



The downs and ups of FHA lending: The government mortgage roller coaster ride [☆]



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ABSTRACT

Throughout the last decade, mortgage markets experienced both a considerable decline and a considerable increase in the share served by the FHA. Concerns have grown about the solvency of the program and about the access to credit of the borrowers served by the FHA market. These concerns are due, at least in part, to the evolving distribution of loans in the FHA portfolio and uncertainty about future patterns of lending. This paper attempts to explain FHA lending patterns over the past decade, particularly the dramatic downs and ups of FHA lending. We pay particular attention to the drivers of these changes, and the implications of these changes for FHA lending, mortgage markets, and associated public policy initiatives.

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1. Introduction

Throughout the last decade, mortgage markets experienced first a considerable decline in the Federal Housing Administration (“FHA”) market share and then a considerable increase in the FHA market share. This government-insured share of the mortgage market traditionally met the needs of particular subpopulations of borrowers that might not have been as well served by conventional, conforming markets. For example, FHA has offered low down

payments, low closing costs, and, during some periods, easier credit qualification standards than other lenders serving borrowers in the conventional market. This meant that income or wealth constrained minorities and first time homebuyers found the FHA product appealing. As stated in the 2012 FHA Mutual Mortgage Insurance Fund (“MMI Fund”) Summary,

The FHA program is, and has been, a critical player in supporting homeownership, especially for minority and low-income populations, and for first-time homebuyers. A variety of FHA programs allows many homebuyers to find a program to suit their needs; MMI Fund’s 203(b) is the largest FHA program, providing mortgage insurance for 400,000 to 1 million homebuyers a year for the past several years and over 1.6 million in fiscal year 2010. An important target group for increasing homeownership is first-time homebuyers. FHA loans are highly attractive to borrowers who are credit-worthy but have difficulty assembling a large down payment or securing conventional financing.

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FHA insurance has played a key role in mitigating the effect of economic downturns on the real estate sector, as FHA does not withdraw from local markets or during periods of recession.¹

While FHA market share has grown rapidly, concerns about the program have also grown. A major issue has been the continued solvency of the FHA program. Widespread public concerns were documented in *Inside FHA Lending*, September 14, 2012, “As of November 2011, the FHA’s capital reserve fund for unexpected losses was estimated at 0.24 percent – far short of the 2.0 percent cushion required by law. The MMI Fund is not projected to meet its statutory minimum requirement until 2015.” By November 2012, when the annual report to Congress on the MMI fund was released, Secretary Donovan noted that “as the findings of the new independent actuarial study remind us, the job of re-stabilizing our national housing market is not finished. According to those findings, the capital reserve ratio of the MMI Fund, which contains FHA’s single family mortgage insurance programs, has fallen below zero, to *negative* 1.44 percent. Loans insured prior to 2010 continue to be the prime source of stress on the Fund, with fully \$70 billion in future claim payments attributable to the 2007–2009 books of business alone.”²

The House of Representatives approved the FHA Fiscal Emergency Solvency Act of 2012 (H.R. 4264) to help insure that the FHA remains solvent and does not require a taxpayer bailout.³ On September 27, 2013, FHA requested a mandatory appropriation of about \$1.7 billion to cover expected future losses as mandated by the Federal Credit Reform Act of 1990.⁴

Simultaneous concerns have grown about the expected or unexpected losses to the program and about the access to credit of the borrowers served by the FHA market. Several previous studies have detailed the tightening in underwriting standards in the wake of the subprime market collapse. To understand the current importance of the FHA segment of the market, as well as to understand which borrowers might be impacted by changes to FHA standards or curtailment of FHA programs, we provide here a micro level discussion of the changing tract shares of FHA over the past decade. Our focus in this paper is to explain FHA lending patterns, particularly the dramatic decrease and then increase in FHA share. We pay specific attention to the drivers of these changes, and the implications of these changes for FHA lending, the mortgage market, and associated public policy initiatives.

An important result of the changes in FHA lending patterns over the past decade has been a reduction in the

tract-level concentration of FHA lending such that FHA lending is now more prevalent over a greater number of tracts. In particular, it was in the (formerly) high FHA share tracts that FHA lending declined the most from 2000 through 2006. In contrast, the increase in FHA lending volume in the last few years has been far more dispersed across the country. As a result, FHA lending is now a more broadly integrated part of the overall mortgage lending market.

Furthermore, mortgages with higher loan-to-value (“LTV”) ratios and borrowers from lower-income and minority census tracts disproportionately gained FHA share over the decade. In part, this was driven by the lower cost of FHA insurance relative to private mortgage insurance. It was also driven, however, by the much tighter credit requirements of the conventional market. In this regard, the growth in FHA share is clearly counter-cyclical.

This provides an interesting lesson for Congress and policy makers as they consider how to craft the housing market for the future. Clearly FHA’s increased market share helped to stabilize mortgage origination volumes, by providing an alternative loan product to replace the subprime sector originations characterized by more relaxed underwriting standards. Policy makers may be concerned about the high concentration of FHA lending in high (above 80 percent) LTV lending, but there is no doubt that the rising share of FHA lending allowed increased access to credit at a critical time, relative to what would have been available in the absence of FHA lending.

The public policy question often raised with respect to FHA concerns the tradeoff between the provision of mortgages through a fully insured government product with its attendant risks and costs and the increase in homeownership that may result from this market segment when borrowers are constrained from getting mortgages from the private mortgage markets. Historically, there were clear goals and targeting of particularly underserved segments of the population that were served by FHA. It is unclear whether those goals and targeting will persist in the next decade.

The remainder of the paper is organized as follows. Section II discusses the roles of the federal government and FHA in housing finance. Section III summarizes previous research focused on FHA lending and Section 4 presents the data used in our analyses. The empirical results are found in Section 5 with conclusions in Section 6.

2. Historical perspective

The structure of the current mortgage market stems historically from important changes that occurred during the Great Depression and in the years directly following that era. A concerted effort was made by the federal government to provide liquidity and stability to housing markets, following a slowdown in housing construction and widespread housing foreclosures. Some of the housing market conditions present during the Great Depression mirror those observed over the past few years.

In 1932, the Federal Home Loan Bank System was established to provide liquidity to housing markets. The

¹ http://portal.hud.gov/hudportal/documents/huddoc?id=FHA_Fund_MMI_Fund_2_2012.pdf, last accessed November 30, 2013, at B-4.

² <http://portal.hud.gov/hudportal/HUD?src=/fhammifprt>, last accessed November 30, 2013.

³ <http://financialservices.house.gov/uploadedfiles/hrpt-112-hr4264.pdf>, last accessed November 30, 2013.

⁴ Washington Post, “FHA Needs \$1.7 Billion Taxpayer Subsidy,” September 27, 2013 available at http://articles.washingtonpost.com/2013-09-27/business/42443524_1_fha-commissioner-carol-galante-housing-market-loans, last accessed November 30, 2013. Higher than expected losses were attributed to the Home Equity Conversion Mortgage (“HECM”) program and not to the 203(b) program.

Federal Deposit Insurance System was established in 1933 to insure the funds consumers were willing to deposit in financial institutions. In 1934, the Federal Housing Administration (“FHA”) was created, reflecting the importance the federal government placed on housing. In 1938, the first of the government-sponsored entities (“GSEs”), the Federal National Mortgage Association (“FNMA”), was created specifically to provide additional liquidity to the residential mortgage market. The federal government became further involved in mortgage markets when, in 1944, the Veteran’s Administration (“VA”) loan program was created as part of the Veteran’s Bill of Rights following the end of World War II. Clearly, historically, the federal government was interested in taking a very proactive role in the establishment and success of housing markets. Many of the institutional structures in housing finance followed from the clear need for change given the economic conditions experienced during the Great Depression (Quigley, 2006). That same desire to be proactive is observed in the plethora of housing bills being proposed today.

The stated intent of the FHA was to regulate interest rates and standardize mortgage terms for government-insured mortgages. In the FHA program, the government works with approved lenders that originate mortgage loans, with the government assuming the credit risk of those loans through the FHA insurance program. This sharing of risk helps increase the flow of funds to mortgage markets and can help stabilize markets by providing risk sharing with private lenders.

The Department of Housing and Urban Development (“HUD”) was established in 1965 and it assumed operations and regulation of the FHA program, with the mandate that FHA remain entirely self-funded from the proceeds of the mortgage insurance premiums paid by FHA borrowers. Through the Housing Act of 1968, the Government National Mortgage Association (“Ginnie Mae”) was established to facilitate the securitization of federally insured and guaranteed mortgage loans backed by FHA and VA.⁵ Essentially, much of the government insured portfolio of FNMA was transferred to Ginnie Mae when Fannie Mae became a shareholder-owned GSE.⁶ In an attempt to provide a more competitive structure in the secondary market for residential mortgages, in 1970 Freddie Mac was chartered as another GSE, becoming shareholder-owned in 1989.

In 1992, a safety and soundness regulatory oversight structure was established for Fannie Mae and Freddie Mac through the Office of Federal Housing Enterprise Oversight (“OFHEO”). This continued until July 30, 2008, when the Federal Housing Finance Agency (“FHFA”) was established by combining OFHEO, the Federal Housing Finance Board and the GSE mission responsibilities from HUD as part of the Housing and Economic Recovery Act (“HERA”) in 2008. While Congress established statutory mission requirements on Fannie Mae and Freddie Mac to provide liquidity in the conventional, conforming mortgage

markets and serve the needs of underserved, low income, and minority borrowers, FHA was, until the introduction of FHFA in 2008, a primary avenue through which the federal government participated in mortgage lending through its insurance of the credit risk on mortgages originated by private lenders.⁷

In this paper we compare the changes in market share between the fully insured government mortgage program, FHA, to that of the conventional (non-government insured), conforming (loan sizes under government established loan limits) mortgage market. While it is true that the larger the government share, the higher the potential risk to the government of another mortgage market meltdown; it is also true that the more tightly constrained the offerings from the private market, the more the government segment is needed to provide mortgage finance to borrowers not otherwise eligible for mortgage loans, if targeting homeownership to this group of borrowers remains a public policy objective.

This fundamental tension between minimizing the ultimate costs to taxpayers of housing market outcomes while achieving public policy goals of expanded homeownership to underserved populations is not new. It was at the heart of the GSE charter imposed on Fannie Mae and Freddie Mac in the early 1990s. The anticipated role of FHA becomes even more important as the debate continues about the role of Freddie Mac and Fannie Mae.

3. Previous literature

The relationship between FHA and the mortgage market has been studied intensely. Vandell (1995) expressed earlier concerns about the risk and public policy tradeoff for FHA. He believed that FHA’s decline resulted from mixing a heavy social agenda with the basic insurance objective, a lack of control and focus on FHA by HUD, and a fundamental inherent inability of the government to respond to market signals. Even with the earlier decline in FHA, he thought there were improvements, such as an assigned risk pool, that could improve efficiency while still achieving social and public policy objectives.

Since then, mortgage markets have changed substantially. The substitution of FHA lending for prime and subprime lending after the collapse of the subprime market segment was the focus of Courchane et al. (2009). In that paper, the authors concluded that default costs could increase if the substitution from prime continued, as the prime market had tighter credit standards than FHA.

In a recent 2012 paper, Courchane and Zorn also showed that the private subprime market’s ascendancy in 2006 was associated with increasing access to credit. However, the private market exacerbated pricing differentials in 2009 with its more aggressive pricing for credit risk, while the FHA’s pre-eminence during the later years of the

⁵ See “Ginnie Mae is Meeting its Mission but Faces Challenges in a Changing Marketplace,” U.S. Government Accountability Office, Report GAO-06-9 available at <http://www.gpo.gov/fdsys/pkg/GAOREPORTS-GAO-06-9/pdf/GAOREPORTS-GAO-06-9.pdf>, last accessed November 30, 2013.

⁶ See Quigley (2006), at 294.

⁷ Government involvement in mortgage markets can be direct or indirect. Its involvement through FHA and through the GSEs is indirect, through insurance of credit risk on private mortgages. It may also involve direct involvement such as through the Rural Housing Administration program, among others.

decade mitigated this impact due to its FHA's more average-cost-based pricing approach.

There was additional evidence from several authors that changing credit standards impacted the market share of FHA. [Chomsisengphet and Pennington-Cross \(2006\)](#) observed subprime market expansion until 1998, followed by a decline in share, with increased growth again in 2003. They found expansion was most prominent in the least-risky segment of the subprime market (A-grade loans). The subprime market was also characterized by differences in the percentage of ARMs, differences in average FICO scores, and differences in LTV ratios, when compared to the prime market.⁸ [Courchane \(2007\)](#) found that 19 percent of subprime loans had LTV ratios greater than 90 percent, while only 10 percent of prime loans had LTVs that high. Nearly 67 percent of subprime loans were ARM loans, but only 30 percent of prime were ARMs. Twenty-nine percent of subprime borrowers, but only 3 percent of prime borrowers, had FICO scores less than 600. Clearly, there were some key differences in the distributions of loan characteristics that might steer borrowers from the traditional prime market, or FHA market, to subprime.

At the secondary market level, the subprime loan securitization rate grew from less than 30 percent in 1995 to over 58 percent in 2003, comparable to that of prime loans in the mid-1990s. [Nichols et al. \(2004\)](#) found that credit constrained borrowers with substantial wealth were the most likely to finance the purchase of a home by using a subprime mortgage. As a result, FHA became less important to marginal or less credit worthy borrowers, and by 2006, FHA made up less than 3 percent of all the loans originated in the U.S.

The decline in FHA's market share was, like the rise of the subprime market share, associated with several factors and has been accompanied by higher ultimate costs for certain conventional borrowers and a worsening in indicators of credit risk among FHA borrowers. FHA continued to have more product restrictions than did the conventional market and it had fewer process improvements – those factors also likely impacted its share. Until 2008, FHA mortgage loan maximums were lower than mortgage loan amounts available in the subprime market. In many high cost markets, an FHA loan afforded the buyer a modest starter home at best. The subprime jumbo loan market, with no limits on loan size, did not restrict borrowers similarly.

Another drawback for some borrowers was/is FHA's down payment requirement. Unlike many subprime mortgage programs, FHA required a 3 percent equity contribution to the deal.⁹ Subprime lenders routinely offered 100 percent LTV loans, comprised often of an 80 percent first lien loan and a 'piggyback' second for the remaining 20 percent. In response to the subprime market share growth, FHA ex-

panded product offerings and streamlined the application process and initial outlay requirements from the borrower. Under certain circumstances, borrowers going through the FHA channel were able to obtain gift funds creating zero down payment options.

Low interest rates and rising house prices further increased demand for loan products offered by the conventional market (especially subprime lenders), appealing to borrowers seeking flexible payment and interest options that allowed them to qualify for mortgages despite higher housing costs. Factors associated with the decline in FHA's market share stem from the use of innovative products (no money down, no asset or income verification ("NINA"), debt-to-income ("DTI") ratios in excess of 50 percent, negative amortization up to 125 percent of the home's value, interest only ("IO")) and use of automated underwriting tools, leading FHA to likely experience some adverse selection. Lenders offering conventional, conforming products identified and approved relatively lower-risk borrowers, leaving relatively higher-risk borrowers to search for mortgages through the FHA program.

A final, but important, difference was the channel of origination. FHA did not rely on wholesale broker firms for as much of its loan production as did the conventional market, or, specifically, the subprime market. Part of this difference was driven by costs. FHA has had, historically, more particular financial requirements for brokers writing FHA loans.¹⁰

FHA loans, like those in the conventional market, can be used for home purchase, refinance, and also for construction and rehabilitation. The most popular program – Section 203(b) – offers 15- and 30-year fixed-rate mortgages for single-family dwellings. Because the focus is helping low- and moderate-income households, similar to those obtaining loans under the GSE conforming loan limits, Congress historically has limited the size of mortgages the FHA can insure. For single-family homes, limits ranged from \$271,050 to a maximum of \$729,750 at the end of 2008, based on an area's median home prices.¹¹ FHA loans can still be made at this higher loan limit, although conventional, conforming loans in 2013 are restricted to a maximum loan amount of \$417,000 on single unit properties, except in select high cost areas where maximum loan limit can be \$625,500.

Historically, FHA offered borrowers less strict underwriting standards and lower down payment requirements, allowing homeownership possibilities for those who might not qualify in the prime market. FHA loans are insured using an upfront mortgage insurance premium ("UFMIP"), as well as a monthly mortgage insurance premium. The UFMIP is nearly always financed into the loan. The benefit of insuring with FHA rather than with a private mortgage

⁸ See Exhibit 3, [Courchane \(2007\)](#) at 415. The dataset included over one million loan-level records of originations in 2004 and 2005.

⁹ The cash downpayment requirements for FHA continue to evolve over time. For current limits, see Department of Housing and Urban Development, Mortgagee Letter 2013-14, Minimum Cash Investment and Secondary Financing Requirements, May 9, 2013, available at: http://portal.hud.gov/hudportal/HUD?src=/program_offices/housing/sfh/np/sfhdap01, last accessed November 30, 2013.

¹⁰ According to FHA's mortgage broker license requirements the only financial requirement is "Audited Financial Report: CPA issued GAAS audit less than 12 months old with net worth calculation of at least \$63,000 with a minimum of 20% liquid assets) Paragraphs 2-5, 2-6 and 3-2(A)6." See "The FHA Title II Mortgagee Approval Handbook 4060.1, Rev-2" http://portal.hud.gov/hudportal/HUD?src=/program_offices/administration/hudclips/handbooks/hsgb/4060.1, last accessed November 30, 2013.

¹¹ <https://entp.hud.gov/idapp/html/hicostlook.cfm>, last accessed November 30, 2013.

insurer depends in part on the LTV ratio on the loan and in part on the rate structure of private mortgage insurance.

Several recent studies have analyzed the changing market share of FHA. HUD produces *The U.S. Housing Market Conditions Report* and in May 2011 the publication included an analysis of the FHA share estimated by race and ethnicity from HMDA data. Based on the number of loans originated, the FHA's share of the mortgage market was 16.5 percent in the fourth quarter of 2010, with a 37.2 percent share of new mortgage loans and a 10.1 percent share of refinance loans. In its analysis of market share by race and ethnicity, it was noted that,

Historically, FHA home mortgage programs have played an important countercyclical role in the market. Prime conventional lenders and private mortgage insurers typically curtail their risk exposure in regions experiencing a recession by tightening underwriting standards to limit lending to only the most creditworthy applicants in those regions. Subprime lenders often curtail lending more severely when funding sources for higher risk loans become scarce. FHA, on the other hand, maintains its presence in all markets, providing stability and liquidity in markets experiencing recession.¹²

A recent 2011 assessment of the FHA program, by Van Order and Yezer (2011), concluded that while FHA played an important stabilization role in 2008 and 2009, FHA has diverged from its traditional focus on minorities and first time home buyers and is currently undertaking risks that it has not undertaken historically and for which its capacity may be too small. Further, they do not believe the larger loan limits help subsidize other potential losses, nor would the larger loan limits assist first-time homebuyers and minorities.¹³

Newberger (2011) conducted a study of FHA trends in lending focusing on regional differences in the FHA lending patterns. The paper considered policy implications from the FHA's limits on underwriting for low- compared to high-FICO score borrowers and on loan limits in particular geographies in the country.

Finally, others have raised serious concerns about the under estimation of the actual credit risk in the FHA mortgage pools. Gyourko (2011) predicted that future losses to the MMIF fund could be tens of billions of dollars higher than forecast. He cast doubt on the forecasts performed by Integrated Financial Engineering, Inc. ("IFE"). Gyourko concluded that adequate capital reserves were not being held against the likely losses from the increased credit risk in the FHA pools. In fact, the 2012 actuarial report issued by IFE noted that the value of the MMI fund at the end of fiscal year 2012 was negative \$13.48 billion and that, under some pessimistic forecasts, it could remain negative through 2019.¹⁴

The focus in the current paper varies from the earlier research in looking at micro level data from both FHA and conventional programs across the U.S. and correlating the

characteristics of that data to FHA shares over time and across geographies. Our goal is to distinguish between FHA lending and conventional lending patterns, in order to offer to policy makers a better understanding of whether FHA will and should remain a critical component of housing and whether its scope will be likely to expand either geographically or in terms of populations of borrowers served. Either of these expansions will have implications of the viability of the MMI fund.

4. Data

Our analyses utilize mortgage level data reported under the Home Mortgage Disclosure Act ("HMDA") for the years 2000 to 2010.¹⁵ The largest mortgage lenders are required to report HMDA data if they meet certain criteria, including asset size and scope of the lender's mortgage origination activity. HMDA coverage is estimated to include approximately 80 percent of the mortgage market each year (Avery et al., 2010b). The volume of FHA originations in HMDA over the 2000 to 2010 time period, moreover, is approximately 90 percent of the FHA endorsements reported by HUD.¹⁶

In this research, in order to ensure comparability in type of loan product between the conventional and FHA lending programs, we include loan level mortgage data for one to four-family purchase money and refinancing loans below conforming loan limits in each year. We aggregate individual mortgage transactions in each year within a Census tract. Because of the change over time in tract boundaries and the identification associated with decennial Census reporting followed for HMDA reporting, we followed a process to identify common tracts across the Census reporting structures. In some cases, this led to the creation of "super-tracts" that encompass geographical areas across reporting definitions. The advantage of this strategy is that we create a panel of data to examine shares over the time period without having to ignore any tracts because changing geographic definitions.

We merge the mortgage data at the tract level with tract level data obtained from two other data sources. We include data describing educational attainment and owner-occupancy dwelling status from the decennial Census for the year 2000. We also incorporate credit bureau information obtained from TransUnion, one of the three major credit repositories. These data include a random sample of credit profiles for 5,000,000 individuals in each year in our sample from across the United States. We aggregate this data by tract to obtain measures of the percentage of individuals in the tract that have either a bankruptcy or a delinquency of 90 days or greater.

Our analysis sample includes 41,961 tracts over the eleven year period. Table 1 summarizes some of the key statistics from our data from 2001 and 2009. The average of the median nominal loan amount from 2001 across tracts was over \$100,000, while the average of borrowers' median income across tracts was almost \$60,000. By 2009,

¹² See page 6.

¹³ To compare to conventional loan limits, see www.fhfa.gov.

¹⁴ See IFE, 2012, included cover letter from Tyler Yang to Carol Galante.

¹⁵ See Avery et al. (2010a) for a recent article describing HMDA trends.

¹⁶ Data available at http://portal.hud.gov/hudportal/HUD?src=/program_offices/housing/rmra/oe/rpts/oe/olmenu, last accessed November 30, 2013.

Table 1
Sample summary statistics from 2001 and 2009 (41,961 Tracts).

	2001		2009	
	Mean	Standard deviation	Mean	Standard deviation
HMDA median loan amount (\$000)	103.1	48.3	161.7	89.9
Minority %	27.7	29.9	28.9	29.8
HMDA median income (\$000)	58.8	20.9	72.8	41.0
% With 90+ day delinquency	9.4	5.6	8.0	4.5
% With bankruptcy	5.1	4.1	5.9	4.5
Denial rate	25.7	13.5	28.0	13.8
% With at least associate's degree	22.3	16.6	–	–
% Owner occupancy	63.7	22.8	–	–
Loan-to-value ratio	73.3	21.2	–	–

Table 2
Average sample summary statistics over time.

	2001	2002	2003	2004	2005	2006	2007	2008	2009
<i>2001 Top quintile over time</i>									
HMDA median loan amount (\$000)	91.3	96.2	101.9	113.4	124.1	134.8	145.2	145.3	134.6
Minority %	47.1	46.9	47.7	50.5	52.6	54.6	53.9	51.4	48.8
HMDA median income (\$000)	48.3	51.1	52.7	0.1	57.8	64.0	62.9	60.7	55.9
% With 90+ day delinquency	11.5	11.5	10.5	9.8	8.5	8.8	9.4	9.9	9.6
% With bankruptcy	6.3	6.4	6.6	6.7	7.0	7.0	6.7	6.4	6.7
Denial rate	29.9	27.4	27.5	30.7	31.5	32.4	37.4	39.4	32.8
<i>2009 Top quintile over time</i>									
HMDA median loan amount (\$000)	86.4	91.8	97.5	107.8	117.2	126.1	134.7	132.3	124.1
Minority %	51.2	51.2	52.5	54.7	56.7	58.6	58.0	55.8	54.0
HMDA median income (\$000)	46.7	48.8	50.7	0.1	55.4	60.5	59.6	56.9	50.9
% With 90+ day delinquency	11.9	11.8	10.7	10.0	8.7	9.0	9.6	10.1	9.8
% With Bankruptcy	6.3	6.4	6.7	6.9	7.1	7.2	7.0	6.7	7.1
Denial rate	32.7	29.7	29.9	32.6	33.9	35.1	40.4	42.8	35.9

the average of the median nominal loan amount had increased to over \$160,000, while the average of borrowers' median income across tracts reached \$73,000. This represents a significant increase in the ratio of loan amount to income, likely reflecting in part the increased loan limits available for FHA mortgages after 2008. We also note some decline in the percent with 90+ delinquency rates while the percent with bankruptcies increased. As the census information is all based on the 2000 Census, comparable values cannot be shown for 2009.

Given the change observed in FHA over time, we also present the summary statistics for those tracts which are in the top quintile by FHA share in 2001 and 2009, to note

changes in the focus of FHA coverage over time. Those results follow in Table 2. The minority percentage rate for those tracts which were in the top quintile in 2001 actually rises during the rise of subprime in 2005–2007 and then falls off by 2009. The minority percent for those tracts that reached the top quintile by 2009 had a 50 percent or higher minority share over the entire decade. With respect to delinquency rates, both the 2001 and 2009 top quintiles demonstrated improvement from 2001 to 2009, although both remain close to 10 percent with 90+ days delinquent. Denial rates have also increased both for those in the top FHA quintile in 2001 and those in the top quintile by 2009, with nearly 36 percent of loan applications denied in 2009.

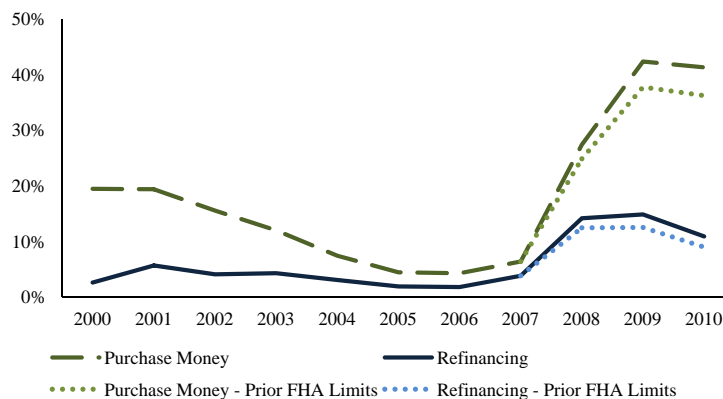


Fig. 1. FHA market shares, 2000–2010, by HMDA loan purpose.

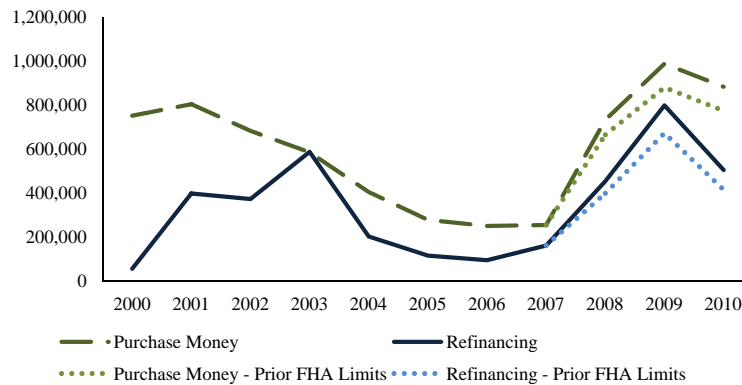


Fig. 2. FHA origination volumes, 2000–2010, by HMDA loan purpose.

5. Analyses

We present here some key observations of FHA share trends over the 2000–2010 period.

A. FHA share declined dramatically from 2000 through 2006, and then rebounded dramatically. FHA share reached its highest level of the decade in 2009.

Fig. 1 displays the proportion of purchase money, refinancing, and purchase money plus refinancing market shares of FHA lending. We provide, for purposes of comparison, the shares that would have resulted had FHA loan limits remained at the level they were at prior to ESA and HERA, and those that resulted with the increased loan limits set in 2008.¹⁷ The data represented in this graph display the roller coaster effect of FHA's lost and regained market

share after the collapse of the subprime sector. The effect is particularly prominent for purchase money loans, as refinancing lending has actually declined from near 15% in 2009 to just about 11% in 2010. Purchase money lending, at only 4% in 2006, climbed to a peak of about 42% in 2009 and remains at 41% in 2010. Had loan limits not been increased, the changes would be similar, although somewhat muted with purchase money shares at approximately 38% in 2009 and 36% in 2010. Refinance shares under the prior limits would have been at about 13% in 2009 and 9% in 2010. Expansion to the higher loan limits did enable slightly higher market shares.

Fig. 2 provides origination volumes over the 2000–2010 time period at the current and prior loan limits. Over the past decade, purchase money loans outnumbered refinancing loans for every year in the sample, with the exception of 2003 when volume for each loan purpose was approximately equivalent. Compared to the start of the decline (2001), purchase money loan volume in 2006 was just 31 percent and by 2009 the volume increased to approximately 123 percent of 2001 volume. Had loan limits not increased, the change would have been a 9 percent increase in 2009 from the 2001 level. Refinancing loan volume increased from 2000 to 2003, declined until 2006, and then expanded until a peak in 2009 with a volume in that year approximately double that of 2001 levels. The higher loan limits also resulted in higher refinancing volumes than would otherwise have been observed. Of note is the relatively low refinancing loan origination volume in 2000, where refinances made up less than eight percent of all FHA loan volume, as compared to the rest of the decade, where refinancing activity comprised approximately 30–50 percent of FHA volume.

B. The national patterns in FHA lending were primarily a result of within-tract changes in FHA shares, and not the result of shifts in total loan origination volumes between areas that were sparse or rich in FHA share.

To analyze the impact of market adjustments over time, it is important to examine not only the increased originations or decreased originations in the market as a whole but also those increases and decreases in tracts that had previously high or low FHA loan market shares. Historically, FHA originations were geographically concentrated. During the decline in FHA, reductions in

¹⁷ See Department of Housing and Urban Development ("HUD") Mortgage Letter 2008-06, March 6, 2008 which set new loan limits under the Economic Stimulus Act ("ESA") for FHA. These higher limits were intended to mitigate the effects from the economic downturn and the sharp reduction of mortgage credit availability from private sources. ESA stipulated that FHA loan limits be set temporarily at 125 percent of the median house price in each area. The FHA loan limits could not exceed 175 percent of the 2008 GSE conforming mortgage limit of \$417,000; nor be lower than 65 percent of the same 2008 GSE conforming loan limit for a residence of applicable size for any given area. Also, ESA stipulated that mortgage limits for Alaska, Guam, Hawaii, and the Virgin Islands be adjusted up to 150 percent of the national ceiling. Also see HUD Mortgage Letter 2008-36, November 6, 2008 which established new FHA loan limits in accordance with the Housing and Economic Recovery Act ("HERA") of July 2008. HERA stipulates that the national loan limit for one-unit homes in the continental United States shall be pegged to a house price index chosen by the FHFA. The national loan limit for 2009 remained at \$417,000. HERA provides that the mortgage limit for any given area shall be set at 115 percent of the median house price in that area, as determined by the HUD, except that the FHA mortgage limit in any given area cannot exceed 150 percent of the Freddie Mac national loan limit, nor be lower than 65 percent of the Freddie Mac national loan limit for a residence of applicable size. For the comparison, we used FHA loan limits before the increase from Mortgage Letter 2008-02. For one-unit buildings, the limit was \$200,160 in the lowest cost areas, up to \$362,790 in high cost areas, and allowable values varied depending on the county. We merge the limits by county in each of the years 2008–2010, and identify FHA loans that have loan amounts over these limits. Therefore, the calculations using all FHA includes all FHA loans regardless of loan amount, and estimates using just FHA loans under the "old" loan limit were those that had loan amounts less than or equal to the limit from Mortgage Letter 2008-02. The FHA loan limits before ESA and HERA are referred to as the "old" limits in Figs. 1 and 2.

overall national FHA share may theoretically reflect changes in either the geographic concentration of where mortgages were originated (e.g., a shift of originations way from historically FHA share-rich tracts) and/or local/geographic reductions in the FHA share of originations across tracts (e.g., a shift away from FHA to conventional originations within a majority of tracts). During the expansion, increases in national FHA share may be a result of increases in tract-level FHA market share and/or the movement of total (FHA and conventional) mortgage activity to areas that maintained a strong FHA market share throughout the decade.

Tables 3 and 4 provide constant share estimates for purchase money and refinance loans, respectively, for the years 2000–2010. The bolded numbers down the main diagonal represent the actual national-level FHA shares reflected in the previous exhibits, which can be calculated as a loan-weighted average of tract-level FHA shares, where i indexes the N tracts in the sample:

$$\text{National FHA Share} = \sum_{i=1}^N \text{FHA Share}_i \times w_i \quad (1)$$

FHA share for each tract i is defined as FHA lending in that tract as a proportion of overall mortgage volume in the tract. Specifically, $\text{FHA Share}_i = \frac{\text{FHA Volume}_i}{\text{Tract Volume}_i}$. Since tract volume is equal to FHA plus conventional volume, changes in FHA share can be due to changes in FHA volume, conventional loan volume, or both. The weight of the tract is the proportion of overall national lending volume made up by the lending in the tract, $w_i = \frac{\text{Tract Volume}_i}{\text{National Volume}}$. Variation in the national volume can come from either the change in the origination volume across tracts or changes in tract-level originations.

Off diagonal elements allow us to conduct a conceptual experiment to identify whether observed national trends were due to changes in where mortgages were originated (i.e., changes in the weight of the tract, w) or changing FHA share within the tract FHA Share. To assess the change, consider, for example, that the upper Midwest was FHA rich, and that region had an increasing share of total origination volume over time. All things equal, that change increased overall FHA share even though FHA origination shares within those tracts remained relatively constant. Alternatively, overall FHA share could increase because

Table 3
National FHA market share—purchase money loans.

		Holding constant tract origination volumes →											Variance
		2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	
Holding constant tract FHA shares →	2000	19.3	19.2	15.4	11.8	7.2	4.3	4.1	5.8	27.5	42.9	42.7	2.01
	2001	19.4	19.3	15.4	11.8	7.2	4.3	4.1	5.7	27.7	43.0	42.9	2.05
	2002	19.5	19.3	15.4	11.8	7.1	4.3	4.0	5.7	27.7	43.1	43.0	2.05
	2003	19.5	19.3	15.5	11.9	7.1	4.2	4.0	5.7	27.8	43.0	42.9	2.05
	2004	20.4	20.2	16.2	12.4	7.3	4.3	4.0	5.9	28.6	43.9	43.9	2.14
	2005	20.9	20.8	16.8	12.8	7.6	4.4	4.1	6.0	29.3	44.6	44.6	2.20
	2006	20.7	20.7	16.9	13.0	7.8	4.6	4.2	6.2	29.0	44.3	44.3	2.14
	2007	19.3	19.6	16.1	12.7	8.0	4.9	4.5	6.3	27.5	42.4	42.3	1.90
	2008	19.0	19.1	15.6	12.3	7.7	4.8	4.5	6.2	27.2	41.8	41.7	1.86
	2009	19.0	18.9	15.3	11.9	7.3	4.5	4.2	5.8	27.2	42.1	41.8	1.91
	2010	18.4	18.4	14.9	11.6	7.1	4.4	4.1	5.7	26.6	41.3	41.0	1.84
Variance		0.006	0.006	0.004	0.003	0.001	0.000	0.000	0.000	0.007	0.011	0.013	1.87

Notes to Tables 3 and 4: Shares in tables are in percentage points. Var (variance) is multiplied by 100. Holding constant tract origination volumes (across a row) keeps constant the share of loans in a tract relative to all mortgage originations in the country, allowing FHA shares within tracts to change over time. Holding constant FHA shares (down a column) keeps constant the share of FHA loans in a tract relative to all loans in that tract, allowing volumes across tracts to change over time. Source: HMDA data.

Table 4
National FHA market share—refinancing loans.

		Holding constant tract origination volumes →											Variance
		2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	
Holding constant tract FHA shares →	2000	2.6	5.5	4.2	4.5	3.0	2.0	2.0	4.2	15.2	20.1	14.8	0.41
	2001	2.8	5.6	4.1	4.2	2.8	1.8	1.8	3.7	13.7	17.9	13.1	0.32
	2002	2.8	5.6	4.0	4.1	2.7	1.7	1.7	3.5	13.0	17.1	12.5	0.29
	2003	2.9	5.9	4.2	4.2	2.7	1.8	1.7	3.4	12.9	17.1	12.5	0.28
	2004	3.3	6.9	5.0	4.9	3.0	1.9	1.8	3.7	14.0	19.8	14.4	0.37
	2005	3.5	7.4	5.4	5.3	3.2	1.9	1.8	3.7	14.7	20.8	15.1	0.41
	2006	3.4	7.4	5.4	5.3	3.2	1.8	1.8	3.7	14.8	20.9	15.2	0.42
	2007	3.2	6.8	5.1	5.1	3.2	1.9	1.8	3.8	14.6	19.9	14.6	0.38
	2008	2.6	5.7	4.3	4.6	3.0	2.0	1.9	3.8	14.1	17.6	13.2	0.31
	2009	2.4	4.9	3.6	3.8	2.6	1.7	1.7	3.4	12.4	14.8	11.2	0.22
	2010	2.4	4.7	3.4	3.6	2.5	1.7	1.6	3.2	11.8	14.3	10.8	0.21
Variance		0.002	0.009	0.005	0.004	0.001	0.000	0.000	0.001	0.012	0.054	0.023	0.23

the FHA origination shares within tracts increased FHA Share, even in the face of relatively little change in overall origination shares across tracts (changes in w_i).

To account for this complexity we index the year used for FHA share, y , and the year used for tract weight, t . This yields:

$$\text{National FHA Share}_{yt} = \sum_{i=1}^N \text{FHA Share}_{iy} \times w_{it} \quad (2)$$

Moving down a column in Tables 3 or 4 holds constant the FHA share of originations within each tract (the FHA Share_i , but varies the overall share of loans originated by each tract (the w_i). This allows us to assess whether overall changes in the location of loan originations tended to favor or disfavor national FHA share.

For example, consider the first column in Table 2 for the year 2000. The first entry in this column, 19.3%, is the (actual) national share of FHA lending in the year 2000 for purchase money loans. Moving down this column keeps constant the year 2000 FHA share, but varies the weights in each year (e.g., the second row in this column, 19.4%, is calculated as $\text{National FHA Share}_{2000,2001} = \sum_{i=1}^N \text{FHA Share}_{i,2000} \times w_{i,2001}$).

Alternatively, moving across a row holds constant the overall share of the national volume of loans originated by each tract, but varies the FHA share of originations within each tract. That is, it allows us to assess whether overall changes in the share of FHA loans originated in each tract tended to favor or disfavor national FHA share. For example, moving across the first row in the table keeps constant the year 2000 tract weight (the contribution of the tract to national volume), but varies the FHA share within the tract by the observed values in each year (e.g., the second value in this row, 19.2%, is $\text{National FHA Share}_{2001,2000} = \sum_{i=1}^N \text{FHA Share}_{i,2001} \times w_{i,2000}$).

For both purchase money and refinancing loans, we find evidence that the variance in national FHA share is driven almost entirely by variation in within tract-level market shares of FHA lending, and not by geographic redistribution of total mortgage market origination volumes across tracts. When within tract FHA shares are held constant (moving down columns in Tables 3 and 4), we observe rel-

atively little change in simulated national FHA share. When weights are held constant (moving across rows in Tables 3 and 4) there is much more variation. This is also reflected in the last rows and columns of Tables 3 and 4 that include the variance of the numbers in the rows and columns, with the far right bottom cell calculated as the variance of the actual values found in the main diagonal. Row variances are much higher than column variances.

These findings do not suggest that there were no geographical changes in FHA lending patterns. In fact, we present evidence in subsequent sections that the geographic footprint of FHA lending has changed substantially over the time period. Rather, our conceptual experiment demonstrates that the observed geographical changes were largely a result of within tract changes in the market shares of FHA and conventional lending, not simply a redistribution of overall mortgage volume across tracts. More volume did not shift to historically rich FHA areas. Instead, FHA shares within tracts increased. Thus, the geographic distribution of FHA originations at the end of the decade was different than that observed at the beginning.

C. The time series of FHA shares varied considerably across tracts. The post-2006 growth in FHA shares was dramatic for mid-tier FHA-share tracts, with the result that there was a high concentration of high FHA-share tracts by the end of the decade.

We have demonstrated that changes in the within-tract composition of conventional and FHA market share drove observed national FHA patterns. We next show how the time series of FHA shares varied for tracts with different FHA shares at the beginning of the decade.

We illustrate the different trends of tracts with varying levels of FHA shares at the beginning of our time period in Tables 3 through 6. In Figs. 3 and 5 we focus on the variance in the share of total FHA originations across tracts. Specifically, we plot the share of total FHA volume by tract quintiles, ranked by the share of FHA volume in 2000 separately for purchase money and refinancing loans. The quintile shares sum to total FHA volume (i.e., 100%) in each year. In Figs. 4 and 6 we focus on the variance in the FHA share of total originations across tracts. Specifically, we plot the FHA share of total origination volume by quintile, but now the quintiles are based on the distribution of FHA

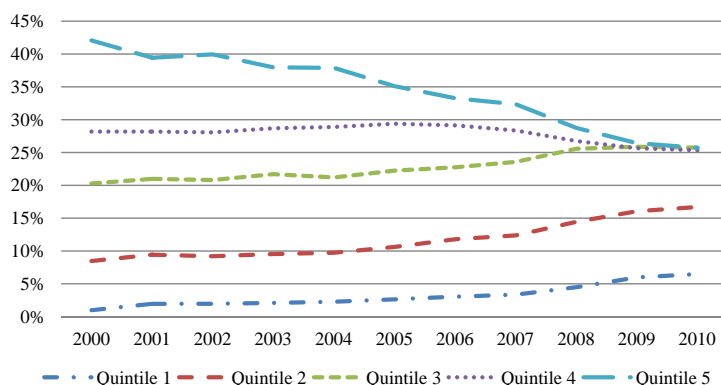


Fig. 3. Share of FHA volume, by quintile of 2000 share of FHA volume, purchase money loans, 2000–2010.

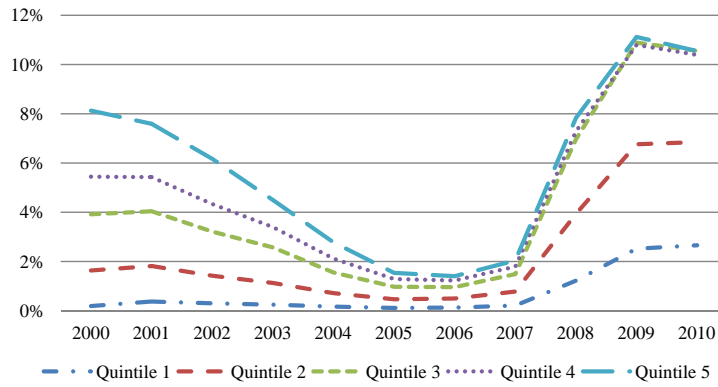


Fig. 4. FHA share of overall volume, by quintiles of FHA volumes in 2000, purchase money loans, 2000–2010.

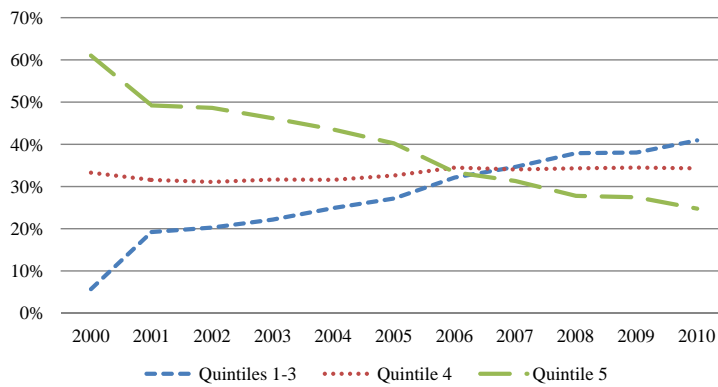


Fig. 5. Share of FHA volume, by quintiles of FHA volumes in 2000, refinancing loans, 2000–2010.

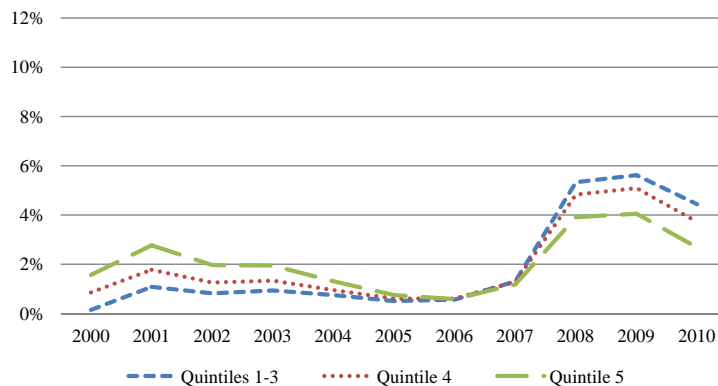


Fig. 6. FHA share of overall volume, by quintile of 2000 share of FHA volume, refinancing loans, 2000–2010.

shares of total originations, ranked by the FHA share of total volume in 2000 separately for purchase money and refinancing loans. The quintile shares sum to the FHA share of total originations in each year.

As displayed in Fig. 3, FHA purchase money market share for tracts belonging to the highest quintile, ranked by FHA volume in year 2000, experienced a decline over the period. This group of tracts comprised over 40 percent

of FHA purchase money volume in the beginning of the period, declining to about 25 percent of volume by the end of the decade. The share of volume for the fourth quintile of year 2000 tracts stayed relatively constant, while the shares of the bottom three year 2000 quintile tracts all increased by at least five percentage points. More generally, the highest quintile tracts lost share of FHA originations while the lower quintiles gained share. This resulted in

reduced variation in shares of FHA originations—quintile shares started with a range of 0.01–0.42 in 2000, but by 2010 the range had declined to only 0.06–0.26.

Fig. 4 provides the FHA share of overall origination volume by quintile, ranked by FHA share in 2000. In this Figure we see the broad decline in FHA share of overall volume from 2000 to 2006, followed by the broad rebound through 2009. Every quintile followed this national trend, but the high-share quintiles both declined the most and grew the greatest.

More interesting is tracking the difference in the quintiles in the post-2006 expansion period. All quintiles' FHA shares were greater in 2010 than in 2000; however the lower quintiles' increase was more dramatic. As a result, the top three quintiles ended the period with equal FHA shares, so that 60 percent of all tracts had relatively homogenous FHA shares. This indicates that the growth in FHA share by tract with the largest FHA shares at the beginning of the period was not the only driver of national FHA expansion. In particular, the relatively faster expansion of FHA shares in the tracts with smaller original FHA shares played a key part as well, demonstrating the broad appeal of FHA across the country in response to the mortgage crisis changes in market structure.

Refinance volumes trends shown in Figs. 5 and 6 appear reasonably similar to the purchase money loan trends observed in Figs. 3 and 4, but interpretation is complicated because a large proportion of tracts had refinance FHA market shares at or near zero in the year 2000. Fig. 5 illustrates a decline in FHA refinance share for the tracts in the highest year 2000 quintile of from over 60 percent to less than 25 percent. The tracts in the fourth quintile kept a relatively constant share of FHA volume, while the tracts in the bottom three quintiles saw their share of refinance volume grow from less than ten percent to over 40 percent over the decade. This increase in volume by the lowest quintiles resembles the increase in purchase money mortgages shown in Fig. 3.

Fig. 6 also echoes Fig. 4. Again, the increase in FHA share post-2006 was most dramatic for those tracts with low (zero) FHA shares in 2000.

D. The post-2006 FHA tract-level share expansion was generally greater than the pre-2006 decline, but tracts with the largest declines did not expand the most. This led to a more equally dispersed pattern of FHA originations.

We next look at the periods of FHA decline and expansion. Here, and throughout the rest of the paper, we define the period of decline as years 2001–2006, and the period of expansion as years 2006–2009. We decompose the variation in tract-level FHA share across the decline and expansion time periods into three possible sources: (a) national time trends, (b) cross-sectional variation across tracts, and (c) time series variation within tracts. To examine this, we regress FHA share on identifiers for each year and tract:

$$\text{FHA Share}_{it} = \theta I_i + \gamma T_t + \omega_{it}, \tag{3}$$

with the year indexed by t and the tract by i ; I is a vector of Census tract dummy variables; T is a vector of year dummy variables; and ω is the error term.

In Eq. (3), θ and γ are vectors of estimated parameters and are interpreted as the cross-sectional tract and national time trend contributions to the observed variance in FHA share. We calculate the contribution of the time series within tract component as:

$$\hat{\omega}_{it} = \widehat{\text{FHA Share}}_{it} - \hat{\theta} I_i - \hat{\gamma} T_t \tag{4}$$

By construction, a regression of tract level FHA shares on $\hat{\theta}$, $\hat{\gamma}$, and $\hat{\omega}$ has an R-squared equal to one. As such, we obtain the portion of total variance in FHA share explained by of each of the components as:

Contribution of national time trend variation

$$= 1 - R^2(\text{FHA share}; \hat{\theta}, \hat{\omega}) \tag{5a}$$

Contribution of cross sectional tract variation

$$= 1 - R^2(\text{FHA share}; \hat{\gamma}, \hat{\omega}) \tag{5b}$$

Contribution of within tract variation over time

$$= 1 - R^2(\text{FHA share}; \hat{\theta}, \hat{\gamma}) \tag{5c}$$

Table 5

Decomposition of variance: national time trends, cross-sectional variation across tracts, and time-series variation within tracts.

Loan type	(1)	(2)	(3)	(4)
	Percent explained by			
	Time trend	Cross-sectional	Within tract time-trend	Total sum of squares
<i>Decline period 2001–2006</i>				
Purchase Money	17%	48%	36%	4361
Refinancing	5%	50%	44%	780
<i>Expansion period 2001–2006</i>				
Purchase Money	42%	30%	28%	12,051
Refinancing	25%	35%	40%	4243
<i>Expansion period 2001–2006 (prior FHA limits)</i>				
Purchase money	35%	35%	29%	11,261
Refinancing	21%	38%	41%	3902

Table 5 presents the results of this variance decomposition separately for the periods of decline and expansion. We separately compare expansion under the post ESA and HERA loan limit increases to expansion at the loan limit levels existing before those changes in 2008. The columns indicate the contribution of each factor to the overall variance in tract-level FHA share declines and increases. Column (4) provides the total sum of squares for each row.

Total sum of squares is substantially higher in the expansion than the decline period. This indicates that there is more cross-tract variation in expansion than there is in decline. We find that cross-sectional variation explains rough half (the largest portion) of FHA share variation during the decline period for both purchase money and refinancing loans. This is consistent with our previous observations that FHA share declines varied considerably across tracts. The within tract time trend is the second largest contributor.

There is a different story in the expansion period. Here, the national time trend, which measures common yearly variation across tracts, explains the largest portion of the FHA purchase share variation. This indicated that, to a large extent, tracts all experienced the same rate of expansion in the 2006 through 2009 period. Cross-sectional variation, the contribution of differences across tracts, explains a relatively smaller amount of variation in the expansion than the decline.

In summary, and especially for purchase money, we see a general trend of widely varying declines in FHA shares during the 2001 through 2006 period. High FHA share tracts declined the most, resulting in a relatively tight distribution of tract-level FHA shares in 2006 at a very low mean. This may have resulted from the greater proportion of minority, low income and low wealth borrowers in the tracts with high FHA shares at the beginning of the decline. These borrowers disproportionately moved to subprime during the growth of subprime. The expansion of the 2006–2009 period brought a relatively common across-tract increase in FHA share. This expansion likely reflects the inability of private markets to supply the market

during the crisis period. The result of the combined decline and then expansion is that FHA shares were more tightly distributed across tracts. That is, there was less cross-tract variation in FHA in 2009 (or 2010) than there was in 2001 (or 2000). If the FHA loan limits had not been increased, there would have been less of the variation explained by the time trend – in fact the common variation over time and the cross-sectional variation would have contributed about the same amount of the purchase money variation during the expansion. The loan limit increase meant that FHA could reach more borrowers, across the country, including in higher cost areas, than it could prior to the loan limit changes.

E. As the national FHA share fell it became more concentrated, both across tract and geographically. As FHA share increased it became less concentrated, both across tract and geographically.

In Fig. 7, we show that FHA lending for purchase money mortgages became more concentrated across tracts during the decline period, but less concentrated during the expansion period. To illustrate this, we calculate Gini coefficients as a measure of the equality of FHA share among Census tracts. Gini coefficients range from zero to one, with values closer to one indicating more concentration in FHA lending and values closer to zero indicating less concentration. Given the higher loan limits resulting from ESA and HERA, concentration was lower than it might otherwise have been had loan limits not changed over the past few years.

Fig. 7 shows that as FHA lending contracted substantially in the 2000–2006 period, FHA purchase money lending became more concentrated across tracts. However, during the expansion period FHA purchase money lending became more dispersed. By 2008 the concentration level had fallen to that of the earlier period, and by 2010 it reached a decade low. This reduced concentration reflects FHA's broader national appeal, in part, perhaps, because of its larger loan limits and the relatively tighter credit requirements of the private market. For FHA refinance activity, an increase in tract concentration was observed only in 2005. Otherwise, the FHA refinance mortgages

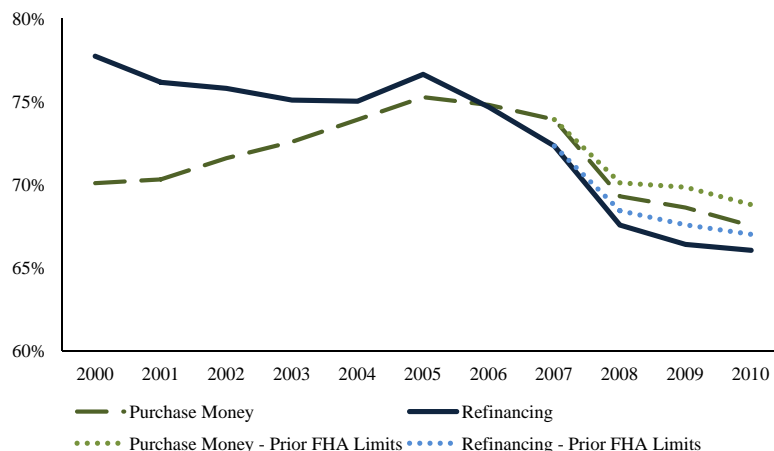


Fig. 7. Concentration of FHA lending, Gini coefficients, 2000–2010.

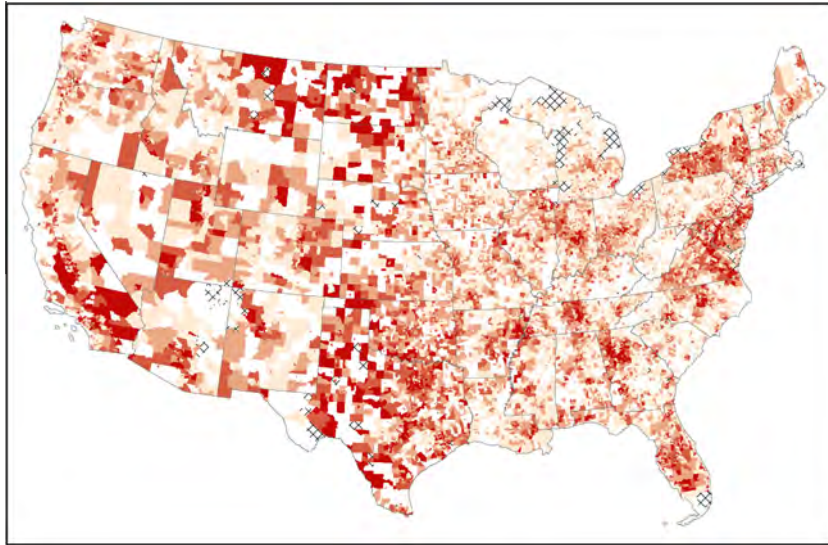


Fig. 8. Geographic concentration of FHA lending, 2001.

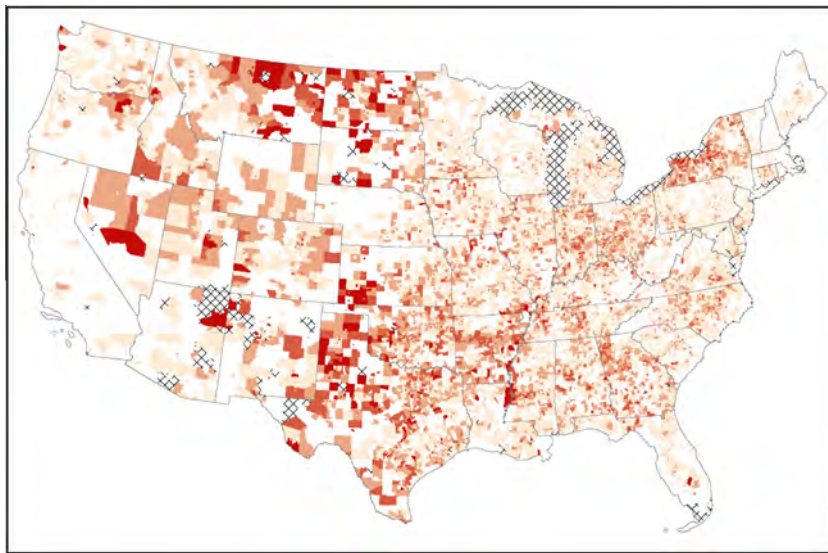


Fig. 9. Geographic concentration of FHA lending, 2006.

were originated more broadly across tracts throughout the decade.

In Figs. 8–10, we explore FHA lending's geographic concentration. Specifically, we provide maps of FHA share at the beginning (2001), middle (2006), and end (2009) of our contraction and expansion time periods. Shading within the maps reflects quintiles of 2001 FHA share. Tracts with no color indicate the first quintile (0–1.4%), with increasingly dark shading for the second (1.5–4.9%), third (5–9.7%), fourth (9.8–17.8%), and fifth (17.8–100%) quintiles. Crosshatching indicates missing data.

Comparing the geographic distribution of lending across the three years yields some stark observations. In

the beginning of the period there is both cross-tract heterogeneity in FHA share (widely varying levels of shading) and geographic concentration (FHA lending is concentrated in the mid-west and in major MSAs in the west coast, south and east coast. In 2006, FHA continued to have market share strength in parts of Texas and the Montana/Dakotas region. However FHA lending activity was considerably reduced in the sand states, such as California and Florida, where subprime lending was prevalent. FHA lending was also much in New York and across the Mid-Atlantic and Midwest markets.

The 2009 map of Fig. 10 is dramatically different than the other two—almost the entire country is darkly shaded.

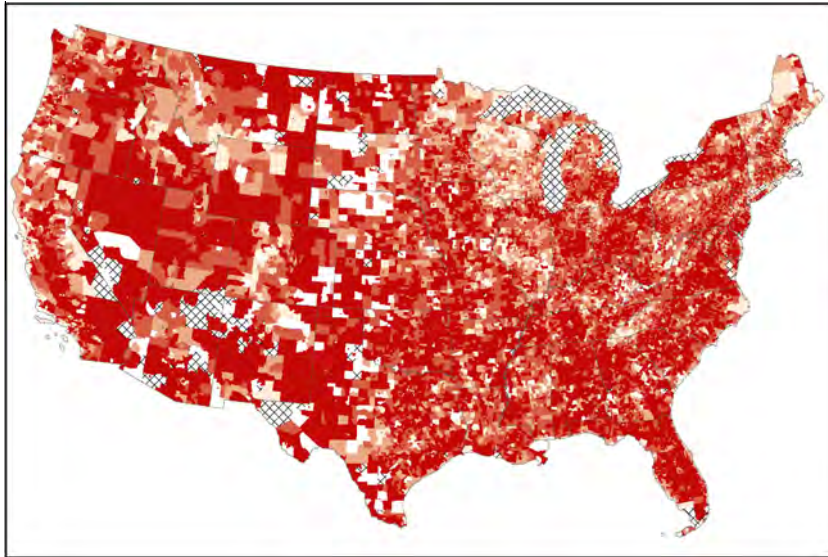


Fig. 10. Geographic concentration of FHA lending, 2009.

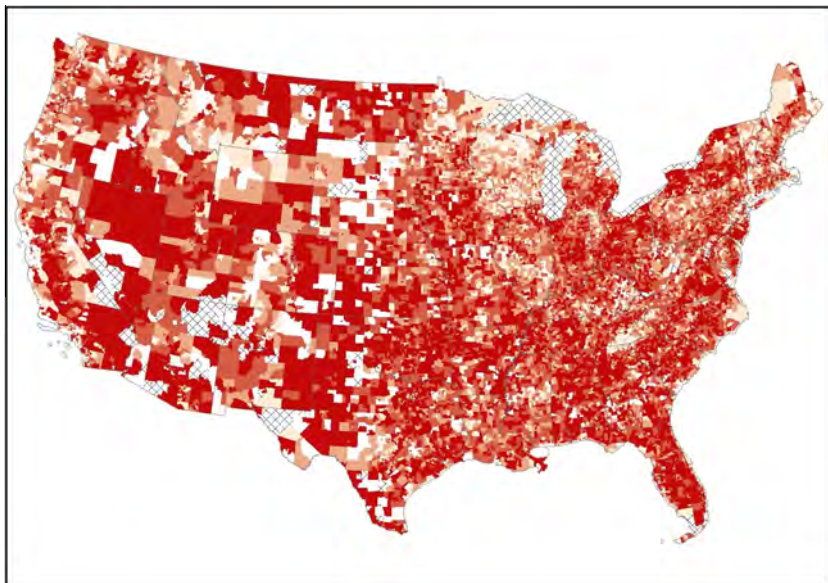


Fig. 11. Geographic concentration of FHA lending at prior loan limits, 2009.

This reflects the large number of tracts with high levels of FHA share noted earlier. It also reflects how widely geographically dispersed FHA lending became by the end of the decade. By 2009, FHA lending appears to be nearly uniformly dispersed across the country. This likely reflects FHA's higher loan limits, their relatively flexible underwriting standards, and the virtual disappearance of subprime lending. To demonstrate this likelihood, we include Fig. 11, which reproduces the FHA lending shares, but restricts participation to the loan limits prior to ESA and HERA. Clearly FHA would still have expanded, but the more dramatic increases in higher cost areas such as California and Florida are obvious.

F. During the decline period, FHA lost market share in tracts with relatively lower delinquency and bankruptcy rates, incomes, and education levels and relatively higher loan amounts and minority composition. During the expansion, FHA gained market share in tracts with relatively higher delinquency and bankruptcy rates and minority composition, and relatively lower income and education levels. These tracts represent areas with higher risk.

We next examine the relationship between factors that are correlated with tracts that experienced large changes in FHA shares. We again focus on the decline (2001–2006) and expansion (2006–2009) periods. We first compute the simple difference between FHA share at the

Table 6
Estimations of FHA Share, Purchase Money Loans.

	(1) Decline (2001–2006)	(2a) Expand (2006–2009)	(2b) Expand – prior limits (2006–2009)	(3) IQR	(4) Decline Expl.	(5a) Expand Expl.	(5b) Expand Expl. prior limits	(6a) Expand – decline	(6b) Expand – decline prior limits
Median loan amount (\$000)	0.047*** (0.001)	0.065*** (0.004)	–0.031*** (0.004)	69.00	3.24	4.49	–2.14	1.24	–5.38
Minority %	0.042*** (0.001)	0.146*** (0.005)	0.134*** (0.005)	38.53	1.62	5.62	5.16	4.01	3.54
Median income (\$000)	–0.010*** (0.003)	–0.206*** (0.010)	–0.175*** (0.010)	23.00	–0.23	–4.74	–4.03	–4.51	–3.80
Denial Rate	–0.016*** (0.004)	–0.171*** (0.013)	–0.252*** (0.013)	6.12	–0.10	–1.05	–1.54	–0.95	–1.44
% With 90 + Delq	–0.030*** (0.006)	0.129*** (0.022)	0.049** (0.022)	4.55	–0.14	0.59	0.22	0.72	0.36
% With bankrupt	–0.023*** (0.008)	0.267*** (0.027)	0.300*** (0.027)	17.93	–0.41	4.79	5.38	5.20	5.79
% >= Assoc. Deg.	–0.014*** (0.003)	–0.039*** (0.010)	–0.030*** (0.010)	19.36	–0.27	–0.76	–0.58	–0.48	–0.31
% Owner occupancy	–0.008*** (0.001)	0.045*** (0.005)	0.038*** (0.005)	31.22	–0.25	1.40	1.19	1.65	1.44
Loan-to-value ratio	–0.002 (0.001)	0.169*** (0.005)	0.149*** (0.005)	23.79	–0.05	4.02	3.55	4.07	3.59
FHA share	0.884*** (0.002)	0.513*** (0.007)	0.531*** (0.007)	24.74	21.87	12.69	13.14	–9.18	–8.73
Obs.	38,319	37,658	37,658						
Adj R-Sq	0.882	0.335	0.348						

Table 7
Estimations of FHA Share, Refinancing Loans.

	(1) Decline (2001–2006)	(2a) Expand (2006–2009)	(2b) Expand – prior LIMITS (2006–2009)	(3) IQR	(4) Decline Expl.	(5a) Expand Expl.	(5b) Expand Expl. prior limits	(6a) Expand – decline	(6b) Expand – decline prior limits
Median loan amount (\$000)	0.011*** (0.001)	–0.019*** (0.003)	–0.066*** (0.003)	69.00	0.76	–1.31	–4.55	–2.07	–5.31
Minority %	0.006*** (0.001)	0.106*** (0.004)	0.104*** (0.003)	38.53	0.23	4.08	4.01	3.85	3.78
Median income (\$000)	0.013*** (0.002)	–0.117*** (0.007)	–0.106*** (0.007)	23.00	0.30	–2.69	–2.44	–2.99	–2.74
Denial rate	0.012*** (0.002)	0.135*** (0.009)	0.086*** (0.009)	6.12	0.07	0.83	0.53	0.75	0.45
% With 90+ Delq	–0.015*** (0.003)	0.162*** (0.015)	0.102*** (0.015)	4.55	–0.07	0.74	0.46	0.81	0.53
% With bankrupt	–0.048*** (0.004)	0.204*** (0.019)	0.248*** (0.019)	17.93	–0.86	3.66	4.45	4.52	5.31
% >= Assoc. Deg.	–0.007*** (0.001)	–0.044*** (0.007)	–0.002 (0.007)	19.36	–0.14	–0.85	–0.04	–0.72	0.10
% Owner occupancy	–0.002*** (0.001)	0.006 (0.004)	0.015*** (0.004)	31.22	–0.06	0.19	0.47	0.25	0.53
Loan-to-value ratio	–0.012*** (0.001)	0.104*** (0.004)	0.088*** (0.003)	23.79	–0.29	2.47	2.09	2.76	2.38
FHA share	0.924*** (0.002)	0.637*** (0.011)	0.625*** (0.011)	7.46	6.90	4.75	4.66	–2.14	–2.23
Obs.	38,224	37,873	37,873						
Adj R-sq	0.849	0.367	0.367						

start and end of the decline and expansion periods, such that:

$$y_i^{\text{Decline}} = 2001 \text{ FHA Share}_i - 2006 \text{ FHA Share}_i \quad (6a)$$

$$y_i^{\text{Expansion}} = 2009 \text{ FHA Share}_i - 2006 \text{ FHA Share}_i \quad (6b)$$

We then estimate the share change separately for purchase money and refinance mortgage markets as follows:

$$y_i^p = \alpha_p + \beta_p X_i^p + \varepsilon_i^p, \quad p = \text{Decline, Expansion} \quad (7)$$

Here, i indexes Census tracts and X is a vector of factors with estimated parameter vector β . The explanatory factors in X include the following tract level factors measured in 2001: median loan amount; the percentage of originations in the tract with minority (not non-Hispanic white) borrowers or co-borrowers; median income of HMDA borrowers; denial rates for applications; the percentage of borrowers in the tract with delinquencies greater than 90 days; the percentage of tract residents that have earned an Associate's Degree or higher; and the percentage of dwellings in the tract that are occupied by the owner of the dwelling. We measure the expansion using both the loan limits after the changes allowed by ESA and HERA, and with the loan limits prior to those changes.

The first five factors are from HMDA, the next two factors are obtained from TransUnion credit data, and the latter two factors are obtained from the 2000 decennial Census. We also add a measure of loan-to-value ("LTV") for lending in the area, obtained by dividing the median purchase money loan amount for that tract and year by an estimate of the average home value in the area. We exclude from the data observations with missing or outlier values.

The results of the regressions are provided in columns (1), (2) and (3) of Tables 6 and 7; separately for purchase and refinance mortgages.¹⁸ Each table also includes the interquartile range ("IQR") of each independent variable factor (column 4).¹⁹ We multiply the IQR value by the coefficient values displayed in columns (1)–(3) for the decline and two expansion periods respectively and display the absolute value of this product in columns (4), (5a) and (5b) respectively. We then calculate the difference between these two resulting values (column (5a) or column (5b) minus column (4)), and present it in columns (6a) and (6b) as a measure of the difference in the impact of the factor during the two key periods. Positive values in columns (6a) and (6b) show that the variable is a more important explanatory factor during the expansion, while a negative value shows it is more important during the decline.

¹⁸ In Tables 6 and 7 we denote significance as follows: *Significant at 10%, **significant at 5%, ***significant at 1%. The dependent variable in columns (1) and (2) is the change in share during the decline period (FHA share in 2001–FHA share in 2006) or expansion periods (FHA share in 2009–FHA share in 2006) with either the loan limits after ESA and HERA or prior to that ("prior limits"). The magnitude of the dependent variable and covariates (where applicable) is provided in percentage points (i.e., 1% = 1). Controls for the tract-level FHA share in 2001 are included in the model, but not displayed. The unit of observation is a tract. Standard errors are in the row below the coefficient estimates, displayed in parentheses.

¹⁹ The IQR measures the difference between the values at the 75th and 25th percentiles.

We find that the same general factors are important for both the purchase money and refinance equations, with generally stronger effects in the purchase money model. Of key importance are the minority borrower share (as determined using HMDA data) and median income, particularly during the expansion period. This likely reflects the down payment constraints of lower income and minority borrowers, suggesting that without high-LTV lending in the subprime segment, constrained borrowers flocked to FHA loans. As evidence for this change, IFE (2010) note that the share of FHA insured mortgages with 95% + LTV ratios had declined from 77.8% in 2003 to 57.7% in 2008 (the during height of the subprime era), but the share had increased to 68.2% by 2010.²⁰ This direct effect can also be observed by looking at the differential impact of the LTV variable during the expansion period.

For both purchase and refinance loans, loan amount, and application denial rate also explain large portions of variation of during the expansion period, but less so during the period of decline. As expected given the relatively restrictive FHA guidelines, owner-occupancy rates in the tract had a negative relationship with FHA share decline, but a positive relationship with FHA share expansion.

We also observe some similarity in trends during the decline and expansion periods. From 2001–2006, FHA market share declined most rapidly in areas with higher minority compositions and larger loan amounts, but lower incomes, denial rates, and levels of education. FHA market share expanded most rapidly from 2006 to 2009 in areas with these same characteristics. This is consistent with our expectation that minority, low income, high loan amount, and more poorly educated home buyers moved away from FHA lending in the beginning of the decade, likely substituting the subprime market's products for FHA products. However, after subprime (and prime) credit offerings became ever more restrictive in terms of underwriting standards, these borrowers turned to FHA. In support of this hypothesis, we find evidence that FHA continued to well serve areas with relatively higher proportions of minority, low-income, and less educated borrowers, even during a time when overall mortgage loan originations were rapidly declining. Most of the impacts are similar in sign although slightly different in magnitude, even if loan limits had not been increased.

Moreover, for purchase money and refinance loans, relatively lower bankruptcy rates and higher delinquency rates are associated with tracts that experienced a relatively larger FHA share decline, but higher bankruptcy rates and higher delinquency rates are associated with tracts that experienced relatively larger FHA expansion. These results suggest that, while FHA maintained a relatively strong presence in areas with poor credit profiles during the decline, FHA lending strongly picked up market share in areas with relatively poor credit during the expansion. More broadly, FHA experienced its greatest growth in areas with relatively poor credit scores and higher LTVs, leading to concerns about the increased default risk being encored by the FHA portfolio.

²⁰ See Exhibit IV-5, p. 40.

Table 8

Share of lending by largest 25 lenders nationwide in the top quintile of FHA tracts.

	Top Lenders (All Loan Types) (%)	Top Lenders (FHA) (%)
2001	44.10	50.10
2009	45.10	45.90

For purchase money loans, denial rates are negatively correlated with increasing FHA share during both decline and expansion periods. For refinance loans, denial rates are positively associated with increasing FHA share during both decline and expansion periods. Therefore, while similarities exist across purchase money and refinancing FHA lending patterns, we find evidence that the trends diverged in some ways. Additionally, the ability of the models to explain the decline is much better than its ability to explain the expansion period outcomes. This may reflect the fact that economic factors continued to have expected impacts during the declining period. However during the expansion period, policy pressures beyond economic and demographic factors are playing a role not well reflected in our models. This could well reflect the need for FHA lending to substitute for the retrenchment of private capital, as underwriting standards have dramatically tightened in private markets.

One hypothesis consistent with the observed broad expansion of FHA over time is that the market for FHA is being served by more nationally focused lenders, rather than those with a more local reach. To examine this question, we looked at the share of all lending and FHA lending in the tracts that comprise the top quintile of FHA lending in 2001 and 2009 by the top 25 lenders from HMDA in those years. Table 8 includes these shares. While top lenders increased their lending in the tracts which historically comprised the top quintile for FHA lending (based on 2001 volumes), there is virtually no difference in lending share by top lenders in those tracts which comprised the top quintile by 2009. This argues that it is not simply the change in the structure of lending that impacted FHA's resurgence in the market.

While the regression results indicate that unobservable factors influence the rise of FHA during the expansion, we cannot isolate those omitted factors with the data available. Clearly tightening underwriting standards could explain some of the change. In a recent working paper by Parrott and Zandi (2013), they note that the average credit scores of borrowers with purchase money mortgages sold to Fannie Mae and Freddie Mac reached 766 in June 2013 while current FHA borrowers have average credit scores above 700, about 50 points higher than in previous periods.

6. Conclusions

The broad mission of FHA is to serve borrowers who might otherwise be underserved by other lenders. Historically, this has meant that FHA disproportionately served low income and minority first-time borrowers who have lacked down payment funds, have not yet developed an established credit history record, or have been otherwise unable to obtain a loan from a prime lender.

The past decade has seen FHA's national share of lending decline to an historic low, and then quickly rebound to an historic high. This roller coaster ride was the result of many factors and caused a rich mosaic of outcomes. It is possible, however, to draw broad themes from this recent history and discuss their implications in light of likely future changes in the mortgage market.

Our analyses indicate that in large part the national changes in FHA lending reflect within-tract trends in FHA share. For both purchase money and refinancing loans, we find evidence that the variance in national FHA share is driven almost entirely by variation in within tract-level market shares of FHA lending, and not by geographic redistribution of total mortgage market origination volumes across tracts toward tracts with historically stronger FHA shares. The result is that the pattern of FHA lending has changed dramatically. FHA lending is more geographically dispersed, and FHA shares vary far less across tracts. By 2010, FHA had a solid base across the country and in every community. The growth in FHA is not simply recovering ground lost to the subprime lenders.

This growth has not been without risk. First, while FHA's newly extended reach can be viewed as a positive sign from a business perspective, we observe that this expansion occurred in a manner that likely has increased, at least temporarily, the risks of the FHA loan portfolio. Specifically, the growth disproportionately occurred among low down payment, low income borrowers in communities with higher delinquency rates and less education. However, recent signs indicate some improvement in the credit quality of the FHA single family portfolio, including, among other factors, increased average credit scores.

FHA achieved its current market dominance in large part because the subprime market collapsed and the prime and conventional markets ceded high-LTV lending and higher credit risk lending to FHA. FHA's pricing has been adjusted upwards five times since 2009 and will likely continue to be adjusted upward to support its insurance fund. Also likely is the increased use of risk-based pricing on the part of FHA. Both trends will reduce FHA's competitive advantage and likely reduce its market share over time. Any reduction in share from new business may reduce premium based income to FHA and continue to pose a challenge to FHA in meeting its required capital reserves.

Actions in the private market likely complement this trend. There are signs of a re-emergence of private mortgage insurance for high-LTV lending, and even the glimmerings of a limited revival in subprime lending. These trends too, if more fully realized, will reduce FHA share.²¹

Also putting pressure on FHA share in the future is the broadly held belief that government involvement in the mortgage market should decline. Likely, this sentiment will affect the future role of the GSEs (Fannie Mae and Freddie Mac) or their surviving entities. It could also affect the reach of FHA. In particular, trimming FHA's currently higher loan limits is increasingly mentioned as a vehicle

²¹ Potentially offsetting this is the increase in risk-based pricing occurring in the non-FHA market. (See Courchane and Zorn (2012)). We expect that the net impact of all the risk-based pricing changes (FHA and non-FHA) will tilt loans away from FHA, but that is simply a prediction.

for scaling back government involvement in mortgage lending.

In our view, therefore, FHA's current market share is likely to be a high water mark for some time to come. Partly this will be the result of deliberate public policy, partly this will be the result of competing market pressures, and partly this will be the result of FHA having to raise prices to address the solvency of its insurance fund as it works through the performance of loans originated during the 2007–2009 time period. In other words, the roller coaster ride is unlikely to be over.

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