Interest Rates and House Prices: the "Priced Out" Effect
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A question that economists at NAHB are often called upon to answer is, "What happens to housing affordability?" when either interest rates or house prices go up.

The most straightforward way of answering begins with a representative house price and interest rate, changes one of those parameters, and then observes the impact on affordability. The most convenient concept of affordability to use is based on mortgage underwriting standards. Under those standards, the question becomes, "How many households can qualify for a mortgage before the change, but not afterwards?" Those are the households that are effectively 'priced out' of the market for a home.

Applying this method to the U.S. as whole shows that in 2005—under typical assumptions about the nature of the mortgage, property taxes, and insurance—25 basis points tacked on to the mortgage rate will price about 1.2 million households out of the market for the median-priced new home. A $5,000 increase in the price of the home has a similar impact, also pricing out about 1.2 million households.

The same method can be applied to individual metro areas. The size of the impacts varies across metros, for the obvious reason that U.S.metropolitan areas themselves vary in size and therefore contain drastically different numbers of households to price out. In the 318 metro areas studied here, the impacts of a 25-basis point interest rate hike and $5,000 increase in the median new home price range from fewer than 200 households priced out of the market in some of the smaller metros to more than 20,000 in metro areas like Chicago, Houston, and Washington, DC.

The Priced Out Calculation
Most home buyers take out a mortgage (according to the Census Bureau's 2003 American Housing Survey, well over three-fourths of the owners who reported moving within the past year also reported having at least one mortgage), so it's reasonable to use ability to qualify for a mortgage as an affordability standard. A qualifying criterion used by the Fannie Mae and Freddie Mac guidelines limits the "front end ratio" (also known as "PITI" for Principal and Interest on the mortgage, plus property Taxes and homeowner's Insurance) to 28 per cent of household income.

Mortgage originators sell about half of their conventional loans within a year, so acceptability of these loans to the secondary market is an important consideration, and originators for that reason are inclined to follow the Fannie/Freddie guidelines. Many of them in fact use a standard application form developed jointly by Fannie and Freddie.[1]

Other underwriting standards are based on "back end" ratios, which incorporate consumer debt. From the standpoint of a priced-out calculation, the primary disadvantage of back end ratios is that sufficiently detailed information about household debt is not always available. The front end ratio, on the other hand, requires only an income distribution for the area of study. The impact of interest rate and house price changes on PITI is the same whether a front end or back end ratio is used.

The affordability standard is thus a ratio of housing expenses to income, and the number of households that qualify for a mortgage to buy a home of a given price will depend on the income of households in an area. Reasonably detailed income distributions for all parts of the country are available from the Census Bureau, but not always for the current year, so they most often need to be adjusted for the most recent changes in population and incomes.

To adjust for income growth, NAHB typically uses the estimates of median family income published each year by the Department of Housing and Urban Development (HUD) for every state and county in the country. HUD published median income estimates for 2005 early in February. Population or households estimates rates are available from a number of government sources. Table 1 shows a U.S.household income distribution based on the number of households in the Census Bureau's Housing Vacancy Survey. The total number of U.S.households in 2005 is projected by applying the growth rate from the first half of 2004 to the number of households in 4th quarter of 2004.

Table 1: 2005

Income Range:			Households	Cumulative
$0	to	$11,588	10,284,365	10,284,365
$11,589	to	$17,383	6,800,951	17,085,316
$17,384	to	$23,178	6,743,530	23,828,846
$23,179	to	$28,972	7,085,686	30,914,531
$28,973	to	$34,767	6,947,837	37,862,369
$34,768	to	$40,562	6,863,272	44,725,641
$40,563	to	$46,356	6,370,825	51,096,466
$46,357	to	$52,151	6,094,666	57,191,133
$52,152	to	$57,946	5,357,429	62,548,561
$57,947	to	$69,535	9,743,074	72,291,635
$69,536	to	$86,919	11,240,983	83,532,618
$86,920	to	$115,892	11,032,390	94,565,008
$115,893	to	$144,866	5,610,083	100,175,091
$144,867	to	$173,839	2,713,647	102,888,738
$173,840	to	$231,786	2,372,169	105,260,907
$231,787	or	More	2,556,705	107,817,612

Other assumptions used in the priced out calculations are a downpayment equal to 10 percent of the purchase price and a 30-year fixed rate mortgage. For a loan like that, the calculations also assume lenders require private mortgage insurance with an annual premium of 45 basis points.[2] Effective property tax and hazard insurance rates can be constructed from decennial Census data.[3] For the U.S.as a whole, the rates work out to $11.27 per $1,000 of property value for property taxes and $3.06 per $1,000 of property value

for insurance.

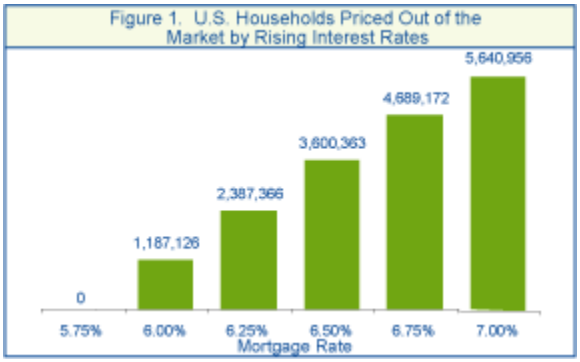
Under these conditions, 39.7 million of the 107.8 million U.S.households could afford to buy the median priced new home in 2005—assuming that they pay a 5.75% interest rate on the mortgage. This is different from the number of households that currently own a home, but of course current owners bought their homes at different times in the past, when house prices and the other variables that go into the analysis were sometimes quite different.

Interest Rates

If the mortgage rate rises, the monthly mortgage payments will be higher and some of the 39.7 million households will no longer qualify to purchase the home. The size of the priced-out effect depends in part on the starting house price. A median price of $224,400 for new homes in 2005 was generated by starting with the Census Bureau's median price for new homes sold in 2004 and assuming one year of inflation at 2.5 percent, based on NAHB's forecast for changes in the Consumer Price Index.

Figure 1 shows the number of households priced out of the market for a $224,400 home by each 25 basis-point increase in the mortgage rate between 5.75% and 7.00%.

The figure shows that an increase in the mortgage rate from 5.75% to 6.00% will price about 1.2 million households out of the market, and the increases from 6.00% to 6.25% and 6.50% will have comparable impacts. Above that, the impacts begin to taper off slightly, so that boosting the interest rate from 6.75% to 7.00% prices about 950,000 households out of the market. The tapering off occurs, because we are moving into a slightly thinner part of the U.S.income distribution, where there somewhat fewer households to be priced out.



House Prices

House prices may go up for many reasons. Some are the result of changes in demand, such as those driven by rising household incomes. The priced-out calculation, however, is designed to estimate the impacts of something that takes place on the supply side of the market—conditions somehow changing so that it becomes more costly to deliver a home to its final consumer.

An example often encountered by developers is an impact fee. If an impact or other construction-related fee goes up, all else equal, the price of the home will go up and fewer households will be able to afford it. In fact, the final price of the home to the buyer will usually go up by more than the increase in the fee.

The reason is that, when costs of construction and development rise, other costs such as commissions and financing charges also rise. Rates of return to home building also need to remain competitive with other investments, or businesses will leave the industry until the rates

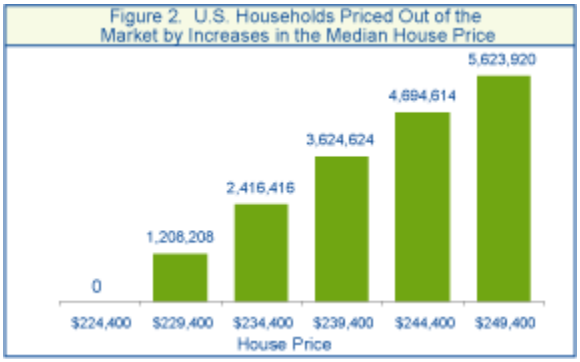
even out.

As a result, most cost increases are passed on to the buyer with a mark-up. The size of the mark-up depends both on the type of cost increase and when it's imposed in the development/construction process. NAHB has estimated that a $1 increase in impact fees imposed at the time of development will typically raise the price of a house to its final customer by $1.25. So an increase of $5,000 in the price of the home is consistent with an increase of $4,000 in impact fees, the way many of the fees are imposed.

If the price of the median-priced home goes up by $5,000 (from $224,400 to $229,400), the effect is similar to a 25 basis-point interest rate hike, pricing out about 1.2 million U.S. households (Figure 2).

The size of the priced out effect is largely a function of the income distribution in Table 1. The $5,000 price increase stays within the same part of the distribution, simplifying the process of approximating the impacts for smaller price changes. The impact of each $1,000 price increase in that range, for instance, is roughly one-fifth of the $5,000 impact, or about 240,000 households priced out of the market.

As the house price gets higher and higher, the problem again shifts into a thinner part of the income distribution with fewer households to be priced out. The last $5,000 price increase at the right of Figure 2 prices an additional 930,000 households out of the market. Over most of the price points a developer is likely to be interested in, the number of households priced out tends to become smaller as the house price goes up.[4]



Individual Metros

An advantage of the priced-out method outlined above is that it can easily be adapted to local markets. NAHB has often applied the method to smaller geographic areas, as many of the crucial supply-side effects that drive up house prices—e.g., impact fees and constraints on land use—are imposed at the local level.

The most recent data source providing household income distributions for a large number of local areas is the 2000 Census. Using the Census data, the number of households priced out of the market by a 25-basis point interest rate hike and a $5,000 price increase were calculated for 318 metro areas.[5] It makes little sense to use the same price for all metro areas, as a representative new home price for, say, Pine Bluff Arkansas would seem inappropriate in a high-priced metro area like San Francisco, so the analysis is based on an estimated median new home price that varies from metro to metro.[6]

The number of households priced out of the market for a median-priced new home by a 25-basis point interest rate increase (from 5.75% to 6.00%) ranges from 78 in Syracuse, NY to 26,652 in Chicago, IL. The number priced out by a $5,000 increase in the house price varies from 139 in

Syracuse to 22,292 in Houston, TX.

As a general rule, the house-price effect tends to be high relative to the interest-rate effect in metro areas that start out with lower median new home prices. House price effects would be more similar across metros, and therefore perhaps easier to compare, if they were based on a percentage change in the price, rather than a straight $5,000 increase. Experience has shown, however, that the largest share of NAHB's audience is most interested in house price increases, expressed in dollar terms, within a particular market area.

Summary and Conclusion

This article describes the priced out analysis that NAHB uses frequently to estimate the impacts of changes in housing markets. The analysis shows the number of households that will no longer be able to afford a particular home if either its price or interest rates go up. The article also gives numerical examples for the U.S.as a whole, as well as for several hundred metro areas.

The results of a priced out analysis don't answer all possible questions, such as, "How many households will not buy a house when they otherwise would have?" or "What will the resulting reduction in home building be?"

Although these are important questions, doing a good job of answering them requires a complex economic model that addresses issues such as the willingness of households to accept homes that are somewhat smaller or have fewer amenities to achieve affordability, how different segments of a local housing market are related to one another, and how builders will adjust the product they build when affordability problems are on the rise. An analysis that substitutes crude assumptions for this type of complex modeling will be difficult to justify, especially to a skeptical audience.

In contrast, the priced out effect is relatively easy to understand and justify, straightforward to calculate, and available for any local housing market in the U.S.

Download *Households Priced Out of the Market for a New Home in 2005, by Metro Area*:

Excel Table

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[1] In recent years, automated underwriting has become more common. This form of underwriting automatically examines many borrower characteristics to assess ability to make loan payments, so the simple front end ratio is not as important to the secondary market as it used to be.

[2] In the PITI formula, mortgage insurance is essentially treated as part of the interest payment. Like interest on the loan, it is a percentage of the declining mortgage balance.

[3] http://www.nahb.org/fileUpload_details.aspx?contentID=31465

[4] See the NAHB Housing Affordability Pyramid:
http://www.nahb.org/generic.aspx?sectionID=784&genericContentID=27962

[5] To estimate income distributions in 2005, HUD median income estimates are first used to inflate the income ranges. Then the number of households in each range is adjusted for population growth, using data either from the Census Bureau's American Community Survey or the Regional Economic Information System from the Bureau of Economic Analysis. As these data are generally available only through 2003, recent growth rates are used to project population levels to the middle of 2005.

[6] There is no convenient source for median new home prices. To estimate them for a large number of metros, it's necessary to combine data from a variety of sources. For the metro area table discussed in this article, information from the 2000 Census, National Association of REALTORS existing home prices, OFHEO repeat sales indices, and regional new home prices from the Census Bureau's Survey of Construction were used. Some of the estimates are better than others, and readers should not assume they are extremely precise in all cases.

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