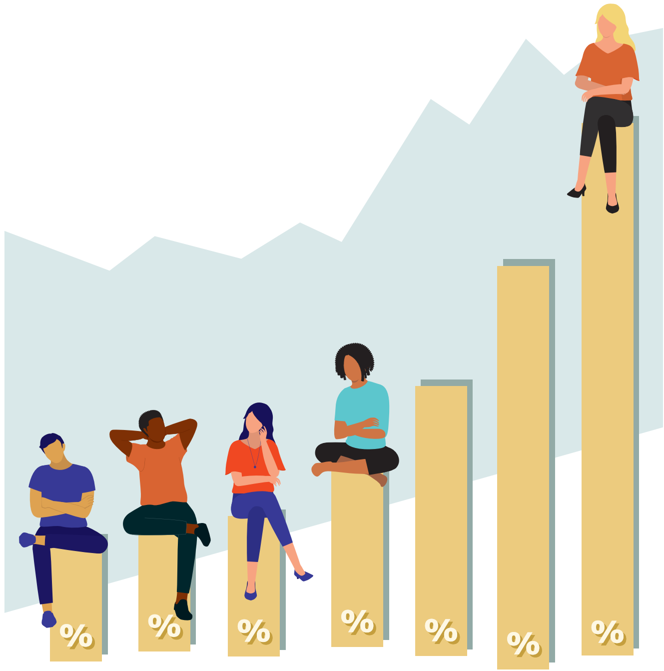
JULY 2023

The Economy, Though Volatile, Has Shown Resilience in the Face of Rising Interest Rates

The housing market has also been impacted by high rates as millions of homeowners locked into previously low mortgage rates and are content to remain in their current homes, therefore helping to keep inventory low

The U.S. economy has been resilient in the face of rising interest rates and grew at its long-run average rate of 2% during the first quarter of 2023. The labor market remains strong with an unemployment rate below 4% and rising labor force participation for the 25–54-year-old age group. The housing market has also been impacted by high rates with millions of U.S. homeowners locked into previously low mortgage rates and content to remain in their current homes, helping to keep inventory low and the balance tilted in favor of home sellers over buyers in most markets. In this month's spotlight we show that this "mortgage rate lock-in effect" is the largest ever in U.S. history, and is likely to impact the housing market for years to come.



Recent developments in the U.S. economy

Per the U.S. Bureau of Economic Analysis, the third and final estimate of first quarter 2023 Real Gross Domestic Product (GDP) was much stronger than previously reported. Quarterly growth was revised up 0.7 percentage points to an annualized rate of 2%. While real GDP was revised upwards, the pace of growth continues to slow mainly due to the drag from the interest rate-sensitive sectors such as residential fixed investment and business investment. But the undaunted U.S. consumer has remained resilient, and consumer spending grew at an annualized rate of 4.2% in the first quarter, contributing to the upward revision of real GDP growth.

Consumer confidence and sentiment play a pivotal role in boosting consumer spending. The Conference Board's June 2023 measure of consumer confidence jumped to the highest level since January 2022, reflecting improvements in the current conditions as well as in the future expectations. Expectations of inflation fell in June to 6%, the lowest reading since December 2020.

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On the labor market side, according to the Bureau of Labor Statistics Employment Situation Summary for June 2023, the economy added 209,000 jobs in June led by the government, health care, social assistance, and construction sectors. The unemployment rate ticked down to 3.6% to remain near 50-year lows. The prime age (25–54-year-old) labor force participation rate has been rising and is now at the highest level since April 2002 (**Exhibit 1**). This suggests that the tight labor market is bringing many of the younger workforce, who were on the sidelines, back into the market.

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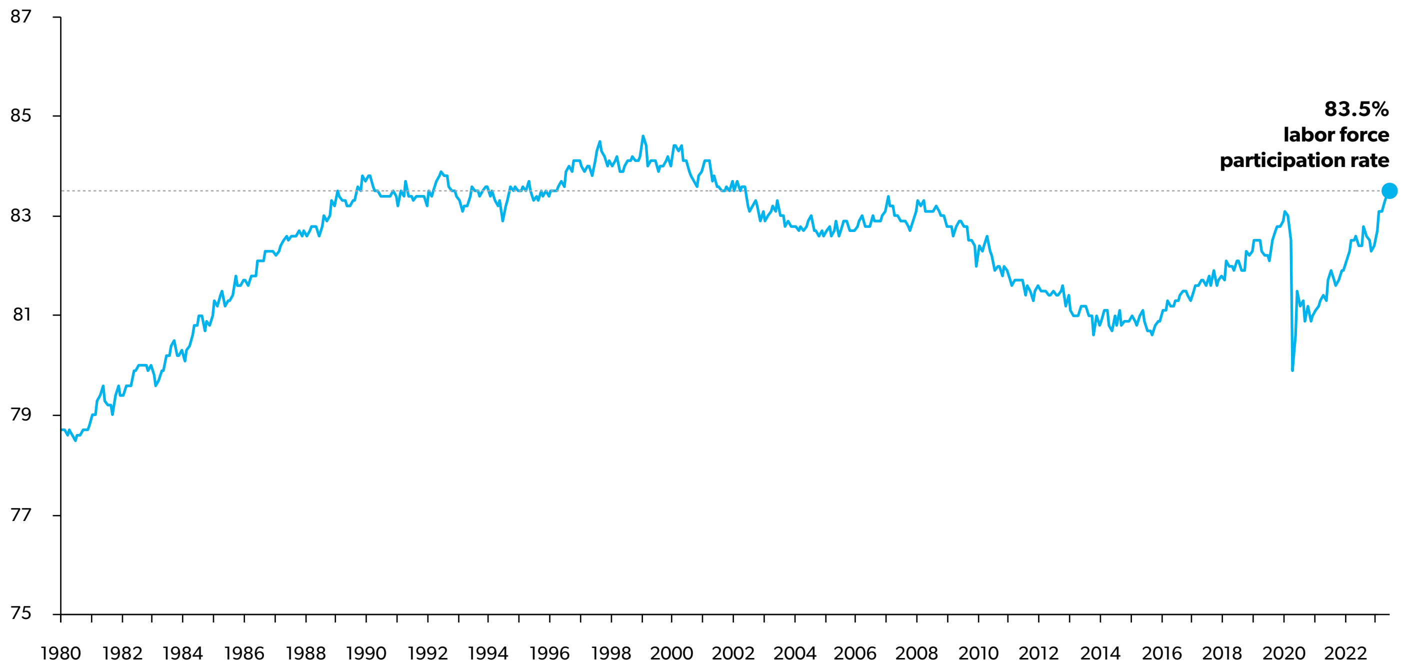
EXHIBIT 1

Prime-age labor force participation at the highest level since 2002

Prime-Age (25-54) labor force participation rate (%)



Source: U.S. Bureau of Labor Statistics

Inflation has been cooling in recent months, and the measure tracked by the Federal Reserve, the U.S. Bureau of Economic Analysis' "core" price index for personal consumption expenditures, excluding food and energy (Core PCE), came in at 4.6% year-over-year in May. While housing continues to be the largest contributor to the increases in inflation and prices, it has started to cool off. Another inflation measure that the Federal Reserve has been tracking recently is the supercore service inflation (core services excluding energy and housing). Supercore inflation has been decreasing and the year-over-year change in May 2023 came in at the lowest since March 2022.

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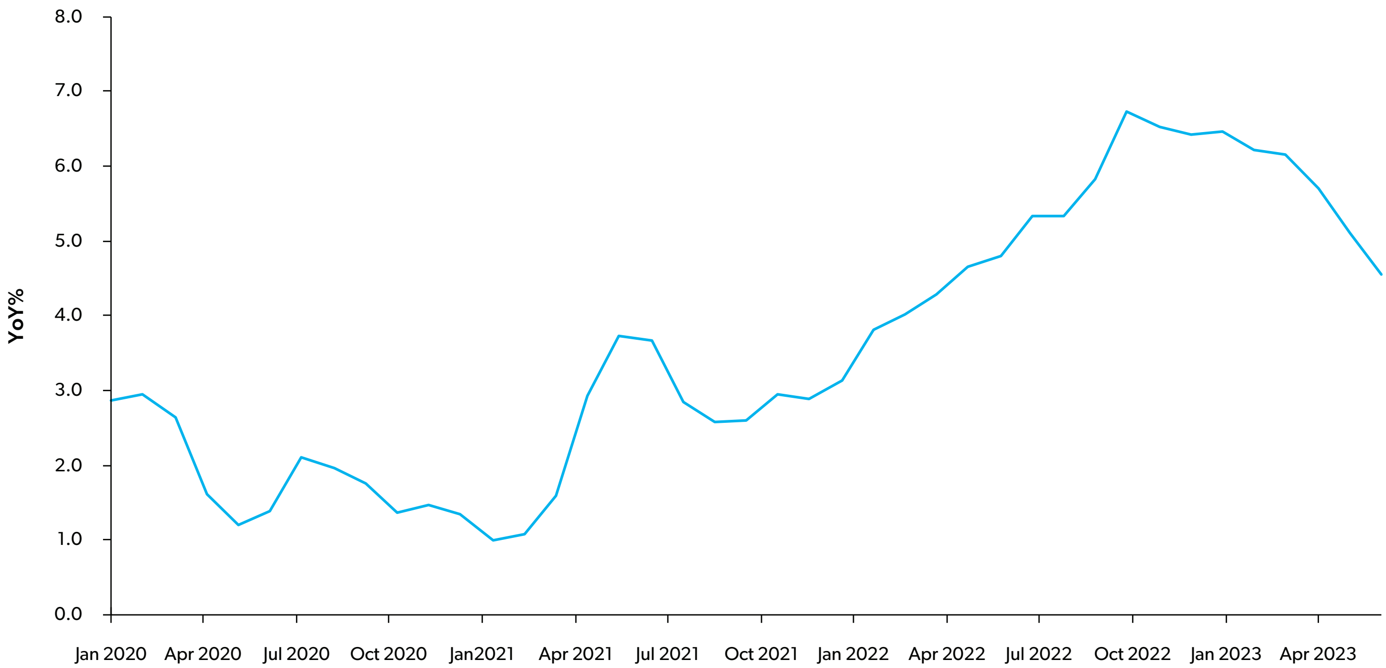
EXHIBIT 2

Super-core inflation came in at the lowest since March 2022

Core services less energy and shelter



Source: U.S. Bureau of Economic Analysis, calculations by Moody's Analytics

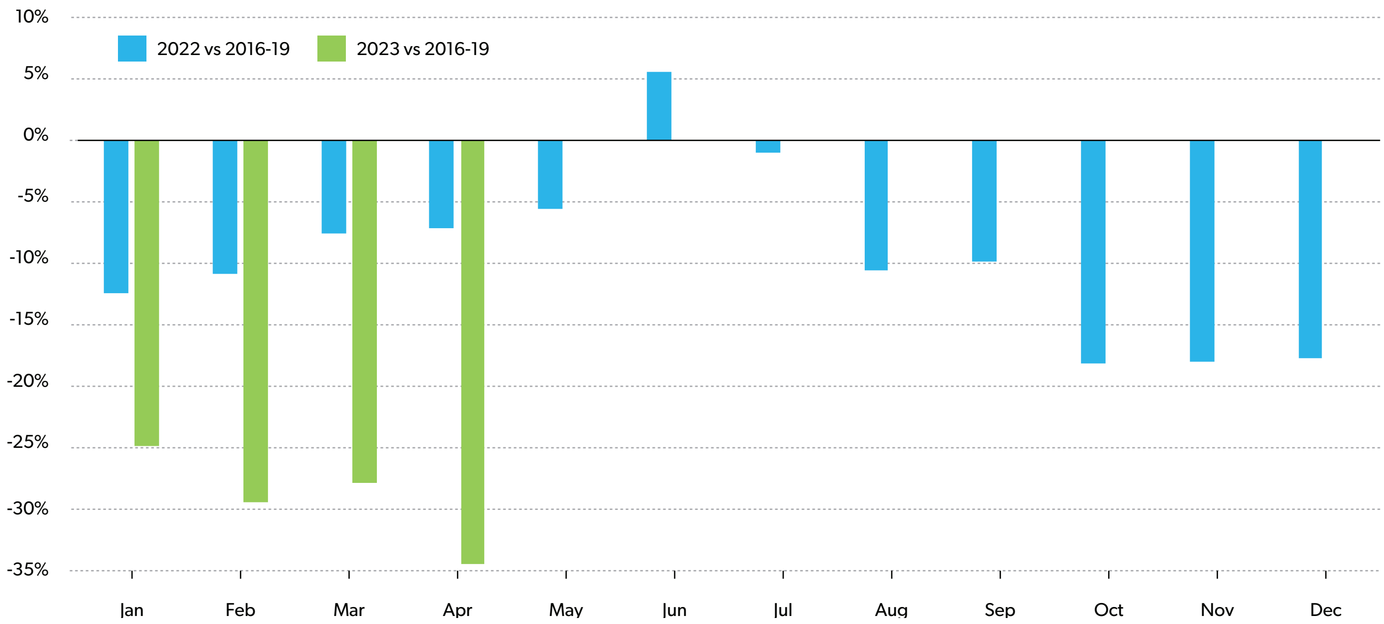
Recent developments in the U.S. housing market

The divergence between existing home sales and new home sales has grown wider in recent months. Existing home sales receded 20% from a year ago, while new home sales surprised on the upside and increased 20% from a year ago in May. The mortgage rate lock-in effect continues to impact the listings of existing homes, which are down 35% as of April 2023, compared to the pre-pandemic average between 2016-19 (**Exhibit 3**). Pending home sales, which are a forward-looking indicator for existing home sales, also declined during May and were down 2.7% over the month and 22.2% over the year according to the National Association of Realtors®.

EXHIBIT 3

New listings fall as mortgage rate lock-in effect dampens repeat buyer activity

Percent change in new listings (2022/2023 vs. avg of 2016-2019)



Source: Freddie Mac using CoreLogic MLS data

On the other hand, according to the NAHB/Wells Fargo Housing Market Index builder confidence improved to the highest level in nearly a year due to continued housing demand and easing of supply chain issues, as well as the lower level of existing homes for sale. All three subcomponents of the HMI increased: the sales expectation component saw the greatest increase of 6 points to 62, current sales conditions increased 5 points to 61, and buyer traffic rose 4 points to 37.[1] The current sales conditions and the sales expectations rose to levels above 60 for the first time in a year as homebuyers warm up to mortgage rates in the 6-7% range.

1 The Housing Market Index is a diffusion index normalized so that a value of 50 indicates sentiment balanced between positive and negative. Any value above (below) 50 indicates that on average survey respondents have a positive (negative) sentiment. For more information on the index see https://www.nahb.org/news-and-economics/housing-economics/indices/housing-market-index.

This increased builder confidence was also reflected in the housing starts, which jumped 21.7% in May. Furthermore, the monthly increase in total starts at 291,000 units was the highest in over three decades. Permits also increased over the month of May and were up 5.2% on a month-over-month basis, despite being down 12.7% year-over-year.

House prices may have bottomed and continue to firm up in the short run. Per the FHFA's Purchase-Only House Price Index, house prices increased nationally 0.7% from March to April 2023. While house prices increased across all the divisions over the month of April—ranging from +0.1% in the Pacific division to +2.4% in the New England division—the variation is wider when we consider the house price appreciation as compared to a year ago. The 12-month changes ranged from -3.8% in the Pacific division to +6.1% in the East South-Central division.

Recent developments in the U.S. mortgage market

The 30-year fixed-rate mortgage as measured by our Primary Mortgage Market Survey®, settled at 6.7% in June, partly due to the Federal Reserve's decision to pause increases in the Fed Funds Rate. Partially in response to the stabilization in mortgage rates, purchase applications increased 7.1% over the month of June, while refinance applications increased 2.8%, both after seasonal adjustment according to the Mortgage Bankers Association Weekly Applications Survey.

With respect to mortgage performance, the delinquency rate, as measured by loans 30 or more days past due went down 11 basis points in May to 3.1%, close to the historical low of 2.92%, according to Black Knight's May Mortgage Monitor. Serious delinquent loans (90 or more days past due) also fell by 18,000 over the month and are down around 30% since May 2022. While foreclosure starts increased 2.2% over the month of May, they remain 41% below 2019 levels.

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The outlook

The outlook remains volatile as we enter the second half of the year. The Federal Reserve's pause on interest rate hikes after ten consecutive increases since March 2022 was a welcome breather for the economy. The labor market remains strong with low unemployment and inflation appears to be moderating. Downside risks as a slowing economy could tip into recession, but on balance our outlook is cautiously optimistic.

General economy, rates, inflation

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The U.S. economy will continue to grow, unless consumers pause their spending. While the labor market is gradually moderating, it remains sufficiently tight, and combined with consumers' excess savings and recent wage gains, consumers will continue to spend and the economy will continue to expand, although at a reduced pace.

Under our baseline scenario, we expect inflation to continue cooling as the long and variable lags of monetary policy work through the economy. The slowing growth in prices of goods and services will further reinforce consumers' purchasing power. However, even though inflation is expected to slow it will be gradual and the pressure on long term rates including mortgage rates will not likely abate this year. Therefore, we expect mortgage rates to stay above 6% for the second half of 2023. High mortgage rates will increase the cost of owning a home, likely leading to a reduction in other spending. However, savings from cooling inflation could be enough to offset the increased housing costs. If this is the case, consumers will keep spending, and the economy will continue to grow unless the labor market further moderates significantly.

Home sales

On the housing front, home sales are plagued by a combination of a lack of inventory of existing homes and high mortgage rates. Due to the mortgage rate lock-in effect (described further below), many existing homeowners are unwilling to list their homes for sale, and we do not expect sufficient existing homes to come on the market any time soon to significantly boost existing home sales. Therefore, we expect existing home sales to remain low through the rest of 2023. However, new home sales are expected to pick up through the rest of the year. Although new home sales' contribution to the total sales has been increasing in recent months, they are a fraction of the total home sales, we expect total home sales to remain muted for the rest of the year.

Home prices

Our official corporate forecast for the next 12 months has house prices falling by 2.9% and an additional 1.3% over the subsequent twelve months. However, given the current housing market conditions with historic low inventory and an early read on our data, we will likely revise our home price forecast in the next iteration of the Economic, Housing and Mortgage Market Outlook. We expect tight inventory will push sales volume down, and we expect it to keep home prices up.

Mortgage originations

Due to lower home sales, purchase origination volumes are expected to remain muted this year, while high mortgage rates keep refinance activity low. As homebuyers get accustomed to the new normal in terms of mortgage rates, we expect home sales to pick up and purchase originations to resume modest growth in 2024.

JULY 2023 SPOTLIGHT:

Mortgage rate lock-in and the housing market

The recent rapid increase in mortgage rates from historical lows to 20-year highs has created a scenario that we have not seen in more than 40 years. Because so many households have a fixed-rate mortgage, which exists in part because of financing from Freddie Mac and Fannie Mae, they were able to refinance into low interest rates in recent years. This contrasts with variable-rate mortgages, which have increased significantly as a result of rising mortgage rates. Nearly 6 out of 10 borrowers now have a mortgage rate at or below 4%. Given current market rates, many of those homeowners have locked in payment savings, but they also may have locked themselves into a forever home. Throughout this spotlight we use the term “mortgage rate lock-in effect” to refer to the ownership of a mortgage on favorable terms compared to current market interest rates.

Nearly 6 out of 10 borrowers now have a mortgage rate at or below 4%. While those homeowners have locked in payment savings, they also may have locked themselves into a forever home.

The mortgage rate lock-in effect is a benefit to homeowners with fixed-rate mortgages. To illustrate the benefit of the mortgage rate lock-in effect, suppose a lucky homeowner has refinanced their mortgage of $250,000 at 2.65% in January of 2021. Their current monthly principal and interest payment would be $1,007 and after 29 months of payment their current outstanding balance would be $236,379. If the borrower obtained a new 30-year mortgage of $236,379 at the prevailing market interest rate of 6.81%, their monthly payment would increase to over $1,500 a month.

Following Quigley[2], we compute the net present value of the mortgage rate lock-in effect by taking the difference between the outstanding balance of the mortgage and the present value of the mortgage at prevailing market interest rates.[3] The value of mortgage rate lock-in is $86,136 in our example.[4]

Except for certain limited cases, the mortgage is not portable or assumable. In today’s market, most mortgages have due-on-sale clauses, requiring the borrower to terminate the mortgage when they sell

2 Quigley, J.M., 1987. Interest rate variations, mortgage prepayments and household mobility. *The Review of Economics and Statistics*, pp.636-643.

3 The net present value of the mortgage rate lock-in effect is denoted by V and computed by using the value of the current mortgage balance (B) and the present discounted value of the payments (P) using prevailing market interest rates (r) discounted over the remaining (n) periods of the loan:

$$V = B - \sum_{i=1}^{n} \frac{P}{(1+r)^i}$$

4 In our example, the borrower’s current balance B is $236,379, but the present value of the monthly payments (P=$1,007) discounted for the remaining (n=331) months at 0.005675 (r=6.81/1200) equals $150,243. Thus, the value V is $86,136 ($236,379-$150,243) which represents the value the borrower gets by having locked in a low mortgage interest rate.

the property. To enjoy the benefit of the value of their low mortgage rate, the borrower must continue to live there, maintain it as second home, let it sit vacant or rent it out. In our example, the homeowner is only going to be willing to sell their current home, and thus give up their low mortgage rate, if the net benefit of a move is worth at least $86,136. For some households who are pursuing a new job opportunity or moving to be closer to family the move could be worth it, but others may opt to stay put.

The national average mortgage rate lock-in effect for 30-year and 15-year fixed rate loans is $55,000.

For each 30-year and 15-year fixed rate loan in Freddie Mac's portfolio active as of June 2023, we computed the value of the mortgage rate lock-in effect.[5] Per these calculations, the national average mortgage rate lock-in effect is $55,000 per household but because of differences in average loan sizes and the timing of originations and the history of refinance activity, the average value varies considerably across the country and by year of origination. Across geographies the average mortgage rate lock-in effect varies from a high of $91,000 in Hawaii to a low of $32,000 in West Virginia.

Considering year of origination, the highest average values are for loans originated in 2020 and 2021 with average mortgage rate lock-in effect of $77,000 and $85,000, respectively. But, as rates continue to increase, even mortgages originated in 2023 have an average mortgage rate lock-in effect of $10,000.

To get a sense of how significant the mortgage rate lock-in effect is for the U.S. economy, we can sum the mortgage rate lock-in effect over the Freddie Mac portfolio. Considering only 30-year and 15-year fixed-rate mortgages financed by Freddie Mac, the aggregate mortgage rate lock-in effect for borrowers in Freddie Mac's portfolio is substantial. We estimate that, considering the company's single-family mortgage portfolio, homeowners with fixed-rate mortgages financed by Freddie Mac have locked in savings of a collective $700 billion dollars in total value. This is equal to about 25% of the outstanding unpaid principal balances in Freddie Mac's single-family mortgage portfolio.

Our aggregate estimate of 25% of outstanding mortgage balances is significant and shows that many have truly benefitted from their fixed-rate mortgage when rates hit record lows. For comparison, Quigley calculated the average mortgage rate lock-in effect equal to $1,800 in 1981 for households with mortgages, which represented about 5% of outstanding mortgage balances versus about 25% today.[6] In **Exhibit 4** (on the following page) we show a time series of quarterly average mortgage rate lock-in effect in the Freddie Mac portfolio since 2018. From March 2019 through December 2021, the average lock-in effect was negative, meaning that the average borrower had significant incentive to

5 Due to curtailment, or early payment of principal, our formula is slightly more complicated than the one presented above. To adjust for cases of curtailment we use the modified formula:

$$V = B - \left(\sum_{i=1}^{n} \frac{P}{(1+r)^i} \right) - \frac{F}{(1+r)^{n+1}}$$

Where n is now the remaining months left adjusting for curtailment and F is the residual partial payment due in period n to pay off the remaining balance.

6 Per the 1981 American Housing Survey (https://www2.census.gov/prod2/ahsscan/h150-81a.pdf page 10 Table A-2) there were about 27 million households with a mortgage in the U.S. Multiplying $1,800 by 27 million gives us a little less than $50 billion in aggregate mortgage rate lock-in effect in 1981. Per the Financial Accounts of the United States, the total mortgage debt outstanding on 1-4 family housing was $1 trillion in 1981. $50 billion / $1,000 billion = 5%.

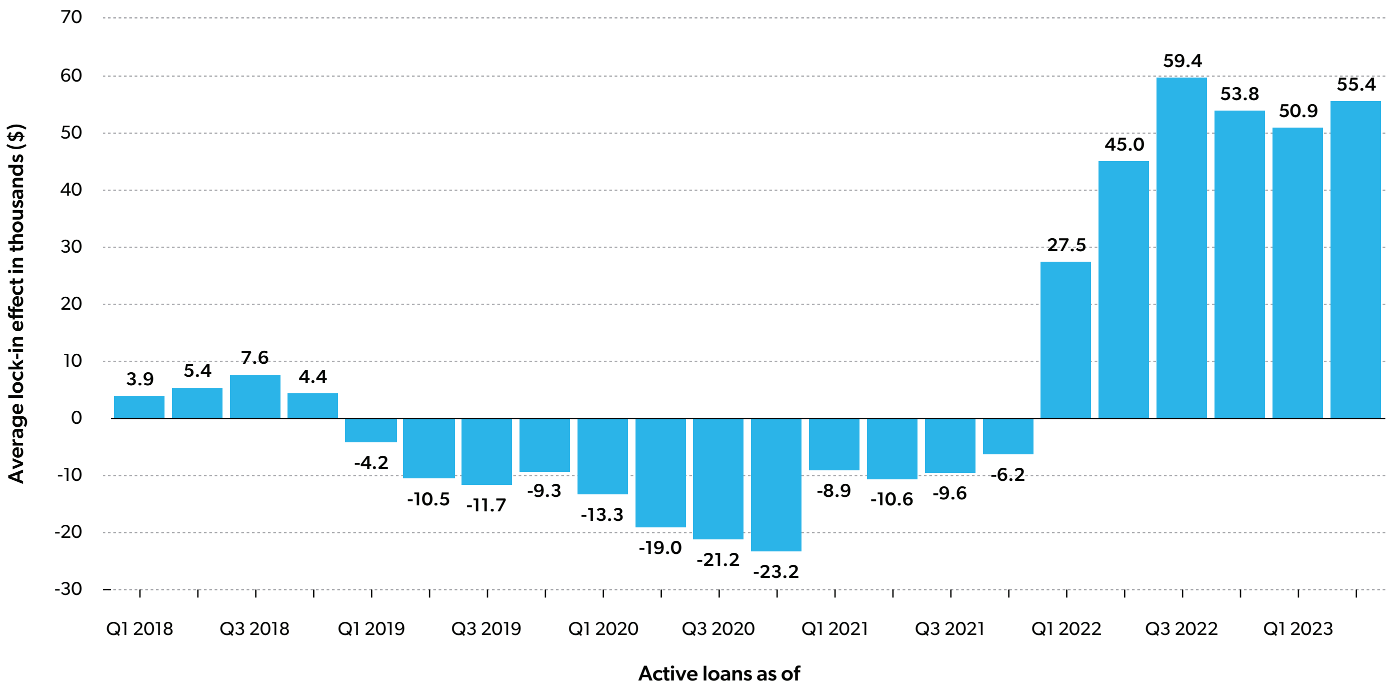
refinance. But since March 2022, the average lock-in effect has surged, reaching over $50,000 in each of the past four quarters.

EXHIBIT 4

In a rising interest rate environment, homeowners with a fixed mortgage provided by Freddie Mac have locked in over $50,000 per household in value

Average mortgage rate lock-in effect

Freddie Mac active 30-year and 15-year fixed mortgages



Note: Lock-in (V) computed by the formula $V = B - \left(\sum_{i=1}^{n} \frac{P}{(1+r)^i}\right) - \frac{F}{(1+r)^{n+1}}$ where B is the current outstanding mortgage balance, P is the monthly principal and interest payment, r is the current prevaling 30-year/15-year mortgage rate in the PMMS, n is the remaining months left on the mortgage and F is any partial payment due after n periods due to curtailment.

The mortgage rate lock-in effect is already having a significant impact on the U.S. economy and will likely continue to do so for years to come. One of the major challenges to the current U.S. housing market is a lack of available-for-sale inventory. The lock-in effect is yet another layer contributing to the dearth of available inventory. How much so is an active area of research.

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