

July 2007

Federal Reserve Bank of Cleveland

What's Really Happening in Housing Markets?

by Morris A. Davis, François Ortalo-Magné, and Peter Rupert

Recent trends in house prices have induced a certain amount of hand-wringing among leading economists, policymakers, and bloggers of some repute. In the eight-year boom ending sometime last summer, they warned that house prices were rising much faster than ever before, and that such appreciation was unwarranted. As a consequence, these commentators are predicting that prices will fall, perhaps disastrously so.

According to the most widely cited historical data on house prices (compiled by Robert J. Shiller for the 2005 edition of his book, *Irrational Exuberance*), house prices were roughly flat from 1890 to 1997 (after adjusting for inflation), but since 1998, they have climbed 6 percent per year in the aggregate. Adding to analysts' sense of trouble is that the rate of house-price appreciation over the boom has varied widely across the United States. The more populated coastal states, such as California and Florida, have experienced nominal gains on the order of 10 percent per year, whereas prices in Midwestern and interior states, like Michigan and Nebraska, appreciated approximately 4 percent per year. The acceleration of prices in the aggregate reflects the fast growth of house prices in the coastal states, so the argument goes, but because growth in house prices has outpaced the growth of residents' income in these states, analysts argue that the rise in house prices is not supported by economic "fundamentals." Their observations imply that house prices on the coasts, and therefore in the aggregate, should fall to be more in line with income and fundamentals.

But there is a problem with the data on which these projections rest. They are inaccurate in a particularly important period—the 1970s, a decade which, as it turns out, does offer a precedent for the current situation. A different source of data on housing prices suggests that a housing boom similar to the 1998–2006 boom occurred sometime between 1970 and 1980.

As for what might be behind the latest housing boom, two reasonable explanations spring to mind. One has to do with the price of land, and the other with relaxed credit constraints.

The value of the land on which a house sits contributes a part of the total price of a home. While housing structures are reproducible with little additional cost, land is in fixed supply. To understand changes in house prices, it is necessary to study the price of residential land. Data indicate that the real price of land has been marching steadily upward since 1950. If the 1998–2006 boom to house prices reflects demand for housing-related amenities, then the data on land prices argue that this boom is a continuation of earlier trends.

Relaxed credit constraints could explain the outpacing of house price appreciation to incomes. House prices can and should be expected to surge if credit constraints are unexpectedly relaxed for first-time homebuyers who are credit or down-payment constrained. This surge can occur even when incomes remain constant; when credit constraints change over time, incomes and house prices should not be expected to increase at the same rate.

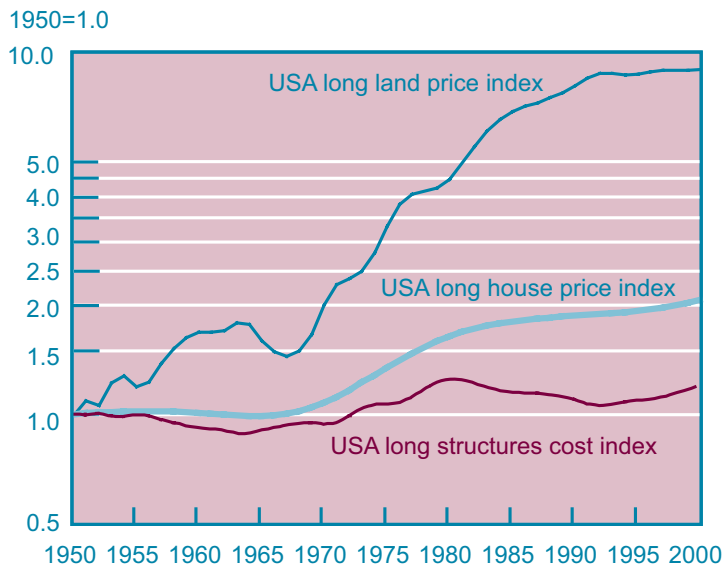
Most of the public concern about housing markets is based on claims that house prices have increased at historically anomalous rates and that house prices have outpaced incomes. The first claim is based on inaccurate historical data. The second is linked to relaxed credit constraints. House prices are likely to fall further, but not for the reasons usually proposed.

■ Historical Housing Prices

Until recently, the only long time series of house prices for the United States had been compiled by Shiller (2005). Shiller constructs this series by splicing together available house price data from 1890–1934 from Grebler, Blank, and Winnick (1956), the home-purchase component of the CPI-U from 1953–1975, the OFHEO from 1975–1987, and the Case-Shiller-Weiss index from 1987–2005. To fill in the gap, Shiller constructs an index of house prices from 1934 to 1953 by compiling data on the sales price of houses from five major cities based on newspaper advertisements. These data, after adjusting for consumer price inflation, show almost no trend increase in house prices until about 1997, leading Shiller and others to conclude that the boom to house prices from 1998–2006 is historically anomalous.

But there are reason to believe the Shiller series is inaccurate for the late 1960s and early 1970s—a period for which his data source was the CPI-U. John Greenlees (1982) first reported that the home purchase component

FIGURE 1 NATIONAL HOUSE AND LAND PRICE INDEXES, 1950–2000



Source: Davis and Heathcote (2006).

TABLE 1 ESTIMATES OF REAL GROWTH IN HOUSING PRICES (ANNUALIZED REAL RATE OF CHANGE)

Decade	Shiller 2005	Davis and Heathcote 2006
1950–1960	0.23	0.10
1960–1970	0.11	0.62
1970–1980	1.79	4.35
1980–1990	0.63	1.32
1990–2000	0.81	1.01
2000–2006	x	6.60

of the CPI-U is significantly biased down—a result of the methodology used to extract the housing data. But Shiller does not correct for the bias when he incorporates the CPI-U housing prices into his series.

Davis and Heathcote (2006) have compiled a long time series of constant-quality house prices by reconciling decade-by-decade changes in the aggregate market value of housing (based on micro data from the Decennial Census of Housing) with year-by-year data on residential investment, as published in the National Income and Product Accounts (NIPA). Although the Shiller series and Davis and Heathcote series differ in every decade, the most pronounced difference between the two series occurs in the 1970s (see table 1). The Davis

and Heathcote data show a real average annual rate of appreciation just shy of 4½ percent per year, whereas the rate of growth of the CPI-U in that decade is less than 2 percent per year. If the Davis and Heathcote data are to be believed, the boom to house prices in 1998–2006 in the aggregate has a close historical precedent in 1970–1980.

■ Land Prices

Housing prices are based on two components of the house, land and structure. Because increasing the quantity of structures is less costly than increasing the quantity of “good” residential land, any change in the price of housing will largely come from an increase in the demand for land. By “good” we mean land with short commutes, low crime, or other desirable amenities.

On average in the United States, the price of land used for residential purposes has been rising rather steadily since the 1950s (see figure 1).¹ Because the price of land has been rising faster than the cost of structures, land has become a larger proportion of the housing price. This proportion is quite different in different cities across the United States, however. If land’s share of house prices is high in a location, then an increase in the demand for land will have a large effect on the price of the house (land plus structure). Conversely, if land is a small component of the overall price, then an increase in the demand for land will have only a small effect on housing prices. What this means is that observing housing prices alone can mask the increase in demand for certain locations.

Changes in the price of land have been large, not only in the coastal cities, but in many of the interior cities as well (see table 2). Indeed, the growth in land prices in St. Louis has far outpaced that in New York, Boston, and San Francisco. The increase in land prices in Minneapolis is roughly the same as that seen in New York City. Of course, the price of land did not appreciate this rapidly for every city in the United States. Four cities located in the Fourth Federal Reserve District were included in the study from which table 3 is taken, and three of these did not see a pronounced change to the price of developed residential land, the exception being Pittsburgh.

The evidence suggests that for the price of land—the component of housing that is in fixed supply—the 1998–2004 period was not a time of unprecedented growth. In addition, although the growth of housing prices took place mainly on the coasts, this is largely because land is a much more scarce resource on the coasts, land is a larger share of the house price, and house prices on the coasts more closely track the price of land. The price of land, in contrast, rose in most of the 46 cities studied. We see, then, that the boom was widespread across the United States (not just on the coasts), and probably reflects a continuation of demand-side pressure

TABLE 2 LAND'S SHARE IN 1998 AND REAL GROWTH IN HOUSE AND LAND PRICES FROM 1999–2004

	Land's share, 1998	Real cumulative percent increase, 1999–2004	
		Home values	Land values
Coastal cities			
Boston	0.60	81.2	128.6
Los Angeles	0.65	96.9	139.0
New York City	0.44	92.4	192.3
San Francisco	0.81	73.5	89.4
Other interior cities			
Houston	0.19	25.4	107.2
Milwaukee	0.33	35.5	90.7
Minneapolis/St. Paul	0.25	59.6	190.8
St. Louis	0.12	34.4	233.1
Fourth District cities			
Cincinnati	0.34	20.8	41.0
Cleveland	0.36	17.1	33.0
Columbus	0.39	18.9	29.6
Pittsburgh	0.13	22.8	153.0

Source: Davis and Palumbo (2006).

for housing that may have origins as early as 1950.

■ Credit Constraints and Prices

Any change in the ability to purchase a home, such as from innovations in the lending environment, can have a large impact on the level and volatility of housing prices. In a world where first-time home buyers face binding constraints and housing is in fixed supply, prices can vary without any changes in income. Two common constraints faced by homebuyers are that a mortgage payment cannot be any larger than a given fraction of income and that a homebuyer must put down equity in the house of no less than a certain percentage.

The best way to see the impact of a change in constraints on house prices is through a simple example using a change in the down payment requirement. Consider the case where starter homes cost \$100 and the down-payment requirement is 10 percent. Households need to save \$10 in order to purchase a home. At any point in time, there are a number of households that are working toward this objective and that will have accumulated savings ranging between \$0 and \$10. If the down-payment require-

ment is suddenly reduced to 5 percent, then all households with savings between \$5 and \$10 can afford a starter home assuming the price remains fixed at \$100. However, if more starter homes cannot be built instantaneously, and the price remains fixed at \$100, then more people will be able to purchase starter homes than the number of starter homes that are available to be purchased. Given no new starter homes are built, a requirement for the market for starter homes to clear—that is, the number of sellers of starter homes equals the number of households that can afford to buy—is that only households with savings of \$10 are able to buy a home of their own. With the required down payment set at 5 percent, the price of starter homes must rise to \$200—because 5 percent of \$200 is \$10.

As Ortalo-Magné and Rady (2006) noticed, the effects on the housing market do not end with the increase in the price of starter homes. This is because many who of those who own starter homes would have bought more expensive homes if they had not been constrained by their ability to obtain credit. As the price of their starter home increases, they enjoy capital gains; in the previous

example, the capital gains would equal $\$200 - \$100 = \$100$. These capital gains enable them to trade up to a more expensive house. The fact that all owners of starter homes enjoy significant capital gains, by the same reasoning as before, pushes up the demand for, and price of, more expensive homes.

The key take-away from this reasoning is that changes to credit constraints directly map to changes in house prices when housing is in relatively fixed supply. If housing is not in relatively fixed supply, then a change in credit constraints might lead to more new housing and relatively small changes in house prices. The fact that house prices outpaced income in the coastal areas and not in the interior could very well reflect a combination of two factors: The relaxation in credit constraints that may have occurred everywhere, and the fact that new housing is relatively hard to build in many places on the coasts and is more easy to build in the so-called “fly-over” states.

■ What's Next?

House prices may still fall in the future, but for a different reason than most analysts seem to realize. To start, the change in credit constraints discussed above will cause house prices first to rise but then to fall. The process centers around the fact that, assuming credit constraints do not change again, the price of starter homes will remain flat. New starter-home owners will therefore have little or no capital gains to use to finance the purchase of a more expensive trade-up home. The fact that these homeowners have no capital gains implies that, relative to the previous cohort of expensive-home buyers, they have relatively low down-payments to apply to the purchase of their more expensive trade-up homes. Since the equilibrium price of expensive homes is directly linked to the down-payment, low down payments (relative to the previous set of expensive-home buyers) will drive down the price of these homes. Second, private mortgage originators have announced substantial changes to their subprime variable-rate mortgage programs, which are likely to result

Federal Reserve Bank of Cleveland
Research Department
P.O. Box 6387
Cleveland, OH 44101

Return Service Requested:

Please send corrected mailing label to the above address.

Material may be reprinted if the source is credited. Please send copies of reprinted material to the editor.

PRSR STD
U.S. Postage Paid
Cleveland, OH
Permit No. 385

in the sharply curtailed availability of this type of credit. Using exactly the same reasoning as before, tightening credit standards will cause the price of starter homes to fall, thus reducing the wealth of the current owners of starter homes, which will itself trigger a chain-reaction decline in the price of trade-up homes.

■ **Footnotes**

1. The price of farm land, on average in the United States, has also been increasing since 1950 at an average annual real rate of 1.9 percent per year. However, unlike the price of land used for residential purposes, the price of farm land peaked in 1982, declined sharply until 1994, and then increased again from 1994–2006, such that the inflation-adjusted price of farm land did not return to its 1982 level until 2005. See the USDA web site <http://www.ers.usda.gov/Briefing/LandUse/aglandvaluechapter.htm> for details.

■ **Recommended Reading**

Karl E. Case and Robert J. Shiller. 2003. "Is There a Bubble in the Housing Market? An Analysis," *Brookings Papers on Economic Activity*, vol. 2, pp. 299–342.

Morris A. Davis and Jonathan Heathcote. 2006. "The Price and Quantity of Residential Land in the United States," *Journal of Monetary Economics*, forthcoming.

Morris A. Davis and Michael G. Palumbo. 2006. "The Price of Residential Land in Large U.S. Cities," *Journal of Urban Economics*, forthcoming.

François Ortalo-Magné and Sven Rady. 2006. "Housing Market Dynamics: On the Contribution of Income Shocks and Credit Constraints," *Review of Economic Studies*, vol. 73, no. 2, pp. 459–85.

John S. Greenlees. 1982. "An Empirical Evaluation of the CPI Home Purchase Index, 1973–1978," *Real Estate Economics*, vol. 10, pp. 1–24.

Robert J. Shiller. 1982. "Consumption, Asset Markets and Macroeconomic Fluctuations," *Carnegie-Rochester Conference Series on Public Policy*, vol. 17, pp. 203–38.

Robert J. Shiller. 2005. *Irrational Exuberance*, 2nd Edition, Princeton: Princeton University Press.

Robert J. Shiller. 2006. "Long-Term Perspectives on the Current Boom in Home Prices," *The Economists' Voice*, vol. 3, no. 4, Article 4.

Morris A. Davis is an assistant professor at the University of Wisconsin-Madison School of Business, François Ortalo-Magné holds the Robert E. Wangard Chair in Real Estate at the University of Wisconsin-Madison School of Business, and Peter Rupert is a research advisor at the Federal Reserve Bank of Cleveland.

The views expressed here are those of the authors and not necessarily those of the Federal Reserve Bank of Cleveland or the Board of Governors of the Federal Reserve System or its staff.

Economic Commentary is published by the Research Department of the Federal Reserve Bank of Cleveland. To receive copies or be placed on the mailing list, e-mail your request to 4d.subscriptions@clev.frb.org or fax it to 216.579.3050.