JOINT CENTER FOR HOUSING STUDIES
OF HARVARD UNIVERSITY

The Industrial Structure of Affordable Mortgage Lending

Frank E. Nothaft and Brian J. Surette
July 2001

LIHO-01-2

Low-Income Homeownership

Working Paper Series

Joint Center for Housing Studies

Harvard University

The Industrial Structure of Affordable Mortgage Lending

Frank E. Nothaft and Brian J. Surette

LIHO.01-2

July 2001

Frank E. Nothaft is the Director of Economics Operations and Analysis and Brian J. Surette of Freddie Mac.

Eric Belsky, Raphael Bostic, and Jim Follain provided helpful comments, Robert Avery shared a file from the National Information Center database, and Marie Anderson provided research assistance with the Home Mortgage Disclosure Act data.

This paper was prepared for the Joint Center for Housing Studies' *Symposium on Low-Income Homeownership as an Asset-Building Strategy* held November 14-15, 2000, at Harvard University, and for the 2001 AREUEA annual meeting. The symposium was funded by the Ford Foundation, Freddie Mac, and the Research Institute for Housing America.

This paper, along with others prepared for the Symposium will be published as a forthcoming book by the Brookings Institute and its Center for Urban and Metropolitan Policy.

The Industrial Structure of Affordable Mortgage Lending

Frank E. Nothaft and Brian J. Surette

LIHO-01-2

July 2001

Abstract

This paper examines trends in prime-market mortgage lending to low- and moderate-income families and to families living in underserved areas, hereafter *affordable lending*, during 1993–99. In the prime market, affordable lending was increasingly done by mortgage bank subsidiaries of depositories. Savings institutions and independent (unaffiliated) mortgage banks provided a declining fraction of all affordable loans.

Against this backdrop, the analysis looks at variations in affordable lending at the level of the lending organization with a special emphasis on the factors that explain that variation: We examine the role of lender size, local economic conditions, industry concentration, and cultural affinity on lenders' affordable lending shares.

In general, we find negative relationships between lender size and affordable lending, though there are offsetting positive relationships among very large depositories. The effects of economic conditions on affordable lending are decidedly mixed: Lending to low- and moderate-income families is greater in markets with a stronger local economy, while lending to traditionally underserved areas exhibits an inverse relationship. We find positive relationships between industry concentration and affordable lending among savings institutions and mortgage companies. Finally, we do generally find a positive relationship between affordable lending and minority ownership of lenders. However, the small number of minority-owned institutions in our data suggests caution in interpreting this result.

Table of Contents

I.	Introduction	1
II.	Affordable Lending Regulation	3
III.	The Size of the Prime, Subprime and Government-Backed Markets	4
IV.	Aggregate Lending Trends in the Conventional Market	6
	Mortgage Bank Subsidiaries of Depositories as an Increasing Fraction of Lending	7
	Affordable Lending Increase Among Mortgage Banks	10
	Subprime Market Dominance by Independent Mortgage Banks	12
V.	Average Affordable Lending Shares at the Lender MSA-Level	13
	Differences in Average Affordable Lending Shares by Institution Type	16
VI.	The Effects of Market-Relates Factors on Affordable Lending	18
	Economies of Scale in Affordable Lending	18
	Local Economic Conditions and Affordable Lending	22
VII.	Multivariate Analysis of Affordable Shares	24
	Economies of Scale	27
	Market Concentration and Competition	28
	Local Economic Conditions and the Price of Housing	29
	The Role of Secondary Market Loan Sales	31
	Cultural Affinity	33
VIII.	Summary and Conclusions	34
References		36

I. Introduction

Ensuring the widespread availability of mortgage credit for lower-income families and borrowers who reside in lower-income neighborhoods has long been a public-policy concern. Legislative efforts aimed at financial institutions intensified during the 1970s with the passage of the Home Mortgage Disclosure Act (HMDA) in 1975 and the Community Reinvestment Act (CRA) in 1977 and the Federal Reserve Board's promulgation of Regulation C[1]. Other legislative efforts have sought to ensure, by authorizing targets for loan purchases, that the secondary mortgage market facilitate lending to low- and moderate-income borrowers and those living in underserved areas, the first such regulations were issued by the Department of Housing and Urban Development (HUD) in 1978.[2] As the target populations are similar across the two sets of regulations, the laws complement one another in ensuring that borrowers from the lower end of the income distribution and those living in historically underserved neighborhoods have access to the mortgage credit they need to purchase and keep their homes.

This paper examines trends in prime-market mortgage lending to low- and moderate-income families and to families living in underserved areas, hereafter *affordable lending*. We undertake this examination in two parts: First, we identify and discuss how the mix of institutions providing affordable mortgage credit changed during the 1990s. In the prime market affordable lending was increasingly done by mortgage bank subsidiaries of depositories.[3] Savings institutions and independent (unaffiliated) mortgage banks provided a declining fraction of all affordable loans.

Against the backdrop of emerging trends in the mortgage market as a whole, the second part of the analysis looks at variations in affordable lending at the level of the lending organization with a special emphasis on the factors that explain that variation. Four specific hypotheses about the determinants of affordable lending are examined:

---

[1] See 12 CFR 203.

[2] See 24 CFR 81.16(d) and 81.17 (1992 codification). The Housing and Urban Development Act of 1968 authorized HUD to establish regulations to require that a portion of Fannie Mae's purchases be related to the national goal of providing adequate housing for low- and moderate-income families. The Financial Institutions Reform, Recovery, and Enforcement Act of 1989 extended HUD's regulatory authority to Freddie Mac.

[3] The term "depositories" includes thrift and bank holding companies. As defined here, mortgage bank subsidiaries of depositories include (non-bank) holding company affiliates.

1. *Economies of Scale*: Is there a significant association between the size of an institution and its share of lending to low- and moderate-income families or families living in underserved areas? At issue is whether the increased size of financial institutions during the 1990s has had an appreciable impact on the provision of funds to low- and moderate-income homebuyers and underserved areas. In general, we find that depositories operating in only a single Metropolitan Statistical Area (MSA) do more affordable lending as a fraction of their origination business than other institutions. Across most institution types, we find negative relationships between origination volume and affordable lending, though there are offsetting positive relationships among very large depositories.
2. *Economic Conditions*: Are there significant differences in the lending patterns of financial institutions under various economic conditions, such as refinance booms or recessions? Such differences may emerge if marketing and underwriting policies vary with economic activity. The effects of economic conditions on affordable lending are decidedly mixed. Lending to low- and moderate-income families exhibits a strong pro-cyclical trend. On the other hand, lending to traditionally underserved areas exhibits a counter-cyclical trend. The latter result may be a consequence of the static definition of geographically based affordable lending targets, which, for all years examined, are based on area characteristics in 1990.
3. *Financial Sector Consolidation*: Does the number or concentration of lenders in an MSA affect the overall provision of credit to low- and moderate-income borrowers and underserved areas? This question is particularly relevant in light of the recent passage of the financial services modernization legislation,[4] which is expected to lead to further consolidation in this industry. Measures of concentration (Herfindahl indices) are used to test this hypothesis. Among savings institutions and both independent and depository-affiliated mortgage banks, we generally find a positive relationship. This result is consistent with the conclusion that legislative efforts have been successful at increasing the amount of affordable lending.
4. *Cultural Affinity*: Do minority-owned financial institutions provide a disproportionately larger share of their lending to low- and moderate-income borrowers and families living in underserved

[4] The Gramm-Leach-Bailey Act of 1999 repeals the restrictions on banks affiliating with securities firms contained in sections 20 and 32 of the Glass-Steagall Act and creates a new “financial holding company” under section 4 of the Bank Holding Company Act. Such holding company can engage in a statutorily provided list of financial activities, including insurance and securities underwriting and agency activities, merchant banking and insurance company portfolio investment activities.

areas than other institutions? If so, then perhaps efforts to improve the diversity of the management of financial institutions should be enhanced and encouraged by regulators. We do generally find a positive relationship between affordable lending and minority ownership. However, the small number of minority-owned institutions in our data suggests caution in interpreting this result.

Many of the recent trends in mortgage lending raise concerns about the provision of prime mortgage credit to lower-income borrowers and borrowers living in traditionally underserved areas. Our analysis of trends in lending to such borrowers helps identify which concerns may be warranted. The efforts expended by all parties—regulators, lenders, and secondary market investors—to ensure a sufficient quantity of such lending. In particular HUD's new regulation raising the affordable mortgage purchase requirements for Freddie Mac and Fannie Mae, makes our investigation of these trends, and potential explanations for them, especially important.

II. Affordable Lending Regulation

The term *affordable mortgage* used in this paper refers to a home-purchase loan or a refinance loan that satisfies either the low- and moderate-income goal or the underserved areas goal of HUD's regulation of Freddie Mac and Fannie Mae (the Government Sponsored Enterprises, or GSEs) as promulgated in 1995. These "housing goals" enumerate levels of affordable mortgages that the GSEs must purchase each year. For 1996, the low- and moderate-income housing goal was set at 40 percent of homes financed and the underserved area housing goal was set at 21 percent of homes financed; for each of the years 1997 to 2000, the housing goals were set at 42 percent and 24 percent, respectively. HUD raised the housing goal levels to 50 percent and 31 percent, respectively, for the years 2001 through 2003.[5] Understanding the factors that affect affordable mortgage lending therefore takes on particular importance.

A loan purchase can meet HUD's affordability criteria by financing a home for a *low- or moderate-income* family or by financing a home in an *underserved area*. A low- or moderate-income family is defined to be one whose income is no more than the median family income in the MSA in which the property being purchased is located. An underserved area mortgage is one extended to a family living in census tracts with a median family income no greater than 90 percent of the median MSA family income, or census tracts with a median family income no greater than 120 percent of the MSA median and where at least 30 percent of the population is non-white or Hispanic.[6] This paper examines separately lending to both the low- and moderate-income segment and the underserved area segment (collectively, the affordable segment) of the prime, conventional mortgage market.

The types of borrowers targeted by the affordable housing goal regulations overlap substantially with those targeted by another prominent mortgage market regulation: the CRA. The CRA requires depositories to help meet the credit needs of qualified borrowers in the communities they serve.[7] An enumeration of the specific criteria on which banks will be judged under the CRA is beyond the scope of this paper.[8] In general, however, one of the three main objectives of the legislation is to encourage banks to extend mortgage credit to lower-income families and those living in lower-income neighborhoods in areas in which the banks operate branch offices[9,10]. As such, borrowers who satisfy CRA requirements often also satisfy HUD's affordable housing goal requirements. This complementarity partly motivates the analysis of affordable shares at the lender level: The regulations clearly make affordable shares an outcome that bank and GSE managers take into account when making underwriting and loan purchase decisions.

III. The Size of the Prime, Subprime and Government-Backed Markets

The share of mortgage originations going to the affordable segment (affordable shares) varies substantially by lender-type, reflecting differences in location and product offering. Lenders who specialize in manufactured housing lending, for example, make a large share of loans to lower-income borrowers and in underserved areas, reflecting the relatively low price of manufactured housing and the

---

[5] The goal definitions for 1996-2000 can be found in *The Secretary of HUD's Regulation of the Federal National Mortgage Association (Fannie Mae) and the Federal Home Loan Mortgage Corporation (Freddie Mac)*, Final Rule, December 1, 1995 (60 FR 61846). The new regulation enumerating affordable housing goals for 2001-2003 was published October 31, 2000 (65 FR 65044).

[6] In non-metropolitan areas, somewhat different definitions apply based on the county or non-metropolitan state demographic information. We restrict our analysis to metropolitan areas.

[7] There are no laws requiring mortgage banks (independent or subsidiaries of depositories) to lend to the affordable segment of the mortgage market, with the possible exception of the Equal Credit Opportunities Act (ECOA). ECOA requires all lenders to extend credit without prejudice based on borrowers race or other protected characteristics.

[8] For a review of the original provisions of the CRA, see Griffith L. Garwood and Dolores S. Smith, "The Community Reinvestment Act: Evolution and Current Issues," *Federal Reserve Bulletin*, April, 1993, pp. 251-267.

[9] Families with incomes less than 80 percent of the area median income, and census tracts with median incomes less than 80 percent of the area median income are considered lower-income under the CRA.

lower-income location that most of these dwellings are sited. Lenders that focus primarily on government-backed products—such as loans insured or guaranteed by the Federal Housing Administration (FHA), Department of Veterans' Affairs (VA) and Rural Housing Service (RHS)—also serve a lower-income clientele, reflecting loan limits, low down payment, more lenient underwriting, and other product features that attract lower-income borrowers. More recently, the growth of conventional lending to borrowers with impaired credit histories, known as "subprime" lending, has disproportionately catered to lower-income borrowers.[11] Each of these segments of the market are dominated by mortgage companies that are independently-owned, i.e., owned by entities other than banks and savings institutions, and thus outside the purview of the federal banking regulators; these lenders tend to be specialists in lending to each of these market niches. As shown in Figure 1, in 1999 independent mortgage companies that specialized in manufactured housing or subprime lending accounted for 67 percent and 64 percent, respectively, of the lending volume in those market segments.[12]

At the other end of the spectrum is the jumbo segment of the single-family market; jumbo loans exceed the loan-size purchase limits of the GSEs. In contrast to other market segments, banks and savings institutions dominate jumbo lending: Depositories accounted for 54 percent of jumbo originations in 1999, and 83 percent including mortgage banking subsidiaries. This segment has the lowest affordable lending shares with only 2 percent of borrowers low- or moderate-income and only 13 percent in underserved areas.

This paper focuses on an analysis of conventional GSE-conforming prime originations, for several reasons.[13] First, this is the largest segment of the single-family market, constituting 56 percent of all mortgage credit by dollar volume in 1999 (Figure 1). Second, market shares across major lender types are more equally distributed, assuring a large analytic sample of firms within each lender type. Third, this segment supplies nearly all of Freddie Mac and Fannie Mae's purchase volume, and hence is most impacted by HUD's affordable housing goal regulations. Fourth, only a small fraction of conventional

---

[10] The other two main objectives of the CRA are to encourage banks to invest in their communities and to provide other credit-related services, such as counseling, to their communities.

[11] Glenn Canner, Elizabeth Laderman, and Wayne Passmore, "The Role of Specialized Lenders in Extending Mortgages to Lower-Income and Minority Home Buyers," *Federal Reserve Bulletin*, November 1999 (volume 85, number 11), pp. 709-31.

[12] Regulatory concerns have recently focused on predatory lending practices of some lenders in the subprime market. See *Curbing Predatory Home Mortgage Lending*, a report summarizing information gathered at five field forums by a joint HUD-Treasury Task Force on Predatory Lending, June 20, 2000.

[13] This paper defines GSE-conforming prime loans as those with a loan balance within the one-unit loan limit of Freddie Mac and Fannie Mae that are originated by a lender that primarily makes loans to "prime" credit quality borrowers. In 1999 the one-unit limit was $240,000 in most of the U. S. Some "prime" lenders originate subprime loans, which cannot be separately identified and thus are included in the analysis. The list of subprime and manufactured housing specialty lenders has been developed by HUD; see http://huduser.org/datasets/manu.html.

mortgages with loan amounts above the GSE-conforming limit are made to low- or moderate-income borrowers or borrowers living in underserved areas. While a smaller fraction of loans in the conventional conforming market are defined as affordable than in the government-backed, manufactured housing, or subprime market segments, it is still important to understand the determinants of higher affordable lending shares within this segment.

Figure 1: Lender Share and Dollar Volume of Residential Mortgage Originations, 1999

	Savings Institutions	Commercial Banks	Mortgage Companies: Subsidiaries of Depository Institutions	Mortgage Companies: Independent	Credit Unions	Volume (In billions)	Low- and Moderate Income Share	Underserved Area Share
Conventional Single Family								
Subprime	13	5	18	64	0	$99	58	48
Manufactured Housing	4	5	23	67	0	$18	66	52
Prime (Conforming)	20	23	31	22	4	$629	41	31
Prime (Jumbo)	28	25	29	17	1	$217	2	13
FHA, VA & RHS Single Family	6	6	41	46	1	$134	65	41
Conventional Multifamily	37	32	7	23	0	$31	n.a.	62
FHA & RHS Multifamily	0	1	17	82	0	$1	n.a.	52
Total Residential	20	20	30	28	2	$1128	44	34

Source: Federal Financial Institutions Examination Council, 1999 Home Mortgage Disclosure Act data. Low- and Moderate-Income and Underserved area percentages reflect percent of number of loans originated. Low- and moderate-income share is not available (n.a.) from Home Mortgage Disclosure Act data; the low- and moderate-income share shown for residential is only for single-family.

IV. Aggregate Lending Trends in the Conventional Market

Within the conventional market, there has been marked variation in the volume of both total and affordable mortgage lending over the 1990s as well as in the mix of institutions extending those loans, according to data collected pursuant to HMDA.[14] To a large extent, origination volumes have cycled with interest rates and refinance activity. However, during the 1990s there has been a prominent, secular increase in lending by mortgage bank subsidiaries of depositories and a corresponding decline in lending by independent mortgage banks and savings institutions.

Between 1993 and 1999, overall prime, conventional conforming origination volumes in metropolitan areas varied from a low of 2.6 million loans in 1995 to a high of 6.1 million loans in 1998. The fraction of total originations going to low- or moderate-income borrowers varied from a low of 32 percent in 1993 to a high of 41 percent in 1999 (Figure 2). In most years other than 1993 and 1998 (both refinancing booms), the low- or moderate-income share hovered around 40 percent. The underserved area shares follow essentially the same pattern as the low- or moderate-income shares, experiencing lows of 18 percent in 1993 and 21 percent in 1998, but hovering around 24 percent in most other years.

The figure makes clear that in terms of mortgage originations and purchases, the GSE housing goals cover a broader population of borrowers than the CRA. About two-thirds of borrowers designated as "low- or moderate-income" under the GSE housing goals also qualify as "lower-income" under CRA definitions. About two-fifths of borrowers designated as living in "underserved areas" would also meet the CRA's geography-based lending criteria.[15] Thus, although there is substantial overlap in the populations targeted by the CRA and the GSE housing goals, the overlap is not total. As a consequence, each of these regulations may have a distinct effect on the affordable segment of the mortgage market.

Mortgage Bank Subsidiaries of Depositories as an Increasing Fraction of Lending

In terms of the fraction of total conventional conforming originations attributable to each type of institution (market share), the overall trend since 1993 has been away from savings institutions and independent mortgage banks and toward mortgage bank subsidiaries of depositories, most of which are subsidiaries of commercial banks (Figure 3). Commercial banks' market share varied notably from year to year—especially from 1998 to 1999—but showed no clear trend over the seven-year period.[16]

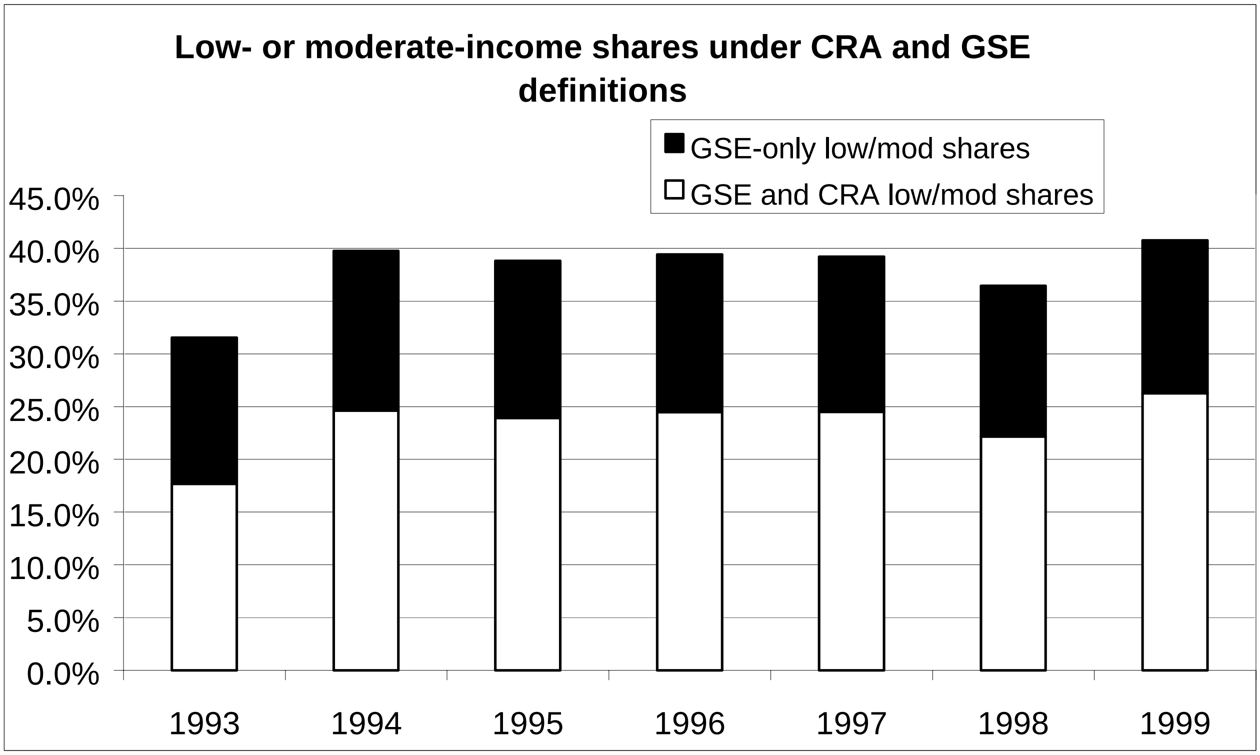
---

[14] Federal Reserve Board staff has estimated that HMDA covered 80 percent to 87 percent of all home purchase loans during 1993-97. Robert B. Avery, Raphael W. Bostic, Paul S. Calem and Glenn B. Canner, "Trends in Home Purchase Lending: Consolidation and the Community Reinvestment Act," *Federal Reserve Bulletin*, February 1999, p. 100.

[15] On the other hand, the figures do not reflect banks' nonmortgage CRA obligations (service to and investment in the banks' communities).

[16] The volatility in the commercial bank and subsidiary mortgage bank series between 1998 and 1999 could be driven by the way these institutions report under HMDA. Several large subsidiaries and their commercial bank parent filing separately in 1998 but jointly in 1999 could explain this pattern.

Figure 2: Affordable Originations Share of Total



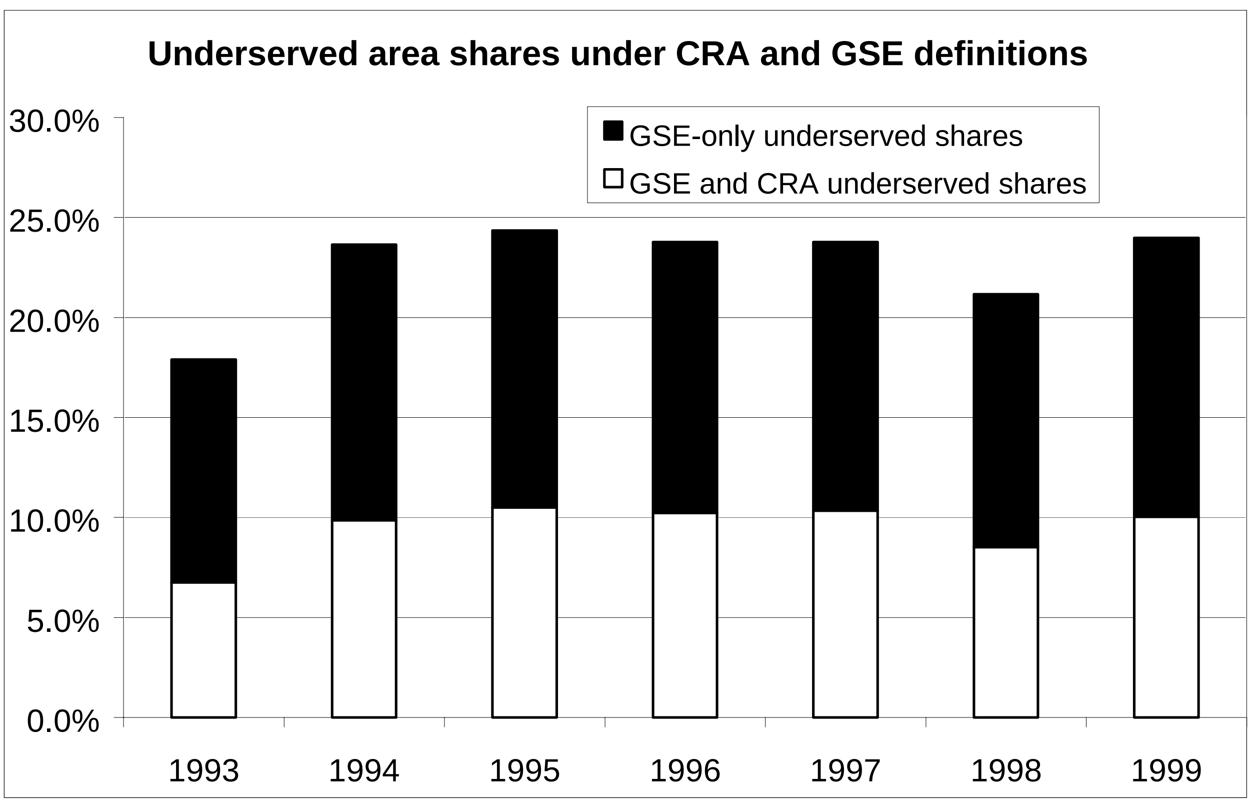
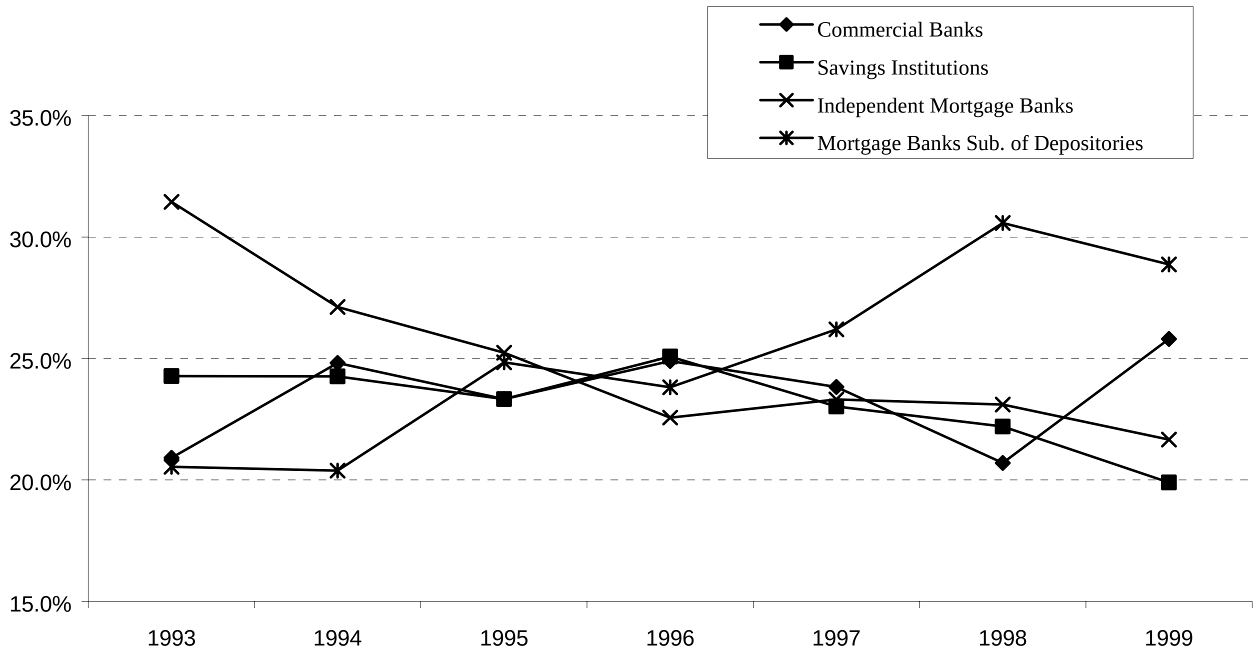


Figure 3: Prime Market Shares and Institution Type



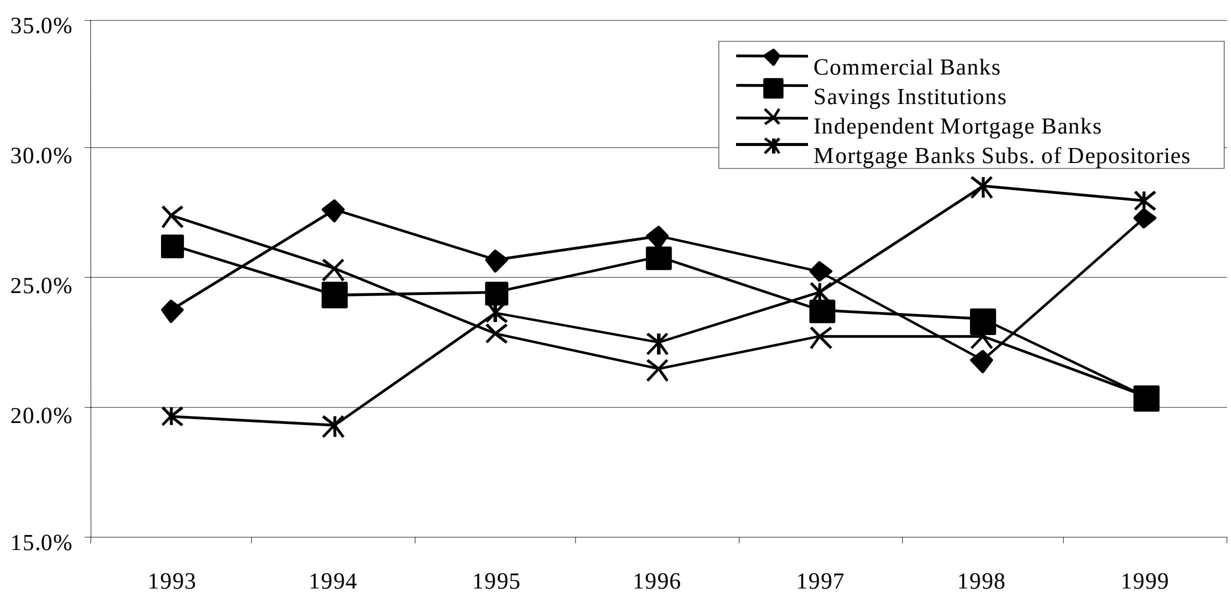
The trend toward mortgage bank subsidiaries is quite strong. Indeed, in 1993 they accounted for just 20 percent of originations, but grew more or less steadily to 29 percent in 1999.[17] The trend away from independent mortgage banks is equally strong: Their share fell steadily over this period from 32 percent to 22 percent. At the same time, the market share controlled by savings institutions fell from 24 percent to 20 percent.

The relative increase in the fraction of mortgages extended by nonbank affiliates or subsidiaries of depositories raises several concerns about the provision of mortgage credit to the affordable segment. First, these affiliates are much larger and operate across larger geographic areas than depositories. They may, as a consequence, have less connection to local communities than depositories and may have less incentive to serve the affordable segment. Second, to the extent that connections to the community generate local knowledge important for lending profitably to this segment, affordable lending may be lower than otherwise. Finally, such institutions are only indirectly, if at all, subject to CRA and the GSE housing goals. While these concerns are certainly warranted, the data do not show a substantial decline in the overall volume of affordable lending over the 1990s. Thus, while the mix of originators changed substantially, aggregate affordable lending appears to have continued apace.

Affordable Lending Increase Among Mortgage Banks

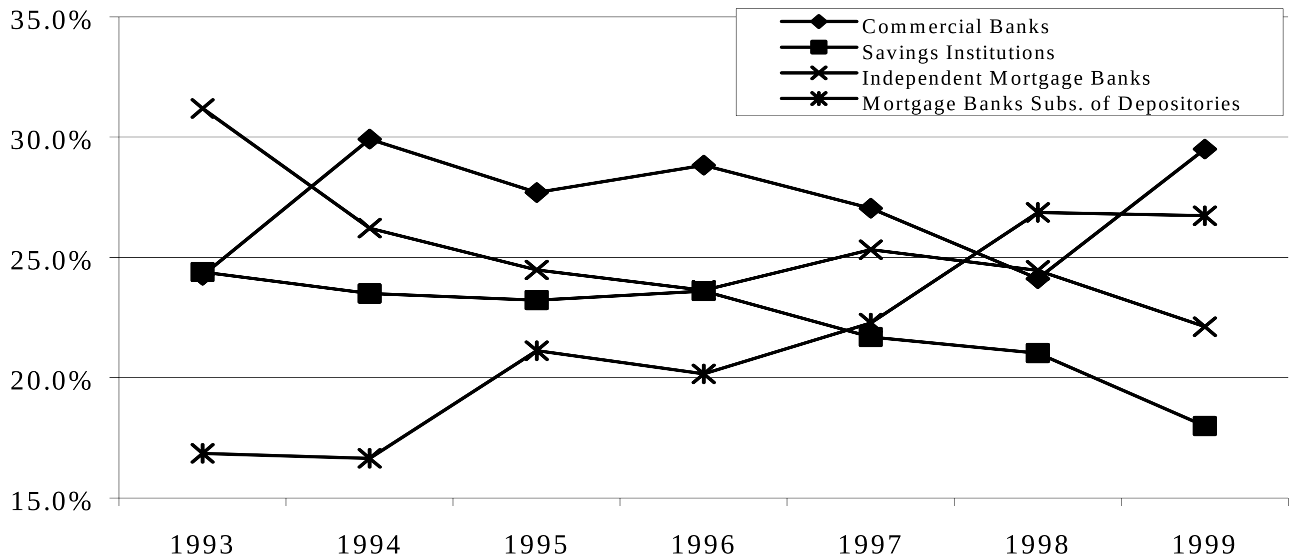
Consistent with the considerable growth in the overall market share of mortgage bank subsidiaries of depositories, these institutions accounted for an increasing fraction of mortgages to low- or moderate-income borrowers and mortgages originated in underserved areas between 1993 and 1999 (Figures 4 and 5). Mortgage bank subsidiaries of depositories accounted for 19 percent of total low- or moderate-income originations in 1993, rising more or less steadily to 28 percent in 1999. Similarly, over the same period mortgage bank subsidiaries' share of underserved area originations rose from about 16 percent to 27 percent. Most of the subsidiaries' increases in affordable lending shares came at the expense of independent mortgage banks and savings institutions. Savings institutions' low- or moderate-income market share dropped from 26 percent to 20 percent, and their underserved area market share fell from 24 percent to 18 percent between 1993 and 1999. The affordable lending market shares among independent mortgage banks fell even more dramatically throughout the period.[18]

Figure 4: Prime Market Low- or Moderate-Income Shares



[17] Figure 1 reports dollar volume of originations. The figures chart number of originations.
[18] This trend could also be driven in part by measurement error. If improvements in the identification of lenders that specialize in manufactured housing or subprime lending led to a larger fraction of such lenders being identified as such by HUD over time, then the decline in independent mortgage banks' market shares over time would be exaggerated.

Figure 5: Prime Market Underserved Area Shares



At least two possible conclusions about the structure of mortgage lending are suggested by the trends in overall and affordable mortgage lending. First, the trends are almost certainly the result of acquisition activity on the part of depositories, particularly commercial banks. As more mortgage banks subsidiaries are created, either *de novo* or through acquisitions of independent mortgage banks, the subsidiary mortgage bank share of the market should grow at the expense of independent mortgage banks.[19] A second possible conclusion follows from the first. As depositories have acquired or otherwise established mortgage bank subsidiaries, they may have increasingly diverted customers seeking mortgage loans to their mortgage bank subsidiaries.

Left unanswered is the question of why depositories increased their use of mortgage bank subsidiaries. One view is that depositories have simply diversified across loan production channels in an effort to reduce the costs associated with originations. Branch offices are costly to operate and may not afford the

---

[19] A congressionally mandated study of the effects of CRA also notes that the increase in lending to low- and moderate-income borrowers and areas is partly attributable to the nonbank affiliates of depositories acquired after 1992. *The Community Reinvestment Act After Financial Modernization: A Baseline Report,* R. Litan, N. Retsinas, E. Belsky, and S. White Haag, U. S. Department of the Treasury, April 2000.

opportunity to expand and contract in response to the overall level of mortgage activity. An important motivation for such diversification may therefore be the substantial year-to-year variation in the volume of originations. Mortgage bank subsidiaries may afford more operational flexibility in this regard, for example, by utilizing correspondent (mortgage broker) networks at the point of origination.

The use of subsidiaries and affiliates offers depositories a further advantage with respect to how their CRA performance is measured. Depositories are permitted by examiners to either include or omit, at the depositories' discretion, the originations of nonbank affiliates and subsidiaries. Thus, the increased use of nonbank affiliates and subsidiaries affords banks the opportunity to improve their measured CRA lending performance.

At the same time, there is no evidence in the aggregate data to suggest that the overall volume of affordable originations have declined as a result of the trend toward subsidiaries. As Figure 2 shows, affordable originations as a fraction of total originations held about constant in most years, except for the refinance years 1993 and 1998. By this metric, the trend away from savings institutions and independent mortgage banks does not appear to have caused a decline in affordable lending.

Subprime Market Dominance by Independent Mortgage Banks

It is worth noting at this point that market share trends are markedly different in the manufactured housing and subprime (MHSP) segment, a market that tends to be dominated by independent mortgage banks. Owing to the large current size of the MHSP market, and its dramatic growth since 1993, independent mortgage banks have played an increasingly important role in total (prime and subprime) conventional conforming lending. Indeed, when loans originated by lenders whom HUD has identified as serving primarily the subprime and manufactured housing market are considered with the rest of the conventional conforming market, the secular market share decline of independent mortgage banks discussed above are halted or reversed. In that case, the share of all conventional conforming mortgages attributable to independent mortgage banks holds about constant over the period, and their share of the total affordable originations rises modestly over time. The increase in market share for mortgage bank subsidiaries over time persists, but is less dramatic—both as a fraction of all originations and as a fraction of all affordable originations. Both types of depositories' market shares and affordable lending shares decline modestly when the MHSP lenders are included in the analysis.[20] The fraction of all originations that qualify as "affordable" rises steadily over the 1990s.

V. Average Affordable Lending Shares at the Lender-MSA Level

Against the backdrop of a substantial shift of aggregate, prime market origination activity out of independent mortgage banks and savings institutions and into mortgage bank subsidiaries, we now examine the extent to which average lending patterns of individual lenders of each type changed during the 1990s, and the factors that contributed to those changes. Much like aggregate affordable origination volumes, average affordable lending shares cycled with interest rates. Specifically, during low-interest rate periods—the so-called refinance booms of 1993 and 1998—refinance activity rose and average affordable shares fell. In years other than the refinance booms, average affordable lending shares remain within a fairly narrow range.

At the same time, affordable shares varied along several other important economic dimensions. First, average affordable lending shares rose modestly for both types of mortgage banks during the 1990s, suggesting that something more than a simple composition shift occurred in affordable mortgage lending. Second, there are large differences in the average affordable lending shares by lender size. Finally, affordable shares vary notably according to the degree of market concentration and the state of the local economy.

To measure the influence of these factors on affordable lending, we examine the lending patterns of individual *lending organizations*—defined here to be a separate entity for each lender-MSA combination.[21] The analysis is restricted to the prime, conventional conforming home purchase and refinance market. To focus the analysis on the firms who commit a *de minimus* level of resources to a particular MSA, we further limit the analysis to organizations that originated at least twenty loans within their MSA in each year. Hereafter, the analysis focuses on lending organizations' *affordable shares*—the

---

[20] There probably exists considerable imprecision in estimates of the size of the subprime market. Because MHSP lenders originate some prime loans, and because non-MHSP lenders originate some subprime loans, it is impossible to determine whether the subprime market is larger or smaller than indicated in Figure 1. Estimates of the volume of prime affordable origination volume discussed above are subject to similar imprecision, with no way to reliably gauge the direction of potential bias.

[21] "Lender" is defined here to be the HMDA filer. Some large institutions make multiple HMDA filings and may therefore have multiple observations within a single MSA. Similarly, a lender active in more than one MSA is treated as a separate lending organization for each MSA in which it makes loans. A lending organization is considered active in an MSA even if it has no offices within that MSA. A single lending organization may have multiple offices within an MSA.

fractions of their mortgages within an MSA that individual lending organizations devote to the affordable segments of that MSA.

Our selection of the MSA as the relevant unit of observation is admittedly a compromise.[22] On one hand, broad underwriting guidelines are typically established at the lender level. On the other hand, loan terms and pricing often vary from one market to another. By focusing on within-MSA lending while also accounting for lender-level factors that may be the same across affiliated lending organizations, our analysis accounts for both national (lender) and local determinants of affordable lending shares.

We present mean characteristics for lending organizations in two groups of years: 1993–96 and 1997–99 (Figure 6). The groupings are a convenient way to examine changes in affordable shares and other characteristics over time. Ideally, we would like to have included 1996 in the second period, as the GSE's affordable housing goals as defined in this paper first took effect in 1996. However, we do not have data on one of our main variables of interest—which firms were owned by minorities or women before 1997. On the other hand, the GSE housing goals were higher for the 1997–99 period than for 1996 and earlier. Thus, the selected year groupings are still economically important.

[22] Other researchers have used similar data constructs to define their units of observations by geography. In their analysis of consolidation and the CRA, Avery et al. (1999) define "banking organizations" at the level of the lender-county combination.

Figure 6: Mean Characteristics of Lending Organizations, by Institution Type and Year[1]

	Commercial Banks		Savings Institutions		Independent Mortgage Banks		Mortgage Bank Subsidiaries	
	1993–96	1997–99	1993–96	1997–99	1993–96	1997–99	1993–96	1997–99
Affordable lending shares								
Low- and moderate-income share	0.428	0.431	0.393	0.390	0.337	0.376	0.333	0.348
Underserved area share	0.272	0.273	0.227	0.214	0.222	0.247	0.185	0.194
Economies of scale								
MSA originations (number of	194	218	265	285	206	202	232	307
loans)	1,357	9,219	7,904	22,272	19,326	26,594	19,851	45,548
Outside-MSA originations (number	0.351	0.200	0.169	0.095	0.018	0.012	0.007	0.003
of loans)								
Single MSA lender (lender active								
in only one MSA)	42.0	48.4	44.8	51.0	44.2	50.2	43.6	49.5
	109	126	123	139	122	137	118	133
Local economic conditions	537	575	608	635	602	628	576	605
Median MSA family income	5.5	4.1	5.8	4.2	5.9	4.3	5.4	4.1
($000)								
FHA loan limit ($000)								
MSA fair market rent ($/month)[3]	0.042	0.034	0.035	0.029	0.035	0.029	0.037	0.031
MSA unemployment rate (percent)								
Industry concentration	26.0	26.8	34.3	43.6	84.9	86.3	81.2	86.4
MSA Herfindahl index	42.3	42.9	28.7	22.7	4.8	3.6	1.8	0.6
Secondary market factors								
Percentage of loans sold	53.4	58.5	47.4	51.3	49.1	51.7	42.6	53.0
Portfolio lender (sold no loans)	2,300	2,273	2,257	2,179	2,879	2,855	2,316	2,274
Other firm/market characteristics								
Percentage of loans refinanced								
MSA size (square miles)								

1. Variables are reported here in levels only. Several of these variables enter the regression as natural logarithms, as noted in Figure 14.
2. Dollar figures are adjusted to 1999 dollars using the CPI-U index.
3. MSA rent is HUD's Fair Market Rent series. It is the 45th percentile for the years 1993 and 1994, and is the 40th percentile for 1995-1999.

Differences in Average Affordable Lending Shares by Institution Type

The average lending shares devoted to low- and moderate-income families and those living in underserved areas (respectively, "low-mod share," "underserved area share," and collectively "affordable shares") follow a fairly consistent pattern across time and institution type. With the exception of the refinance booms of 1993 and 1998, affordable shares remained within a narrow range across time for each institution type (Figures 7 and 8). Particularly among depositories, affordable shares show little in the way of a secular trend. In all years commercial banks devoted a higher share of their prime mortgage originations to the affordable segments than other institution types, while mortgage bank subsidiaries of depositories lent the smallest share to the affordable segments.

Excluding 1993 and 1998, in each year commercial banks made an average of about 44 percent of their loans to low- and moderate-income families, and about 28 percent of their loans to families in underserved areas. Over the same period, savings institutions made about 40 percent of their loans to low- or moderate-income families, and between 21 and 25 percent of their loans to families living in underserved areas.

On the other hand, both types of mortgage banks exhibited modest increases in average affordable shares over the 1993–99 period. Independent mortgage banks' average low- or moderate-income shares rose in fits and starts from 37 percent in 1994 to 39 percent in 1999. Their average underserved area share rose from about 22 percent in 1994 to 24 percent in 1999, with a peak of 27 percent in 1997. Mortgage bank subsidiaries of depositories' average low- or moderate-income shares held steady at about 35 percent in 1994–97. After a dip in 1998, they rose to 38 percent in 1999. Their average underserved area shares followed a similar pattern, rising from 19 to 21 percent over the period.

These trends in average affordable shares indicate that the dramatic increases in total and affordable market shares attributable to mortgage banking subsidiaries of depositories discussed in preceding sections partly results from changes in the average lending behavior of each lender-type. These offsetting trends partly explain why, in the aggregate, affordable lending shares have not declined.

Figure 7: Average Low- or Moderate-Income Shares Among Lending Organizations, by Year

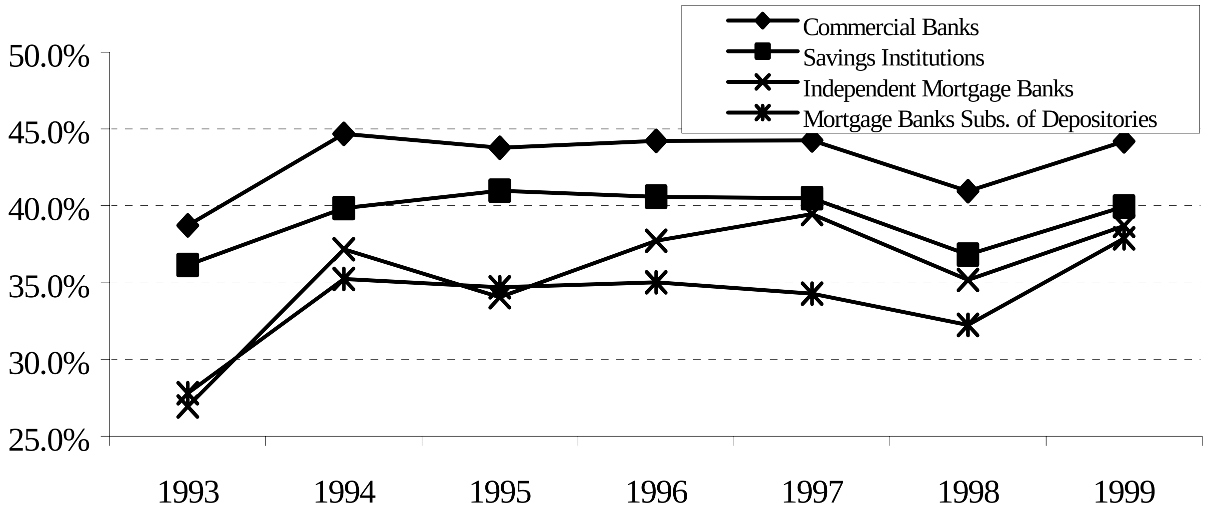
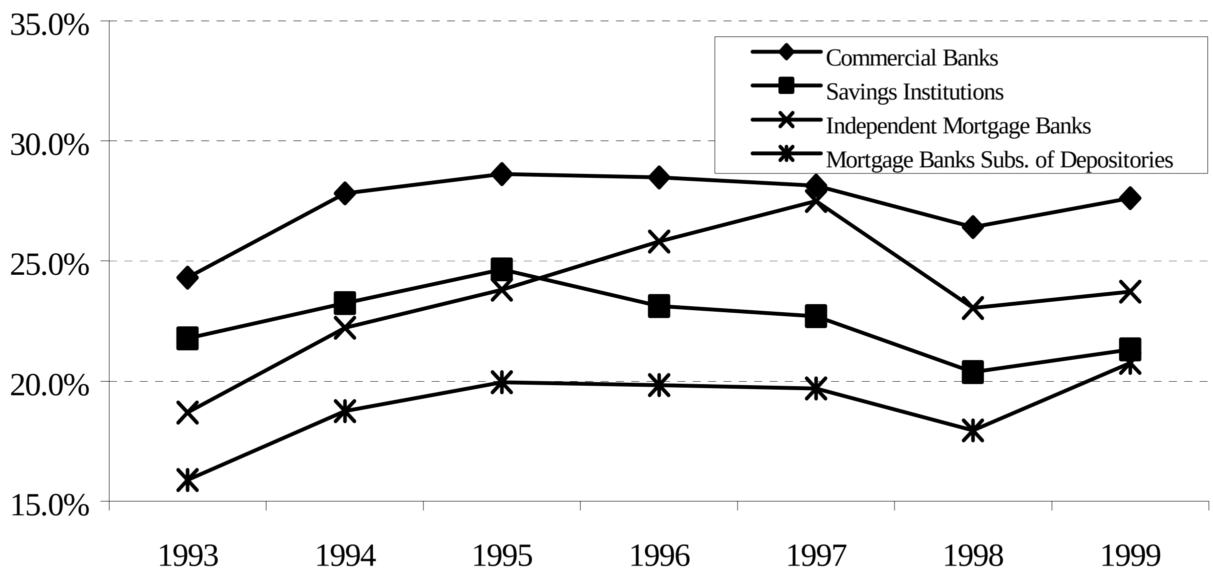


Figure 8: Average Underserved Area Shares Among Lending Organizations, by Year



VI. The Effects of Market-Related Factors on Affordable Lending

Thus far, the analysis has shown a substantial shift in the mix of institutions that originate mortgages to families in the affordable segment of the conventional conforming market. While these changes do not appear to have caused affordable lending as a fraction of total originations to decline (Figure 5), the shift does raise important questions about future levels of affordable lending. Consider that the observed changes occurred amid dramatic change in mortgage markets, most notably ongoing consolidation. What are the likely impacts of further consolidation? The period under study was one of unprecedented prosperity and economic calm. Will affordable mortgage lending decline when the economy slows or enters a recession? The paper now turns to these and related questions about the economic factors driving affordable lending.

Economies of Scale in Affordable Lending

As a result of consolidation, economic prosperity, and other factors, financial institutions grew dramatically in size between 1993 and 1999. Because local knowledge and community ties may be important factors that determine the extent of affordable lending, larger or more geographically diverse organizations may do less of it. A fundamental question is, therefore, whether large organizations have higher or lower affordable shares than smaller organizations.

Because we believe both local (MSA) and national (lender) considerations affect the provision of affordable mortgage credit, we use two distinct measures of size to test for the presence of economies of scale: (1) the number of total originations nationwide by each lender (total lender originations) and (2) the number of originations by each lending organization within their MSA (MSA originations).

We find fairly convincing evidence among depositories that affordable shares decline and then rise with total lender originations. Very small and very large depositories had higher low-mod and underserved area shares than mid-sized depositories (Figures 9 and 10). Such a pattern suggests that small depositories, such as community banks, can lend to the affordable segment profitably due to their more detailed knowledge of the few markets they operate in. The pattern also suggests that size-based efficiencies such as automation enabled larger depositories to lend profitably to the affordable segment. As larger lenders' affordable lending patterns may be more closely scrutinized by regulators than mid-sized or smaller depositories, CRA and the GSE housing goals may also help explain the pattern.

Figure 9: Average Low- or Moderate Income Shares, By Number of Total Lender Originations, 1993-1999

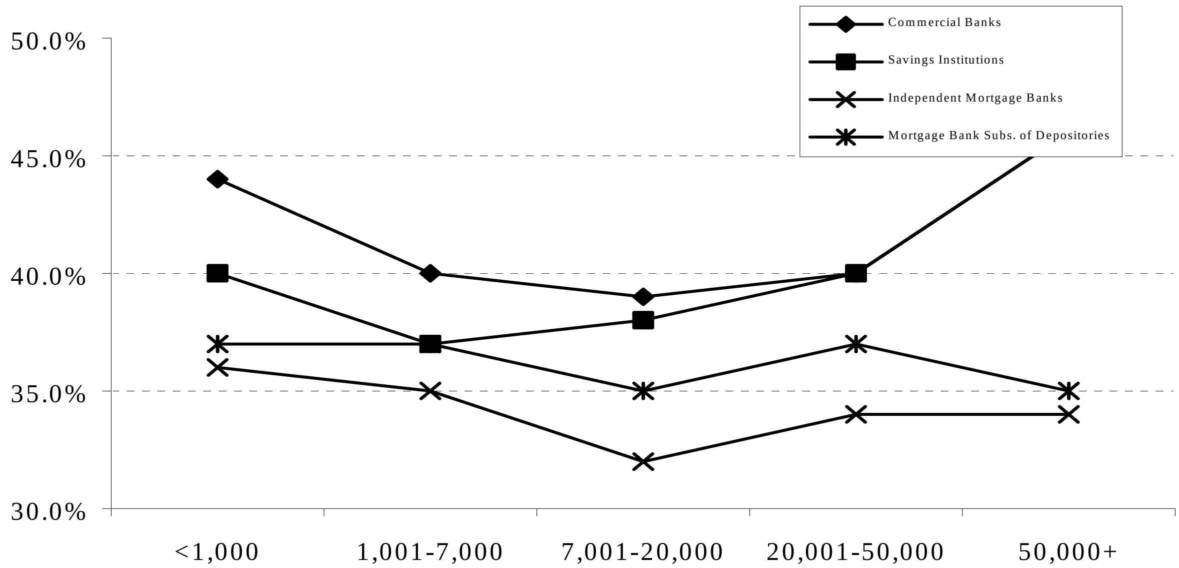


Figure 10: Average Underserved Area Shares, By Number of Toal Lender Originations 1993-1999

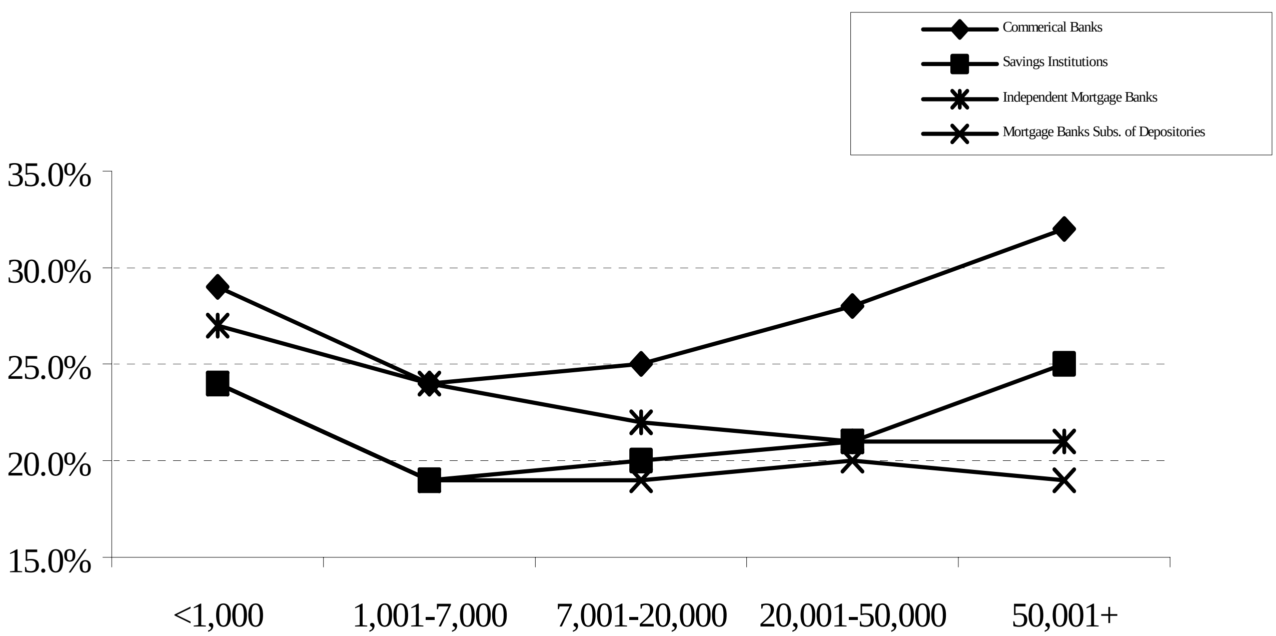
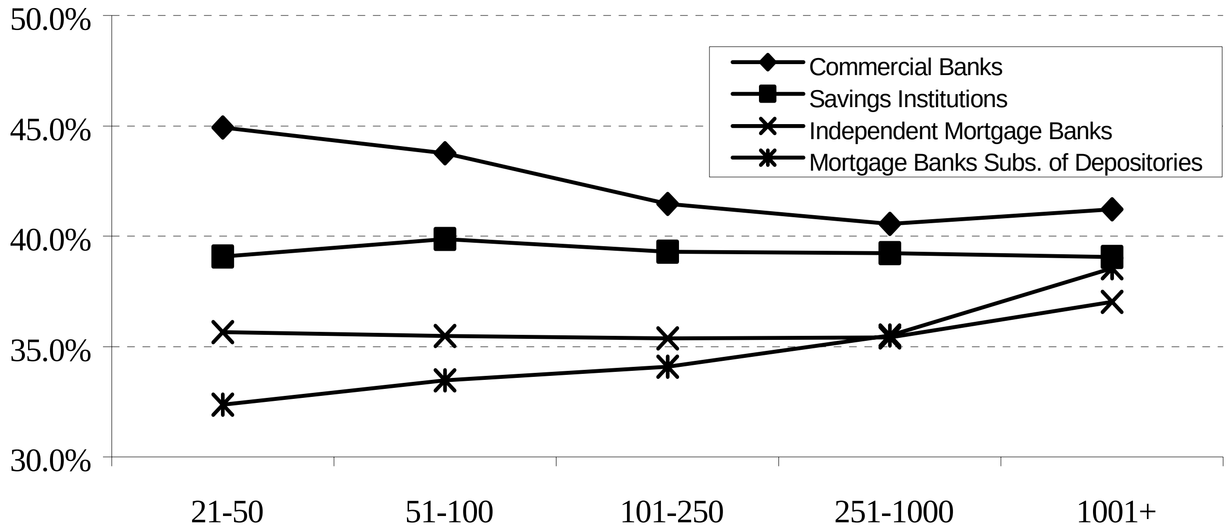


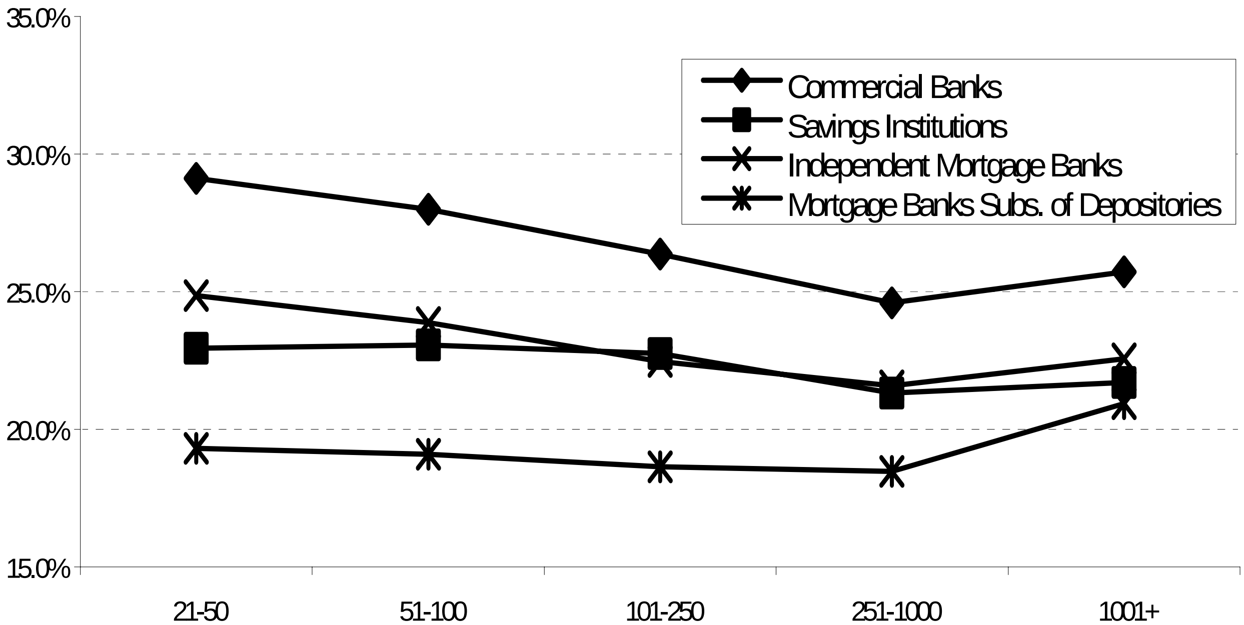
Figure 11: Average Low- or Moderate Income Shares By Number of MSA Originations, 1993-1999



When we measure the size of a lending organization by the number of originations made within their MSA, commercial banks' average affordable shares exhibit a pattern similar to that observed for total lender originations. Mid-sized commercial bank organizations devote the smallest fraction of their loans to both underserved area and low- or moderate-income segments (Figures 11 and 12). For example, commercial bank organizations that originated between 250 and 1,000 mortgages in 1999 extended an average of 42 percent of their loans to low- or moderate income families, compared to 45.1 percent for organizations that extended fewer than 50 mortgages and 43.5 percent for organizations that extended more than 1,000 mortgages. These patterns are present in most years examined.[23]

[23] The patterns of affordable lending and origination volume are weaker among savings institutions. This is due partly to changes over time in the patterns of affordable shares by institution size. Savings institutions exhibit pronounced diseconomies of scale in affordable lending in some years, but negligible or positive economies in other years. In the multivariate analysis below we discuss in more detail differences across time in the relationship between size and affordable shares.

Figure 12: Average Underserved Area Shares
By Number of MSA Originations, 1993 - 1999



Among mortgage banks, the relationship between affordable shares and size differs depending on the size measure used. At the national level, both independent mortgage banks' and mortgage bank subsidiaries' average underserved area shares decline steadily with total lender originations. Diseconomies in total lender originations are present but are less apparent in mortgage banks' low- or moderate-income shares.

In contrast, mortgage bank subsidiaries' local underserved area shares are positively related to MSA originations. There is no obvious reason why national (lender) and local (lending organization) economies of scale go in opposite directions for mortgage bank subsidiaries. Given that such firms typically are very large and operate across many MSAs (Figure 6), we believe the negative relationship between national volume and affordable shares is more important economically.

The U-shaped pattern in scale economies among commercial banks at the level of both the lender and the lending organization may partly explain why in the aggregate the affordable segment did not shrink as a fraction of total originations over the course of the 1990s, despite the increase in the size of financial institutions over this period. Nonetheless, in light of the apparent diseconomies of scale in mortgage bank subsidiaries affordable shares and the trend towards greater market share for mortgage bank subsidiaries during the 1990s, concerns about the ongoing provision of mortgage credit to the affordable segment are still warranted.

Local Economic Conditions and Affordable Lending

Affordable lending shares are affected by a wide variety of factors other than lending organization type and size. The business focus of different institutions, the condition of the local economy, and the degree of concentration and competition within local markets all play a significant role in determining the extent to which lenders can profitably originate affordable mortgages, and hence their availability to families in the affordable segment.

Particularly important for explaining variations in affordable shares across lending organizations are the limited financial resources that families in the affordable segment typically have at their disposal. Such families may be more susceptible to downturns in their local economy and pose more risk to lenders compared to other borrowers. When local economic conditions are measured by the unemployment rate within each MSA, average lending shares to low- and moderate-income families exhibited a strong pro-cyclical pattern: MSAs with very low rates of unemployment had very high low- and moderate-income shares (Figure 13). In contrast, lending shares to underserved areas appear to have been basically uncorrelated with the unemployment in the bulk of MSAs. However, in MSAs with an unemployment rate above the 80th percentile, average underserved area shares are considerably higher than other MSAs. Both of these trends are quite strong in both the 1993–96 and 1997–99 periods.

Neither of these trends individually is particularly surprising. What is surprising is that the two trends go in opposite directions—pro-cyclical low- and moderate-income shares and counter-cyclical underserved area shares. Part of the explanation for these patterns may lie in simple algebra: Given that the affordable shares are ratios with the number of MSA originations in the denominator, the patterns imply that as the unemployment rate rises within a given MSA (more accurately, across MSAs), each lending organization's number of underserved area loans in their MSA declines proportionately less than their total MSA originations. At the same time, each lending organization's number of low- or moderate-income loans in their MSA declines proportionately more than their declines in total MSA originations. Put another way, in the highest unemployment rate MSAs, the number of underserved area loans is less sensitive to variations in local economic conditions than total MSA originations, while low- or moderate-income originations are more sensitive to local economic conditions than total MSA originations.

Such a pattern may be a consequence of the static definition of underserved areas, which are based on census tract and MSA characteristics in 1990. We note first that the cyclicality of both low-mod and underserved area shares are strongest when MSA unemployment is highest—the decline in low-mod shares and the rise in underserved area shares are largest going from the fourth to the fifth quintile of the MSA unemployment rate. This pattern is equally strong in both the 1993–96 and the 1997–99 period. This suggests that there is something unusual (and persistent) about the highest unemployment rate MSAs that may explain the puzzling relationships between affordable shares and local unemployment rate.

It turns out that in the highest unemployment rate MSAs, a substantially higher fraction of the population lives in underserved tracts than is the case in other MSAs, whereas by definition exactly 50 percent of families in any MSA are low- or moderate-income. About 45 percent of the population in the highest unemployment rate MSAs lives in underserved tracts, compared to about 38 percent in the other MSAs (Figure 13). Thus, underserved area shares are higher in high unemployment rate MSAs in part because significantly more families live in such areas compared to other MSAs. The large decline in low-mod shares moving from the fourth to the fifth MSA unemployment rate quintile may also be explained by such factors.

Of course, while tract population is a reasonable explanation for these patterns, the evidence is not conclusive. We cannot reject the hypothesis that there is something else unusual about the high unemployment rate MSAs that explains this pattern. For example, regulatory incentives may play a role in explaining the relationships between affordable shares and the unemployment rate. Most lenders in the prime market have a regulatory-based incentive to make loans in low-income neighborhoods, either directly as a result of the CRA (depositories) or indirectly through the GSE housing goals (mortgage banks and depositories). If lenders target special programs more aggressively in underserved areas, and if such efforts are less sensitive to local economic conditions than other lending programs, one might expect the ratio of underserved area originations to total originations to exhibit a procyclical pattern. The GSEs' provision of liquidity for such programs, stemming from their housing goals, may also play an affirmative role.

Figure 13: Average Low- or Moderate-Income Shares and 1990 MSA Population Living in Underserved Tracts, 1993–96 and 1997–99

	Average low- or moderate income share (percent)	Average underserved area share (percent)	1990 MSA population living in underserved tracts (percent)
MSA unemployment rate, 1993–96			
Lowest quintile	38.8	20.5	37
Second quintile	37.9	21.7	40
Third quintile	37.1	21.9	38
Fourth quintile	36.3	20.4	38
Highest quintile	31.7	27.5	45
MSA unemployment rate, 1997–99			
Lowest quintile	42.2	21.7	37
Second quintile	39.9	23.1	38
Third quintile	38.6	21.0	39
Fourth quintile	36.8	21.1	38
Highest quintile	31.9	27.8	46

VII. Multivariate Analysis of Affordable Shares

Thus far, the data have shown considerable variation in the amounts of affordable lending extended by originators. A wide variety of lender- and market-related factors—measures of market concentration, organization size, cultural affinity, and economic conditions—potentially explain the variation in affordable shares we observe across different types of lenders. We now test, using a multivariate regression model, the extent to which these factors explain affordable lending.

The substantial differences across institutions in the regulatory environment they operate in, along with observed differences in affordable lending shares led us to model affordable shares separately for each institution type and for each year 1993 through 1999. To simplify the exposition, we present only two sets of regression results for each institution type: for the pooled 1993–96 and the pooled 1997–99 data (Figure 14). The main results discussed here are qualitatively unaffected by the pooling.

Fiugure 14 Panel A: Low- or Moderate-Income Share Regression Results, by Institution Type and Year[1]

	Commercial Banks		Savings Institutions		Indep. Mortgage Banks		Mortgage Bank Subsid.	
	1993–96	1997–99	1993–96	1997–99	1993–96	1997–99	1993–96	1997–99
Intercept	-2.454‡	-1.791‡	-2.642‡	-1.818‡	-2.286‡	-1.521‡	-2.880‡	-1.850‡
Economies of scale								
MSA originations[2]	-0.006‡	-0.008‡	-0.009‡	0.004‡	0.001	0.002†	0.012‡	0.010‡
Outside-MSA originations[2]	0.003‡	-0.000	0.007‡	0.002‡	-0.005‡	-0.006‡	-0.004‡	-0.007‡
Single MSA lender	0.026‡	0.027‡	0.047‡	0.040‡	n.a.	n.a.	n.a.	n.a.
Cultural affinity								
Minority/Women owned	n.a.	0.002	n.a.	0.047‡	n.a.	-0.008	n.a.	0.141‡
Local economic conditions								
MSA median income[2]	0.392‡	0.418‡	0.340‡	0.347‡	0.376‡	0.416‡	0.419‡	0.349‡
FHA loan limit[2]	-0.062‡	-0.080‡	0.001	-0.069‡	-0.068‡	-0.117‡	-0.065‡	-0.098‡
MSA fair market rent [2,3]	-0.093‡	-0.199‡	-0.097‡	-0.110‡	-0.080‡	-0.169‡	-0.067‡	-0.045‡
MSA unemployment rate[2]	-0.007	-0.020‡	-0.036‡	-0.029‡	-0.022‡	-0.038‡	-0.007	-0.021‡
Industry concentration								
Herfindahl index	0.184‡	-0.147	0.631‡	0.862‡	0.206‡	0.355‡	0.332‡	0.415‡
Secondary market factors								
Percentage of loans sold to:	-0.120‡	-0.084‡	-0.044‡	-0.031‡	n.a.	n.a.	n.a.	n.a.
Portfolio lender only	0.013‡	0.003	0.010‡	-0.015‡	n.a.	n.a.	n.a.	n.a.
Other firm/market characteristics								
Percentage of loans refinanced	-0.077‡	-0.053‡	-0.123‡	-0.035‡	0.096‡	0.108‡	0.030‡	0.051‡
MSA size (square miles) [2]	0.011‡	0.005‡	0.011‡	-0.001	-0.008‡	-0.013‡	-0.018‡	-0.011‡
Year dummies[4]								
1993 (or 1997)	-0.032‡	0.002	0.004	0.011‡	-0.115‡	0.011‡	-0.079‡	-0.026‡
1994 (or 1998)	-0.000	-0.021‡	0.007	-0.026‡	0.005	-0.052‡	0.002	-0.064‡
1995 (or omitted)	-0.004	n.a.	0.005	n.a.	-0.017‡	n.a.	0.008†	n.a.
No. MSA-lender combinations	16,199	13,969	12,660	10,184	17,779	14,549	13,121	12,690
Adjusted R-square	0.193	0.170	0.135	0.113	0.195	0.175	0.229	0.211

1. Parameter estimates designated with a ‡ (†) are statistically significant at the 99% (95%) level of confidence.
2. These variables are included in the regression as natural logarithms.
3. MSA rent is HUD's Fair Market Rent series. It is the 45th percentile for the years 1993 and 1994, and is the 40th percentile for 1995-1999.
4. The year dummies given outside (in) parentheses are used in the first (second) period models. 1996 and 1999 are the excluded categories.

Figure 14: (Panel B) Underserved Area Share Regression Results, by Institution Type and Year

	Commercial Banks		Savings Institutions		Indep. Mortgage Banks		Mortgage Bank Subsid.	
	1993–96	1997–99	1993–96	1997–99	1993–96	1997–99	1993–96	1997–99
Intercept	1.138‡	0.765‡	0.531‡	0.436‡	0.293‡	-.0216	0.230†	-0.439‡
Economies of scale								
MSA originations[2]	-0.008‡	-0.008‡	-0.010‡	-0.003†	-0.006‡	-0.009‡	-0.001	-0.000
Outside-MSA originations[2]	0.002‡	0.001	0.003‡	-0.000	-0.007‡	-0.007‡	-0.003‡	-0.002‡
Single MSA lender	0.031‡	0.037‡	0.050‡	0.057‡	n.a.	n.a.	n.a.	n.a.
Cultural affinity								
Minority/Women owned	n.a.	0.109‡	n.a.	0.204‡	n.a.	0.004	n.a.	0.151‡
Local economic conditions								
MSA median income[2]	-0.231‡	-0.121‡	-0.155‡	-0.0780‡	-0.143‡	-0.075‡	-0.086‡	-0.082‡
FHA loan limit[2]	-0.008	-0.031†	-0.060‡	-0.0890‡	-0.050‡	-0.036‡	-0.079‡	-0.037‡
MSA fair market rent[2,3]	0.230‡	0.151‡	0.276‡	0.223‡	0.306‡	0.241‡	0.266‡	0.278‡
MSA unemployment rate[2]	-0.006	-0.002	0.020‡	0.032‡	0.045‡	0.048‡	0.037‡	0.049‡
Industry concentration								
Herfindahl index	-0.152	-0.200	0.419‡	0.772‡	0.306‡	0.458‡	0.126†	0.753‡
Secondary market factors								
Percentage of loans sold	-0.094‡	-0.086‡	-0.015†	-0.015†	n.a.	n.a.	n.a.	n.a.
Portfolio lender only	0.013‡	0.007	0.011†	-0.007	n.a.	n.a.	n.a.	n.a.
Other firm/market characteristics								
Percentage of loans refinanced	-0.023‡	-0.000	-0.009	0.035‡	0.140‡	0.165‡	0.098‡	0.071‡
MSA size (square miles)[2]	0.044‡	0.038‡	0.038‡	0.026‡	0.008‡	0.013‡	0.008‡	0.011‡
Year dummies[4]								
1993 (or 1997)	-0.042‡	-0.010†	-0.048‡	-0.007	-0.134‡	0.013‡	-0.095‡	-0.016‡
1994 (or 1998)	-0.016‡	-0.016‡	-0.020‡	-0.029‡	-0.054‡	-0.038‡	-0.030‡	-0.046‡
1995 (or omitted)	-0.007	n.a.	0.003	n.a	-0.016‡	n.a.	0.002	n.a.
							‡	
No. of MSA-lender combinations	16,199	13,969	12,660	10,184	17,779	14,549	13,121	12,690
Adjusted R-square	0.084	0.070	0.082	0.078	0.223	0.166	0.161	0.154

1. Parameter estimates designated with a ‡ (†) are statistically significant at the 99% (95%) level of confidence.
2. These variables are included in the regression as natural logarithms.
3. MSA rent is HUD's Fair Market Rent series. It is the 45th percentile for the years 1993 and 1994, and is the 40th percentile for 1995-1999.
4. The year dummies given outside (in) parentheses are used in the first (second) period models. 1996 and 1999 are the excluded categories.

We estimate these models using Ordinary Least Squares (OLS), where the dependent variables are the fraction of each lending organization's MSA originations made to low- and moderate-income families and the fraction to families living in underserved areas.[24] As before, we limit the analysis to conventional, conforming mortgages for the purchase (or refinance) of owner-occupied, single-family properties. The explanatory variables in these regressions include a broad array of firm- and market-related characteristics. The means of the independent variables are presented in Figure 6.

Economies of Scale

With respect to affordable lending shares at the organization level, the data show fairly clear diseconomies of scale. Smaller organizations and firms that operate in only a single MSA generally extend a larger fraction of their mortgages to the affordable segment than other lenders. On the other hand, among large depositories we find some evidence of an offsetting positive relationship between origination volume and affordable shares.

We focus on three measures of lending volume with which we test for the presence of economies of scale in affordable lending: The number of originations by each lending organization within their MSA (MSA originations) and the number of originations by the lender as a whole outside the lending organization's MSA (outside-MSA originations).[25] A large number of banks and savings institutions have operations in only a single MSA.[26] To account for this feature of the data, a dummy variable identifying such lenders is included in the depository regression models only. It takes a value of one if the lender has operations in only one MSA, zero otherwise.

The strongest trend apparent in these results is the large, positive effect of having mortgage operations in only a single MSA. Depositories operating on this scale do notably more affordable lending—on the order of 2 to 6 percentage points more—than otherwise similar depositories operating in multiple MSAs. Such a result strongly suggests that local knowledge and

[24] We present and discuss unweighted regression results here. Weighting the regressions by originations by the lending organization does not alter our qualitative conclusions.

[25] For example, if an organization makes 500 mortgages within their MSA, and the lender that the organization is a part of makes 1,500 mortgages across all MSAs, outside-MSA originations equals 1,000 (1,500-500).

[26] Depending on the year, between 15 and 40 percent of banks and savings institutions have operations (consisting of at least 20 originations annually) in only one MSA. The corresponding figures for mortgage banks are typically well under 5 percent.

community ties stemming from a narrow geographic focus are key to originating a large fraction of both low- or moderate-income and underserved areas loans.

Among depositories, the other measures of economies of scale indicate that affordable shares decline with origination volume up to a point, and then either level off or increase with origination volume. Among both commercial banks and savings institutions, affordable shares generally decline modestly with MSA originations.[27] For example, a lending organization that originates 200 mortgages within their MSA (about the average for MSA originations) has about 0.5 percentage points lower low- or moderate-income shares than an otherwise similar organization that originates 100 mortgages within their MSA. At the same time, depositories' affordable shares appear to rise with outside-MSA originations. In the earlier period, the offsetting effect of outside-MSA originations is sufficiently large that very large depositories may have higher affordable shares than single-MSA lenders. This offset is substantially smaller in the more recent period.

Among both independent mortgage banks and mortgage bank subsidiaries of depositories, the relationship between affordable shares and origination volume is generally negative. While the coefficient on MSA originations in the low- or moderate-income share regressions is positive, because mortgage companies' outside-MSA originations are generally much larger than their MSA originations (Figure 6), the positive relationship will usually be swamped by the negative effect of outside-MSA originations.

Overall, the data show that larger lending organizations generally devote a smaller fraction of their business to the affordable segment. Among depositories, the scale of operations within a particular MSA is most important. Among mortgage banks, the scale of operations across multiple MSAs is most important. This difference is partly the result of differences in the organizational structure of each lender type, with mortgage banks much more likely than depositories to operate in many MSAs.

Market Concentration and Competition

The question of whether there are economies of scale in affordable lending feeds naturally into a discussion of the effects of industry concentration on affordable lending shares.

Concentration is measured by a Herfindahl index, which is the market share of each lending organization, squared and summed for all organizations lending within each MSA.[28] Such measures are typically viewed as gauges of the intensity of competition within a market. In this view, higher values of the index imply more concentration and less competition. Somewhat surprisingly, the level of concentration within an MSA declined between 1993 and 1999 (Figure 6).[29] On average, during 1993–96, individual lending organizations controlled a larger fraction of MSA originations than after 1996.

The effects of market concentration were mixed: higher levels of concentration were generally positively related to affordable shares for savings institutions and mortgage banks. If the Herfindahl index measures the level of competition in an MSA, the positive relationship implies that less competition is generally associated with more affordable lending. While this result contradicts expectations, these relationships could reflect the impacts of increased affordable lending scrutiny by regulators as a result of past consolidation. Recall that CRA ratings are an important factor in regulator approvals of bank mergers and acquisitions. In markets where a substantial amount of consolidation occurred, Herfindahl values should be higher and affordable lending may also be higher as a result of CRA considerations.

Alternatively, these findings are also consistent with commercial banks increasingly relying on their mortgage bank subsidiaries to originate mortgages in the affordable segment, particularly in more concentrated markets. The results reported in the figure are consistent with both these interpretations, but are not conclusive.

Local Economic Conditions and the Price of Housing

The state of the local economy and the price of housing are of particular interest in any examination of affordable mortgage lending. Borrowers in this segment tend to have limited financial resources and may be less able to meet their credit obligations in the event of an unexpected decline in income, such as would occur if the borrower were to become unemployed.

---

[27] MSA and outside-MSA origination volumes enter the model as logs. By construction these variables have a diminishing absolute effect on affordable shares. Using dummy variable groupings for the number of MSA and outside-MSA originations does not alter the main inferences from Figure 14.

[28] Market share is defined as the ratio of each lending organization's number of MSA originations to the total number of MSA originations for all lending organizations within an MSA. The Herfindahl index varies from zero to one, with the latter signifying that there is only one lending organization in the MSA.

As a consequence of such risks, one might expect affordable lending to be positively associated with measures of local economic health and inversely related to the costs of homeownership.

As it turns out, however, the relationship between local economic conditions—measured by the unemployment rate and the median MSA family income—and average affordable lending shares across lending organizations is more complicated than that. On one hand, average lending shares to low- and moderate-income families exhibit a strong procyclical pattern: low-mod shares are high in low unemployment MSAs and high median-income MSAs.[30] On the other hand, lending shares to underserved areas are generally counter-cyclical. These patterns hold in both the 1993–96 and the 1997–99 periods

At first blush, these countervailing trends are a bit puzzling. If the financial well being of borrowers in the affordable segment is more sensitive to economic conditions, procyclical low-mod shares are unsurprising. But clearly something very unusual is happening in underserved area lending. Though puzzling, these patterns may simply be artifacts of the definitions of low-mod borrowers and underserved areas, coupled with the CRA obligations of banks and the GSEs' affordable housing goals. By construction, exactly 50 percent of families in an MSA are low- or moderate-income because the definition of such borrowers is based on median MSA income. On the other hand, underserved area designations under both the GSEs' affordable housing goals and the CRA are based on median tract family income in 1990 relative to median family income for the MSA in 1990.[31] As noted earlier, high unemployment rate MSAs tend to have the largest fractions of their population living in tracts designated as underserved.[32] Thus, MSAs that exhibit persistently high unemployment or low median family incomes during the 1990s appear to simply be rich in borrowers living in underserved tracts. We might, therefore, expect high volumes of underserved area lending in MSAs with persistently high unemployment or low median family incomes. We infer from this supplemental evidence that the counter-cyclical relationship between the unemployment rate, MSA median family income, and

---

[29] Declining Herfindahl values over time appear to be a consequence of our grouping the data by MSA-lender combinations. Ungrouped, the data show a clear increase in Herfindahl values over time, indicating that the national concentration of originations increased between 1993 and 1999.

[30] The same procyclical pattern for low- and moderate-income shares was reported in *The Impact of Economic Conditions on the Size and the Composition of the Affordable Housing Market*, April 5, 2000, PricewaterhouseCoopers.

[31] This definition applies to the CRA. For the GSE housing goals, middle-income tracts with high minority concentrations also qualify as underserved.

[32] Census tracts are generally intended to be homogeneous, about equal-population geographic areas. In practice there is considerable variation in population size and income variation within tracts. Changes over time in the affluence and number of families living in particular tracts exacerbate this problem.

underserved area lending shares is probably more an artifact of definitional factors. It seems to us that in the event of an economic downturn, the aggregate share of underserved area lending would not rise.

The price of housing almost certainly affects homeownership and mortgage originations in the affordable segment. We use two housing cost measures to control for local price effects: The MSA FHA loan limit proxies for the local price of homeownership and HUD's MSA rent series proxies for the cost of renting.[33] Not surprisingly, FHA loan limits and affordable shares are inversely related. In high house-price areas, both low- or moderate-income and underserved area shares are lower than in more modestly priced areas. Local rent has opposing effects on low- or moderate-income shares and underserved area shares, respectively. However, the relative cost of homeownership (not shown), defined as the ratio of the annual payment associated with a loan at the FHA loan limit to annual local rent, is generally negatively related to affordable shares.[34] Consistent with expectations, the more expensive it is to own compared to renting, the lower are both low- or moderate-income shares and underserved area shares.

The Role of Secondary Market Loan Sales

Because a large fraction of mortgages are sold on the secondary market after origination, and because the largest purchasers of prime market originations—Freddie Mac and Fannie Mae—are subject to affordable mortgage purchase regulations, it is important to examine whether the fraction of originations sold by an organization has any effect on affordable lending.[35]

It is difficult to assess the effects of mortgage sales among mortgage banks because they typically sell almost all the mortgages they originate. That is, there is very little meaningful variation in the fraction of mortgages sold by mortgage banks with which to assess the effects of sales on affordable lending. We therefore examine the effects of mortgage sales on the affordable shares of depositories only.

---

[33] Median house price data for all MSAs for the period under study are not publicly available. Although it is not the median local price of single-family dwellings, the MSA FHA loan limit is widely regarded as approximating the middle of the distribution of the price of single-family dwellings in an MSA.

[34] The annual payment is simply the payment associated with a 30-year fixed rate loan at the loan limit, with monthly payments and a 7 percent interest rate.

[35] The explanatory variable is the fraction of loans sold, regardless of the purchaser. The purchaser could be a depository, a GSE, or another financial services firm such as an insurance company or pension fund. We do not distinguish among purchasers because many loans, particularly those to borrowers in the affordable segment, are sold to loan wholesalers or other third parties before they are purchased by depositories or GSEs. As a consequence, the purchaser field does not measure which institution

In general, the fraction of mortgages sold has a negative effect on affordable lending by depositories. The larger the fraction of originations sold, the lower the depositories' low- or moderate-income and underserved area shares. This relationship holds across both the 1993-96 and 1997–99 periods, but is notably weaker in the second period. A large fraction of depositories sell very little or none of their originations to secondary market participants. The model includes a dummy variable to identify those "portfolio lenders" who sell none of their loans. The declining parameter value on this variable indicates that although portfolio lenders had higher affordable lending shares than other lenders during the 1993–96 period, they had about the same or lower affordable lending shares than others during the 1997–99 period. Coupled with the declining negative effect of loan sales, this pattern suggests that the secondary market for affordable loans changed in an important way over the course of the 1990s.

There are at least two plausible explanations for these patterns. First, they could have resulted from technological innovations in the mortgage market along with robust economic growth over the latter half of the 1990s, both of which may have enhanced the ability of secondary market participants to purchase mortgages originated in the affordable segment. Lower-income families have enjoyed robust income growth in recent years, and a larger fraction of lower-income families may have qualified for a prime mortgage than earlier in the decade. At the same time, the introduction of automated underwriting has allowed lenders and secondary market participants to identify lower-risk prime market borrowers in the affordable segment. Both of these developments should have enhanced the ability of the GSEs and others to purchase prime affordable loans.[36]

The smaller negative effects of loan sales in the second period may also have resulted from regulatory developments. The level of affordable mortgage purchases required by HUD rose over the course of the 1990s, which may have led the GSEs to provide more liquidity to the affordable segment. Indeed, the definition of affordable mortgage used here first took effect in 1996 and the affordable housing goal levels were higher during the 1997–99 period than during the earlier period. Along with the other mortgage market developments discussed above, the

---

ultimately ends up with the loan. Notwithstanding this measurement error, distinguishing among purchaser types in the regressions does not alter the pattern of results discussed here.

[36] Among others, Mark Zandi and Brian Nottage have argued that income gains by lower-income families, along with improved underwriting systems and risk-based pricing have enabled borrowers who previously would have qualified only for an FHA or VA loan to qualify for a prime conventional loan. Mark M. Zandi and Brian Nottage, "The Outlook for Mortgage Credit Quality," *Regional Financial Review*, vol. 11, no. 10 (October 2000), pp. 21-27.

declining negative effect of loan sales and the reversal of the "portfolio lender" effect are consistent with the conclusion that these regulatory changes have contributed to the declining negative effect of loan sales on affordable shares.

Cultural Affinity

It has often been argued that discrimination partly explains why minority families tend to have higher mortgage denial rates and lower rates of homeownership than nonminority families.[37] If discrimination is widespread, then one should expect lending organizations owned and operated by minorities to extend a larger fraction of their mortgages to minorities than other lenders. Indeed, this may be the case even in the absence of discrimination if minority-owned firms engage in community outreach targeting minorities and other traditionally underserved borrowers to a greater extent than other lenders. Moreover, because minority families comprise a disproportionate fraction of lower-income families and those living in underserved areas, one expects such organizations to have higher affordable shares as defined by HUD.[38]

To test this hypothesis, we included in the regression an indicator for whether each firm was minority- or women-owned or managed. Before turning to the results, it is important to keep in mind that only a small fraction of lending organizations are owned by minorities or women. Thus, while the results reported here are statistically significant, they may be decidedly less robust to alternative specifications than the other results discussed in this paper. Cultural affinity was only available for the years 1997–99, and was included in the second period's model only.

The data generally support the conclusion that minority- and women-owned lenders extend a higher fraction of originations to families living in underserved areas, the exception being independent mortgage banks. However, the evidence is more mixed with respect to low- and moderate-income lending: Being a minority- or women-owned lender raises low- and moderate-income shares only among savings institutions and mortgage banking subsidiaries of depositories. The effects of cultural affinity are quite large. Affordable shares are 4 to 17 percentage points higher among minority- or women-owned organizations compared to other lenders.

---

[37] See Munnell, Alicia H., Geoffrey M.B. Tootell, Lynn E. Browne, and James McEneaney, "Mortgage Lending in Boston: Interpreting HMDA Data," *American Economic Review*, 86: 25-53 (1996).
[38] See William C. Hunter and Mary Beth Walker, "The Cultural Affinity Hypothesis and Mortgage Lending Decisions," Chicago Federal Reserve Bank WP-95-8.

VIII. Summary and Conclusions

As part of the ongoing consolidation in the financial services industry, the 1993 to 1999 period saw a migration of prime mortgage originations out of independent mortgage banks and savings institutions and into the non-bank subsidiaries and affiliates of depositories. This trend raises several concerns about the provision of prime mortgage credit to lower-income and traditionally underserved families: Has the increased size of financial institutions adversely affected the provision of affordable, prime mortgages? What have been the competitive effects of increased market concentration on such lending? What is the role of local economic conditions? Do minority-owned financial institutions provide a disproportionately larger share of affordable lending than other institutions? The extensive regulatory efforts aimed at ensuring an adequate supply of prime mortgage credit to the affordable segment of this market, and the efforts of depositories, secondary market participants, and others make these questions particularly important.

In the aggregate, there was no decline in affordable prime mortgage lending measured as a fraction of total prime-market originations over the 1993-1999 period. We do find that larger organizations tend to do less affordable lending. While an adverse effect on total affordable lending has not been apparent to date, the trend toward originations among mortgage bank subsidiaries of depositories and away from savings institutions raises the concern that consolidation has the potential to reduce overall affordable lending in the future.

With respect to market concentration, we find that at the MSA-level concentration actually declined between 1993 and 1999. The fraction of total origination volume controlled by a single lending organization was on average smaller later in the period than earlier. More concentrated markets saw more affordable lending by savings institutions and both types of mortgage banks. Affordable lending among commercial banks was unaffected by market concentration. It is difficult to draw firm conclusions from these patterns, but it is consistent with increased reliance by banks on originations by their mortgage bank subsidiaries, particularly for affordable originations, in more concentrated markets. It is also consistent with increased regulator scrutiny of affordable lending patterns stemming from merger and acquisition activities.

The relationship between local economic conditions – measured by the unemployment rate and the median MSA family income – and average affordable lending shares across lending organizations turned out to be quite complicated. On one hand, average lending shares to low-and moderate-income families exhibit a strong pro-cyclical pattern: low- and moderate-income shares are high in low unemployment MSAs and high median-income MSAs. On the other hand, lending shares to underserved areas are generally counter-cyclical. These patterns hold in both the 1993-96 and the 1997-99 periods.

Though puzzling, the data suggest that low- and moderate-income lending is probably pro-cyclical in the traditional sense. One can reasonably expect less of it in the event of a local or national economic slowdown. With respect to the counter-cyclical underserved area lending, we infer that this result is less a traditional business cycle effect and more an artifact of the static definition of underserved areas—based on the 1990 census. The pattern may also result from unobserved characteristics unique to high unemployment rate MSAs. We conclude from this and supplementary evidence that the level of underserved area lending and the fraction of originations that qualify as underserved are less sensitive than overall lending to local economic conditions, but would probably not rise in a downturn.

As for the cultural affinity hypothesis, we do generally find a positive relationship between affordable lending and minority ownership. However, the small number of minority-owned institutions in our data suggests caution in interpreting this finding.

The overall set of results reported here provides important insights in to the structure of the affordable prime mortgage market. Many of the issues addressed and the trends identified and discussed in the paper are worthy of further study. Further research should attempt to reach more definitive conclusions about the presence of economies of scale, the impacts of consolidation, and the role of local economic conditions. We hope that this paper, by addressing these and related questions, will serve as a roadmap for those future efforts.

References

Avery, Robert B., Raphael W. Bostic, Paul S. Calem and Glenn B. Canner. 1999."Trends in Home Purchase Lending: Consolidation and the Community Reinvestment Act", *Federal Reserve Bulletin*, February.

Canner, Glenn, Elizabeth Laderman, and Wayne Passmore. 1999. "The Role of Specialized Lenders in Extending Mortgages to Lower-Income and Minority Home Buyers", *Federal Reserve Bulletin*, November (volume 85, number 11), pp. 709-31.

Federal Financial Institutions Examination Council. 2000. "1999 Home Mortgage Disclosure Act" Press Release, August 8.

Garwood, Griffith L. and Dolores S. Smith. 1993. "The Community Reinvestment Act: Evolution and Current Issues", *Federal Reserve Bulletin*, April, pp. 251-267.

Hunter, William C. and Mary Beth Walker. 1995. "The Cultural Affinity Hypothesis and Mortgage Lending Decisions," Chicago Federal Reserve Bank working paper WP-95-8.

Litan, R., N. Retsinas, E. Belsky, and S. White Haag. 2000. "The Community Reinvestment Act After Financial Modernization: A Baseline Report," U. S. Department of the Treasury, April.

Munnell, Alicia H., Geoffrey M.B. Tootell, Lynn E. Browne, and James McEneaney. 1996. "Mortgage Lending in Boston: Interpreting HMDA Data," *American Economic Review*, 86: 25-53.

Pricewaterhouse Coopers. 2000. *The Impact of Economic Conditions on the Size and the Composition of the Affordable Housing Market*, April 5.

U.S. Department of Housing and Urban Development. 1995. *The Secretary of HUD's Regulation of the Federal National Mortgage Association (Fannie Mae) and the Federal Home Loan Mortgage Corporation (Freddie Mac)*, Final Rule, Federal Register (60), December 1.

U.S. Department of Housing and Urban Development. 2000. *HUD's Regulation of the Federal National Mortgage Association (Fannie Mae) and the Federal Home Loan Mortgage Corporation (Freddie Mac)*; Final Rule, Federal Register (65), October 31.

Zandi, Mark M. and Brian Nottage. 2000. "The Outlook for Mortgage Credit Quality," *Regional Financial Review*, vol. 11, no. 10 (October), pp. 21-27.