ghelfi, 1993).

Traditionally, few lenders have provided mortgages for mobile homes on the same terms as for conventional homes (Kravitz and Collings, 1986). Current practice distinguishes between manufactured homes that are permanently fixed to land owned by the occupant with the legal status of "real property" and homes placed on rented or leased land, such as in mobile home parks (Fannie Mae, 1996; Freddie Mac, 1997). Permanently fixed manufactured housing may be financed with mortgages, and these would be eligible for purchase by the GSEs. Buyers of other manufactured homes must rely on dealer financing or consumer loans (Strauss, 1998).

For some segments of the rural/nonmetropolitan population, income (and race) may pose housing problems as severe as for central-city residents. Regional location and remoteness

from metropolitan areas may exacerbate these problems. While the South continues to have the highest poverty rates, the incidence of worst case housing needs has declined there while increasing sharply in the Northeast. Remote locations may be more likely to have problems with infrastructure provision, to have small and stagnant markets where new construction is not viable, and to have a high proportion of mobile homes. Owner-occupancy rates are higher in smaller and more remote counties. Yet the traditional benefits of tenure may not accrue to the owner of a mobile home on rented land, or to the owner of a conventional home that needs maintenance but has not appreciated in value. The housing problems outlined above are complicated by other problems related to credit.

Is There a Credit Problem for Nonmetropolitan Homebuyers?

Credit barriers in nonmetropolitan or rural areas are difficult to identify, given the sparsity of data (Rural Economy Division, 1997). Recent studies of rural credit markets conclude that although not all rural markets and market segments are equally well served, there is no evidence of widespread market failure (Rural Economy Division, 1997). However, mortgage interest rates and terms differ between rural and urban borrowers. In 1995, the average interest rate on a rural home loan was 0.36 percent higher than on an urban loan.[9] After accounting for differences in loan-to-value ratio, loan size, and type of originator, the ERS estimates that this difference was reduced to 0.17 percent, a small margin. Fixed-rate loans appeared to carry a smaller premium in rural areas (0.14 percent after adjusting for loan characteristics) compared with adjustable rate mortgages (0.24 percent after adjusting for loan characteristics) (Rural Economy Division, 1997). Other indicators of loan quality (such as downpayment, income history, and other debt) may account for this difference.

Nevertheless, a series of recent studies suggests that rural and nonmetropolitan credit markets do suffer from problems not shared by urban markets, which may limit or shape access to credit in important ways. Problems may be worse in some places, especially smaller, more remote locations:

> Remoteness gets at the heart of the capacity problem in rural America. Rural areas often are not only separated by distance but also disconnected from institutions and resources that urban areas take for granted such as information networks and technical support systems. This isolation fosters a lack of capacity by lending institutions to effectively evaluate risk and undertake complex transactions. (Wilson and Carr, 1998)

The small, conservative lending institutions typical of rural and nonmetropolitan areas may offer homebuyers fewer choices. Consolidation and other changes in the financial services industry may have disparate consequences in rural areas compared with urban areas. Lack of access to government housing finance programs and weakly developed secondary markets in nonmetro areas may further reduce options.

Lending Institutions in Rural Areas. Commercial banks play a much more important role in mortgage lending in rural than in urban areas, originating more than 46 percent of rural housing loans in 1995 compared with 20 percent of urban housing loans (Rural Economy Division, 1997). Mortgage companies, which accounted for a 56.2-percent share of the urban mortgage market in that year, originated only 40.8 percent of rural mortgages (Rural Economy Division, 1997). Rural mortgages were more likely than urban mortgages to be shorter term fixed-rate or balloon mortgages, and for nonstandard terms. Adjustable rate mortgages and fixed-rate 30-year loans, which accounted for 89.8 percent of urban mortgages in 1995, made up a smaller proportion of rural mortgage markets (78.1 percent). For commercial banks, loans for nonstandard periods (that is, for periods other than 15 or 30 years) made up 28 percent of rural mortgages but only 5 percent of urban mortgages (Rural Economy Division, 1997). This is an important difference,

because loans for periods of other than 15 or 30 years require more complex packaging if they are to be sold into the secondary market. One reason for shorter term fixed-rate loans may be consumer preference and the ability to make higher monthly payments, rather than banks' reluctance to make long-term loans. For balloon mortgages, which are prevalent in smaller rural counties (accounting for 8.3 percent of rural mortgages compared with 2.6 percent of urban mortgages), a similar rationale may not hold (Rural Economy Division, 1997). Balloon mortgages may instead reflect banks' attempts to manage liquidity in the absence of secondary market outlets for loans.

Rural bank markets are less competitive than urban markets, but it is unclear that this is responsible for the somewhat higher interest rates paid by rural homebuyers. As many rural populations have shrunk and competition for deposits has intensified, community banks face a declining supply of funds to lend out (Guenther, 1996). However, rural banks make "considerably less use of nondeposit funds than do banks headquartered in urban areas" (Rural Economy Division, 1997). Nonmetro banks had lower loan-to-deposit ratios than banks nationally (70.1 percent compared with 81 percent) (Milkove, 1995).[10] Low loan-to-deposit ratios may be a sign that banks do not meet all credit needs in their communities. They certainly indicate that local resources support less credit market activity in rural areas than nationally (Rural Economy Division, 1997).

Consolidation and Other Regulatory Change. Bank consolidation in the recent past has reduced the number of rural banks (Milkove, 1995). Nonmetro bank headquarters declined by 27 percent between 1984 and 1994 (Duncan, 1996).[11] This has intensified concerns about access to credit. Some commentators argue that acquisitions of rural banks by larger metro-based banks will lead to an outflow of deposits that will worsen liquidity problems (Guenther, 1996). Others argue that the effects of consolidation will be locally specific, and sometimes positive (RUPRI, 1997; Wilson and Carr, 1998).

It is impossible to evaluate quantitatively the effect that the Community Reinvestment Act (CRA) has had on expanding the supply of credit even where HMDA data are available (Evanoff and Segal, 1996). Anecdotal evidence suggests that since CRA enforcement was strengthened in 1989, the supply of credit in rural areas has improved (Housing Assistance Council, 1993; RUPRI, 1997). Recent amendments to the CRA have unclear implications. Streamlining regulations may certainly ease pressure on smaller institutions and may make enforcement more effective (RUPRI, 1997). However, exempting small institutions from some reporting requirements may gut the effectiveness of the CRA in rural locations (Milkove, 1995). For metro-based institutions, rural offices must be considered within assessment areas separate from urban offices, so poor rural CRA scores will affect the bank's rating. Nevertheless, the absence of home mortgage data for rural locations constrains grassroots attempts to evaluate local banks (Fishbein, 1992).

Access to Federal Mortgage Insurance. Federal housing assistance is concentrated in urban areas. There are disparities in rental assistance, but differences are wider for homeowners—spending on the major home-owners assistance programs (Federal Housing Administration [FHA], Veterans Administration [VA], and RHS) averaged $224 per capita in urban areas and $67 per capita in rural areas in 1995 (Mikesell, 1997). Overall, only 17 percent of nonmetro mortgages in 1993 were originated under the three major Federal mortgage insurance or direct loan programs, compared with 25.9 percent of metro mortgages (Mikesell, 1997). Surprisingly, only 47 percent of loans originated or insured by RHS in 1995 went to nonmetro areas.[12] A General Accounting Office (GAO) evaluation of RHS Section 502 lending patterns concluded that "program funds are concentrated in and around MSAs in amounts that are disproportionately high in relation to the rural population and the number of substandard rural housing units in these areas—two factors

that, among others, are used by the Farmer's Home Administration to determine housing need. Remote rural areas, on the other hand, receive a disproportionately low amount of program funds in relation to their housing needs." (U.S. General Accounting Office, 1993). In the recent past, the RHS Section 502 program has shifted from direct subsidized loans to loan guarantees. Direct lending is now done primarily through loan-sharing agreements with other public and private entities (among them Fannie Mae and Freddie Mac), using a subsidized second mortgage to lower homeowners' costs.[13] Collings (1998) argues that the shift away from direct lending will exclude the lower income homebuyers once served by the Section 502 program.

The FHA and VA mortgage insurance and guarantee programs actually play a larger role in nonmetro areas than RHS loans, although nonmetro areas account for only 6 percent and 11 percent of FHA and VA activity respectively. FHA-insured loans were more likely to be in the West, and in counties that were more urbanized or with higher proportions of retirees. Although the per capita rate for nonmetro FHA loans ($48) compares poorly with the metro average of $182, remote rural counties do even worse, with only $19 per capita. VA-guaranteed loans exhibit a similar pattern (Mikesell, 1997). Private mortgage insurers do not appear to make up the gap. In 1991, 16 percent of rural mortgages carried private mortgage insurance, compared with 22 percent of urban loans (Rural Economy Division, 1997). The reason for this disparity is unclear. It could show higher rejection rates by mortgage insurers or fewer applications from rural homebuyers. If a bank has already decided to keep a low downpayment loan in its portfolio rather than selling it, the bank may choose to self-insure the mortgage rather than require private mortgage insurance.

Secondary Mortgage Markets in Rural Areas. Secondary markets are thinly developed for all types of rural loans. The small scale of loan markets, the lack of information on loan performance, and the absence of some key actors in the securitization process (such as loan poolers and servicing companies) account for the slow pace of development (Drabenstott and Meeker, 1996). For many rural banks, it may be difficult to sell non-standard mortgages because they may not meet national underwriting standards (Milkove, 1995).

Rural banks are more likely to hold home loans in their portfolio than sell them (Strauss, 1998; ICF Incorporated, 1993, as cited in Rural Economy Division, 1997). A less competitive local market may provide fewer pressures to increase profits through servicing fees and increased lending. Small rural lenders may have few incentives to sell loans given the startup costs of learning how to negotiate the secondary markets. The physical characteristics of many rural housing units clearly pose problems for underwriters (Rural Economy Division, 1997). The Rural Economy Division report also speculates that more rural homebuyers may have difficulty qualifying under standard underwriting guidelines—income that varies from year to year is discounted, and more rural dwellers may be self-employed. While none of these alone would define a loan as substandard, in combination they may. Rural borrowers have smaller loans and loan payments relative to income than urban borrowers. This probably reflects lower home prices in part, but may also reflect the greater difficulty rural borrowers have in qualifying for loans (Rural Economy Division, 1997).

As Government-sponsored secondary mortgage market enterprises, Fannie Mae and Freddie Mac have played a crucial role in improving liquidity and in streamlining access to credit, thus lowering mortgage interest rates for single-family residential debt. Although it is impossible to identify precisely by how much interest rates to homebuyers are lowered, estimates range from not at all to 40 basis points (0.4 percent) (Congressional Budget Office, 1996; Cotterman and Pearce, 1996; Ambrose and Warga, 1996; U.S. General Accounting

Office, 1996). By mid-1996, these two agencies, with Ginnie Mae (the Federal agency that securitizes Government-insured mortgages), either held or had issued securities backed by mortgages accounting for 49 percent of total residential debt (Vandell, 1996). John Weicher (1994) argues that "[t]he housing finance system is an emerging duopoly, dominated by the two large GSEs. Other institutions are increasingly limited to segments of the market that are effectively barred to the GSEs by statute, which are declining in importance." Access to the Government-sponsored secondary markets is clearly important for homebuyers. To what extent do the GSEs serve nonmetro homeowners?

Until recent changes to their charters and the development of loan purchase programs tailored to rural areas, Fannie Mae and Freddie Mac had very little presence in rural housing markets. The GSEs do not purchase farm loans. Rural homes on more than 40 acres (even those without farming income) were ineligible for purchase, and homes on less than 40 acres were frequently disqualified by condition or design requirements (Vandell, 1996). The requirement that appraisals be based on nearby comparable properties often also made rural home loans ineligible. Beginning in the late 1980s, a series of reforms by the GSEs have increased their market shares in nonmetro areas.

Both entities now have rural mortgage purchase programs, and interviews with lenders suggest the programs are well designed (Vandell, 1996). Fannie Mae's revised underwriting criteria for rural home appraisals demonstrate many attempts to introduce flexibility within the charter restrictions that prevent the agencies from buying farm loans or loans on mobile homes that are not classified as fixed property. Appraisers may use comparable properties from outside the market area (with adjustments for location). Many other characteristics of rural properties that may not be acceptable for urban properties (such as vacant or boarded-up buildings on the site, an expected marketing time of longer than 6 months, or inferior condition and quality) are acceptable if they are taken into account in developing the appraised value and possibly also the downpayment ratio. Unpaved roads and septic systems are permissible if these are typical of "local standards," but properties must have adequate utilities and be suitable for year-round use (Fannie Mae, 1996). Manufactured housing is permissible if it is legally classified as real property and permanently fixed to a foundation.

A third GSE was established in 1987 to act as a secondary market for rural loans, including home loans. Farmer Mac purchases single-family loans for owner-occupied homes in communities with fewer than 2,500 residents, with a purchase price of less than $100,000 (in 1988 dollars). Loan-to-value ratios may be 75 percent, or up to 85 percent if private mortgage insurance is available. Until January 1996, sellers or poolers of loans had to retain the top 10 percent of any losses (a subordinated participation interest), which discouraged the use of Farmer Mac.[14] For this and other reasons, Farmer Mac's market share has remained very small (Vandell, 1996).

By September 1995, the agency was close to depleting its initial capital and very few rural home loans (and not many agricultural loans) had been securitized. Changes made to Farmer Mac in January 1996 (primarily repealing the requirement for a participation interest) were intended to increase the agency's activity (Barry and Ellinger, 1996). It is unclear that these changes have been sufficient to create a viable secondary market. Given the problems with Farmer Mac, Vandell (1996) argues that Fannie Mae and Freddie Mac may offer a more efficient way to expand access to mortgage credit in rural areas. They already enjoy economies of scale, they have expertise in evaluating loan risk, and they have the incentive (their affordable housing mandate) to serve rural markets.

A few private secondary market conduits also serve rural housing markets. Rural home loans are generally underwritten at 50 basis points above the base rate (which ranged from

9.625 percent to 12.125 percent, depending on credit quality, in October 1996). The maximum loan-to-value ratio is 80 percent and credit underwriting standards are more lenient than the GSEs (these are tied to price adjustments) (Vandell, 1996). Small-scale nonprofit secondary markets have also emerged, but low densities and remoteness raise transaction and information costs (Altman, 1996). These problems may limit the use of any secondary market outlets.

Fannie Mae's and Freddie Mac's Role in Expanding Access to Credit

How effectively can the GSEs expand access to the secondary markets in traditionally underserved communities (and for underserved borrowers) with diverse housing problems? Subprime and nonstandardized loans, even in urban areas, do not benefit from the efficiencies the GSEs bring to the bulk of the single-family residential market. As shareholder-owned institutions (but with an implicit Federal guarantee represented by the GSEs' line of credit with the Treasury), Fannie Mae and Freddie Mac cannot be expected to purchase loans that do not provide an economic return. Their charters prohibit them from purchasing exceptionally risky loans. Exactly what is an adequate economic return, though, has been at the center of policy debates over the social responsibilities of the GSEs (Congressional Budget Office, 1996; Stanton, 1996; Wachter et al., 1996; MacDonald, 1996). As federally backed institutions, expecting the GSEs to fulfill public purposes that do not undermine their safety and soundness is clearly legitimate.

Important underwriting reforms preceded and followed the explicit social goals established in Title XIII (the Federal Housing Enterprises Financial Safety and Soundness Act) of the 1992 Housing and Community Development Act. Affirmative goals were designed to increase GSE purchases from borrowers with incomes below the area median income and purchases of loans secured by properties in geographically targeted areas (defined as central cities initially) (U.S. Congress, Senate, 1994). In 1995 the geographically targeted goal was redefined to include underserved urban and rural areas. Underserved rural areas are nonmetro counties with a median family income less than 95 percent of the statewide or national nonmetro median income (whichever is greater) or counties with a minority population of more than 30 percent and a median income less than 120 percent of the statewide nonmetro median income (GSE Housing Goal Definitions, www.hud.gov:80/progdesc/govspon.html).

How Have the GSEs Met Their Housing Goals? In 1993 both Fannie Mae and Freddie Mac met the interim goals for purchases of mortgages to low- and moderate-income borrowers (set at 30 percent and 28 percent respectively). However, neither met the goals established for loans secured by properties in central cities (28 percent and 26 percent, respectively) (U.S. Congress, Senate, 1994). The goal for geographically targeted areas was redefined to better target underserved areas in 1996, and, as a result, it was revised downward for both agencies to 21 percent for 1996 and increased slightly to 24 percent for the 1997–99 period. For 1996, HUD reports that 28.1 percent of Fannie Mae's loan purchases were secured by properties in geographically targeted areas, compared with 25.09 percent for Freddie Mac.

Despite improvements in the GSEs' performance, many recent analyses suggest that they serve proportionately fewer low-income and minority homebuyers than depository institutions. Bunce and Scheessele (1996) compare Fannie Mae's and Freddie Mac's market shares within the FHA-eligible portion of the conventional conforming market. While GSE market shares improved between 1993 and 1995, they fall short in many instances. Fannie Mae's market shares for very low-income (below 60 percent of median income)

borrowers and for low-income census tracts have improved. Yet they are lower than depository institutions' shares—13 percent versus 17.3 percent for low-income borrowers, and 12.5 percent versus 15.4 percent for low-income tracts. Fannie Mae's performance in serving racial minorities and concentrated minority tracts has improved to the point that it nearly matches or outstrips the performance of depository institutions (Bunce and Scheessele, 1996). Freddie Mac's market shares have improved in most categories over this period, but by less than Fannie Mae's. There are substantial gaps between its share and that of depository institutions, in both income- and race-based categories. Freddie Mac makes 11.5 percent of its purchases from very low-income borrowers (versus 17.3 percent for depository institutions), 10.2 percent from low-income census tracts (versus 15.4 percent), and 3.8 percent from African American tracts (versus 6 percent) (Bunce and Scheessele, 1996). For both agencies, first-time and low-income homebuyers were more likely to have higher downpayment ratios compared with borrowers from other income groups. It is unclear whether downpayment ratios differ substantially from the primary market (Bunce and Scheessele, 1996).

More detailed analyses of the mortgages purchased by the GSEs between 1993 and 1995 suggest they serve fewer first-time homebuyers than the mortgage market overall (Manchester, Neal, and Bunce, 1998). However, Fannie Mae's first-time homebuyer loans have served proportionately more lower income and minority borrowers, and low-income and high-minority tracts, than those of Freddie Mac (Manchester, Neal, and Bunce, 1998). Other analyses suggest that depository institutions play a more important role in bearing credit risk than the GSEs (Canner, Passmore, and Surette, 1996). In part, this is because more mortgages bought by the GSEs had private mortgage insurance (35 percent for the GSEs, compared with 20 percent for depository institutions). Charter restrictions prevent the GSEs from purchasing mortgages with loan-to-value ratios greater than 80 percent without insurance or equivalent financial protection for the GSE (Canner, Passmore, and Surette, 1996).

Freddie Mac makes more of its purchases in nonmetropolitan locations than Fannie Mae. Both GSEs increased their activity in nonmetro areas between 1993 and 1995 (from 11.1 percent to 12.3 percent of purchases for Fannie Mae, and from 13.1 percent to 14.8 percent for Freddie Mac) (Manchester, Neal, and Bunce, 1998). However, these shares are likely smaller than the proportion of all loans originated in nonmetropolitan areas, which HUD's Survey of Mortgage Lending Activity estimates at 17 percent (HUD, 1996, cited in Rural Economy Division, 1997). Higher proportions of Freddie Mac's purchases of loans to first-time African American and Hispanic buyers earning less than the median income were in nonmetro areas than was the case for Fannie Mae (Manchester, Neal, and Bunce, 1998). Proportions of purchases in the New England, Mid-Atlantic, and Pacific regions declined for both agencies between 1993 and 1995, and increased in the East South Central, West South Central, and Mountain regions (Manchester, Neal, and Bunce, 1998).

Policy Implications of GSE Purchasing Patterns. Since the mid-1980s, critics have questioned whether Fannie Mae's and Freddie Mac's role in the mortgage market justifies the Federal benefits they receive. The agencies do not have explicit Federal backing but could draw on a $2.25 billion line of credit with the U.S. Treasury. The securities they issue are exempt from Securities and Exchange Commission regulations and fees, unlike the securities issued by their competitors. They are also exempt from State and local income taxes. There is debate about the extent to which these benefits are passed through to homebuyers as lower interest rates rather than being retained by shareholders as increased dividends (Congressional Budget Office, 1996; Stanton, 1996; Cotterman and Pearce, 1996; Ambrose and Warga, 1996; Wachter et al., 1996).

Fannie Mae and Freddie Mac (and other commentators) argue these benefits bring with them unique social responsibilities that entirely private-sector entities would not have. Wachter and colleagues (1996) argue that privatizing the GSEs would have a small impact on homeownership. Homeownership costs may increase by an average of 3 percent, and homeownership rates may decrease by 1 to 2 percent. However, they caution that if the GSEs withdrew from their current role, African Americans, central-city residents, and low- and moderate-income homebuyers would be disproportionately affected. Homeownership rates for these groups could be reduced by 10 percent or more (Wachter et al., 1996). They conclude that increasing the GSEs' social goals would be more effective than privatizing them and eliminating the subsidies represented by Federal sponsorship. The larger policy question about whether the GSEs' competitive advantages are passed on to homebuyers is not addressed here. However, if Federal backing is justified by their social purpose, evaluating their impact in different kinds of communities is important. A question rarely addressed is their impact on expanding access to the secondary market in nonmetropolitan areas.

This review of research on demographic and economic trends, housing markets, and credit markets suggests many legitimate reasons for variations in GSE market shares among nonmetropolitan communities. In housing markets with little recent construction, stagnant property values, or high vacancy rates and poor housing quality, property appraisals would reflect the riskiness of high loan-to-value mortgages. If borrowers cannot provide a larger downpayment or private mortgage insurance, loans may not be purchased. In credit markets with little competition and few liquidity problems, banks may not use secondary market outlets for loans. The GSEs traditionally have not purchased substandard loans (for instance, those to borrowers with poor credit and employment histories), and high rates of economic distress may suggest more substandard borrowers. Low proportions of GSE purchases in nonmetropolitan counties may not imply that the GSEs are neglecting legitimate credit needs. Controlling for these explanations of variations in GSE market shares is necessary to determine whether market shares also differ by region or metro adjacency.

What Determines GSE Market Shares in Nonmetropolitan Counties?

Does location help to explain GSE market presence in nonmetropolitan areas? This section begins by describing GSE purchasing patterns in the study area. Much of the apparent variation by region and metro adjacency could be explained by differences in economic, demographic, or other characteristics. Does location have a separate, identifiable effect once we control for other explanations of GSE market shares? To address this question, multivariate analysis is necessary. The first of our research questions—"does space help to explain variations in GSE market shares?"—is addressed by constructing a partial model (including only nonspatial variables) and a full model (including spatial variables as well). An f-test statistic is calculated to decide whether the spatial variables improved the model significantly. Differences between Fannie Mae and Freddie Mac as well as patterns observable for underserved counties were explored using the same set of models.

This question addresses the issue of *place*. A cross-cutting policy concern is with people—the extent to which the GSEs serve borrowers traditionally neglected by the mainstream housing finance industry. Nonmetro homebuyers served by the GSEs were less likely to have lower incomes (compared with the area median) or to be first-time buyers than borrowers in metro areas. The second question further explores possible differences between the agencies, controlling for a range of county and borrower characteristics.

Exhibit 3

Proportion of Mortgage Market Served by the GSEs, by Metro Adjacency and Targeted Status

	Both Agencies (%)		Fannie Mae (%)		Freddie Mac (%)	
	Adjacent	Nonadjacent	Adjacent	Nonadjacent	Adjacent	Nonadjacent
Northeast	38.40	27.98	23.70	14.83	15.75	13.15
South Atlantic	46.60	35.72	30.17	25.27	22.19	17.02
West South Central	33.01	27.34	19.74	20.64	16.60	17.59
East North Central	44.91	29.06	26.62	14.74	18.30	14.33
West North Central	32.23	14.60	20.51	9.70	14.35	7.17
Mountain	58.11	52.10	48.28	33.75	38.99	31.98
Pacific	70.45	31.44	46.62	19.31	38.10	13.25
Total	48.90	31.12	29.02	20.17	21.83	16.74
F-value	———19.130***———		———12.969***———		———4.907*———	

	Not Underserved %	Underserved (%)	Not Underserved %	Underserved (%)	Not Underserved %	Underserved (%)
Northeast	44.09	23.88	26.25	13.87	19.09	10.01
South Atlantic	48.95	37.22	32.10	25.55	21.99	18.32
West South Central	53.84	21.94	39.30	13.71	36.99	10.36
East North Central	50.37	23.06	28.75	12.39	21.62	10.67
West North Central	28.42	13.82	18.92	8.09	13.52	5.74
Mountain	69.32	41.18	51.61	28.96	48.70	22.30
Pacific	57.16	39.49	36.87	25.65	26.81	22.85
Total	47.82	28.35	31.64	18.33	25.37	13.95
F-value	———47.037***———		———30.391***———		———25.700***———	

Significance of *f*-values:* = $p < .05$; ** = $p < .01$; *** = $p < .001$

Source: Loan purchases obtained from 1995 GSE Public Use Database. Proportions calculated by the author using estimated home sales.

How Do GSE Market Shares Differ Among Nonmetropolitan Counties?

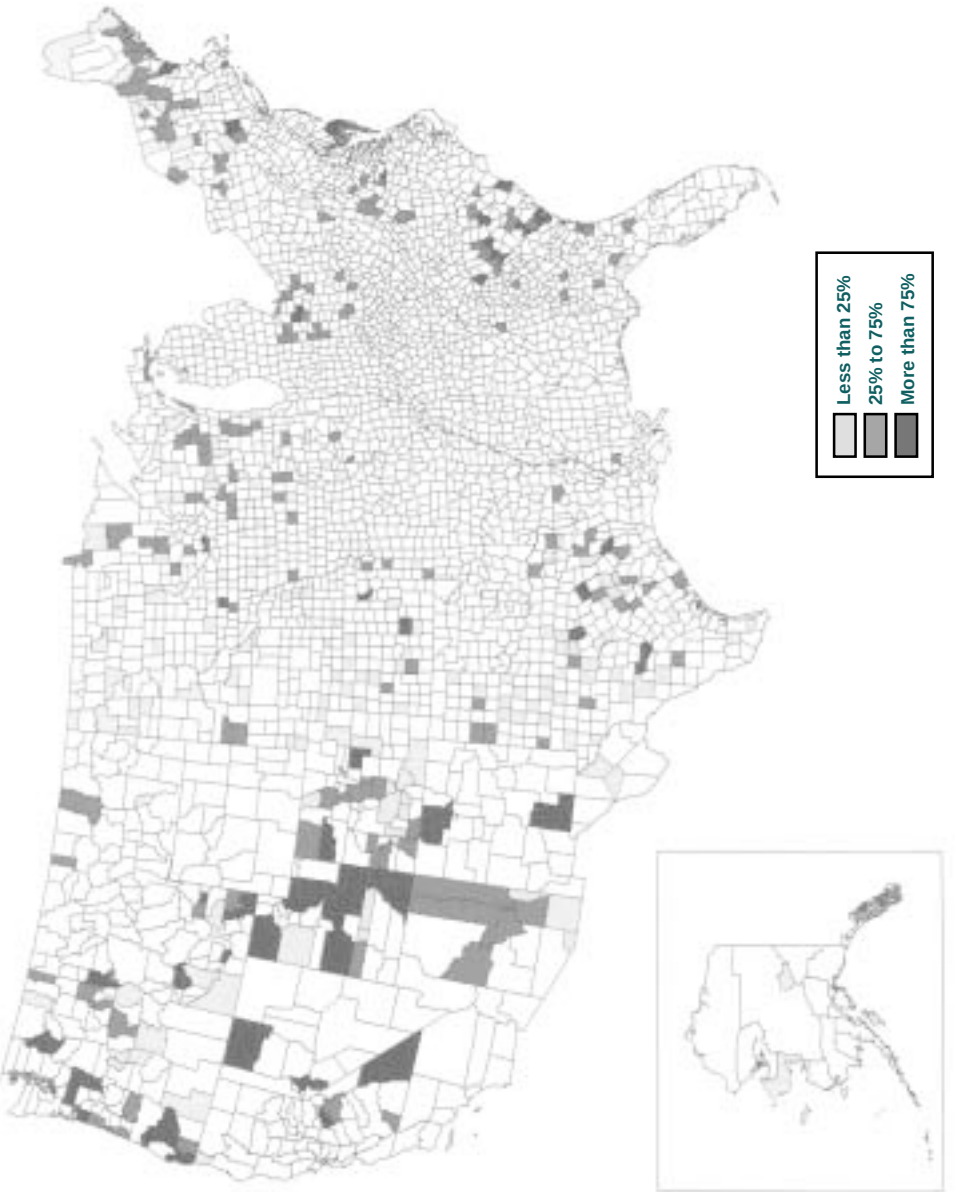
In 1995, 12.3 percent of Fannie Mae's purchases and 14.8 percent of Freddie Mac's were made in nonmetropolitan locations (Manchester, Neal, and Bunce, 1998). Of all new conventional conforming home purchase mortgages originated in the sample counties in 1995,[15] Freddie Mac purchased nearly 20 percent of mortgages and Fannie Mae just more than 24 percent. Purchasing patterns differ by region and metro adjacency, as shown in exhibit 3 and in graphic form in exhibit 4.

A much higher than average proportion of mortgages were purchased in the Mountain States and in Pacific counties adjacent to metro areas. Simple one-way analyses of variance show that for each agency and for both combined, shares were significantly higher in metro-adjacent than in nonadjacent counties. The second half of exhibit 3 compares GSE market shares in underserved counties with those in other counties. As we might expect, counties classified as underserved had much smaller proportions of mortgages purchased by the GSEs than nontargeted counties, and these differences were large and significant for each agency and for both combined, as shown by a simple one-way analysis of variance.

Whom do the GSEs serve within the study area counties? Earlier research has suggested that the borrowers served in nonmetropolitan counties were less likely to be first-time

Exhibit 4

Proportion of Loans Purchased by Both GSEs



Source: Loan purchases obtained from 1995 GSE Public Use Database. Proportions calculated by the author using estimated home sales.

Exhibit 5

Characteristics of Borrowers Served, by Nonmetro County Type

	Both Agencies (%)	Fannie Mae (%)	Freddie Mac (%)
All counties			
Low income	9.6	10.1	8.9
Moderate income	13.4	12.7	13.1
Middle income	14.0	13.9	13.9
High income	56.6	60.1	58.1
Minority	5.2	5.2	5.3
First-time homebuyer	16.3	17.5	14.8
Underserved counties			
Low income	7.2	7.4	7.0
Moderate income	10.5	10.7	10.1
Middle income	11.6	11.9	11.3
High income	67.3	66.2	68.7
Minority	7.7	8.0	7.2
First-time homebuyer	15.8	17.2	13.9
Nonadjacent counties			
Low income	8.5	9.0	7.9
Moderate income	11.7	12.0	11.4
Middle income	12.5	12.2	12.9
High income	62.6	61.6	63.7
Minority	5.1	5.2	4.9
First-time homebuyer	15.4	16.1	14.5

Source: Calculated by the author from the GSE Public Use Data Set, single-family census tract file.

homebuyers or low income (Manchester, Neal, and Bunce, 1998). Both GSEs met their low-moderate income purchasing goal nationally in 1995 (with Fannie Mae at 42.3 percent of purchases and Freddie Mac at 38.9 percent, as reported by HUD). Exhibit 5 shows that much smaller proportions of single-family loans purchased in the nonmetro sample counties were made to buyers with low and moderate incomes (22.8 percent of Fannie Mae's purchases and 22 percent of Freddie Mac's). Similarly, while 31.9 percent of Fannie Mae's loan purchases in 1995 were to first-time homebuyers (28.7 percent for Freddie Mac), first-time buyers make up much smaller proportions of loans purchased in the study area (17.5 percent and 14.8 percent respectively).

These disparities are quite sharp. What could account for them? We do not have information on the proportion of nonmetro homebuyers who were first-time buyers (or minorities) or on their income distribution. It is possible that fewer homebuyers in 1995 were low- and moderate- income or first-time buyers. This may merely reflect urban-rural differences in home purchase decisions. It could also imply that nonmetro homebuyers must meet different standards. The Economic Research Service speculates that only those with low housing-cost-to-income ratios may qualify for rural mortgages (Rural Economy Division, 1997).

Evaluating the proportion of loans purchased from minority homebuyers is also difficult. Minorities made up 12.1 percent of county residents in the sample. Minority buyers made up approximately 5 percent of the nonmetro borrowers served by each GSE. Nationally, 18.5 percent of Fannie Mae's and 14.7 percent of Freddie Mac's purchases were from minority borrowers (Manchester, Neal, and Bunce, 1998) in 1995, while minorities made up 25.2 percent of the Nation's population in 1990. Proportionately, more minorities may be served by the GSEs at the national level than is the case for the nonmetro counties in the study area.[16]

An early finding in investigations of the GSE purchasing patterns was that loans purchased in geographically targeted areas were more likely to serve higher income borrowers (U.S. Congress, Senate, 1994). This study finds a similar pattern. Smaller proportions of loans purchased in counties designated as underserved were made to low- and moderate-income borrowers compared with the sample as a whole—at 18.1 percent for Fannie Mae and 17.1 percent for Freddie Mac. Just less than two-thirds of loans purchased in underserved counties were made to high-income borrowers. Smaller proportions of loans purchased in underserved counties were made to first-time buyers than was the case for the sample as a whole, but the disparity was not as great as for income. In nonadjacent counties, fewer low-income and first-time buyers are served compared with the sample as a whole, but disparities are smaller than for underserved counties. As we might expect given the racial definition of underserved counties, higher proportions of minority borrowers are served in the targeted counties.

The apparent disparity between the proportions of nontraditional borrowers served nationally and in the study area suggests that improvements in access to the GSEs have bypassed many nonmetro residents. Location appears to play a strong role in determining access to credit *for some people.* Low-income, minority, and first-time nonmetro buyers are less likely to have loans sold to the GSEs compared with nontraditional buyers in the Nation as a whole.

There may be significant differences in the proportions of mortgages purchased by the GSEs in different locations. Nonadjacent (and underserved) counties in each region have smaller proportions of mortgages purchased than other counties in the region. However, nonadjacent and underserved counties in some regions do much better than adjacent and nontargeted counties in other regions (compare, for example, the Mountain and West North Central regions). This suggests important interactions between region and adjacency that need to be accounted for in our analysis. Thus we have not yet provided a satisfactory answer to the question of whether location matters. Several important differences among counties have not been taken into consideration. These could explain the disparities shown in exhibit 3. This question must be addressed more rigorously through a multivariate analysis of mortgage purchases, controlling for county characteristics that could affect GSE market shares.

Question One: Does Location Help To Explain Variations in GSE Presence in Nonmetropolitan Counties?

To investigate whether location has a separate, identifiable effect once we control for other sources of variation in GSE market shares, I constructed a set of multiple linear regression models. The first model includes only nonspatial independent variables (demographic, economic, and housing stock characteristics). The second model adds dummy variables for location. The change in the goodness-of-fit statistic (adjusted R^2) is tested to decide whether adding spatial variables significantly improves the explanatory power of the model. The dependent variable (proportion of mortgages purchased by the GSEs

Exhibit 6

Variables in the Analyses

Variable	Description
AGEBOR	Age of borrower
AREAMEDIN	Area median income
BORINCRAT	Ratio of borrower income to area median
CHGCNINC	Proportionate change in county income, 1990–95
CHGPBPERM	Proportionate change in building permits issued, 1990–95
CHGPOP	Proportionate change in population, 1990–95
CHGUNEM	Proportionate change in unemployment rate, 1990–95
CHGVALUN	Proportionate change in value of new units, 1990–95
DADJ	Dummy metropolitan adjacency: 0=adjacent, 1=not adjacent
DADJENC	1=adjacent East North Central region
DADJMNT	1=adjacent Mountain region
DADJNE	1=adjacent North East
DADJPAC	1=adjacent Pacific
DADJSAT	1=adjacent South Atlantic
DADJWNC	1=adjacent West North Central
DAGENCY	Dummy agency: 0=Freddie Mac, 1=Fannie Mae
DFIRSTT	Dummy first-time buyer: 0=not first time, 1=first-time
DGEND	Dummy for gender of borrower: 0=male, 1=female
DMIN	Dummy minority buyer: 0=not minority, 1=minority
DNONENC	1=nonadjacent East North Central
DNONMNT	1=nonadjacent Mountain
DNONNE	1=nonadjacent North East
DNONPAC	1=nonadjacent Pacific
DNONSAT	1=nonadjacent South Atlantic
DNONWNC	1=nonadjacent West North Central
DNONWSC	1=nonadjacent West South Central
DUNDERS	Dummy underserved: 0=not targeted, 1=targeted
INCPLUM	Proportion of units with incomplete plumbing, 1990
LOGPOP95	Log_{10} of the 1995 county population
MEDINC95	Median county income 1995 ($)
MINPCT	Proportion minority population, 1990
MOBHRAT	Owner-occupied mobile homes as proportion of all owner-occupied units, 1990
OWNRAT	Owner-occupancy rate, 1990
PMIRAT	Proportion of loans with private mortgage insurance
UNEM95	Unemployment rate 1995
VACRAT	Vacancy rate 1990
VALUN95	Value per unit of new residential construction in 1995

combined) is a ratio. Ratios are artificially bounded by zero and one, so their distribution is not entirely normal. As suggested by Blalock (1979), the variable was transformed into logarithmic form, after which it approximated normality.[17] The log-linear model provided a noticeable improvement in the goodness-of-fit statistic (adjusted R^2) over the model with an untransformed dependent variable. The assumptions underpinning each model were investigated; appendix B describes this process. The distribution of residuals deviates slightly from the normal curve, but Norusis (1993) argues that this may be expected because of sampling variation. Otherwise the assumptions on which the linear regression model is based seem valid for this model.

Choice of Variables. To capture the interaction effects between region and metro adjacency, I defined a set of 13 dummy variables (for example, adjacent Northeastern counties, nonadjacent West South Central, and so on). Adjacent South Atlantic counties were chosen as the reference because they had proportions of mortgages purchased most closely approaching the average for the sample as a whole. The review of the literature on rural housing and credit markets suggested several nonspatial variables that may contribute to explaining variations in GSE market shares. This analysis includes three sets of variables: (1) those designed to capture the situation in the county as of 1995, (2) those designed to capture changes over the recent past (1990 to 1995), and (3) those that provide information about the county for 1990 (these variables are derived from census data because no more recent estimates are available). Variables were chosen to reflect the demographic, economic, housing stock, and credit market characteristics of the counties. Variables included in the analyses presented in this chapter are listed in exhibit 6.

The demographic, economic, and housing and credit market characteristics of counties in 1995 may affect proportions of loans purchased. They may affect appraised values compared with sales prices, the likelihood that more loans would be eligible for purchase, and the likelihood that mortgage originators would pursue secondary market outlets for their loans (either because economies of scale exist given the level of originations or because liquidity concerns would encourage them to do so).

Population size may be an important indicator of the variety and sophistication of financial services available locally. A threshold population size may be necessary to ensure stable demand for housing and support appraised values. County median income and unemployment rates both provide proxy measures of the economic health of the county and may measure (indirectly) the proportion of borrowers with substandard credit or employment histories or prospects. The per-unit value of new residential construction put in place in 1995 (from building permit data) was chosen instead of using median home value from the 1990 census. The census median value variable was highly correlated with both population and median income and may not be a very accurate measure of value given that it is reported by the homeowner. Many regional housing markets underwent substantial changes in the first half of the 1990s.

Credit market variables were more difficult to define. The number of bank offices in the county was highly correlated with population. An alternative measure was volume of bank deposits per capita. While deposits do not place any absolute constraint on mortgage originations, low levels of deposits per capita may increase liquidity concerns and thus encourage originators to sell their loans if possible. Unfortunately no data were available on mortgage broker activity. Mortgage brokers account for fewer nonmetropolitan mortgage originations than in metro areas, but still a sizable proportion (40 percent). This is one area where more information would strengthen the model. Data on private mortgage insurance agreements written in each county in 1995 were used to calculate the proportion of conventional, conforming loans with private mortgage insurance (PMIRAT). The

GSEs' charters require mortgage insurance (or other credit enhancement) for all low-downpayment loans purchased.

A second set of variables was designed to capture changes in counties between 1990 and 1995. Recent changes in employment, construction activity, per-unit value of new construction, population, and median income may affect the quality of loan applicants and assessments of county property markets and thus the proportions of loans purchased. A county may have high unemployment rates, a low median income, and a small population, but the trend could be strongly positive during the first half of the decade. Assessments of

Exhibit 7

Explaining GSE Market Share

Variable	Model 1	Model 2
Adjusted R^2	0.544	0.585
F-value	33.783***	21.816***
F-value for change in R^2		4.072**
CHGCNINC	–0.036	–0.020
CHGPBPERM	0.042	0.003
CHGPOP	0.095*	0.037
CHGUNEM	–0.036	–0.035
CHGVALUN	–0.042	–0.044
DEPERCAP	–0.123**	–0.030
INCPLUM	–0.047	–0.051
LOGPOP95	0.231***	0.217***
MEDINC95	0.263***	0.238***
MINPCT	0.051	0.064
OWNRAT	0.088*	0.132**
PMIRAT	0.379***	0.407***
UNEM95	0.096*	0.071
VACRAT	0.080	0.092*
VALUN95	0.074*	0.068
DADJENC		–0.010
DNONENC		–0.097
DADJMNT		–0.043
DNONMNT		0.106
DADJNE		–0.038
DNONNE		–0.023
DADJPAC		0.061
DNONPAC		–0.052
DNONSAT		–0.077
DADJWNC		–0.079
DNONWNC		–0.214***
DADJWSC		–0.061
DNONWSC		–0.087
Constant	–1.015**	–1.129**

Note: Significance of t-values: * = $p < .05$; ** = $p < .01$; *** = $p < .001$

borrowers and property markets would be more positive here than for a county with identical 1995 features but a downward trend since 1990.

Other housing market and demographic characteristics could be represented only by data from the 1990 census of population and housing. The minority composition of the county and the proportions of owner-occupied units, of units with incomplete plumbing, and of vacant units were included in the analysis. Nationwide analyses suggest that the GSEs have lower market shares in neighborhoods with high proportions of minority residents (Bunce and Scheessele, 1996). In urban settings, owner-occupancy rates are important indicators of the stability of neighborhood values. High ownership rates may represent steady demand for new and existing homes. Incomplete plumbing is the indicator of housing quality most likely to affect lending decisions; more homes with incomplete plumbing in a community may suggest that more loans would not meet the GSEs' underwriting criteria. Vacancy rates are important indicators of the demand for property and thus assessments of the stability of property values (although in rural settings they may also suggest high proportions of seasonal or vacation homes).

The model is far from "complete." I do not have detailed information on the quality of loans originated, or any details on homebuyers. Proportions of lower quality loans (B and C grade) clearly affect mortgage purchases. The analysis tries to account for measurable differences among counties that may affect the proportion of investment-quality mortgage loans originated. Ideally, the extent to which the GSEs serve nonmetropolitan housing consumers should be evaluated using detailed loan-level data (more detail would be necessary than is currently included in the HMDA data available for metropolitan areas).

Analysis. What explains GSE market shares in nonmetropolitan counties? How important a contribution does location make in explaining variations in the proportions of mortgages purchased? Exhibit 7 presents two models—one (model 1) including only non-spatial variables and one (model 2) combining county characteristics and spatial variables. Here, the dependent variable is the logarithm of the proportion of mortgages purchased by both GSEs. Nonspatial variables alone explain 54 percent of the variance in the proportion of loans purchased. Larger counties, with faster growing populations, higher median incomes, and higher owner-occupancy rates, have higher proportions of loans purchased by the GSEs. The percentage of loans with private mortgage insurance is strongly associated with GSE purchases.[18] Counties where banks have more deposits to fund loans (where DEPERCAP is higher) have fewer loans purchased by the GSEs. Surprisingly, the GSEs have higher market shares in counties with higher unemployment rates.

The addition of dummy variables controlling for location improves the goodness-of-fit statistic to 0.585. Not all the variables that were significant in the first version of the model continue to be significant. Deposits per capita, unemployment rates, and change in county population are no longer significantly related once we include spatial variables. Only one spatial dummy variable is significantly related to proportions of mortgages purchased. The GSEs have significantly lower market shares in nonadjacent counties in the West North Central region compared with other regions. The signs of the spatial dummies suggest no clear difference in market shares between adjacent and nonadjacent counties. Only in the Pacific region do nonadjacent counties have lower GSE activity and adjacent counties higher GSE activity. However, both categories of counties in the Northeast, East and West North Central, and West South Central regions have lower market shares than all others, while nonadjacent counties in the Mountain region have higher shares than adjacent counties. Interactions between region and metro adjacency are clearly complex.

Exhibit 8

Explaining Fannie Mae's and Freddie Mac's Market Shares

	Fannie Mae		Freddie Mac	
Variable	**Model 1**	**Model 2**	**Model 1**	**Model 2**
Adjusted R^2	0.553	0.593	0.554	0.605
F-value	35.105***	22.531***	35.139***	23.576***
F-value for change in R^2	———4.012**———		———4.959**———	
CHGPOP			0.137**	0.090*
CHGUNEM	–0.081*	–0.098**		
CHGVALUN			–0.094*	–0.085*
DEPERCAP	–0.145***		–0.092*	
LOGPOP95	0.184***	0.192***	0.186***	0.148**
MEDINC95	0.256***	0.244***	0.195***	0.162***
OWNRAT		0.100**	0.087*	0.144***
PMIRAT	0.435***	0.444***	0.466***	0.515***
VACRAT	0.097*	0.116**	0.083*	0.087*
VALUN95			0.087*	0.074*
DNONENC		–0.161**		
DNONMNT				0.154**
DADJPAC				0.094*
DNONWNC			–0.191**	–0.147*
DNONWSC				–0.121*
Constant	–0.934**	–1.188**	–1.316***	–1.387***

Note: This table summarizes coefficients with significant beta scores.
Significance of t-test values: * = $p < .05$; ** = $p < .01$; *** = $p < .001$

Does the addition of spatial variables improve the explanatory power of the model significantly? We can calculate an f-test statistic to decide whether the change in adjusted R^2 is significant. In other words, we can test the null hypothesis that the change in the extent to which the variables explain variations in the population is zero (Afifi and Clark, 1984). For this equation, the change in adjusted R^2 has an *F*-statistic of 4.072, which is significant at the $p < .01$ level, so we can reject the null hypothesis. Location appears to be an important reason for variations in GSE market shares after controlling for other county characteristics.

Other models were constructed to explore differences between Fannie Mae's and Freddie Mac's market share. Exhibit 8 summarizes these models. Overall, explanations for each agency's market share were quite close to the model reported in full above. Both agencies had higher market shares in larger wealthier counties, and market shares for both were strongly associated with the availability of private mortgage insurance.

The addition of spatial variables improved the adjusted R^2 for both agencies significantly (at $p < .01$). Both agencies had significantly lower market shares in nonadjacent West North Central counties. Fannie Mae also had significantly lower market shares in nonadjacent East North Central counties (suggesting a Midwestern effect). Freddie Mac had significantly lower market shares in nonadjacent West South Central counties, and significantly higher market presence in adjacent Pacific and nonadjacent Mountain counties.

Exhibit 9

Explaining GSE Market Share in Underserved Counties

	Model 1	Model 2
Adjusted R^2	0.551	0.592
F-value	19.223***	12.532***
F-value for change in R^2	———2.584*———	
LOGPOP95	0.282***	0.303***
MEDINC95	0.123*	
MINPCT		0.177*
OWNRAT	0.141**	0.199***
PMIRAT	0.439***	0.456***
VACRAT		0.170**
DNONWNC		–0.248**
Constant	–1.717***	–2.081***

Note: This table summarizes coefficients with significant beta scores.
Significance of t-test values: * = $p < .05$; ** = $p < .01$; *** = $p < .001$

A third set of models explored whether explanations of GSE market shares differ when we restrict the analysis to underserved counties only. The geographic targets that define the affirmative purchasing goals do not differentiate among regions or locations, as they are based on county income or racial composition. The earlier description of GSE purchasing patterns suggested that underserved counties had lower proportions of mortgages purchased than nontargeted counties. An analysis[19] (not reported here) was run including a dummy variable for whether or not a county was designated as underserved. The variable was significantly related to proportions of mortgages purchased, suggesting that the GSEs had significantly lower market shares in underserved counties compared with all others.

Exhibit 9 presents a summary of the models developed above, including only the 224 underserved counties in the analysis. Variables that were significant when all counties were included are no longer significant. The relationship with deposits per capita and value of new units have the same signs but are no longer significant. Population size, owner-occupancy rates, and proportions of privately insured mortgages continue to be positively and significantly related to the proportion of GSE mortgage purchases.

Adding spatial dummies improved the goodness-of-fit statistic to 0.592. Once again the change in adjusted R^2 is significant, but only at the $p < .05$ level. Two surprising outcomes are that GSE market share is significantly higher in counties with larger proportions of minority residents, and in counties with higher vacancy rates. Proportion of minority residents is positively related with GSE market share in all models, but is only significant when we restrict the analysis to underserved counties and control for location. This issue is explored in more detail in appendix B. Even when we consider only underserved counties, nonadjacent West North Central counties still have much lower GSE activity than all others. This suggests that the definition of underserved counties does not capture the particular disadvantages that may limit GSE market share in this location. The robustness of this one finding—the disadvantage that appears to face more remote West North Central counties—is striking.

Metropolitan adjacency and region interact in complex ways to mediate access to or use of the secondary markets. We cannot conclude that being remote from a metropolitan area per se affects the extent to which the secondary market outlets are used. In every analysis reported above, nonadjacent West North Central counties have a significantly lower proportion of home mortgages purchased by the GSEs. The explanations for this are intriguing. One is that this is a passing phenomenon—a result of the year chosen. The other is that the "remote West North Central" effect is really a reflection of some omitted variable or combination of variables. As noted above, data on mortgage brokers are not collected for nonmetropolitan areas. It is possible that counties in this location have local credit markets that are quite different from those of other regions and locations. These explanations are explored in detail in the conclusion. At this point, we turn to consider the second research question: Who do the GSEs serve in nonmetro counties?

Question Two: Are There Significant Differences Between the Borrowers Served By Each Agency?

For the Nation as a whole, Fannie Mae serves proportionately more low-income, minority, and first-time homebuyers than Freddie Mac. However, larger shares of the lower income and first-time borrowers served by Freddie Mac are in nonmetropolitan areas (Manchester, Neal, and Bunce, 1998). The earlier comparison of the agencies in the study area identified no striking differences between them. However, the descriptive analysis left many questions unanswered. Are there disparities between the agencies when we control for a full range of county and borrower characteristics? Multivariate analysis is necessary to answer this question adequately.

The GSEs' affirmative goals set a target percentage of loan purchases from low- and moderate-income borrowers. Although other borrower characteristics—for instance, whether or not they are minorities or first-time homebuyers—are of public policy interest, they are not reflected in explicit goals. Consequently, this analysis focuses on explaining variations in the incomes of borrowers served, compared with their area median income. As a ratio, this variable (like the "proportion of mortgages purchased" variable discussed above) is not normally distributed and had to be transformed into its logarithmic form before the models could be constructed. These models then are also of the log-linear form.

The models set out to identify and control for several explanations for variations in borrower income relative to area median income. They are structured similarly to the analyses presented above, but include three additional borrower dummy variables: for minority borrowers, for female borrowers, and for first-time homebuyers. First-time, minority, and female borrowers may have lower income levels compared with others. A dummy variable is designed to capture differences between the agencies (Freddie Mac is coded as zero and Fannie Mae as one). A positive coefficient would mean that the borrowers from whom Fannie Mae purchases loans have income ratios that are higher than the borrowers Freddie Mac serves, controlling for all other variables in the equation. A negative coefficient would mean the opposite. For the second model, a dummy variable codes counties designated as underserved. Again, a positive coefficient would mean borrowers in underserved counties have higher incomes relative to the median than those in nontargeted counties.

A range of county characteristics was included to control for factors that could explain variations in borrower incomes compared with the median. Including a variable controlling for county median income was essential, because borrowers in counties with low median incomes may have incomes higher compared with that median than in higher income counties. That is, more buyers may be below 80 percent of median income in a

Exhibit 10

Analysis of Borrower Income Levels

	Model 1	Model 2
Adjusted R^2	0.144	0.137
F	743.602***	702.961***
AGEBOR	0.037***	0.040***
AREAMEDIN	–0.145***	
CHGCNINC	–0.051***	–0.068***
CHGPBPERM	–0.016***	–0.017***
CHGPOP	0.010*	–0.022***
CHGUNEM	0.021***	0.021***
CHGVALUN	–0.003	–0.004
DAGENCY	–0.032***	–0.033***
DFIRSTT	–0.124***	–0.125***
DGEND	–0.203***	–0.204***
DMIN	–0.025***	–0.024***
MINPCT	0.018***	0.017***
MOBHRAT	0.032***	0.081***
OWNRAT	–0.063***	–0.048***
VACRAT	0.188***	0.188***
DUNDERS		0.087***

Note: Significance of t-test values: * = $p < .05$; ** = $p < .01$; *** = $p < .001$

high-income county than in a low-income county. Borrower income ratios may also reflect judgments about the riskiness of loans in particular places. Counties with smaller increases in median income, lower rates of population growth, and lower or declining rates and value of new construction may have borrowers with higher incomes compared with the median. Higher increases in unemployment rates may also be positively associated with borrower income ratios—fewer low-income buyers may be able to buy homes, or underwriting standards may reflect more stringent criteria for qualifying low-income buyers. Older borrowers may have income ratios higher than younger ones.

Lower income buyers in counties with high proportions of mobile homes may be more likely to buy a mobile home, in which case the loan would traditionally not have been eligible for purchase by the GSEs. Borrower income ratios could be skewed upward in these locations. Where homeownership rates are high, counties may have more lower income borrowers. Counties with higher vacancy rates may also have higher borrower income ratios, reflecting either more stringent underwriting criteria in those housing markets or the much higher incomes of buyers of second homes.

The first model in exhibit 10 analyzes variations in borrower income ratios, controlling for area median income but not for whether a county is designated as underserved. These two variables cannot be included in the same model because they are highly correlated (the correlation with minority population is much lower). The second model includes a dummy variable for underserved counties and excludes area median income. The goodness-of-fit statistics (adjusted R^2) are not high—the variables included here explain about

14 percent of variation in borrower income levels. However, our main purpose is to explore the factors that may affect borrower income levels rather than predict income levels.

What determines the income ratios of borrowers served by the GSEs? Most of the hypotheses outlined above are borne out by the analysis. In counties with lower median incomes, larger increases in unemployment rates, and smaller increases in median income and construction rates over the past 5 years, loans are purchased from borrowers with incomes higher than the median. Borrower incomes are also higher compared with the median in counties with higher vacancy rates, lower owner-occupancy rates, and higher proportions of mobile homes. Borrowers who are minorities, female, or first-time buyers have incomes that are lower compared with the county median. Older borrowers have higher incomes. The one variable that did not behave as expected was population growth; counties that were growing faster had higher income borrowers. However, this may reflect the fact that many loans were made to new residents, who may have incomes higher compared with the median, rather than reflecting assessments of risk.

The model's explanatory power diminishes when we include the underserved dummy (DUNDERS) instead of AREAMEDIN, but the structure of the model remains intact. Borrowers in underserved counties have incomes that are significantly higher compared with the median even after controlling for other characteristics. The only other change is that borrowers in counties with less rapid population growth have higher incomes, the relationship we originally expected. Both models suggest a significant difference in the income levels of borrowers served by each agency. Freddie Mac purchases loans from borrowers with income ratios significantly higher than those Fannie Mae serves. This is the result suggested by the descriptive analysis presented in exhibit 5 on page 237.

The borrowers served in targeted counties appear to have higher incomes compared with the median than all borrowers in the sample. However, the average income of borrowers in targeted counties was lower than that of borrowers elsewhere. This finding likely reflects differences in area median incomes, rather than implying higher underwriting standards in underserved counties. Without any detail on the characteristics of all borrowers in a county, no conclusions can be drawn about this finding.

What can we conclude at this point? Location has quite narrowly defined effects. The GSEs have significantly lower market shares in only one region—West North Central counties not adjacent to a metro area. Consequently, revising the definition of targeted counties to include location may not be justified. However, the marked disadvantages of this one location need to be examined further. The limited conclusions that can be drawn about the borrowers served in nonmetro locations raise a further set of important policy implications related to data collection and availability.

Conclusions and Policy Implications

This study set out to address two questions:

- Does location explain differences in GSE market share, after controlling for other sources of variation among counties?
- Whom do the GSEs serve in nonmetro areas?

This section of the report discusses the study's findings in more detail, and draws conclusions about their implications for policy.

The effects of location are more complex than can be captured by the division between counties adjacent to and remote from metropolitan areas. Metropolitan adjacency affected GSE market shares in some regions but not others; in some, more remote counties had proportionately more loans purchased by the GSEs. Clearly a characterization of credit problems or barriers along divisions between remote and adjacent counties is too simplistic. Nevertheless, after controlling for nearly every other explanation for why the GSEs would have lower market shares in some places than in others, location was a significant factor. The GSEs have significantly lower market shares in nonadjacent West North Central counties than in any other location. Space appears to matter in a very specific way.

Generalizing from our sample of 426 counties to nonmetropolitan communities as a whole, the GSEs appear to serve smaller proportions of first-time and lower income buyers in nonmetro communities than in the Nation as a whole. Smaller proportions of minority buyers are served than their proportion in the population would suggest. However, determining whether this is a result of primary mortgage originations, or of GSE purchasing patterns, is impossible. The borrowers served by each agency differ—Fannie Mae serves borrowers with significantly lower incomes (compared with the area median) than Freddie Mac does.

These findings raise several issues. First, how can we explain variations in GSE market shares across nonmetropolitan communities? Second, what could explain the surprising difference between nonadjacent West North Central counties and all others? Third, does the comparison of borrowers throw any light on GSE purchasing patterns in nonmetro communities? The discussion of these questions forms the basis for a series of questions for policy and for future research.

How Can We Explain Variations in GSE Market Shares Across Nonmetropolitan Communities?

The GSEs purchase significantly lower proportions of mortgages in smaller, poorer, and less rapidly growing nonmetro areas than in larger, wealthier, and more rapidly growing ones. Secondary market underwriting guidelines may disadvantage these nonmetro residents, who may be more likely to be seasonally or self-employed, or to buy homes with appraisal problems. However, mortgage originators in nonmetro areas may interpret guidelines too conservatively, or may not try to qualify nontraditional borrowers for mortgages. It is also possible that mortgage brokers (who sell high proportions of the conventional conforming mortgages they make to the GSEs) are less active in these locations. Without detailed data on loans applied for and originated and those purchased, identifying the source of the problem is difficult.

Counties with higher ratios of bank deposits per capita had fewer loans purchased by the GSEs. This may show that where liquidity is not a concern, banks may be less likely to sell the mortgages they originate. One could also argue that those counties with higher owner-occupancy rates and larger populations may meet a threshold loan demand standard that makes it more efficient for mortgage originators to pursue secondary market outlets for their loans. Improving liquidity through loan sales may enable originators to expand their business, but this may not be sufficiently profitable in counties with lower volumes of loan originations. However, analyses controlling for the volume of conventional conforming mortgages originated did not suggest a “threshold” standard.

As noted earlier, nonmetro mortgages are less likely to be for standard terms (15 or 30 years) and more likely to be provided in forms that are difficult to securitize (such as

balloon mortgages). Although information on the terms of loans is not available, this may be the direct explanation for why more loans are not securitized. However, it may also show that loan origination practices have not adjusted to the conventions of a home finance market increasingly dominated by securitization. In addition, several commentators noted that the other actors necessary to securitize loans (for instance, mortgage poolers) often do not operate in nonmetro areas.

What Could Explain Lower GSE Market Shares in Nonadjacent West North Central Counties?

Although space significantly improves explanations of GSE market shares, its effects are narrow. One location (nonadjacent counties in the West North Central region) has significantly lower proportions of mortgages purchased compared with all others. The West North Central States in this study include Iowa, Kansas, Minnesota, Nebraska, North Dakota, and South Dakota. Several explanations for this—smaller population sizes and rates of growth, and fewer liquidity problems—are already controlled for in the model. Why is there a separately identifiable regional effect once these differences have been taken into consideration?

One possibility is that the location effects found in this model are time specific. Complex data assembly limited this study to only 1 year. Would the distinct spatial patterns that emerge in 1995 be consistent over a longer period? The study year was not particularly unusual compared with the decade as a whole. Nationally, the economy had recovered from recession and employment rates were up. Interest rates were slightly higher than in the preceding 2 years so the volume of mortgage refinancing was down, but home prices had not yet begun to rise in response to the improving economy, according to *U.S. Housing Market Conditions* for the fourth quarter 1995 (HUD, 1995). GSE market shares in this region did not change substantially between 1993 and 1995.[20] However, it is possible that patterns observed in one calendar year may vary over time. Future research could extend this analysis over a longer period.

Another explanation goes back to the issues discussed above—that the West North Central region, especially nonadjacent counties, may have less sophisticated credit markets than other regions. Mortgage brokers' level of activity could not be included in the analysis because no suitable data exist. Information on loan terms (whether they were adjustable rate or balloon mortgages, for instance) was also unavailable. Given the sparse populations and the remoteness of much of the region from *large* metropolitan centers, it is quite possible that the location effects are mediated in important ways by spatial differences in credit markets. Thus, one tentative explanation of our findings may be that *location matters because it represents different patterns of financial services provision.*

This interpretation fits with research on access to financial services in disadvantaged city neighborhoods. Researchers there have found distinctly different credit markets in neighborhoods differentiated by income, race, and other characteristics (Squires, 1992; Campen, 1993; Corbridge and Thrift, 1994). Access to homeowners insurance and private mortgage insurance, use of Government-backed compared with conventional loan products, and the availability of banks compared with check-cashing services represent different kinds of neighborhood credit markets.

Factors affecting access to credit in nonmetropolitan locations may be different from those in metro areas. The racial composition of communities may not be as strongly related to credit patterns. Different histories of interstate banking regulation, different patterns of bank consolidation, and cultural attitudes toward long-term debt may be

important factors shaping local credit markets and thus GSE market shares. Further research on regional differences in financial services, and differences in the restructuring of the financial services industry, would be needed to investigate this hypothesis fully.

Two categories of explanations may account for differences in GSE market shares. On one hand, low proportions of loan purchases may show that lower incomes, smaller populations, and so on pose barriers to using the GSEs' products, because loans are less likely to meet their underwriting standards. On the other hand, counties with lower incomes and smaller populations may not have sufficient lending activity to justify mortgage originators pursuing secondary market outlets. In the first interpretation, we may talk about "barriers" to use of the GSEs' products. In the second, we are actually talking about the lack of incentives for some financial institutions to be innovative. Both explanations are likely relevant. Lower proportions of loan purchases may suggest both barriers for some borrowers and a lack of sophistication by the originators that serve small nonmetro markets.

Whom Do the GSEs Serve in Nonmetro Communities?

Fannie Mae and Freddie Mac purchased smaller proportions of loans to lower income borrowers in this sample of nonmetropolitan counties than they did in the Nation as a whole. Relatively higher income borrowers, and fewer first-time buyers, were served by the GSEs in targeted nonmetropolitan counties. In fact, more than 60 percent of the borrowers whose loans were purchased in nonmetro underserved counties had incomes above 120 percent of the area median.

Location appears to affect each agency's purchasing patterns in similar ways. Both have significantly smaller market shares in nonadjacent West North Central counties. Freddie Mac has larger shares in the nonadjacent Mountain and adjacent Pacific regions, but a smaller presence in nonadjacent West South Central counties. Fannie Mae has smaller market shares in nonadjacent East North Central counties.

The multivariate analysis suggested one important difference between the agencies: Fannie Mae buys loans from borrowers with incomes that are significantly lower compared with the area median income than Freddie Mac. This finding echoes those in national-level comparisons of the two agencies. Freddie Mac's greater emphasis on nonmetropolitan areas does not translate into a greater emphasis on nontraditional borrowers in those locations.

Are there other variables that could account for this difference between the agencies? The explanatory power of the model presented in exhibit 10 is low (about 14 percent of variation is explained), so it is likely that a range of other factors not included in the equation could be influential. The extent to which banks (or other actors) originate mortgages to lower income borrowers, the kinds of properties lower income borrowers buy, their credit and employment histories, and the extent to which lower income borrowers are served by other programs (FHA, VA, RHS, or State or local loan programs) could all affect the proportion of lower income borrowers' loans available for purchase. However, would these factors affect the agencies differently? It is unclear that they would.

Policy Implications

Two principal kinds of implications are discussed here. First, what could be done to address the apparent disparities in access to secondary market sources of credit that emerge from this study? Second, what would be needed to address the questions this study raises?

How Could These Disparities Be Addressed? The General Accounting Office explains HUD's definition of affirmative purchasing goals for the GSEs as an attempt to mirror the primary conforming mortgage market (U.S. General Accounting Office, 1996). This study throws little light on the extent to which the borrowers served by the GSEs in nonmetro areas mirror the primary market. However, the findings do suggest that GSE purchases do not mirror the primary, conventional conforming market similarly across all nonmetro counties. Significantly smaller proportions of mortgages originated in underserved counties were purchased by the GSEs. This finding suggests that the definition of "underserved" counties captures some important differences in determinants of GSE market shares. A continued incentive to expand market shares in low-income and high-minority locations is justified. However, GSE market shares differ significantly among underserved counties. Size and location continue to differentiate market shares, especially for nonadjacent West North Central counties.

Defining affirmative goals sufficiently detailed to capture these other sources of difference would be difficult. However, a clearer understanding of what underpins these differences is necessary for any attempt to guide or encourage remedial action. Do underwriting barriers affect GSE market shares differently in some counties? If so, would it be possible to revise underwriting standards to serve more lower income nonmetropolitan borrowers without reducing credit quality? Partnerships with other risk-bearing entities such as RHS offer the best practical means to expand service to lower income borrowers in the short term. When a variable for the proportion of Government-insured loans was included in the analyses reported above, it was positively and significantly associated with GSE market shares in underserved counties. However, RHS loan guarantees serve fewer low-income borrowers compared with direct lending programs, and they also show marked regional biases. Expanding GSE market shares in the least well-served counties may entail careful coordination with risk-bearing partners, and more emphasis on neglected regions. GSE loan purchases backed by Government insurance are not counted toward affirmative goals, and this is appropriate. However, better coordination of social goals (expanding access to credit in underserved areas) in Federal (and State and local) programs could provide an additional incentive to increase GSE market presence in the least well-served counties.

It is also plausible that the small size and lack of sophistication of mortgage originators, or lack of competition from mortgage brokers, may result in less use of the GSEs. Spatial differences in the availability of financial services may underpin the regional and size differences that persist among underserved counties. Although it is possible that all credit needs are being met in locations without strong GSE presence, nonmetro banks' low ratios of loans to deposits suggest that relying primarily on deposits to finance loans may leave out important sections of the market. The higher rates of bank deposits in communities with lower proportions of purchases will likely diminish in time as inheritances are passed down, and deposits shift to mutual funds. In the future, liquidity concerns may be a more important incentive for banks to pursue secondary market outlets. The transaction or startup costs involved in doing so may be important barriers to maintaining access to mortgage credit in some, especially much smaller, communities. Bank consolidation may improve the ability of local institutions to use secondary markets, but may not occur evenly throughout nonmetro areas. Very small peripheral communities may be less attractive locations for expansion.

This study has not addressed the issue of the barriers to using GSE products that originators in smaller, poorer, less rapidly growing communities may face. The patterns identified

in this initial analysis suggest that this may be an important direction for future inquiry. If this is the case, how could the GSEs make it easier for small-scale originators to package and sell their loans?

How Should We Address Unanswered Questions? Specific conclusions are limited by the very sparse data available on nonmetropolitan mortgage markets. This study represents an initial attempt to fill this gap by estimating the size of the conventional, conforming mortgage market. Information on the size and terms of loans, on originators, and on borrowers is simply not collected in nonmetro areas. Without data equivalent to that collected in metropolitan areas, fully understanding and evaluating mortgage markets and access to credit in nonmetro areas is impossible.

Nonmetropolitan lenders were excluded from the Home Mortgage Disclosure Act because of the legislation's initial focus on redlining in metropolitan areas. However, this justification may need to be revisited. Claims made about disparities in access to credit among nonmetro communities in earlier anecdotal studies are supported by this study's findings. GSE market shares, and thus access to home financing on the most affordable terms, differ significantly within this sample of communities. These disparities may go beyond GSE practices and reflect more fundamental differences in local mortgage markets. A first step toward clarifying these disparities would be to analyze detailed information on loan applications and originations, as is available in metropolitan areas. Although using HMDA data is not a perfect way to identify the primary market that the GSEs are required to mirror, it does at least provide a starting point for evaluation that is wholly lacking in nonmetropolitan areas. It would also provide a far better basis for understanding the credit gaps that appear to exist in some nonmetro communities.

Although nonmetro depository institutions are covered by the CRA, the ability of regulators to evaluate their performance without HMDA data is limited. This is especially true for smaller institutions that are exempt from some more detailed reporting requirements. The same arguments that supported the expansion of HMDA data in metropolitan areas in 1989—that it is essential for grassroots CRA enforcement to occur and that it can greatly aid regulators (Fishbein, 1992; Garwood and Smith, 1993)—support arguments for home mortgage data to be collected in nonmetropolitan areas, too. If one reason for the disparity in access to secondary market sources of credit is that nonmetro banks have few incentives to be innovative, outreach efforts by the GSEs alone are unlikely to resolve the problem.

There would be objections to extending HMDA to include nonmetro institutions. Smaller metropolitan institutions complain that HMDA imposes an unreasonable reporting burden, and nonmetro institutions would likely make similar arguments. Many nonmetro banks may also fall below the asset-size limitations on institutions required to report under HMDA. However, technological advances within the past 5 years may enable reporting requirements to be streamlined to lessen the burden on all institutions. The possibility should be explored.

The data provided by the GSE Public Use Database are clearly essential for any evaluation of how the GSEs serve different markets. However, one limitation is the restricted range of information available with geographic identifiers. Flags to identify Government-insured loans would help to determine what the GSEs' market shares cover (although neither GSE purchases many FHA and VA loans, this appears to vary widely among communities). Information on loan-to-value ratios at the geographic level would be extremely helpful in analyzing the relationship between community characteristics and the type of credit available. Disparities in the proportion of the mortgage market served may

be explained by these ratios, or new patterns of disparities may emerge. The confidentiality implications of attaching geographic identifiers to this data should be reevaluated.

Aggregate analyses are useful in identifying generalizable patterns, but most raise more questions than they answer. This study is no exception. While HMDA data would substantially improve the quality of conclusions that could be drawn, it would not be sufficient to answer every question of interest. Distinguishing between the effects of underwriting barriers and the effects of less sophisticated or less competitive mortgage markets requires more than secondary data. More detailed case studies of how credit markets operate in particular localities (and how homebuyers find financing) offers a different perspective. A more detailed understanding of how the mortgage process works in place may offer more specific policy recommendations. Recent ethnographic studies of homebuying (for example, Ratner, 1996) offer a promising model for future research evaluating the role of the GSEs and other actors in nonmetropolitan housing and credit markets.

Acknowledgment

This project was supported by the U.S. Department of Housing and Urban Development (HUD), Office of Policy Development and Research (PD&R). Support was also provided by the University of Iowa. I am very grateful for the advice and assistance of Paul Manchester, the project supervisor, and for the help and advice provided by John Gardner and Randall Scheessele, all of PD&R. Two anonymous reviewers and staff at PD&R provided useful feedback on this report. I would like to thank Dean Dateweiler of the U.S. Department of Agriculture's Rural Housing Services office and Paul Nehrenberg of the Loan Policy division of the U.S. Department of Veterans Affairs for the information they provided. This project would not have been possible without the help of the many State and county officials who provided data and answered questions; they are too numerous to mention here. The project benefited from the excellent research assistance provided by Kristi Bales and Kimberley Harman. Finally, I would like to thank Alan Peters for reviewing the final draft of the report. Any errors or omissions are my responsibility.

Author

Heather MacDonald is an associate professor and chair of the graduate program in urban and regional planning at the University of Iowa. Her recent research deals with access to housing finance in disadvantaged communities, analyses of rural housing needs and housing policy in Iowa, and the restructuring of Section 8 projects in the Mark-to-Market program. MacDonald received funding from the Fannie Mae Foundation in 2000 for a study assessing housing needs in Iowa and has served as a reviewer for Housing Policy Debate, *a journal published by the Fannie Mae Foundation.*

Notes

1. It is unclear how much of the advantage of Federal backing is passed on to homebuyers in the form of lower interest rates rather than being captured by the institutions and their shareholders in the form of higher profits (Stanton, 1996; Ambrose and Warga, 1996).

2. Since 1992, affirmative mortgage purchasing goals have defined their public purpose responsibilities. Goals encourage mortgage purchases from lower income households, from geographically targeted communities, and from multifamily projects serving very low income households. Initially, geographically targeted areas were defined as central-city census tracts, but as of 1996 the definition was expanded to include

both metropolitan and nonmetropolitan areas with low median incomes and/or high minority populations.

3. This decision was made because of anticipated difficulties in comparing "market share" when two different sources are used to estimate a baseline number of conventional conforming mortgages originated. HMDA provides a fairly complete estimate of mortgages applied for and approved. The methods used here to estimate nonmetro mortgages originated are considerably more complex, relying on residential sales figures adjusted for a variety of factors (these are described in detail in appendix A).

4. The rural/urban divide is not the same as the metropolitan/nonmetropolitan divide. There are urban areas (incorporated places with more than 2,500) in nonmetropolitan counties, and rural areas (unincorporated places with populations of less than 2,500) in metropolitan counties. However, the Federal Rule for GSE Housing Goals indicated that an "underserved rural area" is a nonmetropolitan county meeting the income and race criteria described, and this is the definition used in the study.

5. This may reflect changes other than immigration or natural increase. For example, growth in the Hispanic population may be partly accounted for by the legalization of many previously illegal immigrants, and growth in the Native American population may reflect a change in self-identification.

6. Nonadjacent counties with cities had the lowest rates of nonmetro homeownership in 1990, presumably because their cities offer rental housing which in nonmetro adjacent counties would be provided in the neighboring metro area (Ghelfi, 1993).

7. Households with "worst case" housing needs are defined as renters who do not receive Federal housing assistance, have incomes below 50 percent of area median income, and pay more than half their income for rent and utilities or live in severely substandard housing (HUD, 1998). It should be noted that this definition excludes many extremely low-income owner households who are more likely to live in nonmetro areas.

8. All mobile homes manufactured after 1975 must meet HUD standards, and are classified as manufactured housing.

9. The American Housing Survey reported a difference of 0.5 percent between nonmetro areas and suburbs, but this could reflect older loans that had not been refinanced.

10. Another reason for the disparity may be that very large institutions' use of nondeposit sources of funds for lending skews the national average upward (Milkove, 1995, p. 10).

11. Regionally, declines were sharpest in the Mountain States (39 percent), followed by West South Central (27 percent) and West North Central and East South Central (22 percent each).

12. RHS also makes loans to rural residents of metro counties, accounting for 1.3 percent of metro mortgages in 1993 (Mikesell, 1997).

13. RHS takes essentially all the risk exposure for the combined (first and second) mortgage (Mikesell, 1997).

14. This was exacerbated by a Comptroller of the Currency ruling that seller institutions would have to retain reserves for the full amount of the loan (not just their 10 percent participation) under risk-based capital rules. Furthermore, Farmer Mac securities (unlike those issued by Fannie Mae or Freddie Mac) had to be registered with the Securities and Exchange Commission, which increased their price (Vandell, 1996).

15. Conventional conforming mortgages are those that fall below the conforming limits (in 1995, this was $207,000) and that are not Government-insured or guaranteed (although RHS-guaranteed loans are included because the GSEs do have programs in place to purchase these). The construction of these estimates is discussed in detail in appendix A.

16. Rural minority residents have higher homeownership rates than in urban areas. For African Americans, nonmetro homeownership rates are 58.9 percent compared with 39.7 percent in urban areas; for Native Americans, 62.5 percent in nonmetro areas compared with 42.6 percent (Housing Assistance Council, 1994).

17. This introduces some difficulty in interpretation. Predicting the value of Y for any given combination of independent variables entails detransforming in Y, which would likely introduce some bias (Afifi and Clark, 1984). However, as the interest here is in the explanation of variation in the dependent variable rather than prediction, I decided to transform Y. Most of the independent variables are either normally distributed interval variables or dummy variables, so transforming them was not appropriate.

18. An alternative variable, the proportion of conforming loans with Government insurance (FHA, VA, and RHS) was included in place of the private mortgage insurance variable. This was positively and significantly related to GSE purchases. The model structure remained intact.

19. This analysis is not presented because it is not directly comparable to the others reported here. The variable for county median income (MEDINC95) could not be included because it was highly correlated with the underserved dummy, and thus the adjusted R^2 was somewhat smaller. However, the structure of the model remained intact.

20. Fannie Mae purchased 6.7 percent of its total loans in the West North Central region (metro and nonmetro areas) in 1993, and 5.6 percent in 1995; Freddie Mac purchased 6 percent of its total loans there in 1993, and 6.3 percent in 1995 (Manchester, Neal, and Bunce, 1998).

References

Afifi, A.A., and Virginia Clark. 1984. *Computer-Aided Multivariate Analysis*. Belmont, CA: Lifetime Learning Publications.

Altman, Frank L. 1996. "Commentary," in *Financing Rural America*, proceedings of a conference in Omaha, December 4–5. Kansas City, MO: Federal Reserve Bank of Kansas City, pp. 121–129.

Ambrose, Brent W., and Arthur Warga. 1996. "Implications of Privatization: The Costs to Fannie Mae and Freddie Mac," in *Studies on Privatizing Fannie Mae and Freddie Mac*. Washington, DC: U.S. Department of Housing and Urban Development, Office of Policy Development and Research, pp. 169–204.

Barry, Peter J., and Paul N. Ellinger. 1996. "Liquidity and Competition in Rural Credit Markets," in *Financing Rural America*, proceedings of a conference in Omaha, December 4–5. Kansas City, MO: Federal Reserve Bank of Kansas City, pp. 47–77.

Beale, Calvin L., and Kenneth M. Johnson. 1995. "Nonmetro Population Continues Post-1990 Rebound," *Rural Conditions and Trends 6*, 1:6–9.

Blalock, Hubert M. 1979. *Social Statistics*. 2nd revised edition. New York: McGraw-Hill.

Bunce, Harold L., and Randall M. Scheessele. 1996. *The GSEs' Funding of Affordable Loans*. Housing Finance Working Paper Series No. HF–001. Washington, DC: U.S. Department of Housing and Urban Development, Office of Policy Development and Research.

Campen, James T. 1993. "Banks, Communities and Public Policy," in *Transforming the U.S. Financial System: Equity and Efficiency for the 21st Century*, Gary A. Dymski, Gerald Epstein, and Robert Pollin, eds. Armonk, NY: M.E. Sharpe, pp. 221–249.

Canner, Glenn B., Wayne Passmore, and Brian J. Surette. 1996. "Distribution of Credit Risk Among Providers of Mortgages to Lower-Income and Minority Homebuyers," *Federal Reserve Bulletin* 82 (December): 1077–1102.

Canner, Glenn B., and Wayne Passmore. 1994. "Private Mortgage Insurance," *Federal Reserve Bulletin* 80 (October): 883–899.

Canner, Glenn B., and Stuart A. Gabriel. 1992. "Market Segmentation and Lender Specialization in the Primary and Secondary Mortgage Markets," *Housing Policy Debate* 3, 2:241–329.

Collings, Art. 1998. "The Role of the Federal Rural Housing Programs," in *Housing in Rural America: Building Affordable and Inclusive Communities*, Joseph N. Belden and Robert J. Wiener, eds. Thousand Oaks, CA: Sage Publications, pp. 101–109.

Congressional Budget Office. 1996. *Assessing the Public Costs and Benefits of Fannie Mae and Freddie Mac*. Washington, DC: U.S. Government Printing Office.

Corbridge, Stuart, and Nigel Thrift. 1994. "Money, Power and Space: Introduction and Overview," in *Money, Power and Space*, Stuart Corbridge, Ron Martin, and Nigel Thrift, eds. Oxford, U.K.: Basil Blackwell, pp. 1–25.

Cotterman, Robert F., and James E. Pearce. 1996. "The Effects of the Federal National Mortgage Association and the Federal Home Loan Mortgage Corporation on Conventional Fixed-Rate Mortgage Yields," in *Studies on Privatizing Fannie Mae and Freddie Mac*, Washington, DC: U.S. Department of Housing and Urban Development, Office of Policy Development and Research, pp. 97–168.

Cromartie, John. 1993a. "Nonmetropolitan Population Grew Slowly During the 1980s," *Rural Conditions and Trends* 4, 3:12–15.

———. 1993b. "Blacks Maintain Small Nonmetro Growth; One in Four New Nonmetro Residents Is Hispanic," *Rural Conditions and Trends* 4, 3:16–19.

Deavers, Ken. 1992. "What Is Rural?" *Policy Studies Journal* 20, 2:183–189.

Devaney, Mike, and William Weber. 1993. "Rural Credit Markets and Proposed Changes in Appraisal Standards," *The Appraisal Journal* (January): 100–104.

Drabenstott, Mark, and Larry Meeker. 1996. "Financing Rural America: A Conference Summary," in *Financing Rural America*, proceedings of a conference in Omaha, December 4–5. Kansas City, MO: Federal Reserve Bank of Kansas City, pp. 1–10.

Duncan, Marvin. 1996. "Keynote Address: Where are rural capital markets headed?" in *Financing Rural America*, proceedings of a conference in Omaha, December 4–5. Kansas City, MO: Federal Reserve Bank of Kansas City, pp. 11–46.

Evanoff, Douglas D., and Lewis M. Segal. 1996. "CRA and Fair Lending Regulations: Resulting Trends in Mortgage Lending," *Federal Reserve Bank of Chicago: Economic Perspectives* (November): 19–43.

Fannie Mae. 1997. *Rural Housing Native American Pilot (Section 502 Guaranteed Loans)*. Washington, DC: Fannie Mae.

———. 1996. *Underwriting Rural Properties: Building on the Basics*. Washington, DC: Fannie Mae.

Fishbein, Allen J. 1992. "The Ongoing Experiment With 'Regulation from Below': Expanded Reporting Requirements for HMDA and CRA," *Housing Policy Debate* 3, 2:601–636.

Freddie Mac. 1997. "Real Estate Mortgages Secured by Manufactured Homes." www.freddiemac.com/function/fm-lenders/fm-servs/expmkts/manufact.html.

Fuguitt, Glenn V. 1991. "Commuting and the Rural-Urban Hierarchy," *Journal of Rural Studies* 7, 4:459–466.

Garwood, Griffith L., and Dolores S. Smith. 1993. "The Community Reinvestment Act: Evolution and Current Issues," *Federal Reserve Bulletin* 79 (April): 252–267.

Ghelfi, Linda M. 1993. "Nonmetro Housing Growth Slows," *Rural Conditions and Trends* 4, 3:54–61.

Glassmeier, Amy K., and Marie Howland. 1995. *From Combines to Computers: Rural Services and Development in the Age of Information Technology*. Albany, NY: State University of New York Press.

Guenther, Kenneth A. 1996. "Commentary: Implications of Banking Consolidation for the Financing of Rural America," in *Financing Rural America*, proceedings of a conference in Omaha, December 4–5. Kansas City, MO: Federal Reserve Bank of Kansas City, pp. 141–145.

Hardy, Melissa A. *Regression with Dummy Variables.* Quantitative Applications in the Social Sciences, Vol. 93. Thousand Oaks, CA: Sage, 1993.

Housing Assistance Council. 1994. *Taking Stock of Rural Poverty and Housing for the 1990s*. Washington, DC: Housing Assistance Council.

———. 1993. *The Community Reinvestment Act in Rural America*. Washington, DC: Housing Assistance Council.

ICF Incorporated. 1993. "Effect of Home Loan Bank System District Banks on the Housing Finance System in Rural Areas." Study for the Federal Housing Finance Board.

Kravitz, Linda, and Art Collings. 1986. "Rural Housing Policy in America: Problems and Solutions," in *Critical Perspectives on Housing,* Rachel G. Bratt, Chester Hartman, and Ann Meyerson, eds. Philadelphia, PA: Temple University Press, pp. 325–334.

MacDonald, Heather I. 1996. "The Rise of Mortgage Backed Securities: Struggles To Reshape Access to Credit in the U.S," *Environment and Planning A* 28:1179–1198.

MacDonald, Heather I., and Alan H. Peters. 1994. "Rural Women in a Restructuring Economy: Work and Commuting in Eastern Iowa," *Economic Development Quarterly* 8, 2:171–185.

Manchester, Paul B., Sue George Neal, and Harold L. Bunce. 1998. *Characteristics of Mortgages Purchased by Fannie Mae and Freddie Mac, 1993–1995*. Housing Finance Working Paper Series No. HF–003. Washington, DC: U.S. Department of Housing and Urban Development, Office of Policy Development and Research.

Mikesell, Jim. 1997. "Federal Housing Assistance Emphasizes Loan Guarantees," *Rural Conditions and Trends* 8, 1:26–31.

Milkove, Daniel L. 1995. "Special Issue: Rural Financial Institutions," *Rural Conditions and Trends* 6, 2.

Nelson, Arthur C., and Thomas W. Sanchez. 1997. "Exurban and Suburban Households: A Departure from Traditional Location Theory?" *Journal of Housing Research* 8, 2:249–276.

Norusis, Marija J. 1993. *SPSS for Windows: Base System User's Guide, Release 6.0.* Chicago: SPSS Inc.

Ratner, Mitchell S. 1996. "Many Routes to Homeownership: A Four-Site Ethnographic Study of Minority and Immigrant Experiences," *Housing Policy Debate 7,* 1:103–145.

RUPRI Rural Financial Task Force. 1997. *The Adequacy of Rural Financial Markets: Rural Economic Development Impacts of Seven Key Policy Issues: A Background White Paper*. Columbia, MO: Rural Policy Research Institute.

Rural Economy Division, Economic Research Service (ERS), U.S. Department of Agriculture. 1997. *Credit in Rural America*. Agricultural Economic Report No. 749. Washington, DC: U.S. Government Printing Office.

Squires, Gregory D. 1992. "Community Reinvestment: An Emerging Social Movement," in *From Redlining to Reinvestment: Community Responses to Urban Disinvestment,* Gregory D. Squires, ed. Philadelphia, PA: Temple University Press.

Stanton, Thomas H. 1996. "Restructuring Fannie Mae and Freddie Mac: Framework and Policy Options," in *Studies on Privatizing Fannie Mae and Freddie Mac*. Washington, DC: U.S. Department of Housing and Urban Development, Office of Policy Development and Research, pp. 1–47.

Strauss, Leslie R. 1998. "Credit and Capital Needs for Affordable Rural Housing," in *Housing in Rural America: Building Affordable and Inclusive Communities,* Joseph N. Belden and Robert J. Wiener, eds. Thousand Oaks, CA: Sage Publications, pp. 125–136.

U.S. Congress, Senate. 1994. *Government-Sponsored Enterprises [GSEs] Interim Housing Goals Performance in 1993*. Hearing before the Committee on Banking, Housing and Urban Affairs. 103rd Congress, 2nd Session. April 13.

U.S. Department of Housing and Urban Development (HUD), Office of Policy Development and Research. 1998. *Rental Housing Assistance—The Crisis Continues: The 1997 Report to Congress on Worst Case Housing Needs*. Washington, DC: U.S. Department of Housing and Urban Development.

———. 1996. "Survey of Mortgage Lending Activity: Fourth Quarter/Annual, 1995." HUD No. 96–82. Washington, DC: U.S. Department of Housing and Urban Development.

———. 1995. *U.S. Housing Market Conditions, Fourth Quarter 1995*. Washington, DC: U.S. Department of Housing and Urban Development.

U.S. General Accounting Office. 1996. *Housing Enterprises: Potential Impacts of Severing Government Sponsorship*. Report to the Committee on Banking, Housing and Urban Affairs, U.S. Senate. GAO/GGD–96–120. Washington, DC: U.S. General Accounting Office.

———. 1993. *Rural Housing: FmHA's Home Loan Program Not Meeting the Needs of All Rural Residents*. Report to the Chairman, Subcommittee on Housing and Community Development, Committee on Banking, Finance and Urban Affairs, U.S. House of Representatives. Washington, DC: U.S. General Accounting Office.

Vandell, Kerry D. 1996. "Improving Secondary Markets in Rural America," in *Financing Rural America,* proceedings of a conference in Omaha, December 4–5. Kansas City, MO: Federal Reserve Bank of Kansas City, pp. 85–120.

Wachter, Susan, James Follain, Peter Linneman, Roberto G. Quercia, and George McCarthy. 1996. "Implications of Privatization: The Attainment of Social Goals," in *Studies on Privatizing Fannie Mae and Freddie Mac*. Washington, DC: U.S. Department of Housing and Urban Development, Office of Policy Development and Research, pp. 337–377.

Weicher, John C. 1994. "The New Structure of the Housing Finance System," *Federal Reserve Bank of St. Louis Review* 76, 4:47–65

Whitener, Leslie A. 1997. "Rural Housing Conditions Improve but Affordability Continues To Be a Problem," *Rural Conditions and Trends 8,* 2:70–73.

Wiener, Robert J., and Joseph N. Belden. 1998. "The Context of Affordable Housing in Rural America," in *Housing in Rural America: Building Affordable and Inclusive Communities*, Joseph N. Belden and Robert J. Wiener, eds. Thousand Oaks, CA: Sage Publications, pp. 3–12.

Wilson, Harold O., and James H. Carr. 1998. "Impact of Federal Interventions on Private Mortgage Credit in Rural Areas," in *Housing in Rural America: Building Affordable and Inclusive Communities,* Joseph N. Belden and Robert J. Wiener, eds. Thousand Oaks, CA: Sage Publications, pp. 137–153.

Young, Kate Porter. 1997. "Rural South Carolina: An Ethnographic Study of Homeownership, Home Financing, and Credit," *Cityscape* 3, 1:13–37.

Ziebarth, Ann, Kathleen Prochaska-Cue, and Bonnie Shrewsbury. 1997. "Growth and Locational Impacts for Housing in Small Communities," *Rural Sociology* 62, 1:111–125.

———. 1995. *Housing in Small Midwestern Towns*. RUPRI Research Report. Columbia, MO: Rural Policy Research Institute.

Appendix A
Data Sources

This project combines data from a variety of sources. Data may be divided into three main types:

- Data collected to estimate the size of the conventional conforming mortgage market in each county.
- Data collected to summarize the features of each county that may affect mortgage purchasing patterns.
- Data collected on the GSEs' mortgage purchases in each county.

This appendix outlines the sources of data used in the project, and the adjustments made to reach the estimates used.

Data Collected To Estimate the Size of the Conventional Conforming Mortgage Market

This was the most complex data collection task. In metropolitan areas, HMDA data provide a solid basis for evaluating mortgage lending and purchasing patterns. No equivalent data source exists for nonmetropolitan counties. The first (and most time-consuming) task was collecting data on total single-family residential sales in each nonmetropolitan county. We began this collection effort by contacting county revenue departments. Many counties did not have the computer or staff facilities to provide this information. The next step was to contact State revenue departments, which was far more successful. Many States conduct annual sales ratio studies, which include the number of sales included in the study for each property category. A few States did not differentiate improved residential property from other property types, some relied on only a random sample of sales, and a smaller number did no such analyses. In a few cases, State housing finance authorities could provide information on sales by county where the revenue department could not. In States that could not supply the information, we continued to contact county offices directly, and succeeded in obtaining single-family residential sales from many counties. Data were collected from at least some counties in 36 of the 49 States with nonmetropolitan counties.

All data include only arms-length "good" sales of single-family (one to four units) residential properties—that is, they do not include bankruptcy or court-ordered sales or transfers among family members. Sales figures are not identical to mortgage loans originated (the data were unavailable, as mortgage recorders do not break down mortgages by type of property). We assumed that every homebuyer would finance the purchase of their home, but considered that some may do so through seller financing or by assuming an existing mortgage. Numbers of sales were adjusted by the proportion of owners with mortgages that reported the first mortgage was originated at the time of sale. The data were reported by region in the American Housing Survey for 1995. The proportion does not, unfortunately, reflect owners' practices in 1995. It applies to all current owners, and

may thus include a large number that did not originate new mortgages during periods of high interest rates, which may not be typical behavior in 1995. It should also be kept in mind that the proportion is only available at the broadest census region, and may vary substantially by county (and perhaps even by census division). Nevertheless, this is the best available adjustment and, like others, it errs on the side of conservatism.

Next, estimated mortgages were adjusted by a further estimate of the number of loans above the GSE limits. In 1995, this limit was $207,000. Unfortunately, we did not have breakdowns of sales by price in the vast majority of cases. Census data from 1990 provided a method of approximating the number of jumbo loans—the proportion of total housing units valued above $200,000 in 1990. Again, this is a crude and imprecise but conservative measure. The conforming limit for GSE loans in 1990 was close to, but less than, $200,000. Eliminating the proportion of all homes with a total value above $200,000 would make the potential conforming mortgage market smaller than it probably was. Often at least part of the total loan amount on jumbo mortgages is sold to the GSEs. In most counties very few units were valued above this limit, but in a few coastal and resort communities the proportion was significant.

The third adjustment excluded the proportion of mobile homes reflected in sales figures. The GSEs are prohibited by charter from buying mobile home loans. For the State data sources, usually manufactured homes are included only if they are permanently fixed to property (that is, they are legally real property and thus eligible for purchase by the GSEs). For data obtained directly from counties, the inclusion of mobile homes varied. In some counties, all mobile homes were included. For those counties, the proportion of sales equivalent to the proportion of owner-occupied units classified as mobile homes in the 1990 census of population and housing were excluded from our estimates. This is an inexact measure that will exclude some "mobile homes" classified as real property, but there was no better alternative. Condominiums (where identified separately in sales ratio studies) were included as single-family residential. In Alaska, many units in more remote locations do not have adequate infrastructure. County officials provided assistance here; these units are classified separately as "cabins" (not officially intended for year-round use), and we could exclude them from our sales figures for those counties.

Finally, sales estimates were adjusted to reflect mortgages originated under each of the two Government insurance or guarantee programs sold primarily to Ginnie Mae. Although both GSEs do purchase FHA and VA loans (and these purchases are reported in the Public Use Database), this amounts to only about 2 percent of all FHA and VA loans originated. These purchases likely vary across counties. However, for the purposes of this analysis, we assume that FHA and VA loans do not make up many purchases in any county. Data were obtained from the Federal Housing Administration and the Veterans Administration on the number of loans originated in 1995 under their single-family mortgage insurance or guarantee programs. These originations were subtracted from the estimate of conforming mortgages to produce an estimate of the conventional conforming loan market. Data were also obtained for Rural Housing Service loans guaranteed, but because the GSEs have had programs in place for some time to purchase RHS loans (and buy quite substantial numbers of them), these loans were not excluded.

Data Collected About the Counties in the Sample

This data collection effort was intended to supplement the estimates of mortgage markets with data that could potentially explain variations in loan purchases. A variety of secondary sources of data were used to construct the county-level variables included in the analyses. The 1990 census of population and housing provided data on county population and racial

composition and a variety of housing stock characteristics. Homeownership rates, vacancy rates, proportion of owner-occupied mobile homes, median housing value in 1990, median age of the housing stock, proportion of units with complete plumbing, and access to infrastructure (water and sewer) were obtained from the census. In addition, HUD provided updated data on 1995 household median income for counties and States, and identified counties classified as "underserved" for the purposes of the GSE housing goals.

Unemployment rates for 1990 and 1995 were obtained from the Bureau of Labor Statistics. Another set of economic variables was residential building permits in 1990 and 1995; these were obtained from the Census Bureau. Unemployment rates and building permits were used to provide basic indices of changes in local economies over the first half of the 1990s. The Census Bureau's County Data Book for 1996 reported information on bank offices and deposits in each county as of June 30, 1994, from the Federal Deposit Insurance Corporation. Of course, mortgage brokers now account for a large share of home mortgages originated, and do not necessarily have physical offices in the locations where they do business. There was no information on mortgage broker activity in nonmetro locations.

Data Collected on the GSEs' Mortgage Purchases

The Single Family Census Tract GSE Public Use Data Set for 1995 was used in this analysis. The data are collected from Fannie Mae and Freddie Mac and include loans purchased for the year reported, along with information on borrower and loan characteristics. Borrower characteristics include the race, gender, and age of borrower and coborrower, their annual income, and whether or not they were first-time homebuyers. The unpaid loan balance is also provided (along with the census tract of the property), but unfortunately not the loan-to-value ratio information included in the other GSE data sets.

The single-family data set does not differentiate between home purchase loans and refinancing of existing loans. Another problem is that loans purchased by Fannie Mae and Freddie Mac were not necessarily originated in the same year, and many more marginal loans may have been "seasoned" for some time before being sold. This problem also applies to analyses using HMDA data (see discussion in appendix A of Bunce and Scheessele, 1996), and this mismatch is not easily accountable. Nationwide figures for refinanced loans and year of origination reported for each agency (in Manchester, Neal, and Bunce, 1998) were used to adjust the estimate of the number of loans the agencies purchased in each county. No adjustment could be made to the detailed loan-level data used to investigate the differences between the GSEs.

Appendix B
Methodological Issues

The assumptions on which the multivariate analyses are based were investigated in detail. These assumptions are reported here. More detailed investigations of the unexpected results in the multivariate analysis are also reported.

Investigating Assumptions

Multivariate linear regression analysis is based on several assumptions. One of the most important assumptions is that the true relationship between the dependent variable and the independent variables is linear. If a straight line fits the data well, the observed residuals (E), which are estimates of the true errors (e), should be distributed randomly (Blalock, 1979). A scatter plot of standardized residuals against standardized predicted values

should show a band of points around zero. Scatter plots were constructed for all the models presented here, and normal curves were plotted against the residuals. The distribution of residuals was very close to normal after the dependent variable was transformed (for lower values of the dependent variables, residuals were spread more widely than for higher values).

Another assumption is that independent variables are not collinear. As a first step, correlation matrices were constructed and some variables were discarded because they were highly correlated with others (above 0.5). Collinearity diagnostics (using tolerances and variance inflation factors, and inspecting variance proportions associated with eigenvalues) were run on all models, and they did not suggest the variables were collinear (Norusis, 1993).

A third assumption is that no highly influential cases disproportionately affect model estimates. As expected, there were "outliers" in this data set. These were identified by calculating centered leverages for each case. The leverage of a case describes what impact the Y-value for a particular case has on the fit of the equation estimated. Ideally, cases should have roughly equal amounts of influence on the fit. The mean value for the centered leverage is p/N, where p is the number of independent variables in the equation and N is the number of cases (Norusis, 1993). Cases with leverage values that exceeded 2p/N were identified, and the model was run excluding these cases. For each model, the adjusted R^2 value improved but the structure of the model remained intact.

Finally, the assumption of homoscedasticity is important to investigate given that our data may be categorized in several ways—by location, and by designation as "underserved," for example. The estimate of the population variance will be unbiased only if we can assume that all subgroups have equal variances. Hardy (1993) suggests a simple test to investigate the potential problem of heteroscedasticity: compare the mean residual sum of squares derived from separate subgroup regressions. The data have several potential subgroups. I tested the assumption that the variances are equal between adjacent and nonadjacent counties, and between served and underserved counties. For the model presented in exhibit 7, the f-scores obtained were 0.51 for adjacent versus nonadjacent counties (with 184 and 198 degrees of freedom) and 0.67489 for underserved versus served counties (with 174 and 208 degrees of freedom). We could not reject the null hypothesis that there was equal variance between subgroups at the $p < .001$ level. Consequently, it appears that the assumption of homoscedasticity may be valid.

Unexpected Results

Not all variables in the analyses reported in the section "What Determines GSE Market Shares in Nonmetropolitan Counties?" had the expected signs, suggesting that our understanding of how mortgage markets work in nonmetropolitan areas needs to be refined. How do we explain those variables that did not behave as expected?

The most intriguing result was the finding that the proportion of mortgages purchased by the GSEs *increased* as the percentage of minority residents in a county increased. (However, a high proportion of purchases in high-minority counties does not necessarily mean that loans to minorities made up a high proportion of loans purchased. A simple ratio between the percentage of loan purchases from minority homebuyers and the percentage of minority residents in a county was constructed. In regions where average county minority populations were small, minority borrowers make up a share of GSE loan purchases similar to or higher than their share of the population. In regions with higher proportions of minorities, minority borrowers make up a much smaller proportion of GSE loan purchases. The positive relationship between the proportions of loans purchased and percent minority

in a in a county should not be interpreted as an indication that minority buyers are more likely to be served by GSEs.)

A substantial amount of urban research has suggested exactly the opposite relationship (Canner and Gabriel, 1992; Manchester, Neal, and Bunce, 1998; Bunce and Scheessele, 1996). Does this finding suggest that the racial composition of a nonmetropolitan area may have different effects on access to credit compared with metropolitan locations? A variety of explanations were explored. The most obvious—that percent minority was highly correlated with region and thus just reflected regional patterns—was not supported by an investigation of correlations among all variables included in the models. The highest correlation with minority percent was for adjacent South Atlantic counties (at 0.3) and the counties in this category had close to the average proportion of mortgages purchased, so this did not seem to be a satisfactory explanation.

Four other explanations were explored:

- The minority composition of the county is measured at too broad a geographic scale; percent minority in a tract would more closely approximate the patterns observed in metropolitan areas. A summary measure of the mean percent minority population in each tract in which loans were purchased was constructed. The regression model (model 1 from exhibit 7) was rerun with this variable replacing MINPCT. The standardized coefficient of the new tract minority percent variable was positive (and larger) than MINPCT.
- "Percent minority" may mask substantial differences in the treatment of counties with high Hispanic populations versus high African American populations, for example. A new variable was constructed (percent African American), but this too behaved much the same as MINPCT.
- Race may act as a proxy for an omitted variable, such as mortgage broker activity. Urban research suggests that mortgage brokers are sometimes more important actors in predominantly minority neighborhoods, although they tend to specialize in Government-backed loans (Canner and Passmore, 1994).
- The East South Central region could not be included. Including Alabama and Mississippi counties may substantially alter these results. Further investigation would be needed to conclude that in nonmetropolitan areas, racial composition has different effects on access to housing finance than in metropolitan areas. This is an intriguing possibility.

Another variable that did not behave as expected was vacancy rate (VACRAT). I hypothesized that higher vacancy rates may show weaker demand for housing and would lead to lower proportions of mortgages purchased. Vacancy rates were not always significantly related to the dependent variable, but the sign of the coefficient was always positive. Vacancy rates in nonmetro areas may be less a reflection of substandard housing (especially if we control for the proportion of units with incomplete plumbing), and more a reflection of seasonal and vacation homes. This would not necessarily imply an oversupply of units. A comparison of mean vacancy rates shows a significant difference in rates between counties designated as retirement or destination counties by ERS (30.9 percent vacancies) and all others (18.1 percent). These counties grew far more rapidly than other nonmetro counties over the early 1990s. Vacancy rates in nonmetro areas may be associated with *strong* demand for housing (because of population and employment growth and the demand for second homes) rather than weak demand as in metro areas.