AEI HMI: Key Takeaways for the National Mortgage Risk Index (NMRI)

• Given the mortgage rate drop since November, the rate of house price appreciation (HPA) has picked up again
  – At our January 7, 2019 briefing we predicted: “Given the rate drop since November, we would expect a modest pickup in the HPA rate”
  – Preliminary numbers for January 2018 indicate HPA of 3.8% compared to a year ago
  – HPA remained strongly bifurcated. Prices in the low price tier appreciated at 5.3% compared to a year ago, while house prices in the high tier appreciated at only 1.5%

• Mortgage risk jumped in November
  – The composite Purchase NMRI was up 0.5 ppt from Nov. 2017
  – All purchase indices (with the exception of Rural Housing Services) either set new series’ highs or matched those highs
  – This trend was led by FHA, whose NMRI for November 2018 stood at 28.5%
  – The Refi NMRI also set a new series’ high primarily due to a higher Cash-Out Refi NMRI

• Fannie Mae’s risk index continues to outpace Freddie Mac’s
  – Fannie’s purchase risk index in Nov. 2018 was 1.5 ppts (or 22%) higher than Freddie’s
  – Interestingly, this risk pick-up has not translated into any meaningful market share gains for Fannie

• Purchase volume for November 2018 was down 5.1% compared to a year ago
  – Volume for first-time buyers (-3.6% yoy) and repeat buyers (-7.0% yoy) has declined
  – Greater access to credit is allowing first-time buyers to offset higher mortgage rates and higher house prices, while repeat buyers with less access to credit are electing to drop out of the market in larger numbers

• The share shift from banks to nonbanks is intensifying, again driven by nonbank’s greater risk tolerance
  – The nonbank’s agency purchase market share set a series’ high in November 2018, while the large bank market share fell to a series’ low
  – The nonbank purchase NMRI stood 15.2% in Nov. 2018, while the large banks NMRI stood at 9.2%
AEI Housing Market Indicators: An Introduction

• Provide accurate and timely metrics for the housing market. These include:
  • Mortgage Risk/Leverage
    – Particular focus is paid to agency first-time buyer volume and risk
  • House prices and appreciation trends
  • Housing sales
    – New and existing sales whether institutionally financed, cash, and other-financed
  • Months inventory

• The housing market is influenced by many different levers. All need to be connected and considered to better understand market trends.
  – AEI HMI adds geography and price points to the broad set of metrics:
    • Geography: national, state, and selected metros
      – House prices down to the census tract
    • Price points: low, low-medium, medium-high, and high price tiers
      – Price tiers are defined based on the availability of leverage for borrowers at certain geographies.

• The Housing Market Indicators draw from and connect many different datasets:
  • HMDA
  • Public Records Data
  • National Mortgage Risk Index (agency MBS data)
  • CoreLogic's LLMA and Black Knight's McDash (servicer data)
  • Fannie Mae's Loan Performance data and Freddie Mac's Loan-Level Data (acquisition data)
  • FHA Snapshot data (endorsement data)
  • Data from Zillow on existing home sales and unique listings

• Advantages of the AEI Housing Market Indicators:
  – Most in-depth resource for key housing data and trends (select data available online for download)
  – Accurate, timely, and in-depth coverage of purchase trends
  – Connects the dots between a multitude of housing indicators for the most comprehensive analysis of the housing market and boom/bust cycles
National Mortgage Risk Index (NMRI): A Quick Primer

• Overall goal:
  – Monitor market stability through accurate, real-time tracking of leverage that, if left unchecked, would result in destructive housing booms/busts.

• Principles behind the NMRI
  – NMRI is a stress test, similar to a car crash safety rating or hurricane rating for buildings.
  – The NMRI’s stress event is the financial crisis from 2007.

• Basics of index construction
  – The NMRI is a standardized quantitative index for mortgage risk (leverage)
  – Places loans in risk buckets and assesses default risk based on the performance of the 2007 vintage loans with similar characteristics

• Advantages of the NMRI
  – Near-complete census of gov’t-guaranteed loans,
  – Accurate, timely, and in-depth coverage of purchase mortgage trends
  – NMRI provides significant signals of market trends without the noise of other indices

• What does an increasing or decreasing NMRI mean?
  – Increasing NMRI = increasing leverage = looser lending
  – Decreasing NMRI = decreasing leverage = tighter lending
Stressed Default Rates, Home Purchase Loans

<table>
<thead>
<tr>
<th>Risk Bucket</th>
<th>Credit Score</th>
<th>CLTV</th>
<th>Total DTI</th>
<th>Default Rate</th>
</tr>
</thead>
<tbody>
<tr>
<td>Very Low</td>
<td>≥ 770</td>
<td>61-70%</td>
<td>≤ 33%</td>
<td>0.8%</td>
</tr>
<tr>
<td>Low</td>
<td>720-769</td>
<td>76-80%</td>
<td>34-38%</td>
<td>4.2%</td>
</tr>
<tr>
<td>Medium</td>
<td>690-719</td>
<td>81-85%</td>
<td>39-43%</td>
<td>9.3%</td>
</tr>
<tr>
<td>High</td>
<td>660-689</td>
<td>91-95%</td>
<td>44-50%</td>
<td>22.7%</td>
</tr>
<tr>
<td>Very High</td>
<td>620-639</td>
<td>&gt; 95%</td>
<td>&gt; 50%</td>
<td>45.8%</td>
</tr>
</tbody>
</table>

Note: Default rates represent cumulative defaults through year-end 2012 for Freddie Mac's 2007 vintage of acquired loans. The loans included in the calculation are all primary owner-occupied, 30-year fixed-rate, fully amortizing, fully documented, home purchase loans.

- Takeaway: Huge spread of default rates across risk buckets
- All 320 risk buckets for home purchase loans are shown at [Periodic Table – Purchase](#)
- Analogous tables for cash-out and no-cash-out refi loans are at [Periodic Tables – Refinance](#)
- Additional loan risk factors are applied to VA loans and to ARMs, investor loans, second homes, 15 year terms, and 20 year terms
National Mortgage Risk Index (NMRI): A Quick Primer

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  – Increasing NMRI = increasing leverage = looser lending
  – Decreasing NMRI = decreasing leverage = tighter lending
House Price Appreciation (HPA) Index: A Quick Primer

• Overall goal:
  – Monitor market stability through accurate, real-time tracking of house prices.

• Basics of index construction
  – Most widely known HPA Indices are repeat sales (i.e. Case Shiller or FHFA) or hedonic (Zillow) indices.
  – AEI’s HPA is a “quasi” repeat sales index with a hedonic element.
  – Index measures HPA by constructing an artificial sales pair consisting of one actual sale and one “artificial” sale as measured by the property’s AVM.
  – The AVM (Automated Valuation Model) approximates a property’s sale price at a given point in time. The AVM used for AEI’s HPA Index is unbiased and accurate.

• Advantages of AEI’s HPA Index:
  – Combines the best of repeat and hedonic models.
  – Unlike a true repeat sales index, which is limited to repeat sales and may therefore be biased, AEI’s index includes the entire universe of sales.
  – Unlike a true hedonic index, which incorporates every property (even unsold ones), it reduces the amount of errors since at least one sale of the transaction pair actually occurred.
  – Allows for an index construction by price tier and fine geographic levels (down to census tract).

• Data for the HPA index
  – Data currently cover the largest 74 metro areas with the exception of the Atlanta, GA Metro.
  – Uses virtually all institutionally financed sales back to October 2012.
  – Data are weighted at the county level to make them representative.
  – HPAs for the medium-high and high price tiers are spliced around the time of loan limit changes.
The composite NMRI for purchase loans jumped 0.5 ppt from elevated levels a year ago. The first-time buyer index jumped 0.6 ppt, primarily due to FHA being up 1.7 ppts. The repeat buyer index was up 0.3 ppt. Rising prices are having a disparate impact on buyers, benefiting repeat buyers through asset appreciation, and hurting FTBs who have to take on more leverage.

Note: Includes all types of NMRI purchase loans (primary owner-occupied, second home, and investor loans).
NMRI for Home Purchase Loans

The composite index has consistently been trending up since mid-2013, with FHA leading the way. All agencies – with the exception of RHS - set new series’ highs in November. Unless household income accelerates, future support for the housing market will likely involve further increases in leverage from an already high level.

FHA share of purchase loans:
- Sep-18: 22.0%; Oct-18: 22.4%; Nov-18: 22.5%

FHA: +7.6 ppts, from 20.9 to 28.5%

Composite: +2.0 ppts, from 11.1% to 13.1%

VA: +1.7 ppts, from 10.7% to 12.4%

Fannie: +3.0 ppts, from 5.0% to 8.1%

RHS: -0.5 ppt, from 19.4 to 18.9%

Freddie: +1.8 ppts, from 4.9% to 6.6%

* Change from October 2012 to October 2018.
Source: AEI, Center on Housing Markets and Finance, www.AEI.org/housing. RHS is Rural Housing Service.
Purchase Loans with Total DTI Greater than QM Limit of 43%

As expected, the share of loans with DTI > 43% is growing rapidly to compensate for faster home price increases compared to incomes, a trend most pronounced for Fannie (+15.5 ppts) and FHA (+12.7 ppts) over past 24 months. Despite Fannie’s announcement in March to update its Desktop Underwriting, after it had first raised the DTI limit to 50 in August 2017, there is little evidence that it has actually reigned in this segment. The only exceptions to the trend are RHS and Portfolio lenders.

Note: Data pertain to purchase loans for primary owner-occupied properties. Data for the portfolio line come from LLMA and McDash after removing duplicative loans. The data are weighted by loan amount buckets and origination year using HMDA weights (lag due to time needed to allow for sales to GSEs). Weights for 2018 are assumed to be identical to 2017.

* A seller’s market, defined by the National Association of Realtors (NAR) as a home inventory supply of 6 months or less, has been present since Sept. 2012.

Source: AEI, Center on Housing Markets and Finance, www.AEI.org/housing, CoreLogic, and Black Knight.
Over the last 6 years FHA-insured home buyers have seen a growth in housing debt that has greatly outpaced income growth. Lower income borrowers have had the largest increase in debt burden relative to incomes (+14 ppts. differential).

Note: Data are for largest 73 metros. Source: AEI, Center on Housing Markets and Finance, www.AEI.org/housing.
Dovish Fed = Monetary Punchbowl Getting Spiked Again

Given the drop in mortgage rates from their November high, house price appreciation (HPA) has modestly picked up again as predicted. At our January 7, 2019 briefing we stated: “Given the rate drop since November, we would expect a modest pickup in the HPA rate.” Preliminary numbers for January 2019 indicate HPA of 3.8% compared to a year ago, up from 3.4% for December 2018 vs. December 2017. Given rate trends and continued increases in DTIs, we expect the rate of HPA to accelerate in the spring.

Note: Data for October 2018 to January 2019 are preliminary.
House price appreciation (HPA) has been greater for entry-level homes (low and low-medium price tiers) than for move-up homes (medium-high and high price tiers). Since October 2012, house prices in the low tier have risen 49% but only 29% in the high tier. This trend of divergent growth rates is continuing and even accelerating.

Source: AEI, Center on Housing Markets and Finance www.AEI.org/housing.
House Price Appreciation (HPA) by Price Tier: 73 Metros

HPA remained strongly bifurcated. In January 2019, house prices in the low and low-medium price tiers appreciated at a faster pace than in December, with the biggest rebound in prices coming in the low price tier, where access to credit is most prevalent. Compared to a year ago, house prices in the low price tier appreciated 5.3% and 4.0% in the low-medium tier, while house prices in the medium-high tier appreciated 3.1% and only 1.5% in the high tier.

Note: Data for October 2018 to January 2019 are preliminary. Price tiers are set at the metro level and are defined as follows: Low: all sales at or below the 40th percentile of FHA sales prices; Low-Medium: all sales at or below the 80th percentile of FHA sales prices; Medium-High: all sales at or below the 125% of the GSE loan limit; and High: Rest. HPAs are smoothed around the times of FHFA loan limit changes.

The supply-demand imbalance persists. The NAR’s not-seasonally adjusted months (mo.) inventory in January, which is traditionally the month with the greatest inventory and lowest sales, stood at 5.6 mo., up 0.7 mo. from a year ago. While this metric has started to increase over the past 5 mo., it is still averaging below 6 mo., the demarcation between a buyer’s and seller’s market, and it will fall back with the beginning of the spring buying season. Thus, it is too soon to project a return of a buyer’s market. Instead, we expect the seller’s market to modestly strengthen. This means further credit easing will continue to be capitalized into higher home prices. According to the FHFA, not-seasonally adjusted home prices rose 5.8% in November year-over-year, down from 6.8% a year ago. The chart below shows the strong inverse relationship between supply and prices.
Affordability Worsens in a Seller’s Market

Nominal Price-to-Income Ratio* has retraced 53% of the drop from the 2006 peak to the 2012 trough. Combination of a continued highly accommodative monetary policy and easier lending promotes further capital flows into real estate, increasing the potential for economic damage as highly leveraged lending fuels a cyclically volatile housing sector.

Nominal Price-to-Income Ratio, through 2018:Q4*

* Calculated as median house price divided by median household income.

Source: Zillow.

GSE affordable housing goals take effect for CY 1993 as mandated by the Housing Enterprises Safety and Soundness Act of 1992

1993-2006: period of credit easing and generally falling mortgage rates

2012 to date: easing loan standards, very loose Fed policy, and historically low mortgage rates

* Calculated as median house price divided by median household income.

Note: The National Association of Realtors (NAR) defines a seller’s market as inventory that is less than or equal to 6 months of sales. NAR data pertain to existing homes; not available before June 1982. Data from the Census Bureau for new home inventories used before June 1982. Source: AEI, Center on Housing Markets and Finance, www.AEI.org/housing, Zillow, Census Bureau, and the NAR.
Fannie Mae’s risk index continues to outpace Freddie Mac’s. Fannie’s purchase MRI in Nov. 2018 was 1.5 ppts (or 22%) higher than Freddie’s. Interestingly, this risk pick-up has not translated into any meaningful market share gains for Fannie. While its share has been volatile, it has averaged around 58-61% for each November since 2013.

A closer look at the risk distribution of Fannie and Freddie reveals that while Freddie has loosened underwriting moderately, Fannie has been more aggressive. The share pickup for Fannie, Freddie, and FHA shows that Fannie is increasingly competing with FHA for loans with a risk score between 8-24%. This segment currently accounts for 41% and 38% of Fannie and FHA’s business respectively. FHA is replacing this lost business with much higher risk loans, those with an MRI of greater than 32%.

History Repeats Itself: the “Quiet” Battle for Subprime (High Risk >95 CLTV Purchase Loans) among Fannie, Freddie & FHA

As this segment of the GSE’s business has grown, Fannie has been holding the clear advantage over Freddie with a market share of 75-95% (Fannie’s share of all GSE purchase business is currently less than 60%). Interestingly, with Fannie in the driver seat, it has been charging higher loan rates on a risk-adjusted basis. As the prior slide shows, Fannie is able to poach these loans from FHA, since FHA does not price for risk.

Note: Data are for high risk primary owner-occupied home purchase loans with a CLTV > 95%. High risk are loans with a stressed default rate of 12% or greater. Source: AEI, Center on Housing Markets and Finance, www.AEI.org/housing.
Leverage Fueled Housing Demand Pauses Due to Higher Rates

While still being up 25 percent from 5 years ago, purchase volume in November 2018 declined 5.1 percent from a year earlier. First-time buyer volume was down 3.6 percent, while repeat buyer volume was down 7.0%. Greater access to credit is allowing first-time buyers to offset higher mortgage rates and higher house prices, while repeat buyers, with less access to credit, are electing to drop out of the market in larger numbers.

The November Agency FBMRI stood at 17.0%, up 0.6 ppt from a year earlier. It is also 7.4 pts. higher than the mortgage risk index for repeat buyers, which is 0.4 ppt. wider than the gap a year earlier. Given supply constraints and absent a triggering event, we expect house prices and leverage to continue to rise for FTBs.

Note: Calculated for primary owner-occupied home purchase mortgages.
Source: AEI Center on Housing Markets and Finance, [www.aei.org/housing](http://www.aei.org/housing).
Origination Shares and MRIs by Seller Lender Type, GSE Purchase Loans

The shift in GSE market share from large banks to nonbanks appears to be resuming. The large-bank share has dropped to a series’ low of around 25% in November 2018, down from 34% a year ago. Other banks are also losing share. Banks (both large and other) have a lower GSE risk profile than nonbanks.

Note: Data for most recent months may understate large-bank share by perhaps 2 percentage points, as large banks are slower to move recent originations to the guarantee agencies for securitization and our market shares are based on securitized loans. MRIs for credit unions and state housing agencies are not shown because of low loan volumes.

*Origination shares do not show shares for State Housing Finance Agencies or Credit Unions which account for about 5% of the GSE Purchase market.

The dramatic market shift from large banks to nonbanks for FHA loans appears to be continuing. In November, the large bank share dropped below 10%, a new series’ low. Migration to nonbanks has boosted overall risk levels, as nonbanks are willing to originate riskier FHA loans than large banks.

Origination Shares*

Mortgage Risk Indexes

Note: Data for most recent months may understate large-bank share by perhaps 2 percentage points, as large banks are slower to move recent originations to the guarantee agencies for securitization and our market shares are based on securitized loans. MRIs for credit unions and state housing agencies are not shown because of low loan volumes.

*Origination shares do not show shares for State Housing Finance Agencies and Credit Unions which account for about 4% of the FHA Purchase market.

The same share shift from banks to nonbanks applies to agency refi loans. The large bank share dropped below 20% for the first time in the series. Similar to purchase loans, the gap in riskiness between banks and nonbanks has also widened over time.

Note: Composite includes credit unions and state housing agencies, which are not shown separately.
Introducing the NMRI Interactive Tool


Scroll over “Indexes & Indicators” and then click on “Mortgage Risk Index” on the dropdown menu.
Introducing the NMRI Interactive Tool (cont.)

Latest data will go live at 10 am on the day of the briefing call.
Remaining Briefing Dates for 2019

- Next briefing on Monday, April 1.
- The remaining briefings for 2019 are listed below:

<table>
<thead>
<tr>
<th>Day</th>
<th>Date</th>
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<tbody>
<tr>
<td>Monday</td>
<td>April 1</td>
</tr>
<tr>
<td>Monday</td>
<td>April 29</td>
</tr>
<tr>
<td>Tuesday</td>
<td>May 28</td>
</tr>
<tr>
<td>Monday</td>
<td>July 1</td>
</tr>
<tr>
<td>Monday</td>
<td>July 29</td>
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<tr>
<td></td>
<td>August – no briefing</td>
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<tr>
<td>Monday</td>
<td>September 30</td>
</tr>
<tr>
<td>Monday</td>
<td>October 28</td>
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<tr>
<td>Monday</td>
<td>November 25</td>
</tr>
<tr>
<td>Monday</td>
<td>January 6, 2020</td>
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</tbody>
</table>

- All briefings take place at 11 AM ET.
<table>
<thead>
<tr>
<th>Term</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>MRI</td>
<td>The <strong>Mortgage Risk Index</strong> (MRI) measures how the loans originated in a given month would perform if subjected to the same stress as loans originated in 2007, which experienced the highest default rates as a result of the Great Recession.</td>
</tr>
<tr>
<td>NMRI</td>
<td>The <strong>National Mortgage Risk Index</strong> (NMRI) currently covers home purchase and refinance loans (except for VA refinances) that have been (1) acquired and securitized by Fannie Mae or Freddie Mac or (2) insured or guaranteed by the Federal Housing Administration (FHA), the Department of Veterans Affairs (VA), or the Rural Housing Service (RHS).</td>
</tr>
<tr>
<td>SMRI</td>
<td>The <strong>State-level Mortgage Risk Index</strong> (SMRI) measures mortgage risk on a state level. It employs exactly the same stress-test methodology as the national index.</td>
</tr>
<tr>
<td>FBMSI</td>
<td>The <strong>First-time Buyer Mortgage Share Index</strong> (FBMSI) equals the number of loans made to first-time buyers divided by the number of all home purchase loans excluding those made to investors and second home buyers for any given month (see first-time buyer (FTB) definition below). The agency FBMSI covers government-guaranteed loans, while the combined FBMSI covers both government-guaranteed and private-sector loans. The agency loans are from the same database used for the NMRI, while the private-sector component of the combined FBMSI come from AEI’s National Housing Market Index (NHMI) and assumptions believed to be reasonable.</td>
</tr>
<tr>
<td>FBMRI</td>
<td>The <strong>First-time Buyer Mortgage Risk Index</strong> (FBMRI) is calculated using the same methodology as for the NMRI. The only difference is that the set of included loans is restricted to first-time buyers.</td>
</tr>
<tr>
<td>FTB</td>
<td>AEI uses the federal government’s definition of a <strong>first-time homebuyer</strong> (FTB). A FTB is an individual borrower who (1) is purchasing the mortgaged property, (2) will reside in the mortgaged property as a primary residence, and (3) had no ownership interest (sole or joint) in a residential property during the three-year period preceding the date of the purchase of the mortgaged property. Investment properties, second homes, and refinance transactions are not eligible to be considered first-time homebuyer transactions. Other organizations such as the National Association of Realtors (NAR) use a different definition of FTB based on self-identification.</td>
</tr>
<tr>
<td>RB</td>
<td>Repeat Buyers (RB) are all home buyers that are not first-time buyers.</td>
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<tr>
<td>Term</td>
<td>Description</td>
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<tr>
<td>GSE</td>
<td>A <strong>Government-Sponsored Enterprise</strong> (GSE) is an entity created by Congress that operates under a government-defined mission and charter. There are two housing-related GSEs: Freddie Mac and Fannie Mae. They purchase mortgages on the secondary market and subsequently pool them into mortgage-backed securities (MBS), which are purchased by government and private investors.</td>
</tr>
<tr>
<td>Fannie Mae</td>
<td>The <strong>Federal National Mortgage Association</strong> (FNMA), known as Fannie Mae, was founded in 1938 as part of the New Deal legislation.</td>
</tr>
<tr>
<td>Freddie Mac</td>
<td>The <strong>Federal Home Loan Mortgage Corporation</strong> (FHLMC), known as Freddie Mac, was created in 1970 to complement Fannie Mae.</td>
</tr>
<tr>
<td>Ginnie Mae</td>
<td>The <strong>Government National Mortgage Association</strong> (Ginnie Mae) is a federal government corporation that aims to promote homeownership for low- and moderate-income families. It ensures the timely payment of principal and interest on mortgage-backed securities formed from mortgages that are guaranteed or insured by FHA, VA, RHS, or smaller programs for Native Americans. Ginnie Mae was created in 1968. Prior to 1968 its role was performed by Fannie Mae.</td>
</tr>
<tr>
<td>FHA</td>
<td>The <strong>Federal Housing Administration</strong> (FHA), founded in 1934, is a federal agency that today provides mortgage insurance for residential loans made to high-risk borrowers. The borrower pays an upfront mortgage insurance premium as well as monthly insurance premiums for the service. In return, FHA covers 100% of the lender's loss in case of the borrower's default.</td>
</tr>
<tr>
<td>RHS</td>
<td>The <strong>Rural Housing Service</strong> (RHS) is a program within the U.S. Department of Agriculture that guarantees mortgages in rural areas. The borrower pays an upfront annual fee for the service. In return, RHS covers 100% of lender's loss in case of the borrower's default.</td>
</tr>
<tr>
<td>VA</td>
<td>The <strong>Department of Veterans Affairs</strong> (VA) guarantees mortgages to eligible veterans and generally pays 25% of lender's loss in case of the borrower's default. The borrower pays an upfront annual fee for the service.</td>
</tr>
<tr>
<td>HUD</td>
<td>FHA has been overseen by the <strong>Department of Housing and Urban Development</strong> (HUD) since its creation in 1965.</td>
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<tr>
<td>Term</td>
<td>Description</td>
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<tr>
<td>FICO®</td>
<td>The <strong>FICO Credit Score</strong> is a statistical credit evaluation score developed by Fair, Isaac and Co. The FICO score attempts to measure a borrower’s risk of default through his or her personal financial history. FICO scores range from a high default-risk score of 300 to a low default-risk score of 850. The term “credit score” is used to connote a generic score.</td>
</tr>
<tr>
<td>LTV / CLTV</td>
<td>The <strong>Loan-to-Value Ratio</strong> (LTV) is the ratio of the 1st lien loan amount to the property’s value. Since the down payment on a purchase transaction is the property’s value minus the loan amount, the LTV is inversely related to the down payment. The <strong>Combined Loan-to-Value</strong> (CLTV) is the ratio of all loan amounts at 1st lien origination to the property’s value. Both ratios are a measure of a borrower’s skin in the game.</td>
</tr>
<tr>
<td>DTI</td>
<td>The total <strong>Debt-to-Income Ratio</strong> (DTI) gauges the ability of a borrower to repay a mortgage by measuring the amount of income consumed for repayment of all outstanding debts of the borrower.</td>
</tr>
<tr>
<td>ARM</td>
<td>An <strong>Adjustable-Rate Mortgage</strong> (ARM) is a mortgage whose interest rate varies over the lifetime of the loan based on market conditions. ARMs have on average a higher default risk than FRMs.</td>
</tr>
<tr>
<td>FRM</td>
<td>A <strong>Fixed Rate Mortgage</strong> (FRM) maintains the interest rate at origination throughout the lifetime of the loan.</td>
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<tr>
<td>MSA</td>
<td>A <strong>Metropolitan Statistical Area</strong> (MSA) is a geographical region with a population of at least 50,000 inhabitants at its core and close economic ties throughout the region.</td>
</tr>
<tr>
<td>PCE price index</td>
<td>The <strong>Personal Consumption Expenditure</strong> (PCE) price index measures the prices of goods and services purchased by consumers in the U.S. economy. It is published monthly by the Bureau of Economic Analysis in the Department of Commerce. The PCE price index is the measure of inflation targeted by the Federal Reserve.</td>
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<tr>
<td>SLOOS</td>
<td>The <strong>Senior Loan Officer Opinion Survey on Bank Lending Practices</strong> (SLOOS) is a survey of lending conditions conducted quarterly by the Federal Reserve among roughly eighty large domestic banks and twenty-five U.S. branches and agencies of foreign banks.</td>
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<tr>
<td>QM/QRM</td>
<td>The <strong>Qualified Mortgage</strong> (QM) and the <strong>Qualified Residential Mortgage</strong> (QRM) are mortgage terms created under the Dodd-Frank Act. A mortgage that meets the QM requirements provides legal protection for lenders against a claim that the loan was made without due consideration of the borrower’s ability to repay. The QRM designation relates to the securitization of mortgages. If the loans in a mortgage-backed security are QRMs, the securitizing agent is not required to retain any risk position in the security. Although the initial proposed QRM definition was relatively strict, the final definition was watered down to be equivalent to the looser QM definition. The five guarantee agencies (Fannie Mae, Freddie Mac, FHA, VA, and RHS) are exempt from substantial portions of the QM rules and entirely from the QRM rules. (For Fannie and Freddie, this exemption applies only while they are in conservatorship).</td>
</tr>
<tr>
<td>MIP</td>
<td>The <strong>Mortgage Insurance Premium</strong> (MIP) is a payment to compensate for the risk of default on the mortgage. As noted above, FHA mortgages carry both upfront and monthly MIP payments. Fannie Mae and Freddie Mac generally require mortgage insurance for loans they guarantee with LTVs above 80%; borrowers with these GSE-guaranteed loans may make monthly MIP payments depending on the premium plan.</td>
</tr>
<tr>
<td>TRID</td>
<td>The <strong>TILA-RESPA Integrated Disclosure (TRID)</strong> rule – commonly also known as Know Before You Owe – requires lenders to summarize and more prominently display the loan terms on the mortgage form. It also institutes a three-day waiting period before closing to allow borrowers time to review the contract. The form change is currently suppressing sales volume as it is delaying loan closings by creating additional burdens on lenders. TRID was mandated by the Consumer Financial Protection Bureau (CFPB) and applies to mortgage applications filed on or after October 3, 2015.</td>
</tr>
</tbody>
</table>
Appendix

Additional slides and those not included every month:

- National Mortgage Risk Index: Loan Totals
- Background: Financial Crisis and AEI’s Response
- Principles of Housing Finance over 125 years (1850-1975)
- Pinto’s Principles of Housing Finance
- Definition of Low-Risk Loans
- Current State of the Housing Market
- Recent Steps by the GSEs, the FHA, and Regulators Add Fresh Fuel to the Long Running and Accelerating House Price Boom
- Agency Origination Shares, Purchase Loans
- Changes in the >95% CLTV Purchase Loan Market
- Agency Origination Shares, Cash-Out Loans
- Agency Origination Shares, No Cash-Out Loans
- Agency Total, Refi, and Purchase Loan Counts
- DTI Distributions, Agency Primary Purchase Loans
- Prime, Subprime, and Nearprime, Purchase Loan Counts
- GSEs: Large Lender Market Share and Relative Risk Share, Purchase Loans
- FHA: Large Issuer Lender Type Market Share and Relative Risk Share, Purchase Loans
- Combined, Purchase, and Refi NMRIs
- No-Cash-Out Refi and Cash-Out Refi NMRIs
- FHA’s Pro-Cyclical Policies Continue to Fuel the Boom
- Which Risk Factors Have Driven Up the Purchase NMRI?
- FHA’s NMRI for Home Purchase and Refinance Loans
- What explains FHA’s riskiness?
- How wide is the FHA credit box?
- Risk Overlap between FHA and the GSEs
- FHA NMRI by Risk Decile, Home Purchase Loans
- FHA Median Downpayment and Sales Price
- FHA’s Should Begin Reining in Its Pro-Cyclical Policies
– BCFP’s Pro-Cyclical QM Patch Continues to Fuel the Boom
– Pro-Cyclical Parallels to the Last Boom
– Purchase Loans with Total DTI Greater than 43%
– It Is Time for the BCFP to Announce that the Temporary GSE QM Patch Will Be Allowed to Sunset in January 2021
– The Role of Leverage
– Ratio of Sales Price for First-time to Repeat Buyers
– Median Sale Price by Market Segment, FTB Purchase Loans
– Measure Market Behavior in Four Leverage Based Price Tiers
– House Price Trends Impacted by Leverage
– Constant-quality Prices by Guarantor Type: Low Price Tier
– High risk home purchase lending is fueling home price appreciation
– Scatterplots: Introduction
– Strong Positive Correlation Between Mortgage Risk & Home Price Appreciation
– Strong Positive Correlation Between Mortgage Risk & Tract Income
– Measured Steps Now Would Moderate Unsustainable Home Price Increases, Not Lead to Home Price Declines
– DTI Distributions, GSE & FHA Purchase Loans
– Share of Fannie Purchase Loans by DTI Bucket
– RHS Reduced Borrower DTIs from 2013 to 2018, while the FHA Kept Increasing DTIs
– The FHA’s and the GSEs’ Rising DTIs Have Been Pro-Cyclically Fueling the House Price Boom
– Origination Shares Issuer Lender Type, FHA and RHS Purchase Loans
– MRIs by Issuer Lender Type, FHA and RHS Purchase Loans
– Origination Shares and MRIs by Seller Lender Type, GSE Refinance Loans
– Origination Shares and MRIs by Issuer Lender Type, FHA Refinance Loans
– State NMRI and FHA Share, Purchase Loans
– State NMRI Change, Purchase Loans
– Pricing Changes, Home Purchase Loans
– Stressed Default Rates by Loan Type
– Median Downpayments
– Volume Growth in Counts and Dollars, Purchase Loans
– A closer look at RHS’ October 2016 MIP cut
– No-Cash Out Refi Demand and 30-yr Mortgage Rate
– Low-Risk Origination Shares, Purchase Loans
– Calibrating Mortgage Safety
– Credit Conditions: 1990 to 2013-14
– Role of Income Leverage During Housing Boom
– Fed Tightening and Efforts to Maintain Buying Power
– Appraisals Should Be the Guard Rail Against Speculative Booms
– Cross-subsidies Return to the GSEs
– Change in Agency Purchase Loan Volume
– GSEs: Ratio of NMRI for Loans with Total CLTV > 95% to Loans with Lower Total CLTVs
– FICO® Score Distribution
– Median Credit Score on Primary Purchase Loans
– Aggregate Default Risk Surge for Home Purchase Loans Is Over Five Years Old
– The Effect of April 2016 PMI Price Change
– Credit Score Distribution & MRIs, Purchase Loans
– Purchase Loans with Down Payment of 5% or Less
– Composite Origination Shares and MRIs by Channel, Purchase Loans
– Large Bank Origination Shares and MRIs by Channel, Purchase Loans
– Fed’s Senior Loan Officer Survey is Badly Flawed
– Urban Myth: Tight Credit Keeping “Creditworthy” Borrowers Out of Market
– FHA Perpetuates This Myth
Appendix (cont’d)

– FHA Is All about Moral Hazard
– While FHA’s Capital Reached Required 2% Statutory Level for 1st Time since 2008, It Is Insufficient
– Share of States with Increase in SMRI for Purchase Loans from Year-Earlier Period
– CBSA NHMI: Investor Type for Home Purchase Loans
– Riverside/San Bernardino: A Case in Point
– House Price Volatility, 51 Largest Metro Areas
– Median Values of Risk Factors by Loan Type
– Risk Shares for Home Purchase Loans
– DTI Distributions and MRIs, Primary Purchase Loans
– Cash-Out Share and Home Equity
– Agency Cash-Out Share and Defaults
– Nonbank Origination Shares and MRIs by Channel, Purchase Loans
– Greater House Price Volatility at the Lower End
– Housing Volatility Index
– Unforgiving Home Price Cycles: Booms Fueled by Increasing Leverage in a Seller’s Market, Followed by Mean Reversion
– Supply-Demand Imbalance Is Greatest in the Low Price Tier
– Comparing the Supply-Demand Imbalance: 100 Largest Metros
– Mortgage Risk Indices by Lender Type, Purchase Loans
– Jumbo portfolio-GSE spreads (in bps)
– Homeowners Can’t Count on House Price Gains to Build Wealth
– Evaluating the GSEs 2017 Business
– Evaluating the GSEs 2017 Business (cont.)
– Evaluating the GSEs 2017 Business (cont.)
– Update: John Burns Intrinsic Home Values
– GSEs: Large Lender Market Share and Relative Risk Share, Refinance Loans
– FHA: Large Issuer Lender Type Market Share and Relative Risk Share, Refinance Loans
– Leverage Fueled Housing Demand Continues to Climb
– Agency Origination Shares by Risk, Purchase Loans
Appendix (cont’d)

- What Does this Mean for the Broader Market?
- Borrowing at the Conforming Loan Limit, GSE Purchase Loans
- The CFPB’s Qualified Mortgage Policy and GSE QM Patch Allowed for Credit Easing While Supply Is Constrained, a Direct and Continuing Cause of the Current House Price Boom
- Number of Investors Flipping Houses Creeeping Up
- Average House Price Change by Zip (%, annual avg.)
- Raising the Conventional Loan Limit – A Prediction
- Raising the Conventional Loan Limit – A Good Idea?
- Cash-Outs and the Economy
- Cash-Out Share and Expected Defaults
- FTB slides begin
- Punchbowl 1: Mortgage Rate Changes Applicable to FTBs and RBs
- Punchbowl 2: Eased Underwriting Standards Only Available to Agency First-time Buyers
- Agency Purchase Loan Demand Remains Strong
- Market Segmentation:
  - Median Sales Price for First-time and Repeat Buyers
- Constant Quality Prices Outlook for the Bifurcated Market:
  - Slowing Price Appreciation for at the Higher End, Continued Robust Appreciation for at the Lower End
- Outlook for Bifurcation of Market – Quality Changes
- Outlook for a Bifurcated Market – Transaction Prices by State & Changes in Median Transaction Prices
- While FHA’s Forward Program Capital Is at 3.9%, in Excess of Statutory Minimum of 2%, It Should be 7%
- FHA Cash Out Count and MRI
- Average Credit Score and DTI: FHA Purchase Loans
- FTB Purchase Loan NMRI: Credit Easing Continues
Appendix (cont’d)

- Which Risk Factors Have Driven Up the FTB NMRI?
- Share of GSE FTB Purchase Loans w. DTIs of 46-50%
- FTB Purchase Loans, by Level of Downpayment
- Agency First-time Buyer Purchase Loan Share
- Government Housing Policy Creates an Economics Free Zone
- Definition of Low-Risk / Prime Loans
- Agency First-Time Buyer Loan Count
- Agency Origination Shares, FTB Purchase Loans
- Origination Shares by Credit Score Bin, First-time Buyer Purchase Loans
- Agency Origination Shares, FTB Purchase Loans by Market Segment
- Originations by Market Segment, FTB Purchase Loans
- Combined First-Time Buyer Mortgage Share Index
- The NAR’s first time buyer series is fatally flawed. After removing seasonality, most of what remains is noise
- Changes in the >95% CLTV Purchase Loan Market
- Share of States with Rise in First-time Buyer Loan Volume and Share from Year-Earlier Period
- Profiles of GSE and FHA First-time Buyers with >95% CLTV
- Characteristics of Mortgages Taken Out by First-Time and Repeat Homebuyers
- Rising Prices Have Disparate Effects on Buyers
- Agency-Specific First-Time Buyer Mortgage Share Indices
- DTI Distributions, Agency FTB Purchase Loans
- The Effect of FHA Mortgage Insurance Premium Cut
The November 2018 NMRI covers over 35.9 million agency loans dating back to Sept. 2012. These data are used to construct the NMRI, First-Time Homebuyer Indices, and the National Housing Market Indexes (NHMI).

This total consists of nearly 18.2 million agency purchase loans and over 17.7 million agency refinance loans.

NMRI and other risk indices published for:
- Purchase loans, with separate indices for first-time and repeat buyers
- Refinance loans, with separate indices for no-cash-out and cash-out refis
- Composite of purchase and refinance loans
- Purchase loan NMRI is the primary measure for monitoring mortgage risk and the impact of housing policy, particularly with respect to first-time buyers
- Refinance loan NMRI contributes to overall assessment of changes in leverage
Financial crisis largely stemmed from a failure to understand buildup of housing risk:

- Mortgage risk
- House-price (collateral) risk
- Capital adequacy

AEI’s Center on Housing Markets and Finance (AEI.org/housing) addresses this problem by undertaking evidence-based research that expands the body of knowledge concerning housing markets and finance:

- Provides objective and transparent mortgage risk measures
  - Risk indices published monthly
- Provides objective and transparent housing market indicators
  - Market indicators published quarterly
- Provides objective and transparent house price appreciation measures
At all times, but especially in the last few years, people have dreamt of universalizing wealth by universalizing credit. Now, in no country is it possible to transfer from one hand to another more products than there are.(1850)

Since value depends on location, & location on convenience, & convenience on nearness, the intermediate steps may be eliminated & say that value depends on nearness. (1903)

If a new utility does not arise, [sales] prices may advance & recede, while intrinsic values do not change. If a new utility arises, both [sales] prices & intrinsic values will alter their levels. (1903)

Speculative elements cannot be considered as enhancing the security of residential loans [rather they] enhance the risk of loss to mortgagees [if] permit[ed] to creep into valuations....(1938)

Because situations of scarcity [seller's market] or over-supply [buyer's market] do not last indefinitely they cannot be considered as phenomena the affect valuations for long-term use.... & not truly indicative of value for mortgage insurance purposes. (1947)

The sequence of [market cycle] events is fairly predictable, though the period of the phases of the cycle & the amplitude of the variations are not subject to dependable forecasting. (1949)

Inflationary construction costs, home purchase prices, & land prices not only loan disproportionate financial burdens upon the owners at time of acquisition but also form the bloated base upon which the major costs of occupancy [including property taxes] are determined for the entire term of ownership. (1949)

The essential nature of housing demand is changeability; the nature of housing supply is rigidity. (1949)

In a seller's market, when choice is restricted & the seller virtually dictates sales terms, more liberal credit is likely to be [capitalized] in price with probably a reduction in housing standards. (1951)

[Transitioning] from buyer's to seller's market, maximum terms become so commonly used they tend to be considered the minimum. (1951)

The parallel between the increases in the “costs” of new housing units & increases in the amount & percentage of needed funds that could be obtained by lengthening their terms & [reducing] downpayments raises the radical question of whether the disbursements made to assist purchasers & (renters) have not benefited others more than those whom they were intended to relieve. The largest groups to whom it is sometimes suggested some of the benefits may have flowed are the builders, building labor, the suppliers of building materials, & real estate brokers & speculators. (1975)
1. Corollary to Fisher’s capitalization rule: capitalization is added to land price

2. Uncertainty Principle: Can’t simultaneously set an asset’s credit risk & risk weight
   - A low risk designation and corresponding low capital weight (greater leverage) unleashes demand pressures causing it to no longer be low risk (think GSEs, private MBS, Greek sovereign debt)

3. Dual Underestimation Principle: Never underestimate the government’s willingness & ability to (i) add leverage to stimulate the market & (ii) ignore its impact on raising home prices and default risk under stress
   - Housing debt & default risk have increased with over 60 years of housing policies focused on increasing leverage

4. Law of the Marginal Buyer: Home prices will keep rising so long as the marginal buyer, who sets the price for all, has access to higher leverage (see #3)

5. Corollary: Historically the government has endeavored to add leverage in both buyer’s & seller’s markets; but the latter has potential for dangerous buildup of risk (see #1)
   - Result is an economics free zone promoting demand, while supply is restricted by regulation
     - FHA neither prices nor underwrites for risk
     - Government policies increase leverage regardless of rates going up or down
     - Low capital entities (FHA and GSEs) compete with each other over loosening credit
     - Affordable housing goals and duty to serve policies promote risky lending
Definition of Low-Risk Loans

• We define low-risk loans as those with a stressed default rate of less than 6%. Why?

• Low-risk definition calibrated from two sources
  – Original QRM proposal to implement Dodd-Frank
  – FHA underwriting standards over 1935-55
  – Both yield an average stressed default rate of ≈ 3%

  • This is consistent with a maximum stressed default rate of ≈ 6% on individual loans, assuming a uniform distribution starting near 0%

• Hence the use of 6% as the highest stressed default rate for a low-risk loan
The current house price boom is about 6 years old and rate of house price increases is accelerating

- “Home Values Climbing at Fastest Rate in 12 Years....The median U.S. home value rose 8.7 percent to $215,600 in April, the fastest year-over-year climb since June 2006” Zillow, 5.24.17
- “Start of year sees strongest home price growth since 2005. ... About 60% of all U.S. metros saw an acceleration in the rate of price increases through February this year.” (Housing Wire, 5.7, 2018)
- “Housing confidence hits record high as home prices skyrocket. Consumer confidence in housing jumped to its highest level on record in April, according to Fannie Mae. Those who think home prices will move even higher rose the most, and those who think now is a good time to sell came in second.” (CNBC, 5.7.18)
- “Mortgage lenders are making it easier for you to buy a house. But are they repeating last decade's mistakes? Dana Wade, the acting Federal Housing Administration commissioner, minced few words in testimony last month before a U.S. House of Representatives committee. The FHA, the federal housing agency that insures mortgages made to first-time and lower-income buyers, has seen “certain trends and indicators of potential defaults.” Philadelphia Inquirer 5.4.18

A house price boom is when prices rise faster than fundamentals

The boom is driven by too much money chasing too few properties
- When the market is supply constricted (a seller's market), credit easing is likely to be capitalized in price.
- FHA, Fannie, Freddie, and the VA are all pro-cyclically fueling the boom

The length and acceleration of the boom adds urgency to shrink the GSEs and FHA by administrative action
Recent Steps by the GSEs, the FHA, and Regulators Add Fresh Fuel to the Long Running and Accelerating House Price Boom

- “Freddie Mac takes aim at FHA with widespread expansion of 3% down mortgages…. But now, Freddie Mac is about to supercharge its 3% down program and launch a widespread expansion of the offering.” (Housing Wire, 4.26.18)

- “Credit scores may jump starting this month…. Because of improved standards [from regulators] for utilizing new and existing public records, the three major credit reporting companies are now excluding all tax liens from credit reports. That means some scores will head higher, for some by as much as 30 points.” (CNBC, 4.12.18)

- “Manufactured housing giant endorses HUD's call for regulatory relief…. But the FHA has suffered major losses from insuring manufactured loans in the past and is unlikely to increase its role in this sector.” (National Mortgage News, 4.3.18)

- “Will The Gig Economy Change Mortgage Lending?…[r]ather than two years of iron-clad documentation, [GSEs] now say as little as 12 months of self-employment are enough, as long as the applicant’s previous employment is in the same field and his or her income remains steady.” (Mortgage Orb, 7.26.17)

- “If the lender obtains documentation to evidence the actual monthly payment is $0, the lender may qualify the borrower with the $0 payment as long as the $0 payment is associated with an income-driven repayment plan.” (Fannie Mae Selling Guide, 7.25.17)

- “Fannie Mae will ease financial standards for mortgage applicants next month… Fannie will be raising its DTI ceiling from the current 45 percent to 50 percent as of July 29.” (Washington Post, 6.6.17)
Major market shifts are often related to pricing changes. The largest effect was from FHA’s mortgage insurance premium (MIP) cut in January 2015, which boosted FHA’s market share from 23% to 30%. Recently, FHA’s share has declined, returning FHA back to its pre-MIP cut level. As Freddie’s MBS execution price has improved, it has recently picked up share.
Changes in the >95% CLTV Purchase Loan Market

While FHA continues to dominate this market segment with a 73% share, this is down from a 92% share in Oct. 2015. Fannie continues its dominance over Freddie, coming in at a 20% share, up from 7% in Oct. 2015, compared to Freddie’s 7%, up from 1% in Oct. 2015. This is contributing to Fannie’s Risk Index sprinting ahead of Freddie’s.

Note: Excludes loans made by VA and RHS.
Market share for cash-out refis has shifted from the GSEs to the FHA and VA. FHA and VA accounted for less than 10% of market share in 2012. In October 2018, they accounted for 33%, with FHA’s share surging recently. This increase has powered the increase in the riskiness in the cash-out index.

VA and FHA were both losing market share as early as 2018. However, the trend between the two agencies diverges around May 2018, right around the time the VA was subjected to a new statute designed to reign in predatory no cash-out refi lending. The VA share is now near its series' low dating back to October 2013.

Source: AEI, Center on Housing Markets and Finance, [www.AEI.org/housing](http://www.AEI.org/housing).
All agency volume was down 29% from a year ago. Refi volume has slowed since the end of 2016. As interest rates have moved sharply higher since November 2016, refi volume, and especially no-cash out refi volume, has contracted.
DTIs have been shifting higher as the rise in house prices has been outpacing income gains. The share of DTIs below 34% has declined sharply, offset by a much greater share of DTIs above 40%. While bullish for home prices in the near term, this presents long-term sustainability problems for both homeowners and the FHA.

California shows how the shift could intensify as affordability worsens.
While growth in purchase lending volume has paused, it has not paused equally across the risk spectrum. Historically, most of the growth in volume has come from the near-prime and especially the subprime segment.

Source: AEI, Center on Housing Markets and Finance, [www.AEI.org/housing](http://www.AEI.org/housing).
Note: Prime loans are defined as having a stressed default rate less than 6%; near-prime loans are between 6 to 12%; subprime loans are greater than 12%.
GSEs: Large Lender Market Share and Relative Risk Share, Purchase Loans

<table>
<thead>
<tr>
<th>Large banks</th>
<th>Not updated</th>
<th>Large nonbanks</th>
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</thead>
<tbody>
<tr>
<td>NMRI</td>
<td>5.4%</td>
<td>6.0%</td>
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<tr>
<td>Wells Fargo</td>
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<td></td>
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<tr>
<td>JP Morgan Chase</td>
<td></td>
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<tr>
<td>U.S. Bank</td>
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<tr>
<td>Flagstar Bank</td>
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<tr>
<td>Citizens Bank</td>
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<td>Bank of America</td>
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<tr>
<td>Money Source</td>
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Larger circle represents larger market share. Lenders shown represent the 8 largest banks and 15 largest nonbanks by origination share in 2017.

25%+ 15 to 25% 5 to 15% 5 to -5% -5 to -15% -15 to -25% -25%+

Higher GSE risk share (relative to market share) 
Lower GSE risk share (relative to market share)
FHA: Large Issuer Lender Type Market Share and Relative Risk Share, Purchase Loans

<table>
<thead>
<tr>
<th>Large banks</th>
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<th>Large nonbanks</th>
</tr>
</thead>
<tbody>
<tr>
<td>NMRI</td>
<td>22.0%</td>
<td>24.1%</td>
</tr>
</tbody>
</table>

Wells Fargo
US Bank
Citizens
Flagstar
JPMorgan Chase
BB&T
Bank of America

Larger circle represents larger market share. Lenders shown represent the 8 largest banks and 15 largest nonbanks by origination share in 2017.

Higher FHA risk share (relative to market share)
Lower FHA risk share (relative to market share)
The Combined Purchase and Refi NMRI set a series’ high in November. There has been a sharp trend reversal on refis, which tend to follow feast-and-famine cycles depending on the mortgage rate. The Refi series is pulling away steeply from the Purchase one after having converged at elevated levels.

The Refi NMRI set a series’ high in November, powered by the rapidly increasing Cash-Out index. The Cash-Out NMRI has more than doubled since the start of the series, and now exceeds both No-Cash-Out by 3.8 ppts and Purchase NMRIs by 2.7 ppts. Cash-Out NMRI is largely driven by growth in volume and risk on FHA and VA guaranteed loans.

Red markers show November stressed default rate in each year.

FHA’s Pro-Cyclical Policies Continue to Fuel the Boom

- Pro-cyclical policies support the housing market when the market is going up, and withdraw support when the market is going down. Therefore, such policies push the market further away from its long-term mean, which ends up prolonging booms and worsening busts.

- FHA’s mortgage risk indices jumped in Nov. setting new series’ highs
  - Purchase index at 28.5%
  - Refi index at a high for the month of November, with the Cash-Out Refi NMRI at a series’ high.

- Higher NMRI indicates FHA continues to increase leverage to maintain levels of mortgage activity and to further their “affordable housing” mission.
  - FHA’s credit box is wide, therefore credit for entry-level buyers is not tight.
  - FHA continues to loosen at a breath-taking pace.
  - FHA is adding mostly high risk borrowers, whose risk index keeps climbing through the effects of risk layering.
Which Risk Factors Have Driven Up the Purchase NMRI?

Not updated

<table>
<thead>
<tr>
<th>Risk factor</th>
<th>Primary home purchase loans</th>
<th>Freezing FHA at its Oct-12 shares</th>
</tr>
</thead>
<tbody>
<tr>
<td>Credit score &lt; 660</td>
<td>13%</td>
<td>16%</td>
</tr>
<tr>
<td>DTI &gt; 43%</td>
<td>21%</td>
<td>24%</td>
</tr>
<tr>
<td>CLTV ≥ 95%</td>
<td>57%</td>
<td>56%</td>
</tr>
<tr>
<td>30-year term</td>
<td>94%</td>
<td>94%</td>
</tr>
<tr>
<td>Risk layering</td>
<td>20%</td>
<td>26%</td>
</tr>
</tbody>
</table>

*Risk layering is defined as having at least 3 of the 4 features presented in the table above present in a loan.
Note: Calculated for primary home purchase loans with a government guarantee and reported risk factor. Data for the last column hold FHA's shares for each risk factor constant at their Oct-2012 level, thereby assuming no credit easing for FHA.

- Since 2013, all the key risk factors have contributed, which has magnified the effect on the NMRI through risk layering. An increasing share of loans have:
  - Subprime credit scores
  - High DTIs
  - High CLTVs
  - 30-year terms

- Major upward moves by each are in red font.
- Over the past two years, DTIs have moved higher, promoting risk layering.
All of FHA’s indices have consistently been trending up since early-2013 (earliest data available). For comparison purposes, Rural Housing Services’ Purchase MRI has been flat. Unless FHA makes policy changes, its current credit box will continue to lean into the current housing boom, thereby leading the way in the promotion of unsustainable home price increases.
What explains FHA’s riskiness?

<table>
<thead>
<tr>
<th>Risk factor</th>
<th>FHA Nov-16</th>
<th>FHA Nov-18</th>
<th>Rest of Agency Nov-16</th>
<th>Rest of Agency Nov-18</th>
</tr>
</thead>
<tbody>
<tr>
<td>Credit score &lt; 660</td>
<td>36%</td>
<td>46%</td>
<td>8%</td>
<td>9%</td>
</tr>
<tr>
<td>DTI &gt; 43%</td>
<td>48%</td>
<td>60%</td>
<td>20%</td>
<td>32%</td>
</tr>
<tr>
<td>DTI &gt; 50%</td>
<td>19%</td>
<td>30%</td>
<td>3%</td>
<td>4%</td>
</tr>
<tr>
<td>CLTV ≥ 95%</td>
<td>91%</td>
<td>90%</td>
<td>45%</td>
<td>47%</td>
</tr>
<tr>
<td>30-year term</td>
<td>99%</td>
<td>100%</td>
<td>93%</td>
<td>94%</td>
</tr>
<tr>
<td>% high risk loans</td>
<td>88%</td>
<td>93%</td>
<td>24%</td>
<td>29%</td>
</tr>
</tbody>
</table>

Note: Calculated for primary home purchase loans with a government guarantee and reported risk factor. Source: AEI, Center on Housing Markets and Finance, www.aei.org/housing/.

- Across all risk factors FHA is more risky than the rest of the Agency Market.
- Over the past 2 years an increasing share of FHA loans has had higher DTIs and lower credit scores.
- With term and CLTV basically maxed out, further FHA loosening will have to come from subprime credit score borrowers (<660) or higher DTIs.
FHA borrowers are the marginal borrowers. FHA’s credit box is wide and its riskiest portions are being used more and more. It spans as low as a 580 credit score, as high as a 57 DTI, and generally a 98.2 CLTV. In addition, about 1/3 of FHA borrowers make no downpayment. Therefore, the credit box for the marginal buyer is not tight, it is loose.

| Percentile | Credit Score | DTI (in %) | CLTV | | | |
|—— | —— | —— | —— | —— | —— | —— |
| | Nov-12 | Nov-18 | Nov-12 | Nov-18 | Nov-12 | Nov-18 |
| 5 | 631 | 600 | 54 | 57 | 99 | 103 |
| 10 | 642 | 614 | 52 | 56 | 99 | 99 |
| 25 | 659 | 636 | 47 | 52 | 99 | 99 |
| 50 / median | 688 | 664 | 41 | 46 | 99 | 99 |
| 75 | 731 | 699 | 34 | 39 | 97 | 99 |
| 90 | 770 | 737 | 27 | 32 | 95 | 95 |
| average | 697 | 670 | 40 | 45 | 97 | 98 |

Share that received downpayment assistance 25 32

*2018 data for downpayment assistance are from September.
Source: AEI Center on Housing Markets and Finance, [www.aei.org/housing](http://www.aei.org/housing), and FHA Snapshot data.
Risk Overlap between FHA and the GSEs

While there is a clear separation between FHA and the GSEs at the high and low ends of the risk spectrum, there is substantial competition for borrowers with MRIs between 8-20%. Over the past year, the GSEs have moved out the risk curve and therefore gained market share from FHA. On the other hand, FHA has even further moved out its risk curve and has therefore been picking up borrowers with MRIs > 32%.

[Graph showing November 2018 Distribution]

[Graph showing Change in Distribution, November 2017 to November 2018]

All FHA loans are increasing in risk, but alarmingly, it is the riskiest FHA loans that are getting even riskier. As house prices and leverage continue to rise, it will be largely borrowers at the lower end of the market that will continue to add on risk and drive up house prices for everyone.

With both equity and income leverage increasing, the long running boom in home prices is not only shows no signs of abating, but is rather accelerating. One sign of growing equity leverage is the fact that for home buyers guaranteed by FHA, the dollars of initial equity has stayed roughly the same since September 2012, while home prices over the same period have increased by 27%.

Note: In April 2017, Ginnie Mae started including the FHA upfront mortgage insurance premium in the LTV. Due to this switch and lagged reporting of loans for March 2017, this month’s median downpayment is imputed by averaging the median downpayments for February and April 2017, which are largely unaffected by Ginnie Mae’s reporting change.

FHA’s Should Begin Reining in Its Pro-Cyclical Policies

• Start by taking immediate steps to reduce the risk posed to it and its borrowers by an excessively risky credit box:
  – Eliminate DTIs above 50% on 30-year term loans with credit scores below 660
  – Reduce seller concessions to 3% on 30-year term loans
  – Eliminate cash out refinances
  – Crowd in 20-year term loans by lowering mortgage insurance premium and allowing somewhat expanded DTIs and seller concessions
BCFP’s Pro-Cyclical QM Patch Continues to Fuel the Boom

• In 1.13, “Ability-to-Repay and Qualified Mortgage Standards” rule was issued, effective 1.10.14, pursuant to the Dodd-Frank Act’s calling for minimum mortgage standards
• The Bureau noted it will “protect consumers from irresponsible mortgage lending.”
  • The rule effectively set a maximum debt-to-income (DTI) limit of 43% for the private sector.
  • Temporary GSE QM Patch (the QM Patch exempted the GSEs and their automated underwriting systems from this provision for seven years.
  • Similarly, FHA, the VA and the Department of Agriculture’s Rural Housing Services (RHS) , were exempted for up to seven years or until these agencies issued their own rules codifying their own lending practices (which all subsequently did).
  • It was to make sure “prime” loans will be made responsibly, yet it sets no minimum down payment, no minimum standard for credit worthiness, and no maximum debt-to-income ratio (for government agencies)
  • Under this definition of “prime”, a borrower can have no down payment, a credit score of 580, and a debt-to-income ratio over 50% as long as they are approved by a government-sanctioned underwriting system.

• It was foreseeable that this rule would promote an unsustainable home price boom:
  • In 2013: “Booms are fueled by excessive leverage” and “this rule does little to limit borrower leverage and lays the foundation for the next bust.”*
  **
  • In 1951: “[In transitioning] from a buyer's to a seller's market, maximum terms become so commonly used they tend to be considered the minimum.”***

• Flaw 1: The QM Patch does not operate counter-cyclically so as to “take the punch bowl away” during a leverage-fueled price boom.
• Flaw 2: The QM Patch has crowded out the private market, leaving it more risky scraps.

***Fisher, Financing Home Ownership, NBER, 1951
****WSJ, No Pay Stub? No Problem. Unconventional Mortgages Make a Comeback, 1.23.19
In the last 20 years we have experienced two gigantic house price booms.* It is no coincidence that rising debt-to-income ratios have provided the fuel for both the last and current house price boom. Going back to at least the 1930s, there is no other time when DTIs were so high (or interest rates so low).

* Shiller, The Housing Boom Is Already Gigantic, How Long Can It Last?, New York Times, 12.7.18
Note: Rate for 1988-1991 is conservatively estimated at 5 percent, and is likely well below that rate.
Source: AEI, Center on Housing Markets and Finance, www.AEI.org/housing, Fannie Mae, BCFP, and FHFA.
As we have been predicting, the share of loans with DTI > 43% is now growing rapidly to compensate for faster home price increases compared to incomes, a trend most pronounced for Fannie (+3.9 ppts over past 12 months) and FHA (+6.7 ppts). Despite Fannie’s announcement in March to update its Desktop Underwriting, after it had first raised the DTI limit to 50 in August 2017, there is little evidence that it has actually reigned in this segment. The only exceptions to the trend are RHS and Portfolio lenders.

Note: Data pertain to purchase loans for primary owner-occupied properties. Data for the portfolio line come from LLMA and McDash after removing duplicative loans. The data are weighted by loan amount buckets and origination year using HMDA weights (lag due to time needed to allow for sales to GSEs). Weights for 2018 are assumed to be identical to 2017.

* A seller’s market, defined by the National Association of Realtors (NAR) as a home inventory supply of 6 months or less, has been present since Sept. 2012.

Source: AEI, Center on Housing Markets and Finance, www.AEI.org/housing, CoreLogic, and Black Knight.
It Is Time for the BCFP to Announce that the Temporary GSE QM Patch Will Be Allowed to Sunset in January 2021

• As is noted on Slide 19, the percentage of agency loans with DTIs greater than 43% has exploded since the QM rule was announced in 2013, a period that coincides with the current home price boom
• The BCFP, in its January 2019 report, found*:
  – The continued prominence of Temporary GSE QM originations is contrary to the Bureau’s expectations at the time of the rulemaking, and certain goals of the Rule have therefore not been met.
  – In accounting for the continued prominence of Temporary GSE QM originations, two factors can be distinguished. First, the scope of GSE-eligible loans is broad, and it grew even broader for a period of time after the Rule became effective as the GSEs loosened their credit eligibility in various respects.
  – In contrast, the underwriting guidelines and DTI limits for General QM loans have remained static since they were issued.
• BCFP should immediately take steps to:
  – Announce that the GSE patch will not be renewed.
  – Provide guidance to GSEs that they should immediately begin reducing industry’s reliance on patch in a measured manner, thereby reducing any market impacts between now and the 2021 expiration of the patch.
  – Coordinate with HUD/FHA on reductions to its DTI policies as part of a broader effort to counter-cyclically slow down the home price boom.
  – Indicate it will be looking at changes to the QM rule so that, in the future, it has a counter-cyclical component.

* BCFP, Ability-to-Repay and Qualified Mortgage Rule Assessment Report, January 10, 2019
Despite worsening affordability, leverage is allowing lower price tier borrowers to forego a quality adjustment. The same concept applies when mortgage rates rise.

Cumulative Constant-quality and Market Expenditure House Price Appreciation Indices (Oct-2012 = 0%)

Note: HPIs are smoothed around the times of FHFA loan limit changes. 
The trend upward is towards higher first-time buyer (FTB) prices relative to repeat buyers (RBs). FTBs have access to the leverage punchbowl, thereby greatly reducing the tendency to make downward quality adjustments to offset rapid home price appreciation. RBs without access to this punchbowl, tend to make downward quality adjustments to offset home price appreciation. This adds to demand at lower price tiers.

Median Sale Price by Market Segment*, FTB Purchase Loans

* We define prime loans as low-risk (with a stressed default rate of less than 6%), and subprime as high risk (with a stressed default rate of 12% or greater).


Higher risk borrowers are being provided additional leverage which is fueling rapidly increasing home prices. Market prices for subprime borrowers have increased 25 percent since Feb-2013, while market prices for prime borrowers have only increased 11 percent.

<table>
<thead>
<tr>
<th>Month</th>
<th>Prime (Mean Price)</th>
<th>Subprime (Mean Price)</th>
<th>Annual Growth</th>
</tr>
</thead>
<tbody>
<tr>
<td>Feb-13</td>
<td>$270,000</td>
<td>$170,000</td>
<td>3.0%</td>
</tr>
<tr>
<td>Nov-18</td>
<td>$304,000</td>
<td>$218,000</td>
<td>3.2%</td>
</tr>
</tbody>
</table>

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</tr>
<tr>
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<td>$304,000</td>
<td>$218,000</td>
<td>3.2%</td>
</tr>
</tbody>
</table>

* We define prime loans as low-risk (with a stressed default rate of less than 6%), and subprime as high risk (with a stressed default rate of 12% or greater).

Measure Market Behavior in Four Leverage Based Price Tiers

One of AEI’s innovations to track home price appreciation is to use four price bins, because the market behaves differently in each price bin.

- “Low” bin has all sales priced less than the bottom 40% of sales prices for FHA insured homes.
- The “Low-Medium” bin has all sales priced in the next 40% of sales prices for FHA insured homes.

**Most first time buyers (FTB) in the bottom two bins, and their mortgage loans are much riskier. By contrast, the top two bins have relatively fewer FTBs, and buyers have much less risky loans.**

<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Low</td>
<td>47%</td>
<td>24%</td>
<td>29%</td>
<td>14.6%</td>
<td>72%</td>
<td>$ 166,200</td>
</tr>
<tr>
<td>Low-Med</td>
<td>39%</td>
<td>28%</td>
<td>26%</td>
<td>13.3%</td>
<td>61%</td>
<td>$ 249,000</td>
</tr>
<tr>
<td>Med-High</td>
<td>31%</td>
<td>38%</td>
<td>9%</td>
<td>8.1%</td>
<td>38%</td>
<td>$ 393,000</td>
</tr>
<tr>
<td>High</td>
<td>29%</td>
<td>11%</td>
<td>0%</td>
<td>3.1%</td>
<td>NA</td>
<td>$ 910,000</td>
</tr>
<tr>
<td>Combined Low &amp; Low-Med</td>
<td>43%</td>
<td>52%</td>
<td>28%</td>
<td>13.9%</td>
<td>66%</td>
<td>$ 215,000</td>
</tr>
<tr>
<td>Combined Med-High &amp; High</td>
<td>30%</td>
<td>48%</td>
<td>7%</td>
<td>7.0%</td>
<td>NA</td>
<td>$ 445,000</td>
</tr>
</tbody>
</table>

Note: Dare are for largest 73 CBSAs and consist of 8.5 million sale transaction study covering 5-years of home price appreciation (HPA) for 41,000 census tracts. Weighting based on HMDA. Shares based on count. Low & med-low price tiers defined respectively as <=40th & >40th to <=80th percentile of FHA sales prices & med-high & high price tiers defined respectively as >80th percentile of FHA sales prices & <= 125% of GSE limit & > 125% of GSE limit, all at county-level. Mortgage Risk (Leverage) Loan Grades: High risk = >12%, Medium risk = >6% -12%, Low risk = <=6%

Source: AEI, Center on Housing Markets and Finance, [www.AEI.org/housing](http://www.AEI.org/housing).
On a constant-quality basis and market price basis, prices of low and low-medium priced homes have increased much faster than medium-high and high priced homes. With easy access to government-supplied leverage, buyers in low and low-medium tiers have had to make little compromise on quality.

Source: Dare are for largest 73 CBSAs and consist of 8.5 million sale transaction study covering 5-years of home price appreciation (HPA) for 41,000 census tracts. Weighting based on HMDA. Shares based on count. Low & med-low price tiers defined respectively as <=40th & >40th to <=80th percentile of FHA sales prices & med-high & high price tiers defined respectively as >80th percentile of FHA sales prices & <= 125% of GSE limit & > 125% of GSE limit, all at county-level. HPIs are smoothed around the times of FHFA loan limit changes.

Constant-quality Prices by Guarantor Type: Low Price Tier

FHA, GSE, & Private HPI for the low priced tier all went up about the same amount over 5 years—45%. Buyers with high mortgage risk set the price in this and low-medium market segment. VA & RHS had lower price gains, likely due to differing appraisal practices & DTI limitations.

Not updated

Cumulative Constant-quality House Price Index, by Guarantor Type:
Low Price Tier (2012:Q4 = 0%)

Source: Dare are for largest 73 CBSAs and consist of 8.5 million sale transaction study covering 5 years of home price appreciation (HPA) for 41,000 census tracts. Weighting based on HMDA. Shares based on count. Low & med-low price tiers defined respectively as <=40th & >40th to <=80th percentile of FHA sales prices & med-high & high price tiers defined respectively as >80th percentile of FHA sales prices & <= 125% of GSE limit & > 125% of GSE limit, all at county-level. HPIs are smoothed around the times of FHFA loan limit changes. Data for RHS are not available in years for which HMDA data has not yet been published.

High risk home purchase lending is fueling home price appreciation

In the largest 73 metros, currently 41% of agency purchase lending is high risk. FHA accounts for 57% of this high risk lending, which is down from 74% in 2012. Significantly, the GSEs account for nearly all of this high risk share shift. Their high risk share has increased from 10% in 2012 to 30% in 2018.

<table>
<thead>
<tr>
<th></th>
<th>FHA</th>
<th>GSE</th>
<th>Portfolio</th>
<th>RHS*</th>
<th>VA</th>
<th>Total</th>
<th>weighted count</th>
</tr>
</thead>
<tbody>
<tr>
<td>2012</td>
<td>74.4%</td>
<td>10.4%</td>
<td>1.9%</td>
<td>4.9%</td>
<td>8.4%</td>
<td>100.0%</td>
<td>124,052</td>
</tr>
<tr>
<td>2013</td>
<td>66.5%</td>
<td>16.8%</td>
<td>2.0%</td>
<td>5.3%</td>
<td>9.5%</td>
<td>100.0%</td>
<td>515,921</td>
</tr>
<tr>
<td>2014</td>
<td>60.8%</td>
<td>20.6%</td>
<td>2.4%</td>
<td>5.1%</td>
<td>11.2%</td>
<td>100.0%</td>
<td>555,358</td>
</tr>
<tr>
<td>2015</td>
<td>65.9%</td>
<td>18.9%</td>
<td>1.9%</td>
<td>3.3%</td>
<td>10.1%</td>
<td>100.0%</td>
<td>667,255</td>
</tr>
<tr>
<td>2016</td>
<td>63.6%</td>
<td>21.5%</td>
<td>2.1%</td>
<td>2.7%</td>
<td>10.1%</td>
<td>100.0%</td>
<td>760,591</td>
</tr>
<tr>
<td>2017</td>
<td>58.6%</td>
<td>26.6%</td>
<td>2.2%</td>
<td>2.6%</td>
<td>10.0%</td>
<td>100.0%</td>
<td>762,629</td>
</tr>
<tr>
<td>Q1:2018</td>
<td>56.6%</td>
<td>29.9%</td>
<td>3.5%</td>
<td>NA</td>
<td>10.0%</td>
<td>100.0%</td>
<td>132,673</td>
</tr>
</tbody>
</table>

* Unable to identify RHS loans as HMDA data for 2018 not yet available

Source: Dare are for largest 73 CBSAs and consist of 8.5 million sale transaction study covering 5-years of home price appreciation (HPA) for 41,000 census tracts. Weighting based on HMDA. Shares based on count. Low & med-low price tiers defined respectively as <=40th & >40th to <=80th percentile of FHA sales prices & med-high & high price tiers defined respectively as >80th percentile of FHA sales prices & <= 125% of GSE limit & > 125% of GSE limit, all at county-level. HPIs are smoothed around the times of FHFA loan limit changes. Data for RHS are not available in years for which HMDA data has not yet been published.

There is a strong positive correlation between higher mortgage risk (higher expected default rates under stress) and higher home price appreciation, lower home prices, and lower income.

The scatter charts on the two slides that follow show correlations at the census tract level relating to mortgage risk which measures expected default rates under stress (x-axis) and:

• The ratio of tract home price appreciation (HPA) to county HPA,
• Income as a percent of metro area income.

The scatterplots are binned to better show the trend. Instead of a standard scatterplot, which plots all the data points, the binned scatterplot only plots the binned data points.

The scatter dots for each chart are color coded based on the percentage of high risk purchase loans as a share of all purchase loans in the tract.

• Those from the green color palette have a high risk share of less than 30%.
• Those from the blue color palette have a high risk share of greater than or equal to 30%

Source: Dare are for largest 73 CBSAs and consist of 8.5 million sale transaction study covering 5-years of home price appreciation (HPA) for 41,000 census tracts.
Strong Positive Correlation Between Mortgage Risk & Home Price Appreciation

House price appreciation increases with a census tract’s mortgage risk index:

- **For the dark green dots (MRI < 15%), the median ratio of tract to county house price appreciation is 0.86**
- **For the dark purple dots (MRI ≥ 60%), ratio is 1.19—a 38% higher level of price appreciation**

*Together the blue color palette tracts (MRI ≥ 30%) represented about 50% of all sale transactions.*

Note: Instead of a standard scatterplot, which plots all the data points, the binned scatterplot only plots the binned data points. It first groups the x-axis variable into equal-sized bins and then computes the mean of the x and y-axis variables within each bin thereby simplifying the plot while keeping the relationship between x and y variable intact. High risk loans are defined as loans with a Mortgage Risk Index ≥12%.

Source: AEI, Center on Housing Markets and Finance, [www.AEI.org/housing](http://www.AEI.org/housing).
Strong Positive Correlation Between Mortgage Risk & Tract Income

- **Dark green dots on the right, with <15% high risk loans, had low average tract MRIs (about 3-6%)** and dark purple dots on the right, with >=60% high risk loans, had high tract MRIs (about 17-23%)
- **For the dark green dots, the median tract income was 158% of metro area income, while for the dark purple dots, the median tract income was 89% of metro area income**
- **75% of the census tracks with median income below 120% of metro area income had average tract MRIs of 9% or greater**

Note: Instead of a standard scatterplot, which plots all the data points, the binned scatterplot only plots the binned data points. It first groups the x-axis variable into equal-sized bins and then computes the mean of the x and y-axis variables within each bin thereby simplifying the plot while keeping the relationship between x and y variable intact. High risk loans are defined as loans with a Mortgage Risk Index ≥12%.

Measured Steps Now Would Moderate Unsustainable Home Price Increases, Not Lead to Home Price Declines

Unlike FHA, rural housing services (RHS) has not moved out risk curve during boom 2.0, keeping housing more affordable for RHS buyers. RHS’ stressed default rate is unchanged over the last 5+ years, while FHA’s First-Time Buyer (FTB) risk index has increased from 21.5% to 28.9%. (The same increases apply to other FHA risk indices.)

<table>
<thead>
<tr>
<th>Median downpayment</th>
<th>Median saleprice</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>November 2013</td>
<td>November 2018</td>
</tr>
<tr>
<td>RHS</td>
<td>-$2,200</td>
<td>-$800</td>
</tr>
<tr>
<td>FHA</td>
<td>$3,700</td>
<td>$3,900</td>
</tr>
</tbody>
</table>

Source: AEI Center on Housing Markets and Finance, [www.AEI.org/housing](http://www.AEI.org/housing).
DTIs have been shifting higher as the rise in house prices has been outpacing income gains. The credit easing race between the GSEs and FHA continues. After Fannie (and Freddie) eliminated compensating factors in July 2017, virtually all GSE borrowers, not just those around the previous DTI limit of 45 percent, have shifted to higher DTIs. We expect FHA volume to continue to shift to higher DTIs.

Despite Fannie’s announcement in March to update its Desktop Underwriting after it had first raised the DTI limit to 50 in August 2017, there is little evidence that it has actually reigned in this segment. Compared to Feb-2018, the pullback was minor and the share of loans with a DTI in excess of 44 is still much greater than just a year ago.

Source: AEI Center on Housing Markets and Finance, [www.AEI.org/housing/](http://www.AEI.org/housing/).
RHS Reduced Borrower DTIs from 2013 to 2018, while the FHA Kept Increasing DTIs

DTIs limits act as counter-cyclical friction to slow the increase of house prices when supply is tight. Remove the friction and house prices increase, fueling a boom.

In 2013 RHS appears to have had a semi-hard stop at 43%.

RHS also allowed DTIs up to 48%, based on compensating factors. DTIs above 48% were rare.

FHA also allowed higher DTIs, generally up to 57%, with compensating factors. DTIs above 57% were rare.

In 2013 FHA appears to have had a semi-hard stop at 50% DTI.

By 2018, RHS was acting counter-cyclically against the house price boom by lowering its semi-hard DTI limit from 43% to 41%.

More importantly, RHS's hard stop was reduced to 46% from 48% As a result, since 2013 the percentage of loans with DTIs greater then 43% DECLINED from about 20% to about 10%.

However FHA was pro-cyclically fueling the house price boom. Loans with DTIs greater than 43% increased from 37% in 2013 to 55% in 2018. Those above 50% to 57% more than doubled to 27%. Additionally there is no evidence of the use of compensating factors.

The FHA’s and the GSEs’ Rising DTIs Have Been Pro-Cyclically Fueling the House Price Boom

Under QM, their credit boxes allow for DTIs well above 43%. As a result, DTIs have increased dramatically. It is the use of compensating factors that reduces risk layering, which is an important policy during a boom. However, the use of compensating factors has been reduced markedly.

Purchase Loans by DTI Bin: February 2013

- In 2013 FHA appears to have had a semi-hard stop at 50% DTI.
- In 2013 the GSEs had a semi-hard stop at 50% DTI.
- FHA also allowed many DTIs up to 57% with limited use of compensating factors.

Purchase Loans by DTI Bin: February 2018

- FHA was also acting pro-cyclically. DTIs >43% increased from 37% of loans in 2013 to 55% in 2018. Those >50% up to 57% more than doubled to 27%. There is no strong evidence indicating the use of compensating factors.
- Over 2013-2018 the GSEs were pro-cyclically fueling the boom. DTIs >43% increased from 13% in 2013 to 27% in 2018.
- The GSEs' requirement for compensating factors was removed in 2017. As a result, DTIs >45% up to 50% increased from 3.5% of loans to 19%.

Similar dramatic market shifts occurred from large banks to nonbanks for both FHA and RHS loans. Today nonbanks account of 80% of FHA and RHS originations.

*Origination shares do not show shares for State Housing Finance Agencies and Credit Unions which account for about 4% of the FHA Purchase market and 1% of the RHS Purchase market.

Source: AEI Center on Housing Markets and Finance, [www.AEI.org/housing](http://www.AEI.org/housing).
In the case of the FHA, migration to nonbanks has boosted overall risk level, as its wide-open credit box encourages higher risk lending by nonbanks who originate what they can sell and sell what they originate. This has not happened with RHS, apparently due to a risk management approach that monitors risk so as not to lean into the current house price boom. Counter-cyclical policies are key to not promoting a boom.

Shift away from large banks in GSE refi market has mirrored that in GSE purchase market. Banks (both large and other) have lower risk profile than nonbanks.

Note: Data for most recent months may understate large-bank share by perhaps 2 percentage points, as large banks are slower to move recent originations to the guarantee agencies for securitization and our market shares are based on securitized loans. MRI for state housing agencies not shown because loan volume is nil.

*Origination shares do not show shares for State Housing Finance Agencies and Credit Unions which account for about 3% of the GSE Refi market.

Massive shift from large banks to nonbanks in FHA refi market. Nonbanks now have 94% of the market, along with a higher risk profile than large banks.

Note: Data for most recent months may understate large-bank share by perhaps 2 percentage points, as large banks are slower to move recent originations to the guarantee agencies for securitization and our market shares are based on securitized loans. MRI for state housing agencies and credit unions not shown because loan volume is nil.

*Origination shares do not show shares for State Housing Finance Agencies and Credit Unions which account for about 1% of the FHA Refi market.

The share of FHA purchase loans in a state is heavily correlated with overall lending risk. FHA, as the riskiest lender by far, is accounting for a significant portion of risk, but is also moving the risk curve out for other agencies.

The states with the largest FHA and greatest risk levels have experienced faster growth in risk. All but three states have seen their risk levels increase over the past 5 years.

### Pricing Changes, Home Purchase Loans

<table>
<thead>
<tr>
<th>Agency</th>
<th>Date</th>
<th>Effect</th>
</tr>
</thead>
<tbody>
<tr>
<td>RHS</td>
<td>Oct. 2014</td>
<td>RHS raised monthly fee from 40 bps to 50 bps</td>
</tr>
<tr>
<td>FHA</td>
<td>Jan. 2015</td>
<td>FHA lowered annual MIP from 135 bps to 85 bps</td>
</tr>
<tr>
<td>RHS</td>
<td>Oct. 2015</td>
<td>RHS raised upfront fee from 200 bps to 275 bps</td>
</tr>
<tr>
<td>GSEs</td>
<td>Apr. 2016</td>
<td>As a result of GSE-imposed private mortgage insurer (PMI) capital requirements, industry revised premium structure to focus more on borrower’s credit score</td>
</tr>
<tr>
<td>RHS</td>
<td>Oct. 2016</td>
<td>RHS lowered upfront MIP from 275 bps to 100 bps and lowered monthly fee from 50 bps to 35 bps</td>
</tr>
</tbody>
</table>

- The GSEs find themselves in a multi-faceted competitive situation
- At one end is the FHA which neither prices nor underwrites for risk
- At the other end, the GSEs have risk-based loan level fee adjustments and private mortgage insurers are required to hold capital in a manner that more accurately reflects risk
  - The recently implemented PMI premium changes lowered cost for borrowers with higher credit scores (>720) and increased cost for borrowers with lower credit scores (<700)
- To meet affordable housing goals in this difficult competitive environment, the GSEs are resorting to heavy subsidies
  - However, stiff competition from FHA and due to the new PMI premium structure, the GSEs have been forced to fill affordable housing quotas with higher credit score loans (median of 737)
Stressed Default Rates by Loan Type

Compared to an identical purchase loan, refis have higher stressed default rates across all CLTV buckets. Cash-out refis are even riskier than no-cash-out refis. At its current level, the average CO is as risky as a >90% purchase loan and the average NCO is as risky as a mix of 81-90% and >90% purchase loans. Reasons: weakness of appraisal process and borrower self-selection.

Note: All stress default rates computed for credit score of 720-769 and DTI of 39-43%.
Median Downpayments

For agency market as a whole, median downpayment is small (5%, $10,700)

Median is even smaller for first-time buyer loans, especially for Ginnie loans (1.8%, $2,800). Ginnie accounts for almost 60% of agency first-time buyer volume

Traditional 20% downpayment is the norm only for Fannie/Freddie repeat buyers. Ginnie repeat buyers typically put down barely more than first-time buyers

Hence, in today’s market, little saving or accumulated equity is needed to buy a home, particularly a first home
As prices have been rising, dollar volume has been outgrowing count volume. Credit easing, particularly by the FHA, is fueling this trend. This creates a vicious cycles of price appreciation and credit easing. Solution: dial back flow of money into housing system.

As expected, RHS’ purchase volume jumped immediately after its MIP cut in October 2016. Since the cut, RHS has grown faster than FHA, its most direct competitor. In January, its growth surpassed all other agencies.

In our last NMRI briefing we wrote that in response to higher rates “refi volume could drop by 40% to 150,000 per month.” In January refi volume was down 40% from its peak in October. Refi demand, especially no-cash outs, and the mortgage rate are strongly correlated.

Fannie’s low-risk (prime) share has recently dropped below 50% for the first time in the history of the series. The low risk percentage gap between Fannie and Freddie is also the widest in series history. VA’s low-risk share is well below the GSEs’.
Calibrating Mortgage Safety

- NMRI captures the complex interplay of changes in three types of leverage: property (LTV and term), income (DTI, ARM vs. FRM, and term), and credit score

- Composite index substantially above 1990 level, but not approaching 2007 level when underwriting was exceptionally lax

- Fannie/Freddie index somewhat above 1990 level

- FHA index is extremely high. Sharp contrast with safe underwriting during 1935-55.

- VA index less than half the level of FHA, both recently and in 2007

<table>
<thead>
<tr>
<th>NMRI – purchase loans</th>
<th>Latest date</th>
<th>Latest Value</th>
<th>1935-1955 vintages (est.)</th>
<th>1990 vintage (est.)</th>
<th>2007 vintage (est.)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Composite index</td>
<td>Jul</td>
<td>12.8%</td>
<td>NA</td>
<td>6%</td>
<td>19%</td>
</tr>
<tr>
<td>Fannie and Freddie</td>
<td>Jul</td>
<td>7.3%</td>
<td>NA</td>
<td>4%</td>
<td>13%</td>
</tr>
<tr>
<td>FHA</td>
<td>Jul</td>
<td>28.0%</td>
<td>3%</td>
<td>15%</td>
<td>33%</td>
</tr>
<tr>
<td>VA</td>
<td>Jul</td>
<td>11.9%</td>
<td>NA</td>
<td>NA</td>
<td>15%</td>
</tr>
</tbody>
</table>

An index value of less than 6 is indicative of conditions conducive to a stable market.
### Credit Conditions: 1990 to 2013-14

<table>
<thead>
<tr>
<th></th>
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<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>% Loans with DTI ≥ 42%</td>
<td>5-10%</td>
<td>28% (2003)</td>
<td>43% (2007)</td>
<td>28%</td>
</tr>
<tr>
<td>Median borrower credit score</td>
<td>735</td>
<td>701</td>
<td>705</td>
<td>735-740</td>
</tr>
<tr>
<td>% Loans with credit scores &lt; 640</td>
<td>9.5%</td>
<td>25%</td>
<td>NA</td>
<td>5%</td>
</tr>
<tr>
<td>% Loans with CLTV &gt; 90%</td>
<td>26%</td>
<td>35%</td>
<td>40%</td>
<td>45%</td>
</tr>
<tr>
<td>% Loans with CLTV ≥ 97%</td>
<td>1%</td>
<td>11%</td>
<td>40%</td>
<td>30%</td>
</tr>
<tr>
<td>% Loans Low/No Doc</td>
<td>Nil (1992)</td>
<td>6% (2000-02)</td>
<td>25%</td>
<td>Nil</td>
</tr>
<tr>
<td>30-year fixed interest rate</td>
<td>10% (1990)</td>
<td>7% (2001)</td>
<td>6.5% (2006)</td>
<td>4% (2013)</td>
</tr>
<tr>
<td>First-time buyers as % of primary home purchase mortgages</td>
<td>38-42% (1990)</td>
<td>NA</td>
<td>NA</td>
<td>50%</td>
</tr>
<tr>
<td>Perfect credit (no lates) as a % of home purchase borrowers</td>
<td>57-60% (1990)</td>
<td>NA</td>
<td>NA</td>
<td>60%</td>
</tr>
<tr>
<td>NMRI</td>
<td>6%</td>
<td>NA</td>
<td>19%</td>
<td>10%</td>
</tr>
</tbody>
</table>

Compiled by AEI. Sources: CoreLogic for DTI data for 2000-03 and 2005-07 and median credit score for 2005-07. Other data from AEI, Fannie Mae, FHA, Equifax, Freddie Mac, FICO®, and miscellaneous other sources. In general, figures shown are for the entire purchase loan market (conventional and government guaranteed). John Burns (John Burns Real Estate Consulting) collaborated on the presentation format.

- Clear buildup of risk from 1990-92 to 2005-07
- 2013-14 loan cohort less risky than 2005-07 cohort due to smaller percentage of loans with high DTIs, higher median credit score, and very few low/no doc loans
- Still, 2013-14 cohort is substantially riskier than 1990-92 cohort. Main differences are sharp increase in loans with high CLTVs and high debt ratios, notwithstanding much lower interest rates
Role of Income Leverage During Housing Boom

- Less attention paid to income leverage than to property and credit leverage
  - Owes to data scarcity, as the FHA and GSEs published virtually no DTI data until 2013, when FHFA released DTI trends for the period 1996 onward for both the GSEs and FHA

- Over 1996-2005, higher income leverage raised overall home purchase buying power 46%, three-quarters of the 62% rise in real home prices*
  - GSE median housing DTIs (purchase transactions): 23% in 1996, 27% in 2005 — 17% boost in buying power (based on 8% interest rate for both years)
  - Median loan rates fell from 8% in 1996 to 6% in 2005 — 20% added boost in buying power
  - Low doc/no doc loan share was near 0% in 1996 with minimal income overstatement. By 2005, share was 15% with 25% income overstatement (source: CoreLogic). This increased housing DTI in 2005 another percentage point to 28% (4% added boost in buyer power).

- Push/pull of increasing leverage at work today
  - *Home Prices Start to Heat Up: Double-digit growth arrives in more cities, but affordability worries emerge amid thin supply (WSJ, May 12, 2015)*

- NMRI tracks changes in income leverage
  - Since Nov. 2012, median total DTI for all agency primary purchase loans increased from 36% to 38%, leaving buyers more highly leveraged even as income volatility increases: *Cash Crunch Is, for Many, a Monthly Problem* (WSJ, May 20, 2015)

* Does not take into account increases in income, home size or quality. Ex. the median new home size increased 14% from 1996 to 2005.
Fed Tightening and Efforts to Maintain Buying Power

• Historical precedent: end of the Fed’s interest rate peg in effect from World War II
  – Long-term mortgage rate rose from 4.1% in 1953 to 6% in 1962
  – 5 amendments to National Housing Act (1954-61) increased FHA’s LTV and loan term limits
  – These changes, along with rising housing DTIs, kept buying power constant from 1953 to 1962

• Today: with the Fed now starting to tighten, long-term interest rates will rise
  – All else equal, a rise in the 30-year mortgage rate from 4% to 6% would reduce buying power by same amount as a 19% jump in home prices

• Two steps would keep buying power largely constant with no change in income-to-house price ratio
  – Reduce FHA’s annual premium an additional 35 basis points to 0.50% (requires action by FHA and would further stress FHA’s capital level)
  – Boost median total DTI from 41% today to 45% for FHA and from 34% today for GSEs to 38%. These changes would be QM compliant due to the agency QM exemption.

• Very risky steps. Would result in median total DTI for FHA well above the peak level in 2005-06 and for GSEs equal to the 2005-06 peak level.

• Wealth Building Home Loan provides a sustainable alternative

*FHFA’s 2014 fee report indicates that the GSEs were undercharging on high risk loans and overcharging on low risk ones and that overall guarantee fees were lower than needed to meet capital return levels. This is equivalent to a hidden guarantee fee cut and could be repeated in the future.
Appraisals Should Be the Guard Rail Against Speculative Booms

An appraisal should provide an opinion as to the relationship between market selling price and intrinsic or fundamental value

- Property valuations and appraisals should review and provide:
  - A robust and transparent opinion of a property’s most likely market price based on a systematic analysis of generally available information rather than 3 subjectively chosen comparison properties
    - Including a range around the most likely market price at a specified confidence level
  - Trends in and nearness to key elements of utility such as employment, shopping, transportation, other infrastructure and amenities, along with zoning, density restrictions, and tax burden that impact intrinsic value and market price
  - Market conditions and an assessment of whether a substantial differential between a property’s intrinsic value and market price is substantiated by a change in utility:
    - At least 10-year nominal and real home price trends and a determination as to current position in market cycle relative to equilibrium
      - At least a 5-year history of buyer’s market (inventory > 6 mo.) and/or seller’s market (≤ 6 mo.)
    - Impact on buying power over last 5 years due to changes in loan leverage or prevailing interest rates
  - Current land value and land share, and trends in both
  - Whether real price changes are due to leverage growth, improving utility or a combination
  - A property’s overall condition and a recommendation as to any readily observable repairs necessary to make it meet generally accepted minimum property requirements
Cross-subsidies Return to the GSEs

- FHFA’s Report on Single-Family Guarantee Fees in 2014 disclosed numerous instances of mispricing and cross-subsidies, a significant deviation from 2013 report\(^1,2\)
  - High risk 30-year loans subsidized by low risk 15-years
  - Borrowers with low credit scores scores subsidized by those with high credit scores
  - High LTV loans subsidized by low LTV loans
  - Overall guarantee fee levels were found insufficient to meet the estimated future cost of providing the guarantee

- Mispricing promotes adverse selection and increases overall risk of mortgage finance system
  - Allows the GSEs to implement guarantee fee cuts in an opaque manner
  - Ability to subsidize risky loans will cause progressive loosening of underwriting standards
  - As was the case the last time around, this movement out the risk curve may take 5-10 years

- NMRI is designed to track these risks in real time

Since April 2016 the GSEs have again overtaken FHA as the fastest growing agencies indicating that FHA MIP cut effect from January 2015, which led to massive poaching and some new homebuyers, has worn off.
FHFA Director Mel Watt stated that with use of compensating factors “loans with a 3 percent down payment backed by GSEs are no riskier than those with a down payment of 10 percent …” (Jan. 27, 2015). Based on NMRI ratios, this is not true.

Fannie accounts for the vast majority of GSE loans with CLTVs > 95%
FHA’s minimum scores are near the bottom of the FICO credit score distribution. An FHA borrower with a 500 credit score has an NMRI of 50%, twice as risky as today’s median FHA loan and eight times riskier than today’s median GSE loan.

Source: AEI Center on Housing Markets and Finance, www.AEI.org/housing, from FICO 8 score distribution for October 2014. Distribution for FICO scores of 300-800 and 850 directly from FICO; distribution between 800 and 850 interpolated by Edward Pinto.
Median scores about unchanged from January 2017. FHA’s all-buyer median at 34th percentile of scored distribution, with room to drop given FHA’s minimum scores. In current seller’s market, this will boost home prices faster than income.

*Data pertain to purchase loans for primary owner-occupied properties. Percentiles based on population of all scorable individuals.

Source: AEI Center on Housing Markets and Finance, www.AEI.org/housing
Aggregate default risk (which measures the combined effect of loan-level risk and volume) continues to rise. FHA continues to account for more than half of the aggregate agency risk.

Pricing for risk matters. GSE pricing for higher credit scores are now competitive with FHA, which is reflected in changes to market shares. It has also led to GSE gaining a greater share of lower risk FHA borrowers.

Stark contrast between credit score distributions for FHA and GSE borrowers. FHA accounts for over 80% of scores below 660, while GSEs account for nearly 90% above 740.

MRIs rise as credit scores decline – evidence of risk layering rather than compensation for risk. In a seller’s market, risk layering artificially pushes up prices, resulting in a wealth transfer from buyers to sellers of entry-level homes.
58% of all primary purchase loans and 36% of such Fannie/Freddie loans have a minimal down payment. With QM silent on down payments, lots of room for these shares to rise. In current seller’s market, this will drive up home prices more than income.

In October 2018, 90% of FHA primary owner-occupied purchase loans had a down payment of 5% or less; the share for VA was 88%.

The October 2018 share for first-time buyers was 72%.

*Data pertain to purchase loans for primary owner-occupied properties.
Source: AEI Center on Housing Markets and Finance, www.AEI.org/housing
Retail and correspondent shares have stabilized at around 45% each. Broker share has remained around 10%. Correspondent and broker composite MRIs tracking higher at levels significantly above retail MRI.
**Large Bank Origination Shares and MRIs by Channel, Purchase Loans**

*Nearly all large-bank volume comes through retail and correspondent channels; broker volume has dropped to de minimis level. MRI shows that large banks are acting to limit defaults among retail customers and reducing risk tolerance on correspondent loans.*

*Sharp drop in MRI for broker channel is due to greatly reduced volume of GNMA loans. Source: AEI Center on Housing Markets and Finance, www.AEI.org/housing.*
Fed’s Senior Loan Officer Survey is Badly Flawed

• Showed no systematic loosening in mortgage lending standards in the run-up to the 2007-08 financial crisis

• Survey design problems
  – Only covers commercial bank lenders
  – Based on opinions of a small number of loan officers
  – Weights all responses equally

• Results over past year: some easing for GSE loans, little change for Ginnie loans. Survey misses the caution prevailing at banks revealed by NMRI (see table).

• Mortgage lending standards have eased but this is due to mix shifts not captured by the survey (from banks to nonbanks and from GSEs to FHA).

• Bottom line: don’t use the Fed survey

<table>
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<tr>
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</tr>
</thead>
<tbody>
<tr>
<td>GSEs</td>
<td>Some easing</td>
<td>Some easing</td>
</tr>
<tr>
<td>FHA, VA, and RHS</td>
<td>Some easing</td>
<td>Little change</td>
</tr>
</tbody>
</table>

Note: “Easing” denotes a rise in the NMRI of 0.25 percentage point or more, “Tightening” denotes a decline in the NMRI of 0.25 percentage point or more, and “Little change” denotes a change in the NMRI of less than 0.25 percentage point in either direction.

Urban Myth: Tight Credit Keeping
“Creditworthy” Borrowers Out of Market

- **Assertion:** “Today’s lenders are simply not originating loans for borrowers with less than perfect credit.” (Urban Institute, April 2015)
  
  - **Fact:** 40% of home purchase borrowers in 2013-14 had less than perfect credit (perfect being no lates)
  
  - **Fact:** Median credit score for FHA purchase loans was 674 in April 2015, well below the median for all individuals in U.S. with a score

- **Assertion:** “Severe” 2013 standards caused 1.25 million purchase loans to be missing relative to “cautious” 2001 standards

  - **Fact:** 70% of these “missing” borrowers had a credit score < 660; would have an MRI above 25% due to extensive risk layering on FHA loans

  - **Fact:** Urban study is fatally flawed. Credit score distribution was the same in 2005 as in 2001, so the number of “missing” loans would be the same using either year as the baseline. Because credit standards in 2005 were extremely lax, this makes the notion of “missing loans” meaningless

  - **Fact:** Credit standards in 2001 were much looser than in the early 1990s. Thus, the early ’90s would be a more appropriate baseline for cautious standards.

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2. In addition to subprime credit score, initial equity of 3% or less, 30 year loan term, average total debt ratio of 41% without use of residual income.
3. A 1999 Urban Institute study ([http://www.urban.org/publications/1000205.html](http://www.urban.org/publications/1000205.html)) documented the easing of standards by the GSEs through 1998 but also noted that “The GSEs’ guidelines, designed to identify creditworthy applicants, are more likely to disqualify borrowers with low incomes, limited wealth, and poor credit histories; applicants with these characteristics are disproportionately minorities.” HUD relied on this study when it greatly expanded the affordable housing goals in 2000.
FHA Perpetuates This Myth

- FHA promotes lending to very high-risk borrowers: credit score floors of 500 with 10% down and 580 with 3.5% down
- 2007 vintage of FHA loans indicative of performance under stress

<table>
<thead>
<tr>
<th>Credit Score Range</th>
<th>Delinquency Rate</th>
</tr>
</thead>
<tbody>
<tr>
<td>≤ 620</td>
<td>47%</td>
</tr>
<tr>
<td>620-650</td>
<td>35%</td>
</tr>
<tr>
<td>650-700</td>
<td>25%</td>
</tr>
<tr>
<td>700-750</td>
<td>14%</td>
</tr>
<tr>
<td>&gt;750</td>
<td>9%</td>
</tr>
</tbody>
</table>


- FHA charges the same mortgage insurance premium regardless of borrower credit risk. Lack of risk-based pricing:¹
  - Misleads high-risk borrowers into thinking they are creditworthy
  - Exposes FHA to adverse selection
  - Is inherently unfair
  - Increases overall risk of mortgage finance system.

- AEI’s Wealth Building Home Loan offers a better solution for higher-risk borrowers

¹For a detailed analysis of the value of credit scoring and risk-based pricing for promoting a fair and efficient mortgage market, see Board of Governors of the Federal Reserve System, Report to the Congress on Credit Scoring and Its Effects on the Availability and Affordability of Credit, August 2007, [www.federalreserve.gov/boarddocs/rptcongress/creditscore/creditscore.pdf](http://www.federalreserve.gov/boarddocs/rptcongress/creditscore/creditscore.pdf)
Moral hazard: “A situation where one party gets involved in a risky event knowing that it is protected against the risk and the other party will incur the cost.”

FHA insurance presents a classic case with multiple layers of moral hazard:

- FHA insures 100% of the loss for high-risk loans, has minimal capital, and is taxpayer backed
  - It neither prices for risk nor underwrites for risk layering, which is inherently unfair to borrowers and exposes FHA to adverse selection.
  - Exact opposite of the original FHA structure in the 1934 National Housing Act
- Ginnie Mae and nonbank lenders, both with minimal capital, are able to ignore borrower solvency risk since they are protected by FHA
- High-risk borrowers, misled into thinking they are creditworthy, borrow more than they should. Greater borrowing spurred by recent cut in mortgage insurance premium is a textbook example.
- Increases overall risk of mortgage finance system
  - Effectively unconstrained by QM, increasing competition between Fannie and FHA, and eventually Freddie, will cause progressive loosening of underwriting standards
  - As was the case during the last boom/bust cycle, this movement out the risk curve may take 5-10 years

NMRI is designed to track these risks in real time

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1 http://economictimes.indiatimes.com/definition/moral-hazard
2 For a detailed analysis of the role risk-based pricing plays in promoting a fair and efficient mortgage market, see Board of Governors of the Federal Reserve System, Report to the Congress on Credit Scoring and Its Effects on the Availability and Affordability of Credit, August 2007, www.federalreserve.gov/boarddocs/rptcongress/creditscore/creditscore.pdf
3 QM as implemented does not constrain leverage (LTV/CLTV, credit score, or total DTI). It does constrain loan term, but at a highly levered 30 years. The rest of QM is largely window dressing (except for the current 5 year fully indexed requirement on ARMs). For example, FHA has had full doc and fully amortizing loans since its inception. This did not prevent 1 of 8 (3.4 million) of its borrowers going to claim from cohort years 1975-2013.
While FHA’s Capital Reached Required 2% Statutory Level for 1st Time since 2008, It Is Insufficient

**Mutual Mortgage Insurance Fund at 2.07% in FY 2015 compared to 0.41% in FY 2014.**

A further reduction in insurance fee is unjustified and counter productive.

- Impact of premium cut was minimal as most of the gain since FY 2014 projection was due to FY 2015 volume gain which was offset dollar for dollar by reductions in mortgage insurance premiums.
  - Volume gain was largely due to poaching, mostly from Fannie and RHS, and an improving economy.
  - Most of the increase in buying power was capitalized into the purchase of higher priced homes.
  - Higher home price projection vs. FY 2014 projection also added to economic value.
    - Home prices are assumed to continue to increase faster than incomes for foreseeable future.
  - 36% of FY 2015 volume in CA, FL and AZ (traditionally volatile states) along with TX (has high house-price risk), up from 28% in FY 2010.
  - Premium cut substantially reduced FY2021 projected economic value.

- 2% capital level is insufficient.
  - FY 2014 report indicated a 4% capital level more appropriate given that U.S. is already in the 7th year of an economic expansion.
  - FHA not projected to hit a 4% single-family forward loan capital level until the end of FY 2020, at which point the current expansion, were it to continue, would be the longest on record.

- FHA’s MRI continues to hover near 25% and is 37% for loans with credit scores < 660.
  - Extraordinarily high default rate on loans with scores below 660 is an abusive lending practice.
  - These borrowers are disproportionately low-income and minority.
Credit easing trend has stopped in majority of states – SMRI down in about two-thirds of states for agency composite. Contrast between composite and individual agencies has re-appeared as market shares have shifted back to the GSEs after effects of FHA premium cut have worn off.


Note: SMRI applies exactly the same stress-test methodology from the NMRI to loans at the state level.

FHA has greater presence in lower cost CBSAs, while the Conventional side of the market has greater presence in higher cost CBSAs. FHA, due to its highest risk rating, is driving up risk in these lower cost CBSAs.

Source: AEI, Center on Housing Markets and Finance, www.AEI.org/housing, and First American Data Tree (DataTree.com).
A metro with very volatile house prices, especially for bottom price tier. Since the Jan. 2012 trough, bottom-tier prices up almost 70%, boosted by liberal credit terms and low rates in a seller’s market.

House Price Volatility, 51 Largest Metro Areas

House prices most volatile in California and Florida metros, moderately volatile in 16 other metros, with 25 metros having low volatility.

Note: Each series shows the percent change from 20 quarters (5 years) earlier. Volatile metros are defined as those for which the difference between the highest and lowest annual percent changes is more than 30 percentage points. All other metros are in the "more stable" group.

Median Values of Risk Factors by Loan Type

<table>
<thead>
<tr>
<th>Risk Factor</th>
<th>Purchase</th>
<th>No-Cash-Out Refi</th>
<th>Cash-Out Refi</th>
</tr>
</thead>
<tbody>
<tr>
<td>Credit Score</td>
<td>731</td>
<td>733</td>
<td>710</td>
</tr>
<tr>
<td>Total DTI</td>
<td>40</td>
<td>38</td>
<td>41</td>
</tr>
<tr>
<td>CLTV</td>
<td>95</td>
<td>73</td>
<td>75</td>
</tr>
</tbody>
</table>

Note: Calculations based on loans with non-missing data for credit score, DTI, and CLTV.

• Greater riskiness of refi loans for a given credit score, total DTI, and CLTV is offset by tighter lending standards. Refis have:
  – Higher credit scores
  – Lower total DTIs
  – Much lower CLTVs
Risk Shares for Home Purchase Loans

Loan risk greater than level conducive to long-run market stability, as low-risk loans accounted for only 37% of volume in October, far from comprising the preponderance of loans, which is necessary for long-term market stability.

For first-time buyers, the October 2018 low-risk prime share was 21%.

Low risk prime defined as stressed default rate of less than 6%, medium risk near prime is 6% to 12%, and high risk subprime is 12% or higher.

Note. Risk shares pertain to the composite of all purchase loans.
FHA has DTIs as high as 57% and GSEs have some as high as 50%. DTI limits should operate to “take the punch bowl away” before a leverage fueled boom goes too far. But the current DTIs maximums are so high as to present no such constraint.

For FHA, MRIs rise with DTIs – evidence of risk layering. The same is true for the GSEs up to a DTI of 45%; they compensate for risk on only the very highest DTI loans.

*Data pertain to purchase loans for primary owner-occupied properties.
Cash-outs accounted for 71 percent of total refis in October, more than triple the share at start of the series, owing in part to greater home equity. Temporary spike down early last year was due to a surge in no-cash-outs from FHA premium cut and a drop in mortgage rates. Recent spike is due to a large decline in no-cash-outs from higher mortgage rates while the demand for cash-outs has remained relatively stable.
Agency Cash-Out Share and Defaults

As cash-out share has grown, its agency composition has also changed. Compared to the series’ start, VA and FHA have tripled their share by loosening lending standards faster than the GSEs. Today, they account more over half of the expected defaults, up from just 20%.

Nonbank’s correspondent share has been increasing at the expense of retail and broker. While the MRIs of all three channels are increasing, the correspondent channel has the highest MRI and has increased the most.

Greater House Price Volatility at the Lower End

In the past, increasing leverage has fueled unsustainable house price trends. Since the advent of expanded “affordable housing” efforts, these trends have become stronger at the lower end of the market, as indicated by the higher peaks and lower troughs. Since 2012, a similar boom pattern has emerged.
Today’s 21 quarters look to constitute the early part of an extended housing boom. Sustained periods with few price declines allow market excesses to build and may lead to a Minsky Moment.** Unsustainable increases in entry-level home prices result in speculation in land, the more volatile part of the structure/land package.

**A Minsky moment is a sudden major collapse of asset values which is part of the credit cycle or business cycle. Such moments occur because long periods of prosperity and increasing value of investments lead to increasing speculation using borrowed money. Wikipedia

Source: FHFA Quarterly House Price Index and AEI Center on Housing Markets and Finance
Unforgiving Home Price Cycles: Booms Fueled by Increasing Leverage in a Seller’s Market, Followed by Mean Reversion

Fueled by growing loan leverage and tight supplies, real home prices have increased 29% since the early 2012 trough. Contrary to prevailing view, post-crisis underwriting/regulatory changes promote rather than constrain a boom. The pattern is similar to the initial years of the price boom that began in 1998. If it continues, the risk of a serious house price correction increases.

Real House Price Index (1975:Q1 = 100)*, through 2018:Q3

- Predominantly a buyer’s market
- Entirely a buyer’s market
- Entirely a seller’s market
- Predominantly a seller’s market

Real average annual growth rate
1997:Q2-2003:Q2 -- 4.3%
1997:Q2-2006:Q2 -- 5.1%
2012:Q2-2018:Q2 -- 4.2%

GSE affordable housing goals take effect for CY 1993 as mandated by the Housing Enterprises Safety and Soundness Act of 1992

1993-2006: period of credit easing and generally falling mortgage rates
2012 to date: easing loan standards, very loose Fed policy, and historically low mortgage rates

* Calculated as FHFA’s all-transaction house price index divided by BEA’s price index for personal consumption expenditures.
Note: National Association of Realtors (NAR) defines a seller’s market as inventory that is less than or equal to 6 months of sales. NAR data pertain to existing homes; not available before June 1982. Data from the Census Bureau for new home inventories used before June 1982.
Source: AEI, Center on Housing Markets and Finance, www.AEI.org/housing, FHFA, BEA, Census Bureau, and NAR.
Supply-Demand Imbalance Is Greatest in the Low Price Tier

There is also a greater bifurcation on months supply in the market by price point. From a year ago, the supply-imbalance has improved most at the upper end of the market, which is approaching a buyer’s market nationally. Inventories remain very tight at the lower end, continuing the strong seller’s market, which implies that house prices will continue to increase, thereby worsening affordability.

Comparing the Supply-Demand Imbalance: 100 Largest Metros

While the supply-demand imbalance has generally improved slightly, it remains tight in most metros, especially at lower price tiers. For high end homes, 40 of the 100 metros have buyer’s market conditions, up from 31 a year ago (high tier buyer’s market ≥ 8 months).

Note: Data are for largest 100 metros using Zillow’s existing home sales. Urban Honolulu in the high price tier is outside of range shown. Source: AEI, Center on Housing Markets and Finance, www.AEI.org/housing, and Zillow.
A huge gap has opened up in the riskiness of purchase loans originated by banks and nonbanks. Banks have reduced risk by shifting away from subprime borrowers and low downpayment loans. Nonbanks have increased share by taking advantage of broad Agency credit boxes and continued easing, thus making them the preferred risk channel. While this share shift has stabilized, risk levels continue to diverge. The entire year-over-year increase in risk is attributable to nonbanks.
Jumbo portfolio-GSE spreads (in bps)

Portfolio jumbo rate has been below the GSE rate since 2014, reversing prior pattern. The reasons are an increase in the GSE guarantee fees but also lenders may be bidding aggressively for jumbo loans to obtain low-risk assets with cross-selling opportunities.

<table>
<thead>
<tr>
<th>Period</th>
<th>Spreads in bps</th>
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<tbody>
<tr>
<td>2001-2006</td>
<td>25</td>
</tr>
<tr>
<td>2007-2009†</td>
<td>57</td>
</tr>
<tr>
<td>2010-2013†</td>
<td>21</td>
</tr>
<tr>
<td>2014-2017‡</td>
<td>-26</td>
</tr>
</tbody>
</table>

Note 1: Jumbo Portfolio minus GSE and Jumbo PMBS minus GSE spreads (in bps) between 90% and 110% of conforming limit.
Note 2: Chart omits PMBS-GSE spreads for years with less than 200 jumbo PMBS loans. Inset box uses loans for all years, except as indicated by line breaks.
Note 3: Data for 2017 are for January - September only.
Note 4: For loans between 90 percent and 110 percent of the applicable conforming loan limit

Source: AEI International Center on Housing Risk, [www.aei.org/housing](http://www.aei.org/housing), and CoreLogic.
Homeowners Can’t Count on House Price Gains to Build Wealth

A better approach would be to focus on actual wealth building through widespread adaptation of the Wealth-Building Home Loan (WBHL).

Using zip-level data for top 100 CBSAs to provide most complete analysis to date of risk by price tier

<table>
<thead>
<tr>
<th>Zip codes</th>
<th>Share of zips with decline in house price index</th>
</tr>
</thead>
<tbody>
<tr>
<td>Top price tier</td>
<td>28%</td>
</tr>
<tr>
<td>Middle price tier</td>
<td>37%</td>
</tr>
<tr>
<td>Bottom price tier</td>
<td>42%</td>
</tr>
</tbody>
</table>

Note: Top 100 CBSAs are defined by 2010 population. Analysis uses all five-digit zip codes in these CBSAs with a FHFA house price index back to 1990 or earlier and a Zillow median house price in 2000. Zips with a median house price in 2000 in the bottom third, middle third, and top third of all the zips in its CBSA are placed in the bottom, middle, and top price tiers, respectively.

• Prices rose almost everywhere from 1995 to 2005, but many zips saw declines in other periods, especially 2005-2010
• Bottom price tier – where most first-time buyers locate – was worst-performing tier
• These results are for price indices, which average across many homes. Risk for individual homes greater than shown here. WBHL mitigates this risk.

Evaluating the GSEs 2017 Business

**Principle:** the only plausible reason for government to back the housing market is to help low- or moderate income families buy homes. An evaluation of the GSEs 2017 business shows, that the GSEs fail to meet this simple test.

- **Refi Cash Out**
  - 21% share
  - $300,000 median sales price (SP)
  - 738 median FICO

- **Refi No Cash Out**
  - 19% share
  - $286,000 med. SP
  - 746 med. FICO

- **2nd home & investor**
  - 7% share
  - $229,000 med. SP
  - 774 med. FICO

Almost half of the GSEs’ 2017 volume wasn’t even related to buying a primary residence. These borrowers could be served by the private sector.

Source: AEI Center for Housing Markets and Finance. All share percentages based on dollars (YTD Aug. 2017)
Another 41% went to help well-to-do buyers, of which 25 percentage points went to well-to-do repeat buyers of primary residences and 16 percentage points went to well-to-do first-time buyers.

<table>
<thead>
<tr>
<th>Category</th>
<th>Share</th>
<th>Average Sale Price</th>
<th>Average FICO Score</th>
</tr>
</thead>
<tbody>
<tr>
<td>First-time buyer (FTB) w.&gt;85% CLTV &amp; loan&gt;$250,000</td>
<td>8%</td>
<td>$353,000</td>
<td>746</td>
</tr>
<tr>
<td>FTB w.&lt;85% CLTV</td>
<td>9%</td>
<td>$280,000</td>
<td>752</td>
</tr>
<tr>
<td>Repeat buyer w. &gt;85% CLTV &amp; loan &gt;$250,000</td>
<td>8%</td>
<td>$365,000</td>
<td>755</td>
</tr>
<tr>
<td>Repeat buyer w. &lt;=85% CLTV</td>
<td>18%</td>
<td>$327,000</td>
<td>774</td>
</tr>
</tbody>
</table>

These buyers could be served by the private sector.

Unrelated to buying a primary residence

Source: AEI Center for Housing Markets and Finance. All share percentages based on dollars (YTD Aug. 2017)
Only 6.5% (1 in 16) GSE Dollars went to first-time buyers of more modest homes and only 3.7% (1 in 30) GSE Dollars went to repeat buyers of more modest homes.

Repeat buyer w. >85% CLTV & loan<=$250,000
6.6% share
$189,900 median SP
755 median FICO

First-time buyer w. >85% CLTV & loan<=$250,000
3.7% share
$168,000 median SP
736 median FICO

The private sector and a targeted and reformed FHA could replace the GSEs over time:

- The private sector could handle the 50% who are not buying a primary residence and the 40% well-to-do repeat & 1st time buyers of primary residences
- The remaining 10% could be handled by the FHA and the private sector

Source: AEI Center for Housing Markets and Finance. All share percentages based on dollars (YTD Aug. 2017)
Over the past year the intrinsic over-valuation of the vast majority of metros has increased – the most in the metros that were already highly valued. Almost 75% of metros tracked by John Burns are overvalued today. These overvalued metros are largely concentrated in CA, NV, FL, and AZ, (the Sand States—ground zero in last boom/bust) and CO, TX, OR, and WA (states that largely sat out the last boom/bust).

Fairly Valued: 34 Metros. These metros account for 15% of the overall market*

Over-Valued: 97 Metros. These metros account for nearly 53% of the overall market*

*Based on HMDA data for 2017.

Note: The Intrinsic Home Value Index shows current price versus intrinsic value assuming 6% mortgage rate. It tracks 131 metros in the U.S. Source: AEI Center on Housing Markets and Finance, www.AEI.org/housing, and John Burns Real Estate Consulting.
### GSEs: Large Lender Market Share and Relative Risk Share, Refinance Loans

#### Large banks

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<tr>
<td>NMRI</td>
<td>8.6%</td>
<td>9.7%</td>
<td>8.3%</td>
<td>7.8%</td>
<td>8.9%</td>
<td>9.1%</td>
<td>9.1%</td>
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</table>

- **Wells Fargo**
- **JP Morgan**
- **Flagstar**
- **US Bank**
- **SunTrust**
- **BB&T**
- **Fifth Third**
- **Bank of America**

#### Large nonbanks

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- **Larger circle represents larger market share. Lenders shown represent the 8 largest banks and 15 largest nonbanks by origination share in 2016:Q3.**

- **Higher FHA risk share (relative to market share)**
- **Lower FHA risk share (relative to market share)**

---

25%+ 15 to 25% 5 to 15% 5 to -5% -5 to -15% -15 to -25% -25%+
FHA: Large Issuer Lender Type Market Share and Relative Risk Share, Refinance Loans

Large banks

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Larger circle represents larger market share. Lenders shown represent the largest 8 banks and 15 nonbanks by origination share in 2016:Q3.
Even though the rate of increases have slowed over the past three years, volume is still growing from a high base. Compared to 3 years prior, October 2017 volume by count is up 24 percent; first-time buyer volume is up 30 percent.

Fannie and, to a lesser extent, Freddie have expanded their holdings of higher risk subprime loans, now accounting for a combined 27 percent of such loans, up from 7.5 percent in Sept. 2012. While Freddie has offset this by adding safer, prime and near-prime loans, Fannie has shed some of its business in these categories. Over the past 6 months, Fannie appears to be changing its positioning as talks of GSE reform heat up.

* We define prime loans as low-risk (with a stressed default rate of less than 6%), near prime as medium risk (with a stressed default rate of 6% to less than 12%), and subprime as high risk (with a stressed default rate of 12% or greater).

Due to FHA’s loose lending standards, historically high loan limits and market share, and an appraisal process focused on market price, not market value, FHA borrowers are setting the price for a large share of the market including conventional loan buyers.

Law of Marginal Buyer: home prices will keep rising so long as the marginal buyer, who sets price for all, has access to higher leverage. Historically, the government, has been the most willing provider of this leverage.

* Source: John Ligon, Heritage Foundation
Current policy is driving loan balances higher during a very tight market. FHFA first raised the conforming loan limit from $417,000 to $424,100 in Jan. 2017, then to $453,100 in Jan. 2018.* Borrowers in non-high cost areas immediately borrowed at the new maximum. The same holds for high-cost areas (not shown).

*FHA and VA also raised its maximum guaranty amount in line with FHFA and HUD. Data for February 2018 are partial.
The CFPB’s Qualified Mortgage Policy and GSE QM Patch Allowed for Credit Easing While Supply Is Constrained, a Direct and Continuing Cause of the Current House Price Boom

• In 1.13, “Ability-to-Repay and Qualified Mortgage Standards” rule issued, effective 1.10.14
• The Bureau noted it will “protect consumers from irresponsible mortgage lending.”
  • The rule effectively set a maximum debt-to-income (DTI) limit of 43% for the private sector.
  • GSEs and their automated underwriting systems were exempted from this provision for seven years.
  • Similarly, FHA, the VA and the Department of Agriculture’s Rural Housing Services (RHS), were exempted for up to seven years or until these agencies issued their own rules codifying their own lending practices (which all subsequently did).
• The QM rule was pursuant to the Dodd-Frank Act’s calling for minimum mortgage standards
  • It was to make sure “prime” loans will be made responsibly
    • Yet it sets no minimum down payment, no minimum standard for credit worthiness, and no maximum debt-to-income ratio (for government agencies)
    • Under this definition of “prime”, a borrower can have no down payment, a credit score of 580, and a debt ratio over 50% as long as they are approved by a government-sanctioned underwriting system.
• That this would promote an unsustainable home price boom could be foreseen:
  • In 2013: “Booms are fueled by excessive leverage” and “this rule does little to limit borrower leverage and lays the foundation for the next bust.”*
  • In 1951: “[In transitioning] from a buyer's to a seller's market, maximum terms become so commonly used they tend to be considered the minimum.”**
• The QM Patch does not operate counter-cyclically so as to “take the punch bowl away” so as to slow a leverage-fueled price boom.

**Fisher, Financing Home Ownership, NBER, 1951
Due to higher house prices and cash availability, house flipping is making a comeback. Levels today are back to the levels seen in 2003. 

Note: National Association of Realtors (NAR) defines a seller's market as inventory that is less than or equal to 6 months of sales.

Source: ATTOM Data Solutions and the NAR.
Over the past quarter century, the average rate of house price appreciation has been slow and subject to substantial volatility.

The outcomes for buyers in bottom-tier zips are worse than for buyers in top-tier zips, with lower average appreciation and greater volatility.

The difference in volatility was especially pronounced during the housing boom (2000-2005) and bust (2005-2010).

The reasons:
- Perhaps widening of income equality
- Cyclical swings in mortgage lending standards have a greater impact on FTBs than on RBs

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### Average House Price Change by Zip (% annual avg.)

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<tbody>
<tr>
<td>All zips</td>
<td>1.3</td>
<td>4.9</td>
<td>9.3</td>
<td>-2.8</td>
<td>1.9</td>
<td>2.8</td>
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<tr>
<td>By price tier within CBSA</td>
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<tr>
<td>Top-tier zips</td>
<td>1.7</td>
<td>5.3</td>
<td>8.4</td>
<td>-1.7</td>
<td>2.2</td>
<td>3.1</td>
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<td>Middle-tier zips</td>
<td>1.4</td>
<td>4.8</td>
<td>9.2</td>
<td>-2.8</td>
<td>1.9</td>
<td>2.8</td>
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<tr>
<td>Bottom-tier zips</td>
<td>0.8</td>
<td>4.6</td>
<td>10.3</td>
<td>-3.9</td>
<td>1.7</td>
<td>2.5</td>
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</tbody>
</table>

Note: Top 100 CBSAs based on 2010 population. House prices are measured using FHFA’s all-transactions HPI for five-digit zips and are combined with Zillow’s all single-family residences median house price in 2000 for about 5,300 zips in total. Zip codes are assigned to tiers based on the median house price in 2000. The price changes in the table are unweighted averages across the included zip codes. For more, see [https://www.aei.org/wp-content/uploads/2017/12/Wealth_Building_WP.pdf](https://www.aei.org/wp-content/uploads/2017/12/Wealth_Building_WP.pdf).

Raising the Conventional Loan Limit – A Prediction

*Raising the conforming loan limit during a seller’s market will drive up borrowing and therefore likely increase house prices. A case in point is San Diego, CA.*

* Through November 2016. Data point for $580,000 bin in 2016 is 315 loans.

Note: Data are for 1-unit properties only.

Raising the Conventional Loan Limit – A Good Idea?

Raising the conforming loan limit would be of no value to the vast majority of FTBs. Furthermore, conforming loan limit acts as a constraint on house prices during a seller’s market. Removing it will: 1) drive up borrowing, 2) increase house prices, and 3) shift market share away from the private lenders to the GSEs. Thus the impact on affordability is largely overstated.

![Bar chart](https://example.com/chart.png)

**Share of Borrowers at or above $417,000**

<table>
<thead>
<tr>
<th>Agency</th>
<th>First-time</th>
<th>Repeat</th>
</tr>
</thead>
<tbody>
<tr>
<td>GSEs</td>
<td>6.3%</td>
<td>7.6%</td>
</tr>
<tr>
<td>Fannie</td>
<td>6.2%</td>
<td>7.5%</td>
</tr>
<tr>
<td>Freddie</td>
<td>6.6%</td>
<td>7.7%</td>
</tr>
<tr>
<td>FHA</td>
<td>3.4%</td>
<td>5.2%</td>
</tr>
<tr>
<td>RHS</td>
<td>0.1%</td>
<td>0.2%</td>
</tr>
<tr>
<td>VA</td>
<td>6.2%</td>
<td>12.3%</td>
</tr>
<tr>
<td>All</td>
<td>4.8%</td>
<td>7.6%</td>
</tr>
</tbody>
</table>

Note: Bar chart refers to first-time buyer loans originated from September 2015 – August 2016.
Cash-out refis (CO) have grown in share and absolute number. As equity is extracted from real estate, it gets recycled into the economy driving up GDP. Problem: house prices have risen faster than fundamentals can support (with no end in sight). In the long-run, this makes a house price correction likely. However, as equity is extracted from real estate, owners have less capital to protect themselves from house price declines.

Back-of-the-envelop calculation:

According to Black Knight, $31bn in equity was extracted via COs in 2016:Q4. Cash-out extraction was 50% higher y-o-y.

On an annualized rate, this amounts to $120bn in 2016, or a $60bn increase over 2015.

For an $18.5tr economy, this amounts to an extra annualized stimulus of ~0.3% of GDP.

Source: AEI Center on Housing Markets and Finance, www.AEI.org/housing and Black Knight.
As cash-out share has grown, its agency composition has also changed. Compared to the series start, VA and FHA have tripled their share by loosening lending standards faster than the GSEs. Today, they account for more than half of the expected defaults, up from just 20%.

Punchbowl 1: Mortgage Rate Changes Applicable to FTBs and RBs

Mortgage rates, due to Fed easing, have been near all time lows. Rates for FTBs and RBs have moved in lock-step with a small premium for RBs over FTBs. The boost from lower rates has therefore applied equally to both buyer types – as has the increase in rates since November 2016.

Average GSE Note Rate: Primary Owner-Occupied 30-yr Fixed-Rate Purchase Mortgages

Note: Data are for GSE primary owner-occupied 30-year fixed-rate purchase mortgages with credit scores of 720-769, CLTVs of 76-80, and DTIs of 39-43. Source: AEI Center on Housing Markets and Finance, www.AEI.org/housing.
The Agency First-time Buyer MRI (FBMRI) stood at 16.7% in August, up 0.1 ppt from a year earlier and up 2.6 ppts from 5 Agency RBMRI is virtually unchanged since August 2013 (down 0.1 ppts years earlier. The pts.). The Agency FBMRI is 7.5 ppts higher than the Agency RBMRI, 0.5 ppts wider than the gap a year earlier. If the FBMRI trend continues, it will reach almost 20% by August 2022.

Note: Calculated for primary owner-occupied home purchase mortgages.
Agency Purchase Loan Demand Remains Strong

These two punchbowls have largely driven strong growth in agency volume. However, the market has plateaued at its current high level. Agency FTB volume was unchanged compared to one year ago and up 38 percent compared to five years ago. RB volume has pulled back slightly, but still up 21 percent from five years ago.

FTB vs RB Agency Transactions Index: Feb-2013 to Jan-2014 = 100

Note: First-time buyer volume not available before February 2013. The index is a 12 months rolling index.
The housing market is largely segmented by price. FTBs, or entry level buyers, traditionally buy at lower price points than RBs, or move-up buyers. Lately, FTBs have reduced the gap to RBs, an indication that recipients used added buying power from looser lending to bid up FTB homes, ironically made more expensive by FTB leverage, as RBs have had to make downward quality adjustments.

Note: Data are for primary owner occupied properties only.
Constant Quality Prices Outlook for the Bifurcated Market: Slowing Price Appreciation for at the Higher End, Continued Robust Appreciation for at the Lower End

During the recent house price boom, the lower tiers of the market have experienced faster house price appreciation (HPA) due to the interaction of greater availability of leverage and extremely low inventory. The higher tiers have seen more restrained HPA. Even as the rate punchbowl is further withdrawn, we expect lower tier HPA to be robust as available leverage continues to power prices. Significantly, our research shows that a concentration of about 30% highly-leveraged borrowers in a census tract can raise prices for everyone in the tract. For the higher tiers, which mostly consist of RBs, who are less reliant on leverage, the prediction is a slight moderation in HPA.

Cumulative Constant-Quality HPI, by Price Tier (2012:Q4 = 0%)

Note: HPIs are smoothed around times of FHFA loan limit changes. Date are for 73 largest CBSAs. Source: AEI Center on Housing Markets and Finance, www.AEI.org/housing.
Outlook for Bifurcation of Market – Quality Changes

So far in the boom, borrowers in the higher price tiers have offset higher constant-quality (CQ) prices by reducing the quality of their home purchases. This quality adjustment has kept the market transaction price nearly flat. As the rate punchbowl is withdrawn further, we expect additional quality offsets in higher price tiers to compensate for higher rates. We expect borrowers in lower price tiers to continue to use the leverage punchbowl to largely offset both higher CQ prices and interest rates.

Note: HPIS are smoothed around times of FHFA loan limit changes. Date are for 73 largest CBSAs.
There is evidence for this market bifurcation at the state level. States with lower median prices, which also tend to be states with higher risk scores, have seen their volume flatten or increase, while higher priced states, which tend to be states with lower risk scores (and which tend to be mostly featured in the media), have tended to see declines. This trend will likely continue. Yet, there is a second component to this story as the next slide shows.

Outlook for a Bifurcated Market – Transaction Prices by State & Changes in Median Transaction Prices

There is no correlation between the level of state transaction prices and changes in said transaction prices. Transaction prices are still rising in virtually every state, with the few exceptions having more or less flat transaction prices over the last year. This is further evidence of the bifurcation of the market, where slowing house price appreciation (HPA) at the top is offset by continuing rapid HPA at the bottom.

While FHA’s Forward Program Capital Is at 3.9%, in Excess of Statutory Minimum of 2%, It Should be 7%

- **FHA’s 2014 Annual Report to Congress** provides a useful starting point and methodology for evaluating an appropriate level of capital today for FHA’s forward program.
  - The 2014 report concludes that a 8.5% capital buffer on outstanding insurance in force is needed
  - Our analysis adjusts this ratio upward to 9% to account for the growing risk of FHA’s portfolio.
  - Our analysis also excludes the substantial negative impact of the HECM program on the capital level of the Mutual Mortgage Insurance Fund.

- Applying the 2014 framework to the 2018 book, we find that FHA had a Capital Resource shortfall of 1.1% or about $13 billion
  - At end of FY 2018, FHA had $1.2 trillion in outstanding insurance in force (IIF).
  - FHA reported at 9.30.18, Capital Resources of 3.9% or $46.8 billion on $1.2 trillion outstanding
  - Given the 9% assumptions from the 2014 report, this suggests that FHA would need $108 billion in NPV Claims-Paying Capacity in the next crisis, similar to the Great Recession.
    - This assumes that steady state MIP income would provide a stream of 4% or $48 billion
    - Therefore, the Capital Resources portion would need to equal 5.0% or $60 billion, of which only $46.8 billion are currently covered

- Yet, FHA’s 2014 approach does not adequately address the current risks. While the 2014 Report noted “capital [in the form of house price appreciation] disappears in times of stress,” it misses:
  - The current home price appreciation (HPA) for entry level homes has again been inflated by excess leverage, most of which has been provided by FHA.
  - Entry-level homes’ faster HPA vs the slower HPA of non-highly leveraged higher priced homes
  - FHA’s sizable market share, its geographic concentration, and how its underwriting policies are exacerbating the current house price cycle.

- When taking these factors into account, FHA’s Capital Resources shortfall rises to 3.1% or about $37 billion
  - We think a buffer of an additional 2% in Capital Resources should be provided for each 10% that home prices in the low price tier have increased faster than prices in the med-high and high price tiers (currently a difference of +16%)
    - Today, this would require $24 billion in additional Capital Resources for a total of $84 billion to support $1.2 trillion in IIF
    - Thus, Capital Resources would need to total 7% or $84 billion (forward program only) compared to the 3.9% or $46.8 billion at 9.30.18 for the forward program
FHA commissioner Brian Montgomery stated that the agency was closely monitoring “the exponential rise in cash-out refinance transactions.” FHA’s CO volume has tripled from the beginning of the series and risk has increased from 19% to 27%. COs do nothing to promote homeownership for lower-income and minority buyers.

FHA commissioner Brian Montgomery also stated that the agency was closely monitoring “a continuing increase in the average FHA-insured borrower’s debt-to-income ratio, and declining average credit scores.” FHA’s average credit score for purchase loans has dropped from 697 in September 2012 to 671 in August 2018, while it’s average DTI has risen from 40 to 44.1 over the same time period. Lower credit scores are often combined with higher DTIs, a process known as risk-layering.

The First-time Buyer MRI continued to increase. Setting a new series high, FHA’s First-time Buyer MRI stood at 28.6% in February, up 2.1 ppts from a year earlier. With individual agencies easing credit standards and continued home price escalation, we expect higher FBMRIs in the coming months.
Which Risk Factors Have Driven Up the FTB NMRI?

Since 2012, all the key risk factors have contributed, which has magnified the effect on the NMRI through risk layering.

Over the past 3 years DTIs have contributed the most to a higher FTB NMRI, with about one-third of FTBs having a DTI in excess of the QM “limit” of 43 percent.

### Table: Share of first-time buyer home purchase loans with various risk factors

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<tbody>
<tr>
<td>Credit score &lt; 660</td>
<td>15%</td>
<td>19%</td>
<td>21%</td>
<td>21%</td>
<td>21%</td>
<td>23%</td>
</tr>
<tr>
<td>DTI &gt; 43%</td>
<td>24%</td>
<td>24%</td>
<td>27%</td>
<td>27%</td>
<td>31%</td>
<td>38%</td>
</tr>
<tr>
<td>CLTV ≥ 95%</td>
<td>64%</td>
<td>67%</td>
<td>71%</td>
<td>71%</td>
<td>71%</td>
<td>71%</td>
</tr>
<tr>
<td>30-year term</td>
<td>95%</td>
<td>96%</td>
<td>97%</td>
<td>97%</td>
<td>97%</td>
<td>97%</td>
</tr>
<tr>
<td>Risk Layering</td>
<td>27%</td>
<td>30%</td>
<td>34%</td>
<td>35%</td>
<td>37%</td>
<td>41%</td>
</tr>
</tbody>
</table>

Note: Calculated for primary owner-occupied home purchase loans with a government guarantee and reported risk factor. Risk layering is defined as having at least 3 of the 4 risk features presented in the table above present in a loan.

Source: AEI Center on Housing Markets and Finance, [www.AEI.org/housing](http://www.AEI.org/housing).
DTI limits should “take the punch bowl away” so as to slow a leverage-fueled price boom. The GSEs had standard DTIs as high as 45%, but traditionally allowed DTIs up to 50% with compensating factors. In this 46-50% DTI range, Freddie has historically outpaced Fannie. Fannie responded in Aug. 2017 by eliminating the requirement for compensating factors. The GSEs’ competition on income leverage, combined with FHA’s even looser DTI standards, will help fuel the ongoing price boom.

Source: AEI Center on Housing Markets and Finance, [www.AEI.org/housing](http://www.AEI.org/housing).
FTB Purchase Loans, by Level of Downpayment

It is often reported that down payments of 20% are an impediment to homeownership today. The truth is that VA and RHS don’t require any downpayment at all. And down payment or closing cost assistance is available through State Housing Finance Agencies, with about 15% of FTBs taking advantage of these programs, which often lowers their downpayment to $0. FHA purchasers have an average CLTV of 98%. Only 17% of FTBs put down 15% or more.

Note: Calculated for primary home purchase loans with a government guarantee and reported CLTV. Borrowers with downpayment assistance and CLTVs of 95% or greater are assumed to have no downpayment. Terms and conditions of the downpayment assistance programs vary by program, but in most cases they allow borrowers to offset the downpayment entirely.

Agency First-time Buyer Purchase Loan Share

Agency FTB share for August stood at 57.8%, up 0.3 ppt from a year ago. FTB share has likely reached saturation with tight inventory holding back buyers. An expanding economy and further credit easing will help maintain current levels as they offset higher prices and higher mortgage rates.

Note: First-time buyer volume not available before February 2013.
Government Housing Policy Creates an Economics Free Zone

• Law of the Marginal Buyer: In a seller’s market, prices rise faster than incomes as long as marginal buyer, who sets the price for all, has access to higher leverage. Determines not only price level, but also degree of stability, as price is not necessarily equal to value.

• Fisher’s Law: [I]n a seller's market, when choice is restricted and the seller virtually dictates sales terms, more liberal credit is likely to be capitalized in price. *

• Law of Ignorance: Policy makers ignore principles of supply, demand, and housing finance, resulting in an economics free zone. Cross-subsidies and expanded access to credit push up demand against a regulation-constrained supply.

* Fisher, Financing Home Ownership, NBER, 1951 (FHA’s first chief economist)
Definition of Low-Risk / Prime Loans

• We define low-risk / prime loans as those with a stressed default rate of less than 6%. Why?

• Low-risk / prime definition calibrated from two sources
  – Original QRM proposal to implement Dodd-Frank
  – FHA underwriting standards over 1935-55
  – Both yield an average stressed default rate of ≈ 3%

    • This is consistent with a maximum stressed default rate of ≈ 6% on individual loans, assuming a uniform distribution starting near 0%

    • Hence the use of 6% as the highest stressed default rate for a low-risk / prime loan
Agency First-Time Buyer Loan Count

Agency FTB volume remained unchanged and up 38 percent compared to one and five years ago, respectively.

Note: For primary owner-occupied home purchase mortgages with a government guarantee. November 2017 count is a preliminary estimate.
FHA FTB origination market share, which jumped after its cut in mortgage insurance premium (MIP) in January 2015, has been gradually trending down over the last two years. Since then, the GSEs started clawing back some of the market share they had lost. In August, FHA’s FTB share was near its pre-MIP cut level.

Story in the media has been of too tight credit holding back first-time buyers. Reality is the long-term trend has been towards looser credit and record setting volume (especially FTB). Especially noteworthy is the influx of subprime borrowers with credit score below 660.

Agency Origination Shares, FTB Purchase Loans by Market Segment

GSEs dominate prime segment accounting for 86% of that market. FHA has consolidated most of the subprime segment. Competition is greatest in near-prime segment.

* We define prime loans as low-risk (with a stressed default rate of less than 6%), near prime as medium risk (with a stressed default rate of 6% to less than 12%), and subprime as high risk (with a stressed default rate of 12% or greater).

The high-risk subprime market segment continues to outpace the growth in the lower-risk segments. The near-prime segment now accounts for equal number of loans as low-risk prime segment.

* We define prime loans as low-risk (with a stressed default rate of less than 6%), near prime as medium risk (with a stressed default rate of 6% to less than 12%), and subprime as high risk (with a stressed default rate of 12% or greater).

Combined first-time buyer share at 54.4% in August, up 0.3 ppt from a year earlier. The NAR’s monthly realtor survey is badly flawed, providing a much noisier picture, and as of recently, perhaps the wrong trend. NAR Sep ‘18 down 3 ppt. from Sep ’17.

Red markers show August share in each year.

Note: Calculated as a share of primary owner-occupied home purchase mortgages (both government guaranteed and private-sector mortgages). The NAR’s monthly survey (http://www.realtor.org/reports/realtors-confidence-index) is sent to more than 50,000 realtors (out of a total of 1.3 million members), but has a low response rate; only 7,605 responses were received for the March 2018 survey.

Source: AEI Center on Housing Markets and Finance, www.AEI.org/housing, and the NAR.
The NAR’s first time buyer series is fatally flawed. After removing seasonality, most of what remains is noise.

As a result, the NAR series yields little real trend information. AEI’s First-time Buyer Market Share Index (FBMSI) conveys real trend information. Bottom line: don’t use the NAR survey.

Note: Calculated as a share of primary owner-occupied home purchase mortgages (both government guaranteed and private-sector mortgages). The NAR’s monthly survey ([http://www.realtor.org/reports/realtors-confidence-index](http://www.realtor.org/reports/realtors-confidence-index)) is sent to more than 50,000 realtors (out of a total of 1.3 million members), but has a low response rate; only 4,555 responses were received for the April 2018 survey.

Source: AEI Center on Housing Markets and Finance, www.AEI.org/housing, and the NAR.
First-time buyer loan volume is trending up in vast majority of states. First-time buyer share is also trending up in two-thirds of states due to faster growth than repeat buyers.

NOT UPDATED

*Final value for each series based on change in each state from December 2015-February 2016 average to December 2016-February 2017 average. Earlier values calculated analogously.

The GSEs are primarily expanding their high CLTV business to higher credit score borrowers. These borrowers mainly profited from lower PMI capital requirements which resulted in lower insurance fees. FHA has expanded further down the credit distribution. With high credit scores and relatively low DTIs, GSE risk index (14.8%) is about half of FHA’s (29.1%).

The higher risk of the mortgages taken out by first-time buyers is largely due to risk layering.

Given the combination of little money down and slow amortization, these buyers will have very little home equity for a number of years unless their house appreciates substantially.

The mortgages taken out by repeat buyers are less risky along two dimensions in particular:
- a much smaller share had a CLTV of 95 percent or higher and
- a smaller share had a credit score below 660.

Bottom line: the supply of mortgage credit to first-time buyers is not tight.

Rising Prices Have Disparate Effects on Buyers

Repeat buyers profiting from higher prices have managed to lower their CLTVs, while FTBs have to stretch further. Recently we are also seeing greater separation in DTIs.

Note: Includes all types of NMRI purchase loans (primary owner-occupied, second home, and investor loans).
Share varies widely across agencies. **FHA and RHS are at the high end with a share of around 83 percent, while Freddie Mac is at the low end with a share around 45 percent.**

Note: Calculated as a share of primary owner-occupied home purchase mortgages. RHS is Rural Housing Service. FHA share is taken directly from FHA’s monthly production report, due to concerns about the accuracy of the first-time buyer classification in the NMRI dataset.

Source: AEI Center on Housing Markets and Finance, www.AEI.org/housing and FHA.
DTIs have been shifting higher as the rise in house prices has been outpacing income gains. The share of DTIs below 34% has declined, offset by a greater share of DTIs above 40%. While bullish for home prices in the near term, this presents long-term sustainability problems for both homeowners and the FHA.

California shows how the shift could intensify as affordability worsens.

*Data pertain to all first-time buyer agency purchase loans for primary owner-occupied properties. Source: AEI Center on Housing Markets and Finance, www.AEI.org/housing.
The Effect of FHA Mortgage Insurance Premium Cut

- FHA’s Jan. 2015 MIP failed to live up to its billing because it was undertaken during a seller’s market. FHA’s recently announced (and since suspended) MIP cut, during an even stronger seller’s market, likely would have had a similar outcome.

- Our research addresses two questions:

  - **Question 1**: How did FHA borrowers use the 6% in additional buying power?
    - Have analyzed this question with data from ATTOM Data Solutions, which allowed a robust comparison of FHA and Conventional buyers
    - Because prices rose by 3% for FHA financed homes vis-à-vis conventionally financed, borrowers only saved half of the MIP cut
    - The other half was capitalized into higher prices:
      - The median price paid by ALL FHA borrowers amounted to $1,300 more for the exact same house
      - The rest (around $3,600) was used to go up-market, as FHA buyers opted to purchase larger or more expensively appointed homes or opted for more expensive neighborhoods

  - **Question 2**: How accurate was FHA’s prediction that the cut would spur 250,000 first-time buyer (FTB) home purchases over the coming 3 years (≈ 83,000/year)?
    - FHA’s first-time buyer volume increased about 180,000 in 1st year after MIP cut. Using the NMRI data, we estimate that roughly:
      - 35,000 (20%) went to new entrant FTB brought in by the MIP cut, only 42% of projection
      - 85,000 of these loans (nearly half) were poached from the other Agencies
      - 60,000 (33%) represented market trend growth unrelated to the MIP cut
    - Upshot: FHA fell far short of goal despite big rise in [largely poached] total FTB volume