

ECONOMIC COMMENTARY

Comparing Two House-Price Booms

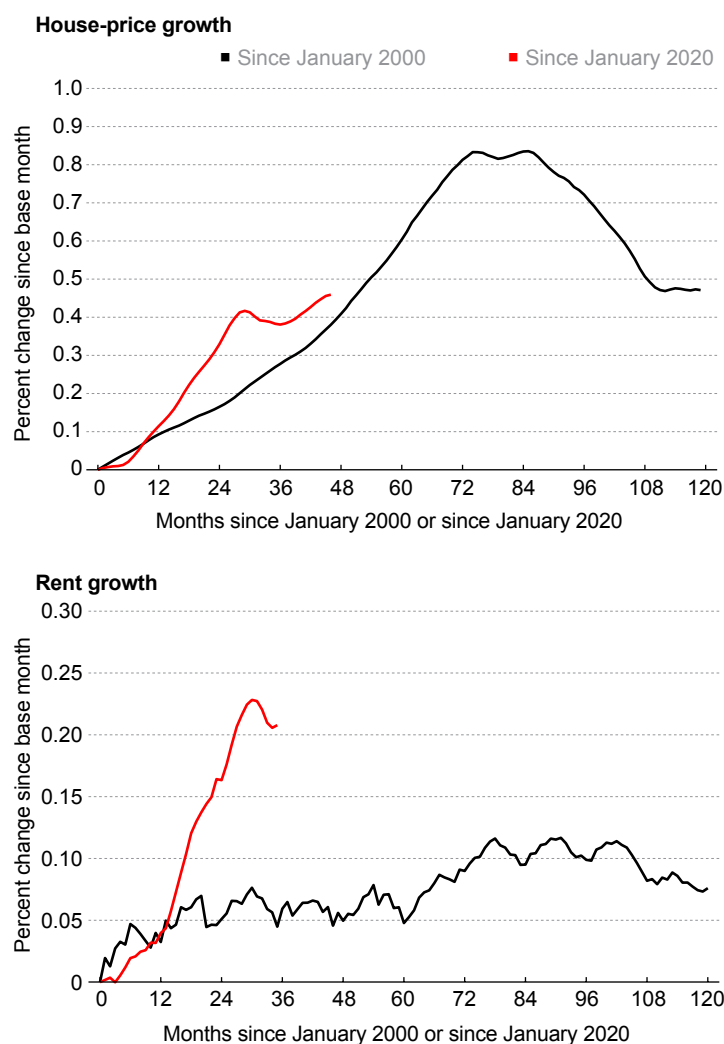
Lara Loewenstein, Jason Meyer

In this *Economic Commentary*, we compare characteristics of the 2000–2006 house-price boom that preceded the Great Recession to the house-price boom that began in 2020 during the COVID-19 pandemic. These two episodes of high house-price growth have important differences, including the behavior of rental rates, the dynamics of housing supply and demand, and the state of the mortgage market. The absence of changes in fundamentals during the 2000s is consistent with the literature emphasizing house-price beliefs during this prior episode. In contrast to during the 2000s boom, changes in fundamentals (including rent and demand growth) played a more dominant role in the 2020s house-price boom.

There have been two US house-price booms in the 21st century. The first, which occurred from about 2000 to 2006, preceded the Great Recession and was followed by a substantial fall in house prices and a spike in foreclosure rates. The second started during the COVID-19 pandemic, with annual house-price growth exceeding that of the 2000s boom (see Figure 1). However, as of October 2023, we have yet to see a price correction. In order to better understand the dynamics of the 2020s boom, this *Economic Commentary* makes use of a variety of data sources to detail a selection of similarities and differences between the 2000s and 2020s house-price booms. Specifically, we will discuss the following four aspects of the housing market and how they did or did not differ between the two booms: house price and rent growth, housing supply, housing demand, and mortgage markets.

The results offer some takeaways. First, the 2000s house-price boom was almost certainly not driven by a change in current fundamentals, but, rather, was most likely driven by expectations about future house-price growth.¹ By contrast, a large part of the increase in house prices in 2020–2022 can be explained by a change in underlying fundamentals, specifically rent growth and inflation. Second, during the 2000s, housing supply grew faster than housing demand, while during the 2020s, demand outpaced supply. This context provides some information on why house prices today may follow a different trajectory than they did in the 2000s. Third, the nature of mortgage lending during the 2000s exposed the financial sector to much more risk than we see in the mortgage market today.

Figure 1: Nominal House-Price and Rent Growth since Start of Boom



Source: Authors' calculations using CoreLogic house-price indices and MLS rental listings

Lara Loewenstein is a research economist at the Federal Reserve Bank of Cleveland. Jason Meyer is a research analyst at the Federal Reserve Bank of Cleveland.



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House Price and Rent Growth

As can be seen in the top panel of Figure 1, both the 2000–2006 and 2020–2022 periods saw house prices rise more than 30 percent. By contrast, the dynamics for rents played out differently. During the 2000s boom, nominal rents were very stable, rising slightly relative to those at the beginning of the boom (bottom panel, Figure 1). Between 2020 and 2023, rents rose over 20 percent, a figure which was less than house prices rose over the same period but still substantially faster than rents rose during the 2000s.

When considering whether housing is overvalued, house prices and rents play the same role as prices and earnings for stocks. The rental rate for a home represents the value of the shelter that home provides over that period. In some ways, this value is similar to a dividend. By contrast, the price of a house depends on both the current rental value of the home and also expectations about the value of that home in the future and how much the buyer values its current rental value relative to the future rental value (the buyer’s “discount rate”). These terms can be related to house prices using the Gordon growth formula in the same manner as often applied to stock valuations:

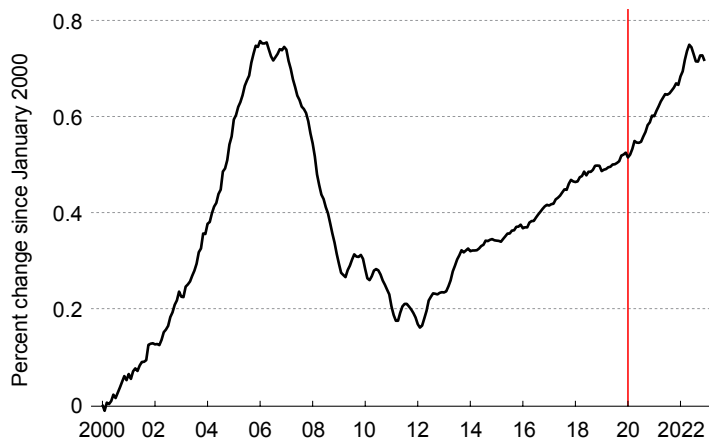
$$\text{House price} = \frac{\text{Rent}}{r-g}$$

where r is the discount rate and g is the growth rate of rent.

Based on this formula, the fact that rents were not rising during the 2000s boom implies that the entire change in house prices was being driven either by a change in the discount rate (r) or a change in expectations about the growth rates of future rents (g). However, it is unlikely that the reason for the change is the discount rate because, for example, a change in the discount rate would likely affect the valuation of all assets, not just real estate assets. But the price–earnings ratio in the stock market was declining in the early 2000s and was then fairly stable between 2002 and 2007. Alternatively, if it was a change in the discount rate specific in housing, it would have affected house prices across the United States, not just in specific locations (which is what happened in the 2000s). It is more likely that people’s expectations about future rent growth (g) had shifted up (Foote et al., 2021). By contrast, a large amount of the increase in house prices during the 2020s boom can be explained by an increase in rents. In other words, the 2000s boom was driven by a change in people’s perceptions about the future value of housing, whereas the 2020s house-price boom was largely driven by a change in current fundamentals.

The change in house prices relative to rents is often captured in an indicator called the price-to-rent ratio, a measure of which is depicted in Figure 2. It shows that the 2000s housing boom was characterized by a large increase in the price-to-rent ratio followed by a decline as house prices rose and then fell while rents remained relatively unchanged. By contrast, the increase in the price-to-rent ratio from 2020 onward is much less severe.

Figure 2: Growth in the Price–Rent Ratio



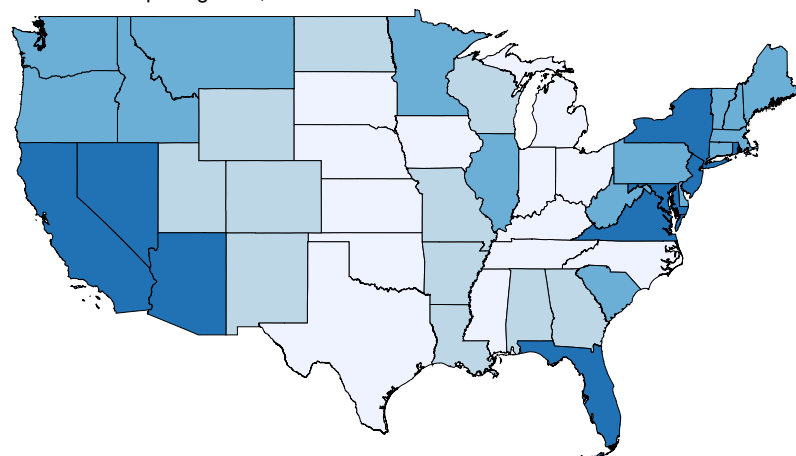
Source: Authors’ calculations using CoreLogic house-price indices and MLS rental listings

Notes: The rent index is a repeat transaction index created using MLS rental listings. Values are percent changes since January 2000.

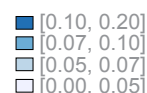
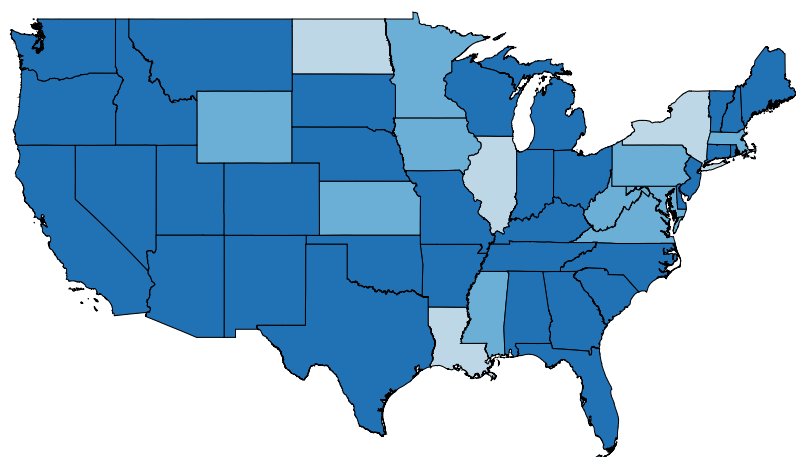
A few aspects of the price-to-rent ratio plotted in Figure 2 are worth pointing out. First, there is a secular upward trend that is most apparent between 2010 and 2020. One possible reason for this trend is a documented long-run decline in discount rates (Amaral et al., forthcoming). Following the Gordon growth formula, this decline in discount rates leads to a higher value of future rental income relative to today’s, a perception which results in a higher price of the house without a change in rents, driving the price-to-rent ratio upward.² Second, large enough data sets on rental contracts became available to researchers and policymakers only after the Great Recession, specifically through CoreLogic’s multiple listing service data collected under its Partner Info-Net program that began in 2010. During the 2000s housing boom, policymakers compared the BLS tenant rent index to a repeat-sales house-price index (Loewenstein and Willen, 2023). The BLS tenant rent index is based on a monthly survey of a sample of all renters and, therefore, is a measure of average rent growth for all renter-occupied housing units whether or not the occupant signed a new lease. Since not all renters move or sign a new lease every month, or even every year, rents on new leases are more volatile and are more reflective of current market dynamics than the average rent growth experienced by all renters. They are also a better comparison to transaction-based house-price indices because they are also based on people’s moving locations as opposed to their continuing to rent their current homes. In Figure 2, the rent index in the denominator is a repeat-transaction index based on rental listings on the MLS (Multiple Listing Service), which reflects prices of newly signed leases. These data allow us to confirm that even rents for new tenants during the 2000s boom were stable; conversely, they were growing rapidly during the 2020s.

Figure 3: Annual House-Price Growth by State

Annual house-price growth, 2000–2006



Annual house-price growth, 2020–2022



Source: Authors' calculation using CoreLogic house-price indices

Note: Values are the average annual percent change in CoreLogic's single-family combined house-price index for each state.

Another, related, difference between the 2000–2006 and 2020–2022 booms is that house-price growth during the 2000s was concentrated in certain states. Often the “sand states”—California, Nevada, Arizona, and Florida—are cited as the primary drivers, but the northeastern United States also saw high house-price appreciation relative to that in the rest of the country. As can be seen in Figure 3, these states saw higher than 10 percent annual house-price growth between 2000 and 2006. The remaining states had lower house-price growth, and many states did not experience rates above 5 percent annually.

The experience was strikingly different during the more recent boom. Between 2020 and 2022, a plurality of states saw annual house-price growth above 10 percent, including many in the Midwest, and no state had house-price growth below 5 percent. This widespread experience during the 2020s points to a large macroeconomic shock, most obviously the COVID-19 pandemic, as the principal catalyst. The pattern is consistent with the demands of people everywhere for more housing. By contrast, the 2000s boom saw higher house-price growth in specific states. This is another reason why a change in discount rates is an unlikely reason for the increase in the price-to-rent ratio during the 2000s. Though the discount rate may vary across different markets or states, these differences are likely to be relatively small, and thus they are relatively small contributors to the larger differences in house prices. As such, it is difficult to

imagine a change in the cross-sectional variation in the discount rate big enough to explain the cross-sectional variation in house-price growth during the 2000s. As established above, rents were not increasing along with house prices in the 2000s, leaving a large component of unexplained variation in house prices that must be explained by expectations.

Many home mortgages in the United States are nonrecourse (that is, the lender cannot pursue repayment other than by seizing the collateral, in this case, the house), so a fall in house prices may lead borrowers to default if they owe substantially more on their mortgage than their house is worth (commonly called being “underwater”).³ Because of this dynamic, the foreclosure crisis that followed the 2000s boom also fell disproportionately on the states that had high house-price growth since they also saw the most substantial falls in house prices. However, other areas that saw almost no house-price appreciation in the early 2000s also saw very high foreclosure rates as the subsequent recession took its toll (Loewenstein, 2020). This occurred in large part because a recession is accompanied by job losses. Areas such as the so-called “Rust Belt,” or industrial heartland, did not experience much of a house-price boom in the early 2000s but still saw high foreclosure rates and dramatic falls in house prices as a result of high unemployment and population loss in the region.

Housing Supply

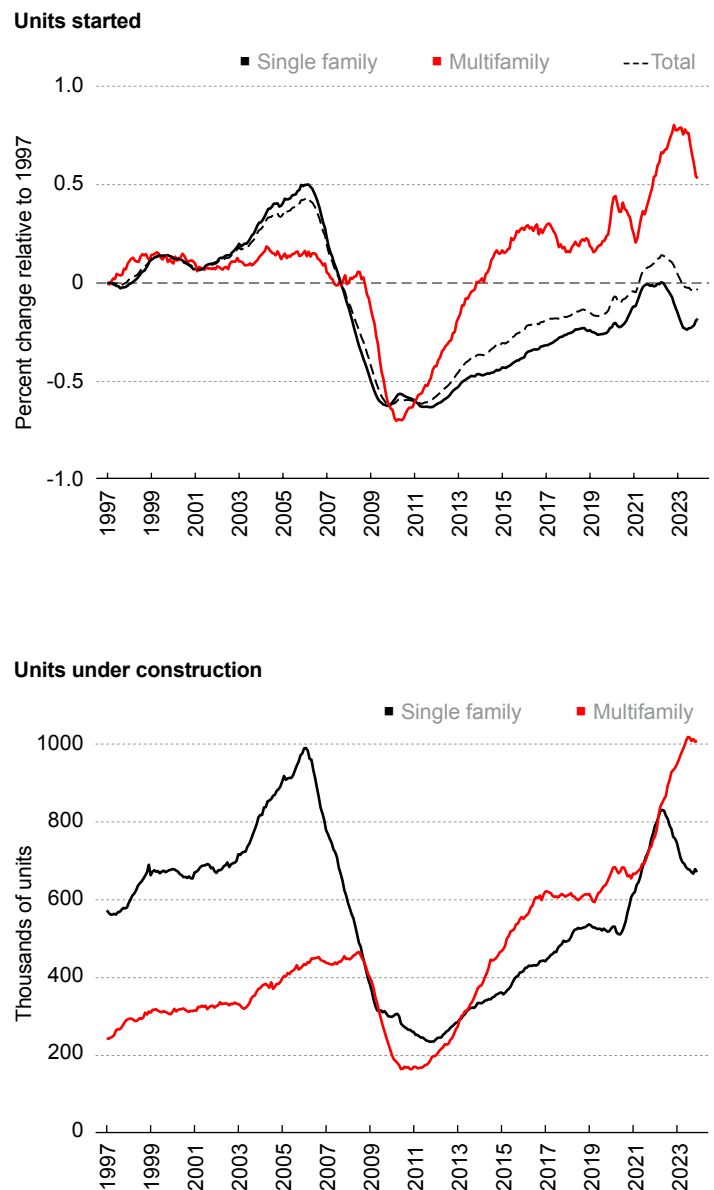
A rapid increase in prices indicates a mismatch between demand and supply growth. It is evident that demand increased during both booms, although for different reasons, as highlighted in the previous section; we elaborate further below. In terms of supply, housing is a durable asset with a long lifespan, so almost all changes in supply come from new construction activity.

Both house-price booms saw increases in construction activity, with some notable differences. First, levels of the total number of construction starts were much higher during the 2000s than during the 2020s. The top panel of Figure 4 separately plots the percent change in total construction starts and numbers for single-family and multifamily units separately since January 1997, a few years prior to the 2000s boom. Total construction starts grew about 40 percent between 1997 and 2006. They then fell dramatically during the Great Recession and have since slowly recovered. While housing starts increased during the 2020s boom, as well, they did so from a relatively low level and by a smaller percentage change than they did in the 2000s.

The composition of construction starts also differed between the two booms. The 2000s boom saw a relative increase in construction of single-family homes, while the 2020s saw a relative increase in the construction of multifamily units.⁴ Multifamily housing starts remained relatively flat between 1997 and 2008, following which starts plummeted during the Great Recession. By contrast, single-family housing starts increased by about 50 percent between 1997 and 2006. While single-family starts also fell during the Great Recession, they were much slower to recover than multifamily starts, remaining below their 1997 level until 2021. Since single-family housing makes up the majority of the stock of housing units, the growth in total housing units (the black dashed line in Figure 4) follows the single-family housing trajectory more closely.

The lower number of starts during the 2020s was, and perhaps still is, compounded by supply chain constraints that lengthened the construction times for both single-family and multifamily units.⁵ Average time from start to completion from 2019 to 2022 has increased by 20 percent for single-family units and 10 percent for multifamily units.⁶ These constraints have had a bigger impact on the multifamily market because the quantity of multifamily units currently under construction exceeds the number of single-family units. The bottom panel of Figure 4 plots the number of units currently under construction. During the pandemic, the number of single-family and multifamily units under construction increased, but the number of single-family homes in the pipeline never surpassed its peak of the mid-2000s and has started to fall as single-family starts have declined and those in construction have been completed. By contrast, the number of multifamily units under construction is at very high levels relative to historical numbers, more than double what it was at the peak of the 2000s boom, and has yet to start declining.

Figure 4: Construction Starts and Units under Construction



Source: US Census Bureau Survey of Construction

Notes: The top panel plots the percent change in the 12-month (equal weighted) moving average of the seasonally adjusted annual rate of unit starts relative to the value in January 1997. The bottom panel is a plot of single-family and multifamily units under construction.

Housing Demand

One measure of demand for new housing units is the number of new households being formed. Figure 5 plots the number of households formed over three-year periods going back to 1993–1995. Household formation did not increase during the 2000s boom.⁷ The number of households grew by 3 percent every three years until 2004, after which it slowed during the peak years of the 2000s boom and then declined further to 1 percent during the Great Recession. By contrast, the 2020–2022 period saw the highest rate of household formation in recent history.

Further, housing supply has not kept pace with the increase in demand. The Census estimates the stock of livable housing units in the United States and also measures the number of households and defines the number of occupied housing units as equal to the number of households. By definition, the housing stock therefore exceeds the number of households since housing units may be vacant for a few reasons: (1) people own second homes, or some homes for rent are occupied only seasonally; (2) homes may be vacant while for sale or for rent or while undergoing repairs; or (3) some homes may be held off the market for occasional occupancy by persons with a primary residence elsewhere (such as someone who has moved into a nursing home). We can therefore decompose the growth in the housing stock as follows:⁸

$$\frac{\Delta \text{Housing Units}_{t-1,t}}{\text{Housing Units}_{t-1}} = \frac{\Delta \text{Households}}{\text{Housing Units}_{t-1}} + \frac{\Delta \text{Vacant Housing Units}}{\text{Housing Units}_{t-1}}$$

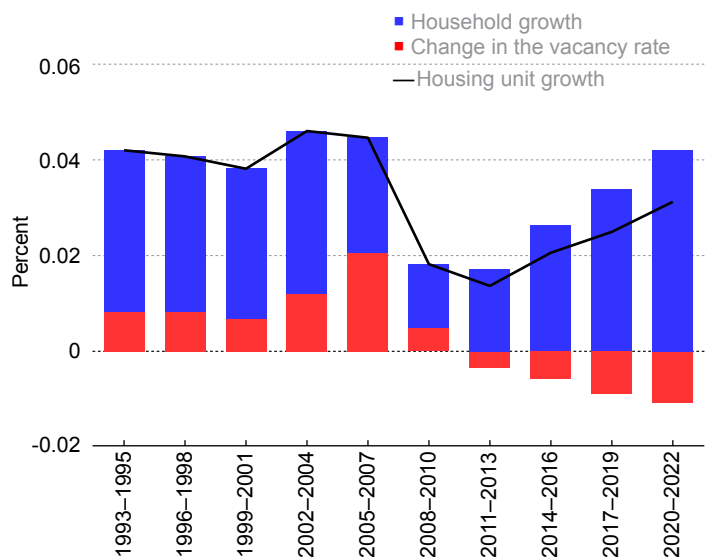
where the term on the left-hand side of the equation is the percent change in housing units between t and $t - 1$, the first of the two terms on the right-hand side is, effectively, growth in the utilization rate of the housing stock, and the last term is the change in the vacancy rate. The growth in utilization rate of housing stock can also be expressed as the rate of change of occupied housing stock, a rate which is equivalent to the rate of household formation as a share of housing units.

As can be seen in Figure 5, the housing stock grew quickly during the 2000s boom, although not much faster than it had been growing in the previous decade. However, the change in the growth rate was largely explained by an increase in the vacancy rate: the supply of housing was increasing faster than demand as measured by household formation. During the Great Recession, growth in housing units declined, as did household formation, although the vacancy rate increased slightly. However, from 2011 onward, as growth in the housing stock increased, the utilization of the housing stock also increased. Household formation picked up, and the vacancy rate declined, and when taken together, these two facts mean that a higher share of the housing stock served as year-round residences for households. This pattern can also be seen in the levels of the vacancy rate in Figure 6, which shows that the housing vacancy rate increased from about 12 percent to more than 14 percent during the 2000s boom but has been declining since, most recently hovering just above 10 percent.

These data points support the story of the two house-price booms told above, that house-price growth in the 2000s boom was largely driven by expectations of future house-price growth,

an expectation which was not in line with fundamentals, whereas in the 2020s it has so far been largely driven by increased demand for housing relative to supply. The increase in the vacancy rate during the 2000s implies that housing units were being built with the expectation that demand for housing would be high in the future, not because it was high at that time.⁹ By contrast, during the 2020s the combination of lower levels of aggregate housing starts, the longer construction pipeline, and increased household formation meant that demand grew faster than supply, collectively resulting in a rise in prices.

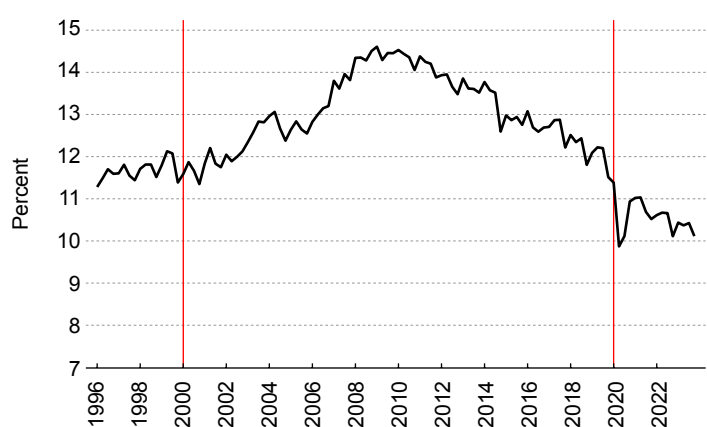
Figure 5: Sources of Growth in Housing Stock



Source: Authors' calculations using the Current Population Survey/Housing Vacancy Survey

Notes: Housing stock comprises occupied and vacant units. By definition, the number of occupied units is equal to the number of households. Therefore, we can decompose the percent change in the housing stock into the percent change in households and the change in the vacancy rate. Values reflect the change over the indicated three-year period.

Figure 6: Share of Housing Units That Are Vacant



Source: Current Population Survey/Housing Vacancy Survey

Note: The Census defines the number of occupied housing units to be equal to the number of households, so second homes and vacation properties are considered vacant.

Mortgage Markets

The mortgage market, especially subprime lending, received substantial negative press during the bust that followed the 2000s house-price boom. A widely disseminated narrative was that nonstandard mortgage products were used as tools by predatory lenders to persuade borrowers into purchasing homes they could not afford, and that securitization allowed lenders to avoid experiencing losses when the borrowers eventually defaulted. While this explanation has been questioned by studies in the years after the crisis,¹⁰ there are material differences between the mortgage market in the 2000s boom versus the current market.

The most important difference in the mortgage market between these two periods is that the aggregate stock of mortgage debt simply has not increased as much to date relative to income in the 2020s as it did in the 2000s. This can be seen in the top panel of Figure 7, which plots the ratio of aggregate mortgage loans on 1–4-family homes held by households and nonprofits to personal disposable income. During the 2000s, this ratio rose from around 0.6 to almost 1. During the subsequent decade, this ratio fell, again reaching about 0.6 in 2020. By contrast, from 2020–2022, this ratio rose to only about 0.65. This moderate increase in the ratio indicates that irrespective of what is happening with house prices, the outlook for the ability of households to continue servicing their mortgage debt today is much more favorable than it was during the mid-2000s.

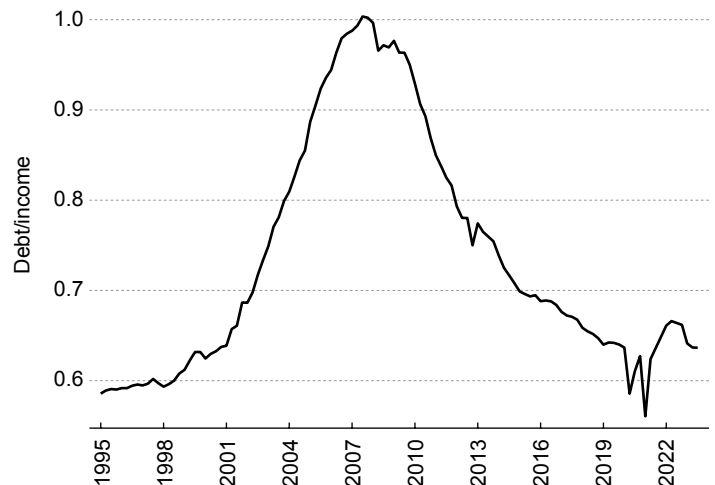
The second major difference between the mortgage market during the two booms is the source of funds for newly originated mortgages. Subprime loans and Alt-A loans¹¹ were common during the 2000s boom. They were originated and then sold into private-label securities, a pool of loans packaged by a private entity and then sold to investors. Mortgage securitization, per se, was not a new phenomenon in the 2000s. By that time, Fannie Mae, Freddie Mac, and issuers of Ginnie Mae securities had been securitizing mortgages for decades. But securities issued by the government (or those issued within the confines of a government program) came with insurance: If the borrower defaulted on their loan, the investors in the securities would still receive the face value of the loan. This insurance did not mean that investors faced zero risk, but that this risk was of a different sort. Borrowers could pay their mortgage early by moving or refinancing, a situation which would reduce the return earned by investors. But investors in private-label securities did not have default insurance, so they would and did face losses when borrowers defaulted. This is not to say that there are not losses on government-insured mortgages, but, rather, that these losses are borne by tax payers in the form of funding for the government institutions that provided the credit insurance and are therefore more widely dispersed, both across the population and over time.

The bottom panel of Figure 7 is a plot of total outstanding mortgage debt that is then subdivided into the source of funds for these mortgages over time. The blue section represents mortgages in Ginnie Mae securities, which are pools of mortgages, most of

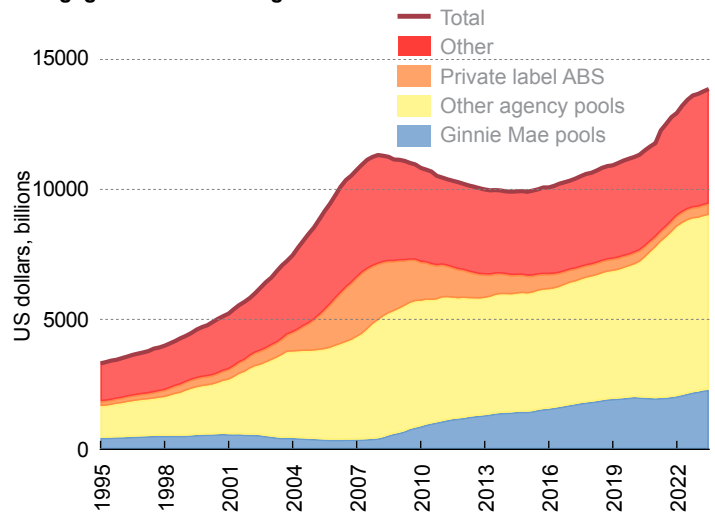
which are insured by the Federal Housing Administration (FHA) or the Veterans Administration (VA). The yellow section includes all the loans in Fannie Mae and Freddie Mac securities, and the orange section includes all loans securitized in private-label securities. The remainder of loans outstanding (which include, for example, those held on bank balance sheets) appear in red.

Figure 7: Mortgage Debt Outstanding

Aggregate debt-to-income ratio



Mortgage debt outstanding



Source: Financial accounts of the United States

Notes: The top panel shows the ratio of outstanding loans on 1–4-family homes relative to personal disposable income of households and nonprofits. The bottom panel shows total outstanding mortgage debt on 1–4-family homes over time broken out into the amounts securitized in Ginnie Mae pools, in other government agency pools (Fannie Mae and Freddie Mac), and in private-label asset-backed securities.

During the 2000s boom, there was significant growth in the issuance of private-label securities. At the same time, the share of all mortgages in government-insured mortgage pools stopped increasing as quickly, and in the case of Ginnie Mae securities even declined. Effectively, there was a shift away from the government-insured market toward the private market. Yet, the story is markedly different in 2020–2022. While aggregate mortgage debt increased during the pandemic, the majority of that increase came from loans sold into Fannie Mae and Freddie Mac securities, which carry default insurance, unlike loans sold into private-label securities. These shifts between the government-insured and private-label mortgages result in an important similarity in the mortgage market over time. While high loan-to-value (LTV) ratios on mortgages in private-label securities received a lot of media attention in the 2000s, the US government has long offered borrowers high LTV loans, most notably through its FHA program, which in part exists to help extend mortgage credit to lower-income borrowers. As a result, even though subprime loans often had high LTVs, the average LTV of all newly originated purchase mortgages has remained effectively unchanged over the past two decades. This can be seen in Figure 8. This measure of origination LTV derives from public records and includes both first and second liens, and we have combined any first and second liens taken out at the time of purchase (commonly known as “piggyback mortgages”) to accurately represent borrowers’ indebtedness at mortgage origination. Perhaps surprisingly, earlier research also found little change in LTVs (Glaeser et al., 2012).

Another way in which the mortgage market has changed is in the average credit quality of buyers who are financing their home purchases with debt. Before the 2000s crisis, borrowers with lower credit quality could use the FHA market to facilitate their purchases, and during the 2000s boom, they could use subprime lending. After the Great Recession, even lenders in the FHA market tightened restrictions on the credit quality of borrowers to whom they were willing to lend. As a result, average credit scores on new-purchase mortgages increased between 2007 and 2013. As can be seen in Figure 9, FICO (Fair Isaac Corporation) scores on newly originated purchase mortgages continued to increase during the COVID-19 pandemic. FICO scores are meant to capture the likelihood that a borrower will default, so this increase indicates that recent homebuyers, who would be most susceptible to a fall in home prices because these new buyers are more highly leveraged on average than others in the mortgage market, are less likely to actually default relative to new borrowers in 2005.

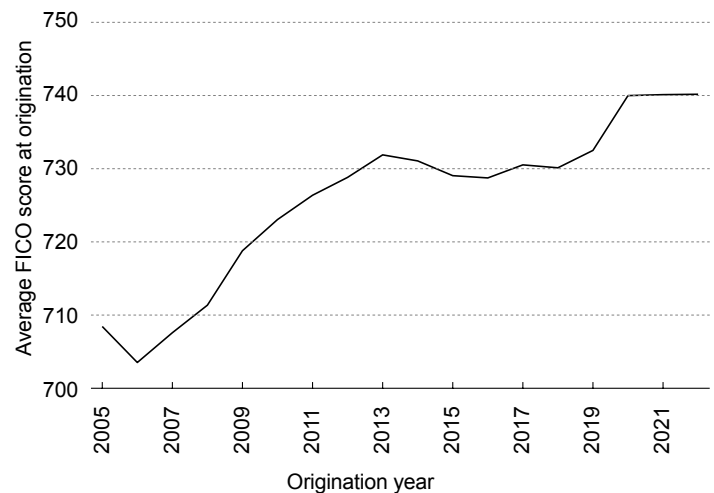
Figure 8: Average Combined LTV on Newly Originated Purchase Mortgages



Source: Authors’ calculations using CoreLogic public records

Note: The numerator includes the sum of any first and second liens (piggyback loans) made at the time of purchase of the property.

Figure 9: Average FICO Score for Newly Originated Purchase Mortgages



Source: Authors’ calculations using Black Knight McDash

Notes: Values are averages of FICO scores at origination for first-lien purchase mortgages originated in a given year. Data available only back to 2005.

Conclusion

Given the US experience during the 2000s, there are pressing questions related to the high level of house prices today. Will house prices fall, and, if so, will delinquencies rise? And, lastly, would a rise in delinquencies portend another financial crisis? The answer to the first question depends in large part on what happens to housing supply relative to demand in the near future. It is certainly possible that the large number of multifamily units currently in the construction pipeline could be completed while there is a simultaneous slowdown in household formation and that together these two events would lead to a decline in house prices. But would a fall in house prices result in a rise in delinquencies? It would almost certainly have some impact, but there is a great degree of uncertainty as to how much. While one can estimate for a given drop in house prices the share of households that would have negative equity,¹² a substantial share of households with negative equity would not default (Gerardi et al., 2018). In addition, because low interest rates during the two years following the end of the COVID-19 recession led to active refinancing activity, a majority of outstanding mortgages (65 percent of outstanding balances as of June 2023, per data from Black Knight McDash) are fixed-rate mortgages with interest rates below 4 percent, reducing the likelihood that borrowers will be unable to make their payments and thus further lowering the risk of default. By comparison, in December 2006 just more than 10 percent of outstanding balances were connected to fixed-rate mortgages with rates below 4 percent. And, finally, would an increase in delinquencies result in broader financial instability? While it is impossible to say with certainty, there are reasons to believe that the economy is situated differently than before the Great Financial Crisis of 2007–2008. First, unlike the 2000s boom, today, most recent mortgage originations have government insurance that protects investors in the event of a delinquency or foreclosure. Second, there is currently little evidence of activity indicating that people are expecting house prices to continue to rise. Most notably, housing transactions have recently declined. However, only time will tell.

Endnotes

1. “House-price growth” here and throughout refers to repeat-sales indices for single-family detached homes as well as single-family attached 2–4-unit structures, which includes townhouses, rowhouses, and duplexes.
2. Theoretically, changes in r in the Gordon growth formula can come from either changes in productivity growth or changes in discount rates. Changes in productivity growth should be offset by changes in house-price growth, resulting in no change in the price–rent ratio. However, changes in discount rates would result in a change in the price–rent ratio.
3. For further discussion on default and underwater mortgages, see Gerardi et al. (2018).
4. “Multifamily unit” refers to housing intended for a single household within a multifamily structure, not an entire apartment complex.
5. For example, see the National Multifamily Housing Council’s Quarterly Survey of Apartment Construction & Development Activity.
6. US Department of Housing and Urban Development Survey of Construction and author’s calculations, retrieved from <https://www.census.gov/construction/nrc/data/time.html>.
7. While this point is perhaps surprising, the majority of the increase in transactions during the 2000s was due to investors and second home purchases.
8. Net new housing units added, a number which is new units completed minus any housing units that are demolished or no longer fit to live in.
9. Data indicate that it was investor demand, not demand for second homes, that drove most of the increase in home purchases during the 2000s. According to data from Black Knight Analytics, at its peak in 2005, second-home purchases accounted for 5 percent of all home purchases, compared to shares between 2.8 percent and 4.2 percent during subsequent years. By contrast, investment purchases reached almost 12 percent of all home purchases in 2005, compared to rates between 4 percent and 6 percent in subsequent years.
10. For example, see Adelino et al. (2016) and Albanesi et al. (2022). More specifically, clauses in mortgages such as interest rate changes were not the cause of defaults and foreclosures, and many mortgage lenders were exposed to losses because of defaults and exposures, a situation indicating that lenders also did not expect this outcome (Foote et al., 2012, 2021; Fuster and Willen, 2017).
11. Alt-A loans were made to prime borrowers with certain characteristics, such as people whose income cannot be fully documented.
12. See, for example, this Liberty Street Economics blog post: <https://libertystreeteconomics.newyorkfed.org/2021/09/if-pricesfall-mortgage-foreclosures-will-rise/>.

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