AEI Housing Market Indicators (HMI)

Transforming data into information, information into knowledge, knowledge into action.

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AEI Housing Center
AEI.org/housing
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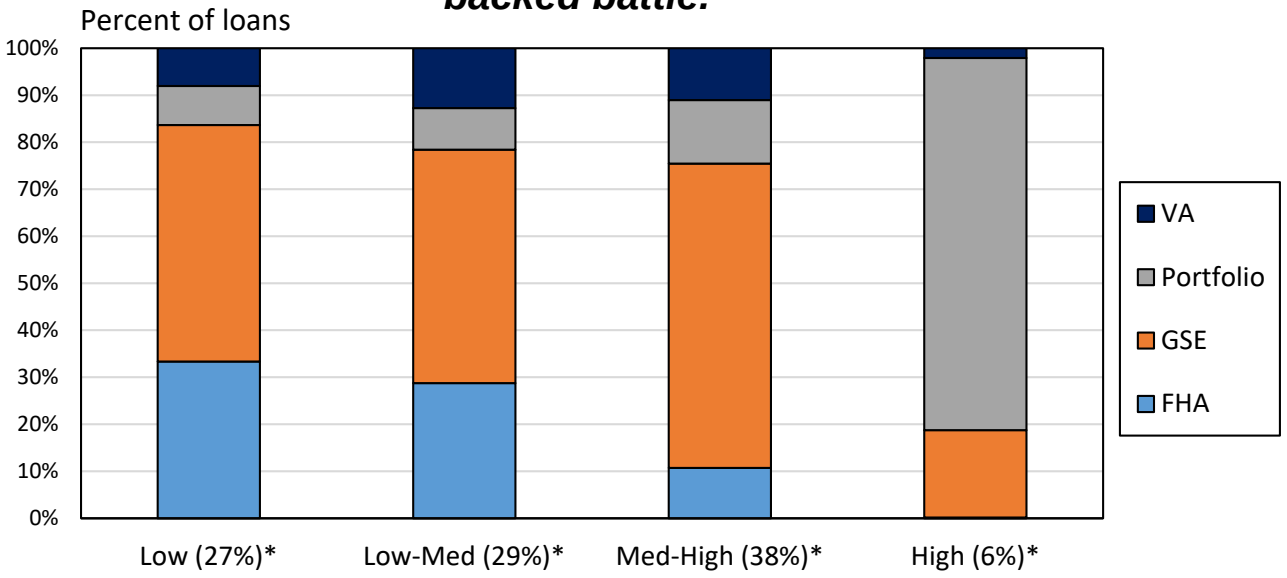
Link to AEI HMIs:
https://www.aei.org/housing/housing-market-indicators/

AEI Housing Market Indicators: An Introduction

- Provide accurate and timely metrics for the housing market. These include:
  - Mortgage Risk/Leverage
    - Particular attention is paid to agency first-time buyer volume and risk
  - House price appreciation trends
  - Housing sales
    - New and existing sales whether institutionally financed, cash, or other-financed
  - Months' inventory
- The housing market is influenced by many different levers. Measuring and evaluating with the right metrics provides a clearer understanding of 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 level
    - Price points: low, low-medium, medium-high, and high price tiers
      - Price tiers are defined based on the availability of leverage for borrowers at the metro level.
- Expanded Housing Market Indicators use 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 for many housing indicators, yielding the most comprehensive analysis of the housing market and boom/bust cycles
- Detailed methodologies are available after "Remaining Briefing Dates" slide.

Market Shares by Guarantor Type and Price Tier: 2019 Purchase Loans

To better track house price trends, we divide the market into 4 leverage-based price tiers. In the low and low-medium price tiers, FHA accounts for over a quarter share in each, while together FHA and the GSEs have a combined share of around 80%. The battle for market share between FHA and the GSEs is therefore largely taking place in these price tiers. Unsustainable constant-quality house price increases are the unfortunate consequence of this tax-payer backed battle.



2019	Price Tier			
	Entry-level		Move-up	
	Low	Low-Med	Med-High	High
Mortgage Risk Index	15.5%	14.3%	8.9%	3.1%
Market Share*	27%	29%	38%	6%

*Market share of all institutionally financed home sales in 2019 by tier.

Note: Data excludes Rural Housing Service. In 2017, Rural Housing Service loans made up 3% of the low tier, 2% of the low-medium tier, and a negligible amount of the two upper tiers. 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: all other sales.

Source: AEI Housing Center, www.AEI.org/housing.

What are the AEI Housing Market Indicators?

Indicator	Key Metric(s)	Additional Features	Geography	Frequency	Tier/ Segment*	Purpose
Home Prices & Supply	HPA**, Months' Supply	Interactive maps & price tier cutoffs	National, largest 40 metros	Monthly	Overall & 4 tiers	Real-time data on HPA & months' supply for 40 metros.
National & Metro Housing Market Indicators	HPA, Months' Supply, Mortgage Risk Index, Average Sale Price, NC*** Share of Sales	Reports for each metro & interactive maps	National, largest 60 metros	Quarterly	Overall & entry-level & move-up	A more comprehensive analysis of the housing market in 60 metros (but slightly less recent & only for 2 market segments).
Mortgage Risk Index	Mortgage Risk Index	Time series data on credit scores, CLTVs, DTIs, & other key metrics	National	Monthly	Overall, first-time & repeat buyers	Comprehensive resource for mortgage origination & risk data for agency loans.
The State of the Housing Market	County & State data: HPA, Months' Supply, NC, Mortgage Risk Index, Entry-Level Price-to-Income Ratio	Housing market metrics (supply, NC, leverage, etc.) & how they affect entry-level affordability	State & county, some metro indicators	Annual	Varies by indicator	A multitude of housing market indicators at the county & state level. These data are aggregated to derive trends on the state of the housing market.
The Carpenter Index	Share of Entry-level Sales Affordable to the Average Carpenter Household	Metro rankings, affordability heat map, change in affordability, & other affordability metrics	Largest 100 metros	Annual	Entry-level	"They can build it, but can they afford it?" The study ranks housing affordability in the entry-level market for 100 metros for blue-collar workers.
The Tech Worker Index	Share of Home Sales Affordable to the Average Tech Worker Household	Metro rankings, geographic trends, and the impact of work from home (WFH).	Largest 100 metros	Annual	Overall	The index investigates both affordability trends and why the WFH phenomenon is destined to have a large and continuing impact in the years ahead.

**Tier/Segment = Price Tier/Market Segment; **HPA = Home Price Appreciation; ***NC = New Construction; FTB = First-time Buyer*

https://www.aei.org/housing/housing-market-indicators/

What are the AEI Housing Market Indicators? (cont.)

Indicator	Key Metric(s)	Additional Features	Geography	Frequency	Tier/ Segment	Purpose
Best & Worst Metros to Be a FTB	Price-to-Income Ratio for over 3 million FTB Purchases	FTB stats on home prices, income, price/sq. ft., & sq. ft. of living area	Largest 50 metros	Annual	First-time buyers	This study ranks 50 metros based on their affordability for first-time homebuyers.
New Construction	NC Share of Sales	Interactive maps/charts and proposed policy solutions.	National, State, County, ZIP, Census Tract	Quarterly	Overall & 3 tiers (combines med-high & high)	Near real-time NC data at the census tract level & above.
Land Price and Land Share	Change in Land Share and Land Prices	Interactive maps on land prices, land shares, & changes over time in these indicators	ZIP (also census tract, county, metro, state, & nation)	Annual	None	The change in land share has been found to be highly predictive of house price boom/bust cycles.
Market Trends Report	HPA, Mortgage Default Rate, Home Sales, Months' Supply, NC Share	Current and historical market trends affecting the market price and intrinsic value of the subject property and its neighborhood	107+ million U.S. property addresses	Updated as data become available	Overall & 4 tiers	Provides trends affecting the market price & intrinsic value of the subject property, the subject's neighborhood, & its broader market areas.
Collateral Risk	Relationship btw. land shares, mortgage default risk, HPA, and borrower income or minority status.	An explanation for housing boom & bust cycles by tracking collateral risk before & after the Great Recession and during the current cycle.	majority of ZIP Codes/Census Tracts	Annually	None	Identify areas most at-risk from an economic downturn

HPA = Home Price Appreciation; NC = New Construction; FTB = First-time Buyer; Tier/Segment = Price Tier/Market Segment

https://www.aei.org/housing/housing-market-indicators/

Indicators and Data

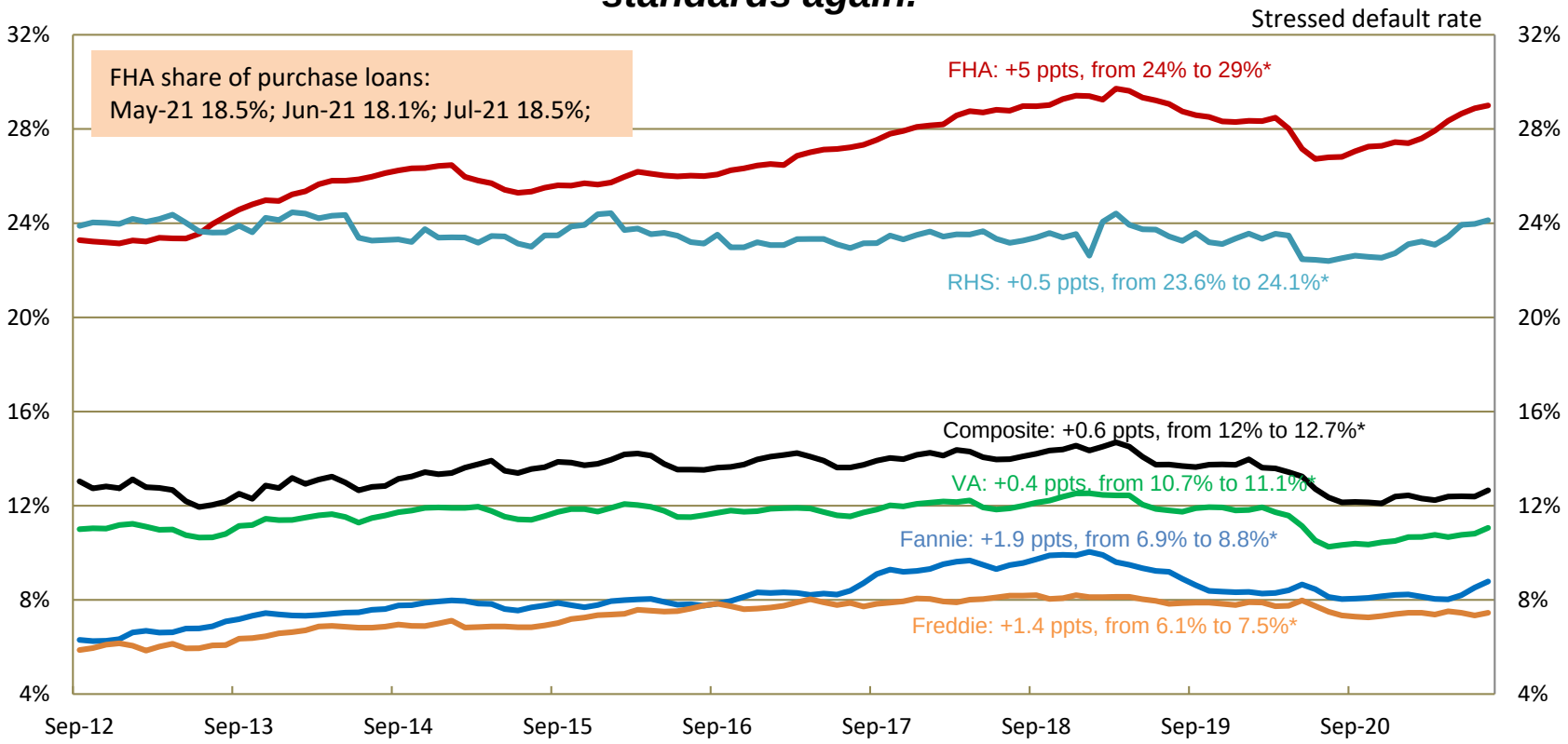
- National Mortgage Default Rate (NMDR) – based on 58.5m purchase & refi loans
  - MDR is a stress test, similar to a car crash safety rating or hurricane rating for buildings.
  - MDR assesses default risk based on the performance of the 2007 vintage loans with similar characteristics.
  - Goal: Monitor market stability through accurate, real-time tracking of leverage.
  - Series begins in September 2012.
  - Data are for government guaranteed loans.
- Historical NMDR – based on 92m purchase loans
  - Covers a quarter century of mortgage risk.
- Home sales – based on 47.6m home sales
  - Data measure home sales for entire nation and include property and borrower level data.
  - Series begins in January 2012.
- Supply/Demand – based on over 2,200 counties
  - Data measure months' supply at metro and county level.
- New Construction Sales – based on 5.1m new construction sales
  - Data identify newly constructed home sales.
  - Series begins in January 2012.
- House Price Appreciation – based on 28m sales of existing homes
  - Using a "quasi" repeat sales index (see appendix).
  - Series begins in January 2012.
- Rate Lock Volume – based on 20.9m rate locks
  - Using Optimal Blue, a rate lock software provider with roughly a third market coverage.
  - Data are updated daily, begin in 2013, and are limited to lenders who have used Optimal Blue since Dec-18 or earlier.

HMI Key Takeaways

- For the second month in a row, Freddie securitized the most mortgages in the market, again overtaking Fannie, which has historically been the leader.
  - In June 2021, Freddie issued more single-family MBS than Fannie for the first time.
  - In July, Freddie's share further increased to 53%, setting another series' high. This trend has been supported by the development and launch of the Uniform Mortgage-Backed Security (UMBS) in 2019.
- FHA serious delinquency levels continue to gradually decline from the pandemic-induced peak.
  - However, at the current rate of decline, it will take until June 2022 for them to reach pre-pandemic levels.
  - After end of the foreclosure moratorium on July 31, 2021, FHA foreclosures are starting to climb again but they remain below their pre-pandemic level.
- Foot traffic is slowly trending up.
  - The national foot traffic level is currently at 79%. Since the vaccination rollout, foot traffic has increased by 20 ppts. from the beginning of the year and 44 ppts. from the trough of the pandemic.
  - However, this trend has plateaued since April 2021.
- Agency purchase loan volume continues to run high.
  - July 2021 volume was up 14% compared to 2019.
  - Based on Optimal Blue data, we expect the final months of 2021 volume to continue running well above previous years (excluding the second half of 2020 due to COVID-related disruptions).
- The home price boom continues, with the national rate of Home Price Appreciation (HPA) for September 2021 coming in at 16.3% (preliminary), up from 8.4% in September 2020.
  - The Fed's monetary punchbowl (historically low interest rates) and the Work From Home revolution are fueling rampant home price appreciation.
  - Starting with June 2020, months' supply levels started to drop precipitously across all price tiers.
  - Low mortgage rates combined with about 1.2 months' supply mean that HPA will remain strong over the coming months, as also indicated by Optimal Blue data.

NMDR for Agency Home Purchase Loans

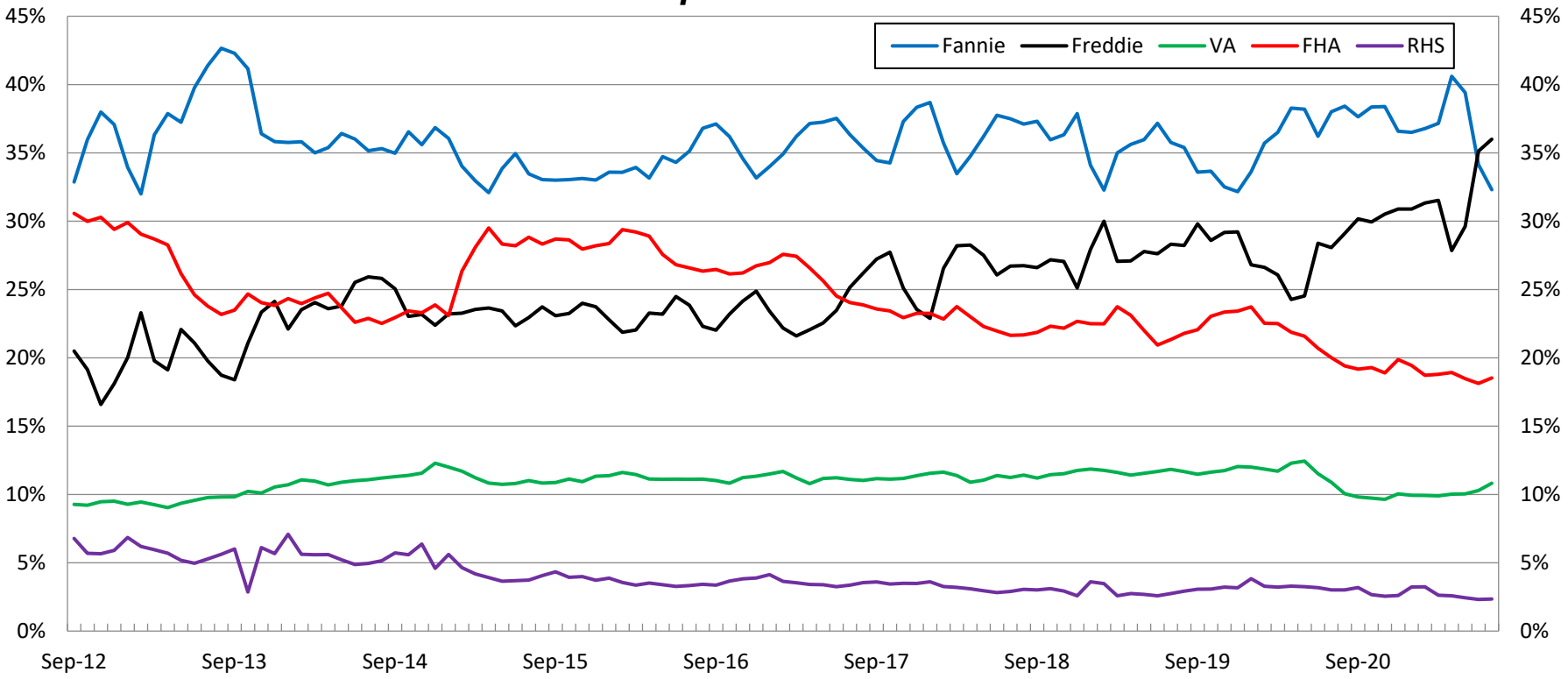
After trending upwards until March 2019, the composite index began a sustained decline. The composite index is near its lowest level since the series began. This credit tightening was the result of prudent policy changes by the various agencies. With the onset of the COVID-19 virus, especially FHA and VA (and their lenders) further tightened lending standards for borrowers with lower credit scores. This tightening for the Agency market appears to have ended in August 2020, with FHA loosening standards again.



*Change from July 2013 to July 2021. RHS is Rural Housing Service.
Source: AEI Housing Center, www.AEI.org/housing.

Agency Origination Shares, Purchase Loans

For the second month in a row, Freddie securitized the most mortgages in the market, again overtaking Fannie, which has historically been the leader. FHA's market share is down to 18.5%, near its lowest level for the series. This is likely due to FHA borrowers being priced out of the entry-level market by rampant home price appreciation, largely engineered by the Fed. The share drop is not due to FHA being more risk adverse, as its MDR has recovered from the pandemic trough and is now nearly at its all-time high set in March 2019. The VA is also slow in regaining the market share it lost in the aftermath of the pandemic.



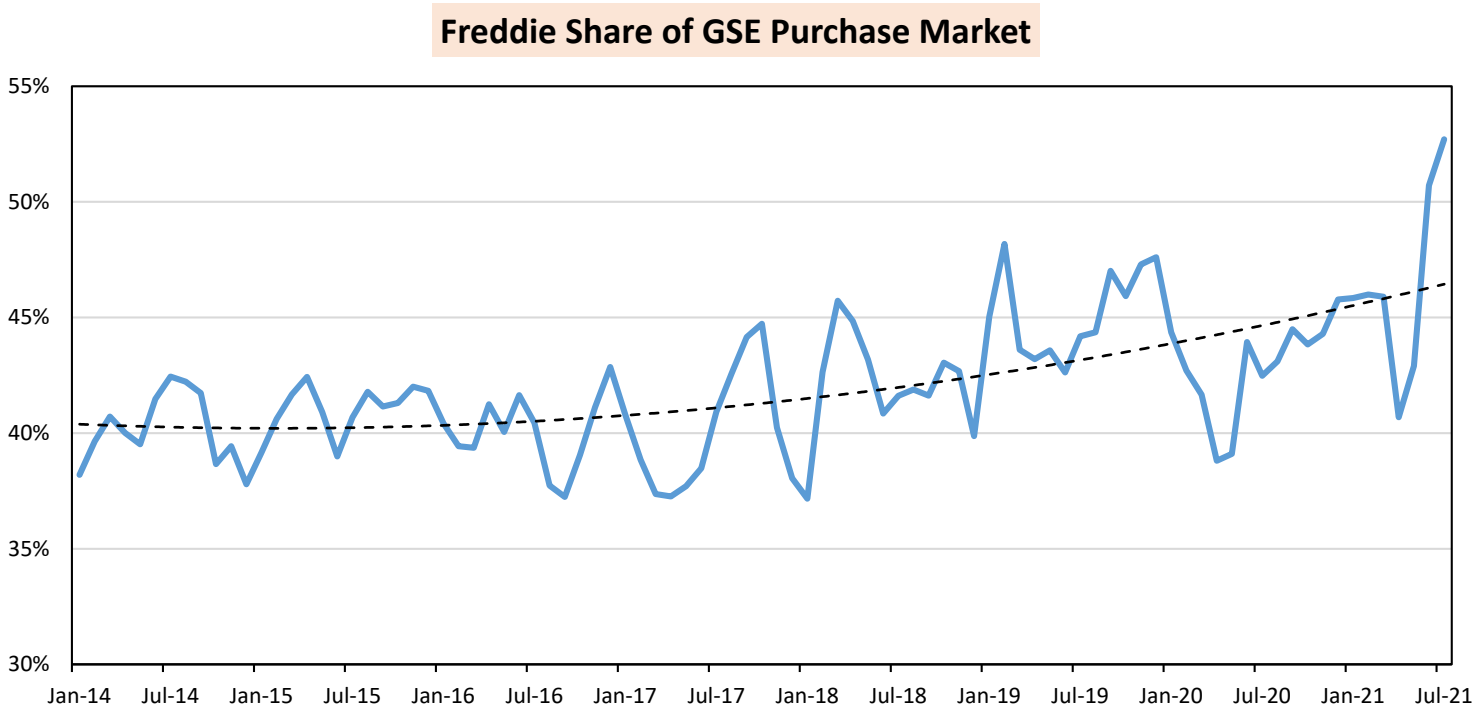
Source: AEI Housing Center, www.AEI.org/housing.

Share Shifts Between the GSEs

Freddie's share of the GSE purchase market, which hovered around 40% from 2014 to 2017, started to trend up as early as 2018. In June 2021, Freddie issued more single-family MBS than Fannie for the first time since tracking started in 2014, accounting for 51% of total GSE loans. In July, Freddie's share further increased to 53%, setting another series' high. This trend has been supported by the development and launch of the Uniform Mortgage-Backed Security (UMBS) in June 2019.

Based on conversations at the MBA Annual Convention:

- ***Sellers find it easier to retain 50bps (rather than 25bps) of servicing with Freddie than Fannie.***
- ***Sellers find Fannie's representations and warranty structure to be more rigid than Freddie's.***
- ***A counter is that seller's find Fannie's no delinquency advancing option more attractive.***



Source: AEI Housing Center, www.AEI.org/housing.

Share Shifts Between the GSEs by Largest Lenders

Lender Name	Period	Freddie Count	Fannie Count	Freddie Share of GSEs	Ppts. Change in Freddie Share	% Change in Freddie Share
Wells Fargo	Jun 20 - Jul 20	22,085	24,534	47%		
Wells Fargo	Jun 21 - Jul 21	15,792	10,133	61%	14 ppts.	**29%**
Pennymac	Jun 20 - Jul 20	6,554	11,771	36%		
Pennymac	Jun 21 - Jul 21	19,383	15,620	55%	20 ppts.	**55%**
United Shore Financial Services	Jun 20 - Jul 20	4,396	12,182	27%		
United Shore Financial Services	Jun 21 - Jul 21	17,385	17,700	50%	23 ppts.	**87%**
Quicken Loans	Jun 20 - Jul 20	5,576	13,558	29%		
Quicken Loans	Jun 21 - Jul 21	11,367	14,987	43%	14 ppts.	**48%**
JP Morgan Chase	Jun 20 - Jul 20	8,416	2,726	76%		
JP Morgan Chase	Jun 21 - Jul 21	13,918	5,930	70%	-5 ppts.	-7%
Fairway Independent Mortgage	Jun 20 - Jul 20	8,734	7,571	54%		
Fairway Independent Mortgage	Jun 21 - Jul 21	12,661	3,671	78%	24 ppts.	**45%**
U.S. Bank	Jun 20 - Jul 20	9,603	6,671	59%		
U.S. Bank	Jun 21 - Jul 21	11,031	5,606	66%	7 ppts.	**12%**
Caliber Home Loans	Jun 20 - Jul 20	9,540	5,004	66%		
Caliber Home Loans	Jun 21 - Jul 21	8,995	2,315	80%	14 ppts.	**21%**
Amerihome Mortgage Company	Jun 20 - Jul 20	6,516	2,761	70%		
Amerihome Mortgage Company	Jun 21 - Jul 21	12,737	3,330	79%	9 ppts.	**13%**
Guaranteed Rate	Jun 20 - Jul 20	8,024	3,403	70%		
Guaranteed Rate	Jun 21 - Jul 21	8,617	6,781	56%	-14 ppts.	**-20%**

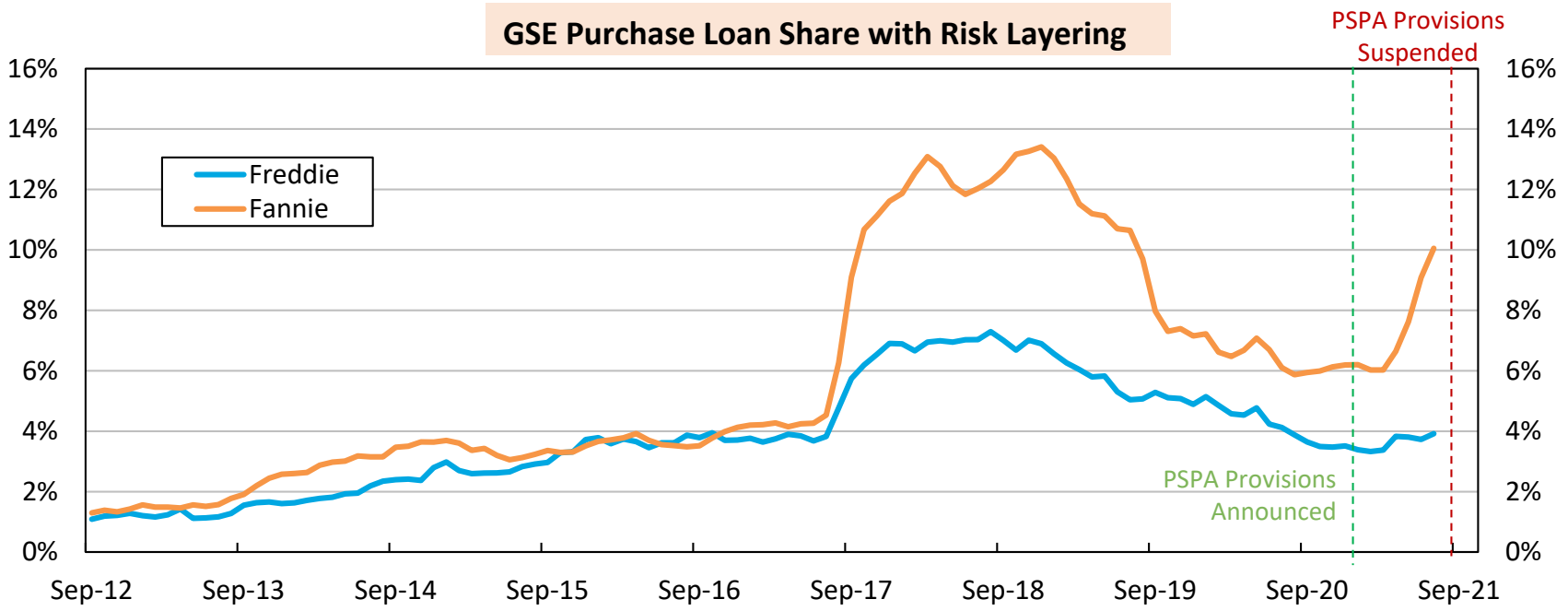
Source: AEI Housing Center, www.AEI.org/housing.

Policy Changes From the New Administration

Agency	Effective Date	Policy Change	Housing Center Plan
CFPB	6/30/2021	CFPB delayed the mandatory compliance data of the QM rule until Oct 1, 2022.	Track changes in rate spread using the Optimal Blue data
FHFA	8/1/2021	FHFA eliminated adverse market refinance fee.	Already covered in AEI Housing Finance Insights
HUD	8/16/2021	FHA updated its student loan monthly payment calculations.	Track changes in DTI using the Optimal Blue/NMDR data
FHFA	8/18/2021	FHFA proposed new benchmark level for minority & low-income tracts home purchase in 2022-24.	Compare the loan risks in minority & low-income tracts versus the rest of the country using the matched data
FHFA	9/14/2021	Fannie and Freddie suspended limits on second homes and investment properties, and risk layering limits on loans due to higher risk characteristics.	Tract changes in GSE second & investor home share and risk layering using the Optimal Blue/NMDR data
FHFA	9/18/2021	Fannie started to include rental payment history in its risk assessment processes.	Track changes in Fannie FICO score using the NMDR data
FHFA	10/18/2021	FHFA expanded eligibility for Fannie's and Freddie's refinance programs for low- and moderate-income borrowers and restored desktop appraisal flexibility.	Track changes in loans getting Refi Now/Refi Possible and appraisal waiver using the NMDR data
HUD	6/24/2021	HUD restored the Discriminatory Effects Standard to the 2013 rule.	
FHFA	9/1/2021	FHFA extended the Enterprises' REO First Look Period to 30 days from 20 days.	
FHFA	9/1/2021	Fannie and Freddie increased LIHTC cap to $850 million annually from $500 million.	

Impact of Limits on GSE Loans with Higher Risk Characteristics

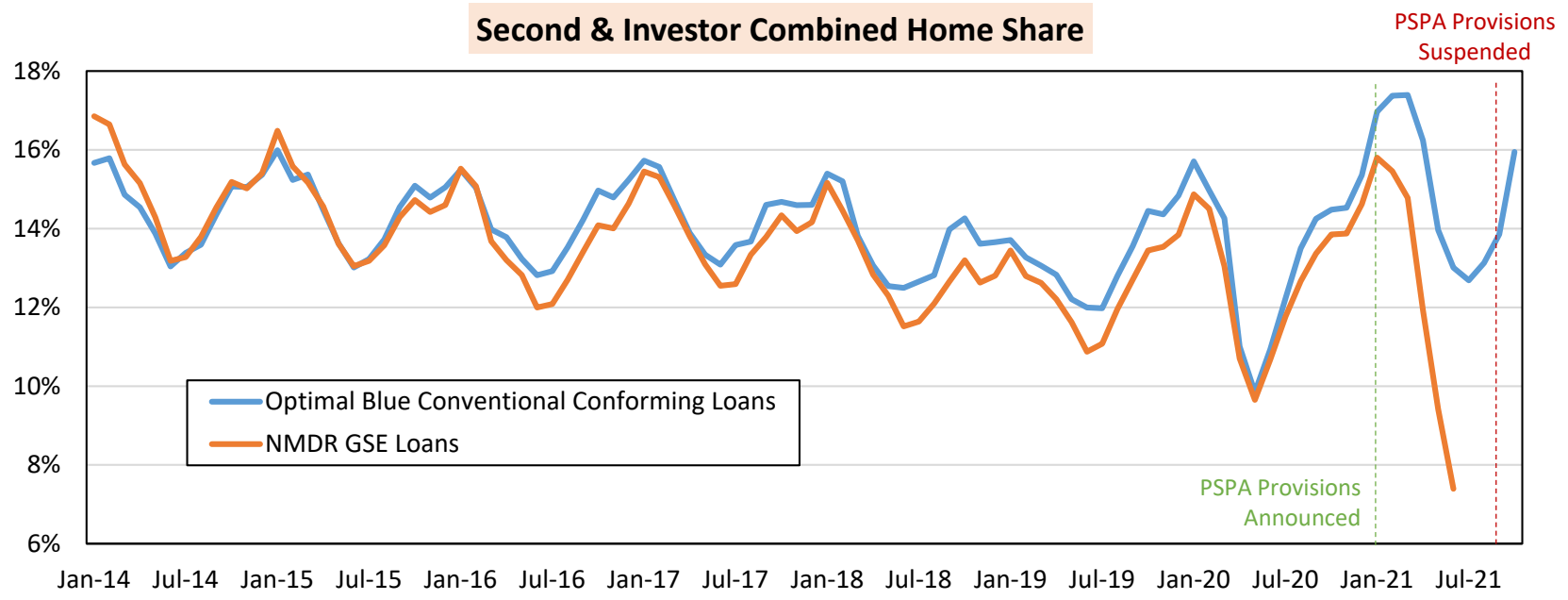
At the behest of FHFA director Mark Calabria, the GSEs started to rein in risk layering in 2019. In January 2021, FHFA and the Treasury Dept. announced revisions to the Preferred Stock Purchase Agreements (PSPA). One of the key terms was to limit the acquisitions of risk layered single-family loans with higher risk characteristics to 6% for home purchase loans and 3% for refinance loans over the preceding 52-week period. However, even before this PSPA provision was suspended in September 2021 under FHFA's new leadership, Fannie's share of risk layered loans had already increased to well above 6% and now stands at 10% in July. Freddie's share remains at around 4%. Based on the Optimal Blue data, we expect the share of higher risk loans to further increase for the GSEs. This change will increase competition between the GSEs and FHA, resulting in higher home price appreciation.



Source: AEI Housing Center, www.AEI.org/housing.

Impact of the Suspension of GSE Second and Investment Home Acquisition Limit

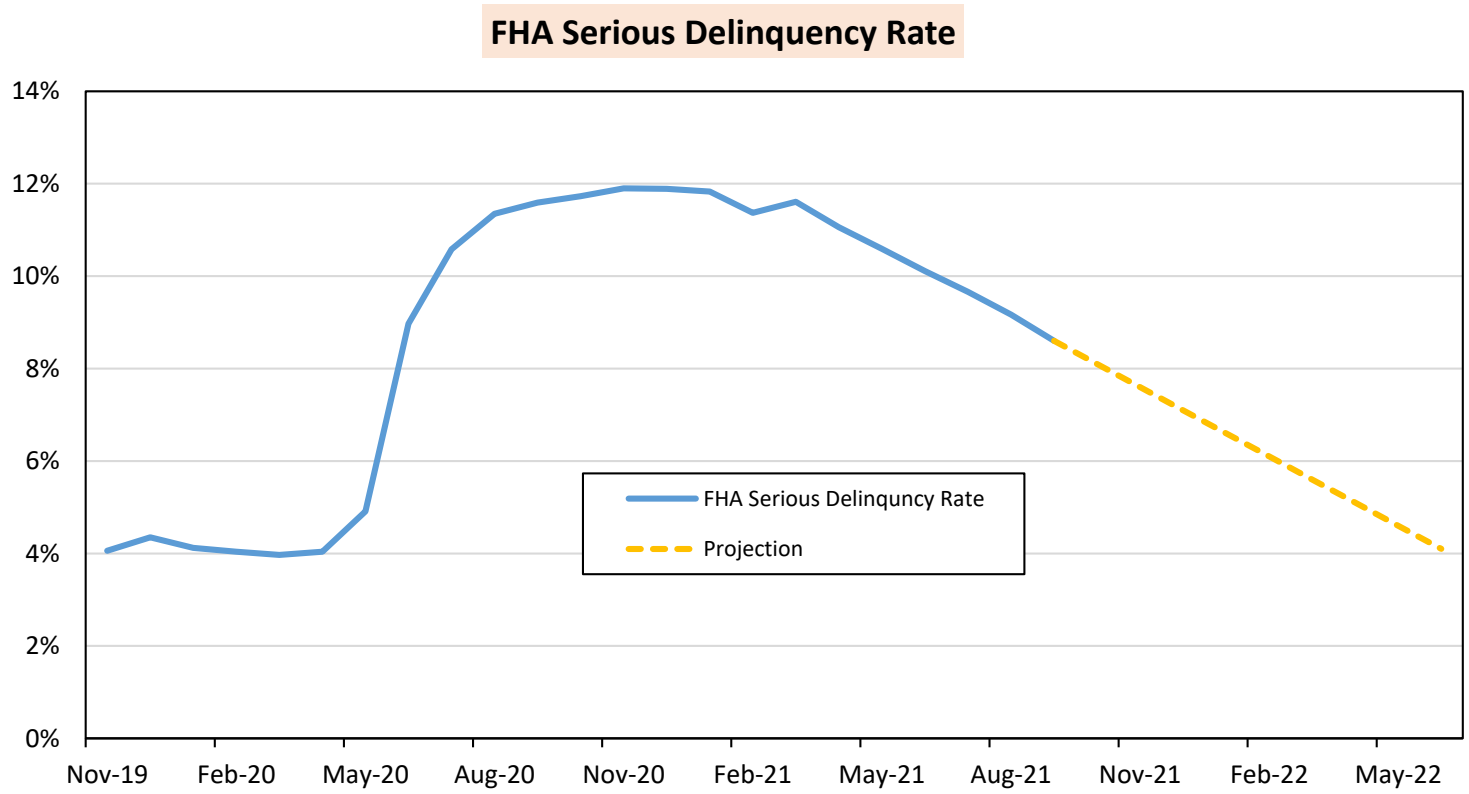
The provisions to PSPA in January 2021 also limited the acquisition of single-family mortgage loans secured by second homes and investment properties to 7% of single-family acquisitions over the preceding 52-week period. Following the announcement, the second and investment home share dropped precipitously in the NMDR data relative to the Optimal Blue data (which tracks GSE and also private loans). This indicates that the business likely switched from the government to the private sector. In September 2021, FHFA's new leadership suspended the PSPA provision. As a result of the policy reversal, we expect the NMDR share to quickly again approach the levels in the Optimal Blue data.



Source: AEI Housing Center, www.AEI.org/housing.

FHA Serious Delinquency Rate

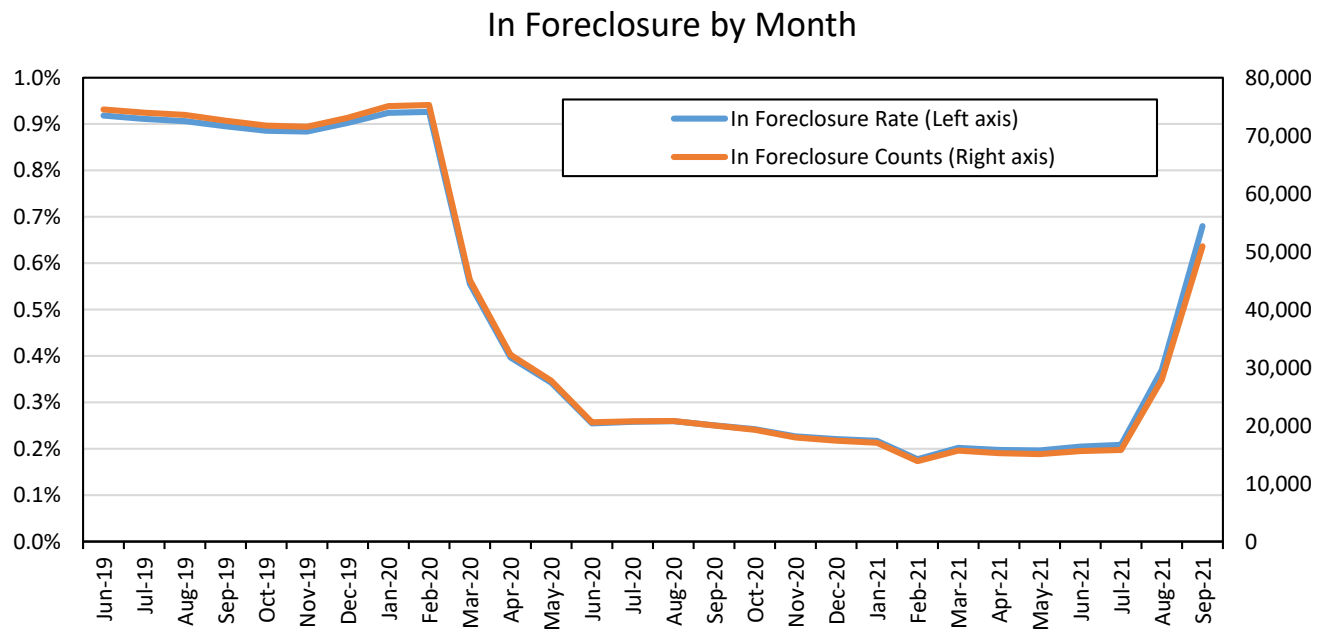
FHA serious delinquency levels continue to gradually decline from the pandemic-induced peak of 12%, however, at the current rate of decline, it will take until June 2022 for them to reach pre-pandemic levels.



Note: Projection is based on the trend of the last 6 months.
Source: FHA Single Loan Performance Trends, FHA Neighborhood Watch, and AEI Housing Center, www.AEI.org/housing.

FHA In Foreclosure Rate and Counts

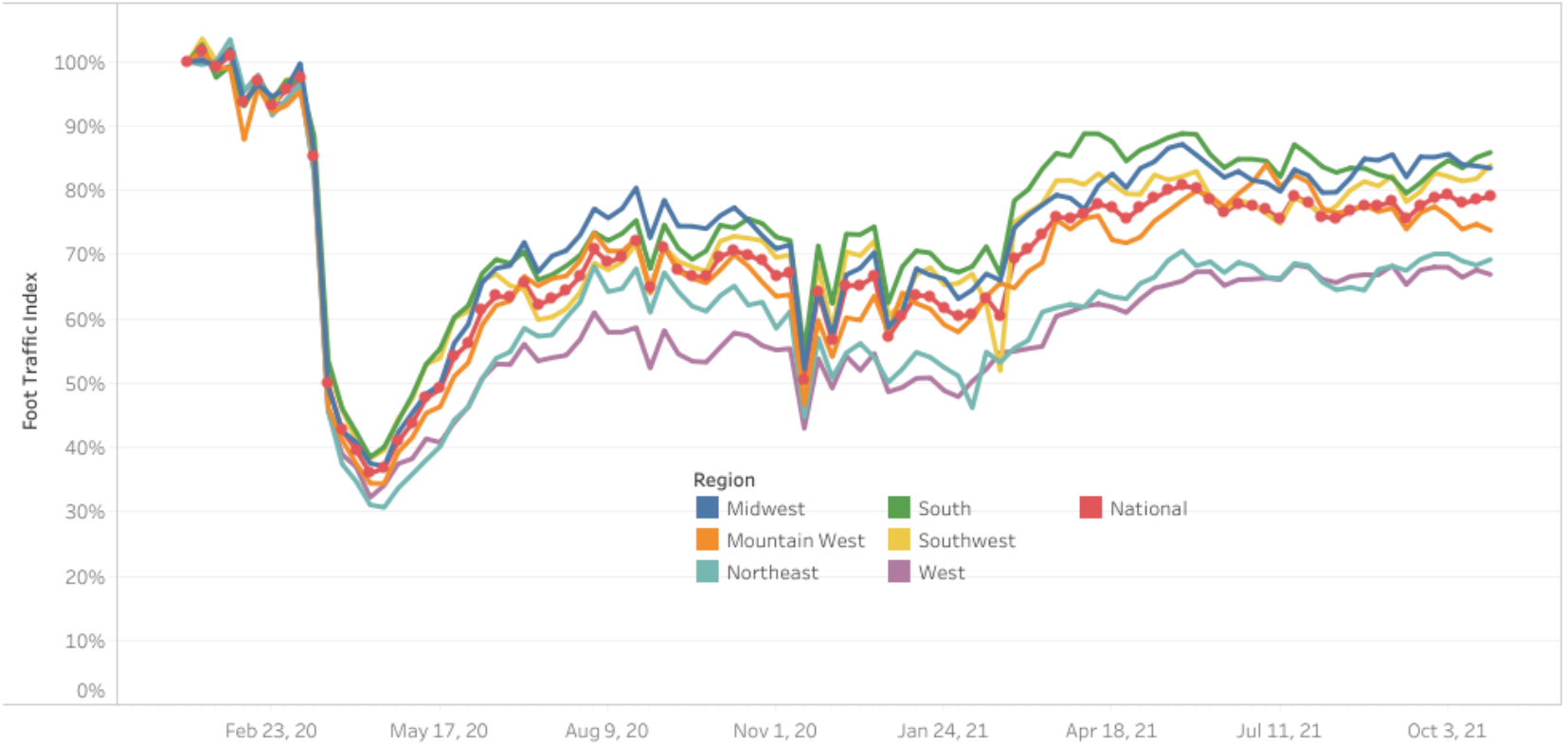
After the end of the foreclosure moratorium on July 31, 2021, FHA foreclosures are starting to climb again. Currently at 50,000 in September, they remain below the pre-pandemic level of about 75,000. However, a coming wave of FHA foreclosures is unlikely. Both the share of FHA delinquent loans and seriously delinquent loans fell to their lowest level since we began tracking in October 2020. This trend is expected to continue at least until the expected end of borrower forbearance plans in September and October. Given the options for the deferral of forborne payments, expanded modifications, and the rapid level of home price appreciation, many of the remaining delinquent owners should be able to avoid foreclosure by exercising one of these options or by selling their properties to pay off their mortgage and cover sale expenses. Delinquencies may also resolve themselves over time through new opportunities afforded by an improving economy.



Source: FHA Single Loan Performance Trends, FHA Neighborhood Watch, and AEI Housing Center, www.AEI.org/housing.

The Midwest, South and Southwest Continue to Lead the Reopening

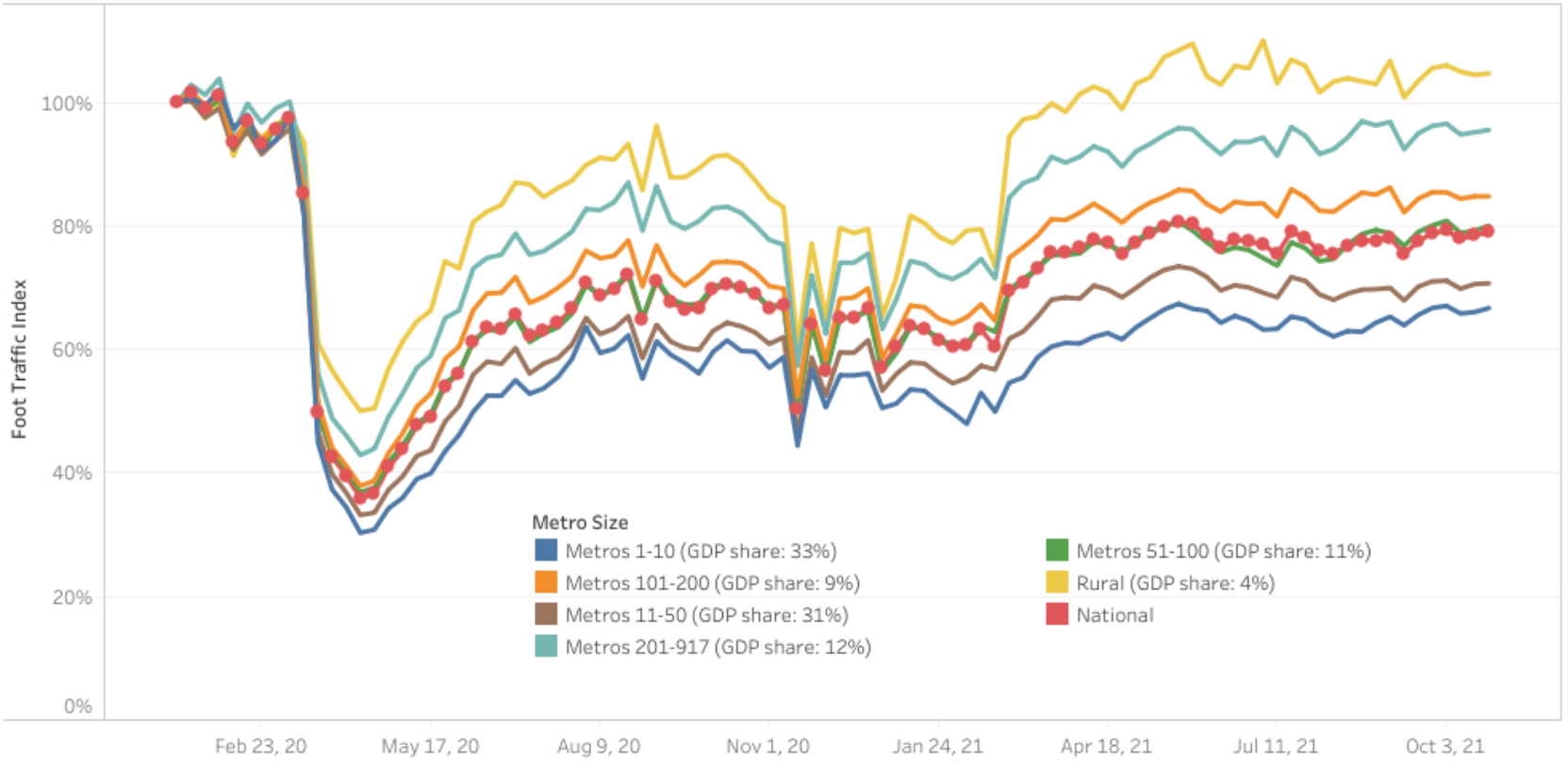
The national foot traffic level is currently 79% of pre-pandemic levels. Since the vaccination rollout, foot traffic has increased 20 ppts. from January 2021, and 44 ppts. from the trough. However, this trend has plateaued since April 2021. The South (86%), Southwest (84%) and Midwest (83%) continue to outperform the national average as states in these regions were among the first to lift COVID restrictions. The Northeast (69%) and the West (67%) continue to lag far behind.



Source: AEI Housing Center, BEA, and Safegraph.com.

Rural Area and Smaller Metros are Above or Close to Pre-Pandemic Foot Traffic Level

Foot traffic in rural areas and smaller metros are above or close to pre-pandemic level. However, foot traffic in the largest 10 metros, which account for 33% of GDP, was still at 67% in week 42 of 2021. The ongoing effect of the pandemic and Work from Home will continue to dampen foot traffic in these large metros.



Source: AEI Housing Center, BEA, and Safegraph.com.

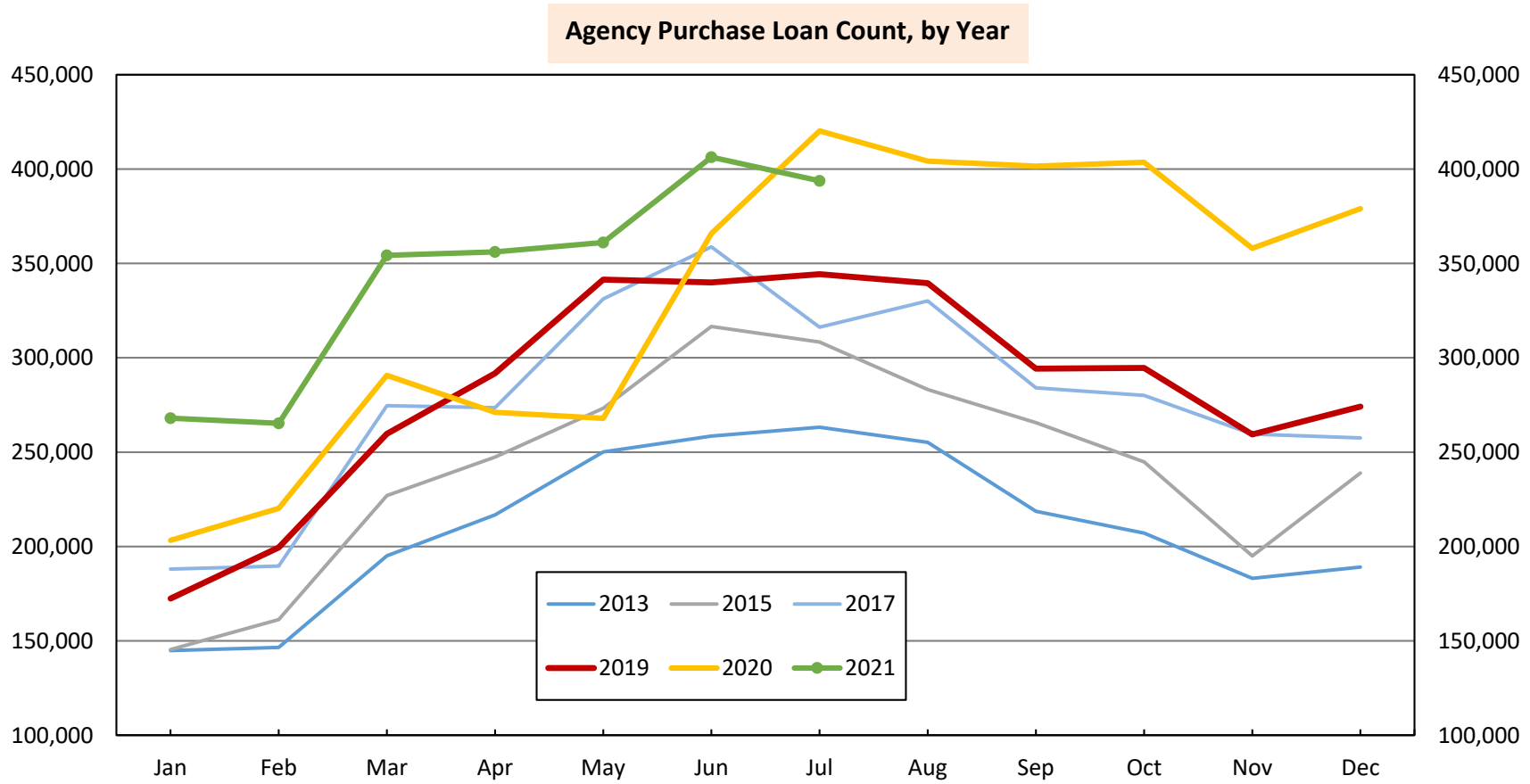
Work From Home Trend Continues in Top Metros

Office Occupancy data suggests that despite the accelerated vaccination rollout, foot traffic in the Northeast and the West are unlikely to catch up with the rest of the country until the office activity rebounds. Office worker occupancy remains at only about 37% (average of 10 large metros). As of October 20, 2021, Houston, Austin and Dallas led the way at around 50%, while San Jose and San Francisco lag far behind at around 26%.

Note: Office Occupancy Rate reflects unique authorized user entries among Kastle's business partners in each metro relative to a pre-COVID baseline, averaged weekly.
Source: Kastle System (https://www.kastle.com/safety-wellness/getting-america-back-to-work/#workplace-barometer) and AEI Housing Center, www.AEI.org/housing.

Agency Purchase Counts

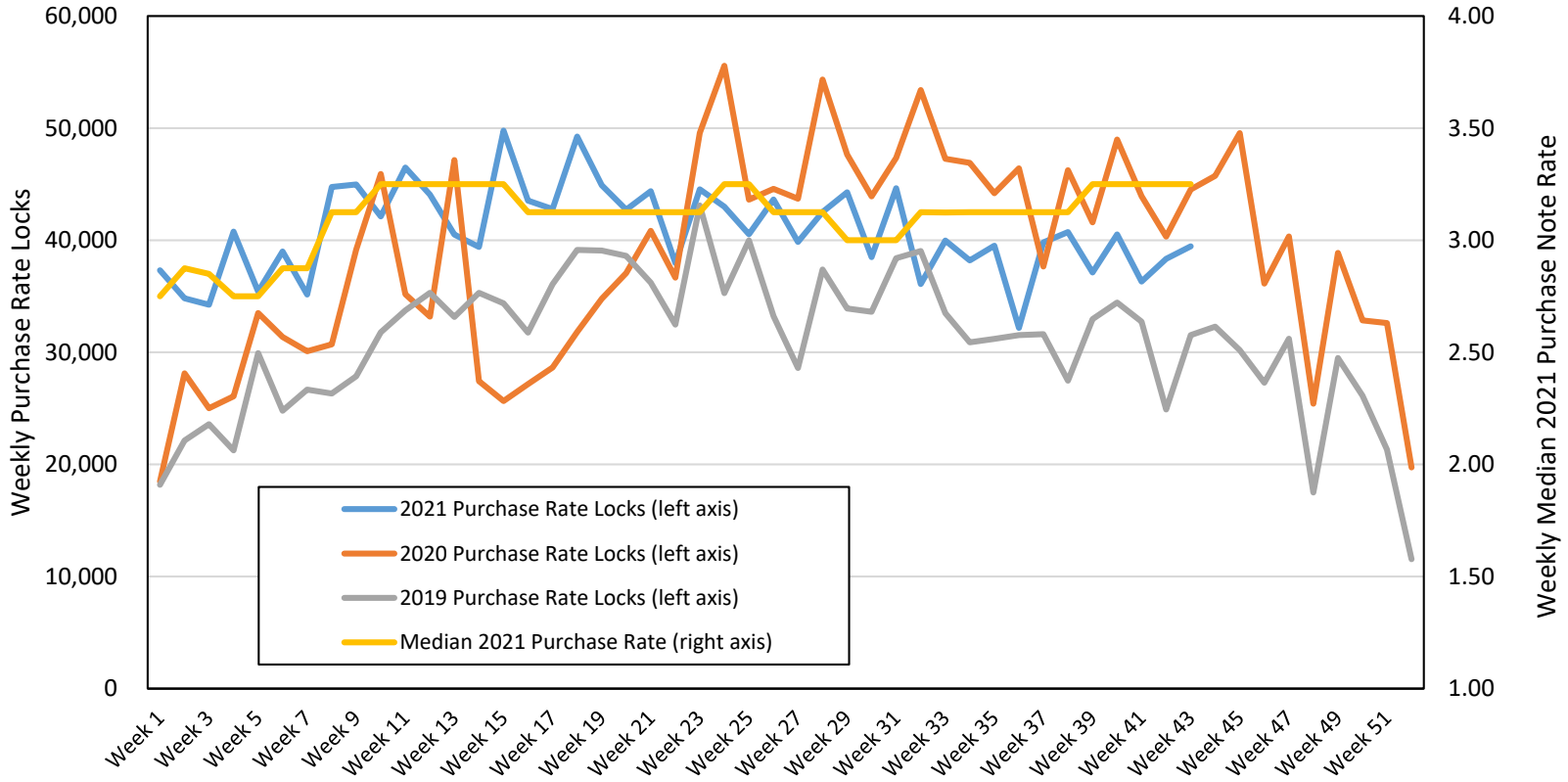
Agency purchase loan volume continues to run high. July 2021 volume was up 14% compared to 2019. Based on Optimal Blue data, we expect the final months of 2021 volume to continue running well above previous years (excluding the second half of 2020 due to COVID-related disruptions).



Source: AEI Housing Center, www.AEI.org/housing.

Purchase Activity Outlook with Higher Rates

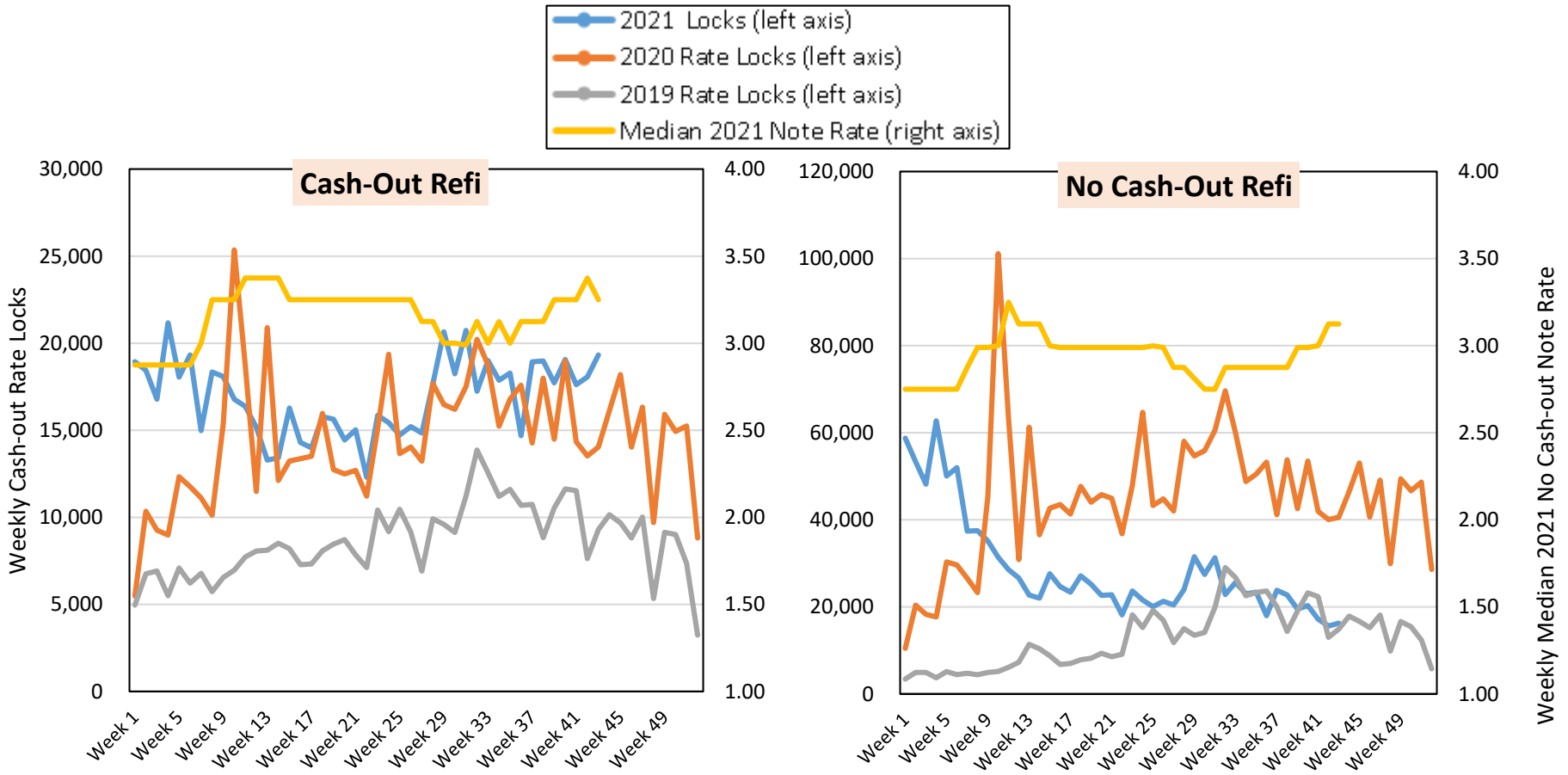
Although median purchase loan rate stays at a slightly elevated level of 3.25%, the highest reading since the beginning of 2021, purchase volume continues to be strong through week 43, up 25% over the same week in 2019. 2019 was the strongest origination year during the 2012-2019 period. We compare to 2019 to avoid the base effect associated with 2020. We expect the seasonal decline in rate locks after the peak of the spring buying season to continue.
Note that week 43 refers to Oct 23-29.



Note: Rate locks are limited to lenders who joined Optimal Blue Dec. 2017 or earlier.
Source: Optimal Blue and AEI Housing Center, www.AEI.org/housing.

Cash-Out and No Cash-Out Refi Outlook

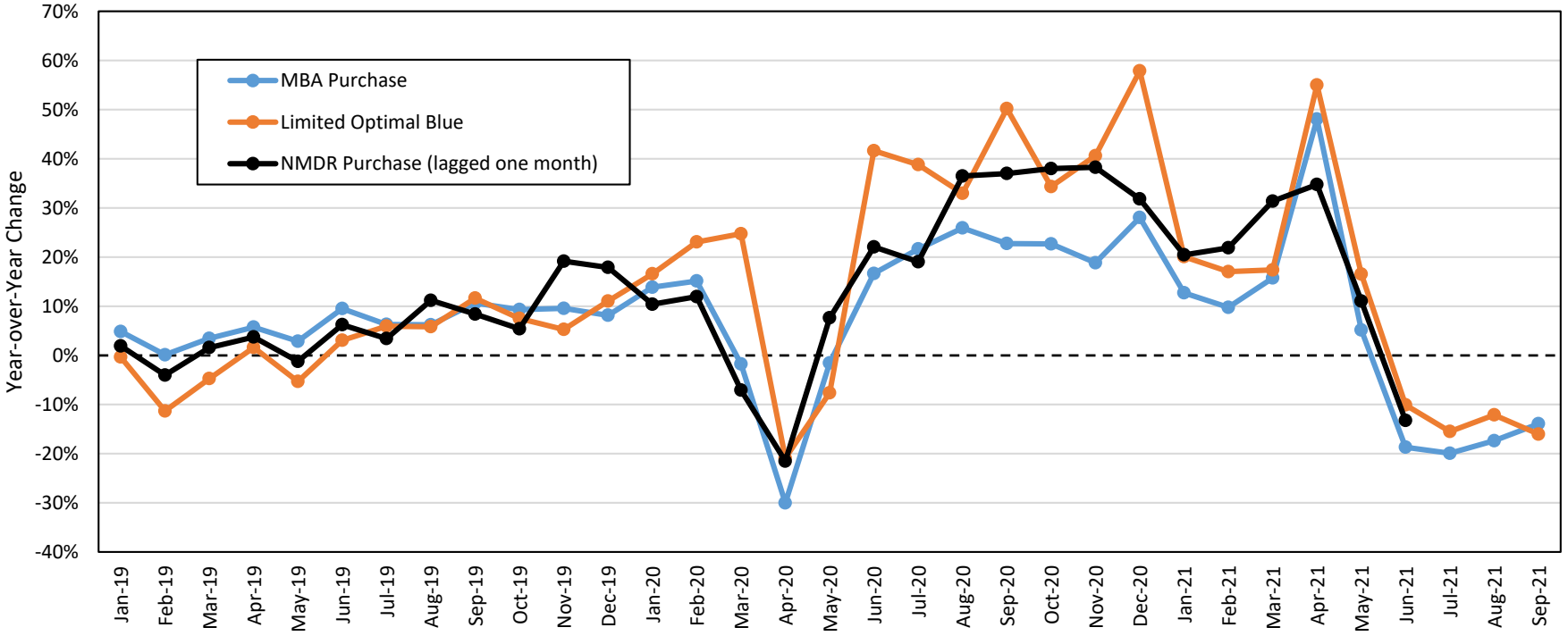
No cash out volume has gradually moderated to about the same level as in 2019 and down 60% from the heady volumes of 2020. Rates were at 3.125% in Week 43, up 3/8% since Week 31. Cash out volume remains heated as equity gains are robust and these borrowers are driven by cash needs instead of the rates. Note that week 43 refers to Oct 23-29.



Note: Rate locks are limited to lenders who joined Optimal Blue Dec. 2017 or earlier.
Source: Optimal Blue and AEI Housing Center, www.AEI.org/housing.

Purchase Year-over-Year Change: MBA, Optimal Blue (OB), NMDR

Prior to the pandemic, measures of purchase activity from the NMDR data, OB, and the MBA followed very similar trends. From April 2020 to February 2021, the OB and MBA series started to diverge with either series showing some divergence from the NMDR series. Since March 2021, the MBA Purchase Application Survey and the OB series have started to closely track again and are again moving in close lockstep with the NMDR. We believe that as of now, both series are the best indication of lending reality going forward.



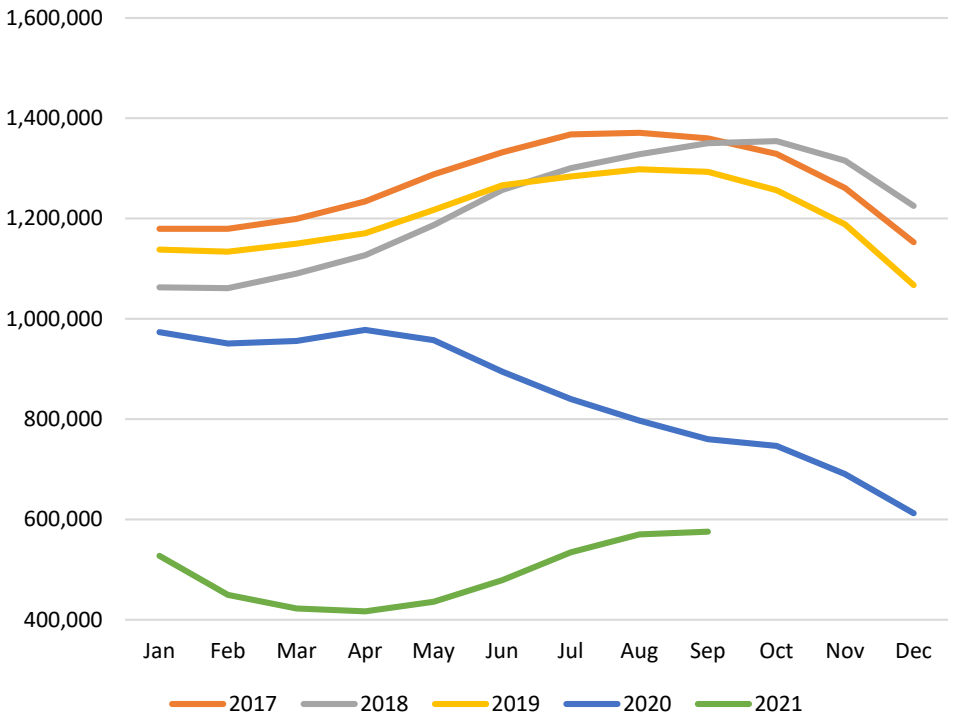
Note: To control for lender changes, we use the Limited Optimal Blue index consisting of rate locks after January 2018 and limited to lenders who have been in the OB sample since December 2017 or earlier. The NMDR data are moved back one month to account for the difference between rate lock/application and loan origination.

Source: Optimal Blue, MBA, and AEI Housing Center, www.AEI.org/housing.

Supply Remains Depleted

Supply remained near its all time low. The recent slight uptick over the last 5 months follows the general seasonal uptick that is common over this period. Supply has been most depleted in less dense areas. For the foreseeable future, it will be difficult to replenish or increase supply since: (i) more baby boomers are staying put, (ii) it takes time to acquire land, title, and to build even in places like North Carolina and Texas, and (iii) adding supply will face the usual difficulties in the Northeast and much of the West.

Housing Inventory: Active Listings (Realtor.com)



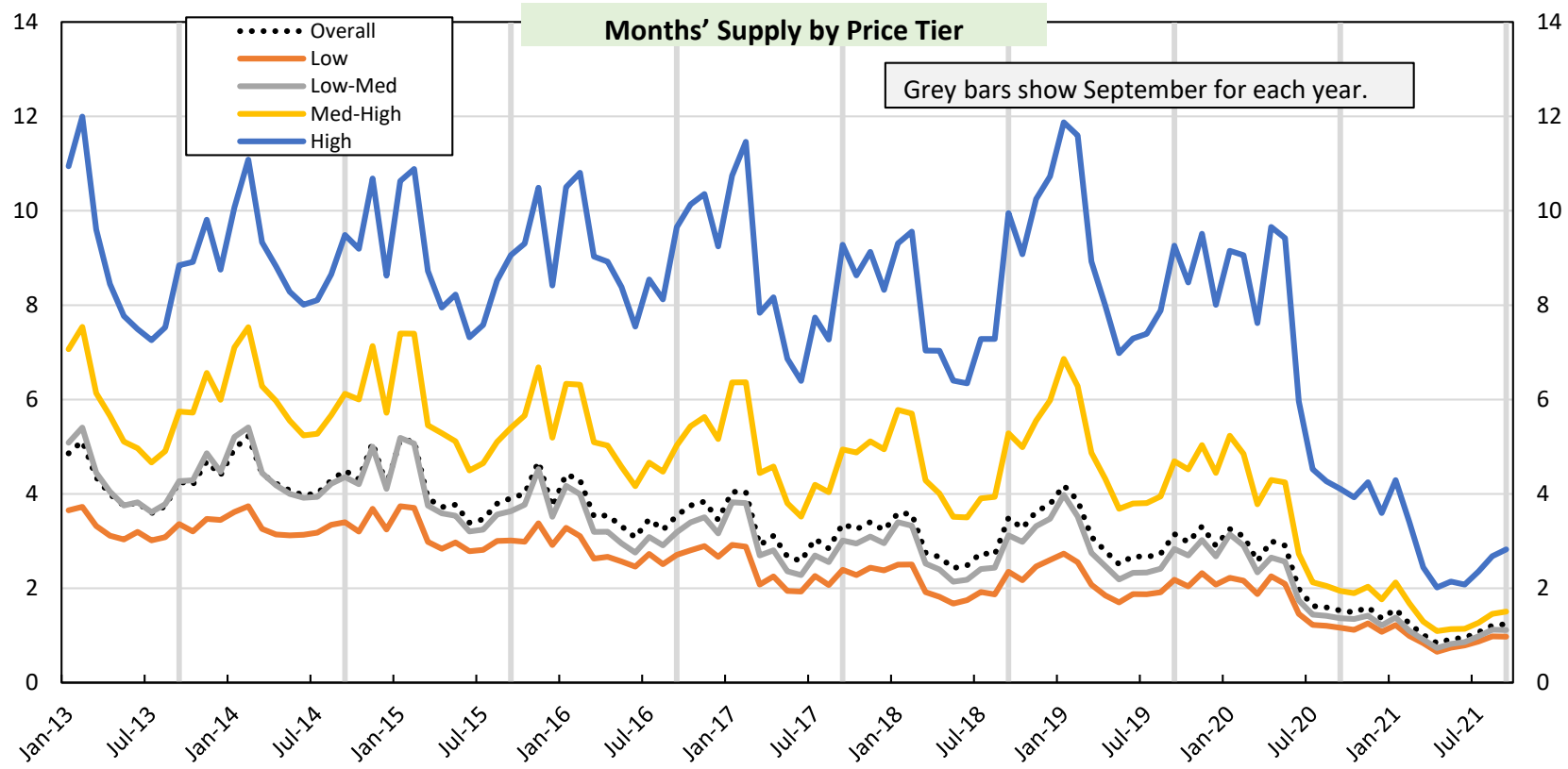
Change in Active Listings by Density (Sept. 2021 compared to Sept. 2019)			
Density Quintile	Nation	LA	NYC
All	-55%	-51%	-30%
1 (least)	-64%	-56%	-50%
2	-60%	-56%	-46%
3	-59%	-51%	-26%
4	-53%	-40%	5%
5 (most)	-27%	-20%	43%

Change in Active Listings by Price Tier (Sept. 2021 compared to Sept. 2019)				
Overall	Low	Low-Med	Med-High	High
-53%	-51%	-55%	-55%	-46%

Source: Realtor.com, Census Bureau, and AEI Housing Center, www.AEI.org/housing.

Months' Supply by Price Tiers

Starting with June 2020, months' supply started to drop precipitously across all price tiers. In September 2021, overall months' supply stood at 1.2 months. While supply remains lowest in the low (1.0 months) and low-med tiers (1.1 months), the drop in the med-high and high price tiers are especially noteworthy. The high tier has fallen from 9.4 months in May 2020 to 2.8 months in September 2021 while the med-high tier has fallen from 4.2 to 1.5. The recent slight upward trend is likely a seasonal effect.



Note: Months' supply measures how long it would take for the existing level of inventory to be sold off at the current sale's pace. While the listings data come from the MLS, the sales numbers come from the public records.
Source: Realtor.com, Zillow, and AEI Housing Center, www.AEI.org/housing.

For the 2nd time in 20 years the Fed's Monetary Punchbowl Is Fueling Rampant Home Price Appreciation, Resulting in a Disparate Impact

Mortgage rates dropping from 10% in 1990 to 6% in 2007, along with policy-induced credit easing, led to a massive home price boom and bust with millions of foreclosures for low income families.

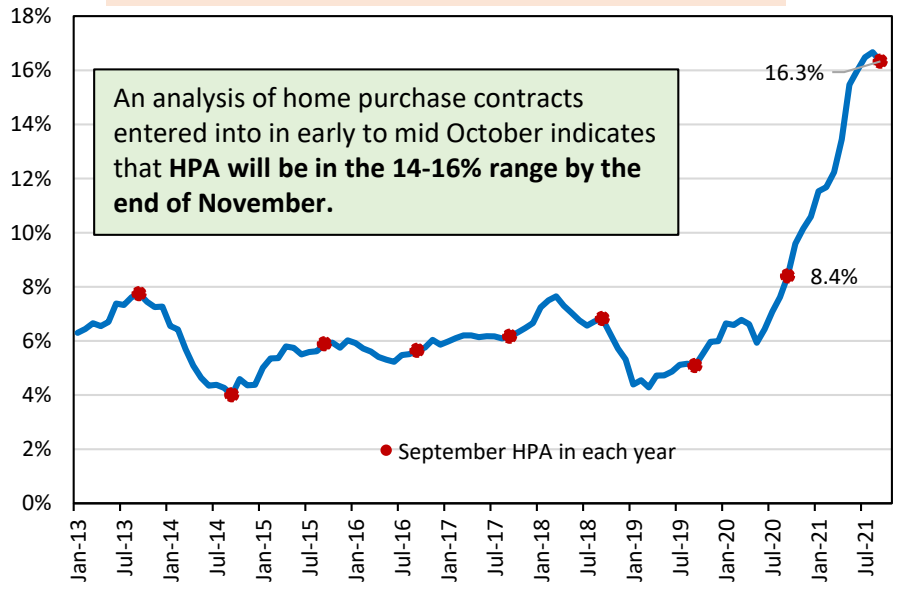
Since 2012 rates have dropped from 4.5% to under 3%. Combined with policy induced credit loosening, a lack of supply, and WFH, the result has been a second massive home price boom.

The preliminary national HPA rate for September 2021 was 16.3%, up from 8.4% a year ago. With prices increasing much faster than incomes, the Fed's policy will have a disparate impact. Higher income households will be able to take advantage of WFH to improve their housing situation, while low income ones will be increasingly crowded out of home buying. This disparate impact will not be transitory as today's high HPA will become incorporated into future price levels, which will slow gains in racial integration and further increase socio-economic stratification.

30-Year Fixed Rate Mortgage

Note: Data are for 30-year fixed-rate prime conventional conforming home purchase mortgages with a loan-to-value of 80 percent.
Source: Freddie Mac.

Year-over-Year Rate of HPA

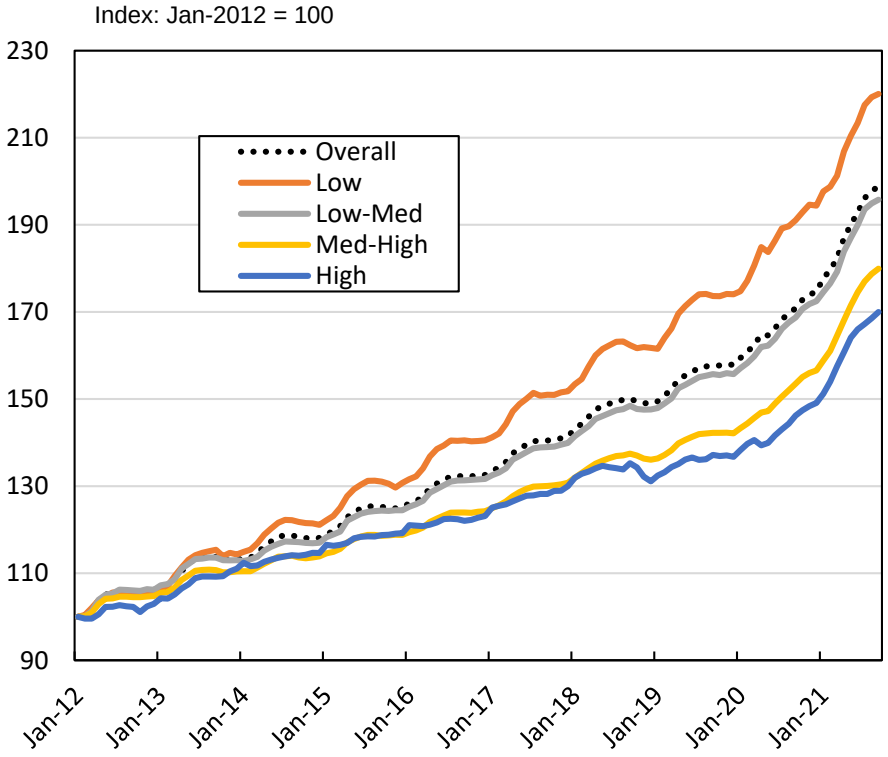


Note: Data are for the entire country. Data for September 2021 are preliminary.
Source: AEI Housing Center, www.AEI.org/housing.

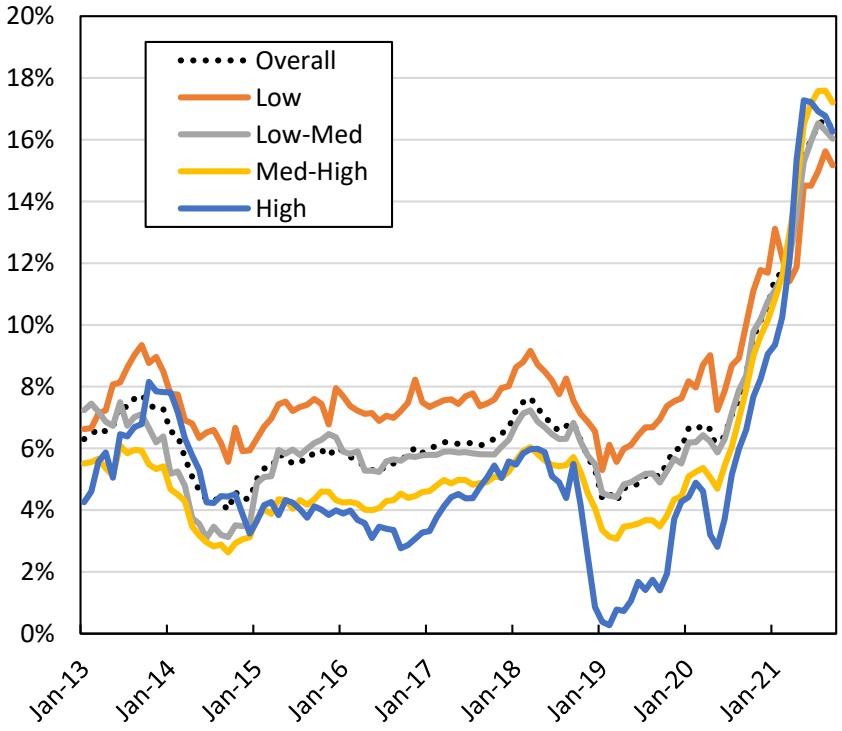
Home Price Appreciation by Price Tier

Since 2012 a large gap in HPA has developed between the lower and upper end of the market (left panel). Preliminary numbers for September 2021 indicate that the low price tier continued to have strong HPA, but the med-high and high price tiers, which are more dependent on the Fed's monetary punch bowl (historically low interest rates), are showing the strongest rates of appreciation (right panel). This is a trend reversal, since historically the low price tier has shown the fastest y-o-y HPA. HPA appears to have peaked but is expected to recede slowly.

Home Price Appreciation by Price Tier



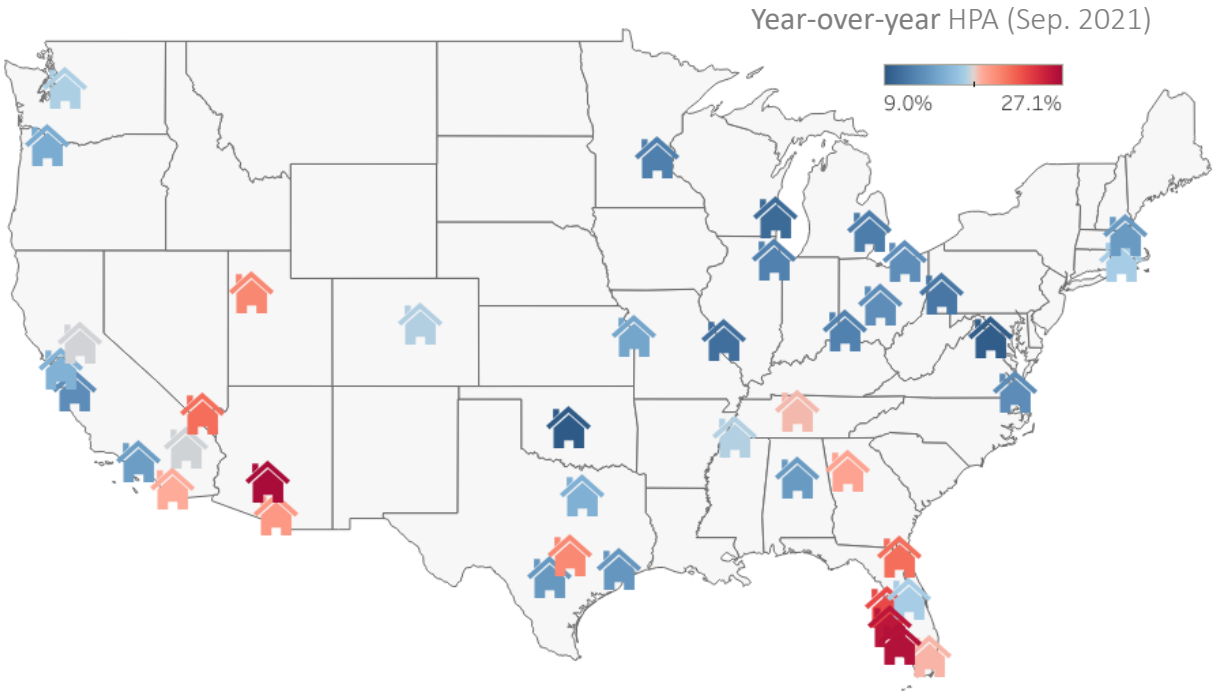
Year-over-Year Home Price Appreciation by Price Tier



Note: Data are for the entire country. Data for September 2021 are preliminary.
Source: AEI Housing Center, www.AEI.org/housing.

Home Price Appreciation (HPA) by Metro (50 Largest)

Home prices are booming everywhere but especially in Florida (Cape Coral, North Port, Tampa, and Jacksonville) and Arizona (Phoenix and Tucson). The attraction of lower prices in these metros is fueling a growing influx of residents from higher-priced California areas and the Northeast due to new Work from Home flexibilities and traditional retirement relocations.



Highest HPA Metros	
Phoenix, AZ	**27.1%**
Cape Coral, FL	**26.6%**
North Port, FL	**26.2%**
Tampa, FL	**23.4%**
Jacksonville, FL	**21.8%**

Lowest HPA Metros	
Oklahoma City, OK	**9.0%**
Washington, DC	**9.2%**
Milwaukee, WI	**10.2%**
St. Louis, MO	**10.5%**
Pittsburgh, PA	**11.1%**

Note: Data are for the entire country. Data for September 2021 are preliminary.
Source: AEI Housing Center, www.AEI.org/housing.

10th Annual Housing Conference: Nov. 17-18th,11 am–4:45 pm ET

Nov. 17-18th from 11:00 am – 4:45 pm. To see the schedule and RSVP, please click here.

Join AEI for a two-day virtual conference, featuring the latest insights from AEI's housing data and an interdisciplinary discussion of how race and socioeconomic status relate to housing.

****The conference will be entirely virtual****

- The first day will focus on housing market trends with panelists discussing groundbreaking housing data, walkable-oriented development, the history of mortgage lending and risk, and the Wealth Building Home Loan and LIFT Home.

- The second day will focus on race and socio-economic status in light of recent research citing raced-based differences in home values, including a discussion from a host of interdisciplinary scholars on policy solutions for lower income households.

In addition to Housing Center researchers, confirmed speakers include:

- **Robert Doar, President, American Enterprise Institute**
- **James J. Heckman, Henry Schultz Distinguished Service Professor of Economics, University of Chicago**
- **Nathaniel Hendren, Professor of Economics, Harvard University, Founding Co-Director, Equality of Opportunity Project**
- **Michael Strain, Director, Economic Policy Studies, American Enterprise Institute**
- **Scott Winship, Director, Poverty Studies, American Enterprise Institute**
- **Ian Rowe, Senior Fellow, American Enterprise Institute**
- **Howard Husock, Senior Fellow, American Enterprise Institute**
- **Salim Furth, Senior Research Fellow, Mercatus Center at George Mason University**
- **And many more.**

Briefing Dates for 2021 & 2022

- Our next HMI briefing is on Tuesday, November 30.
- The briefings for 2021 & 2022 are listed below:

Tuesday	November 30
Tuesday	January 4, 2022
Monday	January 31, 2022
Monday	February 28, 2022
Monday	March 28, 2022
Monday	May 2, 2022
Tuesday	May 31, 3022
Monday	June 27, 2022
Monday	August 1, 2022
	No late August briefing
Wednesday	September 28, 2022
Monday	October 31, 2022
Tuesday	November 29, 2022
Tuesday	January 3, 2023

All briefings take place at 11 AM ET.

If you know someone not on our regular distribution list and who would like to be added to it, please send them this link.

Methodology

National Mortgage Default Rate (NMDR): 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 NMDR
  - NMDR is a stress test, similar to a car crash safety rating or hurricane rating for buildings.
  - The NMDR's stress event is the financial crisis from 2007.

- Basics of index construction
  - The NMDR is a standardized quantitative index for mortgage risk (leverage)
  - Places loans in risk buckets and assesses default risk based on the performance of the 2006-07 vintage loans with similar characteristics

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

- Difference to the prior National Mortgage Risk Index (NMRI)
  - The NMRI was based on the performance of Freddie loans originated in 2007 through the end of 2012
  - The NMDR is based on GSE, FHA, PLS, Portfolio and VA loans originated in 2006-07 through 2019.

- What does an increasing or decreasing NMDR mean?
  - Increasing NMDR = increasing leverage = looser lending
  - Decreasing NMDR = decreasing leverage = tighter lending

Stressed Default Rates, Home Purchase Loans

Risk Bucket	Credit Score	CLTV	Total DTI	Default Rate
Very Low	≥ 770	61-70%	≤ 33%	1.1%
Low	720-769	76-80%	34-38%	6.3%
Medium	690-719	81-85%	39-43%	10.7%
High	660-689	91-95%	44-50%	24.1%
Very High	620-639	> 95%	> 50%	56.2%

Note: Default rates represent cumulative defaults through 2019 for 2006-07 vintage loans. The loans included in the calculation are all primary owner-occupied, 30-year fixed-rate, fully amortizing, fully documented, home purchase Enterprise loans.

- Takeaway: Huge spread of default rates across risk buckets
- Default rates are calculated separately for home purchase loans, rate-and-term refinance loans, and cash-out refinance loans by market segment (FHA, Enterprise, PLS, and VA).
- Additional loan risk factors are applied to investor loans, second homes, 15 year terms, and 20 year terms.

The Stressed Mortgage Default Rate (MDR)

The Periodic Table represents historical stressed MDRs for the cohort years 2006-2007 calculated through 2017, which represents the worst-case scenario stress test similar to a car crash test or a hurricane safety rating.

The stressed MDR captures most relevant risk characteristics at origination: combined loan-to-value (CLTV), credit score, debt-to-income ratio, loan term, loan type, and tenure.*

Advantages of the MDR:

- Takes into account risk layering.
- Is both straightforward and easy to implement.
- Builds on FHFA's own research.
- All data elements used to select the applicable stressed MDR for all loans are common and known at origination.
- Superior to many compensating factors that are opinion based, lack rigorous empirical support, or fail to take into account risk layering.

We propose setting a maximum MDR of 14%

- This keeps credit available while promoting sustainable homeownership through faster equity accumulation.
    - Because MDR limits increase in conjunction with shorter loan terms, borrowers that would otherwise be unable to qualify with a hard DTI limit, could be able to qualify for a mortgage when opting for a shorter term.
- MDR limit is counter-cyclical, meaning they provide friction during a boom and room to ease during a bust.
    - During a boom, this would help keep home prices from increasing much faster than wages, particularly for entry-level borrowers.
    - During a bust, the limit would be unchanged, thereby allowing more normal credit terms to be available as the recovery progresses.

Periodic Table of Housing Risk: GSE Home Purchase Loans

primary owner-occupied, 30-year fixed rate, fully amortizing, fully documented

v. 6.22.21: Default rates based on AEI Working Paper "A Quarter Century of Mortgage Risk" (2021).*
© 2021 AEI Housing Center, www.aei.org/housing.

GREEN (low risk) = <7%
ORANGE (medium risk) = 7 - <14%
RED (high risk) = >=14%

FICO Buckets	DTI Buckets	Cumulative Default Rates for Loans Originated in 2006 - 2007							
		1 - 60 CLTV	61 - 70 CLTV	71 - 75 CLTV	76 - 80 CLTV	81 - 85 CLTV	86 - 90 CLTV	91 - 95 CLTV	>= 96 CLTV
>= 770	1 - 33	0.5%	1.1%	1.6%	2.5%	2.6%	3.8%	5.1%	7.8%
	34 - 38	1.0%	1.9%	3.0%	3.7%	3.8%	5.4%	7.2%	10.0%
	39 - 43	1.1%	2.2%	3.3%	4.5%	4.6%	6.6%	8.4%	12.1%
	44 - 50	1.3%	2.6%	3.5%	4.8%	5.4%	7.5%	9.6%	13.7%
	> 50	0.8%	2.8%	4.3%	5.3%	6.8%	9.0%	11.3%	19.6%
720 - 769	1 - 33	1.1%	2.3%	3.4%	4.2%	3.9%	6.2%	7.5%	10.9%
	34 - 38	1.7%	3.6%	4.4%	6.3%	6.0%	8.4%	9.9%	13.1%
	39 - 43	1.9%	4.4%	5.6%	7.4%	7.2%	10.4%	12.0%	15.8%
	44 - 50	2.1%	4.5%	6.4%	8.5%	8.6%	11.6%	13.7%	18.2%
	> 50	2.2%	4.9%	6.8%	8.8%	9.8%	13.0%	16.4%	25.0%
690 - 719	1 - 33	1.8%	3.7%	5.7%	7.2%	7.2%	9.9%	11.2%	16.9%
	34 - 38	3.1%	6.5%	7.0%	9.6%	10.8%	13.6%	14.2%	19.4%
	39 - 43	3.5%	7.2%	9.1%	11.4%	10.7%	15.5%	16.9%	22.9%
	44 - 50	3.7%	6.8%	10.4%	11.8%	13.2%	17.3%	19.5%	25.6%
	> 50	3.6%	7.5%	11.8%	13.2%	15.0%	18.8%	22.7%	32.9%
660 - 689	1 - 33	3.4%	6.3%	9.0%	8.9%	8.3%	13.5%	15.1%	23.5%
	34 - 38	4.2%	7.9%	9.4%	13.2%	13.0%	16.4%	18.4%	27.5%
	39 - 43	5.1%	10.4%	12.2%	14.1%	15.3%	19.6%	21.5%	30.9%
	44 - 50	5.8%	10.4%	13.6%	16.0%	17.4%	21.9%	24.1%	33.4%
	> 50	4.9%	11.7%	15.0%	17.0%	22.8%	24.5%	29.9%	41.1%
640 - 659	1 - 33	4.9%	8.9%	9.4%	13.1%	12.5%	17.2%	21.3%	31.6%
	34 - 38	6.7%	12.9%	17.6%	16.1%	20.4%	20.0%	24.3%	36.1%
	39 - 43	8.8%	13.6%	17.6%	20.2%	20.5%	24.5%	27.9%	39.9%
	44 - 50	7.2%	14.3%	17.3%	19.9%	21.2%	27.2%	31.4%	42.9%
	> 50	9.3%	16.8%	20.4%	22.3%	27.5%	31.6%	36.9%	49.3%
620 - 639	1 - 33	6.6%	12.9%	15.3%	16.3%	18.2%	21.1%	25.9%	39.3%
	34 - 38	7.9%	17.2%	18.3%	21.0%	25.2%	25.5%	30.3%	43.6%
	39 - 43	10.8%	16.9%	20.0%	21.1%	27.0%	27.6%	34.3%	47.4%
	44 - 50	10.5%	15.9%	24.1%	26.0%	27.1%	31.8%	37.8%	50.5%
	> 50	12.6%	18.2%	29.0%	26.9%	33.5%	38.5%	43.4%	56.2%
580 - 619	1 - 33	10.2%	17.0%	21.1%	22.3%	27.7%	28.3%	32.6%	48.9%
	34 - 38	12.3%	21.5%	23.7%	25.4%	29.4%	31.4%	39.5%	53.3%
	39 - 43	10.9%	24.7%	28.3%	28.4%	38.0%	34.6%	41.6%	55.8%
	44 - 50	14.2%	21.1%	27.3%	30.2%	33.3%	38.4%	45.4%	58.6%
	> 50	15.0%	28.2%	34.0%	33.4%	42.5%	44.9%	51.4%	63.3%
300 - 579	1 - 33	21.3%	30.4%	36.3%	38.5%	46.6%	44.6%	52.7%	61.5%
	34 - 38	24.1%	32.1%	34.6%	40.1%	49.5%	49.7%	52.2%	64.9%
	39 - 43	20.5%	34.4%	35.8%	41.5%	46.1%	48.1%	56.5%	67.3%
	44 - 50	22.6%	36.5%	46.4%	46.7%	48.9%	54.8%	58.4%	68.9%
	> 50	24.9%	37.4%	43.3%	47.0%	56.9%	55.1%	65.6%	71.6%

* Published by the Federal Housing Finance Agency (FHFA) in collaboration with the American Enterprise Institute (AEI) Housing Center's Senior Adviser Steve Oliner (and AEI Adjunct Scholar Morris Davis).

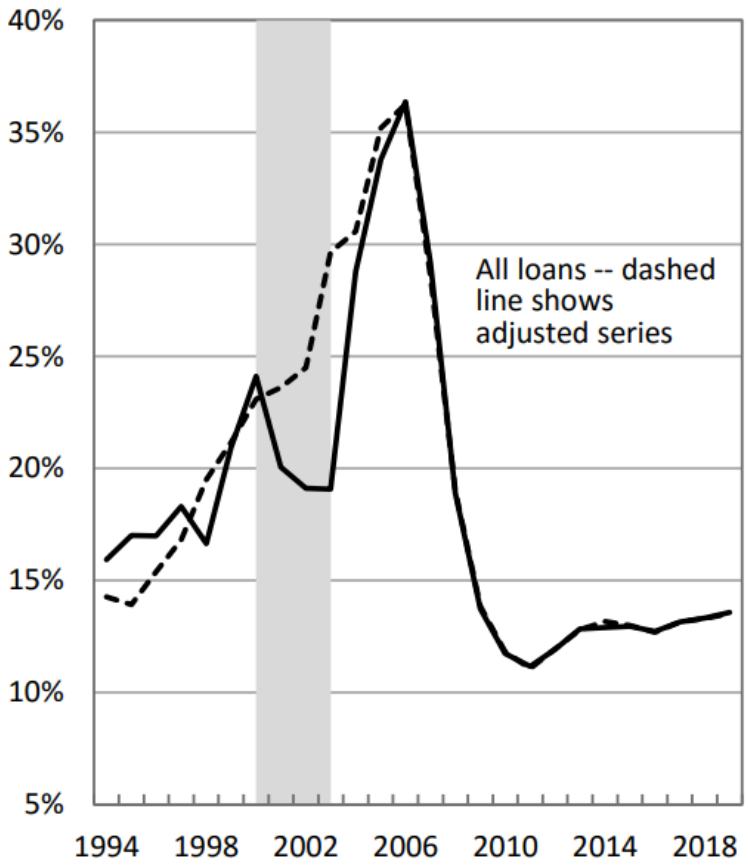
*The additional risk factor multipliers are for loans with a 15- or 20-year loan term, loans with a 40-year loan term, loans for a second home, and loans for an investor home. These factors are available by loan type.

A Quarter Century of Mortgage Risk: FHFA and AEI Housing Center Publish First-of-its-Kind Comprehensive Dataset Covering 1990-2019

This seminal work done in collaboration between the FHFA and the Housing Center's Senior Adviser Steve Oliner (and AEI Adjunct Scholar Morris Davis) will improve researchers, policymakers, and the public's understanding of how mortgage risk has evolved from the early 1990s to the present and the role played in the housing boom, subsequent bust, and the 2008 recession.

The authors' use a comprehensive dataset of more than 200 million purchase-money and refinance mortgages from 1990 to 2019 to "evaluate a common held view that the early 2000s represent a normal period in the mortgage market, a benchmark by which to assess whether lending standards in other periods are loose or tight." The study documents that mortgage risk started accumulating in the mid-1990s and continued until the peak was reached in 2006-2007. Previous research could not identify the fact that a refinance boom from 2000-2003 masked the mortgage risk accumulation.

The size and scope of the expanded dataset is unprecedented in completeness, accuracy and comprehensive historical information on mortgage risk. The paper is available here.



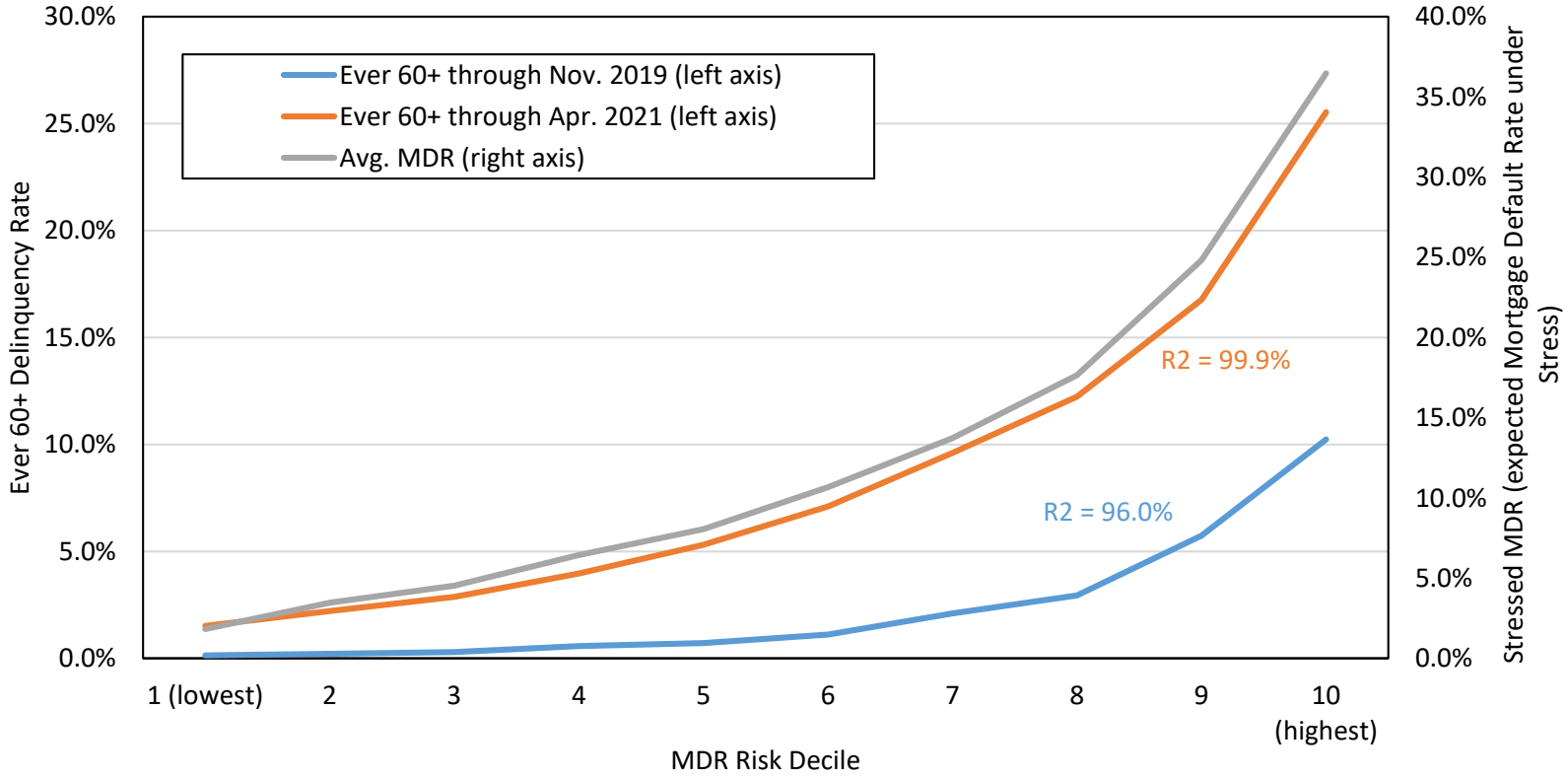
Source: FHFA and AEI Housing Center, www.AEI.org/housing.

Stressed MDRs are Highly Correlated to Post-Financial Crisis Default Rates

Stressed MDRs, calculated solely on the basis of loan characteristics present at origination, are highly predictive of default rates both in a non-stress delinquency environment (R-squared is 96%) and in a stress delinquency environment (R-squared is 99.9%), even though the size and nature of the pandemic is fundamentally different from the financial crisis.

The MDR was equally predictive of defaults for any given loan type.

Actual Ever 60+ Delinquency Rate & Stressed Mortgage Default Rate (MDR) for 30-yr POO FRMs originated in 2016-2019



Source: AEI Housing Center, www.AEI.org/housing.

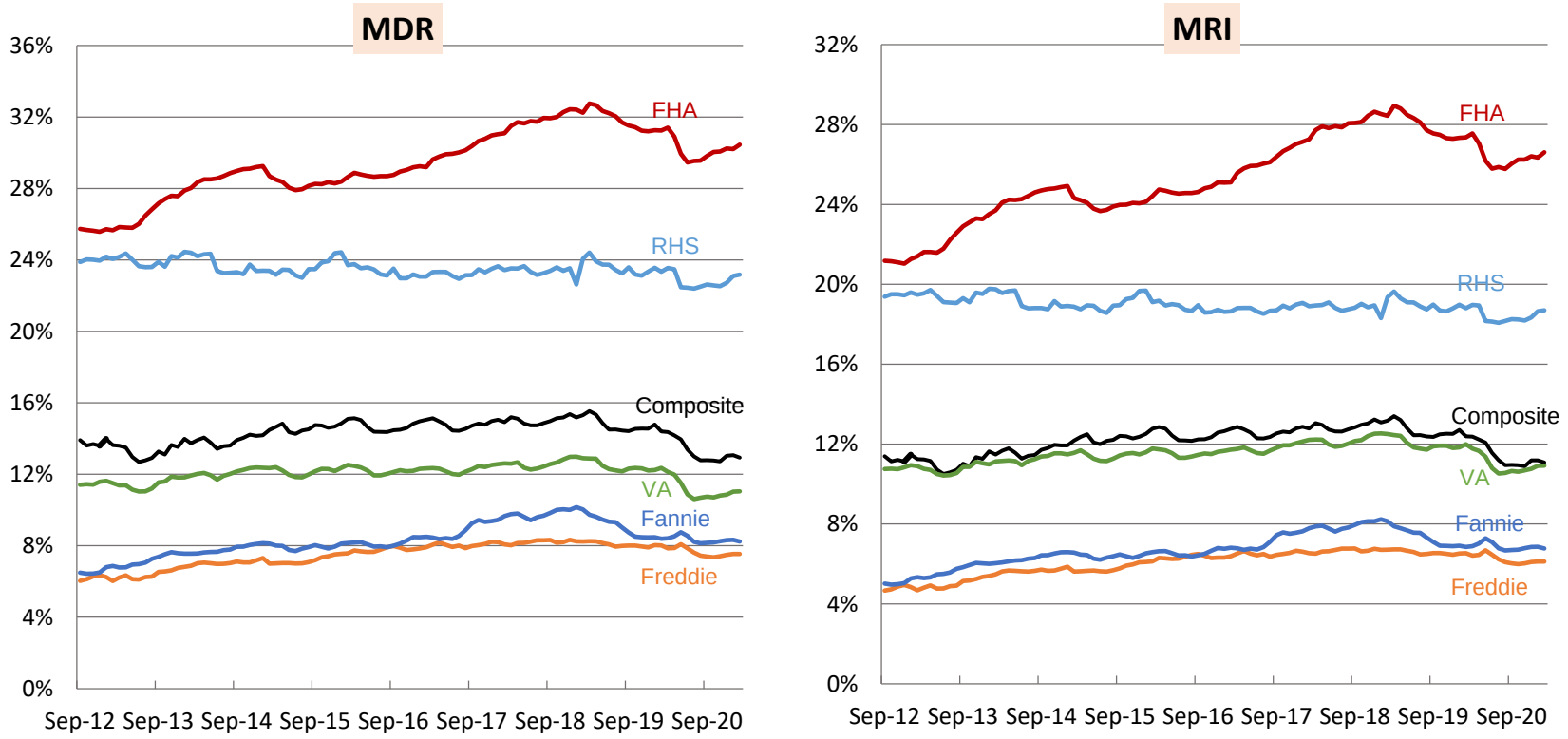
Comparing the MRI and the new Stressed MDR

The FHFA study utilized what is considered to be the best available data: Fannie Mae and Freddie Mac loan data maintained by FHFA and FHA, VA, private portfolio, and private MBS data maintained by the Housing Center. For the Stressed MDR, the FHFA paper builds and expands on the concepts pioneered in 2013 by the Mortgage Risk Index (MRI). Here are key features:

	MRI	MDR
Concept: a stressed default measure	Measures how the loans originated in a given month would perform if subjected to the same stress as loans originated prior to the start of the Financial Crisis.	
Universe of loans to create the Periodic Table:	Only loans originated in 2007, prior to the start of the Financial Crisis, from data publicly released by Freddie Mac. However, this data set was heavily 'censored'.	Combines loans originated in 2006/07 (since both performed about equally poorly) of GSE, FHA, VA, portfolio, and private MBS loans from the most complete data sources available.
Number of risk buckets:	320 (based on a combination of credit score, CLTV, and DTI buckets)	320 (based on a combination of credit scores, CLTV, and DTI buckets)
Agency specific Periodic Tables:	MRI applies the Freddie periodic table to Fannie, FHA, RHS, and VA. For VA loans, we assume a risk haircut of 40%, which is consistent with the literature.	Periodic tables are constructed for each agency with the exception of RHS. (We apply the GSE table to RHS.)
Default occurrences are measured through:	December 31, 2012	December 31, 2019
Refinance risk buckets:	Limited to 80 (Cash-out) and 100 (No cash-out) risk buckets.	Using the combined 2006/07 cohorts, expanded data sources, and inclusion of substantial 'censored' data for 2006/07, it uses the same 320 risk buckets as for purchase loans.

Comparing the MRI and the new Stressed MDR (cont.)

The Stressed MDR and MRI follow nearly identical trends. Since the Stressed MDR allows for a longer time period for loans to default (through 2019 compared to 2012 for the MRI), the level of default risk is higher than the level of the MRI. We will soon phase out the MRI and switch over to the MDR in our reporting of underwriting standards.



Charts updated through Feb-21 only.

Source: AEI Housing Center, www.AEI.org/housing.

Price Tier Methodology

- Goal: create leverage-based price tiers.
- Rationale: segmenting the market by price tier is important because housing policies, new construction activity, and access to leverage vary by these price tier. Thus, these factors can create very different home price appreciation trends depending on the price tier.
- 4 Price Tiers:
  - Low: all sales 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 125% of the GSE loan limit
  - High: all other sales
- Data Inputs:
  - Public Records (near-real time with latency and coverage problems).
  - FHA Snapshot (monthly dataset of all FHA endorsements; released around mid-month with a one month lag).
  - FHFA loan limits at the county level.
- Assumptions and Construction:
  - On average, the difference between loan origination and endorsement is one month (we have confirmed this on aggregate by comparing monthly FHA Snapshot to NMDR counts).
  - Price Tiers are set quarterly at the metro level. When there are fewer than 50 FHA loans in a quarter, we pool all FHA loans at the non-metro state level.
  - For the demarcation between medium-high and high tier, we multiply a perspective's county loan limit by 1.25 to account for an 80% LTV, which is the median LTV of loans taken out at the loan limit.
- Result:

2018	Price Tier				Overall
	Low	Low-Med	Med-High	High	
Mortgage Risk Index	16.0%	14.6%	8.8%	3.2%	11.2%
Market Share*	26%	28%	38%	7%	100%

*For institutionally financed sales. May not add to 100% due to rounding.

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).
  - AEI's HPA is a "quasi" repeat sales index.
  - Index measures HPA by constructing an artificial sales pair consisting of one actual sale and one "artificial" sale as measured by the property's Automated Valuation Model (AVM).
  - The AVM approximates a property's sale price at a given point in time. The AVM used has been evaluated by us and has been found to be, on average unbiased and accurate (meaning that it has a normal error distribution).
- Advantages of AEI's HPA Index
  - Combines the best of repeat and hedonic models.
  - Unlike a 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 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
  - National Public Records data and AVM for Dec-2018 come from First American via DataTree.com.
  - Uses virtually all institutionally financed sales back to January 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.
- AEI House Price Appreciation Indexes are published nationally and by price tier
  - The four tiers are set at the metro level and adjusted quarterly (see: Price Tier Methodology slide) .
  - HPAs are smoothed around the times of FHFA loan limit changes.
- Revisions with public records data are standard, and to ensure accuracy, the AEI Housing Center incorporates the newly released public data to provide updated results.
  - Data for the most recent month are preliminary.

Home Sales Methodology

- Data Inputs
  - Public Records (near-real time with latency and coverage problems).
  - HMDA (annual dataset of institutionally financed sales (IFS); covers around 99% of loans; released with lag).
  - FHA Snapshot (monthly dataset of all FHA endorsements; released around mid-month with a one month lag).
  - National Mortgage Risk Index (NMDR) (covers 99% of Agency loans; two months lag).
- Assumptions
  - Recorder offices process transactions in random order; latency in reporting applies equally across all sales types.
  - FHA loans are properly recorded (stamp on mortgage document).
  - On average, the difference between loan origination and endorsement is one month (we have confirmed this on aggregate by comparing monthly FHA Snapshot to NMDR counts).
  - Conventional loans have same seasonal pattern as GSE loans.
- Construction
  - Aggregation from the county level up.
  - Use FHA Snapshot for all FHA sales.
  - When HMDA is available: Use HMDA for remaining IFS when available:
    - Impute cash and other financed sales as a percentage of IFS (assume state average for counties with latency problems);
    - Impute seasonal pattern from either public records or NMDRI.
  - When HMDA is not yet available: Use Public records with adjustments:
    - Limited to ~ 700 counties that account for ~80% of sales (remove counties with insufficient FHA counts or breaks in series);
    - Gross up all sales in that county by the ratio of FHA Public Records loans to FHA Snapshot loans;
    - Assume same rate of change for ~2400 counties with ~20% of sales -> *still working on improving this assumption.*
    - As a robustness check of this, we compare state VA and RHS totals to the NMRI and adjust totals.

New Construction Identification (NC) Methodology

- Data Inputs
  - Public Records (Deed & Assessor files)
  - Zillow API and/or Listings data
- Identification of NC
  - Year Built in Assessor data
  - If Year Built is missing:
    - Seller name (we have assembled a list of over 400 builders with their subsidiaries and key words to identify smaller builders.) If a seller is a builder and the Year Built is missing, then it is most likely a new construction that has not yet been assessed.
    - Ping Zillow API for Year Built and Use Code. Data not perfect, along with other data helps determine status.
    - Sellers with multiple sales that are not individuals/gov't/lender/other corporation are most likely builders (relatively small number).
  - Count only first sale of home as a new construction.
- Verification – Quality Control, Quality Control, Quality Control
  - Random sampling and checking of new constructions and existing homes using Zillow data, Google street view/satellite images.
  - Find 2% false positives and 1% false negatives.
  - Builder example: AEI NC found 93% of DR Horton sales (unweighted) and 105% (weighted)
- Final dataset allows us to:
  - Monitor new constructions at the property level,
  - Accurately estimate new home sales at fine geographic levels when combined with Home Sales #s,
  - Estimate additions to the existing housing stock when combined with Assessor data,
  - Estimate sales by builder and track builder, and
  - Combine new construction numbers with Months' Supply and house price appreciation.
- Other considerations
  - Lag in data; originally estimated at ~4 quarters; with more data processed, looks like 1-2 months.
  - Hard to identify owner-built homes without a long lag.

AEI-adjusted Land Prices and Land Shares Methodology

Methodology

- AEI-adjusted land price and land share indicators are based on data for 2012 from "The Price of Residential Land for Counties, ZIP Codes, and Census Tracts in the United States" by Davis (Rutgers), Larson (FHFA), Oliner (AEI), and Shui (FHFA). However, due to potential biases (anchored to tax assessments and a limitation to GSE appraisals), the Davis et al. data likely understate the amount of home price appreciation and, by extension, the amount of increase in land prices. Therefore, we enhance the Davis et al. data using AEI's constant-quality home price appreciation index.

How exactly is the AEI adjustment done?

- The AEI-adjusted data use the 2012 land prices and shares from the Davis et al. paper as a stake in the ground. These values are then rolled forward in time using various AEI and CoreLogic metrics and assumptions.

Data:

- AEI constant-quality HPA series: This is an annual series for each ZIP code indexed to 0 in 2012.
- AEI's public records dataset: We use the 2012 average sale price for each ZIP code.
- CoreLogic's Construction Cost Index: This is an annual series for each three-digit ZIP code.

Assumptions:

- The structure value in 2012 is approximated using the 2012 land share from the Davis et al. dataset and AEI's average sale price.
- The structure value is rolled forward using CoreLogic's Construction Cost Index on three-digit ZIP code level.
- The average sale price is rolled forward using its 2012 value and the constant-quality HPA series.
- The land share for any year is calculated as the difference between 100% and the ratio of that year's adjusted structure value and adjusted average sale price. Once a year's land share for a ZIP code is known, we adjust the 2012 land prices according to the changes in the land share over time.
- Detailed methodology can be found here: https://www.aei.org/wp-content/uploads/2021/05/AEI-adjusted-Land-Price-and-Land-Share-Indicators-Methodology.pdf?x91208

AEI Market Indicator Nowcast using Optimal Blue Data

- The AEI Housing Center is providing near-real time Flash Housing Market Indicators (HMI) during the coronavirus (COVID-19) era. Released each Monday, the Flash HMIs will provide weekly insights on:
  - house prices,
  - credit underwriting standards,
  - purchase and refinance origination trends
  - cash out amounts, and
  - much more.

- What is the significance
  - The Flash Housing Market Indicators reports are possible thanks to newly acquired data from Optimal Blue, a rate lock software provider with roughly a third market coverage.
  - After extensive historical analysis of Optimal Blue data going back 7 years, we have concluded that these rate lock data track closely those reported in our National Mortgage Risk Index (NMDR), which cover 99% of the agency market.* As a result, the HMIs enhanced with Optimal Blue data provide an advance look trends which will not be reported in our NMDR until 3 months later. In terms of home price appreciation trends, the data also would not be available until 3 months later and would be reported on a monthly basis.

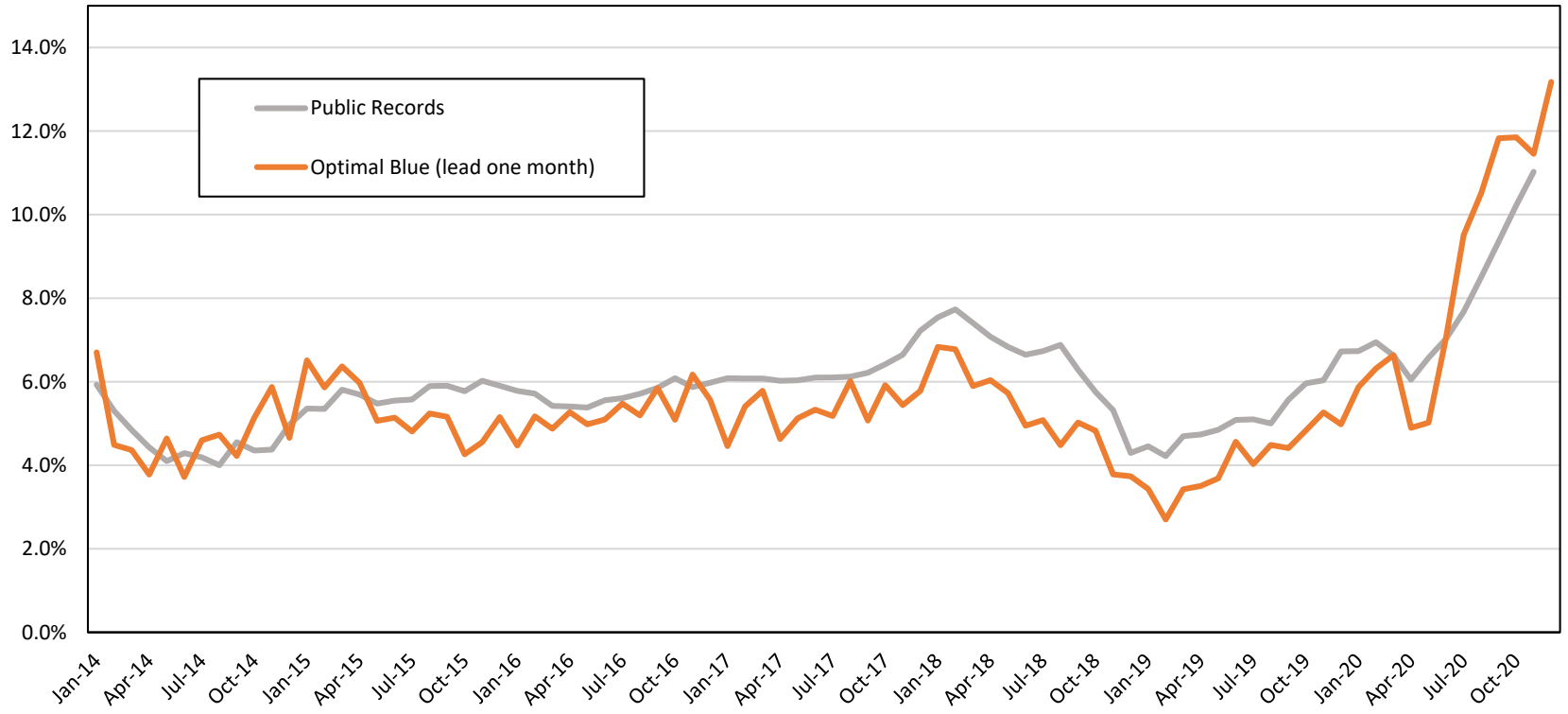
- The Housing Market Nowcast will provide much-needed and timely insights on the single-family residential housing market convulsing from the effects of the coronavirus pandemic.

- The Housing Market Nowcasts are available on our website here.

* While not all rate locks will be originated or the Optimal Blue data cover the entire market, our analysis of the data has found them to be instructive as the changes over short time periods provide a useful signpost for what's to come. While Optimal Blue data is used, Edward Pinto and Tobias Peter are solely responsible for the analysis.

House Price Appreciation (HPA) Trend Comparison

A simplified HPA regression using Optimal Blue data seems to fairly accurately predict HPA trends, while also providing a window in the future. There is a small level difference between both series.



Note: Based on purchase price estimates from rate lock data and their geographic location, we construct a weekly home price appreciation index. The index estimates an average weekly sale price controlling for location at the ZIP code level. The data are weighted by county, loan type, and year using HMDA data to account for differences in coverage of the Optimal Blue data. For the years for which HMDA data are not yet available, we assume the same weight as for 2018. This index largely replicates the findings of our constant-quality quasi repeat sales home price appreciation index available here. Optimal Blue's data coverage has improved over the years, which is reflected in the closer alignment in levels over time.
Source: AEI Housing Center, www.AEI.org/housing and Optimal Blue.

List of Abbreviations

Term	Description
MDR	The **Mortgage Default Rate** (MDR) measures how the loans originated in a given month would perform if subjected to the same stress as loans originated in 2006/2007, which experienced the highest default rates as a result of the Great Recession.
NMDR	The **National Mortgage Default Rate** (NMDR) 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).
SMDR	The **State-level Mortgage Default Rate** (SMDR) measures mortgage risk on a state level. It employs exactly the same stress-test methodology as the national index.
FBMSI	The **First-time Buyer Mortgage Share Index** (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 NMDR, while the private-sector component of the combined FBMSI come from AEI's National Housing Market Index (NHMI) and assumptions believed to be reasonable.
FBMDR	The **First-time Buyer Mortgage Default Rate** (FBMDR) is calculated using the same methodology as for the NMDR. The only difference is that the set of included loans is restricted to first-time buyers.
FTB	AEI uses the federal government's definition of a **first-time homebuyer** (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.
RB	Repeat Buyers (RB) are all home buyers that are not first-time buyers.

List of Abbreviations (cont'd)

Term	Description
GSE	A **Government-Sponsored Enterprise** (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.
Fannie Mae	The **Federal National Mortgage Association** (FNMA), known as Fannie Mae, was founded in 1938 as part of the New Deal legislation.
Freddie Mac	The **Federal Home Loan Mortgage Corporation** (FHLMC), known as Freddie Mac, was created in 1970 to complement Fannie Mae.
Ginnie Mae	The **Government National Mortgage Association** (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.
FHA	The **Federal Housing Administration** (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.
RHS	The **Rural Housing Service** (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.
VA	The **Department of Veterans Affairs** (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.
HUD	FHA has been overseen by the **Department of Housing and Urban Development** (HUD) since its creation in 1965.

List of Abbreviations (cont'd)

Term	Description
FICO®	The **FICO Credit Score** 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.
LTV / CLTV	The **Loan-to-Value Ratio** (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 **Combined Loan-to-Value** (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.
DTI	The total **Debt-to-Income Ratio** (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.
ARM	An **Adjustable-Rate Mortgage** (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.
FRM	A **Fixed Rate Mortgage** (FRM) maintains the interest rate at origination throughout the lifetime of the loan.
MSA	A **Metropolitan Statistical Area** (MSA) is a geographical region with a population of at least 50,000 inhabitants at its core and close economic ties throughout the region.
PCE price index	The **Personal Consumption Expenditure** (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.
SLOOS	The **Senior Loan Officer Opinion Survey on Bank Lending Practices** (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.

List of Abbreviations (cont'd)

Term	Description
QM/QRM	The **Qualified Mortgage** (QM) and the **Qualified Residential Mortgage** (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).
MIP	The **Mortgage Insurance Premium** (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.
TRID	The **TILA-RESPA Integrated Disclosure (TRID)** 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.
APOR	The **average prime offer rate (APOR)** is a weekly survey-based estimate of the Annual Percentage Rates (APRs) of "best quality," 80% LTV, first-lien loans. The APOR is available for (1) 30-year fixed-rate; (2) 15-year fixed-rate; (3) five-year variable-rate; and (4) one-year variable-rate loan products.
Rate Lock	A **rate lock** is an agreement between a borrower and a lender which guarantees that the mortgage will be available to the borrower at a specific interest rate for a certain amount of time. All rate locks reported on in this briefing are made using Optimal Blue, a rate lock software provider covering roughly a third of the market.