Arizona Housing Affordability Update
October 2022

The U.S. and Arizona housing markets are in the midst of a sharp correction – the first since the Great Recession. Prices peaked in June and have fallen over 3% through September. Ongoing rising interest rate pressures, a collapse in buyer interest, and lags in the construction and permit approval cycle will likely put continued downward pressure on prices over the next 6-12 months.

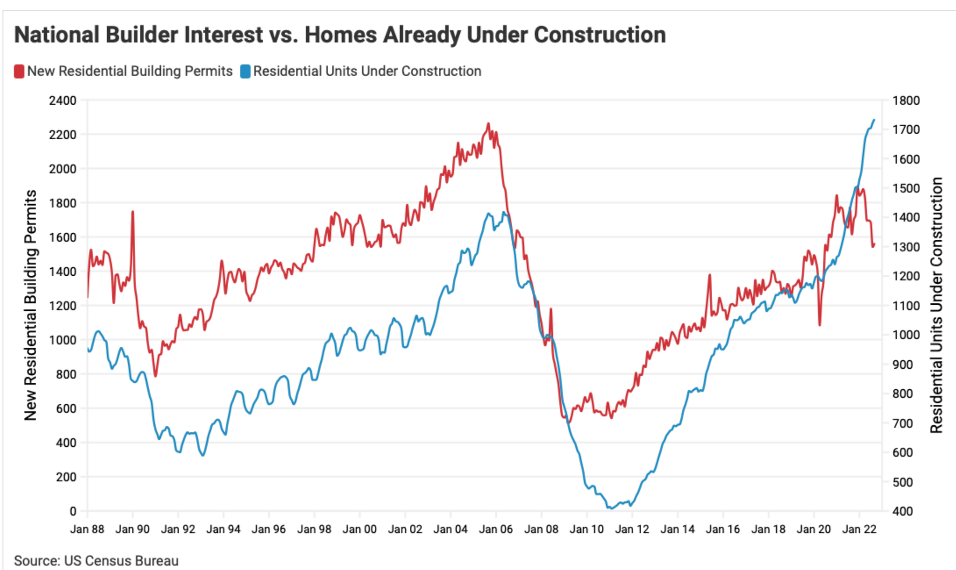
Key Findings

- The Phoenix Homebuyer Misery Index remains severely elevated, at 200.2 in September – nearly double its long-run average level of 103.2. Homebuyer misery increased 1.1% last month despite falling prices, due to rapidly rising mortgage interest rates (now over 7% - a 20 year high).
- Home prices are likely to fall about 15% in Arizona from their all-time peak, which was reached in June. However, because of elevated interest rates, the misery index may only fall to 187.4 (-8.1%) at the price trough – remaining well above historical leverages and potentially disappointing waiting buyers.
- More than 1.7 million homes are currently under construction in the United States (the most ever); those homes will come to market even as homebuilder sentiment collapses and developer desire to try and sell a new home craters.
- Arizona's housing unit shortage fell in 2021, to 98,190 (-5.7% from a revised deficit of 104,000 units in 2020). Though Arizona's current permit pace would close that gap within 7 years, it is unlikely current builder interest and pace of construction will survive the housing recession.

Given the direction of interest rates and current economic conditions, Arizona's housing market is likely to continue cooling over the next 6-12 months. Given changing economic conditions, insufficient supply to meet homebuyer demand, and likely reluctance by existing homeowners to sell at a loss, it is more important than ever that state and local policymakers take steps to protect and promote homebuilding.

Housing Market Slowdown Comes Just As Construction Began to Catch up to Demand

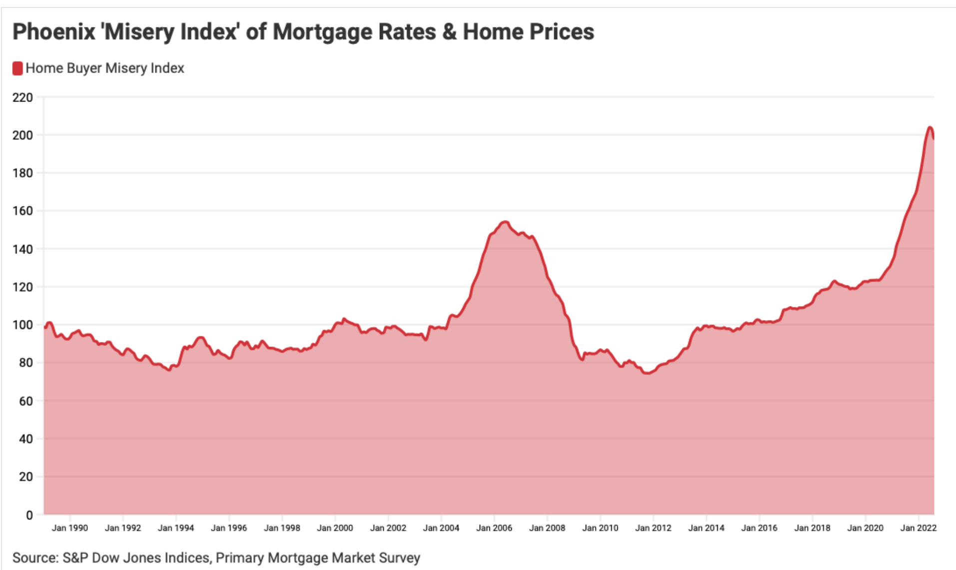
During and after the 2008 'Great Recession', national new home construction experienced a dramatic slowdown, and recovery was slow. This phenomenon was particularly stark in Arizona, where permit activity fell from a 2005 peak of nearly 90,000 new-unit authorizations to just 12,600 in 2010. By 2019 Arizona was authorizing just 45,000 new units a year – about half its pre-Recession level.



Finally, following the 2020 pandemic and related restrictions, Arizona and the U.S. appeared to be on the cusp of a building boom. Indeed, CSI Arizona's initial report on the Arizona housing market based on May data described relatively "rapid home construction", and subsequent reports described a "nascent construction boom". Permit activity surged to the equivalent of an annualized 77,000 units/year being authorized for construction in Arizona.

Since then, sentiment has collapsed – permit activity is slowing rapidly, and surveys of homebuyer and homebuilder confidence reflect the coolest sentiment since the Great Recession (excluding the temporary lockdown period). However, supply and regulatory constraints (construction times have increased 25% since 2012[i]) have created a curious and unprecedented inversion, in that collapsing buyer and developer interest comes just as the home construction pipeline continues to peak. **More than 1.7 million homes are currently under construction in the United States (the most ever), and this supply will continue entering the market over the next 8-9 months even as demand evaporates.** That will exacerbate downward price pressures and could have broad consequences. Developers are likely to take substantial losses on these properties relative to expectations when development began.

Despite Falling Prices, Home Buyer Misery Remains Elevated by Rising Rates



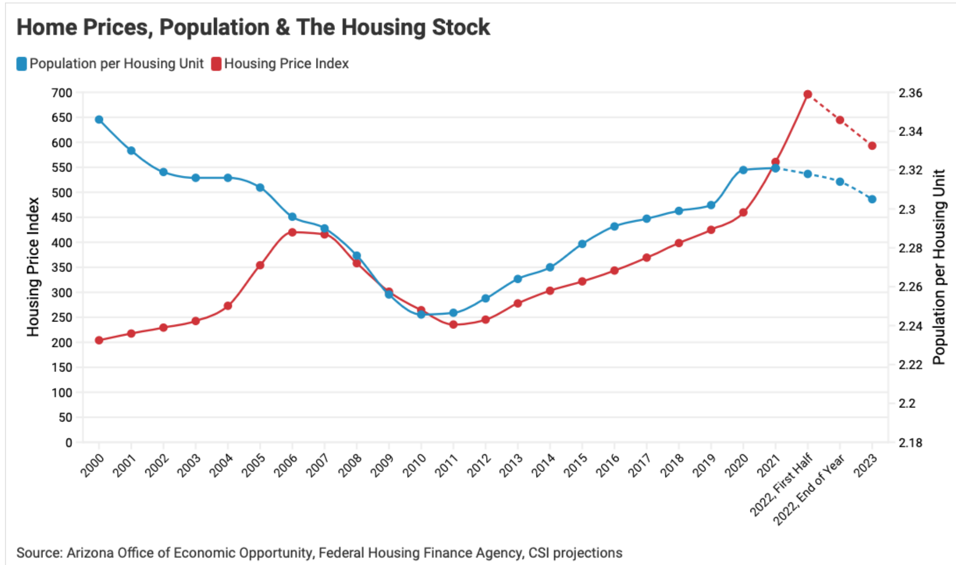
In September, the Phoenix 'Misery Index' was 200.2 – an increase of 1.1% from August and a decline of (1.8%) from the all-time peak value of 203.9 reached in June.

Despite prices falling over 4% from their all-time peak in the Phoenix metro market, CSI's homebuyer 'Misery Index' is down only about 2% relative to its peak and is likely to remain elevated even as prices continue falling. This is because rapidly rising interest rates are offsetting price declines. Since September, interest rates have reached two-decade highs and are at approximately 7.0%. Assuming home prices continue to fall at approximately 1%/month, the Index will increase again in October (higher even than the June peak), reflecting that conditions for home buyers remain challenging despite moderate price relief.

As a reminder, the Misery Index sums normalized and equally weighted home prices and 30-year mortgage rates to measure effective costs of homebuying relative to historical levels. The index is set to a value of 100 in January, 2000. Interestingly, the long-run (30-year) average level is also approximately 100; since 1990 home price appreciation has been offset by falling mortgage rates. The two periods of marked deviation from this trend were the 2006 'housing bubble', and the current market.

To return to a long-run average level would require dramatic and improbable declines in both prices and mortgage rates.

Local Market Fundamentals in Arizona Suggest Moderate Price Declines Coming

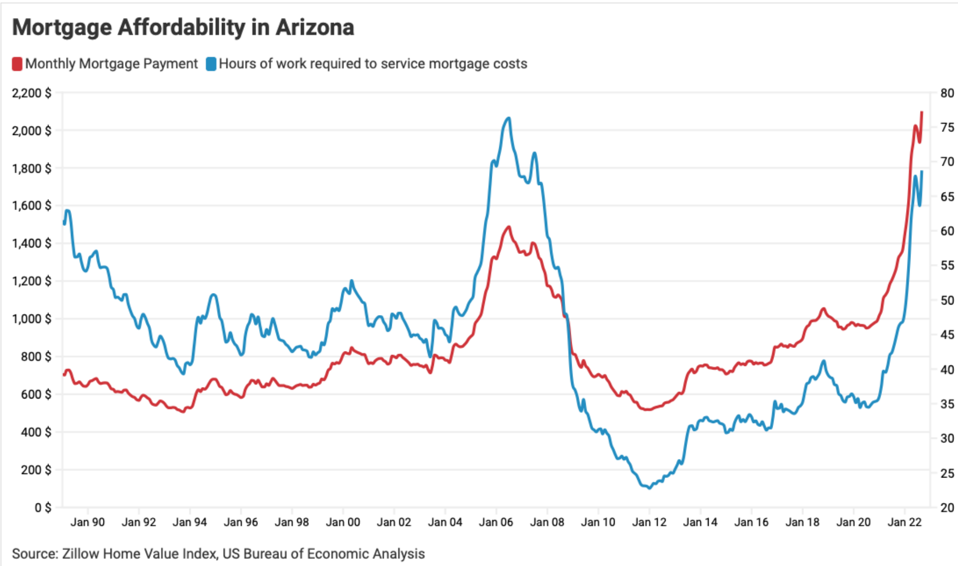


Historically, housing price changes have shown a strong relationship with both population – especially relative to available housing supply – and mortgage rates, or the costs of borrowing. Specifically, about half the variability in Arizona home price changes since 2000 can be explained by changes in the ratio of population to housing units, and the average interest rate on a new 30-year mortgage. When the population per housing unit ratio is high, or mortgage rates are low, prices tend to increase; when the reverse is true prices tend to fall. Over the observed 22-year window, in fact, there were only two periods that experienced marked deviation from this expected trend: 2005 and 2006, and 2021 through the first half of 2022. During both events, prices increased much more quickly than this simple model of supply and demand would have predicted. Correspondingly, subsequent price declines following the first marked deviation were larger than would have been expected based solely on relatively higher interest rates and low population per housing unit (or, alternatively, a high supply of housing relative to the state's population).

According to the All-Transactions House Price Index for Arizona[ii], home prices in 2021 were 22% higher than the year prior, and over the first six months of 2022 prices rose another 24% - for a cumulative increase of over 50% in just 18 months. Many of these gains can be explained by relatively rapid in-migration-driven population growth during the pandemic period, historically low interest rates, and a general shift in consumer demand for housing. Correspondingly, rising rates and a slowdown in homebuilding will lead to lower price growth. However, some of this rapid appreciation goes beyond what fundamentals – population and borrowing costs alone – would predict. That differential creates a "price gap" that appears to be rapidly correcting in the face of collapsing demand as the economic cycle peaks.

Given these trends in interest rates, homebuilding, and population growth, **CSI anticipates that home prices will need to fall approximately 15% from their June 2022 peak by the end of 2023 to return to levels supported by underlying economic fundamentals**. To-date, home price declines have been closer to 4%, suggesting further price declines are likely over the next 6-12 months. This analysis assumes both that homebuilding does not slow more over the next year than is already anticipated by the slowdown in new permit issues through August, and that average mortgage interest rates over the next year are 7%.

Mortgage Affordability Continued Falling in the Last Quarter Despite Declining Prices



Source: Zillow Home Value Index, US Bureau of Economic Analysis

Rising interest rates have more than offset any gains in homebuyer position since home prices in Arizona peaked in June. In September the monthly mortgage payment on an average Arizona home reached $2,100 (+8.6% month-over-month) – an increase of 3.8% from June when statewide prices were about 3% higher. The increase in debt service costs is being driven entirely by rising 30-year mortgage rates, which averaged 6.11% last month and have increased almost 11% since home prices peaked in June. Rates today are even higher, and the average rate for October will be in the 7% range. The last time mortgage costs were this high was in 2001.

At prevailing hourly Arizona wages, a typical household would need to work 68.72 hours per month (+8.0% month-over-month) to service a mortgage at these prices and rates. In terms of household time, these are the highest homebuying costs since 2007 and roughly double the 34.81 hours of work requirements in September 2020.

Since 1989, a household has needed to work on average about 44 hours/month to meet current mortgage service costs, and in practice an average household cannot sustain more than about 72 hours/month at average interest rates and home prices while still meeting lender expectations that no more than 28% of monthly income go to mortgage costs. If prices fall 15% while mortgage rates remain at 7.0% household work-time requirements would still be 65.23 hours – much higher than levels over the past decade and likely inconsistent with consumer expectations.

Arizona's Housing Supply Hasn't Kept Pace With Demand

Arizona's housing supply deficit in 2021 decreased slightly to 98,190 units from just over 104,000 units in 2020 (-5.7%). Still, the deficit in 2019 was just 66,940 units – reflecting the rapid change in Arizona's housing market during the pandemic era driven by the combination of brisk in-migration, increased demand for housing during the nations experiment with stay-at-home orders, and the slowdown in permitting and homebuilding during 2020. Just to keep pace with natural population growth and historic household formation, the state needs to add roughly 43,900 new housing units annually; if we were to close the shortfall implied by current rates within five years, this annual demand for new supply increases to 63,580 units.

As of September, Arizona is on track to permit over 65,000 new residential units for construction this year, and CSI projects that only 53,270 finished housing units will be added during 2022 with another

54,400 added during 2023. At this pace, the housing stock would grow quickly enough to eliminate the shortfall implied by current vacancy rates within 7 years. This level of construction activity, however, is well above the post-Great Recession average of just over 23,000 units annually and it remains to be seen

Arizona's Housing Shortage Since 2019

County	2019 Deficit	2020 Deficit	2021 Housing Deficit Rank	2021 Deficit	Deficit as Percent of 2021 Existing	Annual construction needed over 5 yrs to close the gap
Apache County	(175)	(957)	5	(1,092)	3.78%	60
Cochise County	(707)	(2,193)	7	(1,424)	2.41%	385
Coconino County	1,028	(2,467)	8	(1,538)	2.20%	756
Gila County	(613)	(967)	6	(1,172)	3.60%	261
Graham County	(57)	(272)	3	(404)	2.90%	130
Greenlee County	132	(63)	1	(111)	2.52%	2
La Paz County	280	(243)	2	(379)	2.77%	(58)
Maricopa County	(40,199)	(60,514)	15	(59,186)	3.20%	42,165
Mohave County	(3,966)	(3,652)	11	(4,756)	3.98%	2,385
Navajo County	(1,485)	(922)	9	(2,229)	3.92%	554
Pima County	(8,259)	(14,796)	14	(13,324)	2.81%	6,796
Pinal County	(3,762)	(6,767)	13	(5,311)	2.96%	5,112
Santa Cruz County	(219)	(537)	4	(666)	3.51%	245
Yavapai County	(3,395)	(5,226)	12	(5,125)	4.14%	3,094
Yuma County	(2,789)	(1,817)	10	(3,347)	3.57%	1,298
Arizona Shortage	(66,939)	(104,087)		(98,192)	3.13%	63,583

Source: US Census Bureau, CSI calculations

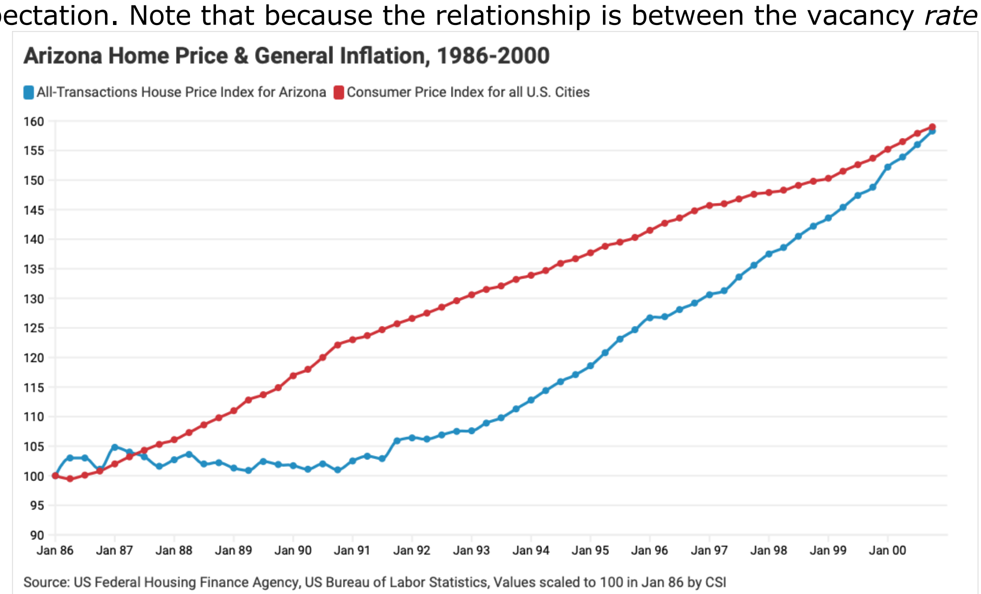
whether it will persist through the ongoing real estate slowdown. For context, 2022 annualized residential construction permitting activity has slowed from a high of over 77,410 units projected in March to 65,360 projected through the end of the year in September.

CSI Arizona's projected housing supply deficit exploits the historical correlation observed between the change in home prices and the effective housing vacancy rate (weighted across both the rental and owner-occupied housing stock)[iii]. Since 1986 the average effective vacancy rate for Arizona housing has been 5.00%. In 2009 – at the peak of the Great Recession and during a period of rapid home price depreciation – the vacancy rate reached its contemporary peak of 8.41%. In 2019, heading into the pandemic and the current period of unusually volatile home prices, vacancy rates were already relatively low at 2.88%. As of 2021 the rate had fallen to just 2.20% - the lowest Arizona vacancy rate on record and suggesting an extremely tight state housing market.

To estimate the housing deficit implied by deviations of county-by-county and statewide vacancy rates from their long-run average, CSI determined how many new housing units would need to be added to the existing stock to bring (assuming these new units immediately became available for purchase or rent) the local vacancy rate back up to 5.0%.

The core presumption is that at an effective average vacancy rate of 5.0% across the states housing markets, there is sufficient housing liquidity to give buyers necessary choice, but not so much as to prevent sellers from completing a timely sale. Home price appreciation during these times should be reasonable and constrained by prevailing inflation. When the vacancy rate is below this figure, we assume there is insufficient supply of willing home sellers relative to buyers, and prices will rise more quickly than general inflation. Conversely, when the reverse is true, we assume inflation-adjusted prices will fall. The intuition here is similar to the information revealed by unemployment rates in the labor market: generally, periods of low unemployment are marked by rapid wage increases, and the converse is associated with falling wages.

Importantly for us, this approach does not require CSI to try and determine what an 'ideal level' of housing supply is. They are also remarkably stable over time: 5.00% since 1986; 4.99% over the past 20 years; and 5.00% during the 15-year period from 1986 to 2000. **And during the 15-year period of 1986-2000, when the Arizona home vacancy rate exhibited about one-quarter of the volatility seen in the last 15 years about its 5.00% average, the state's home prices increased 58% - versus a 59% increase in general prices due to CPI inflation**. This remarkable fact is highly consistent with our theoretical expectation. Note that because the relationship is between the vacancy *rate* and the *rate of change* in home prices (and not the price level), periods of high volatility in vacancy rates (like the recent period of historically low rates) can produce price levels that persistently and dramatically diverge from trend (given by general price inflation), even if the average vacancy rate remains at 5.00% over the longer run.



[i] "New Residential Construction Length of Time". *U.S. Census Bureau*. Retrieved on October 19, 2022.

[ii] "House Price Index". *Federal Housing Finance Agency*. Retrieved on October 19, 2022.

[iii] Herriges, Daniel. "What Vacancy Rates Tell You About a Housing Shortage (And What They Don't)". *Strong Towns*. August 31, 2020.