BELOW THE LINE
Estimates of Negative Equity among Nonprime Mortgage Borrowers

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Abstract

This paper provides some estimates of negative equity mortgages – mortgages whose balances exceed the value of the collateral housing unit - among non-prime borrowers. By combining house price indexes with loan information from the FirstAmerican CoreLogic LoanPerformance database, we provide estimates of the prevalence of negative equity across a variety of dimensions, including the location of the collateral housing unit and the year in which the mortgage originated. Our findings indicate that the prevalence and magnitude of negative equity are closely associated with the time and place the mortgage was originated, and with the existence of subordinate liens against the property. We also discuss the characteristics of borrowers who have a negative equity position, and explore the connection between negative equity and default behavior among subprime borrowers. We find that borrowers whose mortgage is worth more than their house are approximately twice as likely to be seriously delinquent, or in default, on their first lien mortgage than borrowers who have positive home equity. Using estimates of future house price changes, including information from futures markets, we provide estimates of how negative equity will evolve through 2009.

The views represented here are those of the authors and do not necessarily reflect those of the Federal Reserve Bank of New York or the Federal Reserve System.

1. Introduction

The boom in nonprime mortgage lending during 2004 to 2006 was quickly followed by rapid increases in the rate of delinquencies and foreclosures on these loans. This pronounced deterioration created alarm among investors, the public and policy makers. Uncertainty about the source of this decline in loan quality has played a role in the credit crunch that has developed over the last 18 months. In this paper, we provide estimates of borrower equity, an important correlate of the deterioration in the performance of these loans.

For the purposes of this study, the non-prime market consists of both subprime and alt-A loans. Compared with prime mortgage loans, **subprime** mortgages are typically of smaller value and made to borrowers with some blemish on their credit history. **Alt-A, or "near prime,"** mortgages are typically larger value loans made to borrowers who, for a variety of reasons, may not choose to provide the documentation of their income or assets typically required to obtain a prime mortgage.

Nonprime loan originations rose sharply after 2003 (Figure 1) and these loans became delinquent far more quickly than had earlier vintages. Loans originating in 2005 reached a 90-day delinquency rate in 12 months that took the 2003 vintage 20 months to reach. The 2006 vintage was even worse, acquiring the 2003 vintage's 90-day delinquency rate at 30 months within a year.[1] The mortgage industry's standard view of default risk has historically focused on four key underwriting characteristics at origination of a new mortgage: borrower credit rating, loan to value ratio (LTV), debt to income ratio (DTI), and the extent of third-party income and asset verification. Changes in these factors alone seemed insufficient to explain the severe and rapid deterioration in the status of these loans (Demyanyk and van Hemert, 2008; HPT). While some underwriting criteria deteriorated as the nonprime market share expanded,

[1] These figures include loans at least 90 days delinquent, in foreclosure, or in REO.

others changed little or even improved. For example, mean credit bureau scores of nonprime borrowers increased steadily after 2001, largely but not entirely as a result of a shift in composition of the nonprime pool toward alt-A loans (Figure 2).

In light of this mixed record on credit standards, some analysts turned to the economy to explain poor mortgage performance. Yet since economic growth during 2005-2007 was fairly steady--real GDP grew 3.1, 2.9 and 2.2%, respectively, for those three years and the unemployment rate fell below 5%--sharp income declines seemed an unlikely source of widespread increases in nonprime delinquencies and foreclosures.

Of course, aggregate statistics may mask changes in individual circumstances. When a borrower experiences a deterioration in her personal finances, her home equity is a key determinant of what she will do, and one underlying economic factor that did deteriorate concurrently with mortgage performance was house price appreciation. After peaking at an annualized growth rate of 9.68% in the third quarter of 2005, the OFHEO national purchase only House Price Index began to lose steam, and ultimately began to decline. By 2008Q1, the annualized quarterly growth rate was -6.9%, and the reversal was even sharper in some of areas of the country.

Observers in both the popular media and among researchers quickly pointed to the confluence of house price declines and mortgage defaults as more than coincidence (Gerardi, Shapiro and Willen, 2008; HPT; Demyanyk and van Hemert, 2008). Indeed, a large body of previous research on mortgage defaults indicates that declines in house prices – or more precisely reductions in borrower equity – are fundamental to default (Vandell 1995, Elul 2006), and limited evidence from the current downturn confirms this hypothesis (see, for example, Foote, Gerardi and Willen, 2008).

For this reason, measures of housing units with *negative* equity have become a necessary component in crafting policies to address the current foreclosure crisis. In this paper, we estimate and study negative equity in the US nonprime mortgage market for the Winter of 2009 and beyond. We start in Section 2 by describing our sample of mortgages and our methods, and then discuss how changes in mortgage underwriting and house price dynamics might be expected to affect borrower equity. Section 3 presents several tabulations of negative equity mortgages, and in this section we also examine the static relationship between negative equity and mortgage default. Section 4 discusses these results and, using information from other studies and futures markets, relates the evolution of house prices to borrowers' equity positions. Section 5 summarizes our major findings and concludes.

2. Data and methods

We combine information from several sources to provide our estimates of negative equity nonprime mortgages in the United States. Our primary source of information on individual loans and borrowers is FirstAmerican CoreLogic's LoanPerformance data set, which, as of February 2009, provided loan-level information at a monthly frequency on approximately 4.8 million active, securitized subprime and alt-A loans, carrying balances of over $1 trillion. While LoanPerformance captures over 90% of securitized nonprime loans after 1999 and nearly 100% for the crucial 2003-2005 vintages, it excludes all loans held in bank portfolios (Mayer and Pence 2008). Pennington-Cross (2002) argues that securitized subprime mortgages differ systematically from those retained in portfolio. Since our data are limited to securitized loans, any inferences should be limited to this set of loans.

The LoanPerformance dataset is a rich source of information on the characteristics of these loans. The dataset includes information on the date of origination and the zip code in which the collateral property is located, details of the mortgage contract, and underwriting information. Also included are monthly updates of dynamic information such as current interest rates, mortgage balances and the borrower's payment record.

We analyze a one percent random sample of the first-lien subprime and alt-A loans reported in the data as of December 1, 2008.[2] Our data set includes over 49,000 active (not yet paid off) loans with the information required for the analysis. We combine the loan-level data with aggregate data on house price dynamics for each MSA. Since our dataset is a sample, it is subject to sampling variation, but we report only point estimates here.

We use two sources of house price growth to estimate negative equity. The first is the widely-used Office of Federal Housing Enterprise Oversight House Price Index (OFHEO or OFHEO HPI), and the second is the S&P/Case-Shiller Home Price Index (CS).[3] Both of these indexes are based on repeated transactions on the same property over time, but they differ in several ways. For our purposes, the fact that OFHEO provides separate indexes for 381 metropolitan areas is a great benefit, as we can thus estimate house price changes for the great majority of the properties in our loan-level data set. Yet OFHEO is based on the sales prices or appraisals of homes covered by prime, conforming mortgages, i.e., those securitized by one of

[2] Since observations in the LoanPerformance dataset are loans coded to the zip code, we choose our dataset from the universe of first-lien loans only. This avoids the possibility of double counting subordinate lien loans on the same property. While the LoanPerformance data set also includes information on nonprime subordinate liens, it is impossible to match these loans to the first liens.

[3] See http://www.ofheo.gov/hpi.aspx and http://www2.standardandpoors.com/spf/pdf/index/SP_CS_Home_Price_Indices_Factsheet.pdf for more details. In July 2008, OFHEO became the Federal Housing Finance Agency, but we continue to refer to the OFHEO index.

the Government Sponsored Enterprises (GSEs).[4] Since the properties we study are by definition financed with a nonprime mortgage, OFHEO's focus on GSE mortgages introduces the possibility of measurement error in our estimate of house price appreciation, with the sign and magnitude of the error depending on how appreciation varies across different segments of each market.

The Case-Shiller index addresses this problem in two ways. First, it covers all sales, not just those of the prime market segment. Second, CS supplements the overall measure with separate indexes for three tiers in each of the markets it covers. The tiers break each market into thirds – low, middle and high - based on area house prices as of December 2008. For example, Los Angeles MSA properties with prices under $309,184 are in the low tier, properties with prices between $309,184 and $470,182 are in the middle tier and those priced above $470,182 are considered high tier. Inspection of the house price dynamics in these tiers indicates that they are indeed different from the overall measure, suggesting that, for our purposes, measurement error using the OFHEO index is probably nontrivial. This suspicion is confirmed by Leventis (2008) who finds that differences between Case-Shiller and OFHEO are importantly influenced by the treatment of lower-priced houses. In order to account for this potential discrepancy, we use the CS middle and high tier indexes to estimate house prices for subprime and alt-A loans, respectively.

In order to estimate equity in properties, we perform a series of simple calculations. First, we use data from LoanPerformance to calculate the borrower's net equity in the property at origination of each first lien loan. This measure captures both the balance of the first lien as well as all subordinate liens, if any exist. An interesting feature of the data is that while first

[4] Concerns have also been raised that appraisals during the "boom" years of nonprime lending were biased upward, and OFHEO publishes a national "purchase only" index that incorporates data only from actual sales. But this index is not available for individual metro areas.

lien loans remained at relatively stable LTVs throughout the 2000-2008 period, subordinate liens became both more common and rose in value as a percentage of house value. Figure 3 shows "box and whisker" plots of combined (all liens) LTVs by vintage. For each year, the shaded box indicates the middle 50% of the data. Thus the top of each box is the 75th percentile value, while the bottom is the 25th. The line in the middle of the box shows the median value. The thin whiskers extending from the ends of the boxes are the upper and lower and lower adjacent range, which extend 1.5 times the interquartile range in both directions.

The net equity at origination provides a starting point for our estimates; we use it to calculate equity at origination, which is house value at origination of the first lien loan (HV_o) minus total balances on all l liens $\sum_{l=1}^{L} M_o^l$ at origination. Equity at time t is then simply initial equity plus any house price appreciation, minus any increase in mortgage balances, after origination:

$$E_t = [HV_o - \sum_{l=1}^{L} M_o^l] + [\Delta HV_t - \sum_{l=1}^{L} \Delta M_o^l]$$

Net equity can change in three distinct ways:

- Principal amount on the first lien mortgage changes $\Delta M_t^1 \neq 0$ (typically mortgage balances will decline over time, meaning that $\Delta M_t^1 < 0$)
- Principal amount(s) on subordinate liens change $\sum_{l=2}^{L} \Delta M_t^l \neq 0$
- House value changes $\Delta HV_t \neq 0$

We have direct, micro-level evidence on only the first of these, since LoanPerformance tracks monthly balances on each first lien loan we observe. We use each metropolitan area's OFHEO and CS indexes to estimate changes in house values since origination of the loan. For balances on subordinate liens, we assume that the borrower makes regular interest payments,

but that principal amounts remain unchanged. Note that this is something of a "middle ground" assumption: borrowers may either make progress toward reducing the balances on subordinate liens ($\sum_{l=2}^{L} \Delta M_t^l < 0$), or may layer additional liens on top of those we observe ($\sum_{l=2}^{L} \Delta M_t^l > 0$).

3. Negative equity among nonprime borrowers

Two phenomena important for understanding homeowners' equity occurred after 2002. First, full loan-to-value ratios rose sharply, as junior liens became both more common and larger. This change is present throughout the post-2002 period, but is especially significant in 2006, when over 25% of nonprime originations had initial LTVs of 100 or more (Figure 3).

Second, starting in 2005, the house price environment, whether measured by OFHEO or CS, became much less favorable for building borrower equity. After peaking at an annualized growth rate of 9.68% in the third quarter of 2005, the OFHEO purchase only HPI began to lose steam, and reverted to decline. By 2008Q1, the annualized quarterly growth rate was -6.9%. This reversal was especially sharp in some of the areas that had experienced the highest growth prior to 2005. The Las Vegas, NV metropolitan area went from a house price growth rate, measured by the CS index, of over 42% in 2003 to -15% during 2007. An alternative story can be found in parts of the Midwest. In Cleveland, for example, the CS index house prices declined just 1.67% during 2007, but this followed a long period of relatively sluggish growth; the city's peak growth year was 2003 when prices rose just 5.4%.[5]

This combination of many homeowners holding little or no equity at mortgage origination and a declining housing market is a perfect storm for generating negative equity.

[5] Growth rates in this section are measured as December over December percentage growth.

Note that for a mortgage with an apparently safe origination LTV of around 80, a 20% decline in house value – not uncommon in many metro areas during 2007 – has the potential to wipe out essentially all their home equity. We should not be surprised, therefore, to find that the incidence of negative equity grew substantially in 2006 and 2007. What remains to be seen is exactly how large and how common nonprime negative equity mortgages have become, where they are concentrated, and what their consequences are for borrower behavior.

Our December 1, 2008 OFHEO-based estimates indicate that 21% of borrowers are in negative equity on their first lien, while 29% are in negative equity when junior liens are included (Table 1). In April, the percentage of nonprime borrowers facing negative equity was 3% and 13%, calculated using first and combined liens, respectively. At that time, borrowers with junior liens were more than four times as likely to be in negative equity, thus demonstrating the importance of second liens in determining negative equity. However, home prices have dropped markedly since then, causing even many borrowers who made a sizable down payment or had just a single lien to be in negative equity.

Limiting this analysis to the 17 cities covered by the Case-Shiller tiered indexes creates a more pessimistic picture (Table 2). Using this measure of house price changes, we estimate that 47% of housing units covered by nonprime mortgages – over 1.1 million households in these 17 cities alone-are in a negative equity position. Conducting the same analysis with OFHEO for this restricted set of cities produces an estimate of 768,500 mortgages – 35% -- being underwater.

This disparity highlights the difference in the segments of the markets both indices cover. While neither of these measures captures exactly the nonprime securitized market, the Case-Shiller index includes properties covered by these loans, while the OFHEO reliance on

conforming mortgages prevents it from doing so. On the other hand, OFHEO's national coverage is an enormous advantage in estimating the prevalence of negative equity in aggregate. We have opted to concentrate on what we believe to be the more accurate picture available for a restricted set of cities and thus we focus on the 17 cities for which we have CS tier information. Nonetheless, we also report OFHEO results, especially when analyzing the entire US.

As stated earlier, the time of origination of the loan is important in determining negative equity since the two determinants of negative equity, value of home and the ratio of the loan to the initial value of the home, are both correlated with vintage. Increases in full LTVs at origination, combined with the sharp reversal home prices during 2006 suggest that borrowers who took out their mortgages later in the period would be more likely to find themselves without any equity in their property. Very low proportions of nonprime mortgages originated before 2003 were upside down by December 2008, but negative equity rates are sharply higher in subsequent vintages (Figure 4). All told, we estimate that the difference between house values and nonprime balances in these cities totals over $58 billion.

Due to the importance of vintage, one would expect that areas with housing booms during 2004-2006, especially where borrowers took loans with little down, would have the highest prevalence of negative equity. Our data support this hypothesis. Almost a quarter of the negative equity properties in the 17 Case-shiller cities are located in one of the three California metro areas, with over 15% in Los Angeles alone (Table 3). In addition, negative equity amounts are much larger in the California (and to a lesser extent Floria) cities than elsewhere in the country. These Californian cities experienced relatively large declines in housing prices and had larger than average mortgages leading to a greater prevalence and

intensity of negative equity. Thus, borrowers who took out high LTV loans during 2006 and 2007 in areas which experienced sharp reversals in house prices are very likely to find themselves in a negative equity position.

Borrower characteristics and behavior

Borrowers facing negative equity are not distinctly less creditworthy than their positive equity counterparts. Not surprisingly, the most striking difference between positive and negative equity loans is the combined (senior plus junior) loan to value ratio at origination; in each MSA, average initial LTVs are significantly higher on negative equity loans. Debt-to-income ratios are generally higher among negative equity borrowers as well. Interestingly, credit bureau scores are generally higher among the negative equity borrowers.[6] The fact that "borrower quality" at origination is roughly the same for positive and negative equity loans is relevant for interpreting default behavior.

In understanding mortgage repayments it is crucial to analyze the relationship between equity status and default behavior. Recent research on default has indicated the importance of house price appreciation in influencing nonprime mortgage outcomes (Demyanyk and van Hemert, 2008; Gerardi, Shapiro and Willen 2007). Demyanyk and van Hemert (2008) find that borrowers whose houses have appreciated less (or depreciated more) tend to default more, other things equal. In this work, borrower default is treated as a continuous function of house value, while we analyze a sharp break at zero equity. The idea that borrower behavior might

[6] Table 5 reports these results using OFHEO index on the broader set of metropolitan areas. While the estimated shares in negative equity are consistently lower, they demonstrate similar spatial patterns, with the bulk of negative equity properties concentrated in the boom states, especially California. In addition, the concentration of negative equity loans among borrowers with relatively high credit scores, high debt-to-income ratios and combined LTV at origination is true of the broader sample. Neither sample demonstrates a clear relationship between equity and documentation levels.

change markedly as properties pass into negative equity is supported by both theory and empirical evidence. Theory predicts that borrowers with positive equity will rarely default, but borrowers with little or no equity will sometimes determine that default is the best option. When equity declines enough (i.e., if house values fall enough after loan origination), borrowers reach a critical value where they will be certain to default (Vandell 1995).

Haughwout, Peach and Tracy, 2008 (HPT) study the probability that a borrower falls at least 90 days behind on scheduled payments within the first year of a nonprime mortgage's life. HPT report very large ceteris paribus jumps in this probability as LTVs rise above 100, particularly for non-owner-occupant borrowers. They find that negative equity adds approximately 7 percentage points to default probability for owner-occupants, and between fifteen and twenty percentage points for investors, compared to similar owners with slightly positive equity in their properties (ie, those with LTVs between 95 and 100).

In other recent work, Foote, Gerardi and Willen (2008; FGW) study ownership experiences for both prime and nonprime borrowers in Massachusetts beginning in the late 1980s. Their results indicate two things relevant for our analysis: subprime borrowers are much more likely to default in general than those in conforming mortgages, and borrowers with negative equity are more likely to default after five years (and less likely to sell their properties) than those with positive equity.

As expected, we find that the share of loans that are 90 or more days delinquent with positive equity is a little more than half the rate of loans with negative equity (Table 6). However, borrowers who have negative equity on their homes are just as likely to be 30 days delinquent on their loans, but twice as likely to be in foreclosure, and three times as likely to be in REO (bottom panel of Table 6). Thus, a fall in home prices may not precipitate initial

delinquency, but instead encourages a homeowner who is already having difficulty making payments to default. This is consistent with a model in which some borrowers experience shocks to their incomes and fall a month or two behind on their mortgages, then decide whether to prepay (sell or refinance) or default. When their equity is below zero, the tendency to default is relatively strong.

While it is not evident in Table 6, 31% of properties in foreclosure or REO are, by our estimates, in a positive equity position, in spite of the argument presented above that negative equity is a necessary condition for default. The high number of positive equity properties in foreclosure may reflect mis-measurement of housing equity, or the presence of transactions costs that make default a better option than foreclosure.[7] Table 7 details our estimates of borrower equity by loan status for those loans we estimate to be "above the line". We find that our estimates of borrower equity are lower for those properties which are 90 days delinquent, in foreclosure or in REO. When prepayment penalties and the possibility of mis-measurement of house values are considered, it is possible that these borrowers perceive themselves to be upside down on their mortgages, helping to explain their behavior.

These results are qualitatively consistent with both FGW and HPT, but a direct comparison is difficult. In particular, since our mortgage dataset consists entirely of nonprime loans, we observe the effect of negative equity on that subsample of the FGW population. In addition, we observe a single cross-section of properties in foreclosure at a point in time, as opposed to the FGW approach of observing the timing of entry into default and the HPT analysis of delinquency within the first year after origination. Our foreclosure rates thus reflect

[7] Recall that we describe negative *book* equity. It may be the case that many loans that we measure as having positive equity have prepayment fees or other features that put the default option "in the money". It is also possible that we under-estimate house price declines for some of these loans.

not only the prevalence of entering foreclosure (which is itself influenced by both borrower and lender behavior) but also the time that a property in default spends in foreclosure.

4. Looking ahead

Due to the important relationship between negative equity and default, it is valuable to develop an understanding of how negative equity will evolve. We provide two glimpses into the future of negative equity among nonprime borrowers.

Another advantage of using the Case-Shiller indexes is that there exists a market in predicting the future path of house prices in individual MSAs.[8] The contracts are traded on the Chicago Mercantile Exchange, and currently provide estimates of house price appreciation for eight markets for varying quarters through November 2012.[9]

The Case-Shiller futures market forecasts further deterioration in home prices in these cities. In our December 2008 data, the five cities with contracts expiring in November 2009 had a combined negative equity rate of 45%, very near the average rate (47%) for all 17 CS cities. We estimate that the trajectories implied by the CS futures market would increase that rate to 61% by late 2009 and would add an additional 135,500 borrowers to the ranks of those whose homes are worth less than their mortgage balances in these cities. The contracts forecast the percentage of borrowers with negative equity in their home decreasing by the end of 2010 (Figure 5). These calculations were derived using the percent change in home prices

[8] See http://housingrdc.cme.com/index.html for information on this market.
[9] The current cities are Boston, Denver, Las Vegas, Los Angeles, New York, San Diego, San Francisco, and Washington, DC; futures prices for Miami are available only through November 2010. While the market is relatively thinly traded, activity picks up following releases of the CS index. We thus use the futures prices for contracts which had "open interest" on March 31, 2009, the release date for the January 2009 Case-Shiller home price indexes.

predicted for the Case-Shiller composite index and applying these changes to the high- and medium-tier indexes, assuming that borrowers fall no further behind on their mortgages.

Our second glimpse into the future is somewhat more general. In Figure 6, we show the number of borrowers in various equity categories, where equity is expressed as a percentage of house value, as of December 2008. For this analysis, we use the OFHEO index, which offers the broadest coverage. Assuming no changes in mortgage balances, one can estimate the number of new negative equity borrowers by moving the "zero line". For example, the effect of a 10% decline in house prices can be estimated by moving this line two bars to the right. Under this particular scenario, an additional 1,489,600 (719,600+770,000) nonprime borrowers would see their house values fall below their current mortgage balance. Conversely, a turnaround in the housing market that resulted in a 10% increase in house values would lift 729,200 borrowers into positive equity. These estimates are imprecise since they do not account for changes in mortgage balances over time.

5. Conclusion

Recent declines in house values have put hundreds of thousands of nonprime borrowers in a negative equity position, a situation we define as occurring when the value of the house is below the balance on the mortgage. Negative equity nonprime borrowers have several things in common: they took out loans near the peak of the housing market, at high loan to value ratios usually achieved with subordinate liens in addition to the first lien. While negative equity loans occur in most metropolitan areas, they are disproportionately concentrated in those housing markets which experienced especially large swings in house price appreciation, especially in California. We estimate that three California metropolitan areas account for over 1/4 of the

negative equity mortgages in our sample, and, due to higher balances on these loans, nearly half of the overall difference between house value and mortgage balances.

Further house price decline will yield further increases in the number of nonprime mortgages with negative equity. We estimate that an additional 10% decline in house prices will result in roughly 1.5 million new mortgages whose balances exceed the value of the collateral houses nationwide. The aggregate difference between these balances and house values could approach $135 billion.

While negative equity is a necessary condition for default, it is not sufficient. As emphasized in previous literature and as shown by our data, borrowers do not automatically default when their house value drops below the balance on their mortgage statement. Nonetheless, other research has demonstrated that negative equity borrowers are far less likely to prepay their mortgages, and are in fact more likely to become seriously delinquent and to default. We find that, among our nonprime borrowers, the probability that an outstanding negative equity mortgage will be in default in December 2008 was two to three times as high as a positive equity borrower. In this context, the future of house prices will be a critical determinant of future payment behavior of the nonprime population.)

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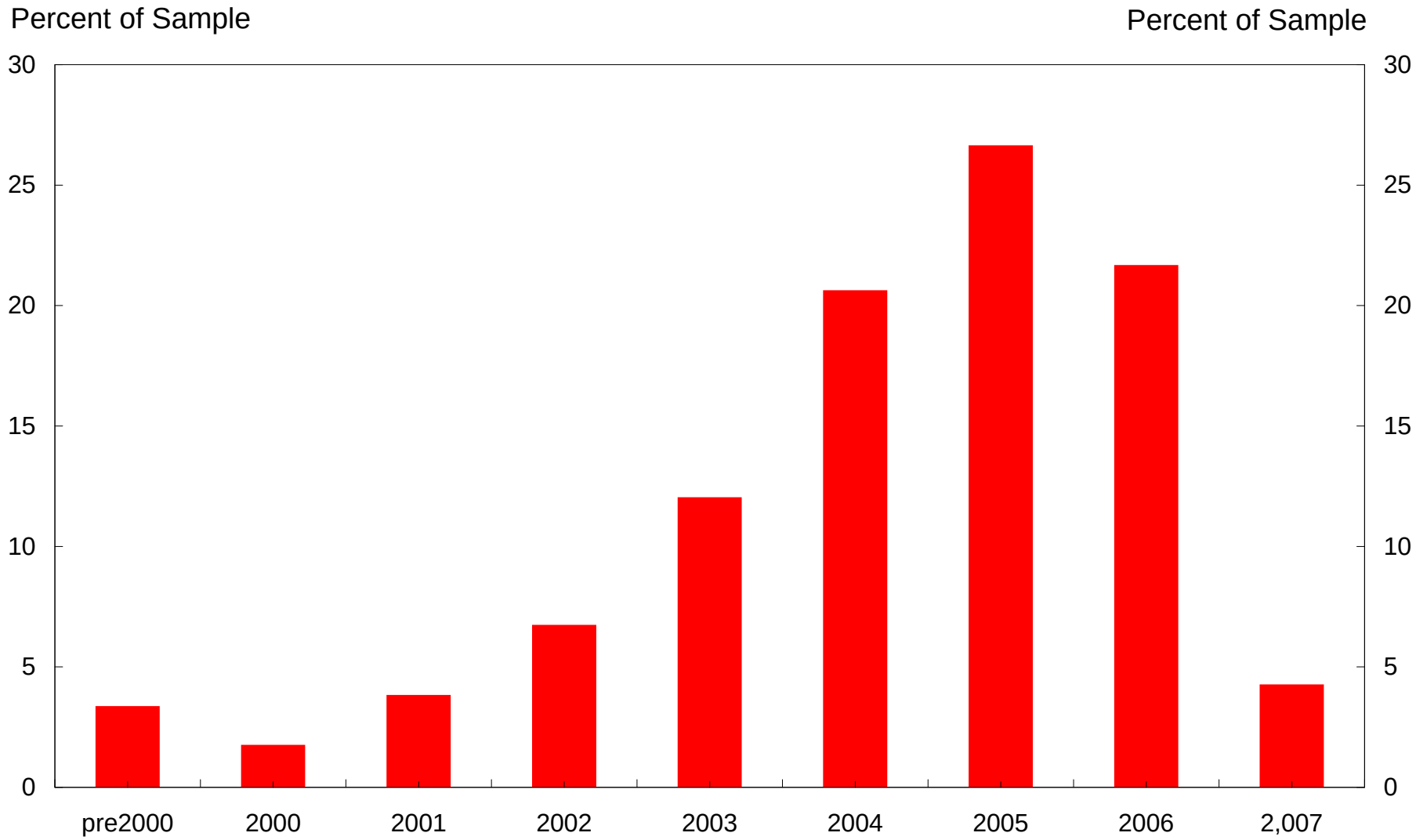
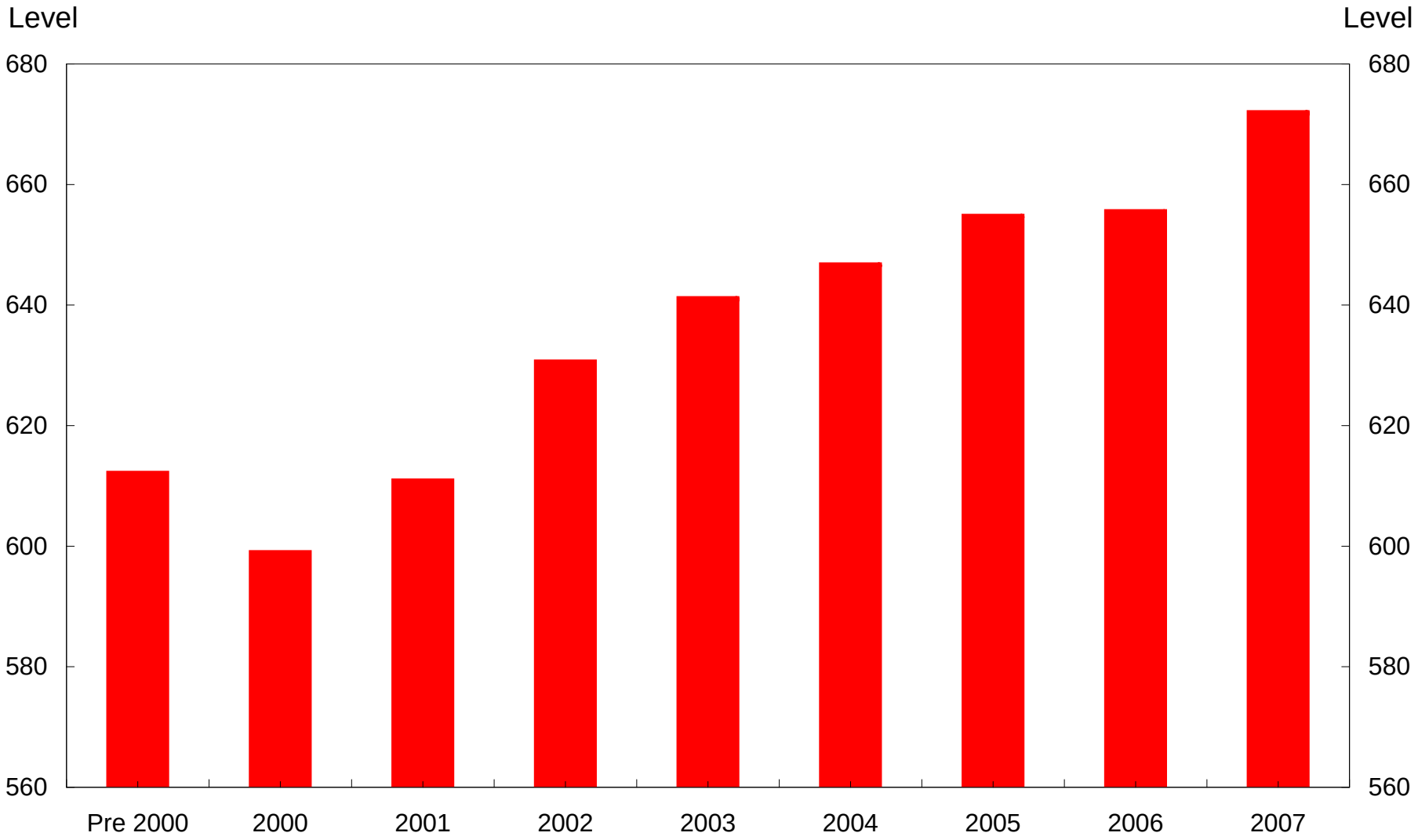
Figure 1: Nonprime Loan Originations by Year



Source: FirstAmerican CoreLogic LoanPerformance

Figure 2: Mean FICO by Vintage



Source: FirstAmerican CoreLogic LoanPerformance

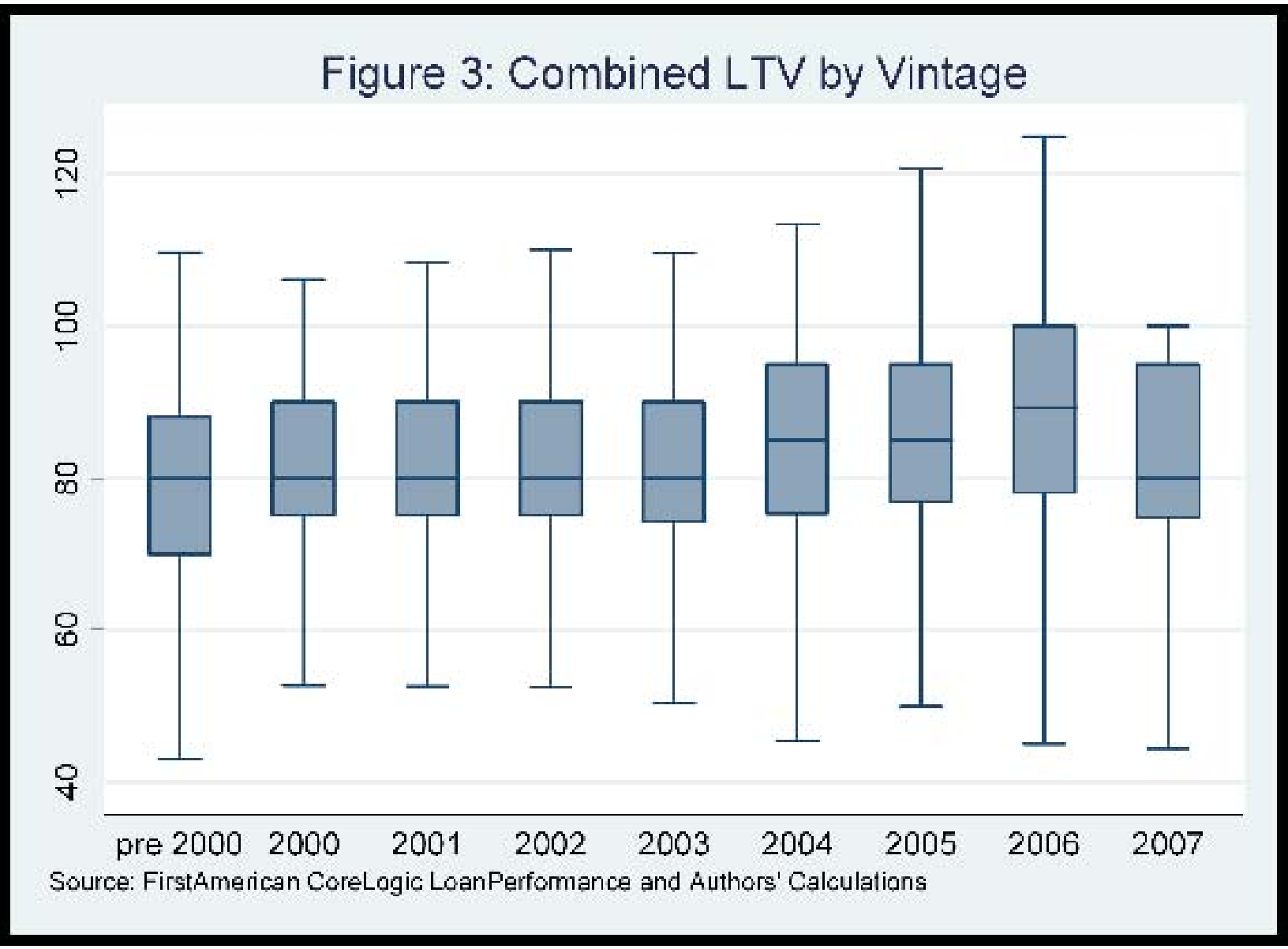
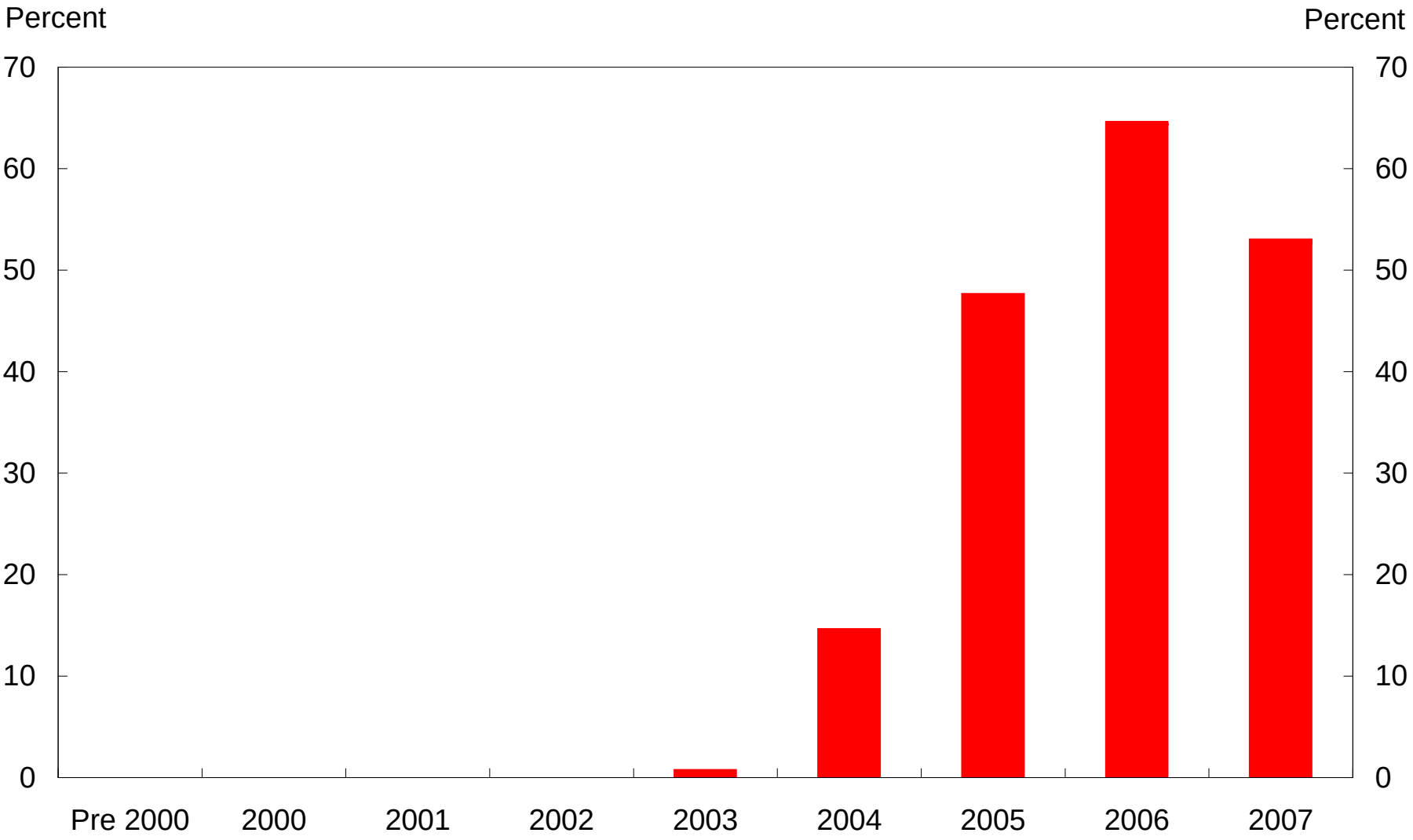


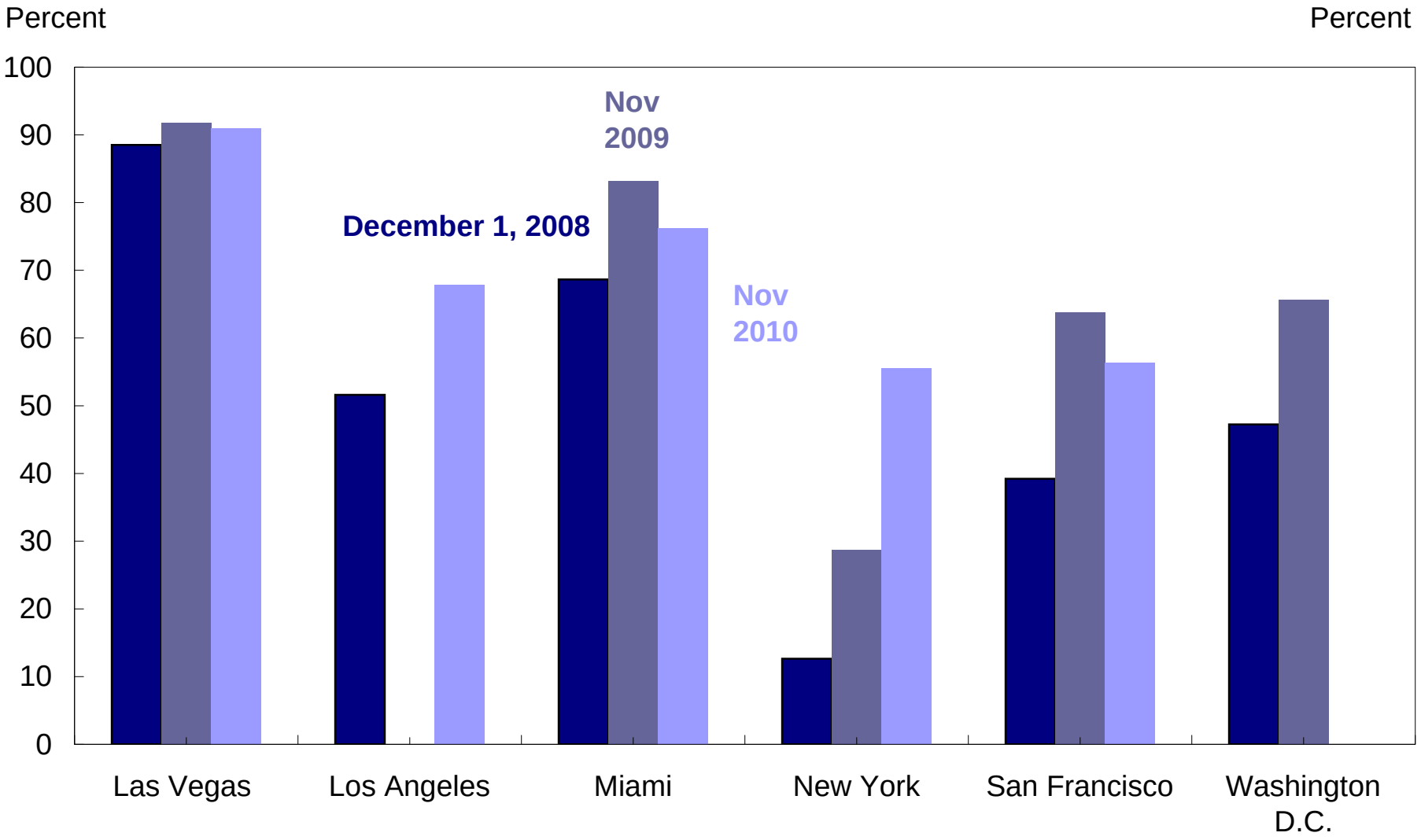
Figure 3: Combined LTV by Vintage
120
100
80
60
40
pre 2000
2000
2001
2002
2003
2004
2005
2006
2007
Source: FirstAmerican CoreLogic LoanPerformance and Authors' Calculations

Figure 4: Nonprime Negative Equity by Vintage



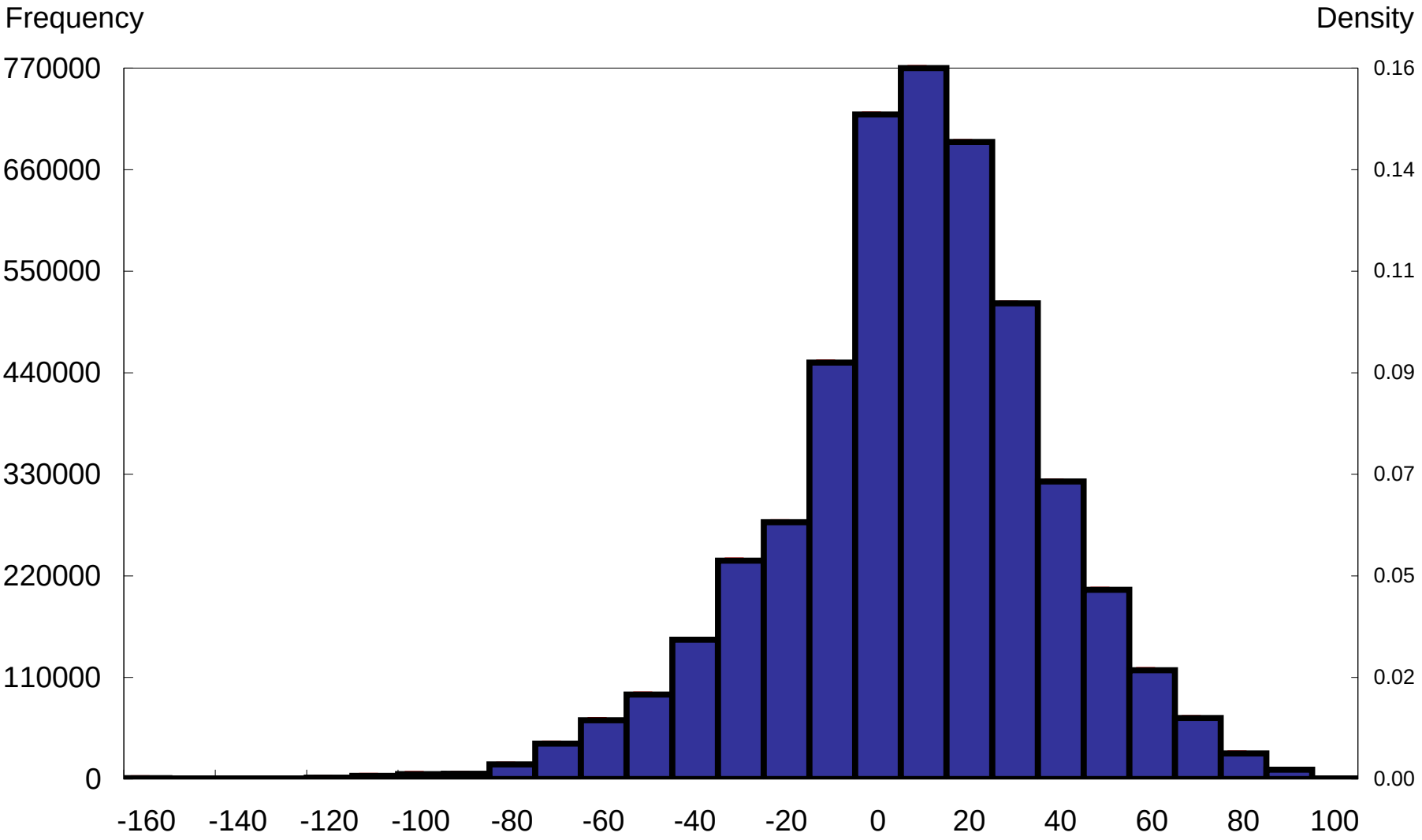
Source: FirstAmerican CoreLogic LoanPerformance

Figure 5: The Future of Negative Equity



Source: FirstAmerican CoreLogic LoanPerformance and S&P/Case-Shiller Home Futures from CME

Figure 6: Equity to House Price Ratio



Source: LoanPerformance CoreLogic LoanPerformance and OFHEO

Table 1: OFHEO-based Negative Equity Estimates**

	Number of Loar	Percent
First lien	10,144	21.19
All liens	13,766	28.75
Total Loans	47,876	100

** House value changes estimated using the OFHEO indexes for individual MSAs

Table 2: OFHEO and Case-Shiller Comparison

Case-Shiller Negative Equity Estimates*

	Number of Loar	Percent
First lien	7,150	33.78
All liens	9,989	47.2
Total Loans	21,164	100

OFHEO Negative Equity Estimates**

	Number of Loans	Percent
First lien	4,945	23.37
All liens	7,367	34.81
Total Loans	21,164	100

* House value changes estimated using the Case-Shiller high and medium tier indexes for individual MSAs
** House value changes estimated using the OFHEO indexes for individual MSAs

Table 3: Negative Equity by MSA*

MSA	% Negative Equity	Average Difference between mortgage balance and house value	Total Amount Underwater
Atlanta	45.5	$18,016	$983,657,766
Boston	20.8	$17,156	$202,444,812
Chicago	35.5	$18,201	$964,665,720
Cleveland	31.6	$9,865	$114,438,594
Denver	33.3	$12,607	$267,278,576
Las Vegas	88.5	$83,654	$7,871,866,807
Los Angeles	51.6	$80,484	$13,593,686,796
Miami	68.6	$68,357	$10,417,594,608
Minneapolis	61.4	$32,839	$1,155,939,488
NewYork	12.6	$22,119	$822,840,192
Phoenix	79.8	$73,314	$9,024,994,023
Portland	24.3	$18,676	$190,500,198
San Diego	60.8	$84,371	$4,496,985,493
San Francisco	39.2	$65,986	$2,830,803,690
Seattle	20.8	$17,125	$236,326,242
Tampa	59.7	$37,110	$1,888,913,761
Washington D.C.	47.2	$52,113	$3,397,755,864
17-City Composite	47.2	$58,496	$58,460,692,526

* House value changes estimated using the Case-Shiller high and medium tier indexes for individual MSAs
Mortgage balances on junior and senior liens combined

Table 4: Underwriting Characteristics by Equity Status and MSA*

MSA	Equity Status	DTI	FICO	LTV	Fully Documented
17 City Composite					
Positive Equity	52.8	38.2	673	72.7	43
Negative Equity	47.2	40.1	678	91.1	36
Atlanta					
Positive Equity	54.5	34.7	673	80.3	56
Negative Equity	45.5	40.1	668	97.8	61
Boston					
Positive Equity	79.2	38.6	662	72.4	42
Negative Equity	20.8	42.5	678	98.1	42
Chicago					
Positive Equity	64.6	39.3	641	80.0	53
Negative Equity	35.5	41.5	667	97.2	40
Cleveland					
Positive Equity	68.4	37.0	636	82.2	62
Negative Equity	31.6	41.0	646	97.1	78
Denver					
Positive Equity	66.7	38.1	675	82.4	57
Negative Equity	33.3	41.5	671	99.0	61
Las Vegas					
Positive Equity	11.5	33.9	689	65.0	39
Negative Equity	88.5	38.8	683	87.9	33
Los Angeles					
Positive Equity	48.4	38.2	692	62.7	35
Negative Equity	51.6	40.6	690	89.5	22
Miami					
Positive Equity	31.4	38.2	654	67.0	42
Negative Equity	68.7	39.3	667	88.5	33
Minneapolis					
Positive Equity	38.6	36.3	673	75.6	52
Negative Equity	61.4	41.2	668	94.9	54
New York					
Positive Equity	87.4	39.8	663	75.3	38
Negative Equity	12.6	41.7	686	98.2	22
Phoenix					
Positive Equity	20.2	34.8	693	69.7	48
Negative Equity	79.8	39.4	673	86.8	41
Portland					
Positive Equity	75.7	37.4	685	79.1	47
Negative Equity	24.3	41.0	691	97.7	44
San Diego					
Positive Equity	39.2	36.3	703	60.3	33
Negative Equity	60.8	40.1	699	88.4	26
San Francisco					
Positive Equity	60.8	36.3	716	65.2	32
Negative Equity	39.2	39.8	693	91.0	24
Seattle					
Positive Equity	79.2	39.2	678	81.3	50
Negative Equity	20.8	39.2	694	97.4	44
Tampa					
Positive Equity	40.3	35.0	659	72.7	49
Negative Equity	59.7	38.9	666	89.5	40
Washington D.C.					
Positive Equity	52.8	38.9	674.51	71.0	44
Negative Equity	47.3	41.1	676.62	93.8	38

* House value changes estimated using the Case-Shiller high and medium tier indexes for individual MSAs

Table 5: Underwriting Characteristics by Equity Status and State**

MSA	Underwater Status	DTI	FICO	LTV	Fully Documented
		Non-Boom and Non-Bust States			
		43 State Composite			
Positive Equity	91.3	38.3	655	83.0	55
Negative Equity	8.7	42.1	672	98.2	44
		Boom			
		Arizona			
Positive Equity	56.9	37.2	674	75.3	46
Negative Equity	43.1	40.1	676	92.6	40
		California			
Positive Equity	42.6	37.2	695	64.2	37
Negative Equity	57.4	40.1	685	88.3	28
		Florida			
Positive Equity	51.1	37.7	657	74.9	46
Negative Equity	49.0	39.4	666	90.7	35
		Nevada			
Positive Equity	20.1	36.8	687	68.6	39
Negative Equity	79.9	38.8	683	88.5	34
		Bust			
		Indiana			
Positive Equity	97.9	37.0	640	86.5	70
Negative Equity	2.2	39.6	623	98.2	79
		Michigan			
Positive Equity	47.0	37.3	637	77.1	65
Negative Equity	53.1	39.8	646	93.5	65
		Ohio			
Positive Equity	89.2	38.0	638	85.6	67
Negative Equity	10.8	41.1	645	99.2	76

** House value changes estimated using the OFHEO indexes for individual MSAs

Table 6: Loan Status by Equity*

	Days delinquent			Foreclosure	REO
First lien	30	60	90+		
Positive Equity	7.51	3.88	7.52	8.07	3.94
Negative Equity	8.67	5.61	11.61	17.18	8.95
All liens					
Positive Equity	7.44	3.58	6.71	7.07	2.73
Negative Equity	8.42	5.45	11.35	15.72	8.88

* House value changes estimated using the Case-Shiller high and medium tier indexes for individual MSAs

Table 7: Loan Status by Positive Equity

	Current	Days delinquent			Foreclosure	REO
		30	60	90+		
between Mortgage Balance and House Value	$137,610.00	$86,294.34	$71,683.01	$76,291.45	$59,898.33	$42,954.09
Averge Difference as a Percentage of House Value	0.28	0.22	0.20	0.17	0.15	0.13

* Estimated using the Case-Shiller high and medium tier indexes for individual MSAs