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Has the Housing Boom Increased Mortgage Risk?

For several years, house price appreciation has outstripped income growth in the United States, with most of the price gains concentrated in the East and West. While moderate increases in house prices often reflect, and contribute to, a region's economic and financial health, the steepness of recent price increases has raised concerns. In particular, it has been suggested that borrowers, emboldened by rising house prices, are turning to riskier types of mortgages in order to qualify for the debt necessary to purchase increasingly expensive homes, thereby potentially setting the stage for repayment difficulties in the future.

We examine mortgage characteristics in different regions to assess the extent to which high appreciation in house prices has been associated with the use of riskier types of mortgages. While mortgage products have evolved to include numerous available features, our analysis focuses on the distinction between traditional fixed- and adjustable-rate mortgages (ARMs), given the availability of consistent regional data on traditional

(Continued on page 2)

INSIDE:

Making Sense of Elevated Housing Prices

There is widespread concern that housing-price bubbles have formed in several countries, fueled by high demand that stems from low interest rates, the spread of lower-payment mortgage products and portfolio shifts from stocks to real estate. Since 1999, for example, home prices have jumped more than 110 percent in the U.K. and nearly 60 percent in the United States (*Chart 1*).[1]

This issue is important beyond housing markets, because U.S. consumer spending has been bolstered in recent years by mortgage refinancing and households withdrawing equity from their homes.[2] Mortgage innovations

(Continued on page 7)

Making Sense of Elevated Housing Prices

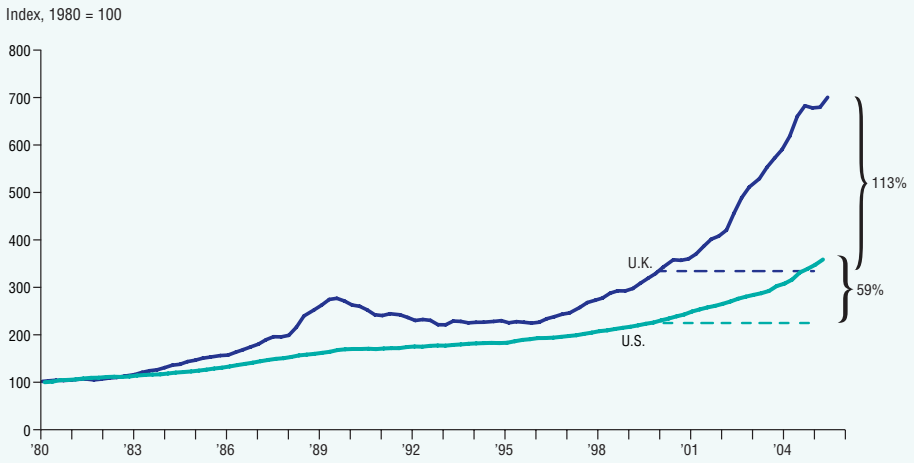
(Continued from front page)

have made it easier and less expensive to do both. Largely by making housing wealth more liquid, these innovations have made consumption more sensitive to housing wealth.[3] So a weakening of home prices can affect consumption—not just construction—beyond what traditional estimates indicate. This is suggested by the experience of the U.K., which has had several, more pronounced swings in home prices than the United States.[4]

In an earlier article, I showed how an overvaluation of home prices was emerging in some parts of the United States.[5] Subsequent increases have only heightened concern that possible price weakness could slow the economy by dampening construction and consumer spending. The current article focuses on making sense of elevated housing prices by analyzing pricing patterns using more recent data and drawing on more recent research to interpret the risks they pose. It also looks at policy implications, including macroeconomic risks from possible weakness in housing prices and factors that might trigger home-price weakness.[6]

Chart 1

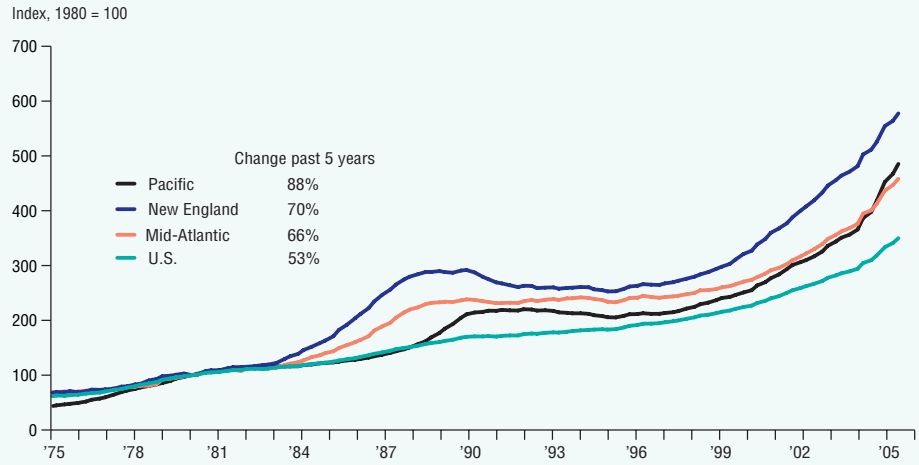
Both U.K. and U.S. Home Prices Rise



SOURCES: Office of Federal Housing Enterprise Oversight; Nationwide (U.K.), www.nationwide.co.uk/hpi/historical.htm, home-price index (all houses).

Chart 2

U.S. Home Prices Rise, Especially in Northeast and Pacific Regions



SOURCE: Office of Federal Housing Enterprise Oversight.

Is There a Bubble?

While there is no generally accepted definition, "bubble" usually describes a substantially overvalued asset price that is in danger of collapsing. As a working definition, substantially overvalued here is a price 20 percent or more above historical norms. The threshold is based on the usual definitions of bull and bear stock markets as having price changes of 20 percent or more from a peak or trough.

Have U.S. Home Prices Fallen as Fast as Financial Asset Prices? Stock bubbles are marked by sustained price increases as the bubble builds, followed by more rapid price declines. For example, U.S. stock prices rose for almost a year leading up to the one-day plunge of Oct. 17, 1987. In contrast, over the past 30 years national home prices have trended upward and at worst, roughly flattened out temporarily (*Chart 2*). Moreover, in the few relevant U.S. cases, regional home-price overvaluations were slower to unwind than stock-price overvaluations. For example, home prices in the New England, Mid-Atlantic and Pacific regions were marked by rapid rises in the mid- to late 1980s, followed by slower paced declines. This asymmetry likely reflects factors that lead owners to delay selling homes at a loss. Selling a house is more costly, takes longer and involves more personal complications than trading stocks. And some owners cannot afford to take a loss. As a result, stocks are far more liquid than homes,

with annual turnover rates of about 100 percent for those traded on the New York Stock Exchange versus 4 percent on homes.

Are U.S. Home Prices Overvalued Enough to Qualify as a Bubble? Accounting for the impact of interest rates on home prices, U.S. housing prices appear—on average—to be overvalued by less than 20 percent. But in some markets, the overvaluation may be higher. Of the various gauges for assessing prices, this article focuses on the ratio of home prices to rents. Rents, in this case, are the cash flow homes could generate, and the price-to-rent ratio is much like a stock price-to-earnings ratio.[7]

Relative to rents, U.S. home prices are 38 percent higher than in 1983 (*Chart 3*). When home prices rose sharply in the Northeast and the Pacific states in the mid- to late 1980s, the national ratio rose, only to reverse in the 1990s, when prices in these regions stagnated or fell. Since 1999, the price-to-rent ratio has surged, suggesting that home prices could fall or rents could jump. But the risk that home prices could fall is smaller when recognizing that high home price-to-rent and high stock price-to-earnings ratios imply a low real rate of cash returns, which can be sustained if real interest rates remain low.

To assess if U.S. home prices are overvalued, I estimated the relationship between the home price-to-rent ratio and a measure of real mortgage rates through 2000 and used it to construct estimates of equilibrium home prices since then. Chart 4 shows the percentage-point gap between actual and equilibrium prices. During the period from 1983 through the end of 2000 that is used to estimate equilibrium, home prices generally stayed within 10 percent of their estimated equilibrium values. Prices surged to 11.5 percent above historical norms by second quarter 2005, implying they were overvalued but not enough to qualify as a bubble.[8] However, because the measure of real mortgage rates is based on a user-cost-of-housing concept that employs lagged price appreciation to adjust nominal rates for inflation, the 11.5 percent figure for second quarter 2005 assumes housing prices would continue appreciating at about 12 percent. If instead it is assumed the increases would settle down to around 5 percent—about the long-run pace of income growth—the degree of overvaluation would exceed 20 percent.[9]

These estimates should be viewed cautiously and seen as shedding light on qualitative, rather than quantitative, conditions, given the short data sample, noise in most asset prices, and difficulty measuring prices and rents. For example, the repeat-sales-price index may overstate prices, partly owing to optimistic home appraisals used in refinancing mortgages.[10] Also, the measure of home rents has been criticized.

And estimates of equilibrium home prices are imprecise, reflected by the large gap between the two-standard-deviation lines (in blue) around the overvaluation estimates, which imply that while the estimates statistically differ

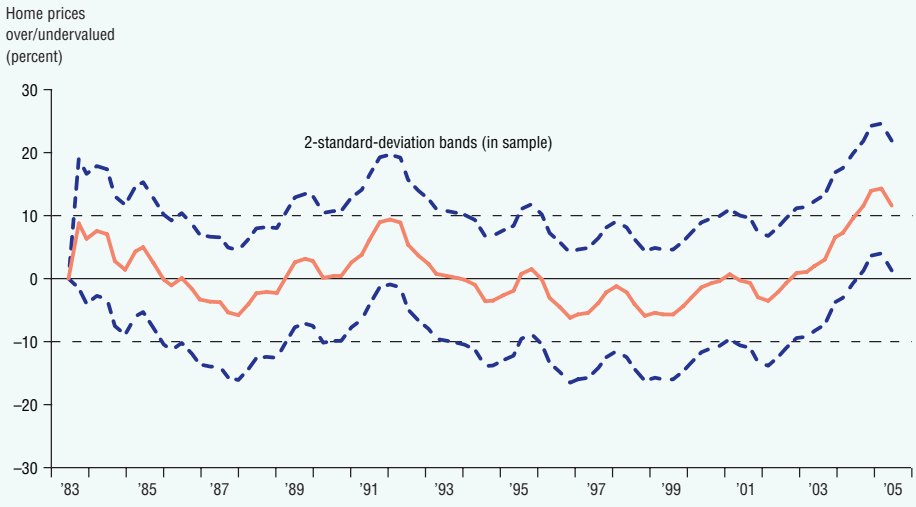
Chart 3

Home Prices Outpacing Rents

SOURCES: Office of Federal Housing Enterprise Oversight; Bureau of Labor Statistics; author's calculations.

Chart 4

Rents and Mortgage Rates Suggest Home Prices Somewhat Overvalued



SOURCES: Office of Federal Housing Enterprise Oversight; Bureau of Labor Statistics; Federal Reserve Board; author's calculations.

from zero, they are not statistically different from a 10 percent threshold (delineated by the dashed black lines), commonly used to define stock market corrections. This imprecision reflects difficulty with identifying an equilibrium price using a short sample period that covers one and a half housing-price cycles. In addition, equilibrium values may have risen in ways not captured by the variables used to estimate equilibrium prices. For example, mortgage innovations have made housing a more liquid, and thus more attractive, asset. In addition, the demand for owning more than one home has recently increased. For these reasons, prices may not be as overvalued as Chart 4 suggests.

The Case Against Overvaluation. Perhaps the strongest case against U.S. home prices being overvalued can be made using the National Association of Realtors' (NAR) national affordability index for all buyers, which is not low (*Chart 5*). This index measures actual median income relative to the income needed to qualify to buy a median-priced home with 20 percent down at the average conventional mortgage rate. In recent years, median income has been about 130 percent of that needed to qualify but fell to about 120 percent in the second quarter of 2005, largely due to a jump in housing prices and, to a lesser extent, slightly higher mortgage interest rates. If rates rose a full point, at current prices and incomes this index would decline to about 110 percent, well below the range of recent years.

In addition, the national affordability index ignores that many homebuyers do not make 20 percent down payments. Indeed, 25 percent of homebuyers made no down payment in 2005, according to the NAR. Also, some buyers pay subprime mortgage rates that are above the rates the affordability index uses. Moreover, many purchases are for second homes (13 percent of 2004 home sales, according to the NAR) or investment homes (13 percent of mortgages for February 2005 home purchases, according to Freddie Mac, and 23 percent of 2004 home sales, according to the NAR). The index, in contrast, assumes households have one mortgage.[11]

The index also overlooks the rising use of creative financing, such as interest-only loans (17 percent of mortgage originations in the second half of 2004, according to the Mortgage Bankers Association), which do not require owners to build up equity by paying down principal. And there are risks from the advent of option adjustable-rate mortgages, which give borrowers the option of paying principal and interest, interest only or an amount smaller than the accrued interest, which increases indebtedness via negative amortization.

Turnover Suggests Speculation. Another sign of possible overvaluation is the large rise in home turnover, which could reflect speculative activity and households buying out of fear that prices will be much higher in the future. Turnover, which can be tracked by the ratio of units sold to the number of existing units, recently jumped above its normal 3 to 4 percent range (*Chart 6*). Likely reflecting swings in housing demand, faster turnover has been accompanied by home-price increases that have outpaced inflation. It is disturbing that recent turnover and relative home-price inflation are at levels last seen in the late 1970s.

Making Sense of Regional Patterns

Divergences in regional home prices reflect different supply and demand conditions. The left panel of Chart 7 depicts areas like the Northeast and Pacific states, where, due to tight supplies of building lots, increased housing demand from low mortgage rates is resulting in large price increases and little construction. Recent research has found that home-price movements are dominated by swings in land, rather than structure, costs.[12] The right panel depicts areas like much of the noncoastal South, where, due to plentiful supplies of building lots, increased demand results in smaller price increases and more construction.

Research has found that tougher zoning, reduced supplies of vacant land and longer commutes have made land supply less elastic in the Northeast and Pacific Coast areas since the early 1970s.[13] As a result, regional home prices, particularly for land, are more apt to diverge, with the risk of overvaluation largely in tight land-supply areas like coastal cities in the Northeast and the Pacific states. Nationally, increases were large enough to raise the land component of existing home prices to about 46 percent of constant-quality home prices in third quarter 2003, well above the 38 percent average that had been seen since 1970.[14]

Home prices are again outpacing rents, mainly in areas of tight land supply in the Northeast and West, where

Chart 5

Housing Affordability Somewhat High but May Be Sagging

SOURCE: National Association of Realtors.

Chart 6

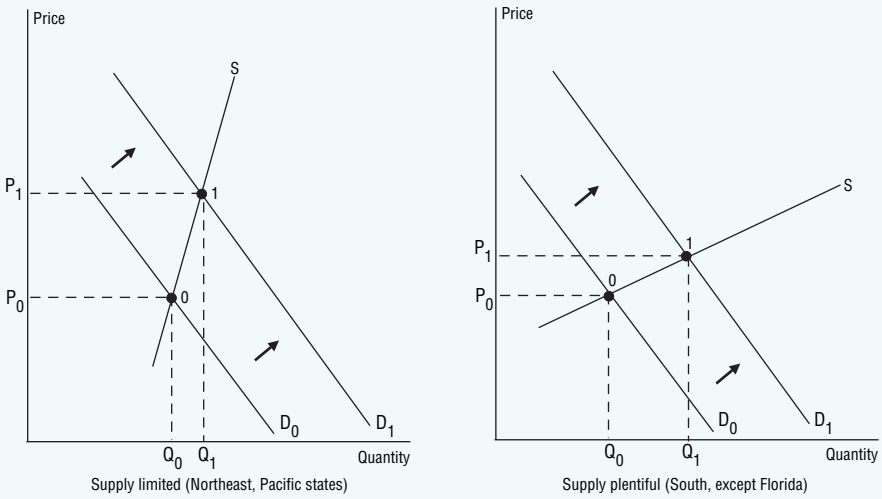
Home Turnover and Housing Inflation Rise

NOTE: Home price is the gap between the percentage growth in home prices and in the core personal consumption expenditures deflator.

SOURCES: Office of Federal Housing Enterprise Oversight; Bureau of Labor Statistics; National Association of Realtors; Federal Reserve Board; author's calculations.

Chart 7

Supply Affects Price Response to Higher Demand



home price-to-rent ratios surged in the mid- or late 1980s, only to retreat in the early 1990s (*Chart 8*). In the Northeast (New England plus the Mid-Atlantic states), the declines in the early to mid-1990s did not fully reverse earlier increases. Similarly, price-to-rent ratios in coastal cities like Boston, New York and San Francisco rose quickly in the mid- or late 1980s but slowly and only partially fell back in the early 1990s (*Chart 9*). Recently, price-to-rent ratios have again jumped in land-tight cities on the Pacific and Atlantic coasts but have risen less in inland cities, like Atlanta and Dallas.

It is plausible that as they become wealthier, people will be willing to pay more to live near the ocean, suggesting that recent price run-ups in coastal cities may not fully unwind. Nevertheless, it is troubling that affordability has plunged in many coastal cities, with recent estimates from Wachovia Bank and the National Association of Home Builders showing that the share of residents who can afford a median-priced home has fallen to about 5 percent in San Diego and Los Angeles and less than 10 percent in San Francisco and New York City.

Implications for Monetary Policy

High real estate prices have several implications for monetary policy. Although signs of home-price overvaluation are seen mainly in the Northeast, Pacific states and Florida, these are economically important areas. In addition, there are emerging signs and anecdotal reports that price appreciation is spilling over into nearby areas, as people either migrate to less expensive places or buy investment property to diversify out of particular markets.

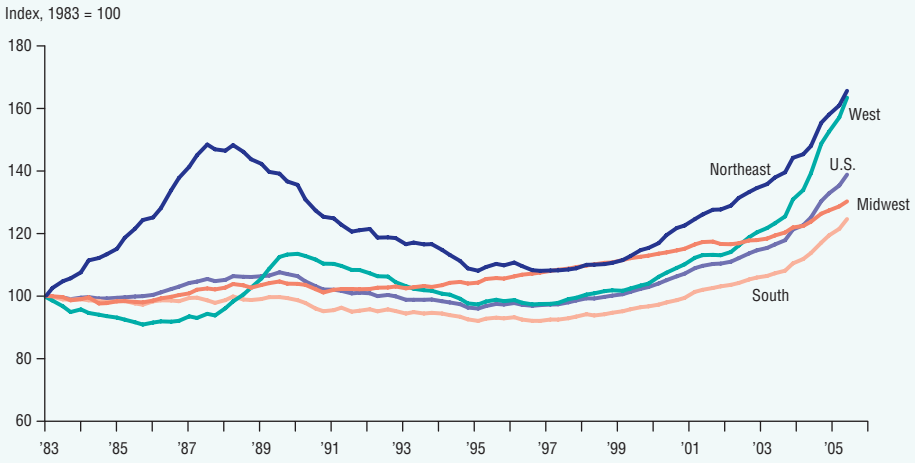
Macroeconomic Risks. The main macroeconomic risk from high home prices is not that a housing crash could trigger a recession but that the impact of a new economic headwind could be amplified if it triggered home-price declines. For example, a headwind that pushed up mortgage interest rates could weaken home prices, which in turn could dampen construction by a bit more than what historically based estimates would indicate.

Another risk is that home prices may no longer aid consumption as much as in recent years. The combination of higher home values and financial innovations has enabled owners to refinance mortgages and tap their equity using collateralized loans that have much lower interest rates than in the past.[15] For example, households are now more willing to refinance their mortgages at a given interest rate savings because refinancing entails lower fixed costs and fewer hassles than in the past. In addition, households have become more able to tap home wealth by cashing out equity when refinancing, using home equity lines and not fully using the proceeds from selling prior homes as down payments on subsequent ones.

One reason mortgage equity withdrawals may affect consumption in ways generally unseen in the past is that housing liquidity has increased, enabling

Chart 8

Price-to-Rent Ratios Rise, Mainly in Northeast and West



SOURCES: Office of Federal Housing Enterprise Oversight; Bureau of Labor Statistics; author's calculations.

owners to more cheaply access capital gains. These withdrawals have jumped recently, at times exceeding $400 billion at an annual pace and amounting to about 5 percent of income. Through late 2003, mortgage interest reductions from refinancing (as a percentage of income) also surged. Tentative econometric results suggest that in 2003, long-run consumption was boosted 1.5 to 2 percentage points by equity withdrawals and, together with mortgage refinancings, by roughly 5 percentage points beyond that suggested by traditional housing wealth effects.[16]

What Could Trigger Home-Price Declines? Given these macro risks and evidence that home prices may be overvalued in some key markets, it is worthwhile to touch on what factors could trigger home-price declines. While prices appear overvalued in areas of tight land supply, it is important to note that economic developments, particularly those affecting job growth and interest rates, tend to drive housing markets, rather than the reverse.

Home prices are vulnerable to job market weakness, especially when economic growth slows and a headwind could tip the economy into recession. Also relevant are the risks of regional recessions that could weaken home prices in the Northeast and West. Indeed, in the early 1990s unemployment rose more in those two regions than in the South and Midwest. Higher housing costs made the Northeast and West less competitive and more vulnerable to shocks, such as the defense cutbacks that hurt Southern California in the early 1990s. Weak job markets in those areas likely hurt home prices in the early and mid-'90s. While current labor market conditions are good, high housing costs in the Northeast and the Pacific states may undermine these regions' ability to generate jobs.

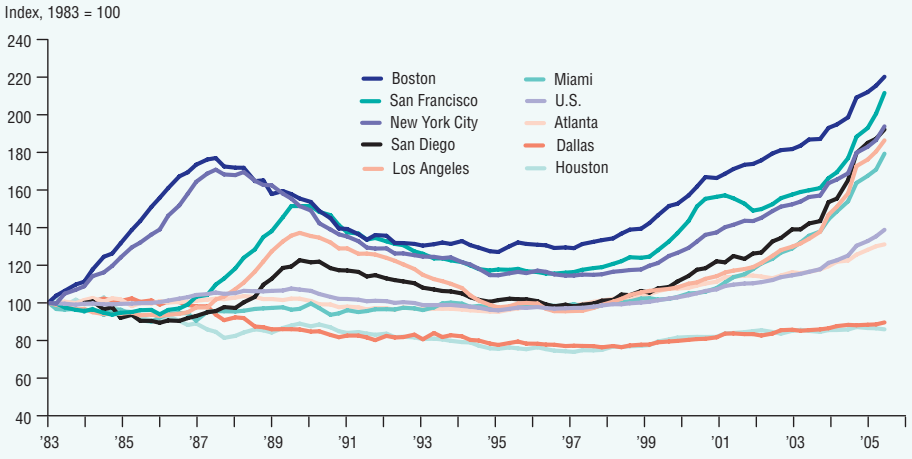
Another factor that could trigger declines in real estate prices is a possible jump in mortgage interest rates, which may have become more difficult to predict. One reason is the unusual behavior of long-term interest rates, which have only recently moved up despite 11 increases in the federal funds rate from 2004 through September 2005. Possible factors include the global savings glut, increased bond investor confidence that the Federal Reserve will keep inflation low and the subdued pace of global economic recovery.

Mitigating Factors. Fortunately, some factors mitigate the risks posed by high home prices. First, the impact of possibly higher mortgage rates on U.S. home prices is limited by the use of fixed-rate mortgages, which cushion homeowners from higher payments. And while use of adjustable-rate mortgages has risen in recent years, ARM use has not increased as much as in earlier short-term interest-rate cycles, despite the impression created by many media reports (*Chart 10*). Nevertheless, ARM use is high and, as in earlier cycles, has jumped in some high-cost markets.

Another mitigating factor is that the unemployment rate will likely remain low because the economic expansion will probably continue. In addition, the limits on new-home supply that have fueled

Chart 9

Price-to-Rent Ratios Rise, Mainly on Atlantic and Pacific Coasts



SOURCES: Office of Federal Housing Enterprise Oversight; Bureau of Labor Statistics; author's calculations.

high prices on the East and West coasts suggest that most construction is not in high-cost areas most vulnerable to price declines. Furthermore, U.S. policymakers would likely have time to react because home prices tend to rise faster than they fall, and refinancing and equity withdrawal effects on consumption appear to be more medium-run than short-run, according to new research.[17] Also helping in this regard is that home price-to-rent ratios in the Northeast and California tend to rise faster than they fall, with past downward corrections mainly owing to the combination of stagnant home prices and rising rents. Furthermore, historical norms may overstate how much home prices may be overvalued.

Chart 10

ARM Share Not (Yet?) as High as in Earlier Fed Tightening Cycles

SOURCE: Freddie Mac.

The United States Is Not Alone

The behavior of housing markets in the U.K. is an interesting example, partly because there are longer time-series data on that country, and home prices appear more overvalued there than in the United States. Indeed, the ratio of home prices to rents has jumped more in the U.K., which appears to be undergoing its third or fourth housing-price cycle since the late 1960s (*Chart 11*). Home-price swings there differ from those in the United States in being more pronounced and as flexible when falling as when rising.

The greater volatility in the U.K. price-to-rent ratio likely stems from two structural differences between the real estate markets there and in the United States.[18] First, U.K. housing demand tends to be more interest-rate sensitive because mortgages there are generally much more adjusted to market rates. Indeed, 70 percent of mortgages have rates that lenders can adjust within one year, and balloon mortgages make up many of the rest. In contrast, Freddie Mac data suggest that only about 30 percent of outstanding U.S. mortgages are subject to adjustment for short-term interest rates. A second difference is that the U.K. has a smaller supply of building lots, so housing-demand swings affect prices more. In this respect, the U.K. may be akin to the land-supply-restricted Northeast and Pacific Coast regions of the United States. By contrast, building lots are plentiful in much of the U.S. South and Midwest.

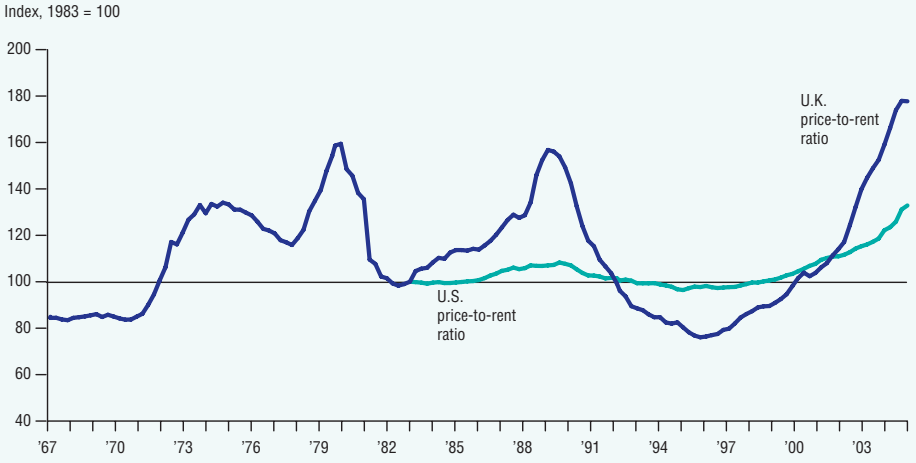
Another difference is that the Bank of England tightened sooner than the Federal Reserve in the most recent interest rate cycle. Probably reflecting this and structural market differences, U.K. home prices, which have jumped 113 percent this decade, may be close to topping out, whereas U.S. prices, which have risen 59 percent, are still going up (*see Chart 1*).

Outlook

As of second quarter 2005, U.S. housing prices appeared elevated relative to fundamentals. However, it was unclear whether there was a national housing bubble because of uncertainty about whether estimates of overvaluation were large and precise enough to warrant such a designation. Nevertheless, several indicators suggest that home prices are frothy, particularly in some regions. For example, home prices in the Northeast and Pacific states seem overvalued, based on historical norms. In some coastal metro areas, measures of

Chart 11

Home Prices Jump More Relative to Rents in U.K. Than in U.S.



SOURCES: Bank of England; Office of Federal Housing Enterprise Oversight; author's calculations.

affordability have plunged and housing prices have nearly doubled in the past five years, a magnitude hard to justify based on fundamentals. The main risk high prices pose is that they could amplify the effects of an economic headwind, in which case consumption could slow if mortgage refinancing and equity withdrawal activity decrease or flatten. Fortunately, high home prices are mainly in areas with little construction, and our limited experience suggests that U.S. policymakers would have time to cushion the macroeconomic impact of price declines.

Nevertheless, there is considerable uncertainty about how much home prices may be overvalued. The United States has a short track record with constrained supplies of building lots in some regions and with today's new mortgage practices. In addition, the increased liquidity of housing wealth and greater demand for second homes could raise equilibrium values to an unknown extent. A limited experience with regional home-price weakness also makes it unclear how much declining home prices would affect the economy in high-priced areas. Such uncertainties warrant more research and monitoring of residential real estate markets and their effects.

—John V. Duca

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Notes

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[1] In this article, housing prices are tracked by indexes that control for quality by using repeat home sales. Economists have differences of opinion about what index most accurately tracks home prices. For example, Jonathan McCarthy and Richard W. Peach ("Are Home Prices the Next 'Bubble'?" Federal Reserve Bank of New York *Economic Policy Review*, December 2004, pp. 1–17) use an index of constant-quality, new-home prices, partly on grounds that there are some upward biases in the repeat-sales index. But I use repeat-sales prices because land costs are a bigger component of existing-home prices (about 38 percent) than of new-home prices (about 10 percent), and they account for most of the movement in home prices. This follows Joshua Gallin in "The Long-Run Relationship Between House Prices and Rents," Finance and Economics Discussion Series Working Paper No. 2004-50, Federal Reserve Board, September 2004. See also "The Price and Quantity of Residential Land in the United States," by Morris A. Davis and Jonathan Heathcote, Finance and Economics Discussion Series Working Paper No. 2004-37, Federal Reserve Board, June 2004.

[2] "Monetary Policy Report to the Congress," Federal Reserve Board of Governors, July 2003; "Mortgage Refinancing in 2001 and Early 2002," by Glenn Canner, Karen Dynan and Wayne Passmore, *Federal Reserve Bulletin*, December 2002, pp. 469–81.

[3] "Why House Prices Matter," by Kosuke Aoki, James Proudman and Gertjan Vlieghe, *Bank of England Quarterly Bulletin*, Winter 2001, pp. 460–68; and "Housing Wealth Effects: Housing's Impact on Wealth Accumulation, Wealth Distribution and Consumer Spending," by Eric Belsky and Joel Prakken, National Center for Real Estate Research, November 2004.

[4] "Mortgage Equity Withdrawal and Consumption," by Melissa Davey, *Bank of England Quarterly Bulletin*, Spring 2001, pp. 1001–03; "Housing Price Bubbles—A Tale Based on Housing Price Booms and Busts," by Thomas Helbling, Bank for International Settlements Paper No. 21, April 2005, pp. 30–41; "Booms and Busts in the UK Housing Market," by John Muellbauer and Anthony Murphy, *The Economic Journal*, vol. 107, November 1997, pp. 1701–27; and "House Prices, Consumption, and Monetary Policy: A Financial Accelerator Approach," by Kosuke Aoki, James Proudman and Gertjan Vlieghe, Bank of England Working Paper No. 169, 2002.

[5] "How Vulnerable Are Housing Prices?" by John V. Duca, Federal Reserve Bank of Dallas *Southwest Economy*, March/April 2004.

[6] Home prices currently pose little risk to most banks, according to several indicators and gauges of risk.

[7] See the article by Joshua Gallin referenced in note 1 and "Bubble Trouble? Your Home Has a P/E Ratio Too," by Edward E. Leamer, *UCLA Anderson Forecast*, June 2002, www.anderson.ucla.edu/documents/areas/ctr/forecast/PE_ratio.pdf.

[8] Real mortgage rates were lagged by three quarters and are defined using the average effective conventional mortgage interest rate adjusted for the Federal Reserve Board's quarterly model estimates of housing depreciation, real estate taxes and other costs, minus the annualized rate of home appreciation over the prior 18 months. Estimates of home-price overvaluation at the end of 2004 were near those of Gallin (note 1), who uses roughly similar, though slightly different, techniques and data.

[9] With both home prices and incomes rising by 5 percent, the implied mortgage-payments-to-income ratio would generally be constant for a given type of mortgage, holding mortgage interest rates constant.

[10] Partly to control for this bias, the Office of Federal Housing Enterprise Oversight created a new, national repeat-sales-price series. While price rises are not as great, this index, the national one used here and existing median home prices move closely together. Since the new series has been available only since 1996, the longer repeat-sales index is used to gain insight from swings in the home price-to-rent ratio from the mid-1980s to mid-1990s.

[11] The NAR estimates that 13 percent and 23 percent of 2004 home sales were for second and investment homes, respectively, while Freddie Mac estimates corresponding figures of 10 percent and 7 percent of prime conforming mortgages. See "Investing in a Second…The Rise of Investor and Second-Home Purchases," by Frank E. Nothaft, www.freddiemac.com/news/finance/commentary/sp-comm_080105.html. Nothaft cites data from LoanPerformance, a subsidiary of First American Real Estate Solutions.

[12] "Housing and the Business Cycle," *International Economic Review*, vol. 46, pp. 751–84, August 2005; and "The Price and Quantity of Residential Land in the United States" (see note 1), both by Morris A. Davis and Jonathan Heathcote.

[13] "Why Have Housing Prices Gone Up?" by Edward L. Glaeser, Joseph Gyourko and Raven E. Saks, Harvard Institute of Economic Research, Discussion Paper No. 2061, February 2005. Other factors, such as density and immigration patterns, may also affect regional pricing patterns.

[14] "The Price and Quantity of Residential Land in the United States," by Davis and Heathcote.

[15] See the Canner, Dynan and Passmore article cited in note 2.

[16] These results are implied by findings in "Mutual Funds and the Evolving Impact of Stock Wealth on U.S. Consumption," by John V. Duca, *Journal of Economics and Business*, forthcoming.

[17] Quarterly mortgage interest savings from refinancing and equity withdrawals as shares of income were statistically insignificant when added to the consumer durable spending equation of the Federal Reserve Board's quarterly U.S. econometric model. However, equity withdrawals and a 12-quarter, cumulative sum of interest savings from refinancing mortgages are significant determinants of long-run consumption, along with wealth and income. (See the Duca article cited in note 16.)

[18] "Asymmetries in Housing and Financial Market Institutions and EMU," by Duncan Maclennan, John Muellbauer and Mark Stephens, manuscript, Oxford University and University of Glasgow, July 2000; "Asset Pricing and the Housing Market," by Olaf Weeken, *Bank of England Quarterly Bulletin*, Spring 2004, pp. 32–41; "What Drives Housing Price Dynamics: Cross-Country Evidence," by Kostas Tsatsaronis and Haiban Zhu, *BIS Quarterly Review*, March 2004, pp. 65–78.