

Housing and Mortgage Market Review

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Housing Isn't as Expensive as You Think

By Ralph DeFranco

Home prices are up 46% nationally since the beginning of 2012, according to the Federal Housing Finance Agency's All-Transactions House Price Index. Since this has caused a lot of hand-wringing in the press, we decided to investigate this statistic in more detail.

Many people will tell you home prices are too high. But is it true relative to historic norms? Is there a way to account for all the other moving pieces, such as incomes and interest rates? As we will see, we believe the best way to understand if home prices are reasonable is by comparing affordability now to its historic norms.

But before digging into affordability, it is worth noting that nearly all of the increase can be accounted for by the following:

- Median household income is up 28% since the beginning of 2012, when unemployment was still very high. It is interesting that income growth exceeded the cumulative inflation of 13% over the same time period.

- 2012 is hardly the right starting point for a comparison since it implicitly suggests that prices were correctly valued back then. In fact, 2012 home prices had overcorrected on the downside by roughly 13% nationally, according to our internal models of fundamental home values. You may recall that home prices in many areas illogically fell below the cost of constructing a new home as potential buyers understandably waited for prices to stop falling (consistent with the old Wall Street adage to avoid trying to "catch a falling knife"). So 2012 was probably a "once-in-a-lifetime" buying opportunity.

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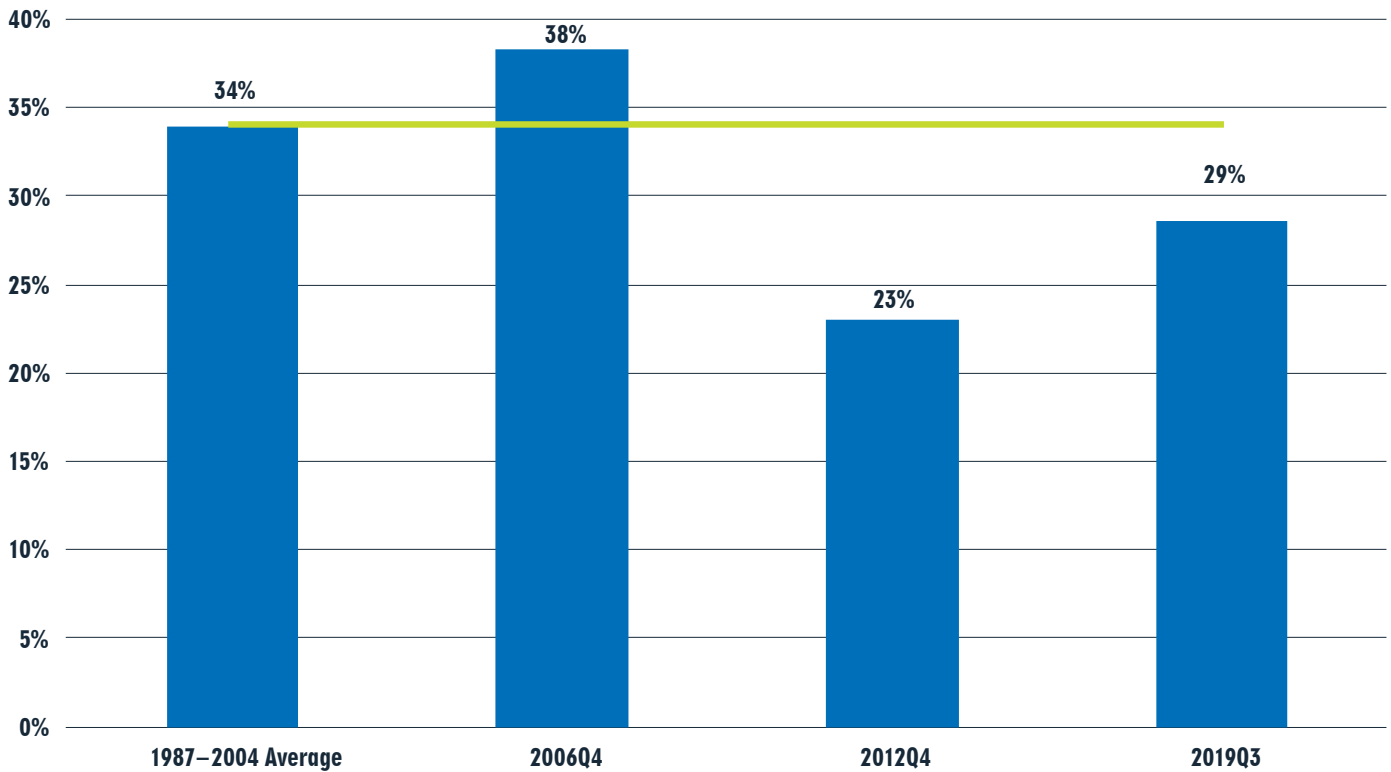
Housing Isn't as Expensive as You Think *(continued from page 1)*

Now that we have looked at income growth and questioned the best starting point for a comparison, we turn to measuring affordability. What matters to most people when buying a home is the question, “can we afford the size of the monthly mortgage payments?” Specifically, what matters are monthly costs relative to income, which depends on home prices, income and interest rates. So, to account for what really matters for homebuyers, we estimate the percentage of median income needed to make monthly mortgage payments on a median-priced home (assuming a 10% down payment, a 30-year fixed mortgage with the Freddie Mac average

rate plus 0.75% to cover mortgage insurance, risk add-ons, and state average property tax rates and insurance). This is a hypothetical value, not based on actual loans.

So how does our current affordability measure compare to its past? To answer this question, we look at affordability at four points in time: 1) what we consider “normal times,” around the 1990s; 2) the peak of home prices in the last cycle in 2006; 3) the bottom of the home price declines in 2012; and 4) now. The first chart shows the percentage of median income needed for monthly payments on a median-priced home in the U.S. for those four time periods.

Figure 1: Percentage of Median Income Needed for Monthly Payments on a Median-Priced Home, U.S.



First, notice that affordability now is far better than the average from 1987 to 2004 and dramatically better than in 2006. Second, note that this measure is currently about halfway back to historic norms since the record lows in 2012. Affordability in 2012 was by far the best it has been since data became available in 1975. A better base for a comparison is the more normal times between 1987 and 2004 — a period between record-high interest rates in the early 1980s and the 2006 housing bubble.

(continued on page 4)

Housing Isn't as Expensive as You Think *(continued from page 3)*

Here is an illustration of how the math works. The National Association of Realtors® reported that the median existing home price in the U.S. is around \$271,000. Assuming a 90% LTV loan, the corresponding monthly mortgage payment would be roughly \$1,600, which works out to around 29% of the median household's \$5,400 a month in pre-tax income. This is better than the 34% average in the more normal times of 1987 to 2004. Interestingly, the monthly payments would have been about the same to buy a home in 2006, but affordability is better now because of a higher median income and lower interest rates.

Figure 2: Percentage of Median Income Needed for Monthly Payments on a Median-Priced Home, Select States

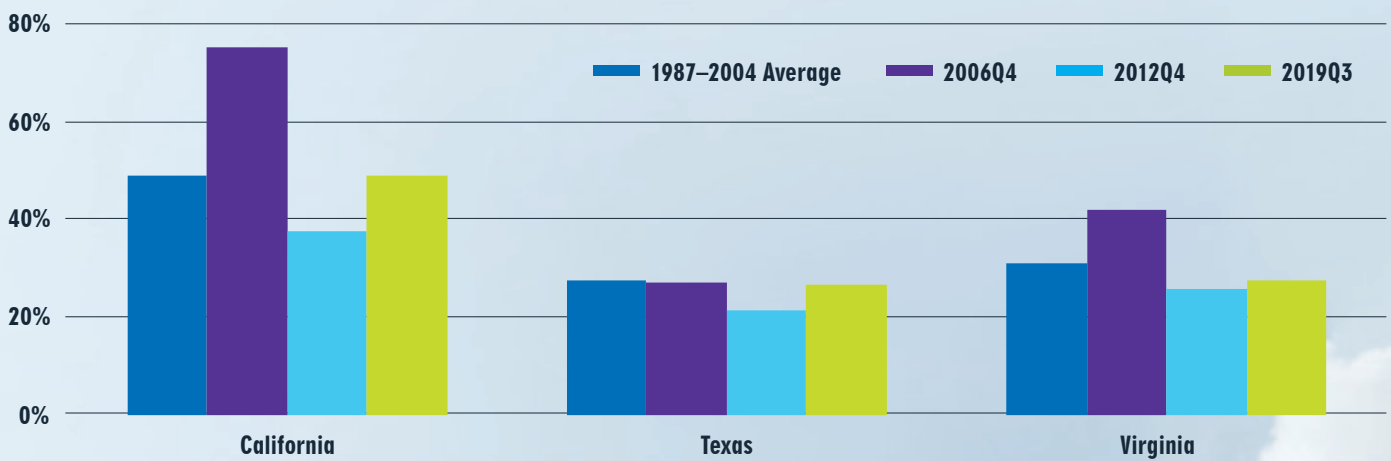
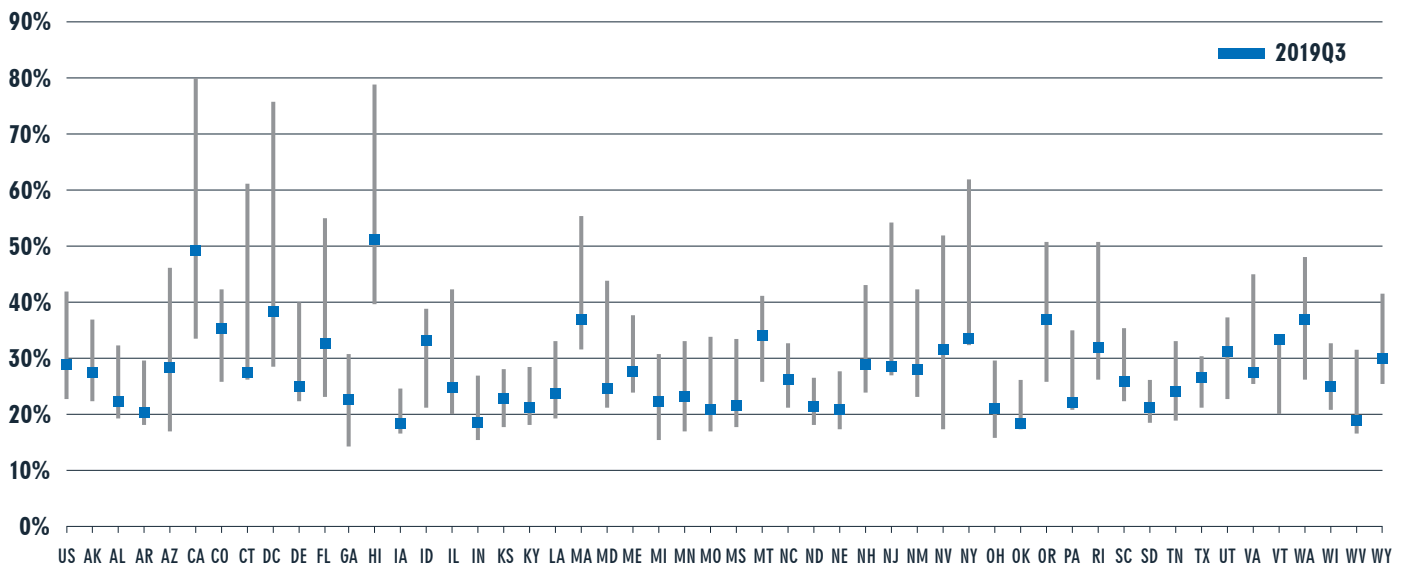


Figure 2 shows California, which had one of the worst home price bubbles of any state, alongside Texas, which nearly completely avoided a bubble, and Virginia, which is somewhere between the two. Affordability now in California is a bit worse than in the “normal” benchmark time period (which admittedly isn’t the perfect base for a comparison; it included a long local slump owing to defense cuts and the aftermath of an earlier housing bubble). Affordability in Texas is about the same as during 1987–2004, while Virginia is currently better than historic norms.

Next, we compare all 50 states now to the full range of our affordability measure since 1990.



Figure 3: Percentage of Median Income Needed for Monthly Payments on a Median-Priced Home Now and Range from 1990 to Now



Several things stand out from Figure 3:

1. Most states are currently below the 30% level many analysts would consider reasonable, with the usual exceptions of states like California and Hawaii that have always been expensive.
2. Affordability now is well below the midpoint for most states but there are a few notable exceptions, such as Vermont and Colorado. Of course, as places evolve, they can naturally become more popular and thus expensive. For example, Colorado's economy has become more high-tech over time and the value of natural amenities has increased as more people choose a location to suit an active outdoor lifestyle.
3. Affordability now is at or near the best it has been since 1990 in Oklahoma, Pennsylvania, Iowa and West Virginia. Even New York State isn't that far behind them.

So why is there so much anxiety over home prices and the general perception that they are too high? Perhaps because it's so easy to remember that home prices (and affordability) were much lower just a few years ago and

it's far harder to know what historic norms have been over many decades. It is so much easier to remember the recent past that researchers even have a name for it: **recency bias**.

Housing affordability is actually better now than its historic norms in most states and remains far better than the worst point for each state since 1990. Certainly there are some serious affordability issues for many individuals or for society at large: For example, a housing shortage and growing income inequality have greatly increased the number of families that are considered "housing cost-burdened." But conditions for a family earning the median income or higher aren't as bad as generally perceived. This implies you shouldn't expect to see lower home prices anytime soon. While there is no shortage of things to worry about, national home prices in today's low-interest-rate environment isn't one of them.

For current values of our affordability measure for each state, please see page 22.

Risk of Home Price Declines Remains Low

The national average probability of home prices being lower in two years declined slightly to a very low 10%. That is according to the Arch MI Risk Index®, a statistical model using nine indicators of local housing market conditions, including estimated home price over/undervaluation, unemployment rates and home price momentum.

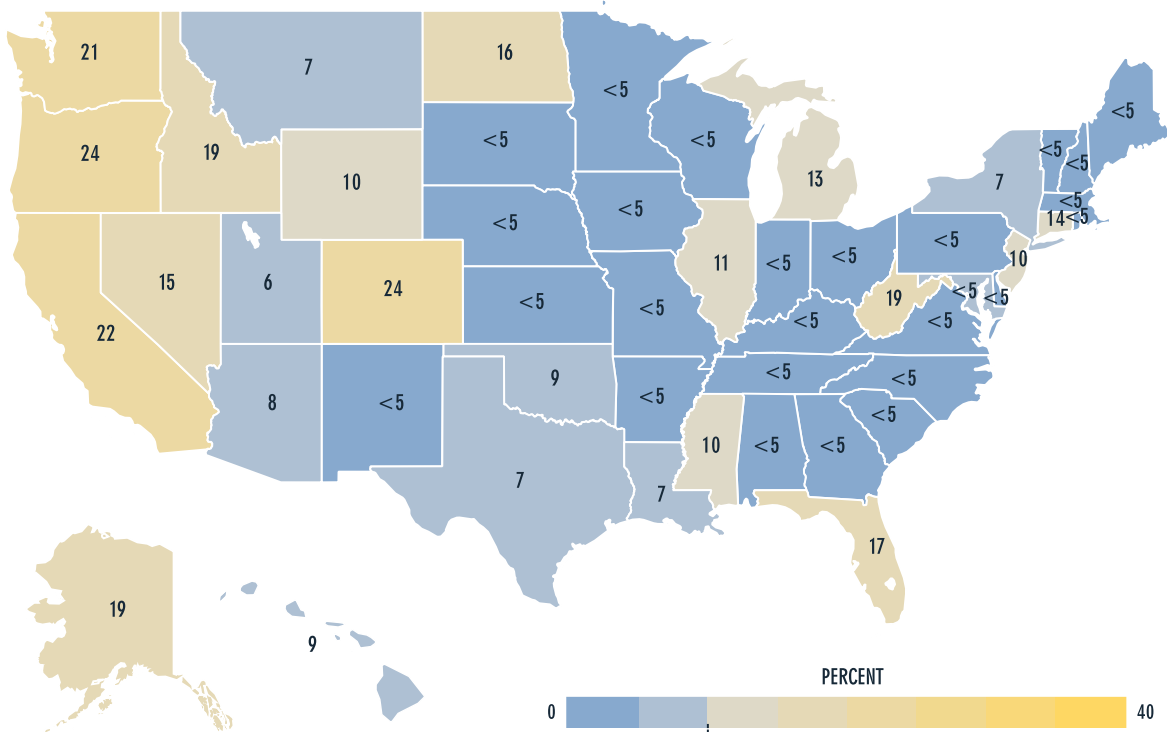
No states or large metros are expected to experience home price declines. A few areas have slightly elevated risk and it is reasonable to assume that areas with higher Risk Index values are more vulnerable to home price declines in the event of a national economic downturn.

It is important to understand that the Arch MI Risk Index doesn't estimate the size of possible home price declines, just the probability of prices being lower, by any amount,

in two years. We believe that any price declines, if they occur, are likely to be fairly limited in today's environment due to a widespread shortage of housing.

Low Risk Index values make sense given **housing market conditions continue to be very favorable** overall. Several leading indicators, such as homebuilder confidence, continue to improve thanks to low interest rates and low inventory. Risk Index values this quarter were also favorably impacted by an upward revision to the official income data. Nevertheless, a few areas did experience a small increase in risk, including Florida, as the strong dollar weighs on foreign tourism and buyers, and California, which has had anemic home price growth over the past year as affordability concerns have limited potential buyers and slowed population growth.

Latest Arch MI Risk Index — Probability of Price Declines in Two Years

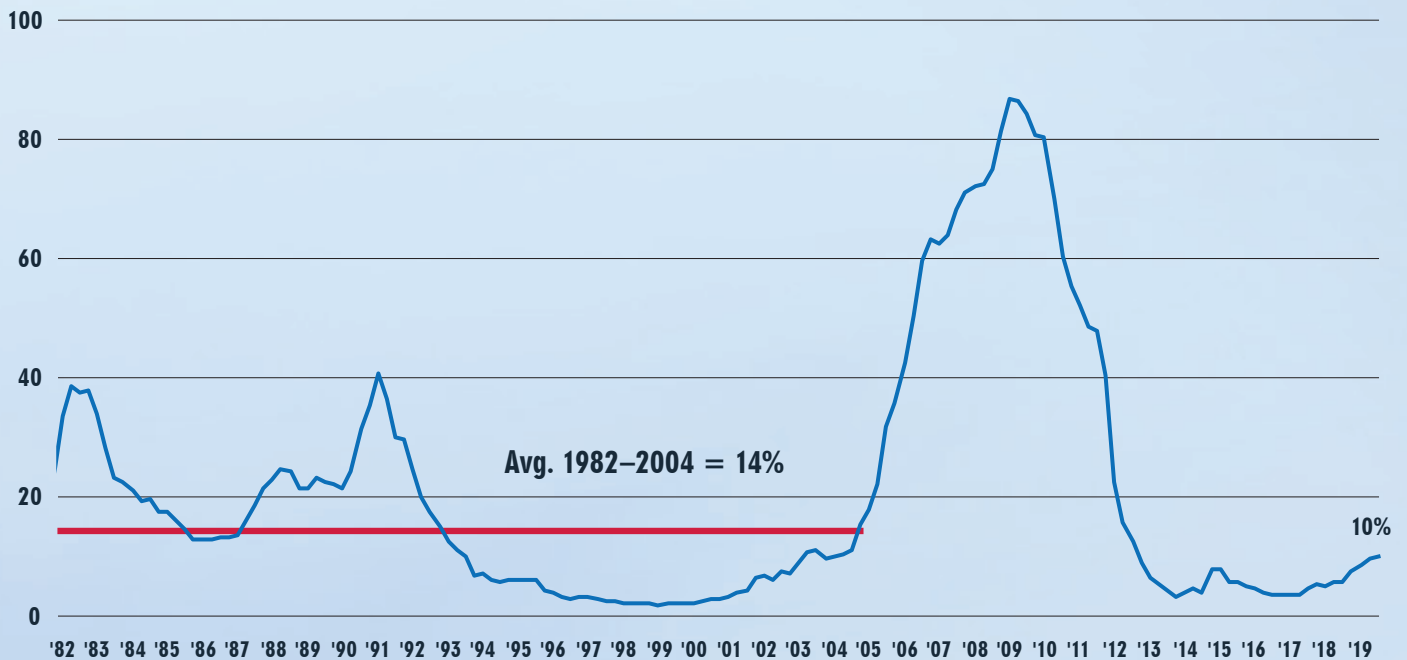


The Arch MI Risk Index estimates the probability home prices will be lower in two years, times 100. It is a statistical model based on factors such as regional unemployment rates, home builder sentiment, net migration, housing starts, the percentage of delinquent mortgages and the difference between actual and estimated fundamental home prices (based on fundamentals, such as income, population growth, etc.). Model results are sometimes adjusted for unmodeled factors.

Historical Context

At 10%, the overall national risk of a decline in home prices (of any size) is well below the historical average of 20% from 1982 through today (and below the pre-crisis 1982–2004 average of 14%).

Average Arch MI Risk Index Values Over Time



How predictive is the Arch MI Risk Index? You can see from the chart above that Risk Index values were clearly signaling a red flag during 2005–2011. Back in 2005, the Risk Index attracted some national publicity because it was flashing yellow or red, with values near or over 50%, for some of the coastal cities that were later hit hard by the housing crash. Risk Index values in the 2000s first rose as overvaluation became more pronounced¹ and continued to increase as economic conditions worsened. Backtests of the model, based on how often markets with Risk Index values greater than 50 actually experienced price declines two years later, put the model's accuracy between 80% and 90%.

More details on Risk Index values for states and the largest 100 metros appear in subsequent articles and tables. Values for smaller metros can be found on the Risk Index by MSA interactive map at archmi.com/hammr using the View our HPI Charts and Maps link.

¹ Our affordability measure on page 19 shows how prices become disconnected from incomes around 2005.

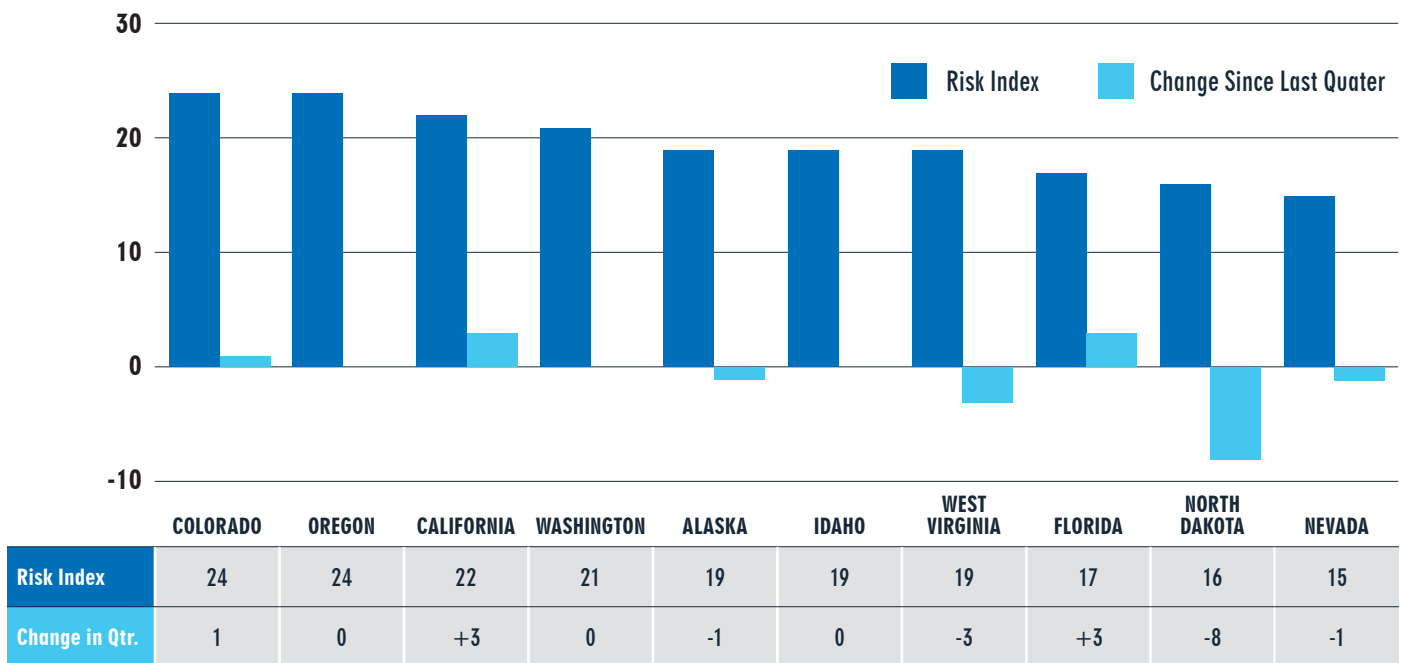


States with Above-Average Risk

Based on current conditions, every state is expected to have positive home price growth over the next two years, according to the Arch MI Risk Index. That would be a continuation of what has actually happened over the past five years. Twenty-six states received the lowest possible model result, with a Risk Index of less than 5%.

The following chart shows the 10 states with the highest probabilities of having lower home prices in two years' time compared to now, according to the Arch MI Risk Index.

States Most at Risk of a Price Correction and Change from Prior Quarter



Colorado moved up slightly to tie Oregon for the highest Risk Index value of 24%. That is still only a one-in-four chance of a price decline (of any size, even a slight amount) in two years' time.

The main reasons why these 10 states have above-average risk are as follows:

- **Florida** and six Western states (**California, Colorado, Idaho, Oregon, Nevada and Washington**) are on the top 10 list because their affordability is somewhat worse than historic norms (discussed further below).
- The other three states in the top 10 list have large energy-extraction industries.
- **North Dakota** includes Grand Forks, which remains relatively weak. The state did have the largest improvement in Risk Index values, as home price growth picked up late in 2019.
- **West Virginia** has had several coal firms go bankrupt as natural gas prices have trended down. Demographic trends are also unfavorable: 2018 was the sixth consecutive year with a falling population. There are now fewer residents than in 1936.
- **Alaska's** beleaguered economy remains weak. The unemployment rate is 6.2%, the highest in the nation. Payrolls in the energy sector have fallen by 25% since 2014, as oil production has trended down.

Our affordability measure on page 19 shows how prices become disconnected from incomes around 2005.

Drivers of Risk Index Trends



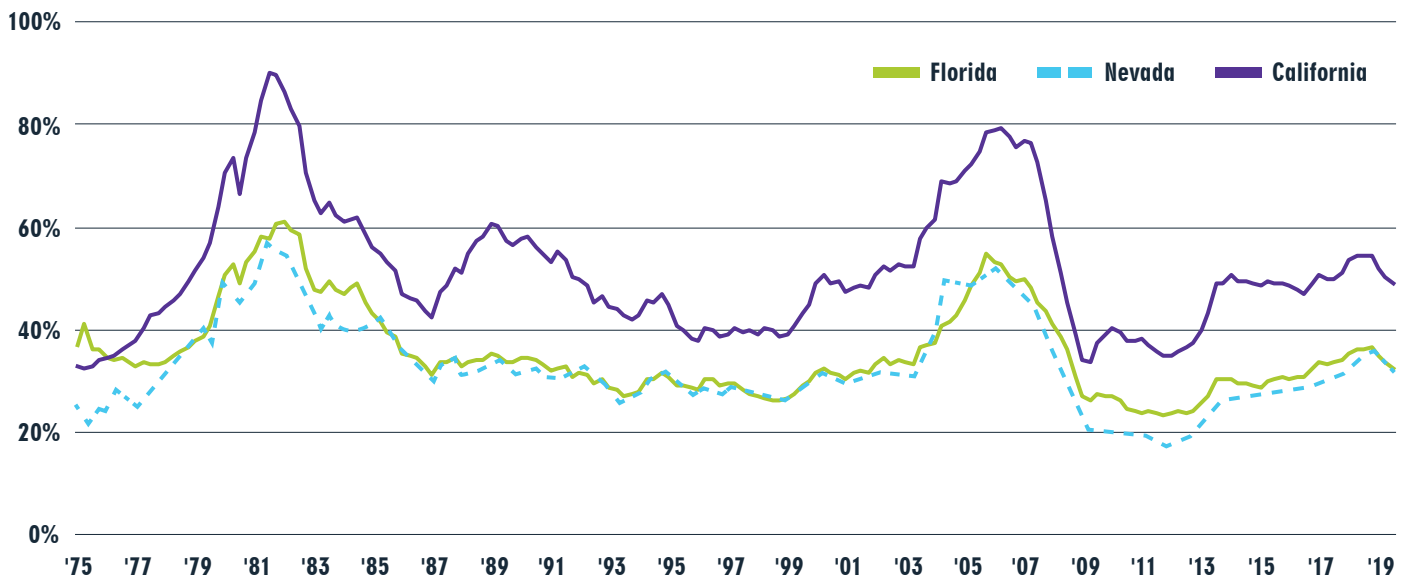
Several macro trends in recent years help explain trends in Risk Index values:

- Affordability is poor compared to the 1990s in most Western states and Florida. Risk Index values have been trending up as the rapid growth in home prices over the past five years has pushed up prices faster than incomes.
- Some areas with large fossil fuel extraction industries remain at elevated risk due to the lingering effects of lower energy prices after the fracking boom ended in 2015. Fortunately economic conditions have been improving, which has lowered their Risk Index values over time.

A Longer-Term Perspective on Affordability for States on the Top 10 List

One method we use to assess local risks is by looking at affordability over time. The following charts show the percentage of median income needed for monthly payments on a median-priced home (assuming a 10% down payment, the Freddie Mac 30-year fixed mortgage rate plus 0.75% to cover mortgage insurance, risk add-ons, etc., and state average property tax rates and insurance).

Figure 1: Percentage of Median Income Needed for Monthly Payments on a Median-Priced Home, Florida, California and Nevada



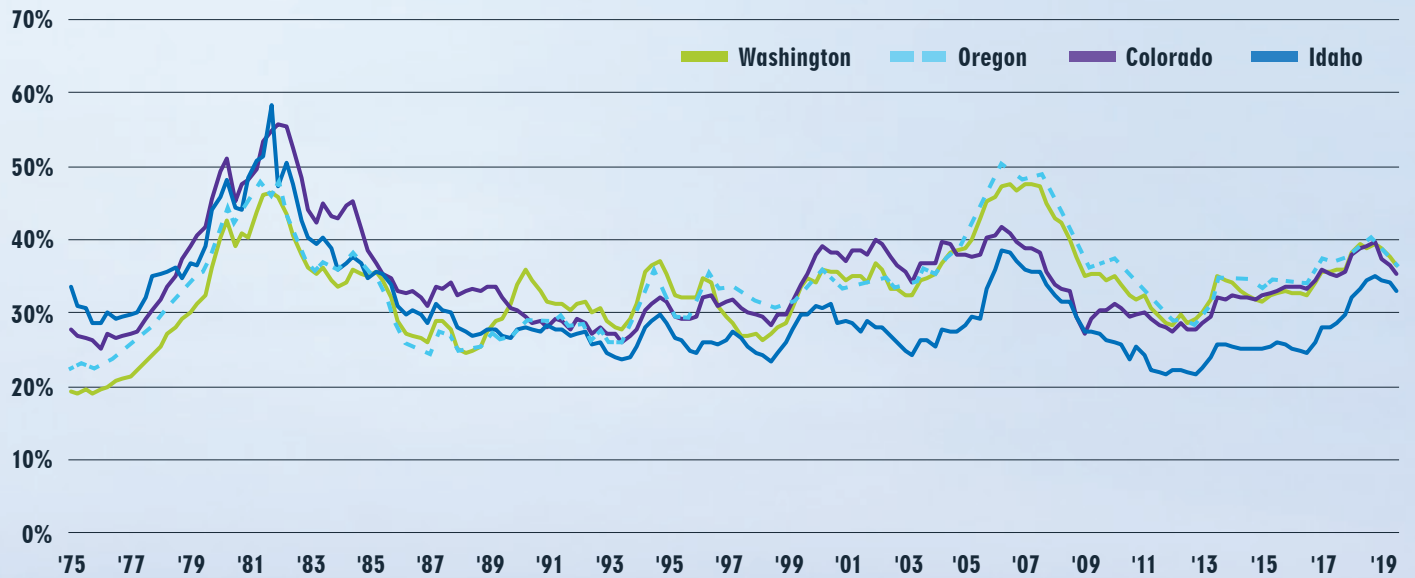
Our affordability measure (lower is better) was worse in the early 1980s, when 30-year fixed mortgage rates peaked at 18%. The second clear period of poor affordability was during the national housing bubble in the late 2000s and a local bubble in California around 1990. The noticeable improvement in affordability during 2019 was because of falling mortgage rates.

Affordability now in California, Nevada and Florida is: 1) modestly worse than the 1990s; 2) at about the same level as in 2003; and 3) well below levels around 2005.

(continued on page 10)

States with Above-Average Risk *(continued from page 9)*

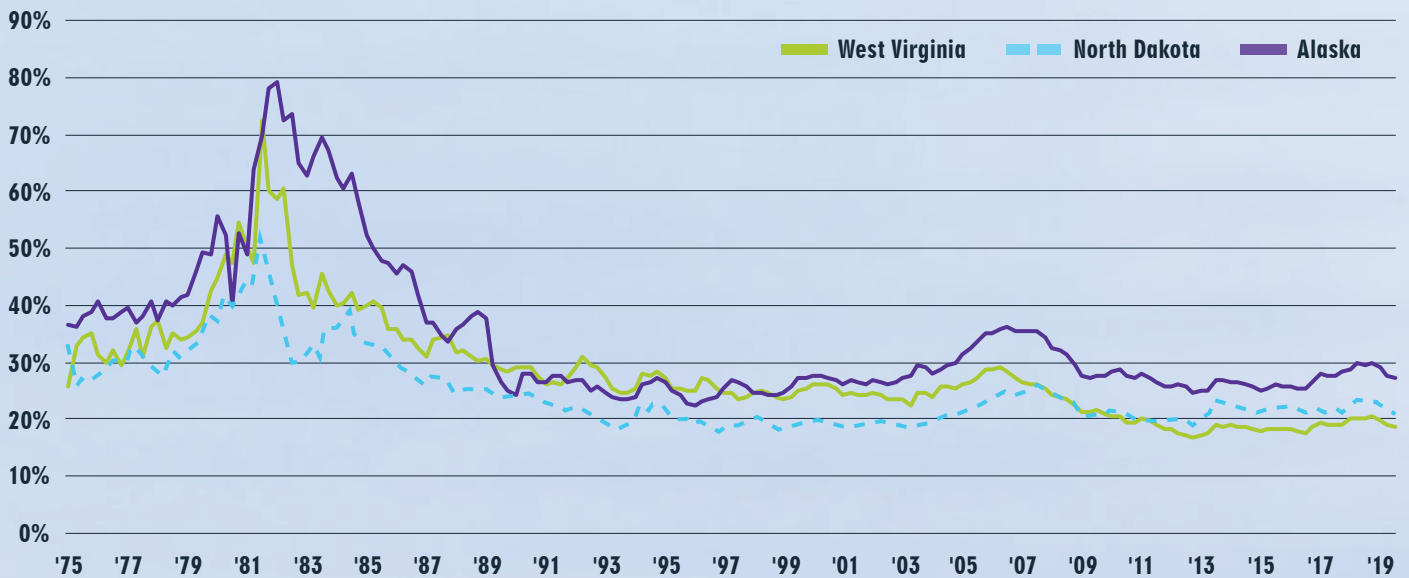
Figure 2: Percentage of Median Income Needed for Monthly Payments on a Median-Priced Home, Four Western States



Currently, all of the Western states in Figure 2 have worse affordability now than during the 1990s. Nevertheless, affordability was materially worse during the 2005–2007 housing bubble and during the early 1980s.



Figure 3: Percentage of Median Income Needed for Monthly Payments on a Median-Priced Home, Energy-Extraction States



Affordability in Alaska and North Dakota is worse now than the 1990s, but not dramatically so. These states are in sharp contrast to West Virginia, which has the best affordability in the country and is far more affordable now than in prior decades. Unfortunately, given the state's weak fundamentals, such as demographics and declining coal-mining employment, we believe its home prices are currently more fair-valued than undervalued.

In conclusion, looking across time and states, we see no reason for serious concern. Even though some states do have somewhat worse affordability now than during the 1990s, our view is this is being driven by a housing shortage. Given how slow construction has been to ramp up, it is more likely that affordability will continue to worsen than to improve over the next few years. Therefore, we believe that near-term risk of sustained price declines remains remote even for states on the top 10 list as long as economic conditions remain similar to today's, as most economists predict.

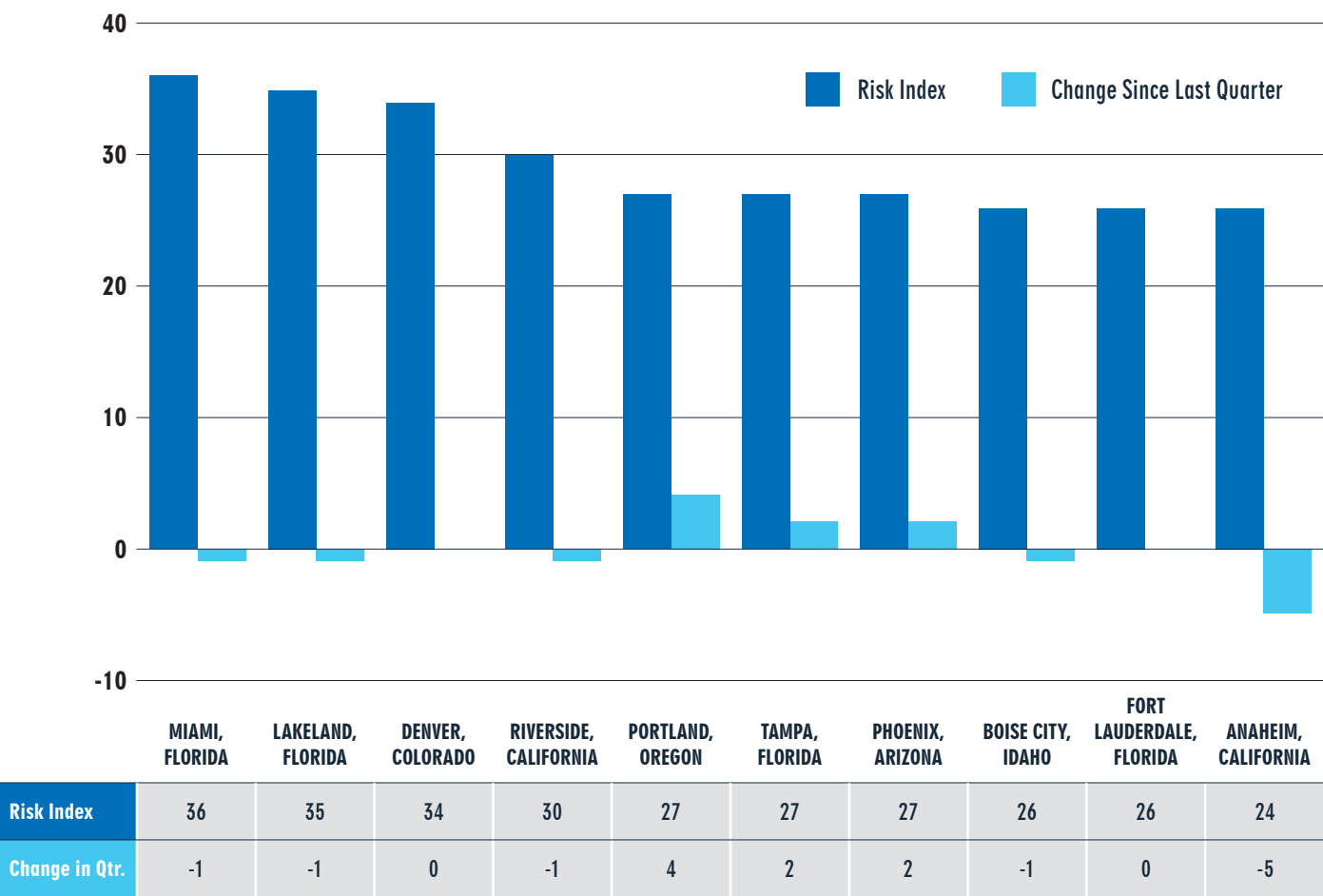


Metros at Elevated Risk

No states or large metros are currently projected to experience persistent home price declines over the next two years. Among the 100 largest metros, **Miami** and **Lakeland** in Florida retained the top slots again this quarter for the highest Arch MI Risk Index values, with just over a one in three chance of price declines (of any size) over the next two years. Both improved slightly this quarter. All of the riskiest cities made the list because they have higher home prices than expected. That is according to an Arch MI internal model’s estimate of expected home values based on fundamentals, such as incomes and changes in population.

- **Miami** continues to have a glut of unsold condos and home prices look highly overvalued compared to historic norms. It is also being hurt by fewer international buyers due to the strong dollar. It is one of the few cities in the country with more than a six-month supply of homes for sale.
- The greater **Lakeland** metro area (inland from Tampa, Florida) looks overvalued compared to its past, as rapid house price appreciation over the past two years has taken a significant toll on affordability.

Top 10 Metros Most at Risk of a Price Correction



Arch MI Risk Index values for all 401 metros are available in the Risk Index by MSA interactive map at archmi.com/hammr under the **View Our HPI Charts and Maps** link. There you can also explore a variety of interactive maps, including home prices.

Smaller Cities Take the Lead in Home Price Growth *By Manhong Feng*

The housing market has pulled a switcheroo. An analysis of home prices by metro reveals that cities that had a large appreciation in the recent past have now switched to a much lower gear while some others, typically smaller metros, are now enjoying a faster ride.

According to the FHFA, national home prices rose 4.6% year-over-year in Q3 2019, slowing from a hot 6.5% in Q3 2018. The deceleration in home price appreciation (HPA) is prominent and widespread, but not every metro experienced lower home price growth. The overall slowdown in HPA is generally a healthy phenomenon

since in the long-run home price growth faster than income growth is unsustainable. Thus, a gradual slowdown now could help prevent prices from running up rapidly from here and risking a sharp correction down the road.

Tables 1 and 2 list the HPA, population and current hypothetical median DTI – our affordability measure (the percentage of median income needed for monthly payments on a median-priced home)² — for 20 metros that had the fastest one-year home price appreciation in Q3 2019 and Q3 2018, respectively.

The final column, labeled Current Hypothetical Median DTI, is the percent of median income needed to make monthly payments on a median-priced home (assuming 10% down). It is the same affordability measure described on page 19 and in the lead article.

Table 1. Metros with Highest HPA in Q3 2019

MSA NAME	1-YR. HPA Q3 2018	1-YR. HPA Q3 2019	POPULATION IN 2019 (IN THOUSANDS)	CURRENT HYPOTHETICAL MEDIAN DTI
Chico, CA	7.2%	14.4%	231	46.5%
Jacksonville, NC	5.4%	12.8%	199	24.7%
Boise City, ID	16.1%	11.8%	759	32.8%
Idaho Falls, ID	11.7%	11.3%	152	28.7%
Walla Walla, WA	6.5%	11.1%	65	32.6%
Coeur d'Alene, ID	10.8%	10.8%	168	35.7%
Odessa, TX	14.3%	10.6%	166	22.5%
Brunswick, GA	0.2%	10.4%	120	26.1%
Spokane, WA	11.6%	10.4%	580	31.6%
Laredo, TX	0.8%	10.3%	279	25.0%
Longview, WA	11.1%	9.8%	110	38.6%
Pocatello, ID	10.8%	9.8%	88	26.5%
Fayetteville, NC	2.1%	9.4%	390	21.1%
Sierra Vista, AZ	2.0%	9.1%	127	23.9%
Hinesville, GA	-8.1%	9.1%	81	20.8%
Logan, UT	7.8%	8.9%	144	34.3%
Winchester, VA	0.7%	8.8%	141	26.1%
Panama City, FL	12.7%	8.7%	204	26.2%
Kennewick, WA	10.6%	8.5%	301	31.2%
Ocean City, NJ	1.9%	8.5%	92	34.6%
Total/Average			4,398	29.9%

² See the top of page 22 for more details.

(continued on page 14)

Smaller Cities Take the Lead in Home Price Growth *(continued from page 13)*

The final column, labeled Current Hypothetical Median DTI, is the percent of median income needed to make monthly payments on a median-priced home (assuming 10% down). It is the same affordability measure described on page 22 and in the lead article.

Table 2. Metros with Highest HPA a Year Ago (Q3 2018)

MSA NAME	1-YR. HPA Q3 2018	1-YR. HPA Q3 2019	POPULATION IN 2019 (IN THOUSANDS)	CURRENT HYPOTHETICAL MEDIAN DTI
Sebring, FL	18.3%	6.1%	107	25.8%
Las Vegas, NV	17.9%	3.9%	2,307	31.6%
Boise City, ID	16.1%	11.8%	759	32.8%
Twin Falls, ID	15.5%	6.5%	113	29.1%
Odessa, TX	14.3%	10.6%	166	22.5%
San Francisco, CA	13.7%	-1.9%	1,662	85.3%
Watertown, NY	13.6%	5.0%	111	26.1%
Mount Vernon, WA	13.6%	6.7%	131	37.6%
Carson City, NV	13.3%	8.3%	56	41.4%
San Jose, CA	12.9%	-1.5%	2,011	65.7%
Sumter, SC	12.8%	4.4%	107	19.5%
Pueblo, CO	12.7%	6.2%	169	32.1%
Panama City, FL	12.7%	8.7%	204	26.2%
Albany, OR	12.7%	7.6%	129	34.3%
Midland, TX	12.6%	7.4%	182	24.3%
Grand Junction, CO	12.4%	6.2%	156	35.0%
Reno, NV	12.4%	5.0%	481	38.5%
Wenatchee, WA	12.3%	5.6%	122	40.9%
Tacoma, WA	12.1%	7.4%	906	34.4%
Salem, OR	11.9%	5.4%	441	34.4%
Total/Average			10,319	47.4%



Here are a few observations:

1. The rate of the fastest HPA is lower in Q3 2019 than a year ago. In Q3 2019, no metro had HPA greater than 15%, while home prices grew more than 15% in Q3 2018 in Sebring, Florida; Las Vegas, Nevada; and Boise City and Twin Falls, Idaho.
2. The metros that had the fastest HPA in Q3 2019 are much smaller than those that had the fastest HPA in Q3 2018. There was only one metro from the top 100 most populous metros that made the 20 fastest HPA list in Q3 2019, compared to five from the top 100 most populous metros a year ago. The total population of metros on the 20 fastest HPA list is 4.4 million in Q3 2019, versus 10.3 million a year ago.
3. The metros which made the Q3 2019 list are more affordable than those that made the 2018 list. The population-weighted average current hypothetical median DTI ratio for the 20 fastest HPA list is 30% in Q3 2019, compared to 47.4% in Q3 2018. The U.S., on average, currently has a hypothetical median DTI ratio of 29%.

Chart 3 compares the population-weighted one-year HPA distribution for Q3 2019 vs. Q3 2018.

Chart 3. Home Price Growth of All U.S. Metros Became More Uniform



Compared to a year ago, the HPA is more concentrated in a narrower band around 5%, with no metros having HPA lower than -5% or higher than 15%. The distribution of annual home price growth rate was more widely spread a year ago, with two metros lower than -5% and four metros having higher than 15.

Growth patterns change during different phases of the housing cycle. At the beginning of the recovery, HPA differed widely and large HPA gains (greater than 20%) happened most often in large cities. Now, in the seventh year since home prices started recovering from the bottom, it is the smaller and more affordable metros that have taken the lead. We welcome the fact that HPA has cooled in larger and less affordable cities where prices increased dramatically in recent years and would not be surprised to see currently hot markets cool over the next few years.

Arch MI State-Level Risk Index

STATE (Sorted by Risk Ranking, then alphabetically)	ARCH MI RISK INDEX			ANNUAL HOME PRICE % CHANGE (FHFA HPI)		UNEMPLOYMENT RATE		
	RISK RANKING	LATEST	1-YEAR CHANGE	LATEST	1 YEAR EARLIER	LATEST	1-YEAR CHANGE	LONG RUN AVG.
Alaska	Low	19	-8	2.9	1.4	6.1	-0.4	7.9
California	Low	22	17	2.9	8.0	3.9	-0.2	7.2
Colorado	Low	24	11	4.2	9.5	2.6	-1.0	5.3
Connecticut	Low	14	-5	2.9	1.6	3.7	-0.1	5.5
Florida	Low	17	11	5.6	8.9	3.1	-0.2	6.1
Idaho	Low	19	7	10.5	13.0	2.9	0.1	5.9
Illinois	Low	11	9	2.9	3.1	3.8	-0.5	6.8
Michigan	Low	13	11	4.9	7.4	4.0	0.0	7.8
Nevada	Low	15	7	5.0	14.6	4.0	-0.4	6.5
North Dakota	Low	16	-2	3.7	0.8	2.5	-0.1	3.8
Oregon	Low	24	14	4.4	6.8	3.9	-0.4	7.0
Washington	Low	21	13	4.9	10.0	4.4	-0.1	6.9
West Virginia	Low	19	0	3.5	3.5	4.9	-0.2	8.0
Alabama	Minimal	<5	2	5.1	5.3	2.7	-1.1	7.1
Arizona	Minimal	8	3	5.9	8.8	4.7	-0.2	6.3
Arkansas	Minimal	<5	2	4.7	3.7	3.6	-0.1	6.4
Delaware	Minimal	<5	-2	4.8	4.5	3.8	0.3	5.4
District Of Columbia	Minimal	<5	2	4.7	6.6	5.3	0.0	7.6
Georgia	Minimal	<5	2	5.6	8.7	3.3	-0.4	6.0
Hawaii	Minimal	9	7	2.6	5.4	2.6	0.0	4.8
Indiana	Minimal	<5	2	5.8	7.3	3.2	-0.3	6.1
Iowa	Minimal	<5	2	2.7	4.5	2.6	0.2	4.5
Kansas	Minimal	<5	2	5.5	4.6	3.1	-0.2	4.6
Kentucky	Minimal	<5	1	4.6	4.8	4.4	0.1	6.7
Louisiana	Minimal	7	0	3.5	1.4	4.7	-0.2	7.2
Maine	Minimal	<5	2	5.9	5.4	2.8	-0.7	5.7
Maryland	Minimal	7	0	3.4	3.5	3.6	-0.1	5.3
Massachusetts	Minimal	<5	2	4.0	6.0	2.9	-0.2	5.4
Minnesota	Minimal	<5	2	4.1	6.6	3.3	0.4	4.8
Mississippi	Minimal	10	-2	4.8	3.1	5.6	0.9	7.5
Missouri	Minimal	<5	2	4.6	6.0	3.1	0.0	5.9
Montana	Minimal	7	5	6.0	5.7	3.4	-0.3	5.7
Nebraska	Minimal	<5	1	4.5	6.5	3.1	0.3	3.5
New Hampshire	Minimal	<5	2	5.2	6.1	2.6	0.2	4.3
New Jersey	Minimal	10	0	4.1	3.7	3.4	-0.5	6.2
New Mexico	Minimal	<5	-3	6.0	3.4	4.8	-0.2	6.7
New York	Minimal	7	2	4.5	5.9	4.0	0.1	6.5
North Carolina	Minimal	<5	3	5.3	7.0	3.8	0.1	5.8
Ohio	Minimal	<5	2	4.9	6.4	4.2	-0.4	6.6
Oklahoma	Minimal	9	-3	5.1	3.6	3.4	0.3	5.1
Pennsylvania	Minimal	<5	2	4.5	5.0	4.3	0.1	6.4
Rhode Island	Minimal	<5	2	4.4	6.9	3.5	-0.5	6.4
South Carolina	Minimal	<5	1	5.3	6.8	2.4	-0.8	6.4
South Dakota	Minimal	<5	2	4.4	5.3	3.1	0.2	3.7
Tennessee	Minimal	<5	0	6.0	7.5	3.3	0.0	6.3
Texas	Minimal	7	-11	4.9	6.8	3.4	-0.3	5.9
Utah	Minimal	6	4	7.0	10.2	2.4	-0.8	4.8
Vermont	Minimal	<5	-2	4.3	4.3	2.3	-0.3	4.6
Virginia	Minimal	<5	2	4.6	4.0	2.6	-0.2	4.7
Wisconsin	Minimal	<5	2	4.3	6.7	3.3	0.3	5.4
Wyoming	Minimal	10	-4	5.3	4.8	3.7	-0.4	4.9
Population-Weighted Total	Minimal	10	4	4.5	6.7	3.5	-0.2	5.7

STATE

(Sorted by Risk Ranking,
then alphabetically)

	GROSS STATE PRODUCT		POPULATION	
	PER CAPITA 2019Q3	1-YEAR % CHANGE	2019Q3 (THS.)	1-YEAR % CHANGE
Alaska	\$ 76,774	4.1	736	-0.2
California	\$ 79,374	4.9	39,743	0.4
Colorado	\$ 67,972	4.5	5,792	1.3
Connecticut	\$ 80,597	5.1	3,570	-0.1
Florida	\$ 50,642	4.5	21,721	1.6
Idaho	\$ 45,110	3.2	1,800	2.1
Illinois	\$ 70,934	5.0	12,676	-0.4
Michigan	\$ 54,110	2.8	10,013	0.1
Nevada	\$ 57,432	3.8	3,120	2.3
North Dakota	\$ 75,351	2.3	767	0.7
Oregon	\$ 59,680	5.0	4,251	1.2
Washington	\$ 78,987	5.7	7,663	1.4
West Virginia	\$ 44,047	3.2	1,795	-0.5
Alabama	\$ 47,239	4.7	4,906	0.3
Arizona	\$ 50,229	4.3	7,340	1.9
Arkansas	\$ 43,878	3.0	3,026	0.3
Delaware	\$ 78,102	3.4	979	1.0
District Of Columbia	\$ 207,349	4.4	710	0.8
Georgia	\$ 58,258	4.2	10,663	1.1
Hawaii	\$ 68,899	4.6	1,419	-0.1
Indiana	\$ 55,866	2.3	6,736	0.5
Iowa	\$ 61,940	2.8	3,171	0.4
Kansas	\$ 59,374	2.8	2,917	0.2
Kentucky	\$ 47,870	3.0	4,485	0.3
Louisiana	\$ 56,852	3.2	4,655	-0.1
Maine	\$ 50,663	4.7	1,340	0.1
Maryland	\$ 71,151	4.3	6,058	0.2
Massachusetts	\$ 86,216	4.7	6,948	0.5
Minnesota	\$ 67,722	3.4	5,662	0.7
Mississippi	\$ 40,222	4.5	2,980	-0.2
Missouri	\$ 54,306	4.3	6,144	0.2
Montana	\$ 48,669	3.2	1,072	0.7
Nebraska	\$ 65,341	1.6	1,945	0.6
New Hampshire	\$ 65,352	5.2	1,365	0.5
New Jersey	\$ 72,560	4.2	8,927	0.2
New Mexico	\$ 50,679	6.5	2,101	0.2
New York	\$ 89,783	5.2	19,489	-0.2
North Carolina	\$ 56,129	3.5	10,533	1.2
Ohio	\$ 60,229	4.6	11,713	0.2
Oklahoma	\$ 53,110	3.7	3,962	0.4
Pennsylvania	\$ 64,021	5.0	12,831	0.1
Rhode Island	\$ 60,149	5.0	1,060	0.2
South Carolina	\$ 47,958	4.9	5,168	1.3
South Dakota	\$ 60,444	2.9	891	0.8
Tennessee	\$ 55,676	3.9	6,845	0.9
Texas	\$ 65,100	4.2	29,207	1.4
Utah	\$ 58,509	4.3	3,232	1.8
Vermont	\$ 55,784	5.1	628	0.2
Virginia	\$ 65,038	4.5	8,582	0.6
Wisconsin	\$ 60,021	4.2	5,839	0.3
Wyoming	\$ 69,583	3.2	580	0.3
Population-Weighted Total	\$ 65,279	4.1	329,750	0.6

Explanatory Notes

The Arch MI Risk Index, both at the state and MSA level, estimates the probability of home prices being lower in two years, times 100. For example, a score of 20 means the model estimates a 20% chance the FHFA All-Transactions Regional House Price Index (HPI) will be lower two years from the date of the input data release. The **Risk Ranking** column is a mapping of the Risk Index values into buckets, while the next column shows the actual Risk Index values. Risk Ranking is “Minimal” if the Risk Index is lower than 10; “Low” if the Risk Index is between 10 and 25; “Moderate” if the Risk Index is between 25 and 50; “Elevated” if the Risk Index is between 50 and 75; and “High” if the Risk Index is higher than 75.

Historical Risk Index scores change as revisions to source data become available. The largest changes are typically from HPI revisions.

Home Price Changes: The first column is the most recent year-over-year percentage change in the FHFA HPI. The next column is the annual HPI change from a year earlier. Recent price appreciation is an indicator of strength in the local housing market and is generally correlated with near-term future price changes.

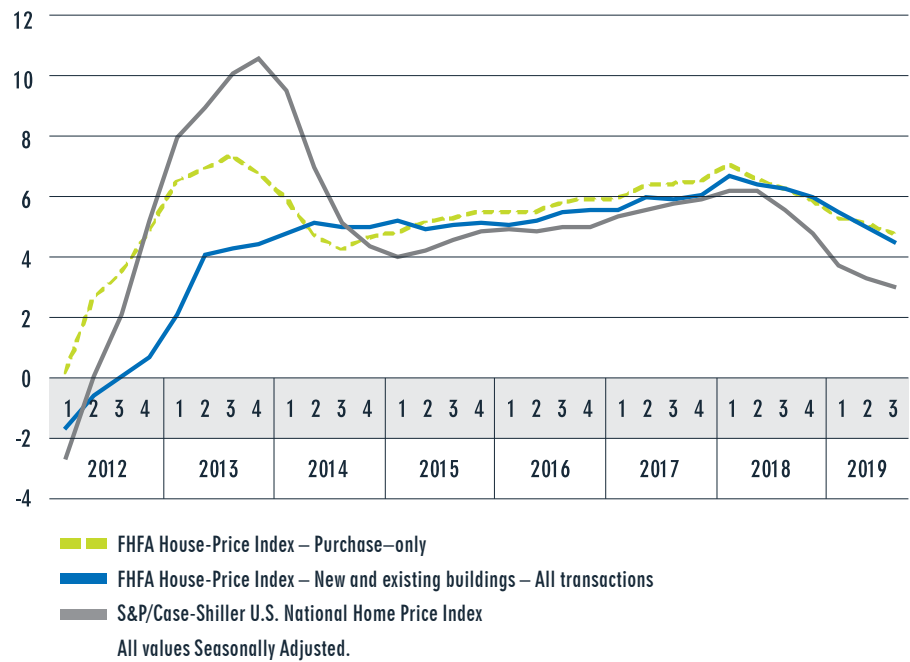
Unemployment Rates are seasonally adjusted statewide or MSA-wide unemployment rates released by the U.S. Bureau of Labor Statistics (BLS).

Gross State Product/Gross Metro Product is from Moody’s Analytics estimation, which is based on gross product data released by the U.S. Bureau of Economic Analysis.

Population is from Moody’s Analytics estimation, which is based on population data released by the U.S. Census Bureau.

Housing and Mortgage Market Indicators

YEAR-OVER-YEAR PERCENTAGE CHANGE IN HOME PRICES

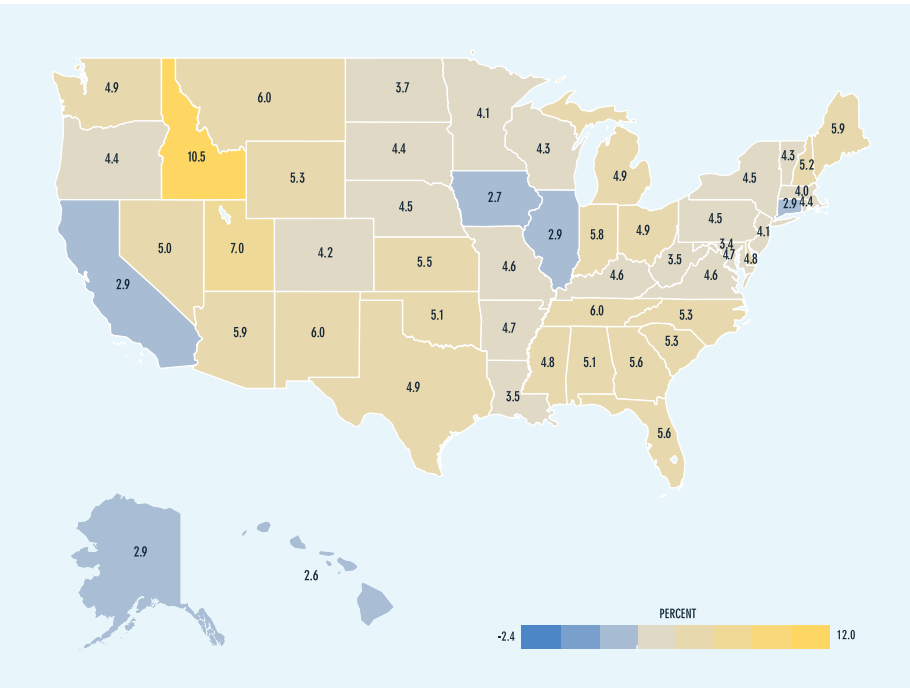


Home price growth decelerates towards a more sustainable rate.

Annual home price growth continued to decelerate in Q3, as expected based on the slowing trend over the past year. The year-over-year growth rate ranged between 3.0 and 5.0% in the major home price indices. The various measures of price growth are telling a consistent story that the market is cooling from what was an overheated situation in many areas, even though they differ in methodologies and data sources (i.e., the FHFA only uses GSE loans, while the Case-Shiller index includes jumbo loans). The Case-Shiller index slowed the most, consistent with homes-for-sale listing data indicating a sluggish market for more expensive homes.

Sources: CoreLogic Case-Shiller/FHFA/
Moody's Analytics/Arch MI

YEAR-OVER-YEAR PERCENTAGE CHANGE IN HOME PRICES



Home prices are up in all 50 states over the past year.

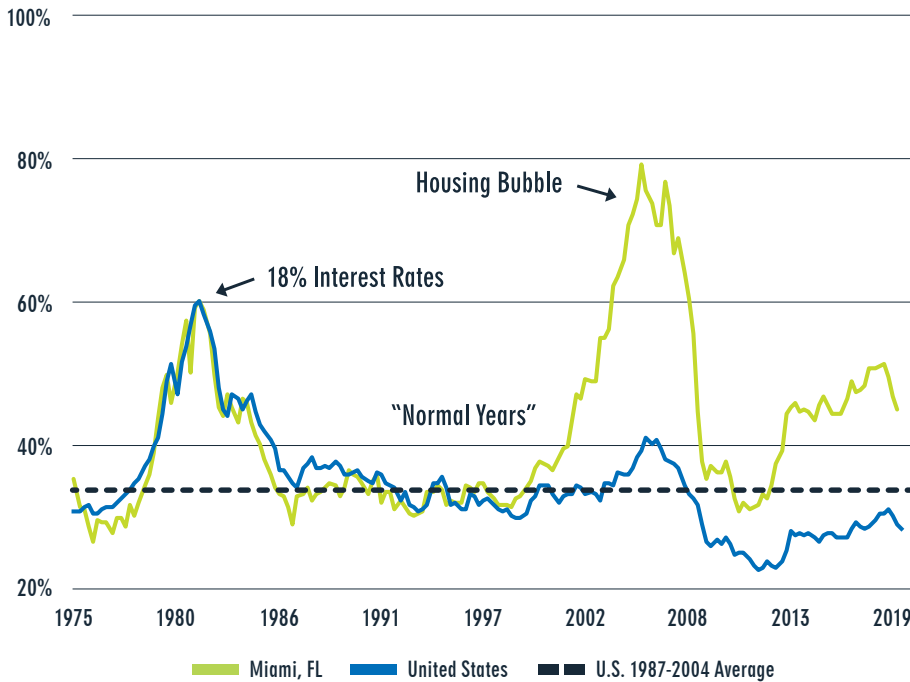
The fastest growth in home prices was in Idaho, Utah, Tennessee, New Mexico and Montana. The slowest growth was in Hawaii, Iowa, California, Alaska, Connecticut and Illinois. Metro-level data and quarter-over-quarter changes are available at archmi.com/hammr under the View HPI Charts and Maps link.

Sources: FHFA All-Transactions HPI/Moody's Analytics/Arch MI

SA stands for Seasonally Adjusted.

Housing and Mortgage Market Indicators

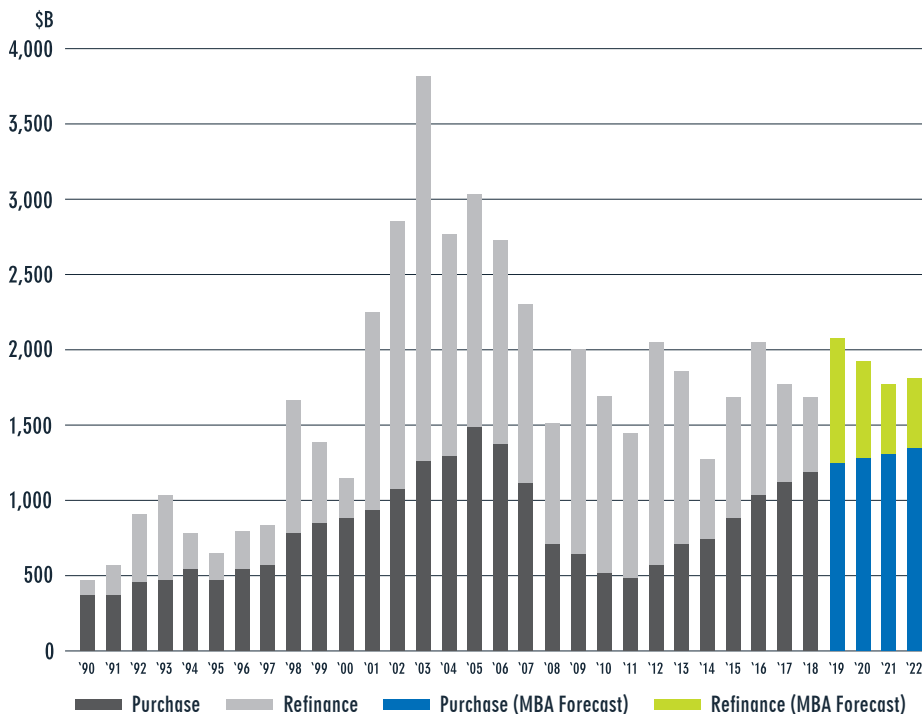
PERCENTAGE OF MEDIAN INCOME NEEDED FOR PAYMENTS ON A MEDIAN-PRICED HOME



Housing affordability improved, and remains better than historic norms nationally. Arch MI's affordability measure is the percentage of a median income needed to make monthly payments on a mortgage for a median-priced home. For the U.S., it is 29%, 5% lower than in 1987-2004. The Hypothetical Median Debt-to-Income (HMDTI) ratio in Miami, Florida, declined to a still high 45% and is well below its peak. See page 22 for a state-level map. Our mortgage payment calculations are based on pre-tax median household income, assuming a 10% down payment, 1.75% escrow for expenses (insurance, dues and property taxes) and the prevailing mortgage rate plus 0.75% for mortgage insurance and risk additions. This HMDTI ratio is an estimate of a front-end DTI ratio since it doesn't include non-mortgage debt payments.

Sources: U.S. Census Bureau/Freddie Mac/
National Association of REALTORS (NAR®)/
Arch MI

ORIGINATIONS IN MILLIONS OF \$



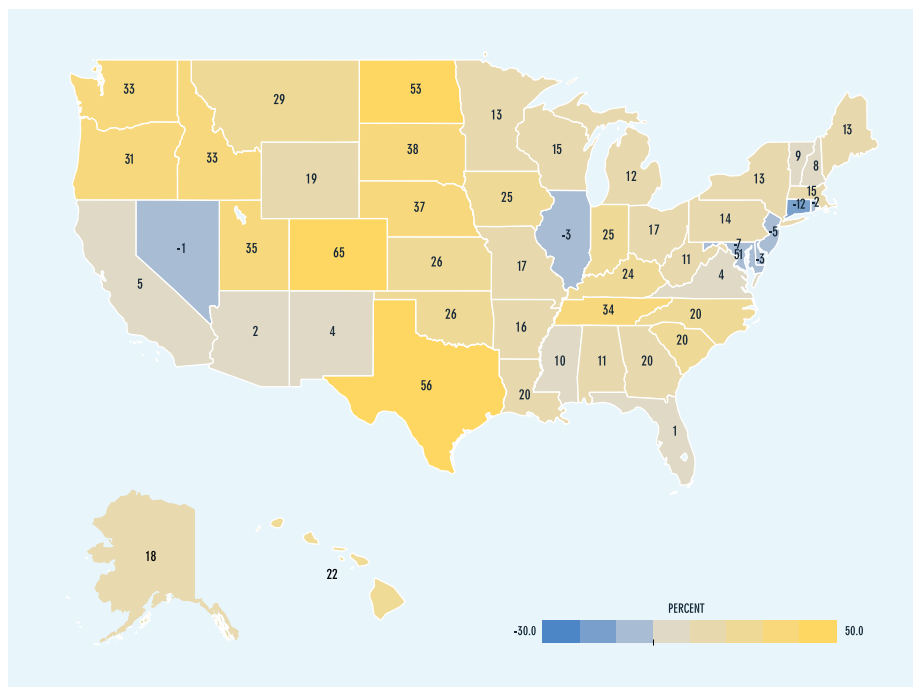
Future mortgage originations likely to tilt toward purchase loans.

The dollar volume of purchase mortgage originations is projected to continue its upward trend since the start of the housing recovery, increasing 3% this year. Refi volume could decline by 24% in 2020. However, for refis, the only things that can be said with certainty are that future mortgage rates will fluctuate and that no one really knows in which direction. If market expectations of global growth prospect improve, the 30-year fixed mortgage rate should rise, while expectations of economic slowing would likely result in lower rates.

Source: Mortgage Bankers Association (MBA)

Housing and Mortgage Market Indicators

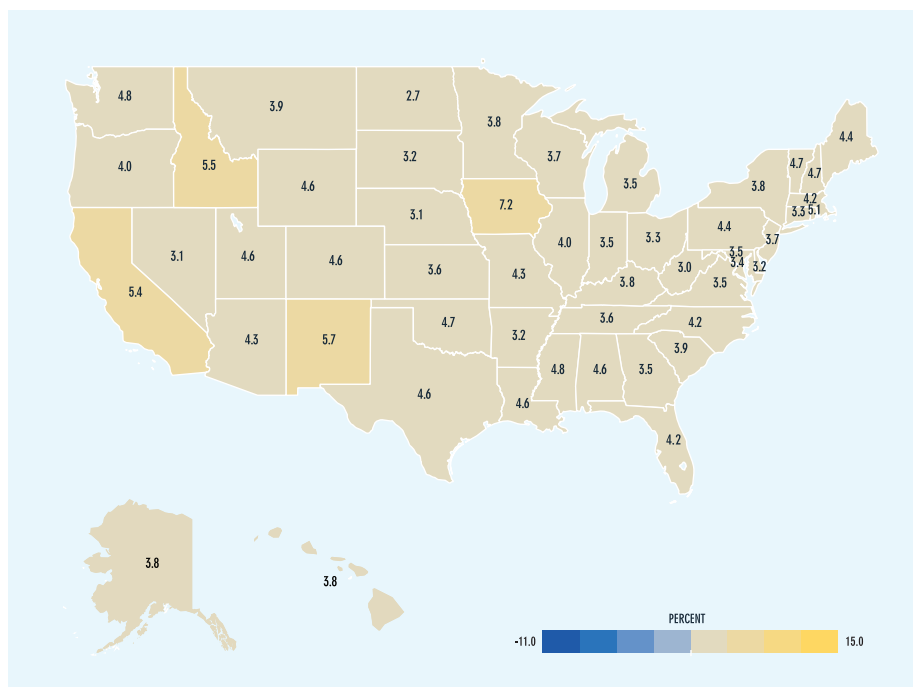
HOME PRICE PERCENTAGE CHANGE FROM PRIOR PEAK (2005-2008)



Home prices are still below the prior peak in eight states. House prices have increased rapidly since bottoming out in 2012 and have surpassed their prior peak levels nationally; however, growth has been uneven. The **largest cumulative home price growth since home prices peaked** around 2006 (we use the peak for each state, which varies by quarter) **is in Colorado, followed by Texas and North Dakota.** At the end of the third quarter of 2019, seven states had house prices lower than their prior peaks, with Connecticut and Maryland still lower by 12% and 7%, respectively. Values shown are in nominal (not inflation adjusted) terms. To adjust for inflation, simply subtract the 27% cumulative inflation in consumer prices since 2006. Adjusting for inflation, home prices are still below their pre-crisis peak in most areas.

Sources: FHFA/Moody's Analytics/Arch MI

ANNUAL PERCENTAGE CHANGE IN PER CAPITA INCOME

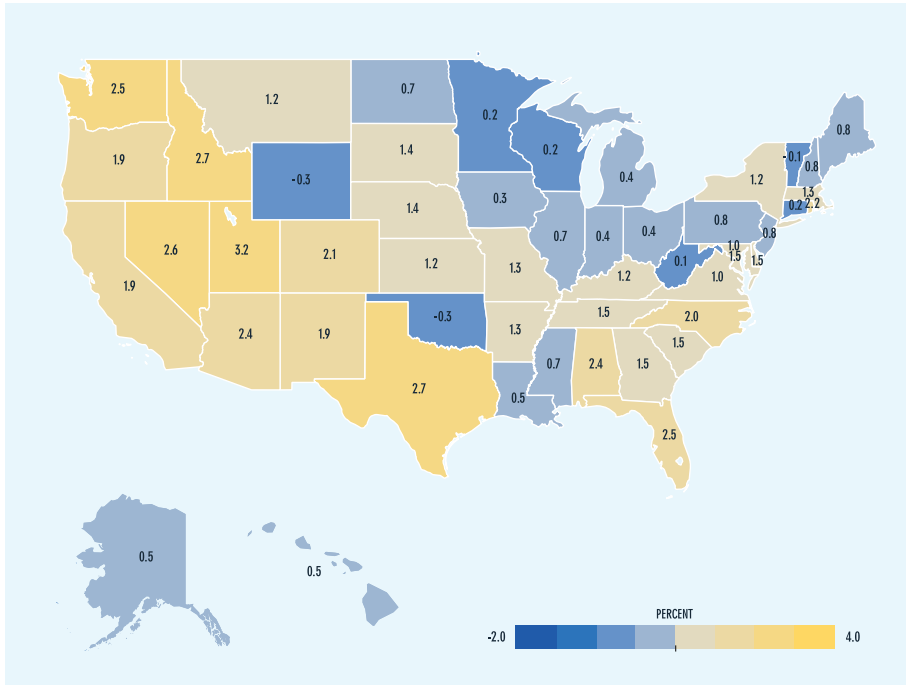


Income growth has picked up, but is uneven. Income growth is an important driver of housing demand. The year-over-year **change in per capita income was strongest in Iowa**, followed by New Mexico and Idaho. It was weakest in North Dakota and West Virginia.

Sources: U.S. Bureau of Economic Analysis/
U.S. Census Bureau/Moody's Analytics/Arch MI

Housing and Mortgage Market Indicators

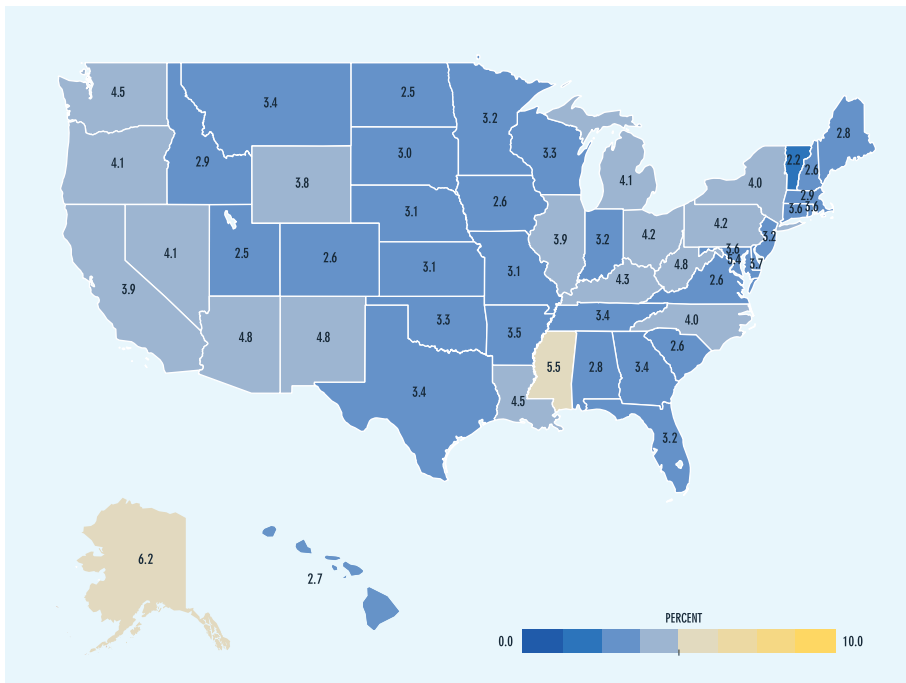
ANNUAL PERCENTAGE GROWTH IN TOTAL EMPLOYMENT



Job growth remains impressive across the nation. On a year-over-year base, **total employment grew** in all states except Wyoming, Oklahoma, and Vermont. **Utah had the fastest job growth**, followed by Texas and Idaho. For the U.S. the annual growth rate was 1.5%. In general, rural areas continue to lag urban areas.

Sources: U.S. Bureau of Labor Statistics (BLS)/Moody's Analytics/Arch MI

UNEMPLOYMENT RATES BY STATE

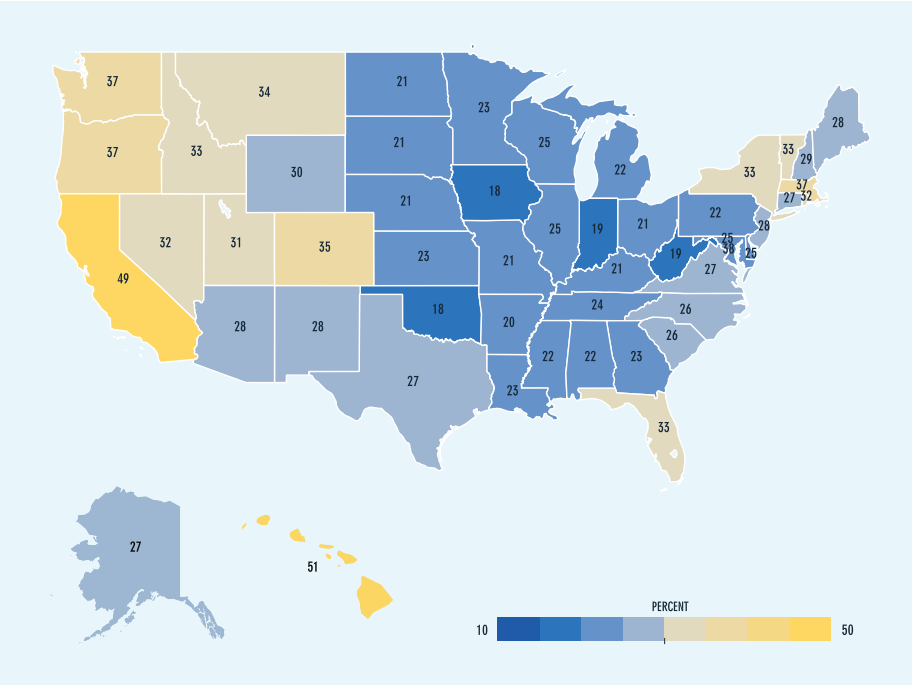


The unemployment rate is exceptionally low. The Great Plains region and New England have some of the tightest labor markets in the nation. Alaska lags the nation at the moment, in part, due to a shrinking energy sector.

Sources: U.S. Bureau of Labor Statistics/Moody's Analytics/Arch MI

Housing and Mortgage Market Indicators

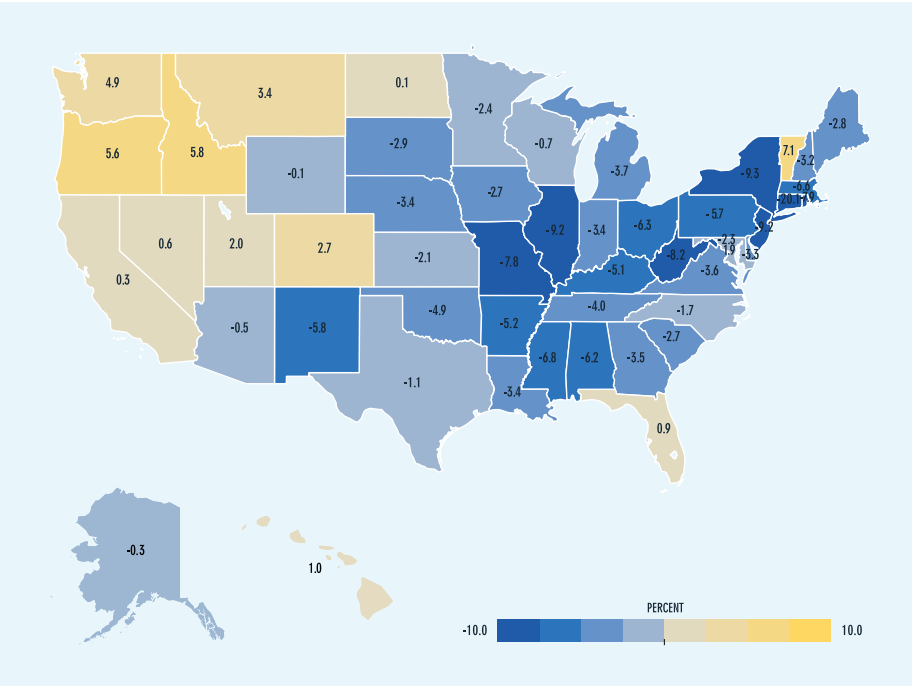
PERCENTAGE OF MEDIAN INCOME NEEDED FOR PAYMENTS ON A MEDIAN-PRICED HOME



Affordability is poor in the West, great in the Heartland. The percentage of median income needed to make monthly mortgage payments on a median-priced home varies widely. Please see the top of page 19 for calculation details. Hawaii required the highest percent of median income, followed by California. This hypothetical DTI ratio is the lowest in Oklahoma and Iowa.

Sources: U.S. Census Bureau/Freddie Mac/NAR/Moody's Analytics/Arch MI

DIFFERENCE IN PERCENTAGE OF MEDIAN INCOME NEEDED NOW VS. NORMAL YEARS

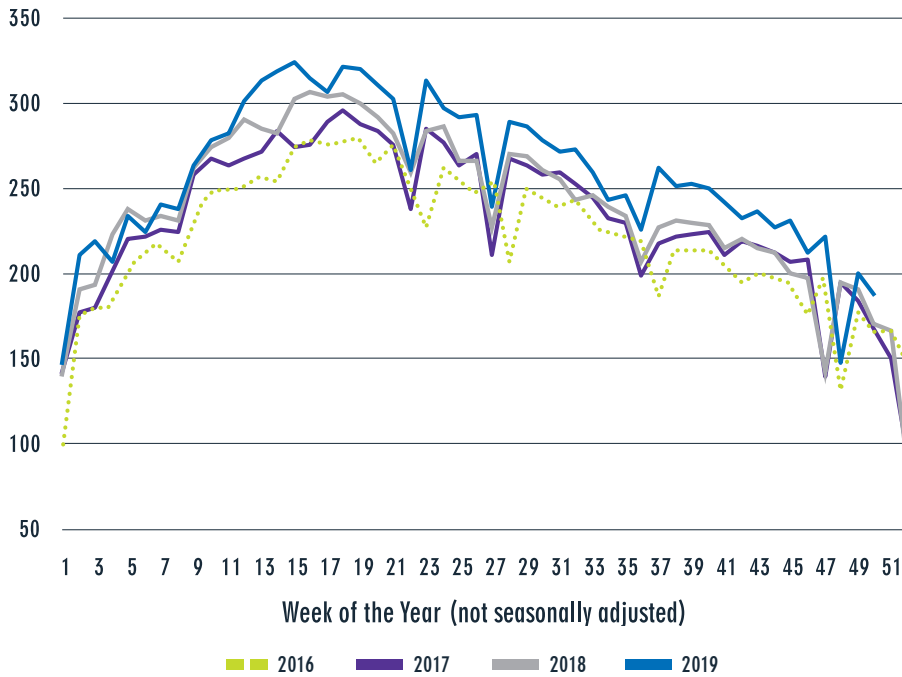


Affordability is far worse now than historic norms in Vermont and the West. This chart shows the percentage of median income needed for monthly mortgage payments on a median-priced home minus the average from more normal years of 1987–2004. Vermont is now the worst state compared to its 1987–2004 average affordability, followed by Idaho and Oregon. Affordability is better now than during 1987–2004 in 38 states, led by Connecticut, New York and Illinois.

Sources: U.S. Census Bureau/Freddie Mac/NAR/Moody's Analytics/Arch MI

Housing and Mortgage Market Indicators

MBA MORTGAGE PURCHASE APPLICATION INDEX



Purchase mortgage applications remain solid. The weekly MBA purchase mortgage applications index has generally been stronger than at the same time last year.

Purchase mortgage applications trend upwards into the spring buying season, before trending downwards later in the year. Purchase mortgage applications at the beginning of the year were 5% higher than during the same period in 2019.

Sources: MBA/Arch MI

U.S. RENTAL VACANCY RATE

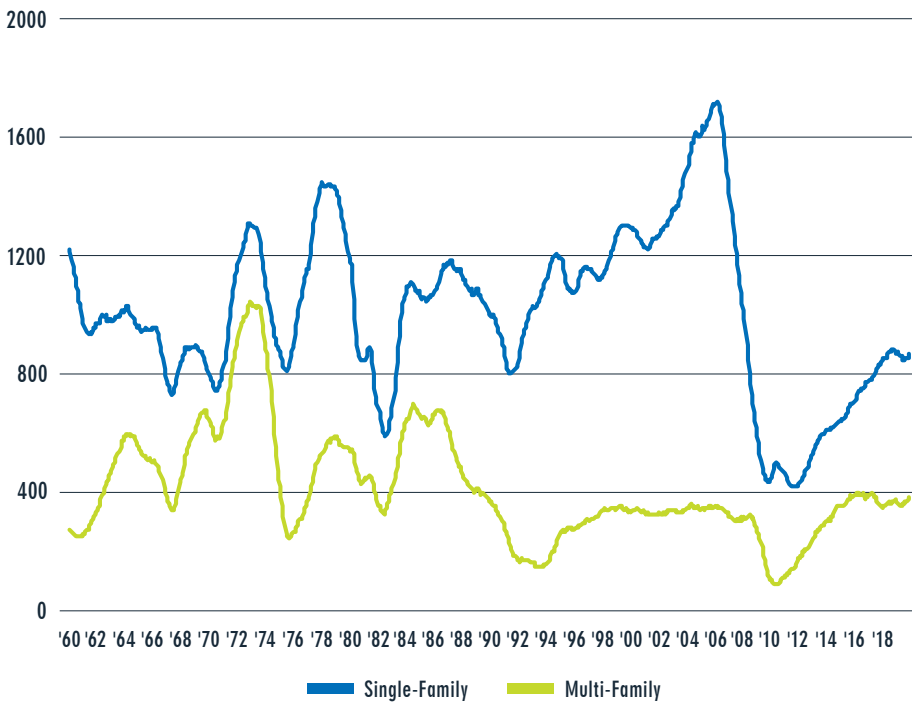


The U.S. rental vacancy rate has bounced around the lowest level in more than three decades, at 6.8% in the third quarter. Sustained low rental vacancy rates indicate a tight housing market.

Sources: U.S. Census Bureau/Moody's Analytics/Arch MI

Housing and Mortgage Market Indicators

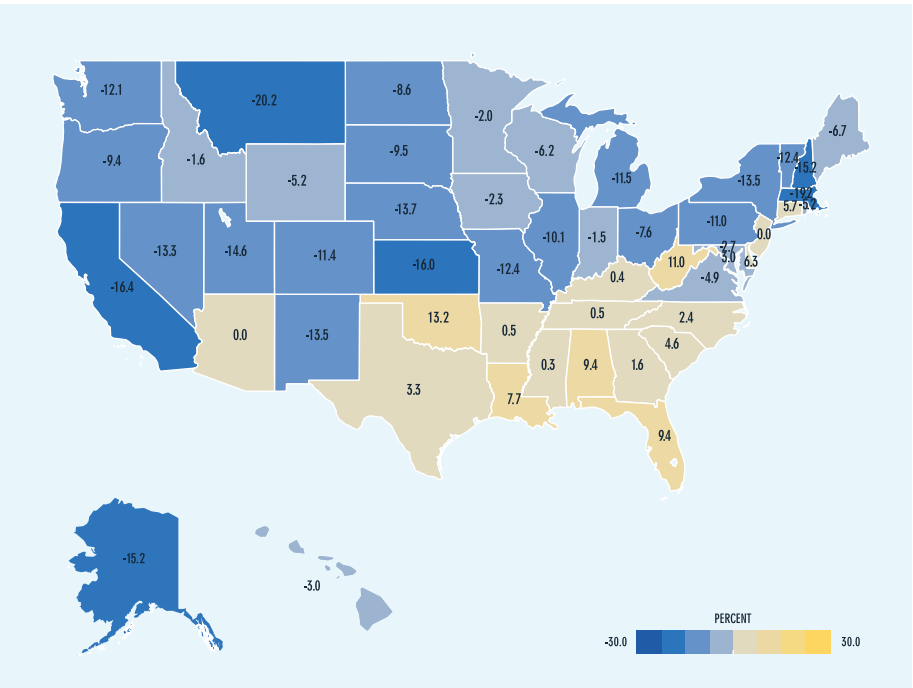
ANNUAL HOUSING STARTS, IN THOUSANDS



Housing starts weakened as mortgage rates increased in late 2018. Single-Family Housing Starts increased 17% nationally from a year ago to 938,000 units (seasonally adjusted annual rate) in November. Multi-family starts increased 2% from a year ago, at 384,000 units a year (after smoothing out highly volatile monthly data by taking a 12-month moving average).

Sources: U.S. Census Bureau/Moody's Analytics/Arch MI

ANNUAL PERCENTAGE CHANGE IN HOUSING STARTS

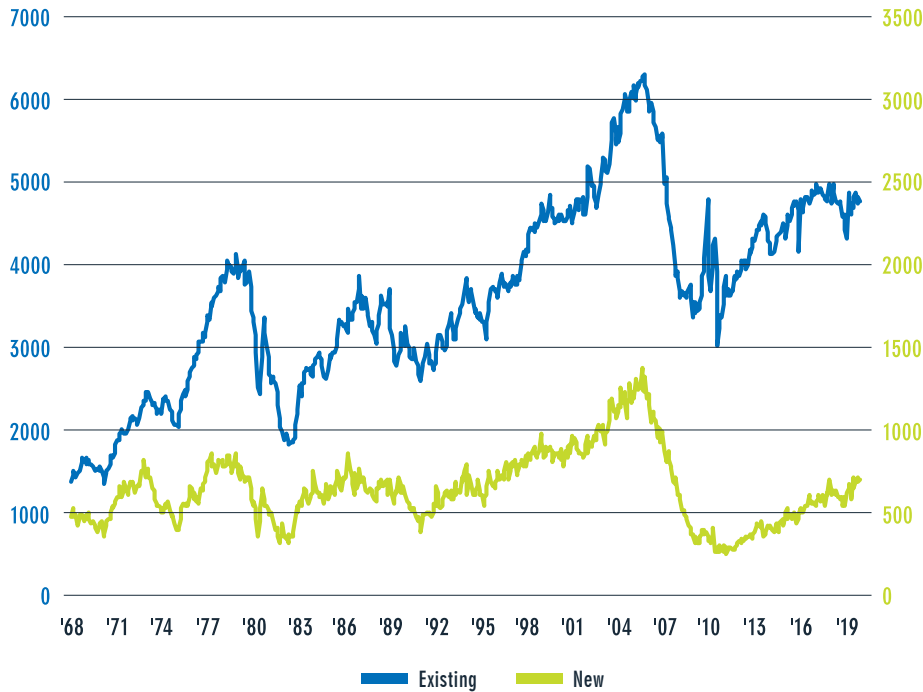


Housing starts appear strongest in the East and South. The growth in Single-Family Housing Starts (through October) is weakest in Montana, Massachusetts and California. **Housing starts increased the most in Oklahoma**, followed by West Virginia and Alabama. To get a clearer understanding of the trend, unlike numbers seen elsewhere, we smooth the data to dampen short-term volatility due to weather, survey limitations, etc., by showing the changes in the 12-month moving average.

Sources: U.S. Census Bureau/Moody's Analytics/Arch MI

Housing and Mortgage Market Indicators

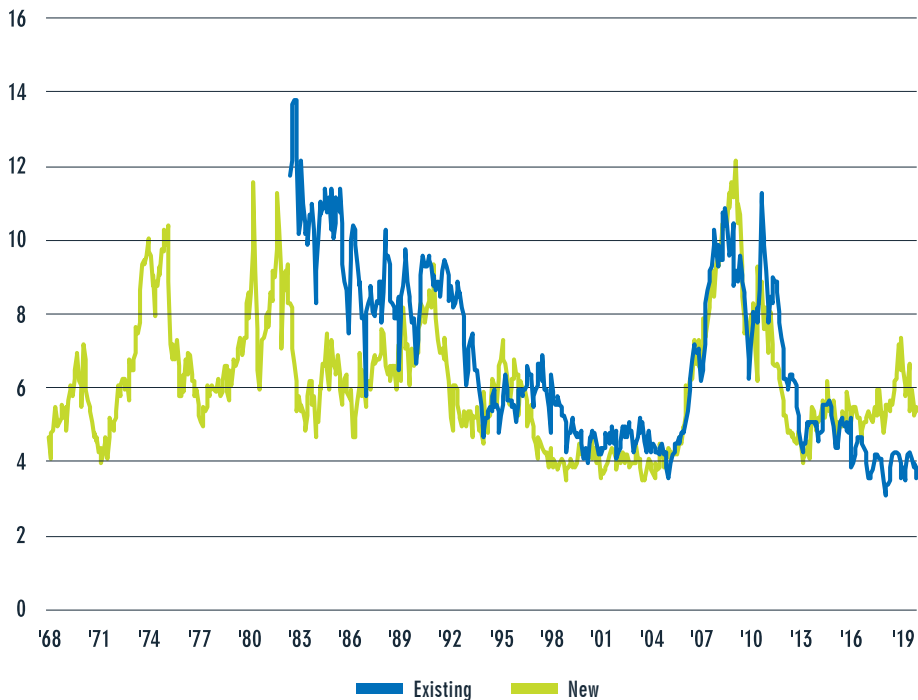
NEW- AND EXISTING-HOME SALES IN THOUSANDS



Both new and existing home sales are trending up. Sales of existing single-family homes were 4.8 million units (after annualizing the monthly number) in November; an increase of 3% compared to the same period last. Sales of newly constructed homes were 719,000 units (annualized rate), up 17% from a year ago.

Sources: NAR/U.S. Census Bureau/
Moody's Analytics/Arch MI

MONTHS' SUPPLY OF HOMES FOR SALE



Home inventory remains low. The months' supply of existing single-family homes for sale (total current listings ÷ last month's sales) was 3.6 months in November, compared to 4.0 months a year ago. The months' supply of new homes for sale, shown in green, ticked down to 5.4 months in November. This is much lower than its post-crisis high of 7.4 months reached in the end of 2018 and lower than its long-term average of 6.1 months.

Sources: NAR/Moody's Analytics/Arch MI

Arch MI Risk Index for the 100 Largest MSAs

100 LARGEST METROPOLITAN

Statistical Areas Sorted by Risk Ranking, then State, then MSA

	ST	RISK RANKING	ARCH MI RISK INDEX			% HOME-PRICE CHANGE	
			2019Q3	1-YR. CHANGE	LONG RUN AVG.	1-YR. 2019Q3	1-YR. 2018Q3
Phoenix-Mesa-Scottsdale, AZ	AZ	Moderate	27	20	22	5.6	9.7
Riverside-San Bernardino-Ontario, CA	CA	Moderate	30	25	38	3.3	8.2
Denver-Aurora-Lakewood, CO	CO	Moderate	34	18	21	3.5	9.7
Fort Lauderdale-Pompano Beach-Deerfield Beach, FL	FL	Moderate	26	18	31	5.3	7.4
Lakeland-Winter Haven, FL	FL	Moderate	35	28	24	6.0	8.9
Miami-Miami Beach-Kendall, FL	FL	Moderate	36	24	36	5.8	9.0
Tampa-St. Petersburg-Clearwater, FL	FL	Moderate	27	19	25	6.6	10.6
Boise City, ID	ID	Moderate	26	9	23	11.8	16.1
Portland-Vancouver-Hillsboro, OR-WA	OR	Moderate	27	10	32	3.5	5.7
Anaheim-Santa Ana-Irvine, CA	CA	Low	24	19	26	1.7	6.3
Bakersfield, CA	CA	Low	22	17	24	4.5	6.1
Fresno, CA	CA	Low	22	17	24	3.6	7.2
Los Angeles-Long Beach-Glendale, CA	CA	Low	24	19	29	2.8	8.4
Oakland-Hayward-Berkeley, CA	CA	Low	23	18	26	0.9	10.3
Oxnard-Thousand Oaks-Ventura, CA	CA	Low	22	17	27	2.7	5.5
Sacramento-Roseville-Arden-Arcade, CA	CA	Low	22	17	26	3.8	7.4
San Diego-Carlsbad, CA	CA	Low	19	14	27	2.8	6.6
San Francisco-Redwood City-South San Francisco, CA	CA	Low	23	15	21	-1.9	13.7
San Jose-Sunnyvale-Santa Clara, CA	CA	Low	22	14	29	-1.5	12.9
Stockton-Lodi, CA	CA	Low	22	17	26	3.0	9.6
Colorado Springs, CO	CO	Low	24	11	13	6.6	11.1
Bridgeport-Stamford-Norwalk, CT	CT	Low	14	-5	36	2.3	1.5
Hartford-West Hartford-East Hartford, CT	CT	Low	14	-5	15	2.3	1.2
New Haven-Milford, CT	CT	Low	14	-5	24	3.6	2.9
Cape Coral-Fort Myers, FL	FL	Low	17	9	20	3.3	6.1
Jacksonville, FL	FL	Low	17	15	23	4.4	10.2
North Port-Sarasota-Bradenton, FL	FL	Low	24	12	25	5.2	7.8
Orlando-Kissimmee-Sanford, FL	FL	Low	17	14	22	6.2	10.2
West Palm Beach-Boca Raton-Delray Beach, FL	FL	Low	22	9	25	4.7	7.6
Chicago-Naperville-Evanston, IL	IL	Low	11	9	30	2.9	3.8
Lake County-Kenosha County, IL-WI	IL	Low	11	9	22	3.1	4.1
Detroit-Dearborn-Livonia, MI	MI	Low	20	18	42	4.6	8.3
Las Vegas-Henderson-Paradise, NV	NV	Low	19	14	25	3.9	17.9
Austin-Round Rock, TX	TX	Low	17	0	13	6.5	6.8
Fort Worth-Arlington-Grapevine, TX	TX	Low	11	-5	8	5.1	8.8
Salt Lake City, UT	UT	Low	12	10	18	6.9	10.4
Seattle-Bellevue-Everett, WA	WA	Low	21	11	23	2.2	9.8
Tacoma-Lakewood, WA	WA	Low	21	13	26	7.4	12.1
Birmingham-Hoover, AL	AL	Minimal	<5	2	10	5.0	6.2
Little Rock-North Little Rock-Conway, AR	AR	Minimal	<5	2	6	4.5	-0.5
Tucson, AZ	AZ	Minimal	8	6	23	6.6	6.5
Washington-Arlington-Alexandria, DC-VA-MD-WV	DC	Minimal	<5	2	20	4.2	4.7
Wilmington, DE-MD-NJ	DE	Minimal	<5	-2	30	4.2	4.1
Atlanta-Sandy Springs-Roswell, GA	GA	Minimal	<5	2	18	5.3	10.2
Urban Honolulu, HI	HI	Minimal	10	8	25	2.6	4.3
Gary, IN	IN	Minimal	<5	2	13	6.5	6.5
Indianapolis-Carmel-Anderson, IN	IN	Minimal	<5	2	17	6.3	8.6
Louisville-Jefferson County, KY-IN	KY	Minimal	<5	2	14	4.7	5.7
Baton Rouge, LA	LA	Minimal	7	-3	12	2.6	2.2
New Orleans-Metairie, LA	LA	Minimal	7	-2	12	4.3	2.3

100 LARGEST METROPOLITAN

Statistical Areas Sorted by Risk Ranking,
then State, then MSA

	UNEMPLOYMENT RATE			GROSS METRO PRODUCT		POPULATION	
	LATEST	1-YR. CHANGE	LONG RUN AVG.	PER CAPITA 2019Q3	1-YR. % CHANGE	2019Q3 (THS.)	1-YR. % CHANGE
Phoenix-Mesa-Scottsdale, AZ	4.3	0.1	5.0	\$ 54,211	4.6	5,002	2.4
Riverside-San Bernardino-Ontario, CA	4.0	0.0	7.4	\$ 47,061	3.6	4,676	0.9
Denver-Aurora-Lakewood, CO	2.7	-0.6	4.7	\$ 75,322	4.5	2,962	0.8
Fort Lauderdale-Pompano Beach-Deerfield Beach, FL	3.1	-0.1	5.4	\$ 54,829	3.6	1,999	2.0
Lakeland-Winter Haven, FL	3.8	-0.2	6.5	\$ 37,247	3.9	725	1.8
Miami-Miami Beach-Kendall, FL	3.2	-0.4	5.8	\$ 55,717	3.6	2,829	2.1
Tampa-St. Petersburg-Clearwater, FL	3.2	-0.1	5.4	\$ 54,311	3.9	3,219	2.0
Boise City, ID	2.7	0.1	4.8	\$ 50,420	4.3	741	1.1
Portland-Vancouver-Hillsboro, OR-WA	3.8	0.0	6.0	\$ 68,409	3.6	2,515	1.2
Anaheim-Santa Ana-Irvine, CA	2.8	0.0	4.9	\$ 99,487	2.8	3,223	1.0
Bakersfield, CA	8.0	0.1	10.8	\$ 56,981	3.5	907	0.9
Fresno, CA	7.3	-0.1	11.7	\$ 59,606	4.3	1,006	0.9
Los Angeles-Long Beach-Glendale, CA	4.4	-0.2	7.3	\$ 81,639	3.0	10,225	1.0
Oakland-Hayward-Berkeley, CA	3.0	0.1	5.7	\$ 76,426	3.8	2,850	1.0
Oxnard-Thousand Oaks-Ventura, CA	3.6	0.0	6.3	\$ 62,940	3.1	861	1.0
Sacramento-Roseville-Arden-Arcade, CA	3.6	0.0	6.4	\$ 70,881	4.5	2,372	0.9
San Diego-Carlsbad, CA	3.2	0.0	5.6	\$ 82,698	3.4	3,382	1.0
San Francisco-Redwood City-South San Francisco, CA	2.1	0.0	4.7	\$ 160,435	4.2	1,672	1.0
San Jose-Sunnyvale-Santa Clara, CA	2.6	0.0	5.6	\$ 134,794	3.9	2,023	1.0
Stockton-Lodi, CA	6.1	0.2	10.0	\$ 48,535	3.8	761	0.9
Colorado Springs, CO	3.2	-0.9	5.3	\$ 52,753	5.7	746	0.7
Bridgeport-Stamford-Norwalk, CT	3.5	-0.3	4.9	\$ 84,619	3.4	945	0.1
Hartford-West Hartford-East Hartford, CT	3.6	-0.3	5.4	\$ 92,627	3.2	1,208	0.1
New Haven-Milford, CT	3.7	-0.5	5.8	\$ 70,429	3.5	859	0.1
Cape Coral-Fort Myers, FL	3.1	-0.1	5.5	\$ 41,796	5.2	773	1.9
Jacksonville, FL	3.2	0.0	5.2	\$ 54,317	3.6	1,572	1.9
North Port-Sarasota-Bradenton, FL	3.2	-0.1	5.2	\$ 42,537	3.1	841	1.9
Orlando-Kissimmee-Sanford, FL	3.1	-0.1	5.3	\$ 60,103	5.6	2,635	1.9
West Palm Beach-Boca Raton-Delray Beach, FL	3.3	-0.1	6.1	\$ 54,065	4.5	1,522	2.0
Chicago-Naperville-Evanston, IL	3.7	0.0	6.4	\$ 77,276	2.9	7,300	0.2
Lake County-Kenosha County, IL-WI	4.0	-0.4	5.4	\$ 72,581	4.2	872	0.2
Detroit-Dearborn-Livonia, MI	5.2	0.3	8.0	\$ 52,806	1.1	1,755	0.1
Las Vegas-Henderson-Paradise, NV	4.3	-0.4	6.5	\$ 56,155	5.3	2,297	2.3
Austin-Round Rock, TX	2.6	-0.3	4.2	\$ 71,287	6.1	2,206	1.3
Fort Worth-Arlington-Grapevine, TX	3.1	-0.3	4.9	\$ 60,861	6.5	2,577	1.4
Salt Lake City, UT	2.7	-0.3	4.1	\$ 76,477	3.7	1,244	1.4
Seattle-Bellevue-Everett, WA	3.1	-0.2	4.9	\$ 113,312	5.9	3,097	1.3
Tacoma-Lakewood, WA	5.5	0.4	6.8	\$ 52,909	4.8	906	1.3
Birmingham-Hoover, AL	2.9	-0.6	5.1	\$ 55,001	3.1	1,155	0.2
Little Rock-North Little Rock-Conway, AR	3.2	-0.1	4.7	\$ 51,545	2.2	746	0.5
Tucson, AZ	4.6	0.2	5.2	\$ 45,925	4.2	1,070	2.5
Washington-Arlington-Alexandria, DC-VA-MD-WV	3.2	0.0	4.2	\$ 86,627	3.1	4,979	0.6
Wilmington, DE-MD-NJ	3.5	-0.3	5.1	\$ 87,966	1.4	731	0.6
Atlanta-Sandy Springs-Roswell, GA	3.4	-0.2	5.5	\$ 65,561	2.8	6,029	1.0
Urban Honolulu, HI	2.6	0.2	4.1	\$ 73,548	3.0	984	0.4
Gary, IN	4.4	-0.2	6.1	\$ 46,963	0.8	704	0.3
Indianapolis-Carmel-Anderson, IN	3.1	-0.2	4.8	\$ 64,428	1.4	2,055	0.2
Louisville-Jefferson County, KY-IN	3.8	-0.2	5.5	\$ 57,822	0.9	1,301	0.2
Baton Rouge, LA	4.0	-0.5	5.6	\$ 69,032	3.4	832	0.1
New Orleans-Metairie, LA	3.9	-0.8	6.0	\$ 63,101	2.9	1,272	0.1

Arch MI Risk Index for the 100 Largest MSAs

100 LARGEST METROPOLITAN

Statistical Areas Sorted by Risk Ranking, then State, then MSA

	ST	RISK RANKING	ARCH MI RISK INDEX			% HOME-PRICE CHANGE	
			2019Q3	1-YR. CHANGE	LONG RUN AVG.	1-YR. 2019Q3	1-YR. 2018Q3
Boston, MA	MA	Minimal	<5	1	30	4.1	5.8
Cambridge-Newton-Framingham, MA	MA	Minimal	<5	2	23	3.9	6.6
Worcester, MA-CT	MA	Minimal	<5	2	20	4.0	6.4
Baltimore-Columbia-Towson, MD	MD	Minimal	7	0	23	3.8	2.8
Frederick-Gaithersburg-Rockville, MD	MD	Minimal	8	1	32	2.5	3.1
Grand Rapids-Kentwood, MI	MI	Minimal	<5	2	17	7.0	7.8
Warren-Troy-Farmington Hills, MI	MI	Minimal	<5	2	24	4.2	7.7
Minneapolis-St. Paul-Bloomington, MN-WI	MN	Minimal	<5	2	24	4.1	7.3
Kansas City, MO-KS	MO	Minimal	<5	1	17	5.5	7.9
St. Louis, MO-IL	MO	Minimal	<5	-1	11	3.9	4.9
Charlotte-Concord-Gastonia, NC-SC	NC	Minimal	<5	1	11	5.7	8.0
Greensboro-High Point, NC	NC	Minimal	<5	2	13	4.9	4.4
Raleigh, NC	NC	Minimal	<5	2	8	5.2	6.7
Winston-Salem, NC	NC	Minimal	<5	2	15	4.4	6.8
Omaha-Council Bluffs, NE-IA	NE	Minimal	<5	2	4	5.0	7.4
Camden, NJ	NJ	Minimal	10	0	26	4.0	2.7
Newark, NJ-PA	NJ	Minimal	10	0	32	3.7	3.5
Albuquerque, NM	NM	Minimal	<5	-3	17	5.2	3.6
Albany-Schenectady-Troy, NY	NY	Minimal	7	2	22	3.2	3.0
Buffalo-Cheektowaga-Niagara Falls, NY	NY	Minimal	7	2	10	5.8	7.5
Nassau County-Suffolk County, NY	NY	Minimal	7	2	31	5.1	6.7
New York-Jersey City-White Plains, NY-NJ	NY	Minimal	7	2	29	3.7	5.5
Rochester, NY	NY	Minimal	7	2	10	3.4	6.1
Akron, OH	OH	Minimal	<5	2	18	3.1	7.0
Cincinnati, OH-KY-IN	OH	Minimal	<5	2	12	5.4	6.2
Cleveland-Elyria, OH	OH	Minimal	<5	2	23	4.7	5.9
Columbus, OH	OH	Minimal	<5	2	11	5.7	7.4
Dayton-Kettering, OH	OH	Minimal	<5	2	24	5.2	7.6
Oklahoma City, OK	OK	Minimal	9	-3	6	5.9	2.6
Tulsa, OK	OK	Minimal	9	-3	8	5.0	5.3
Allentown-Bethlehem-Easton, PA-NJ	PA	Minimal	<5	2	17	3.9	5.4
Montgomery County-Bucks County-Chester County, PA	PA	Minimal	<5	2	26	3.6	4.5
Philadelphia, PA	PA	Minimal	<5	2	22	5.5	6.9
Pittsburgh, PA	PA	Minimal	<5	2	5	4.7	6.6
Providence-Warwick, RI-MA	RI	Minimal	<5	2	30	4.5	6.3
Charleston-North Charleston, SC	SC	Minimal	<5	-1	23	6.0	5.5
Columbia, SC	SC	Minimal	<5	2	13	5.7	4.2
Greenville-Anderson-Mauldin, SC	SC	Minimal	<5	2	12	5.3	9.2
Knoxville, TN	TN	Minimal	<5	2	13	6.6	7.0
Memphis, TN-MS-AR	TN	Minimal	<5	2	14	6.4	5.8
Nashville-Davidson--Murfreesboro--Franklin, TN	TN	Minimal	<5	-3	10	5.5	9.3
Dallas-Plano-Irving, TX	TX	Minimal	9	-7	8	3.8	7.2
El Paso, TX	TX	Minimal	<5	-14	19	4.0	3.1
Houston-The Woodlands-Sugar Land, TX	TX	Minimal	<5	-16	6	3.8	7.2
McAllen-Edinburg-Mission, TX	TX	Minimal	<5	-14	9	7.1	1.5
San Antonio-New Braunfels, TX	TX	Minimal	<5	-15	13	6.9	5.7
Ogden-Clearfield, UT	UT	Minimal	<5	1	11	7.6	11.2
Richmond, VA	VA	Minimal	<5	2	20	4.7	6.3
Virginia Beach-Norfolk-Newport News, VA-NC	VA	Minimal	<5	2	24	4.6	2.4
Milwaukee-Waukesha-West Allis, WI	WI	Minimal	<5	2	20	3.9	6.7

100 LARGEST METROPOLITAN

Statistical Areas Sorted by Risk Ranking,
then State, then MSA

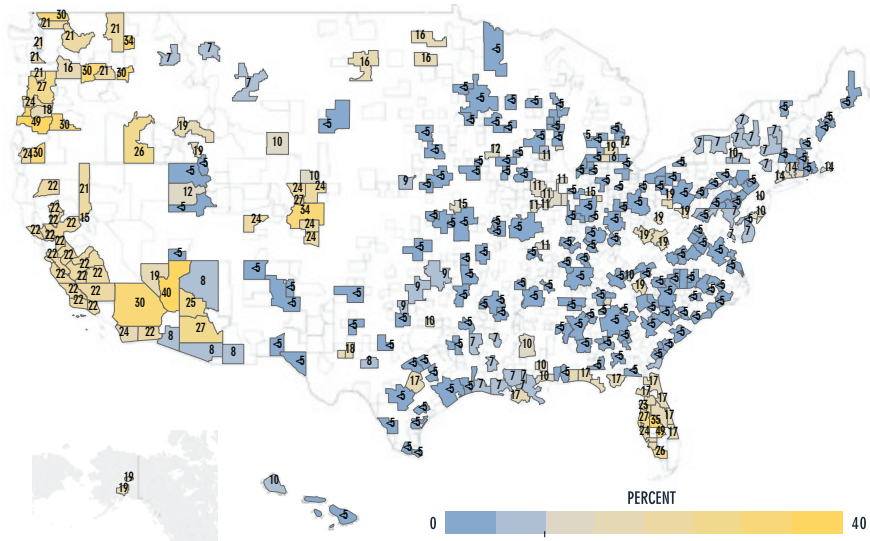
	UNEMPLOYMENT RATE			GROSS METRO PRODUCT		POPULATION	
	LATEST	1-YR. CHANGE	LONG RUN AVG.	PER CAPITA 2019Q3	1-YR. % CHANGE	2019Q3 (THS.)	1-YR. % CHANGE
Boston, MA	2.7	-0.4	4.8	\$ 111,672	3.5	2,036	0.2
Cambridge-Newton-Framingham, MA	2.5	-0.4	4.5	\$ 89,927	3.7	2,411	0.2
Worcester, MA-CT	3.2	-0.4	5.4	\$ 58,926	3.0	950	0.2
Baltimore-Columbia-Towson, MD	3.8	-0.1	5.2	\$ 75,121	3.3	2,832	0.9
Frederick-Gaithersburg-Rockville, MD	3.1	0.0	3.6	\$ 82,904	3.0	1,322	0.8
Grand Rapids-Kentwood, MI	3.0	0.2	5.4	\$ 61,477	2.0	1,070	0.0
Warren-Troy-Farmington Hills, MI	4.1	0.6	6.1	\$ 64,432	1.3	2,575	0.0
Minneapolis-St. Paul-Bloomington, MN-WI	3.0	0.5	4.0	\$ 73,435	2.5	3,660	0.7
Kansas City, MO-KS	3.2	0.0	5.2	\$ 62,120	3.3	2,151	0.2
St. Louis, MO-IL	3.2	-0.1	5.5	\$ 60,446	3.2	2,815	0.3
Charlotte-Concord-Gastonia, NC-SC	3.8	0.3	5.8	\$ 62,024	2.4	2,607	1.1
Greensboro-High Point, NC	4.4	0.5	5.9	\$ 59,008	2.6	780	1.3
Raleigh, NC	3.6	0.4	4.5	\$ 60,979	2.5	1,384	1.2
Winston-Salem, NC	3.9	0.3	5.5	\$ 44,822	3.1	682	1.3
Omaha-Council Bluffs, NE-IA	3.0	0.2	3.6	\$ 65,608	2.2	942	-0.1
Camden, NJ	3.3	-0.8	5.8	\$ 60,158	2.6	1,249	0.4
Newark, NJ-PA	3.3	-0.8	5.6	\$ 80,675	2.7	2,515	0.3
Albuquerque, NM	4.6	0.0	5.3	\$ 51,880	6.4	919	0.3
Albany-Schenectady-Troy, NY	3.7	0.1	4.7	\$ 84,042	4.3	882	-0.1
Buffalo-Cheektowaga-Niagara Falls, NY	4.3	0.1	5.8	\$ 81,562	2.9	1,129	-0.1
Nassau County-Suffolk County, NY	3.6	0.1	4.7	\$ 74,534	3.1	2,837	-0.1
New York-Jersey City-White Plains, NY-NJ	3.6	-0.2	6.4	\$ 95,496	3.6	14,253	0.1
Rochester, NY	4.1	0.1	5.2	\$ 76,211	3.5	1,070	-0.1
Akron, OH	4.3	-0.4	5.9	\$ 59,211	2.7	704	-0.1
Cincinnati, OH-KY-IN	3.6	-0.3	5.4	\$ 64,504	4.0	2,190	-0.1
Cleveland-Elyria, OH	4.3	-0.7	5.2	\$ 66,798	2.6	2,055	-0.1
Columbus, OH	3.5	-0.4	5.0	\$ 67,790	3.9	2,104	-0.2
Dayton-Kettering, OH	4.0	-0.4	6.0	\$ 58,253	2.8	806	-0.1
Oklahoma City, OK	2.9	0.0	4.0	\$ 59,860	6.2	1,402	0.3
Tulsa, OK	3.2	0.0	4.5	\$ 57,402	5.0	998	0.3
Allentown-Bethlehem-Easton, PA-NJ	3.9	-0.5	5.7	\$ 56,967	4.9	843	0.0
Montgomery County-Bucks County-Chester County, PA	3.2	-0.3	4.4	\$ 82,130	4.1	1,979	0.0
Philadelphia, PA	4.7	-0.4	6.7	\$ 62,913	4.2	2,149	0.0
Pittsburgh, PA	3.9	-0.2	5.5	\$ 74,051	4.2	2,325	0.0
Providence-Warwick, RI-MA	3.7	-0.4	6.4	\$ 57,659	2.7	1,625	0.1
Charleston-North Charleston, SC	2.8	0.1	5.2	\$ 54,102	4.0	794	0.6
Columbia, SC	3.1	0.0	5.3	\$ 56,053	2.8	840	0.6
Greenville-Anderson-Mauldin, SC	2.9	0.0	5.4	\$ 50,849	3.2	914	0.6
Knoxville, TN	3.3	0.1	5.0	\$ 52,853	2.5	892	0.8
Memphis, TN-MS-AR	4.2	0.1	5.9	\$ 57,901	3.0	1,361	0.7
Nashville-Davidson--Murfreesboro--Franklin, TN	2.7	0.0	4.6	\$ 68,145	3.9	1,949	0.7
Dallas-Plano-Irving, TX	3.1	-0.4	5.0	\$ 81,269	6.6	5,095	1.4
El Paso, TX	3.8	-0.4	7.6	\$ 46,228	4.5	861	1.5
Houston-The Woodlands-Sugar Land, TX	3.6	-0.5	5.5	\$ 73,864	6.0	7,121	1.4
McAllen-Edinburg-Mission, TX	6.2	-0.2	10.8	\$ 33,041	6.1	881	1.5
San Antonio-New Braunfels, TX	3.0	-0.3	4.8	\$ 56,611	6.0	2,562	1.4
Ogden-Clearfield, UT	2.8	-0.4	4.4	\$ 45,711	5.0	687	1.4
Richmond, VA	2.9	-0.1	4.3	\$ 67,463	2.7	1,322	0.9
Virginia Beach-Norfolk-Newport News, VA-NC	3.0	-0.1	4.6	\$ 62,500	2.3	1,750	1.0
Milwaukee-Waukesha-West Allis, WI	3.3	0.1	5.1	\$ 65,924	3.0	1,582	0.3

Check Home Price Trends in Your Area with Arch MI's Interactive Data Charts

Arch MI's exclusive interactive maps and charts of home prices are now available at archmi.com/hammr. Simply click the HPI Charts and Maps link, or bookmark it for quick reference.

Risk Index Values by Metro

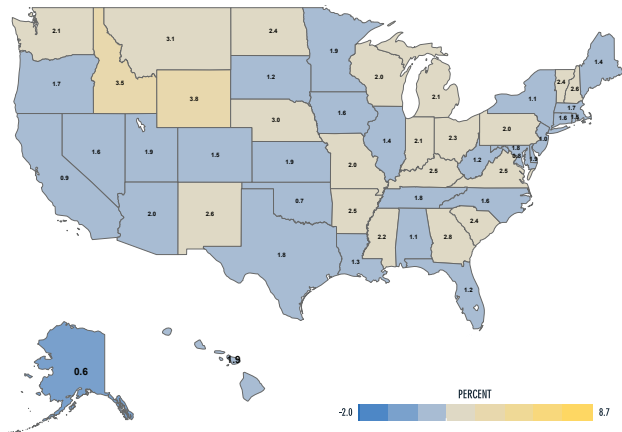
On our website, the map to the right is interactive. As you move over an area, a pop-up box appears with the metro's name and the latest Risk Index Value (the probability of home prices being lower in two years, times 100).



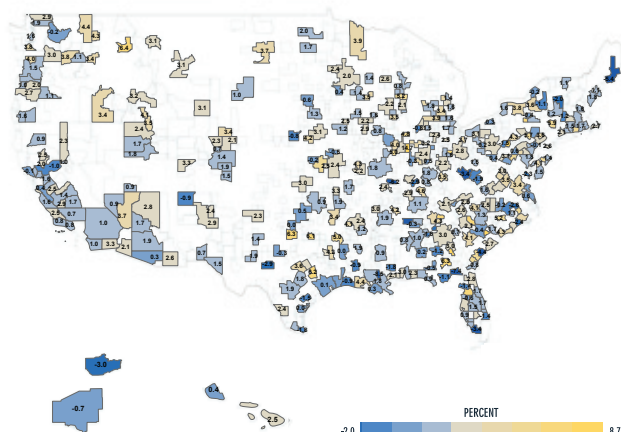
Keep up-to-date on your own region with our interactive maps that show:

- Recent home price growth.
- The probability of home price declines (Arch MI Risk Index).
- Home price changes since the pre-crisis peak.
- Growth in population, a major driver of housing demand.

HOME PRICE QUARTER-OVER-QUARTER CHANGE



HOME PRICE QUARTER-OVER-QUARTER CHANGE



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