

Housing and Mortgage Market Review

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All about Recessions: Is Housing at Risk?

Concern about the next recession has picked up in recent months. According to *The Wall Street Journal*, a survey of economists puts the odds of a recession over the next year at 25 percent.¹

It's not that this time is different, it's that last time was really different...

The risk has been increasing. Global growth has slowed, Q1 2019 looks to be unusually weak and the current economic expansion will soon be the longest in U.S. history. Furthermore, the economic booster rocket launched by tax cuts and increased federal spending is expected to dissipate soon.

While the timing of the start of the next recession is not something that can be known absolutely, a recession is inevitable at some point. So it is worth reviewing what happened to the housing market during previous recessions to develop some insights as to what might happen during the next one.

What we found is that the next recession is likely to be far less severe on the housing market than the last one. It's not that this time is different, it's that last time was really different from historic norms. At the start of the last recession, housing was overbuilt, a buyer mania had emerged in many cities and we were awash in high-risk loan products, such as Option ARMS and no-doc loans. Conditions are nearly the exact opposite now: The U.S. is underbuilt, buyers are more cautious and loan quality is higher.² Last, but not least, home prices in 2006 were highly overvalued nationally (perhaps by 25-35 percent), as compared to being modestly overvalued (our estimate is 5-10 percent) now.

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All about Recessions: Is Housing at Risk? (continued from page 1)

Analyzing national home sales and prices during past recessions, we come to the following conclusions:

- Major home price declines are the exception, not the rule.
 - Since home price data began being collected in 1975, home prices have only turned negative in one of the past five recessions.
 - Going further back, national home prices only experienced meaningful declines at the start of World War II and during the Great Depression.
- A large decline in national home prices is unlikely in the next recession.
 - A persistent housing shortage should help cushion home price declines. A reasonable guess is for mild national home prices declines of 0–5 percent for a year of two before starting to recover.
- Areas most at risk of price declines are the extremes in both directions: metros with the hottest markets in recent years, some of which have gotten ahead of themselves,³ and regions that already have weak housing markets.
- Statistically speaking, the next recession is likely to be milder than the last one.
 - The U.S. has experienced 11 recessions in the past 80 years, with two particularly bad ones: the Great Depression and the most recent one, dubbed the Great Recession.
 - A 2 percent decline in Gross Domestic Product (GDP) is typical, only half as bad as during the most recent recession.
 - Recessions typically last from eight to 18 months, with housing normally bouncing back quickly as interest rates come down.



A forecast of muted price declines seems surprising at first. Perhaps perceptions of risk are distorted because the trauma of the most recent recession is

so easy to remember. Distortions in thinking based on events of the recent past are so common, psychologists even have a name for it: the **Recency Effect**. Inflation also makes it hard to compare prices over time, leading to a common misperception that we are in another housing bubble. For example, if you thought a home was worth \$250,000 in the year 2000 and it is listed now for \$367,000 – is it really overpriced? Since cumulative inflation has been about 47 percent since then, both prices are actually the same in inflation-adjusted dollars.

Risk factors in the housing market are nearly the complete opposite of what they were in 2007.

Before we lay out our reasons for cautious optimism in more detail, we'll take a step back and ask, **Just what** is a recession, anyway?

An old joke has it that a recession is when your neighbor loses their job, but a depression is when you lose your job. Kidding aside, recessions are a significant decline in economic activity spread across the economy, lasting more than a few months (informally defined as at least two quarters of negative GDP growth). A depression is an unusually severe and long recession, but there is no standard definition.

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¹ Economic Forecasting Survey, March 2019.

² For example, all new conventional loans meet Dodd-Frank's Ability-to-Repay requirements. Mortgage loan quality remains better than in the early 2000s, even with the recent trend toward higher debt-to-income (DTIs) and Loan-to-Value ratios (LTVs). For more details, see the Urban Institute's Housing Credit Availability Index for an estimate of mortgage and borrower risk over time.

³ The middle of the country looks undervalued relative to fundamentals like income, while much of the western U.S. looks overvalued by 5–30 percent. We estimate overvaluation using a model of expected home prices given historical norms, incomes, population growth, etc. To see over-/undervaluation estimates for all 50 states, see my article in the October 2018 MReport, "Location, Location, Location." Also, Fitch Ratings shares their estimates at https://www.fitchratings.com/site/structuredfinance/rmbs/us-home-prices.

All about Recessions: Is Housing at Risk? (continued from page 3)

Home Price Growth Slows in Recessions, but Crashes Are the Exception

Figure 1 shows the year-over-year changes in U.S. home prices, both in actual terms (solid line) and a hypothetical home price growth series (dotted) adjusted to account for today's lower inflation rate as compared to the rate during the early part of the series (technically, we lowered past home price growth by the difference between actual inflation and today's level of 2 percent).



Figure 1: Annual National Home Price Changes during the Past Five Recessions

Nationally, home prices only fell during the most recent recession, based on data going back 43 years.

Actual (also called nominal or unadjusted) home prices are what matter to borrowers, because people think in terms of nominal (not inflation-adjusted) dollars and because mortgages are in nominal dollars. The adjusted series is only shown because inflation was higher in the first half of the series, perhaps resulting in faster home price growth than would have been the case if, instead, they had had today's inflation rate of around 2 percent a year. With this adjustment, you can see that the price growth would have been negative in the first three recessions.

Even after accounting for differences in inflation rates, and assuming all else was equal, **history suggests national home prices would be flat to down 5 percent** for a year or two before starting to recover. Also supporting this theory is that the housing market is now standing on a far more solid foundation than last time.

It's Not That This Time Is Different

Most recessions are written with a "little r," not a "capital R" like the last one. The last recession was particularly terrible for two reasons. First, there was housing mania, partially fueled by inexhaustible demand for securitized loans of any quality, which pushed up home prices, which in turn led to overbuilding. Second, there was a total meltdown of nearly all financial markets as investors became unsure of the soundness of financial institutions that they interacted with.

Is the housing bubble back? Risk factors in the housing market are nearly the complete opposite of what they were in 2007, as shown in the following table:

HOUSING MARKET IN 2007	HOUSING MARKET IN 2019
Overbuilt	Underbuilt by a million or more homes
Poor loan quality	High loan quality
Buyer irrational exuberance	Cautious buyers
Highly overvalued, overall	Slightly overvalued, overall
Loosely regulated	Tightly regulated

The next recession shouldn't be as bad as feared for housing, since the housing shortage is not going away anytime soon.

My own estimate of the size of the national housing shortage is between 1 and 2 million units. This is based on (a) lower than normal vacancy rates and (b) less net new supply compared to net new demand over the past decade.

Other economists also see a housing shortage. The National Association of Home Builders' Chief Economist, Robert Dietz, estimates the shortfall is around 800,000 units, split 50/50 between single and multifamily. Freddie Mac's economists put the housing shortfall somewhere between 0.9 million and 4 million units, depending on the assumptions used.



All about Recessions: Is Housing at Risk? (continued from page 5)

And the housing shortage is only getting worse. Roughly 1.3 million new units a year are being built now, while trend demand is higher, probably somewhere between 1.4 and 1.7 million new units a year.⁴ One way to see we are underbuilding is by looking at residential fixed investment (new construction and remodeling) as a percentage of GDP (shown in Figure 2). The most recent data is only 3.9 percent of GDP compared to a historical average of 4.6 percent. Looking back over time, we see that the level of residential construction now is similar to levels only seen in past recessions and is only 60 percent of its 2005 peak of 6.5 percent.



Figure 2: Residential Fixed Investment Remains Well below Normal



While the risk of a Wall Street-driven recession is still with us, it is probably lower than it was pre-crisis. This is important, since recessions triggered by problems in the financial sector have been shown to be deeper, longer and more difficult to recover from. Fortunately, the U.S. banking system is on a sounder footing: Banks have record amounts of capital to draw on in a crisis, Wall Street firms have converted to bank holding companies (which have access to more stable funding) and regulatory oversight is far stricter.

What Will the Next Recession Look Like?

A reasonable starting point for thinking about the next recession is to assume it would be similar to the average of the 11 recessions that have occurred since data collection started after World War II. Specifically:

- The average duration was 11 months. The Great Recession was the longest at 18 months, while the shortest was six months in 1980.
- While a few developed countries have gone more than 25 years without a recession, the average U.S. expansion only
 lasted 60 months. The last three expansions were relatively long, but also have started with relatively weak recoveries.
 The shortest expansion between recessions was six months in 1980 and the longest was 120 months from 1991 to 2001.
- Real GDP dropped 2 percent, on average.
- The unemployment rate typically rose to a little more than 3 percentage points above long-run levels during the year after the recession started. That suggests a reasonable guess for the next recession would be for the unemployment rate to peak around 8 percent. That would be comparable to all but the worst post-WWII recessions.

There are many possible triggers. Expansions don't die of old age but from other factors, such as (a) the economy overheating, (b) major imbalances caused by excessive risk taking or rapid expansion of credit, (c) external shocks such as oil embargoes or wars, or (d) government actions, such as rapid interest rate increases. Many possible shocks could cause a recession: a worsening trade war, a debilitating federal debt ceiling confrontation, a Chinese recession, renewed concern about a breakup of the Euro, a major market correction, terrorist attack, etc.

While each possible shock has different implications for different occupations and cities will get hit hardest, we can at least make some broad assumptions. A few possible recession scenarios:

SCENARIO	CUMULATIVE U.S. HPI DECLINE	
Typical Recession	0–10 percent	HPI refers to the FHFA All-Transaction House Price Index. Other indices
Severe Recession	\sim 15 percent	are more volatile and thus may have somewhat larger declines.
Stagflation	\sim 5 percent	

The **Typical Recession** scenario is roughly a year-long recession with a 2 percent decline in GDP. It would include declines in financial asset values, weaker consumer spending and lower business investment. The Federal Reserve (the Fed) is likely to respond by lowering the federal funds rate by at least 1.5 percent (from today's 2.25 to 2.5 percent). Layoffs would occur across a wide variety of industries and the unemployment rate would increase to 7 or 8 percent. Home sales could decline 10 to 20 percent, as falling consumer sentiment and higher unemployment cause consumers to pull back on their spending. Home prices would fall in many areas, while mortgage credit standards would tighten. Lower demand would result in a large drop in housing starts, setting up conditions for a strong bounce-back once employment recovers.

A **Severe Recession** is just a super-sized version of a mild recession scenario, perhaps due to multiple shocks at once. In a worst-case scenario, the already-large federal deficit could prevent a sufficient federal fiscal policy response to stem the downturn, forcing the Fed to resort to quantitative measures, such as buying mortgage-backed securities. **Stagflation** refers to a weak economy combined with high inflation, which occurred during the 1970s. Triggers might be a disruption of oil supply or an expanded trade war. The Fed might respond to stagflation by raising rates, which would hurt home sales and thus prices. However, this is not a given since the Fed has indicated a willingness to tolerate higher inflation, if it is viewed as temporary.



Stagflation is a fairly remote possibility since inflation typically falls or even turns negative (deflation) during recessions, as soft demand, foreign competition and relatively weak unions constrain price growth.

⁴ Mark Zandi of Moody's Analytics estimates trend housing demand at 1,700,000 by assuming household formations of 1,200,000, obsolescence of 325,000 and new second homes at 175,000. However, these are rough estimates and some components cannot be directly measured.

⁵ "This Time Is Different: Eight Centuries of Financial Folly," by Carmen Reinhart and Kenneth Rogoff. Princeton: Princeton University Press, 2011.

⁽continued on page 8)

All about Recessions: Is Housing at Risk? (continued from page 7)

Conclusion

The next recession will likely come from a non-housing related shock, such as worsening trade frictions, a financial market correction or a political crisis. Any of these would certainly hurt home sales and, if bad enough, would push down home prices temporarily.

Thankfully, a housing crisis as bad as the last one is a fairly remote possibility.

The most likely scenario is a plain-vanilla, typical recession, resembling what happened in 1990 rather than the Great Recession. If the next downturn is fairly normal, then home prices would likely be somewhere between flat to down 10 percent nationally (history suggests flat to down 5 percent but I've padded it a bit, out of an abundance of caution and because home prices in the West look overvalued). Larger home price declines are possible in the cities most impacted by the recession. Particularly vulnerable are areas where home prices shot up sharply over the past few years. Thus, some cities in the western U.S. may be hit harder due to unusually bad affordability. Also at risk are housing markets that are currently relatively weak, such as Connecticut, and areas of slow growth or even falling populations, such as many rural areas.

Thankfully, a housing crisis as bad as the last one is a fairly remote possibility. The U.S. is underbuilt by a million or more units, buyers are cautious, loan quality is high and large financial firms are well-capitalized – the exact opposite of conditions at the end of the last business cycle. This suggests the next recession will be mild compared to the last one.



Are Starter Homes Affordable Homes? - By Manhong Feng

It's exciting that Millennials are now the largest group of buyers in the housing market. To better understand this segment of the market, we did some digging. What price point are they buying at? Where are starter homes most and least affordable? Are Millennials driving up the price of starter homes? (Spoiler alert – yes!)

We find that starter homes have been appreciating at a rate faster than other segments of the housing market in recent years, due to both increasing demand from Millennials and very limited inventory. This unfortunately adds to the already heavy challenges facing people interested in becoming homeowners.

We start with a quick look at the prices of homes sold to Millennial buyers vs. other age cohorts. The standard assumption is that when homebuyers first enter the housing market, they start with relatively cheap homes, the so-called "starter homes." Indeed, evidence supports this theory, as we can see in Figure 1. According to the National Association of Realtors® (NAR), the median purchase price for a home for the youngest age group (age 37 and younger) was the lowest at \$220,000 in 2018, compared to the median price paid by older age groups.





\$239,200

All Buyers 37 and younger 38 to 52 53 to 62 63 to 71

Where Are Starter Homes Most and Least Affordable?

A snapshot of February 2019's median bottom-tier prices tells us that across the top 100 metros, the least affordable metros are in the West: At the top of the list is San Jose, California, where a median bottom-tier home costs \$783,800. The most affordable top metros are mostly in the Mid-West and South, led by Toledo, Ohio, where a median bottom-tier home costs \$44,100!

Figure 2: Median Home Prices, Bottom Tier for Top 100 Metros

Sources: Zillow[®]/Arch MI

\$228,600

72 to 92

10 LEAST AFFORDABLE TOP METROS	MEDIAN BOTTOM TIER HOME PRICE	10 MOST AFFORDABLE TOP METROS	MEDIAN BOTTOM TIER HOME PRICE
San Jose, CA	783,800	Wichita, KS	66,000
San Francisco, CA	557,600	Pittsburgh, PA	64,900
Ventura, CA	455,000	Columbia, SC	64,900
Los Angeles-Long Beach-Anaheim, CA	450,600	Tulsa, OK	60,600
San Diego, CA	424,500	Dayton, OH	60,200
Urban Honolulu, HI	372,200	Memphis, TN	55,400
Seattle, WA	319,300	Scranton, PA	53,500
Boston, MA	305,100	Birmingham, AL	46,400
Portland, OR	302,800	Detroit, MI	46,000
Denver, CO	301,500	Toledo, OH	44,100

Next, we look at the unusually high price growth of starter homes.

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Are Starter Homes Affordable Homes? (continued from page 9)

How Is the Starter Housing Market Doing?

Housing markets have been doing well since home prices bottomed in 2012, with national home prices growing at an annual pace of 5–6 percent. Starter home markets have been even stronger, with much faster home price appreciation.

Most house price indices, including the commonly used Federal Housing Finance Agency (FHFA) House Price Index, are a single index for all properties, containing information on all classes of houses. Therefore, it is impossible to use them to determine the dynamics for different classes of housing. Fortunately, Zillow segments their home value index based on price – dividing it into thirds: high, middle and low price tiers for each metro area. The following chart shows that the bottom price tier in the U.S. has increased much more than the top price tier in the current housing cycle. From the bottom in 2012 to February 2019, the bottom price tier grew from \$75,800 to \$130,200, an increase of 72 percent, compared to a 41 percent gain in the top tier (where prices increased from \$276,800 to \$389,800). Most metros have the same pattern, with the low tier's prices increasing much more than those of the top tier.



Faster home price growth for starter homes has been nearly universal in the top 100 metros by population in recent years. Of these, 92 had greater average annualized home price appreciation for low-tier homes than for high-tier homes. Moreover, 39 percent of the metros have a gap of between 2 and 4 percentage points, and 33 percent of the metros have a gap greater than 4 percentage points (Figure 4).



Figure 4: Trough*-to-Current Average Home Price Appreciation (HPA) Is Mostly Greater in Bottom Tier

*A trough is when home prices hit bottom. | **Sources:** Zillow/Arch MI

When we expand this analysis to all metros where data is available, we still found faster price growth in recent years at the lowest price point in nearly two-thirds of metros.

To understand where affordability for starter homes has changed the most, we again look at the home price history of different price tiers. The table below lists the fastest and slowest trough-to-current annual house price growth rate for bottom-tier houses for the top 100 metros. The fastest-growing metros are mostly in the South and West. Las Vegas, Nevada, has the fastest average annual Home Price Appreciation (HPA) of 18 percent in the current recovery/boom cycle, followed by Melbourne, Florida, and Atlanta, Georgia, both at 16 percent. The slowest growing metros are mostly in the East and South, with El Paso, Texas, gaining at an annual rate of 2 percent.

Figure 5: Average Annual HPA from Trough-to-Current (Bottom Tier) for Top 100 Metros Sources: Zillow®/Arch MI

10 FASTEST GROWING TOP METROS	AVERAGE ANNUAL HPA	10 SLOWEST GROWING TOP METROS	AVERAGE ANNUAL HPA
Las Vegas, NV	18%	St. Louis, MO	4%
Melbourne, FL	16%	Scranton, PA	4%
Atlanta, GA	16%	Virginia Beach, VA	3%
Phoenix, AZ	15%	Omaha, NE	3%
Detroit, MI	15%	Hartford, CT	3%
Orlando, FL	14%	Syracuse, NY	3%
Daytona Beach, FL	14%	Albany, NY	2%
Jacksonville, FL	14%	Rochester, NY	2%
Tampa, FL	14%	Greensboro, NC	2%
Miami-Fort Lauderdale, FL	14%	El Paso, TX	2%

In general, home prices in different price tiers tend to be correlated with each other, as shown in the scatter plot in Figure 6. Moreover, the regression line indicates the tendency of the bottom tier to have a greater rate of price growth in recent years. Most of the top 100 metros fall in the upper left-hand corner of the 45-degree line, indicating that low-tier home prices have grown faster than the top tiers' in the current boom cycle.



Sources: Zillow®/Arch MI



TROUGH TO CURRENT HOME PRICE APPRECIATION

Are Starter Homes Affordable Homes? (continued from page 11)

Difficulties for Participants in the Housing Market



The reasons for the rapid run-up of home prices at the lower end can be attributed to both demand and supply issues. On the demand side, as the largest generation, the Millennials, enter their 30s, demand for starter houses has increased dramatically. On the supply side, due to rising construction and labor costs and a shortage of lots, builders tend to focus on building high-end houses. Existing homeowners may be finding it difficult to trade up, due to the combination of elevated home prices and slow income growth. Supply is also constrained by the fact that roughly 4 million

homes were converted from owner-occupied to rentals during the housing crisis and a large number of people have mortgage rates so low that remodeling makes more sense than trading up.

Strong demand combined with limited supply has restricted the number of starter homes listed for sale. Thus, starter homes have been appreciating at a rate faster than other segments of the housing market. Since overall home price growth often understates price growth in the lowest price tier, affordability in the entry-level housing market has worsened more than is generally understood.

Risk of Price Declines Increased

The average probability of home prices being lower in two years increased from 6 to 9 percent over the quarter, according to the latest results from the Arch MI Risk Index[®], a statistical model based on nine indicators of the health of local housing markets, such as over-/undervaluation, unemployment and home price momentum. The increase was driven by weaker housing market conditions, such as slowing home price growth and weaker sales in the West, and home prices growing faster than fundamentals like income, again, primarily in the West.

The overall national risk of decline in home prices remains better than the historic average of 17 percent. Overall risk is now slightly worse than the average of 7 percent from pre-crisis 1975–2004, but that is in part because inflation is lower now, resulting in relatively slower home price growth. Please note that the Risk Index doesn't estimate the magnitude of any declines, just the probability of home prices being lower in two years.



Latest Arch MI Risk Index – Probability of Price Declines

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, the difference between actual and estimated fundamental home prices (based on income), population growth, etc. Model results are sometimes adjusted for unmodeled factors.

Longtime HaMMR readers may have noticed a change in how we display low values. The lowest Risk Index values are now displayed as "<5" percent instead of "2" percent in recognition of the amount of uncertainty around the future paths of home prices. This change is because there are many possible economic shocks that could cause housing market conditions to deteriorate over the next year or two. So, even if conditions are favorable now, we don't want people to incorrectly interpret very low values as "no risk."



States Most at Risk of a Price Correction

Every state is expected to have positive home price growth over the next two years according to the Arch MI Risk Index. Since no state had price declines over the past year, that would be a continuation of recent trends. A number of states have above average risk, with North Dakota, Alaska and Wyoming having a roughly one in four chance of experiencing a price decline (of any size, even modest declines).

The following chart shows the 10 states with the highest probabilities of experiencing home price declines over the next two years, led by North Dakota, at 27 percent, and Alaska, at 24 percent.



States Most at Risk of a Price Correction, and the Change Over the Quarter

- California, Colorado, Oregon, Texas and Washington make the top 10 list because their home prices are unusually high relative to historic relationships to incomes (see page 20).⁶
- Four states make the list due to the lingering effects of a slowdown in the energy-extraction sector that started in 2015: Alaska, West Virginia, North Dakota and Wyoming.
- Connecticut is on the list, even though home prices are cheap by historic norms, because the population

under age 65 has contracted each year since 2011. Being a high-cost, high-tax state, it will probably be disproportionally affected by new federal limitations on state and local tax deductions, as some wealthier residents chose to migrate to lower tax states.

 Of the top 10, only Alaska and Texas saw improvements in their Risk Index values. Alaskan home price growth improved, while Texas population and job growth remains strong. Among the 100 largest metros, Miami and San Antonio are tied with the riskiest Risk Index values. Both are estimated to have a 25 percent chance of price declines over the next two years. Moody's Analytics estimates Miami's home prices are more than 20 percent overvalued and we are concerned it is even more overvalued. With the exception of three cities in Connecticut, all of the riskiest cities make the list because home prices are far higher than expected, compared to the historical relationship between prices and incomes. Riverside County in California and Miami, Florida, showed the largest increases because we enhanced the way we analyze the reasonableness of home prices to include more economic factors, such as population growth rates.



Top 10 Metros Most at Risk of a Price Correction

To find out more about your local market, such as your Metro's specific Risk Index value, please visit archmi.com/hammr and explore the variety of visualizations under the **View Our HPI Charts and Maps** link.

⁶ Home price over-/undervaluation is also discussed in detail in the HaMMR webinar, available at archmi.com/hammr and in some HaMMR blog posts. For another view of overvaluation, which is fairly similar to ours, see Fitch Ratings at https://www.fitchratings.com/site/structuredfinance/rmbs/us-home-prices).

Arch MI State-Level Risk Index

STATE	ARC	H MI RISK IN	DEX	ANNUAL HO Change (INUAL HOME PRICE % UNEMPLOYMENT RATE CHANGE (FHFA HPI)			ATE
(Sorted by Risk Ranking, then alphabetically)	RISK RANKING	LATEST	1-YEAR Change	LATEST	1 YEAR Earlier	LATEST	1-YEAR Change	LONG RUN AVG.
North Dakota	Moderate	27	0	1.7	1.8	2.4	-0.3	3.8
Alaska	Low	24	-4	0.4	3.6	6.5	-0.2	7.9
California	Low	12	10	6.9	8.2	4.2	-0.1	7.2
Colorado	Low	16	6	8.4	9.3	3.7	0.8	5.3
Connecticut	Low	22	8	1.4	1.3	3.8	-0.7	5.5
ldaho	Low	11	4	12.7	10.6	2.9	-0.1	5.9
Mississippi	Low	12	2	4.4	1.3	4.8	-0.1	7.5
Nevada	Low	11	4	13.9	12.0	4.3	-0.5	6.5
New Jersey	Low	12	4	3.4	3.3	4.0	-0.5	6.3
Oklahoma	Low	12	-2	3.2	4.3	3.3	-0.5	5.1
Oregon	Low	21	18	6.2	7.7	4.4	0.2	7.1
Texas	Low	16	2	6.3	7.9	3.8	-0.3	6.0
Washington	Low	19	17	8.3	11.7	4.5	-0.1	7.0
West Virginia	Low	22	-2	1.4	2.2	5.2	-0.2	8.1
Wyoming	Low	23	-2	3.7	2.6	3.9	-0.1	4.9
Alabama	Minimal	4	2	4.5	3.9	3.7	-0.3	7.1
Arizona	Minimal	7	2	8.9	8.8	5.1	0.3	6.3
Arkansas	Minimal	4	2	4.5	4.1	3.8	0.0	6.4
Delaware	Minimal	6	2	4.0	1.9	3.4	-0.6	5.4
District Of Columbia	Minimal	4	2	8.0	7.0	5.5	-0.3	7.6
Florida	Minimal	6	-9	7.6	9.3	3.5	-0.4	6.2
Georgia	Minimal	4	2	8.2	7.1	3.9	-0.3	6.0
Hawaii	Minimal	4	2	6.9	5.5	2.7	0.4	4.9
Illinois	Minimal	4	2	2.6	3.3	4.3	-0.1	6.9
Indiana	Minimal	4	2	7.1	5.5	3.5	0.2	6.1
lowa	Minimal	4	2	3.8	4.7	2.4	-0.3	4.6
Kansas	Minimal	4	2	6.4	4.4	3.4	-01	4.6
Kentucky	Minimal	4	2	5.0	5 2	41	-0.2	67
	Minimal	10	-	17	3.2	49	0.2	73
Maine	Minimal	4	2	5.6	5.6	3.4	0.2	5.8
Maryland	Minimal	9	4	27	4.0	37	-0.5	5.3
Massachusetts	Minimal	Å	2	5.7	63	3.0	-0.6	5.5
Michigan	Minimal	4	2	6.9	7.6	4.0	-0.4	79
Minnesota	Minimal	4	2	5.6	6.5	31	0.0	4.8
Missouri	Minimal	4	2	6.5	5.0	3.7	-0.3	5.9
Montana	Minimal	4	2	6.7	5.8	3.8	0.0	5.7
Nehraska	Minimal	4	2	5.5	6.8	2.8	-0.1	3.5
New Hampshire	Minimal	4	2	5.0	61	2.0	-0.3	4 3
New Mexico	Minimal	7	-3	11	3.6	51	0.0	6.7
New York	Minimal	0	5	4.1	5.5	3.0	-0.6	6.5
North Caroling	Minimal	1	2	7.5	6.0	3.0	-0.3	5.8
Obio	Minimal	4	2	50	5.0	1.6	0.5	6.7
Dennsylvania	Minimal	4	2	1.1	4.5	4.0	-0.5	6.1
Rhode Island	Minimal	4	2	4.4	4.5	4.0 Z 0	-0.5	6.5
South Carolina	Minimal	4	2	5.9	0.7	J.7 Z 2	-0.4	6.5
South Dakota	Minimal	4	2	5.3	5.0	2.0	-0.0	3.7
Tennessee	Minimal	4	1	7.4	0.0 8 0	Z.7 Z 2	-0.2	5.7
Iltah	Minimal	4	2	10.6	10.0	J.Z Z 0	-0.4	0.4 1 0
Vormont	Minimal	4	2	10.0	10.1	3.0	-0.1	4.0
Virginia	Minimal	0	2	1./ Z 0	4.Z Z 4	2.4	-0.5 _0 Z	4.0
Wisconsin	Minimal	4	2	5.7	5.0	2.7	-0.5	4.7
Population Weighted Average	Minimal	* 8	3	6.1	6.7	3.8	-0.3	5.8

(GROSS STAT	E PRODUCT	SINGLE-FAMILY HOUSING STARTS POPULATION			
PE	ER CAPITA 2018Q4	1-YEAR % CHANGE	PER 1,000 PEOPLE 2018Q4	1-YEAR % Change	2018Q4 (THS.)	1-YEAR % Change
\$	77,325	4.8	2.8	-10.0	763	0.7
\$	78,538	6.6	1.7	10.3	739	0.1
\$	75,348	6.2	1.7	11.5	39,642	0.4
\$	65,281	5.0	5.3	18.1	5,735	1.4
\$	78,821	5.9	0.8	4.5	3,572	0.0
\$	43,816	3.8	7.6	15.4	1,770	1.9
\$	39,682	4.6	2.1	-4.6	2,985	-0.1
\$	55,800	4.6	4.5	2.1	3,065	2.1
\$	71,252	5.3	1.3	-1.3	8,911	0.1
\$	50,868	4.1	2.4	-2.6	3,951	0.4
\$	59,912	3.8	2.7	1.3	4,207	0.9
\$	64,029	4.5	4.4	4.7	28,902	1.4
\$	73,375	6.2	3.3	2.4	7,581	1.3
\$	46,254	6.3	1.3	-1.7	1,802	-0.5
\$	77,644	8.3	2.7	2.5	579	0.2
\$	45,968	4.9	2.7	6.7	4,897	0.3
\$	48,282	4.6	4.5	9.8	7,239	1.9
\$	43,453	3.5	2.5	0.1	3,018	0.3
\$	81,423	4.4	5.8	6.2	971	1.0
\$	202,229	5.5	0.2	-67.9	705	0.7
\$	48,738	4.7	4.5	10.0	21,461	1.5
\$	56,805	5.4	4.0	1.6	10,581	1.1
\$	66,167	5.3	2.0	4.7	1,420	-0.1
\$	68,847	5.2	0.8	-5.7	12,732	-0.3
\$	57,337	5.0	2.6	1.2	6,701	0.4
\$	63,702	5.0	2.6	-8.7	3,161	0.4
\$	57,490	4.3	2.0	-11.3	2,914	0.1
\$	48,701	5.5	1.8	-2.8	4,476	0.3
\$	57,659	7.1	3.1	4.3	4,660	-0.1
\$	49,209	5.2	3.0	-4.1	1,338	0.1
\$	69,887	5.3	2.1	1.7	6,053	0.3
\$	82,210	5.3	1.1	-7.9	6,916	0.5
\$	53,956	5.1	1.7	-5.1	10,002	0.2
\$	66,253	4.8	2.4	-8.7	5,628	0.7
\$	53,436	5.8	1.9	-9.1	6,135	0.3
\$	47,813	4.1	3.3	5.7	1,066	0.7
\$	67,306	5.1	2.7	-11.3	1,935	0.6
\$	63,816	5.3	2.3	0.4	1,359	0.4
\$	49,563	4.7	2.3	12.9	2,100	0.3
\$	84,649	5.9	0.6	-2.9	19,526	-0.2
\$	55,642	5.0	4.9	1.5	10,452	1.2
\$	59,610	5.3	1.5	-1.1	11,692	0.1
\$	63,175	5.3	1.6	10.2	12,798	0.0
\$	60,341	5.0	1.0	-5.8	1,058	0.1
\$	46,206	5.1	6.0	2.4	5,114	1.2
\$	60,540	5.7	3.6	-15.6	885	0.8
\$	54,916	5.2	4.1	-0.3	6,798	0.9
\$	57,075	5.7	6.1	5.6	3,188	1.8
\$	54,760	5.1	1.7	-5.0	627	0.2
\$	64,196	5.3	2.5	-8.9	8,546	0.6
\$	59,884	5.0	2.1	-6.0	5,821	0.3
\$	63,739	4.8	2.7	2.6	328,180	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 percent 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 state-wide 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.

S.F. Housing Starts are the 12-month moving average of single-family housing starts data released by the U.S. Census Bureau.

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



YEAR-OVER-YEAR PERCENTAGE CHANGE IN HOME PRICES

Home price growth decelerates and is set to slow further. Annual home price growth continued to decelerate in Q4. The year-over-year growth rate was between 5 and 6 percent in the major home price indices. Currently, the various measures of price growth are telling a consistent story that the market is cooling, even though they differ in data sources (the FHFA only uses GSE loans, while the Case-Shiller index uses a broader selection of loans) and methodologies.

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

FHFA House Price Index – Purchase–only

- FHFA House Price Index New and existing buildings All transactions
- S&P/Case-Shiller U.S. National Home Price Index

All values Seasonally Adjusted.



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 Nevada, Idaho and Utah. The slowest growth was in Alaska, Connecticut and West Virginia. Metro level data and quarter-overquarter 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.

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



Housing affordability is the worst in seven years, yet remains better than historic norms nationally.

The Y-axis is Arch MI's hypothetical median Debt to Income (DTI) ratio, which is the percentage of the median household's income needed to cover mortgage payments on a median- priced home. For the U.S. it is 31 percent, 3 percent lower than during 1987–2004. Miami is at 51 percent, a concern because it is higher than pre-crisis norms, but at least it is well below its peak. See page 16 for state-level data.

Sources: U.S. Census Bureau/Freddie Mac/NAR/Arch MI



ORIGINATIONS IN MILLIONS OF \$

Future mortgage originations likely to tilt towards purchase loans. The dollar volume of purchase mortgage originations is likely to continue its upward trend since the start of the housing recovery. Mortgage rates will rise if global growth prospects improve,

reducing refis, but there is also a roughly one in three chance rates will continue to fall.

Sources: Mortgage Bankers Association

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



Home prices are still below the prior peak in 10 states. House prices have increased rapidly since bottoming out in 2012 and have surpassed their prior peak levels nationally; however, growth has been very unbalanced across states. The largest cumulative growth since home prices peaked during 2005-2008 (we use the peak for each state, which varied by time) was in Colorado, followed by Texas and North Dakota. As of the fourth quarter of 2018, 10 states had house prices lower than their prior peaks, with Connecticut and Maryland still lower by 10 percent or more. Values shown are in nominal (not inflation adjusted) terms. If we were to adjust for the 20 percent inflation in consumer prices since 2006, then 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 yearover-year change in per-capita income was strongest in New York, followed by Washington and West Virginia. It was weakest in South Dakota and Nebraska.

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

ANNUAL PERCENTAGE GROWTH IN TOTAL EMPLOYMENT



Job growth remains impressive across the nation. On a year-overyear base, total employment grew in January for all states. The number of jobs in Nevada had the fastest growth, followed by Utah and Arizona. For the U.S., the annual growth rate was 1.9 percent. However, in general, rural areas continue to lag urban areas.

Sources: 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 and West Virginia lag the nation at the moment due to a slower energy-sector recovery than in other areas.

Sources: BLS/Moody's Analytics/Arch MI

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



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

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 the West

and in Florida. This chart shows the percentage of median income needed to buy a median-priced home minus the average from more normal years of 1987–2004. Oregon is the worst compared to its 1987–2004 average values, followed by Hawaii and Washington. Affordability is better now than during 1987–2004 in 30 states, led by Connecticut, West Virginia and Illinois.

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



MBA MORTGAGE PURCHASE APPLICATION INDEX

Purchase mortgage applications remain solid. The MBA purchase mortgage applications index by week of the year is similar to last year's. In general, purchase mortgage applications trend upwards into the spring buying season and then trend downwards. Purchase mortgage applications in mid-March are about **91 percent** higher than at the start of 2019.

Sources: Mortgage Bankers Association/Arch MI



The U.S. rental vacancy rate dropped to the lowest level

in more than three decades, at 6.6 percent in the fourth quarter. Sustained low rental vacancy rates indicate a tight housing market.

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



Housing starts weakened as mortgage rates increased late last year. Single-Family Housing Starts increased 5 percent nationally from a year ago to 926,000 units (seasonally adjusted annual rate) in January. Multi-family starts are 1 percent higher than a year ago, at 362,000 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 strongest in the East and West. The growth in Single-Family Housing Starts (through January) is weakest in the District of Columbia, South Dakota and Kansas. Housing starts increased most in Pennsylvania, followed by Connecticut and Colorado. To get a clearer understanding of the trend, unlike numbers you will see 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



NEW AND EXISTING HOME SALES IN THOUSANDS

Both new and existing home sales are trending down. Sales of existing single-family homes were 4.4 million units (after annualizing the monthly number) in January; a decrease of 8.4 percent compared to the same period last year. Sales of newly constructed homes were 607,000 units (annualized rate), down 4.1 percent from a year ago.

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

MONTHS SUPPLY OF HOMES FOR SALE



New home inventory remains high, while existing homes for sale remain limited. The months supply of existing single-family homes for sale (total current listings \div last month's sales) was 3.9 months in January, compared to 3.4 months at the same time a year ago. The months supply of new homes for sale, shown in green, ticked up to 6.6 months in January, slightly lower than the 7-year high reached three months ago.

Sources: NAR/Moody's Analytics/Arch MI

Arch MI Risk Index for the 100 Largest MSAs

Statistical Areas Sorted by Risk Ranking, then State, then MSASTRISK RANKING2018Q41-YR. CHANGELONG RUN AVG.1-YR. 2018Q41-YR. 2018Q41-YR. 2017Q4Anaheim-Santa Ana-Irvine, CACALow128245.86.4Bakersfield, CACALow1210246.04.6Fresno, CACALow1210259.58.2Los Angeles-Long Beach-Glendale, CACALow1210267.68.5Oakland-Hayward-Berkeley, CACALow1210258.09.9Oxnard-Thousand Oaks-Ventura, CACALow1210243.96.6Riverside-San Bernardino-Ontario, CACALow1917257.49.0SacramentoRosevilleArden-Arcade, CACALow1210266.410.2San Diego-Carlsbad, CACALow1210266.410.2
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Bakersfield, CA CA Low 12 10 24 6.0 4.6 Fresno, CA CA Low 12 10 25 9.5 8.2 Los Angeles-Long Beach-Glendale, CA CA Low 12 10 26 7.6 8.5 Oakland-Hayward-Berkeley, CA CA Low 12 10 25 8.0 9.9 Oxnard-Thousand Oaks-Ventura, CA CA Low 12 10 24 3.9 6.6 Riverside-San Bernardino-Ontario, CA CA Low 19 17 25 7.4 9.0 SacramentoRosevilleArden-Arcade, CA CA Low 12 10 26 6.4 10.2 San Diego-Carlsbad, CA CA Low 12 10 26 6.4 10.2
Fresno, CA CA Low 12 10 25 9.5 8.2 Los Angeles-Long Beach-Glendale, CA CA Low 12 10 26 7.6 8.5 Oakland-Hayward-Berkeley, CA CA Low 12 10 25 8.0 9.9 Oxnard-Thousand Oaks-Ventura, CA CA Low 12 10 24 3.9 6.6 Riverside-San Bernardino-Ontario, CA CA Low 19 17 25 7.4 9.0 SacramentoRosevilleArden-Arcade, CA CA Low 12 10 26 6.4 10.2 San Diego-Carlsbad, CA CA Low 12 10 26 6.4 10.2
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Oxnard-Thousand Oaks-Ventura, CACALow1210243.96.6Riverside-San Bernardino-Ontario, CACALow1917257.49.0SacramentoRosevilleArden-Arcade, CACALow1210266.410.2San Diego-Carlsbad, CACALow1210246.18.4
Riverside-San Bernardino-Ontario, CA CA Low 19 17 25 7.4 9.0 SacramentoRosevilleArden-Arcade, CA CA Low 12 10 26 6.4 10.2 San Diego-Carlsbad, CA CA Low 12 10 24 6.1 8.4
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San Diego-Carlsbad. CA CA Low 12 10 24 61 84
Stockton-Lodi CA Low 12 10 26 89 101
Colorado Springs CO
Denver-Aurora-Lakewood CO
Bridgenort-Stamford-Norwalk CT CT Low 22 8 24 0.9 1.3
Hartford-West Hartford-East Hartford CT CT Low 22 8 23 0.5 0.9
New Haven-Milford CT CT Low 22 8 26 21 17
Fort Lauderdale-Pompano Beach-Deerfield Beach FL FL Low 19 2 23 77 87
lakeland-Winter Haven, FL
Miami-Miami Reach-Kendall Fl Fl Low 25 9 23 80 83
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Data sources are listed on page 13.

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100 LARGEST METROPOLITAN	UNEM	PLOYMENT	RATE	GROSS METRO PRODUCT			SINGLE-FAMILY Housing starts		POPULATION	
Statistical Areas Sorted by Risk Ranking, then State, then MSA	LATEST	1-YR. Change	LONG RUN AVG.	PEI 2	R CAPITA 2018Q4	1-YR. % Change	PER 1000 PEOPLE 2018Q4	1-YR. % Change	2018Q4 (THS.)	1-YR. % Change
Anaheim-Santa Ana-Irvine, CA	2.9	-0.4	4.9	\$	94,778	5.2	1.5	-16.2	3,235	1.0
Bakersfield, CA	7.6	-0.9	10.9	\$	55,191	6.8	2.7	-13.6	906	0.9
Fresno, CA	6.8	-1.0	11.8	\$	57,883	6.5	2.4	-0.1	1,003	0.9
Los Angeles-Long Beach-Glendale, CA	4.7	0.1	7.3	\$	78,773	5.3	0.6	3.2	10,307	1.0
Oakland-Hayward-Berkeley, CA	3.0	-0.5	5.8	\$	73,096	6.3	1.3	-19.4	2,850	1.0
Oxnard-Thousand Oaks-Ventura, CA	3.8	-0.5	6.3	\$	64,693	6.7	1.3	2.1	866	1.0
Riverside-San Bernardino-Ontario, CA	4.3	-0.5	7.5	\$	45,974	6.7	2.9	11.9	4,644	0.9
SacramentoRosevilleArden-Arcade, CA	3.7	-0.5	6.5	Ş	67,275	7.0	3.0	-3.9	2,357	0.9
San Diego-Carlsbad, CA	3.3	-0.5	5.7	Ş	78,970	6.5	1.0	-35.3	3,385	1.0
Stockton-Lodi, CA	5.8	-0.7	10.2	Ş	47,807	6.6	3.8	0.8	756	0.9
Colorado Springs, CO	4.0	0.4	5.4	Ş	51,248	6.8	5.7	-6.8	733	0.7
Denver-Aurora-Lakewood, CO	3.2	0.2	4.8	Ş	72,340	6.4	4.2	-4.6	2,923	0.8
Bridgeport-Stamford-Norwalk, Cl	5.9	-0.4	5.0	Ş	82,233	5.6	0.9	2.7	952	0.1
Hartford-West Hartford-East Hartford, CI	4.0	-0.5	5.5	Ş	88,/14	5.2	0.9	42.5	1,213	0.1
New Haven-Milford, Cl	4.4	-0.5	5.9	Ş	6/,669	5.2	0.5	6.2	862	0.1
Fort Lauderdale-Pompano Beach-Deerfield Beach, FL	5.0	-0.0	5.5	\$	52,685	5./	0.8	0.4	1,992	2.0
Lakelana-winter Haven, FL Miami Miami Danah Kandall, FL	5.5	-0.8	0.0	Ş	50,227	4.8	7.1	<i>L.1</i>	/00	1.8
Miami-Miami Beach-Kendali, FL	5.5	-0./	5.8	Ş	55,55Z	5.0	0.8	4.2	2,852	Z.I
North Port-Sarasota-Bradenton, FL West Dalm Beach Beach Britan Delvey Beach, FL	5.0	-0.5	0.2	Ş	42,38/	0./	/.1	-2.5	8Z8	1.9
West Pallin Deach-Doca Katon-Denay Deach, FL Poice City, ID	0.0 2.5	-0.0	0.2	ç	01,/20 40 405	0.0	1.0 10.2	-10.9	1,014	2.0
Camdon NI	Z.0	-0.4	4.0	ç	40,000	7.0	10.2	-0.0	1 250	1.1
Cullucii, NJ Nowark, NJ DA	4.1	-0.7	0.9 5.7	ç	09,101 77 /60	0.Z	1.0	Z1.0 Z1.0	1,200	0.4
Oklahoma City, OK	4.1 Z 1	-0.7	0./ / 1	ç	55 00/	1.0	1.2 Z 7	51.0	1 200	0.5 0 Z
Tulea OK	J.1 Z Z	-0.7	4.1	ç	55 526	4.7	3.7 2 7	-14.8	1,370	0.5
Portland-Vancouver-Hillshoro OR-WA	3.5	-0.3	4.0	ç	70 205	5.1	2.7	-14.0	2 /06	1.2
Austin-Round Rock TX	2.0	-0.5	1.3	ç	67 186	5.5	9.0 8.4	1.6	2,470	1.2
Dallas-Plano-Irvina TX	3.4	0.0	5.1	Ś	77 376	5.3	5.5	4.0	5 014	1.5
FI Paso TX	4 2	-0.2	7.8	Š	44 165	3.6	21	-31.6	863	1.5
Fort Worth-Arlington-Granevine TX	3.3	0.0	5.0	Š	57 661	5.0	3.7	-7.9	2 541	14
Houston-The Woodlands-Sugar Land TX	4.0	-0.6	5.6	Ś	73 374	7.5	5.7	-1.8	7 0 3 9	14
McAllen-Edinburg-Mission, TX	6.5	-0.3	10.9	Ś	31,357	5.8	3.3	5.4	879	1.4
San Antonio-New Braunfels, TX	3.3	0.1	4.8	Ś	54.016	4.9	3.3	0.0	2.526	1.4
Tacoma-Lakewood, WA	5.0	-0.4	6.8	\$	51,445	7.3	2.7	-31.7	893	1.2
Birmingham-Hoover, AL	3.7	0.2	5.2	\$	52,665	4.5	2.3	-6.3	1,153	0.2
Little Rock-North Little Rock-Conway, AR	3.2	-0.2	4.8	\$	52,185	3.7	2.4	-23.2	744	0.5
Phoenix-Mesa-Scottsdale, AZ	4.0	-0.1	5.1	\$	52,031	6.9	5.0	8.0	4,906	2.4
Tucson, AZ	4.5	0.1	5.2	\$	44,338	6.0	3.7	17.3	1,059	2.5
San Francisco-Redwood City-South San Francisco, CA	2.2	-0.4	4.8	\$	140,892	5.7	0.2	-2.4	1,679	1.0
San Jose-Sunnyvale-Santa Clara, CA	2.6	-0.5	5.7	\$	116,271	6.0	1.1	-27.9	2,027	1.0
Washington-Arlington-Alexandria, DC-VA-MD-WV	3.3	-0.4	4.3	\$	84,931	5.8	2.0	-23.4	4,950	0.6
Wilmington, DE-MD-NJ	3.9	-0.7	5.2	\$	90,543	3.8	1.9	-7.9	733	0.7
Cape Coral-Fort Myers, FL	3.2	-0.6	5.5	\$	40,186	7.6	7.1	-4.3	760	1.9
Jacksonville, FL	3.1	-0.5	5.3	\$	53,897	7.9	6.7	-4.2	1,548	1.9
Orlando-Kissimmee-Sanford, FL	3.0	-0.6	5.3	\$	57,612	5.9	6.1	6.0	2,582	1.9
Tampa-St. Petersburg-Clearwater, FL	3.2	-0.5	5.4	\$	52,649	5.9	4.4	4.2	3,181	1.9
Atlanta-Sandy Springs-Roswell, GA	3.4	-0.9	5.5	\$	64,462	6.7	4.3	-3.2	5,980	1.0
Urban Honolulu, HI	2.2	0.2	4.1	\$	71,200	5.6	0.9	-18.0	993	0.4
Chicago-Naperville-Evanston, IL	3.7	-1.0	6.5	\$	74,664	4.8	0.7	3.9	7,334	0.2
Lake County-Kenosha County, IL-WI	4.2	0.0	5.5	Ş	69,858	4.9	1.1	-9.0	874	0.2

Arch MI Risk Index for the 100 Largest MSAs

100 LARGEST METROPOLITAN	AR	CH MI RISK IND	% HOME PRICE CHANGE				
Statistical Areas Sorted by Risk Ranking, then State, then MSA	ST	RISK RANKING	2018Q4	1-YR. Change	LONG RUN AVG.	1-YR. 2018Q2	1-YR. 2017Q2
Gary, IN	IN	Minimal	<5	2	18	7.4	4.8
Indianapolis-Carmel-Anderson, IN	IN	Minimal	<5	2	14	8.7	7.0
Louisville-Jefferson County, KY-IN	КҮ	Minimal	<5	2	15	6.1	6.1
Baton Rouge, LA	LA	Minimal	10	-2	18	2.6	5.4
New Orleans-Metairie, LA	LA	Minimal	10	-1	20	2.7	3.4
Boston, MA	MA	Minimal	<5	2	25	6.4	6.9
Cambridge-Newton-Framingham, MA	MA	Minimal	<5	2	21	6.4	7.2
Worcester, MA-CT	MA	Minimal	<5	2	25	5.7	6.2
Baltimore-Columbia-Towson, MD	MD	Minimal	9	4	22	1.0	4.0
Frederick-Gaithersburg-Rockville, MD	MD	Minimal	9	4	22	3.5	3.0
Detroit-Dearborn-Livonia, MI	MI	Minimal	<5	2	46	7.7	7.8
Grand Ranids-Kentwood MI	MI	Minimal	< 5	2	25	91	9.8
Warren-Trov-Farminaton Hills MI	MI	Minimal	<5	2	30	6.8	8.3
Minnegnolis-St Paul-Bloomington MN-WI	MN	Minimal	< 5	2	24	6.3	71
Kansas City MO-KS	MO	Minimal	< 5	2	24	0.0	6.9
St Louis MO-II	MO	Minimal	5	3	20	4.8	5.0
Charlotte-Concord-Gastonia NC-SC	NC	Minimal	~5	2	14	0.8	70
Graanshara-High Daint NC	NC	Minimal	<5	2	17	6.1	5.5
Palaiah NC	NC	Minimal	<5	2	17	71	7.5
Wincton Salom NC	NC	Minimal	<5	2	10	7.1	7.5 Z 6
Ometer Council Pluffe NE IA	NE	Minimal	< 5	2	0	0.Z	5.0
Albuguergue NM		Minimal	<0	Z	9 21	0.5 Z /	7.0
Albuqueique, NM	NM	Minimal	10	-5	21	0.4 17.6	J.9 1Z 2
Lus vegus-nenuerson-ruruurse, NV		Minimal	10	0 E	20	17.0	13.2
Albany-Schenectady-Iroy, NY	IN Y	Minimal	9	5	22	2.0	5.4 7.7
Buttalo-Cheektowaga-Niagara Falis, NY	IN Y	Minimal	9	5	9 71	0.5	/.5
Nassau County-Suttoik County, NY	IN Y	Minimal	9	5	31	0.1	0.0
New York-Jersey City-White Plains, NY-NJ	IN Y		9	5	20	4.8	0.5
KOCHESTER, NY	NY		9	5	11	4./	4.0
AKTON, UH Cinging di VV IN	UH		<5	2	21	5.2	0.5
	UH		<5	2	18	0.8	0.5
Cleveland-Elyria, OH	UH	Minimal	<5	2	27	6.4	4.1
Columbus, UH	UH	Minimal	<5	2	16	7.4	8.2
Dayton-Kettering, UH	OH	Minimal	<5	2	20	5.2	6.2
Allentown-Bethlenem-Easton, PA-NJ	PA	Minimal	<5	2	22	4.6	4.6
Montgomery Lounty-Bucks County-Chester County, PA	PA	Minimal	<5	2	21	2.8	4.2
Philadelphia, PA	PA	Minimal	<5	2	25	7.9	1.2
Pittsburgh, PA	PA	Minimal	<5	2	8	5.2	4.2
Providence-Warwick, RI-MA	RI	Minimal	<5	2	27	6.0	6.3
Charleston-North Charleston, SC	SC	Minimal	6	2	22	5.0	10.1
Columbia, SC	SC	Minimal	<5	2	19	5.6	5.7
Greenville-Anderson-Mauldin, SC	SC	Minimal	<5	2	15	6.9	7.1
Knoxville, TN	TN	Minimal	<5	2	19	8.6	5.4
Memphis, TN-MS-AR	TN	Minimal	<5	2	18	7.2	4.8
Nashville-DavidsonMurfreesboroFranklin, TN	TN	Minimal	8	-6	16	8.8	10.5
Ogden-Clearfield, UT	UT	Minimal	4	2	16	11.2	10.6
Salt Lake City, UT	UT	Minimal	<5	2	17	10.5	10.3
Richmond, VA	VA	Minimal	<5	2	21	6.3	6.0
Virginia Beach-Norfolk-Newport News, VA-NC	VA	Minimal	<5	2	24	1.3	3.0
Seattle-Bellevue-Everett, WA	WA	Minimal	10	8	19	6.8	14.4
Milwaukee-Waukesha-West Allis, WI	WI	Minimal	<5	2	21	6.2	5.4

Data sources are listed on page 13.

100 LARGEST METROPOLITAN	UNEM	PLOYMENT	OYMENT RATE GROSS METRO PRODUCT		SINGLE-FAI Housing St	POPULATION				
Statistical Areas Sorted by Risk Ranking, then State, then MSA	LATEST	1-YR. Change	LONG RUN AVG.	PE	R CAPITA 2018Q4	1-YR. % Change	PER 1000 PEOPLE 2018Q4	1-YR. % Change	2018Q4 (THS.)	1-YR. % Change
Gary, IN	4.9	0.1	6.1	\$	47,400	5.0	2.8	-7.0	704	0.3
Indianapolis-Carmel-Anderson, IN	3.2	0.0	4.9	\$	67,334	5.6	4.0	5.9	2,036	0.1
Louisville-Jefferson County, KY-IN	4.0	0.1	5.5	\$	58,988	5.6	2.4	-16.7	1,299	0.2
Baton Rouge, LA	4.5	0.4	5.6	\$	66,435	4.6	4.1	-2.4	836	0.2
New Orleans-Metairie, LA	4.6	0.2	6.0	\$	63,099	6.0	2.2	-6.0	1,278	0.1
Boston, MA	3.2	-0.1	4.8	\$	106,700	5.7	1.1	8.3	2,019	0.2
Cambridge-Newton-Framingham, MA	3.0	-0.1	4.6	\$	86,160	5.7	1.0	-2.0	2,395	0.2
Worcester, MA-CT	3.7	-0.1	5.5	\$	57,668	4.6	1.2	-9.7	945	0.1
Baltimore-Columbia-Towson, MD	4.0	-0.1	5.2	\$	73,974	5.4	1.8	-2.3	2,843	0.9
Frederick-Gaithersburg-Rockville, MD	3.3	0.0	3.6	\$	79,979	5.6	2.1	11.9	1,327	0.8
Detroit-Dearborn-Livonia, MI	5.0	-0.4	8.1	\$	52,458	4.0	0.6	-26.6	1,756	0.1
Grand Rapids-Kentwood, MI	2.7	-1.0	5.5	\$	62,018	5.9	2.6	-14.5	1,060	0.0
Warren-Troy-Farmington Hills, MI	3.5	-0.4	6.2	\$	64,800	5.5	2.0	-17.8	2,563	0.1
Minneapolis-St. Paul-Bloomington, MN-WI	2.6	-0.5	4.1	\$	72,167	5.6	2.8	5.5	3,638	0.6
Kansas City, MO-KS	3.2	-0.6	5.2	\$	60,740	5.7	2.7	-9.5	2,137	0.2
St. Louis, MO-IL	3.3	-0.4	5.6	\$	58,153	5.0	2.0	-5.4	2,819	0.3
Charlotte-Concord-Gastonia, NC-SC	3.3	-0.9	5.9	\$	62,230	6.7	6.0	-6.1	2,570	1.1
Greensboro-High Point, NC	3.8	-1.0	5.9	\$	59,445	5.9	2.4	-17.8	776	1.3
Raleigh, NC	3.2	-0.8	4.5	\$	61,749	7.5	7.9	-5.7	1,360	1.2
Winston-Salem, NC	3.5	-0.8	5.5	\$	44,626	5.7	4.5	-6.3	681	1.3
Omaha-Council Bluffs, NE-IA	2.9	-0.1	3.6	\$	66,637	5.6	3.2	-10.2	934	-0.1
Albuquerque, NM	4.4	-1.3	5.4	\$	50,773	5.1	2.4	-8.4	915	0.3
Las Vegas-Henderson-Paradise, NV	4.6	-0.5	6.6	\$	54,017	8.2	4.1	-11.5	2,283	2.4
Albany-Schenectady-Troy, NY	3.5	-0.9	4.7	\$	81,439	5.8	1.6	4.1	885	-0.1
Buffalo-Cheektowaga-Niagara Falls, NY	4.2	-1.4	5.9	\$	79,205	3.9	1.0	7.4	1,136	-0.1
Nassau County-Suffolk County, NY	3.4	-1.1	4.8	\$	73,262	5.5	0.6	-12.4	2,860	-0.1
New York-Jersey City-White Plains, NY-NJ	4.0	-0.5	6.4	\$	88,391	5.6	0.5	-3.9	14,547	0.0
Rochester, NY	3.9	-1.2	5.3	\$	73,798	5.9	1.4	19.2	1,077	-0.1
Akron, OH	4.6	-0.4	6.0	\$	59,117	4.8	1.6	10.2	703	-0.1
Cincinnati, OH-KY-IN	4.0	-0.3	5.4	\$	63,522	5.6	2.1	1.6	2,179	-0.1
Cleveland-Elyria, OH	5.1	-0.1	5.2	\$	66,117	4.7	1.4	-2.0	2,057	-0.1
Columbus, OH	3.9	-0.2	5.0	\$	67,319	6.2	2.4	10.7	2,076	-0.2
Dayton-Kettering, OH	4.2	-0.2	6.0	\$	58,148	5.5	1.4	-6.4	802	-0.1
Allentown-Bethlehem-Easton, PA-NJ	4.5	-0.5	5.7	\$	55,352	5.7	1.5	31.6	841	0.0
Montgomery County-Bucks County-Chester County, PA	3.4	-0.5	4.5	\$	80,728	5.5	1.9	7.0	1,974	0.0
Philadelphia, PA	4.9	-0.8	6.8	\$	60,567	5.3	0.6	-8.8	2,146	0.0
Pittsburgh, PA	4.2	-0.7	5.6	\$	73,262	5.5	1.8	29.4	2,335	0.1
Providence-Warwick, RI-MA	4.0	-0.6	6.5	\$	57,895	5.5	1.0	-7.2	1,625	0.2
Charleston-North Charleston, SC	2.8	-0.7	5.3	\$	51,995	6.0	5.8	-10.6	784	0.6
Columbia, SC	3.2	-1.1	5.3	\$	55,222	6.4	5.2	-2.4	833	0.6
Greenville-Anderson-Mauldin, SC	3.1	-0.7	5.5	\$	50,459	5.9	5.4	5.4	905	0.6
Knoxville, TN	3.4	0.3	5.1	\$	52,446	5.7	4.0	-0.3	887	0.7
Memphis, TN-MS-AR	4.2	0.3	6.0	\$	57,504	5.8	2.2	-14.1	1,361	0.7
Nashville-DavidsonMurfreesboroFranklin, TN	2.9	0.3	4.7	\$	65,693	6.3	6.7	-4.6	1,924	0.7
Ogden-Clearfield, UT	3.2	-0.1	4.5	\$	44,365	6.8	4.1	0.1	679	1.3
Salt Lake City, UT	3.1	0.0	4.2	\$	75,334	6.7	4.5	-2.9	1,228	1.4
Richmond, VA	3.0	-0.8	4.4	\$	67,919	5.7	3.4	-8.7	1,313	1.0
Virginia Beach-Norfolk-Newport News, VA-NC	3.2	-0.8	4.7	\$	61,894	5.3	2.3	-18.3	1,750	1.0
Seattle-Bellevue-Everett, WA	3.3	-0.3	5.0	\$	104,654	7.3	2.1	-12.6	3,047	1.2
Milwaukee-Waukesha-West Allis, WI	3.2	-0.2	5.2	\$	64,631	5.2	1.1	8.5	1,584	0.3

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The map to the right on our website 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).



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- 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.



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