

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 of the market served by the FHA. Concerns have grown about the solvency of the program, while simultaneously there is increasing concern about the access to credit of the borrowers served by the FHA market. This paper attempts to explain FHA lending patterns, 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, the mortgage market, and associated policymaking.

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I. INTRODUCTION

Throughout the last decade, mortgage markets experienced both a considerable decline in the Federal Housing Administration (“FHA”) market share and a considerable increase in the FHA market share. This government-insured share of the 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. 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 concern has been the continued solvency of the FHA program. According to *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.” The House of Representatives recently passed the FHA Fiscal Solvency Act of 2012 (H.R. 4264) to help insure that the FHA remains solvent and does not become a taxpayer bailout.²

¹ http://portal.hud.gov/hudportal/documents/huddoc?id=FHA_Fund_MMI_Fund_2_2012.pdf, last accessed October 11, 2012 at B-4.

² <http://www.gpo.gov/fdsys/pkg/CREC-2012-09-11/pdf/CREC-2012-09-11-pt1-PgH5787-3.pdf#page=1> last accessed on October 2, 2012.

As concerns have grown about the expected or unexpected losses to the program, simultaneous concerns have grown 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 who 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 policymaking.

An important result of 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 the high FHA share tracts that declined the most from 2000 through 2006. In contrast, the increase in FHA volume was far more disperse. As a result, FHA lending is now a more integrated part of the overall mortgage lending market.

Furthermore, higher-LTV mortgages 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 insurers. 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 is an interesting lesson for Congress and policy makers as they consider how to craft the housing market for the future. Clearly FHA lending has played an important role in the housing recovery. Not only is it a major share of all originations, it substituted for the lax standards and sometimes potentially exploitative subprime lending. Policy makers may have concerns about the high concentration of FHA lending in high (above 80 percent) LTV lending, but there is no doubt that the existence of FHA with its government guarantee stabilized the market and increased access to credit at a critical time.

The remainder of the paper is organized as follows. Section II provides an discussion of the federal government's and FHA's role in the mortgage market. Section III provides background

on extant literature analyzing FHA lending and Section IV presents the data used in our analyses. In Section V, we provide findings from our empirical analyses, organized as a series of stylized facts. Section VI concludes.

II. 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 Federal Deposit Insurance System was established in 1933 to insure the funds consumers were willing to deposit in financial institutions. In 1936, the FHA was created, reflecting the importance the federal government placed on housing. In 1938, the first of the government-sponsored entities (“GSEs”), Fannie Mae, 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, 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 which originate mortgage loans, with the government assuming the credit risk of those loans through the FHA insurance program. This sharing of risk helped increase the flow of funds to mortgage markets and also stabilized 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 expand availability of mortgage funds for moderate income families using government guaranteed mortgage-backed securities (“MBS”). Ginnie Mae effectively provided a secondary market for the sale of FHA mortgages. Also in 1968 Fannie Mae became a shareholder-owned GSE. 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, the direct avenue through which the federal government participated in mortgage lending.

In this paper we will 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.

III. PREVIOUS LITERATURE

We began looking at patterns in FHA lending in an earlier paper (see Courchane, Darolia, and Zorn, 2009).³ In that paper, we examined the substitution of FHA lending for subprime and prime lending after the collapse of the subprime market in 2007/2008. We concluded that there could well be observed higher costs of default if the substitution from prime continued as

³Courchane, M., R. Darolia, and P. Zorn, “Industry Changes in the Market for Mortgage Loans,” *Connecticut Law Review*, Vol. 41, No. 4, May 2009, pp. 493–526.

cumulative default rates on prime loans had credit cutoffs, empirically approximated as at the 95th percentile of the credit distribution, of about 15%, while FHA's credit cutoff appeared to be at about 23%.

There was also evidence from several authors that changing credit standards impacted 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 has been 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.⁴ 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, Pennington-Cross and Yezer (2005) found that credit constrained borrowers with substantial wealth are most likely to finance the purchase of a home by using a subprime mortgage. As a result, FHA became less important to marginal 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. FHA mortgage loan maximums were lower than mortgage loan amounts available in the subprime market. In many high cost

⁴ See Exhibit 3, Courchane, 2007 at 415.

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 requires a 3 percent equity contribution to the deal. 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 expanded 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 for FHA.

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. The subprime lenders, and even many of the prime lenders, relied heavily on wholesale channel originations. Part of this difference was driven by costs. FHA has had, historically, more particular financial requirements for brokers writing FHA loans.⁵

⁵ 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.*" The FHA Title II Mortgagee Approval Handbook 4060.1, Rev-2 can be downloaded at: <http://www.hud.gov/offices/adm/hudclips/handbooks/hsg/4060.1/40601handbookHSGH.doc>, last accessed October 2, 2012.

FHA, like the private market, offers loans for home purchase, refinance, and also for construction and rehabilitation. The most popular program--known as Section 203(b)--offers 15- and 30-year fixed-rate mortgages for single-family dwellings. Since the focus is helping low- and moderate-income households, similar to those obtaining loans under the GSE conforming loan limits, Congress limits 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 (FHA, 2008). 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 often financed into the loan. The benefit of insuring with FHA rather than with a private mortgage insurer depends in part on the LTV ratio on the loan and partially 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.⁶ 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.⁷

A recent 2011 assessment of the FHA program, co-authored by Robert Van Order and Anthony Yezer, concluded that while FHA played an important stabilization role in 2008 and 2009, FHA

⁶ "Estimating FHA Market Share by Race and Ethnicity," *U.S. Housing Market Conditions*, May 2011, pp. 7 – 11. Last accessed at http://www.huduser.org/portal/periodicals/ushmc/spring11/USHMC_1q11.pdf on October 1, 2012.

⁷ *Ibid* at p. 6.

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 the first-time homebuyers and minorities.⁸

Harriet Newberger conducted a 2011 study of FHA trends in lending focusing on regional differences in the FHA lending patterns.⁹ 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. Smith (2012) studied FHA lending patterns in Florida and found that FHA lending was concentrated in zip codes associated with high economic risk characteristics, but not with neighborhoods that have a relatively large African American composition.

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 US 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 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.

IV. DATA

The analyses utilize mortgage level data reported under the Home Mortgage Disclosure Act ("HMDA") for the years 2000 to 2010. The largest mortgage lenders are required to report HMDA data if they meet certain criteria, including asset size and scope of lender's mortgage lending activity. HMDA coverage is estimated to include approximately 80 percent of the mortgage market each year (Avery, Brevoort, & Canner, 2005). 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

⁸ See Van Order and Yezer, 2011, available at <http://business.gwu.edu/files/fha-assessment-report-02-2011.pdf>, last accessed on October 2, 2012.

⁹ See http://www.philadelphiafed.org/community-development/publications/discussion-papers/discussion-paper_fha-lending-trends-and-implications.pdf, last accessed on October 2, 2012.

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, we followed a process to identify common tracts across the 1990 and 2000 Census reporting structures. For these tracts, we create a panel of data that looks at FHA share given constant tract originations and tract originations given constant FHA share over that time period. We also highlight some specific MSAs for our focus over this ten-year period.

We merge the mortgage data at the tract level with other 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 the year 2001. The average across tracts of the median nominal loan amount from 2001 was over \$100,000, with the average of borrowers' median income across tracts almost \$60,000.

Table 1: Sample Summary Statistics from 2001 (41,961 Tracts)

	Mean	Standard Deviation
HMDA Median Loan Amount (\$000)	103.1	48.3
HMDA Minority %	27.7	29.9
HMDA Median Income (\$000)	58.8	20.9
% of Tract with > 90 Day Delinquency	9.4	5.6
% of Tract with Bankruptcy	5.1	4.1
HMDA Denial Rate	25.7	13.5
% with at least Associate's Degree	22.3	16.6
% Owner Occupied Dwellings	63.7	22.8
Loan-to-Value Ratio	73.3	21.2

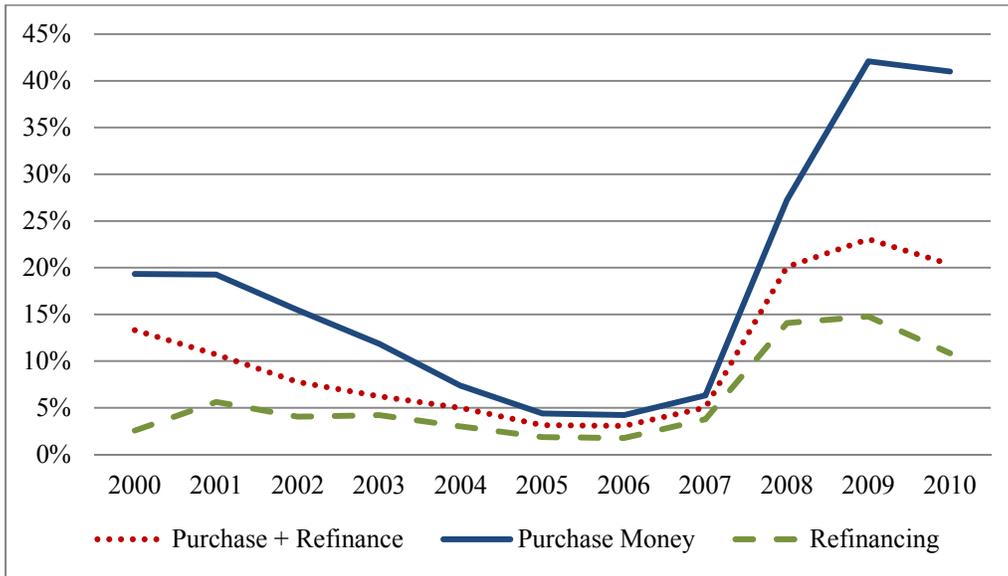
Source: HMDA, Census, TransUnion, and other data.

V. Analyses

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

- 1) *FHA share declined dramatically from 2000 through 2006, and then quickly rebounded above its 2000 level by 2008 and beyond. FHA shares were at their highest level of the decade in 2009.*

Figure 1. FHA Market Shares, 2000 – 2010, by HMDA Loan Purpose



The data represented in Figure 1 clearly 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 refinance 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.

- 2) *National FHA lending patterns were a result of changing FHA shares within tracts, and not geographical shifts in overall loan origination volumes to areas that were typically FHA sparse or rich.*

To look at how markets adjusted over time, it is important to net out the effects of increased originations or decreased originations in the market as a whole from those increases and decreases in tracts that had high shares of FHA loans. Historically, FHA originations were geographically concentrated. Reductions in overall (national) FHA share may therefore reflect

changes in 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 (e.g., a shift away from FHA to conventional originations within a majority of tracts).

Table 2 and 3 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:

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

Here, FHA share for each tract is FHA lending in that tract as a proportion of overall mortgage volume in the tract, $\text{FHA Share}_i = \frac{\text{FHA Volume}_i}{\text{Tract Volume}_i}$. 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 value can come from either the change in the origination volume across tracts or changes in the tract-level FHA shares.

Off diagonal elements allow us to conduct our 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 increased share of origination volume over time. That change would increase overall FHA share even if the within tract market share of FHA did not change. Alternatively, the mix between FHA and conventional within a tract could change. We therefore examine what national share we would expect if there were no changes in FHA shares within tracts or weights. Indexing the year used for FHA share, y , and the year used for tract weight, t , yields:

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

Moving down a column holds constant the FHA share of originations within each tract, but varying the overall share of loans originated by each tract (a change in tract i 's

originations/national originations). That is, it allows us to assess whether overall changes in the geography of where loans were originated 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

$$National\ FHA\ Share_{2000,2001} = \sum_{i=1}^N FHA\ Share_{i,2000} \times w_{i,2001}.$$

Alternatively, moving across a row holds constant the overall share 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, but varies the FHA share by the observed values in each year (e.g., the second value in this row, 19.2%, is calculated as $National\ FHA\ Share_{2001,2000} = \sum_{i=1}^N FHA\ Share_{i,2001} \times w_{i,2000}$).

For both purchase money and refinancing loans, we find evidence that the variance in national FHA share is driven by variances in tract shares, and not changing origination volumes across tracts. When within tract FHA shares are held constant (moving down columns), we observe relatively little change in simulated national FHA share, whereas when weights are held constant (moving across rows) much more variation. This is also reflected in the last rows and columns of Tables 2 and 3 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. Therefore, our conceptual experience demonstrates that observed national FHA lending patterns were not so much a result of geographical shifts in loan origination volumes to areas that were typically FHA rich, but rather within tract changes in the shares of FHA and conventional lending that changed over the decade.

Table 2: National FHA Market Share - Purchase Money Loans

		Holding constant tract origination volumes →											
		2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	Variance
→ 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
<i>Variance</i>		<i>0.006</i>	<i>0.006</i>	<i>0.004</i>	<i>0.003</i>	<i>0.001</i>	<i>0.000</i>	<i>0.000</i>	<i>0.000</i>	<i>0.007</i>	<i>0.011</i>	<i>0.013</i>	1.87

Notes to Tables 2 and 3: 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 3: National FHA Market Share - Refinancing Loans

		Holding constant tract origination volumes →											
		2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	Variance
→ 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
<i>Variance</i>		<i>0.002</i>	<i>0.009</i>	<i>0.005</i>	<i>0.004</i>	<i>0.001</i>	<i>0.000</i>	<i>0.000</i>	<i>0.001</i>	<i>0.012</i>	<i>0.054</i>	<i>0.023</i>	0.23

3) *The decline in FHA share between 2000 and 2006 came largely from traditionally high-FHA share tracts. The rebound in FHA share post-2006 was more disperse.*

We next decompose the variation in tract-level FHA share across the time period 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:

$$(3) \quad FHA\ Share_{it} = \theta I_i + \gamma T_t + \omega_{it}$$

Here, t indexes the year and i indexes the tract; I is a vector of Census tract dummy variables; T is a vector of year dummy variables; and ω is the error term. In equation (2), 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:

$$(4) \quad \widehat{\omega}_{it} = \widehat{FHA\ Share}_{it} - \widehat{\theta} I_i + \widehat{\gamma} T_t$$

By construction, a regression of tract level FHA shares on $\widehat{\theta}$, $\widehat{\gamma}$, and $\widehat{\omega}$ 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:

$$(5a) \quad \text{Contribution of national time trend variation} = 1 - R^2(\text{FHA share}; \widehat{\theta}, \widehat{\omega})$$

$$(5b) \quad \text{Contribution of cross sectional tract variation} = 1 - R^2(\text{FHA share}; \widehat{\gamma}, \widehat{\omega})$$

$$(5c) \quad \text{Contribution of within tract variation over time} = 1 - R^2(\text{FHA share}; \widehat{\theta}, \widehat{\gamma})$$

We present in Table 4 results from the variance decomposition for both the total time period and during primary decline and expansion periods. Here, and throughout the paper, we focus on the period from 2001 to 2006 as the period during which the FHA market share declined dramatically and 2006 to 2009 as the period during which FHA market share increased dramatically. We find that that cross-sectional variation explains the largest portion of FHA

variation during the 2001-2006 decline period for purchase money and refinancing loans, while the within tract variation is the second largest contributor. During the 2006-2010 expansion period in FHA volumes, the national time trend appears to explain a large portion of the purchase money variation. The refinance variation is explained mostly by within tract time series variation.

Table 4: Variance Decomposition

Loan Type	(1)	(2)	(3)
	Time Trend	Percent Explained by	
		Cross Sectional Tract	Within Tract Time Trend
Total Time Period 2000-2010			
Purchase Money	38%	30%	32%
Refinancing	31%	23%	46%
Decline Period 2001-2006			
Purchase Money	17%	48%	36%
Refinancing	5%	50%	44%
Expansion Period 2006-2009			
Purchase Money	42%	30%	28%
Refinancing	25%	35%	40%

We next look at the decline and expansion of FHA shares for each tract. Figure 2 displays the scatter plot of each tract's change in purchase money FHA share during the decline and expansion periods. The red dot is the national average for the decline and expansion periods. On average, tracts declined 0.15 and increased 0.35. As such, we observe a similar trend as seen in Figure 1, where the expansion of FHA exceeds the decline of FHA. There is a single blue dot for each tract, with the x-axis representing the change in the decline period and the y-axis representing, for that same tract, the change in the expansion period. If the tract had no change in either of the periods, they will have a 0 value on the vertical or horizontal axis.

The dark black lines show iso-change lines. The line with vertical intercept at 0.1, for example, indicates all tracts with a 0.2 (20 percentage point) net change from 2001 to 2009. At a value of -0.1 in the decline period (indicating it grew even during the decline), followed by a 0.1 value in the expansion period, yields a .20 change for the decade. Similarly, those tracts with a 0 value

during the decline period, and a 0.2 in the expansion period, are also on that same middle line. We fit onto the plot an orange line that is the locally weighted smoothed line of the scatterplot of tracts. The orange line has a steeper slope than does the iso-change lines, indicating that the rate of expansion generally increases with an increase in decline, however does so at a decreasing rate for tracts with FHA shares that declined over ten percentage points.

For refinancing loans, as shown in Figure 3, we see a somewhat similar trend, though average expansion does not exceed average decline to the same degree as with purchase money loans. For tracts with relatively lower levels of share decline (0 to 20 percentage points), the slope of the fitted orange line has a generally similar slope to the iso-change lines, indicating that refinancing FHA shares of tracts in this range expanded at a roughly similar magnitude as they declined. In tracts with higher declines, however, the slope flattens out, suggesting that these tracts with the highest share declines did not recover FHA share as quickly.

Figure 2: Purchase Money FHA Share Decline (2001-2006) and Expansion (2006-2009)

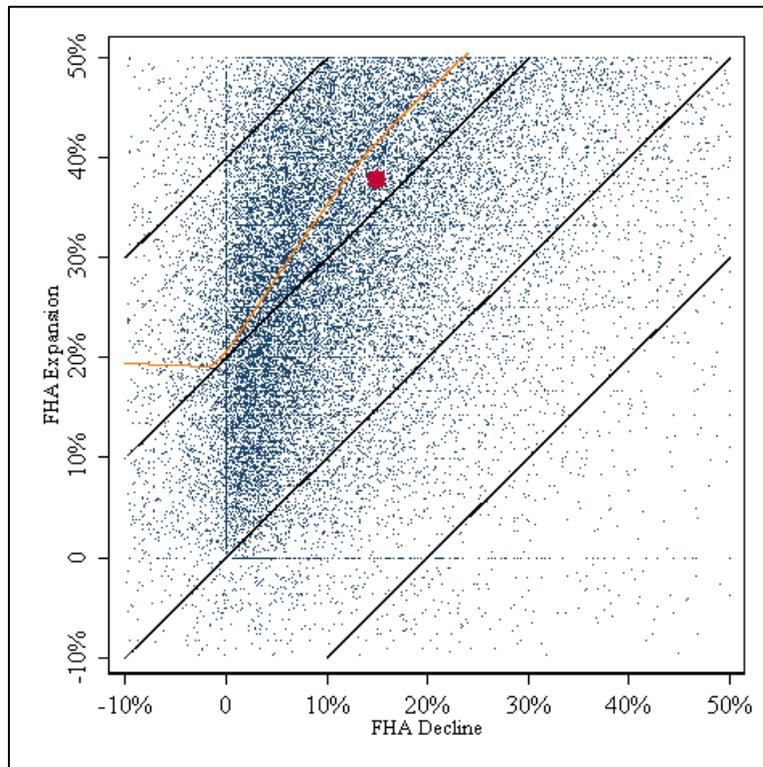
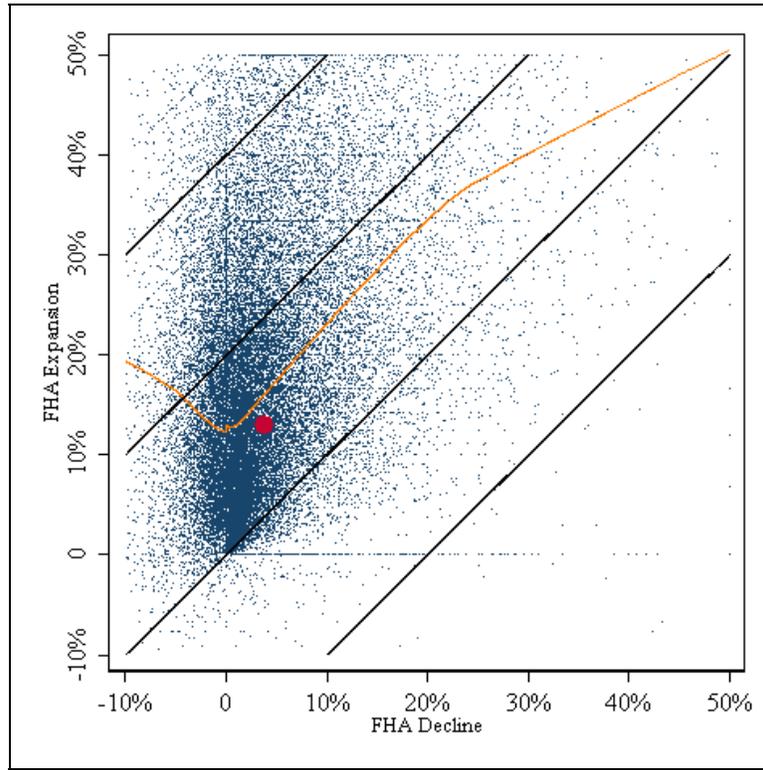


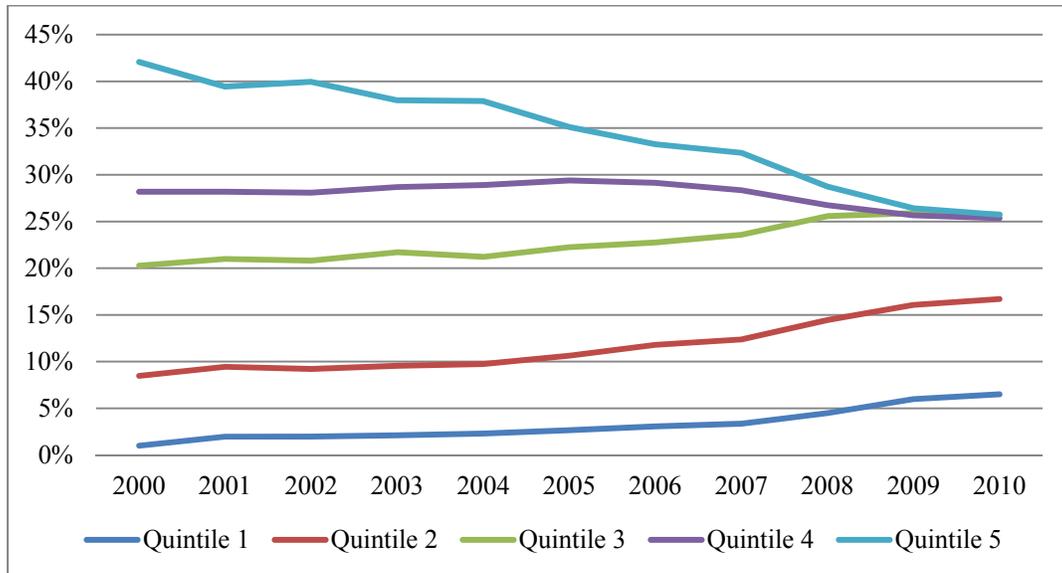
Figure 3: Refinance FHA Share Decline (2001-2006) and Expansion (2006-2009)



4) *The time series variation in tract shares is quite different for tracts with initially high FHA shares than for tracts with initially low FHA shares. This suggests the past pattern of FHA penetration continues to influence the current pattern.*

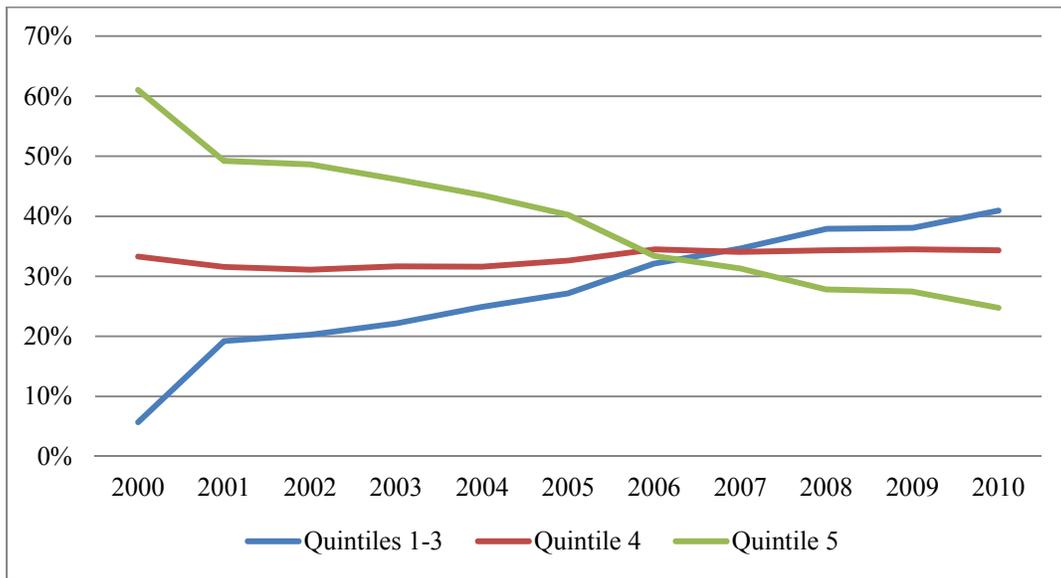
We next illustrate the different trends of tracts with varying levels of FHA share at the beginning of our time period. In Figures 2 and 3, we plot the share of total FHA volume by quintiles of the share of FHA volume for purchase money and refinancing loans. FHA purchase money market share for tracts belonging to the highest quintile 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 nearly 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. Generally, the highest quintiles lost share while the lower quintiles gained share, with much more similarity in shares by 2010. Quintile shares range from 0.06 to 0.26 in 2010 compared to a range among quintiles of 0.01 to 0.42 in 2000.

Figure 4: Share of FHA volume, By Quintile of 2000 Share of FHA Volume, Purchase Money Loans, 2000 - 2010



Refinance volumes shown in Figure 3 appear to follow a similar trend, yet interpretation is a bit more complicated because a large proportion of tracts had refinance FHA market shares close or equal to 0 in the year 2000. Nonetheless, the chart illustrates a decline in FHA refinance market share for the tracts in the highest year 2000 quintile from over 60 percent of FHA refinance volume to less than 25 percent of FHA refinance volume over the time period. The tracts in the fourth quintile kept a relatively constant share of FHA volume share, while the tracts in the bottom three quintiles of year 2000 FHA share saw their share of volume grow from less than ten percent to over 40 percent of FHA refinancing volume over the decade. This increase from the lowest shares resembles that for the increase in purchase money mortgages in the tracts with historically lowest FHA purchase mortgage shares.

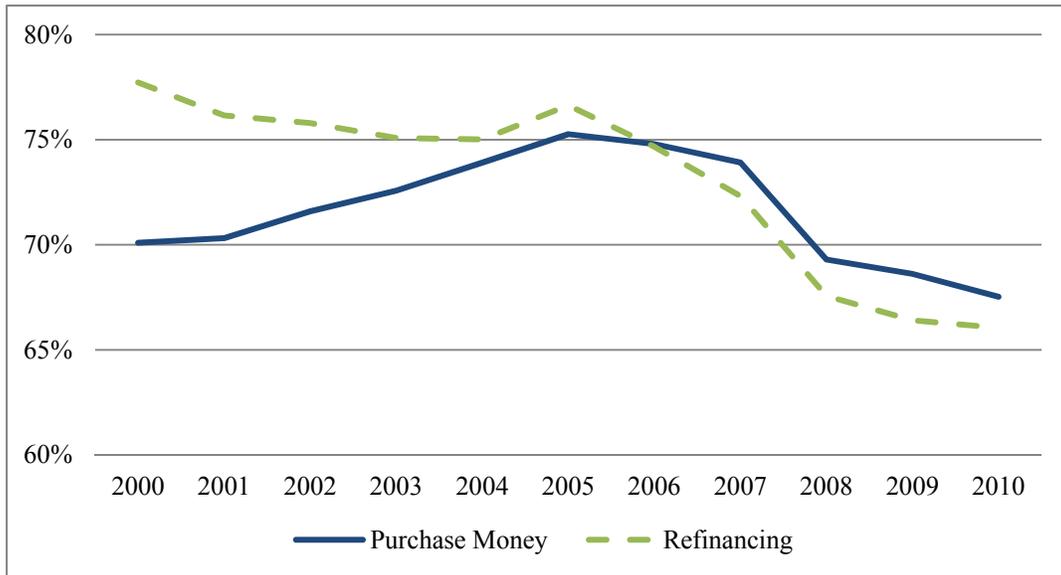
Figure 5: Share of FHA volume, By Quintile of 2000 Share of FHA Volume, 2000 - 2010



5) *As the FHA share fell throughout the nation, it became more concentrated geographically (between 2000 and 2006) and as the FHA share began to grow again, it became less concentrated geographically (between 2006 and 2010). At the lowest points of FHA market share (~2004-2005), FHA lending was relatively highly concentrated geographically. This result likely follows from the fact that FHA was displaced by subprime lending and subprime lending was heavily concentrated in particular regions of the country, including in the sand states.*

In Figure 4, we show that FHA lending for purchase money mortgages become more geographically concentrated during the decline period, but less concentrated during the expansion period. To demonstrate 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 figures closer to one indicating that FHA volumes were more heavily concentrated in a smaller number of tracts and figures closer to zero indicating that FHA volumes were more dispersed.

Figure 6: Concentration of FHA Lending, Gini Coefficients, 2000 - 2010



During the period of declining share as FHA lending contracted substantially, the volume of FHA purchase money lending became more concentrated. However, during the expansion period, FHA purchase money lending became more geographically dispersed and, by 2008, had fallen to a level below that of the beginning of the period. This broader national coverage of FHA reveals how important the product became to the targeted populations of borrowers throughout the country who no longer had access to the diverse product offerings of the subprime market segment.

For FHA refinance activity, an increase in geographic concentration was observed only in 2005. Otherwise, the FHA refinance mortgages were obtained over ever more broadening geographies throughout the decade.

In Figures 7, 8, and 9, we provide maps of the FHA share during the beginning (2001), middle (2006), and end (2009) of our time period. Shading in the maps is based on 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 distribution of lending across the three years yields some stark observations. At the end of the relative decline of nationwide FHA lending in 2006, FHA continued to have some market share strength in parts of Texas and the Montana/Dakotas region. FHA lending activity, however, was considerably reduced in sand states where subprime lending was prevalent, such as California and Florida. FHA lending was also much reduced across markets including New York, the Mid-Atlantic, and the Midwest. By 2009, FHA lending became prevalent in a rather dispersed manner, having substantial market share generally across the country.

Figure 7: Geographic Concentration of FHA Lending, 2001

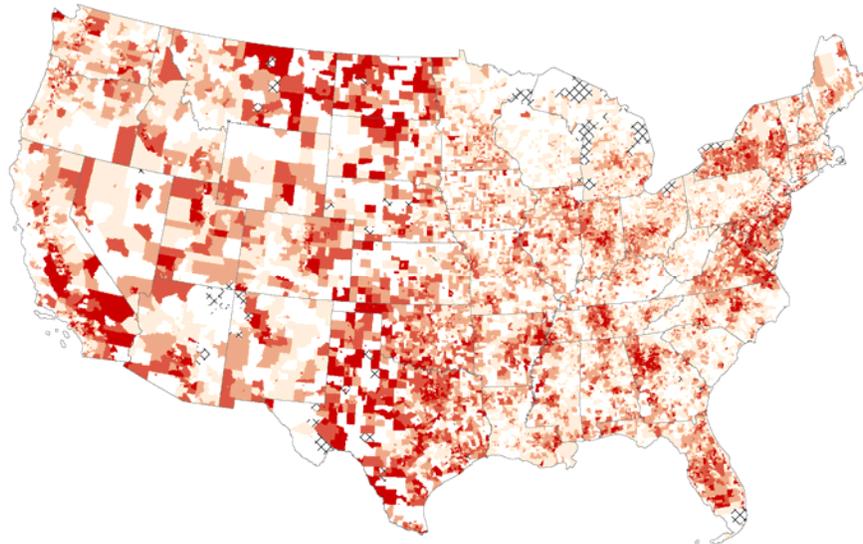


Figure 8: Geographic Concentration of FHA Lending, 2006

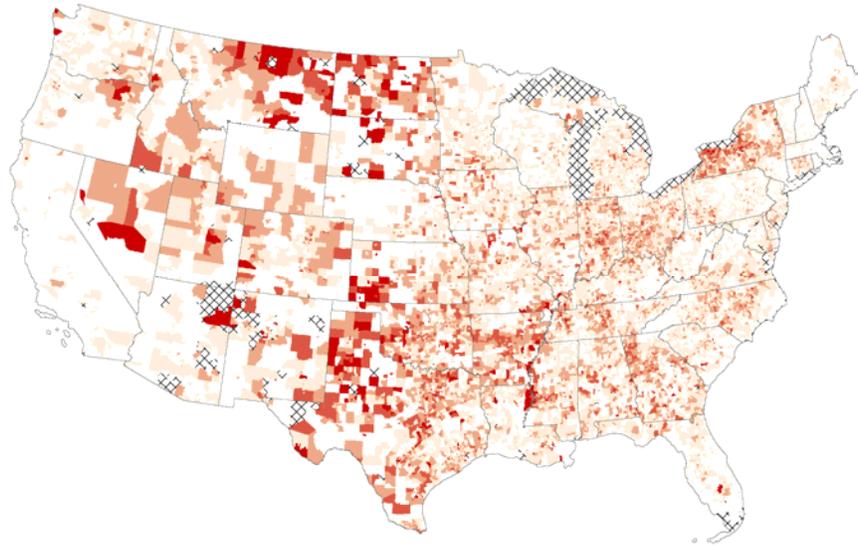
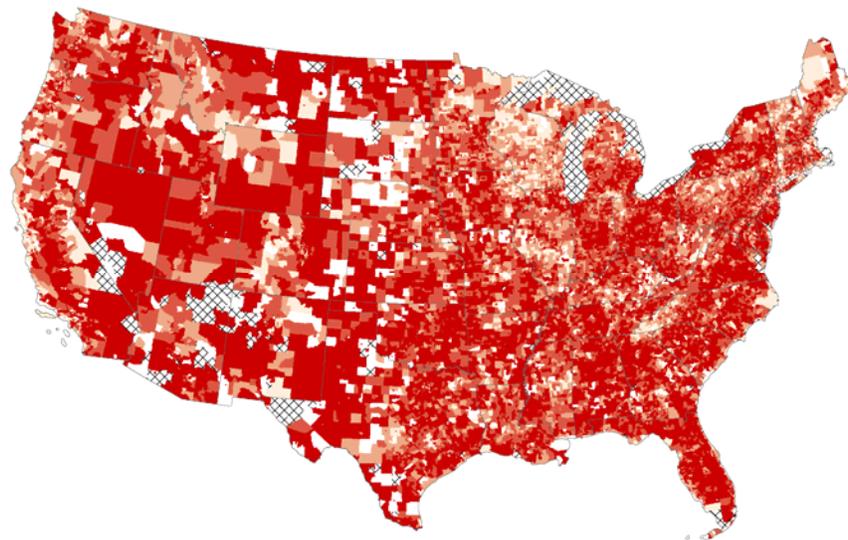


Figure 9: Geographic Concentration of FHA Lending, 2009



- 6) *During the decline period, FHA lost market share in areas 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 areas with relatively higher delinquency and bankruptcy rates and minority composition, and relatively lower income and education levels.*

We next examine the relationship between factors that are correlated with tracts that experienced large decreases or increases in FHA shares. As with prior sections, we focus on the period from 2001 to 2006 as the period during which the FHA market share declined dramatically and 2006 to 2009 as the period during which FHA market share increased dramatically. We first compute the simple difference between FHA share at the start and end of the decline and expansion periods, such that:

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

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

We then estimate the difference in share on a vector of factors in X , with estimated parameter vector, β :

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

Here, i indexes Census tracts and we separately estimate purchase money and refinance mortgage markets. The explanatory factors in X include the following tract level factors as 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 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. 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 2000 decennial Census data. 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) and (2) of Tables 5 and 6. We also include in each table columns including the interquartile range (“IQR”) of each relevant factor (column 3). We multiply this number by the coefficient values displayed in columns (1) and (2) for the decline and expansion periods respectively and display the absolute value of this product in columns (4) and (5) respectively. We then examine the difference between these two resulting values (column (5) less column (4)) presented in column (6)) as a measure of the difference in the impact of the factor during the two key periods. Positive values in column (6) reflect the relatively higher importance of the factor during the expansion in FHA share relative to its importance during the decline in FHA share.

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 population share (as determined using HMDA data) and median income, particularly during both 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. This direct effect can be observed by looking at the differential impact of the LTV variable during the expansion period. For both types of loans, loan amount, LTV, and application denial rate also explain large portions of variation of during the expansion period, but less do during the period of decline. As we would expect given 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 observe some differing trends during the decline and expansion periods. From 2001-2006, FHA market share declined most rapidly in areas with high minority compositions, larger loan amounts, but lower incomes, denial rates, and levels of education. From 2006-2009, however, FHA market share expanded most rapidly in areas with these same characteristics. This is consistent with the story that minority, low income, high loan amount, and relatively poorer educated home buyers moved away from FHA lending in the beginning of the decade, likely substituting the subprime market for FHA products. However, after subprime (and prime) credit offerings constricted, these borrowers turned to FHA. As such, 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 mortgage markets were rapidly declining.

Moreover, for purchase money and refinance loans, relatively lower bankruptcy and long-term delinquency rates are associated with tracts that experienced a relatively larger FHA share decline, but higher bankruptcy and long-term 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. Perhaps of even greater concern is our finding that higher LTVs are associated with larger FHA share purchase money and refinancing expansion. Therefore, we find evidence that FHA experienced its greatest growth in areas with relatively poor credit scores and high LTVs, leading to concerns about the increased default risk being picked up in the FHA portfolio.

While loan application denial rate has a negative relationship with both increasing FHA share decline and expansion for purchase money loans, loan application denial rate is positively associated with increasing FHA share decline and expansion for purchase money loans. Therefore, while some similarities exist across purchase money and refinancing FHA lending patterns, we find evidence that the trends of the two types of loan products also had key differences. Additionally, the ability of the models to explain the decline relative to the expansion is clear from the goodness of fit of the respective models. While the decline in FHA share might be well modeled by the relevant factors, the expansion may be due, in large measure, to policy pressures that are not well modeled by purely economic and demographic factors.

Table 5: Estimations of FHA Share, Purchase Money Loans

	(1)	(2)	(3)	(4)	(5)	(6)
	Decline (2001-2006)	Expansion (2006- 2009)	IQR	Decline Variation Explained	Expansion Variation Explained	Dif- ference
HMDA Median Loan Amount (\$000)	0.047*** (0.001)	0.065*** (0.004)	69.000	3.243	4.485	1.242
HMDA Minority %	0.042*** (0.001)	0.146*** (0.005)	38.526	1.618	5.625	4.007
HMDA Median Income (\$000)	-0.010*** (0.003)	-0.205*** (0.010)	23.000	0.230	4.715	4.485
% of Tract with > 90 Day Delinquency	-0.030*** (0.006)	0.129*** (0.022)	6.118	0.184	0.789	0.606
% of Tract with Bankruptcy	-0.023*** (0.008)	0.266*** (0.027)	4.551	0.105	1.211	1.106
HMDA Denial Rate	-0.016*** (0.004)	-0.172*** (0.013)	17.932	0.287	3.084	2.797
Census % with at least Associate's Degree	-0.014*** (0.003)	-0.040*** (0.010)	19.364	0.271	0.775	0.503
Census % Owner Occupied	-0.008*** (0.001)	0.045*** (0.005)	31.219	0.250	1.405	1.155
Loan-to-Value Ratio ("LTV")	-0.002 (0.001)	0.168*** (0.005)	23.756	0.048	3.991	3.943
Observations	38,318	37,657				
Adjusted R-sq.	0.882	0.335				

Notes for Tables 5 and 6: *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 (FHA share in 2001 - FHA share in 2006) or expansion period (FHA share in 2009 - FHA share in 2006). 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 is included in the model, but not displayed. The unit of observation is a tract. Source: HMDA data.

Table 6: Estimations of FHA Share, Refinancing Loans

	(1)	(2)	(3)	(4)	(5)	(6)
	Decline (2001-2006)	Expansion (2006- 2009)	IQR	Decline Variation Explained	Expansion Variation Explained	Dif- ference
HMDA Median Loan Amount (\$000)	0.011*** (0.001)	-0.019*** (0.003)	69.000	0.759	1.311	0.552
HMDA Minority %	0.006*** (0.001)	0.106*** (0.004)	38.526	0.231	4.084	3.853
HMDA Median Income (\$000)	0.013*** (0.002)	-0.117*** (0.007)	23.000	0.299	2.691	2.392
% of Tract with > 90 Day Delinquency	-0.015*** (0.003)	0.162*** (0.015)	6.118	0.092	0.991	0.899
% of Tract with Bankruptcy	-0.048*** (0.004)	0.204*** (0.019)	4.551	0.218	0.928	0.710
HMDA Denial Rate	0.012*** (0.002)	0.134*** (0.009)	17.932	0.215	2.403	2.188
Census % with at least Assoc Degree	-0.007*** (0.001)	-0.044*** (0.007)	19.364	0.136	0.852	0.716
Census % Owner Occupied	-0.002*** (0.001)	0.006 (0.004)	31.219	0.062	0.187	0.125
Loan-to-Value Ratio (“LTV”)	-0.012*** (0.001)	0.104*** (0.004)	23.756	0.285	2.471	2.186
Observations	38,223	37,872				
Adjusted R-sq.	0.849	0.367				

VI. CONCLUSIONS

The broad mission of FHA is to serve borrowers who might otherwise be underserved by lenders without the government insurance of credit risk. Historically, this has meant that FHA disproportionately served low income and minority borrowers who may have lacked down payment funds, borrowers who may have posed unacceptably high credit risk to prime, conventional lenders, and first time home buyers without established credit history records. Review of the stylized facts surrounding FHA lending are consistent with the hypothesis that FHA lost market share during the 2000 to 2006 period to subprime lenders, particularly for those borrowers with poorer credit histories, and FHA gained market share after 2006 from those with

low down payments (LTVs greater than 80 percent) who might previously have taken out mortgage insurance.

FHA's market share in this space is affected by pricing of government insurance for credit risk and by the level of market competition. During the 2000-2006 period, subprime lenders fighting for market share aggressively competed for FHA's constituency of borrowers by offering faster processing times and higher approval rates and, apparently, lower costs at least in terms of monthly payments. As a result, borrowers with poorer credit moved from FHA to subprime. After 2006, market pricing increased dramatically for low-down payment (high LTV) borrowers and overall credit standards tightened for FHA's targeted borrower, as mortgage insurers in the conventional market and others reacted to the excessively permissive underwriting during the rise of subprime. The result provided FHA with a favorably competitive position. FHA was lower priced, allowed lower down payments and had higher approval rates for mortgage applications. FHA especially gained share among low down payment borrowers. The result is that FHA's service population changed from a focus on more geographically concentrated poorer credit risk borrowers to less geographically concentrated higher LTV borrowers. This varies somewhat from the historical constituency for FHA, and it may make the program more viable in the long run.

FHA share will likely stay relatively high as long as its pricing remains similar relative to current market pricing. Pressures are on FHA to increase its prices to improve the viability of the MMI, but secondary market pressures are also high in the conventional market to increase pricing on higher LTV conventional loans. All things equal, increasing market pressure toward risk-based pricing will tend to keep FHA share high because FHA tends price below the conventional market because of lower costs and a greater tendency to utilize average cost pricing rather than risk based pricing.¹⁰ However, the FHA market for high LTV loans faces direct competition from the mortgage-insured conventional market. The last few years witnessed a substantial decline in the number of MI firms and in the volume of mortgage insured loans. Whether that trend continues depends, among other factors, on the specifications of qualified mortgages ("QM") and

¹⁰ See Courchane and Zorn (2012), *Real Estate Economics*.

qualified residential mortgages (“QRM”), and on the long term viability for the GSEs (Freddie Mac and Fannie Mae).¹¹ If the GSEs remain viable, regulations requiring mortgage insurance on high LTV conventional loans sold to the GSEs will push borrowers toward FHA. In the current market, without FHA lending there would be almost no high LTV lending. While we might suppose the current market is an anomaly in the long run, whether targeted government support for housing remains important, or not, will do much to determine whether or not the current market really is an anomaly or might rather be a portend of things to come.

¹¹ The Qualified Residential Mortgage (QRM) exemption for risk retention purposes (as required by Section 941) of the Dodd-Frank Act and the Qualified Mortgage (QM) definition falls under the “ability to repay” provisions of Section 1412 of Title XIV of the Dodd-Frank Act. See http://housedocs.house.gov/rules/finserv/111_hr4173_finsrvcr.pdf, last accessed October 12, 2012.

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