

Too Much Bubbly at the Fed?:
The New York Federal Reserve Board's Analysis of the Run-Up in Home Prices

Dean Baker¹
Center for Economic and Policy Research
baker@cepr.net
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CENTER FOR ECONOMIC AND POLICY RESEARCH 1611 CONNECTICUT AVE., NW, SUITE 400
WASHINGTON, D.C. 20009 (202) 293-5380 <WWW.CEPR.NET> EMAIL: CEPR@CEPR.NET

¹ Dean Baker is co-director of the Center for Economic and Policy Research. Debayani Kar and Mark Weisbrot gave useful comments on earlier drafts of this paper.

Executive Summary

Since the third quarter of 1995, home sale prices have risen by more than 33 percent after adjusting for inflation. In the regions with the largest increases in prices, the real increase has been more than 50 percent over this period. This run-up in home prices has created almost \$4 trillion in housing wealth compared to a situation in which home prices had simply kept pace with inflation.

A new study from the Federal Reserve Bank of New York questions whether this run-up in home prices can be attributed to a housing bubble. Like prior studies it attributes part of the increase in housing prices to lower interest rates. However, this view, even if accurate, supports the bubble argument, since it means that housing prices will plunge when interest rates return to more normal levels, as is widely expected.

The novel part of this new study is the effort to attribute the run-up in home prices to quality improvements. The study relies on the Census Bureau's constant quality new construction price index as a measure of inflation in housing prices. This index shows only a slightly more rapid pace of inflation in housing prices than the overall CPI. The Fed study argues that the difference between the Census index and the more commonly used House Price Index (HPI) is attributable to the failure of the HPI to pick up quality improvements.

This paper shows that the evidence clearly contradicts the main claims of the Fed study.

- 1) If the huge run-up in home prices in recent years can be explained by a rapid pace of home improvement, then spending on home improvements should have been very high in recent years. In fact, the Census Department's data show that spending on home improvements, relative to the value of the housing stock, has actually been lower in the years of the run-up in home prices than it was in the early nineties, when home prices were not rising relative to inflation. This suggests that a more rapid pace of quality improvement cannot possibly explain the run-up in housing prices shown in the HPI.
- 2) Annual spending on home improvements is equal to less than 1.0 percent of the value of the stock of residential housing. Changes in the size of this spending are an order of magnitude too small to explain increases in the value of the housing stock that have averaged more than 8 percent annually over the last eight years
- 3) The areas that have experienced the most rapid rate of quality improvement, according to the methodology in the Fed study, are not the areas that have seen the largest increases in spending on improvements, according to the Census Bureau's data.

- 4) The number of vacant units is now increasing at a 750,000 annual rate. This is more than one-third of the rate of housing construction and more than 50 percent of the rate of annual absorption. This growth in vacant units can be explained by a speculative bubble. It is not clear what alternative explanations could be plausible.

In short, the Fed's study is clearly contradicted by the available data. It does not provide any plausible reason to question the existence of a housing bubble.

Introduction

The Federal Reserve Bank of New York recently issued a new study that questioned whether the recent run-up in home prices in large parts of the country constituted a housing bubble.² Two main substantive points that questioned the existence of a housing bubble were raised:

- 1) lower nominal interest rates reduced the user cost of housing, and therefore justified considerably higher home prices than we have seen in the past; and
- 2) the Office of Housing Enterprise Oversight's House Price Index (HPI), the standard measure of house price appreciation, had a large upward bias, because it did not take account of quality improvements.

This brief discussion will focus on the second issue. The point concerning lower nominal interest rates is not new, and cannot effectively respond to the evidence of a housing bubble. Put simply, it assumes that homebuyers cannot distinguish between real and nominal interest rates – an assumption radically at odds with standard economic theory, and which also implies dire consequences for current homebuyers.³ Furthermore, it implies a sensitivity of home prices to interest rates that has not been borne out in the past and, if true, suggests that housing prices will collapse if interest rates rise in coming years, in line with most economic projections.⁴

The new contribution of the Fed article is the claim that the extraordinary rise in the HPI since 1995 is being driven primarily by improvements in the quality of housing, rather than an increase in the price of housing of the same quality. If quality improvements can explain most of the run-up in home prices, then there is little basis for concern about a speculative bubble, which may eventually collapse.

Before examining the evidence for this view, it is worth restating the basic case for a housing bubble. Table 1 shows the increase in housing prices as measured by the HPI for the nation as a whole and in each region from the third quarter of 1995 to the first quarter of 2004. The first column shows the nominal price increase, the second column shows the real increase, using the CPI-U as the deflator.

² McCarthy, J. and R. Peach, 2004. "Are Home Prices The Next 'Bubble'?" Forthcoming, Federal Reserve Bank of New York, *Economic Policy Review* [<http://www.newyorkfed.org/research/epr/forthcoming/mccarthy.pdf>].

³ Baker, D, 2002. "The Housing Affordability Index: A Case of Economic Malpractice," Center for Economic and Policy Research. [http://cepr.net/housing_affordability_index.htm].

⁴ The Bureau of Labor Statistics' Home Purchase Index, which in principle is a quality adjusted home sale price index, largely tracked the overall rate of inflation from 1953 until it stopped being used in 1983. This is in spite of a very large increase in nominal interest rates from the fifties through the sixties and seventies.

Table 1

The Run-Up in Home Prices 1995-2004

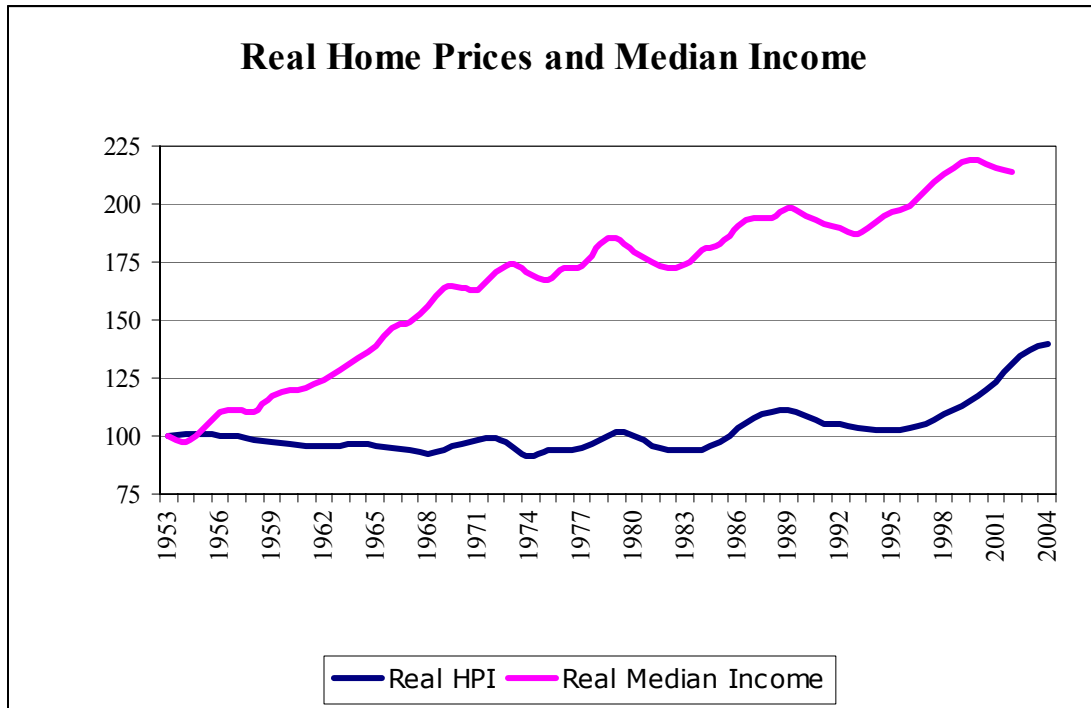
	Nominal	Real
U.S.	62.6%	33.4%
Northeast	94.3%	59.4%
Mid-Atlantic	65.1%	35.4%
East South Central	39.9%	14.7%
West South Central	41.5%	16.1%
South Atlantic	60.7%	31.8%
East North Central	50.5%	23.5%
West North Central	60.8%	31.9%
Mountain States	87.0%	53.4%
Pacific	86.9%	53.3%

Source: Office of Federal Housing Enterprise Oversight 2004.

The table shows an extraordinary run-up in housing prices since 1995, with prices rising by more than 33 percent nationally, after adjusting for inflation.

This increase is without precedent in the post-war period. In the past housing prices had largely kept even with inflation.⁵ Figure 1 shows the path of real housing sale prices from 1953 to the present. (The graph uses the home purchase index from the consumer price index for the years prior to 1975, when the House Price Index was first introduced.) As can be seen, while there is some variation in real housing prices over this period, there is no clear upward trend, and the 1995 level adjusted for inflation is virtually identical with the level at the start of the period in 1953. On the other hand, real median family income, which is also shown in this figure, has a clear upward trend, although it does undergo a long period of stagnation from the late seventies until the mid-nineties. These data show that there is no reason to expect that house prices will rise in step with median family income, as many analysts argue.

⁵ The Bureau of Labor Statistics' home purchase index rose by 225.5 percent from 1953 to 1983 (when the CPI shifted to a rental equivalence for owner-occupied housing), while the overall CPI (chaining the CPI-URS and the CPI-UX1) rose by 240.7 percent. In the years from 1983 to 1995, the Office of Federal Housing Enterprise Oversight's House Price Index rose by 58.1 percent, while the CPI-URS rose by 46.2 percent. Chaining the home sale price indexes, gives a 256.3 percent rise in home sale prices over the 42 year period, compared to a 251.9 percent rise in the overall price level, which amounts to annual difference in inflation rates of 0.03 percentage points.



Source: BLS, Census Bureau, OFHEO, and author's calculations, see text.

The recent run-up in home prices has led to the creation of more than \$3.8 trillion in additional housing wealth compared to a situation in which home prices had just kept even with the overall rate of inflation.⁶ This additional wealth is approximately half the size of the paper wealth created by the stock market bubble; however, it may actually have larger implications for the economy, because housing wealth is much more evenly distributed than stock wealth.

Not only is the gap between home prices and inflation without precedent in the post-war period, there is also a large gap between home sale prices and rental prices. The shelter index of the CPI has increased by just 29.9 percent over this period, indicating a gap of more than 30 percentage points. In the past, home sale prices and rents had largely moved in tandem. The periods in which they diverged were reversed fairly quickly. The logic for this is straightforward. On the demand side, if rents fall relative to sale prices then potential homebuyers opt to rent instead. On the supply side, owners of rental units who find that they have large numbers of vacancies and are forced to accept lower rents try to sell off their housing. While owning and renting are not perfect substitutes, and there are costs associated with selling off rental units, over a long enough period of time these two markets must maintain some balance.

It is also worth noting that the run-up in home prices has been very different across regions. The Northeast, Mountain, and Pacific states have all seen a real increase in home prices of more than 50 percent over the last nine years. By contrast, the real increase in

⁶ This calculation relies on the estimate of the value of residential real estate in the first quarter of 2004 in the Federal Reserve Board's Flow of Funds Table B100, line 4.

home prices in the East South Central and West South Central states has been approximately 15 percent over the same period. Given past patterns for home prices over the post-war period, any increase in excess of the rate of inflation can be seen as evidence of a speculative run-up. However, there clearly have been large differences in the extent of this run-up across regions.

This difference is helpful in providing a basis for testing the main claim of the Fed study – that unmeasured improvements in housing quality explain the run-up in home prices, as measured by the HPI. However, before examining the importance of these regional differences in price appreciation, it is worth examining the plausibility of the study's main claim – that unmeasured quality improvements explain most of the real increase in housing sale prices over the last nine years.

Housing Price Appreciation and Quality Improvements – the Nationwide Story

The study's main claim is that the HPI misses quality improvements because it tracks re-sales of the same homes, but it does not adjust for any additions or improvements that might have been added between sales. This means that if extra rooms or improvements like central air conditioning were added to a house between sales, the HPI would record the resulting increase in the sales price as housing inflation, rather than recognizing it as an improvement in the quality of houses being sold.

The Fed study instead uses what it considers a pure measure of inflation in housing prices, the Census Bureau's constant quality housing price index. This index is used to measure the increase in the price of newly constructed homes. The index is constructed through the use of hedonic regressions that include characteristics such as the numbers of bedrooms and bathrooms, central air conditioning and various types of construction materials. The index also includes the value of the land on which the house is located.

The treatment of land is central. If newly constructed housing is in less desirable locations than existing housing – either because it is further from central cities or it is located in less desirable neighborhoods within cities – then this index will not be picking up the full rise in existing home prices. In effect, it will be comparing the price of newly constructed housing 50 miles from a central city in 2004 with the cost of newly constructed housing in 1994, that might have been 30 miles from the central city. In principle, a true price index would track the price of the same housing, adjusting for any quality improvements or deterioration through time.

The Census Bureau's index shows a much lower rate of inflation than the HPI, rising by 34.3 percent from 1995 to 2003, approximately 1.2 percentage points a year faster than the 21.9 percent cumulative rate of inflation over this period. The study notes this relatively small gap between the increase in housing prices and the overall CPI to argue that there is little evidence of a housing bubble.

In short, the question of whether the Census Bureau's constant quality housing construction index or the HPI provides a better measure of inflation in housing prices depends on:

- 1) the extent to which the HPI overstates house price inflation by failing to pick up quality improvements, and
- 2) the extent to which the Census index understates house price inflation by failing to pick up the fact that new housing is built in less desirable areas than existing housing.

The first and most obvious test of the claim that the run-up in housing prices can be explained by a rapid rate of quality improvement is to examine the Census Bureau's data on spending on home improvements. The study's explanation would require a rapid increase in spending on home improvements. If quality improvements explain the recent run-up in home values, then spending on home improvements should be a large and rising share of the value of residential housing stock.

Table 2 shows the total value of the residential housing stock at the end of each year along with the Census Bureau's estimate of the spending on improvements to single family homes.

Table 2

Value of the Housing Stock and Spending on Improvements, 1991-2002
(billions of current dollars)

	A	B	C
	Value of Residential Housing Stock	Spending on Improvements	Spending on Improvements as a Percent of the Value of the Housing Stock
1991	\$6,709.2	\$62.6	0.9%
1992	7018.8	72.9	1.0%
1993	7248.3	77.6	1.1%
1994	7405.7	85.9	1.2%
1995	7870.3	79	1.0%
1996	8194.6	84.5	1.0%
1997	8652.2	90.7	1.0%
1998	9406.8	96.2	1.0%
1999	10250.1	95.8	0.9%
2000	11268.3	100.2	0.9%
2001	12362.3	106	0.9%
2002	13573	116.2	0.9%

Source: Federal Reserve Board and Bureau of the Census. ⁷

⁷ The data on the value of the residential housing stock are from the Federal Reserve Board's Flow of Funds Table B100, line 4. The data are taken from the Census Bureau's Expenditures for Residential

As can be seen, spending on improvements actually fell relative to the value of the housing stock over this period, clearly ruling out the possibility that the run-up in housing prices can be explained by a more rapid pace of quality improvements to existing homes, as the Fed study argued. The decline in spending on home improvements relative to the value of the housing stock suggests, other things equal, that the quality of existing housing has actually been improving less rapidly in the years of rapid price appreciation than it had been previously.⁸

It is also worth noting the size of spending on improvements relative to the increase in the value of the housing stock. The increases in the value of the housing stock average 8.1 percent for the years from 1995 to 2002. Even if spending on improvements had doubled from the early nineties to the period of rapid price appreciation, it could only explain an increase in the annual rate of appreciation of the housing stock of approximately 1 percentage point. This means that the plausible effects of a more rapid pace of quality improvements are an order of magnitude less than the actual rate of house prices appreciation experienced over the last nine years. It should have been apparent that it is not possible to explain house price increases of the size experienced in recent years by increases in housing quality. This would have required a boom in home improvement spending far in excess of anything the country has ever witnessed. (Of course, since spending on home improvements actually fell relative to the value of the housing stock, none of the run-up in housing prices can be explained this way.)

In short, the evidence indicates that the difference between the Census Bureau's constant price index and the HPI is not explained by quality improvements to existing homes that have been missed in the HPI. Rather, it seems the differences are attributable to fact that newly built homes are located in less desirable areas than existing homes.⁹

Housing Price Appreciation and Quality Improvements – the Regional Story

There is a second important, and easily testable, implication of the Fed study's claim that the gap between the rise in the HPI and the Census Bureau's index is attributable to quality improvements. It implies that the most rapid rise in spending on home improvements should be in the regions that have the largest gap between the HPI and the Census Bureau's index. Table 3 shows the rise in the Census Bureau's constant quality index for the nation as a whole, and by region, for the period from 1995 to 2003.

Improvements and Repaid by Property Type (all residential property)
[<http://www.census.gov/const/C50/histtab2.pdf>].

⁸ It is important to remember that some amount of spending on improvements is necessary just to keep housing at a constant quality. The quality of housing would deteriorate through time due to wear and tear, if there were no offsetting improvements.

⁹ It is also worth noting that the South, the region which has seen the smallest increase in housing prices, has the largest weight in the Census Bureau index (0.4). This is attributable to the fact that more than 40 percent of new construction spending takes place in the South. Of course, an index that is measuring price changes for existing housing should reflect the value of the existing housing stock, which would assign a much smaller weight to the South.

Table 3

Increase in Census Bureau Constant Quality Price Index 1995-2003

U.S.	34.3
Northeast	42.2
Mid-West	27
South	27.3
West	49.5

Source: Bureau of the Census.¹⁰

Accepting the analysis in the Fed study, the data in table 3 can be viewed as the pure inflation in home sales prices over this period. This means that a measure of quality improvements by region can be calculated by dividing the price increase shown by the HPI, by the pure inflation measure in the Census Bureau index. Unfortunately, the regions used in the surveys do not match up precisely, but using the inflation measure from the larger Census Bureau regions for the HPI regions should still give a reasonable approximation of inflation in each HPI region. Table 4 shows the implicit measure of housing quality improvement for the country as a whole and for each region, following the assumptions of the Fed study.

Table 4

Housing Quality Improvement 1995-2003

	HPI/ Census Bureau Index
U.S.	21.1%
Northeast	36.6%
Mid-Atlantic	16.1%
East South Central	9.9%
West South Central	11.2%
South Atlantic	26.2%
East North Central	18.5%
West North Central	26.6%
Mountain States	25.1%
Pacific	25.0%

Source: Census, Federal Reserve Board, and author's calculations, see text.

Consistent with the Fed study, the regions that have the most rapid increase in house prices, as measured by the HPI, also have the largest amount of quality improvement, using this methodology. Of course, this result is also consistent with a situation in which the Census Bureau index is understating the increase in home prices because new homes are being built in less desirable locations than existing homes. There is a simple way to

¹⁰ This data is taken from the "Price Indexes of New One-Family Houses Sold Including Lots, [http://www.census.gov/const/price_indexes.pdf].

test whether the data in table 4 is reflecting differing degrees in quality improvement by region, or actual inflation in house prices. The Census Bureau also has data on spending on home improvements by region. If the data in table 4 reflect quality improvements, then the largest increases in home improvements spending should have occurred in the regions that are seeing the greatest increase in the implicit quality index shown in table 4.

Table 5 shows the value of annual improvements in single-family owner-occupied housing by region. It compares average spending with the early nineties, a period in which housing prices were falling somewhat behind inflation, with spending in the years from 1998 to 2002, when housing prices were rising rapidly. The comparison with a period before housing prices began to rise rapidly is essential, because the assumption of the Fed study is that the rapid rise in housing prices since 1995 is due to a rapid rate of improvement in housing quality. This means that the regions with the largest increase in prices in the last eight years should have seen the largest increase in spending on home improvements.

Table 5
Spending on Housing Improvements by Region

	Avg 91-95	Avg 98-02	Increase
Northeast	\$17.2	\$20.1	17.1%
Mid-West	\$19.0	\$26.5	39.7%
South	\$22.0	\$28.3	28.5%
West	\$16.7	\$29.7	78.4%

Source: Census Bureau¹¹

The data in table 5 do not seem to support this conclusion. The most rapid increase in spending on home improvements does occur in the West, which is a region of substantial quality improvement as indicated in table 4. However, the Mid-West also has a large increase in spending on home improvements, yet its rate of quality improvement would be close to the national average, according to the data in table 4. On the other hand, the Northeast, which should be near the top in its rate of quality improvement according to table 4, is shown to have the smallest increase in spending on home improvement in the data from the Census Bureau. The Census Bureau data certainly do not seem to support the contention that differences in the rate of increase in housing prices, as shown in the HPI, can be explained by differences in the rate of quality improvement.

If There is No Bubble, Then Why Does Supply Exceed Demand?

There is one final point worth noting concerning the evidence for a housing bubble. It is easy to verify that construction is continuing at a far more rapid pace than growth in the demand for housing. The Census Bureau reported that the number of vacant housing units

¹¹ These data are taken from the Census Bureau's Expenditures for Owner-Occupied One-Unit Properties by Region [www.census.gov/const/c50/table_3.pdf].

(mostly rental units) increased by more than 750,000 units from the first quarter of 2003 to the first quarter of 2004

[<http://www.census.gov/hhes/www/housing/hvs/q104tab4.html>]. This increase is large relative to the current annual rate of construction of 2 million units. It is even larger relative to the 1.3 million implied rate of absorption. Until there is a downward adjustment in housing prices, this rate of overbuilding will persist. It is difficult to explain how the presence of a large and rapidly growing number of vacant units (either owner occupied or rental) will not place substantial downward pressure on housing prices. Those who argue against the existence of a housing bubble must find an alternative explanation for the country's exploding vacancy rate.

Conclusion

The Fed study's claim that the run-up in home prices since 1995 is attributable to improvements in housing quality is not supported by the data. Spending on improvements has actually fallen relative to the value of the housing stock in the last eight years, indicating that this spending cannot possibly explain a more rapid rate of increase in home prices. Furthermore, annual spending on home improvements is far too small to explain the sorts of increases in home prices that we have experienced since 1995 in any case. While spending on improvements has averaged approximately \$100 billion in recent years, the annual increases in the value of the housing stock have exceeded \$1 trillion. For an *increase* in spending from recent levels to explain this sort of run-up in home values, home improvement spending would have to be at least an order of magnitude larger.

In addition, there is no obvious relationship between the rate of home quality improvement by region implied by the explanation in the Fed study and actual spending on home improvements. In other words, if the HPI is missing quality improvements, then the Census Bureau appears to be missing them as well in its construction data. Finally, the Fed study has no explanation as to why the housing vacancy is rising at a record rate from already record highs. This pattern is consistent with a housing bubble, but not with the argument presented in the Fed study.

In short, the Fed study really cannot explain any of the main features of the current housing market. It does not support the case that the recent run-up in housing prices can be explained by fundamentals rather than a speculative bubble.