Highlights

Introduction of Expanded-Data House Price Indexes

Background

FHFA's House Price Indexes are estimated using home value data from mortgages financed by Fannie Mae and Freddie Mac. Although the underlying data sample is very large, it does not reflect price trends in all parts of the housing market. Missing in FHFA's sample are transactions for homes financed with nonconforming mortgages—which include "jumbo" loans—as well as homes purchased with cash. To the extent that home price trends for those types of properties differ from those for Enterprise-financed homes, the standard FHFA HPI does not reflect those price patterns.[1]

Beginning with this release, FHFA is initiating the publication of a set of house price indexes that make use of externally-sourced data. These new indexes, which will be denoted as the "expanded-data" HPI and will supplement the already-existing suite of FHFA indexes, will use not only the Enterprise data, but also will use sales price data from county recorder offices and Federal Housing Administration (FHA)-endorsed loans. The county recorder data, which will reflect sales activity in roughly 800 counties across the country, are supplied to FHFA under license from DataQuick Information Systems. The FHA data are provided to FHFA on a quarterly basis and include historical home values for houses collateralizing FHA-endorsed mortgages.

FHFA is publishing the expanded-data indexes for states, census divisions, and the United States. In later quarters, FHFA may expand the suite of indexes to include metrics for Metropolitan Statistical Areas.

The challenges associated with working with county records information are significant and data filters and aggregation methods may be refined with future releases of the expanded-data indexes. Users of these new indexes, as a result, should be aware that revisions for these new series may be larger than for the traditional purchase-only indexes.

Methodology—Forming "Expanded-Data" Indexes for States

The expanded-data HPI will be estimated using the same repeat transactions indexing methodology as is used in the construction of the standard HPI.[2] The only major difference is that the underlying Enterprise data sample, which in this case is comprised of Enterprise-financed purchase-money mortgages,[3] will be augmented with additional transactions data from DataQuick and FHA. Because the same property sale may be reflected in more than

[1] For a short analysis of differences in price trends for homes with different types of financing, see Leventis, Andrew, "Recent Trends in Home Prices: Differences across Mortgage and Borrower Characteristics," OFHEO Research Paper available at http://www.fhfa.gov/webfiles/1165/pricesandfinancing.pdf.

[2] For a detailed description of the approach, see Calhoun, Charles, "OFHEO House Price Indexes: HPI Technical Description" available at: http://www.fhfa.gov/webfiles/896/hpi_tech.pdf.

[3] Appraisal values from Enterprise-financed refinance mortgages will not be used in the formation of the expanded-data HPI.

one of the three sources (Enterprise, DataQuick, and FHA), redundant observations are removed before the sample is used in index estimation.

Although the addition of the new data—particularly the county recorder information—tends to increase the statistical precision with which index values are estimated, it introduces a significant complication. Specifically, while the Enterprise and the FHA mortgage data include transactions information from virtually all counties throughout the country, the county recorder dataset that FHFA licenses from DataQuick has imperfect geographic coverage. The licensed data only include sales price data in about 800 out of the roughly 3,000 counties in the U.S.[4] If not appropriately controlled for, the addition of such data has the potential to skew the geographic representativeness of the data sample.

The licensed county records information tends to be available in more urbanized counties and is often missing for the most rural counties. As such, when these data are pooled with the Enterprise and FHA transactions data for a given state, the most urban counties tend to be over-represented. Urban areas can exhibit different price patterns than more rural locales and pooling the datasets as a result may produce an unwarranted urban bias.

The solution to the problem is to explicitly fix the contribution of covered and uncovered sub-areas within those states where there is imperfect county recorder coverage. This can be achieved by forming the state index as a weighted average of statistics from two sub-indexes: one for DataQuick-covered counties and the other covering the rest of the state.

Under this approach, which is consistent with the manner in which FHFA's standard HPI mitigates biases arising from transactions volume differences across geographies, the change in statewide indexes is set equal to the weighted average change in the two sub-indexes. The weights reflect the share of the housing stock in the respective areas.[5] So, for example, if the licensed DataQuick data have coverage in counties that account for 70 percent of a state's housing stock, then the change in the statewide index is set equal to 0.7 times the change in the DataQuick-coverage-area index plus 0.3 times the change in the index for the rest of the counties.

In some states, it is not possible to estimate reliable indexes for the two sub-areas; for at least one of the sub-areas, insufficient data are available to produce a sufficiently robust metric. In these situations, the statewide expanded-data HPI is formed directly from pooled data from all available data sources. For the purposes of determining which state indexes are formed from sub-area indexes, a minimum threshold for the number of available records has been set. The minimum number of transaction pairs—which are the basis for index estimation and reflect price changes over a specific interval for a given property—is 5,000. If at least 5,000 pairs are not available for estimating either the covered-county

[4] The licensed dataset includes information for some counties where only select transactions have reported sales prices. Data from those counties, which are sometimes in "nondisclosure" states, are used in index estimation.

[5] Counts of one-unit detached properties from each county in the 2000 Census are used. When more recent data become available at the county-level, the weights will be updated.

index or the non-covered-county index, then the statewide index is estimated using pooled data.

The state expanded-data indexes are formed from pooled data in one other circumstance: when the number of DataQuick records is relatively small. For some counties in "nondisclosure" states, where sales prices are not generally a matter of public record, sales price data are only divulged for a small number of sales transactions. In these situations, the introduction of county recorder data to the Enterprise and FHA pooled dataset does not substantively skew the geographic representation within the sample. A threshold value of 1,000 transactions has been set to delineate such situations. When fewer than 1,000 sales prices are available in the county records data, the state index is estimated directly from a pooled dataset containing data from all three sources.

Geographic Coverage and Estimation Strategy: Specifics for Each State

Table 1 reports the coverage of the licensed DataQuick data by state. The first column in the table shows the percentage of counties for which the licensed data are available (e.g., 75 percent = the licensed recorder data are available in three-quarters of the counties in the state). The second column reports the share of the statewide housing stock that can be found in the DataQuick-covered counties.[6]

As is evident in the table, the licensed county-recorder data have complete coverage in nine states and Washington, D.C. and 19 additional states have coverage in counties accounting for at least 50 percent of the statewide housing stock. Eight states have coverage for between 5.5 percent and 45.2 percent of the housing stock.

With the exception of South Dakota, the remaining states are nondisclosure states. While sales price data are not collected or not reported in most counties within these states, as indicated earlier, there are exceptions. In a small number of counties in nondisclosure states, sales prices are divulged in select circumstances (e.g., when the transacting parties voluntarily agree to make the price public information). Any available data in such areas will be used in the estimation of the expanded-data index.

Table 2 shows, for each state, the manner in which the expanded-data HPI is estimated. In 22 states (D.C. inclusive), including the 11 for which the licensed data are geographically complete, the index is estimated used pooled Enterprise-FHA-DataQuick data. Eight of these are nondisclosure states having limited numbers of county recorder observations.

The remaining 29 state indexes are formed as weighted averages of covered and uncovered area indexes. These include North Dakota, Louisiana, Texas, New Mexico and Indiana, which are nondisclosure states but which have a significant amount of sales price information in certain areas.

[6] Single-family detached housing counts from the 2000 Census area are used in estimating the coverage share.

Methodology—Forming Census Division and U.S. Indexes

Once constructed, the expanded-data state indexes are used to form census division and U.S. indexes. These measures are "built up" in the same fashion as they are for the standard FHFA HPI. Specifically, changes in the census division indexes are set equal to the weighted average change in the component state indexes and, in turn, the change in the U.S. measure is set to the weighted change in the census division metrics.[7]

Seasonal Adjustment

As with the standard HPI, seasonally adjusted versions of the expanded-data HPI are released with the unadjusted indexes. The Census Bureau's X-12-ARIMA procedure, as implemented in the SAS programming environment, is the method used for seasonal adjustment.

Empirical Results

Table 3 compares price changes over the last four quarters across the standard purchase-only HPI and the expanded-data HPI. Figures are shown for each state, the nine census divisions, and the United States. Also shown is the decline relative to peak prices estimated by the respective series.

Consistent with the fact that other house price indexes that make use of county recorder data have shown greater declines than those in the FHFA purchase-only HPI, Table 3 reveals that the expanded-data HPI estimates greater declines in home prices since prices peaked several years ago. For the U.S., the expanded-data HPI is down 24.2 percent compared to 20.0 percent for the purchase-only index. When measured with the expanded-data index, the bust-period price decline is greater in 44 states (including the District of Columbia) and in all nine census divisions.

Figure 1 illustrates the historical price trajectories for the purchase-only HPI and the expanded series. Both series follow similar paths, but the expanded-data HPI evidences greater price weakness since 2007. The greater decline in the expanded index since 2007 is likely to be, in some part, a function of differences in the share of distressed sales included in the two measures. The expanded index would seem to include a larger proportion of short sales and REO sales than the standard HPI, which would have the effect of depressing the expanded-data measure.

Figure 1 reveals that the two series diverged starkly in late 2008 and 2009, when the expanded measure fell more precipitously than the standard metric. That period was one in which the standard FHFA HPI showed greater strength than other county-records-based price indexes (e.g., the S&P/Case-Shiller Indexes) and, as such, the divergence should not be particularly surprising.

[7] For details on the approach, see http://www.fhfa.gov/webfiles/21601/Focus1q11.pdf.

That the expanded-data HPI does not rise above the standard purchase-only measure during the housing boom may seem to be at odds with the fact other county-recorder-based price indexes showed greater price increases during the boom than the FHFA HPI. While this will be closely evaluated, one possible explanation involves weighting: the county-records-based indexes published by others tend to be value-weighted, giving more weight to price trends for expensive homes. As a unit-weighted metric, the expanded FHFA index in Figure 1 does not upweight trends for such homes. If, within states, more expensive properties tended to evidence greater boom-period appreciation, then the value-weighted indexes would show relatively large run-ups while FHFA's expanded-data indexes would continue to show relatively subdued appreciation.

Comments

The new expanded-data indexes are made available for download on the HPI Downloadable Data page and, as with the standard FHFA indexes, the measures will be revised each quarter as new data become available. As indicated earlier, users of the new indexes should be aware that refinements may be made to estimation approach or data filters and these changes may producer larger revisions for the new series than for the standard HPI metrics.

FHFA invites public feedback on the new indexes. Specific comments on the methodology or data would be welcome, as would more general feedback. Comments should be sent to Andrew Leventis, Senior Economist in the Office of Policy Analysis and Research. Andrew's email address is andrew.leventis@fhfa.gov and he can be reached by phone at (202) 343-1502.

Table 1: Coverage of Licensed DataQuick Real Property Data by State

State	Percentage of Counties Covered	Coverage of Housing Stock (One-Unit Detached Properties as Estimated in 2000 Census)
Arizona	**100.00%**	**100.00%**
California	**100.00%**	**100.00%**
Connecticut	**100.00%**	**100.00%**
Delaware	**100.00%**	**100.00%**
Maryland	**100.00%**	**100.00%**
Massachusetts	**100.00%**	**100.00%**
New Hampshire	**100.00%**	**100.00%**
Rhode Island	**100.00%**	**100.00%**
Vermont	**100.00%**	**100.00%**
District of Columbia	**100.00%**	**100.00%**
Florida	**98.51%**	**99.95%**
Hawaii	**80.00%**	**99.95%**
New Jersey	**95.24%**	**98.08%**
Nevada	**47.06%**	**95.07%**
Washington	**56.41%**	**90.80%**
Colorado	**36.51%**	**88.31%**
South Carolina	**63.04%**	**87.97%**
Tennessee	**66.32%**	**87.27%**
Oregon	**47.22%**	**78.95%**
New York	**40.32%**	**74.24%**
North Carolina	**45.00%**	**72.76%**
Illinois	**17.65%**	**70.03%**
Pennsylvania	**34.33%**	**69.43%**
Georgia	**30.19%**	**67.34%**
Ohio	**32.95%**	**64.55%**
Michigan	**19.28%**	**64.18%**
Minnesota	**13.79%**	**55.11%**
Missouri	**9.57%**	**54.99%**
Wisconsin	**23.61%**	**53.40%**
Nebraska	**5.38%**	**45.16%**
Oklahoma	**10.39%**	**44.63%**
Virginia	**18.52%**	**43.81%**
Alabama	**10.45%**	**30.14%**
Arkansas	**8.00%**	**29.85%**
Iowa	**7.07%**	**28.92%**
West Virginia	**1.82%**	**11.11%**
Kentucky	**1.67%**	**5.54%**
South Dakota	**0.00%**	**0.00%**

Table 1: Coverage of Licensed DataQuick Real Property Data by State

State	Percentage of Counties Covered	Coverage of Housing Stock (One-Unit Detached Properties as Estimated in 2000 Census)
Alaska	*	*
Idaho	*	*
Indiana	*	*
Kansas	*	*
Louisiana	*	*
Maine	*	*
Mississippi	*	*
Montana	*	*
New Mexico	*	*
North Dakota	*	*
Texas	*	*
Utah	*	*
Wyoming	*	*

* - Nondisclosure states. Transaction prices are not publicly available in most counties in these states. In areas in which transaction price information is available, the proportion of transactions that have sales prices ranges from trivial (e.g., counties in Idaho, Montana, Utah) to significant (e.g., select counties within Texas, Lousiana and North Dakota).

Table 2: Methodology Used in Estimating the Expanded-Data House Price Indexes

State	Estimation	Extent of Licensed Real Property Data from DataQuick
Alaska	Directly Estimated on Pooled Enterprise-FHA-DataQuick Data	Partial--Very Small Sample (Nondisclosure State)
Arizona	Directly Estimated on Pooled Enterprise-FHA-DataQuick Data	Complete
California	Directly Estimated on Pooled Enterprise-FHA-DataQuick Data	Complete
Connecticut	Directly Estimated on Pooled Enterprise-FHA-DataQuick Data	Complete
Delaware	Directly Estimated on Pooled Enterprise-FHA-DataQuick Data	Complete
District of Columbia	Directly Estimated on Pooled Enterprise-FHA-DataQuick Data	Complete
Florida	Directly Estimated on Pooled Enterprise-FHA-DataQuick Data	Partial State
Hawaii	Directly Estimated on Pooled Enterprise-FHA-DataQuick Data	Complete
Idaho	Directly Estimated on Pooled Enterprise-FHA-DataQuick Data	Partial--Very Small Sample (Nondisclosure State)
Kansas	Directly Estimated on Pooled Enterprise-FHA-DataQuick Data	Partial--Very Small Sample (Nondisclosure State)
Maine	Directly Estimated on Pooled Enterprise-FHA-DataQuick Data	Partial--Very Small Sample (Nondisclosure State)
Maryland	Directly Estimated on Pooled Enterprise-FHA-DataQuick Data	Complete
Massachusetts	Directly Estimated on Pooled Enterprise-FHA-DataQuick Data	Complete
Montana	Directly Estimated on Pooled Enterprise-FHA-DataQuick Data	Partial--Very Small Sample (Nondisclosure State)
Nevada	Directly Estimated on Pooled Enterprise-FHA-DataQuick Data	Partial State
New Hampshire	Directly Estimated on Pooled Enterprise-FHA-DataQuick Data	Complete
Rhode Island	Directly Estimated on Pooled Enterprise-FHA-DataQuick Data	Complete
Utah	Directly Estimated on Pooled Enterprise-FHA-DataQuick Data	Partial--Very Small Sample (Nondisclosure State)
Vermont	Directly Estimated on Pooled Enterprise-FHA-DataQuick Data	Complete
Wyoming	Directly Estimated on Pooled Enterprise-FHA-DataQuick Data	Partial--Very Small Sample (Nondisclosure State)
South Dakota	Directly Estimated on Pooled Enterprise-FHA Data	No records
Alabama	Formed from Weighted Sub-State Indexes	Partial
Arkansas	Formed from Weighted Sub-State Indexes	Partial
Colorado	Formed from Weighted Sub-State Indexes	Partial
Georgia	Formed from Weighted Sub-State Indexes	Partial
Illinois	Formed from Weighted Sub-State Indexes	Partial
Indiana	Formed from Weighted Sub-State Indexes	Partial (Nondisclosure State)
Iowa	Formed from Weighted Sub-State Indexes	Partial
Kentucky	Formed from Weighted Sub-State Indexes	Partial
Louisiana	Formed from Weighted Sub-State Indexes	Partial (Nondisclosure State)
Michigan	Formed from Weighted Sub-State Indexes	Partial
Minnesota	Formed from Weighted Sub-State Indexes	Partial
Mississippi	Formed from Weighted Sub-State Indexes	Partial--Very Small Sample (Nondisclosure State)
Missouri	Formed from Weighted Sub-State Indexes	Partial

Table 2: Methodology Used in Estimating the Expanded-Data House Price Indexes

State	Estimation	Extent of Licensed Real Property Data from DataQuick
Nebraska	Formed from Weighted Sub-State Indexes	Partial
New Jersey	Formed from Weighted Sub-State Indexes	Partial
New Mexico	Formed from Weighted Sub-State Indexes	Partial (Nondisclosure State)
New York	Formed from Weighted Sub-State Indexes	Partial
North Carolina	Formed from Weighted Sub-State Indexes	Partial
North Dakota	Formed from Weighted Sub-State Indexes	Partial (Nondisclosure State)
Ohio	Formed from Weighted Sub-State Indexes	Partial
Oklahoma	Formed from Weighted Sub-State Indexes	Partial
Oregon	Formed from Weighted Sub-State Indexes	Partial
Pennsylvania	Formed from Weighted Sub-State Indexes	Partial
South Carolina	Formed from Weighted Sub-State Indexes	Partial
Tennessee	Formed from Weighted Sub-State Indexes	Partial
Texas	Formed from Weighted Sub-State Indexes	Partial (Nondisclosure State)
Virginia	Formed from Weighted Sub-State Indexes	Partial
Washington	Formed from Weighted Sub-State Indexes	Partial
West Virginia	Formed from Weighted Sub-State Indexes	Partial
Wisconsin	Formed from Weighted Sub-State Indexes	Partial

Table 3: House Price Changes as Estimated in Traditional Purchase-Only HPI vs. Expanded-Data HPI
(Note: Expanded-Data HPI Incorporates Sales Price Data from Enterprises, DataQuick Information Systems, and FHA)

	Change over Latest Four Quarters		Change Since Peak	
	Standard (Purchase-Only) HPI	Expanded-Data HPI	Standard (Purchase-Only) HPI	Expanded-Data HPI
United States	-5.9%	-6.1%	-20.0%	-24.2%
Pacific Census Division	-9.1%	-6.6%	-38.9%	-42.0%
Mountain Census Division	-9.8%	-8.8%	-32.2%	-34.9%
West North Central Division	-5.9%	-5.9%	-11.7%	-13.7%
West South Central Division	-2.0%	-3.3%	-2.4%	-5.6%
East North Central Division	-5.2%	-8.1%	-17.5%	-26.7%
East South Central Division	-4.7%	-4.9%	-10.6%	-12.9%
New England Division	-2.4%	-3.1%	-13.8%	-18.3%
Middle Atlantic Division	-3.2%	-4.5%	-9.8%	-13.9%
South Atlantic Division	-7.9%	-6.9%	-27.2%	-30.4%
Alabama	-7.0%	-7.6%	-14.4%	-15.9%
Alaska	-0.3%	-3.4%	-2.6%	-3.7%
Arizona	-14.9%	-10.4%	-50.2%	-54.1%
Arkansas	-6.0%	-6.1%	-10.5%	-13.0%
California	-8.8%	-5.3%	-46.3%	-48.9%
Colorado	-4.2%	-4.9%	-8.0%	-14.6%
Connecticut	-1.8%	-5.3%	-13.9%	-20.8%
Delaware	-8.4%	-9.6%	-21.1%	-23.8%
District of Columbia	12.1%	2.2%	-0.6%	-11.9%

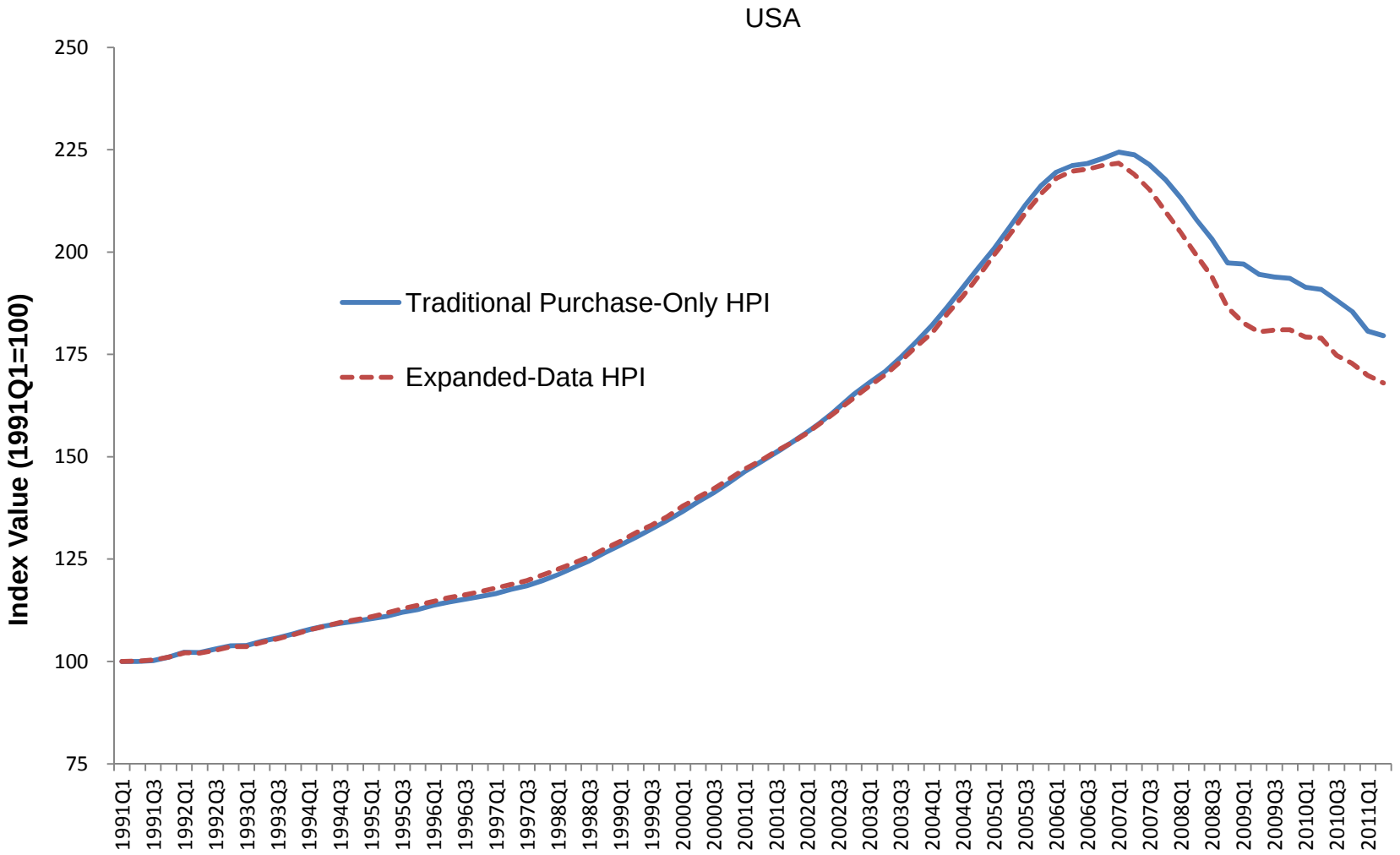
Table 3: House Price Changes as Estimated in Traditional Purchase-Only HPI vs. Expanded-Data HPI
(Note: Expanded-Data HPI Incorporates Sales Price Data from Enterprises, DataQuick Information Systems, and FHA)

	Change over Latest Four Quarters		Change Since Peak	
	Standard (Purchase-Only) HPI	Expanded-Data HPI	Standard (Purchase-Only) HPI	Expanded-Data HPI
Florida	-8.1%	-6.8%	-45.6%	-48.8%
Georgia	-13.6%	-10.3%	-27.0%	-29.3%
Hawaii	-4.3%	-4.8%	-20.6%	-21.8%
Idaho	-13.7%	-14.5%	-32.2%	-35.3%
Illinois	-7.2%	-9.2%	-19.8%	-28.5%
Indiana	-1.3%	-4.0%	-6.8%	-10.5%
Iowa	-2.8%	-3.1%	-4.1%	-3.1%
Kansas	-4.0%	-5.5%	-5.4%	-7.2%
Kentucky	-1.9%	-3.5%	-3.8%	-6.3%
Louisiana	-1.9%	-3.7%	-3.9%	-5.3%
Maine	-2.4%	-3.0%	-10.4%	-12.0%
Maryland	-5.8%	-5.9%	-24.2%	-31.7%
Massachusetts	-2.0%	-1.5%	-14.6%	-17.5%
Michigan	-5.9%	-9.0%	-31.6%	-45.0%
Minnesota	-9.1%	-8.6%	-22.7%	-27.6%
Mississippi	-2.6%	-2.4%	-12.3%	-15.1%
Missouri	-8.1%	-8.6%	-15.0%	-19.1%
Montana	-3.4%	-3.5%	-10.5%	-7.4%
Nebraska	-3.2%	-0.5%	-6.3%	-2.1%
Nevada	-13.4%	-10.3%	-58.5%	-59.6%
New Hampshire	-3.6%	-4.2%	-19.8%	-22.6%
New Jersey	-6.1%	-6.0%	-18.3%	-26.7%

Table 3: House Price Changes as Estimated in Traditional Purchase-Only HPI vs. Expanded-Data HPI
(Note: Expanded-Data HPI Incorporates Sales Price Data from Enterprises, DataQuick Information Systems, and FHA)

	Change over Latest Four Quarters		Change Since Peak	
	Standard (Purchase-Only) HPI	Expanded-Data HPI	Standard (Purchase-Only) HPI	Expanded-Data HPI
New Mexico	-6.3%	-8.5%	-15.8%	-14.1%
New York	-2.5%	-3.3%	-7.3%	-11.3%
North Carolina	-6.6%	-5.2%	-13.2%	-12.9%
North Dakota	3.9%	6.3%	0.0%	0.0%
Ohio	-5.2%	-9.5%	-14.6%	-23.5%
Oklahoma	0.3%	-1.8%	-0.5%	-1.8%
Oregon	-13.1%	-10.6%	-29.0%	-30.6%
Pennsylvania	-2.2%	-4.9%	-7.5%	-8.3%
Rhode Island	-5.9%	-5.3%	-24.6%	-31.2%
South Carolina	-6.4%	-7.3%	-14.6%	-16.2%
South Dakota	-1.4%	-2.3%	-2.4%	-2.7%
Tennessee	-5.9%	-5.1%	-12.5%	-14.1%
Texas	-1.9%	-3.1%	-1.9%	-5.6%
Utah	-8.6%	-10.9%	-26.4%	-26.7%
Vermont	-0.3%	-0.1%	-5.8%	-8.3%
Virginia	-5.0%	-6.7%	-16.7%	-22.9%
Washington	-9.8%	-10.2%	-23.8%	-27.1%
West Virginia	-5.1%	-1.6%	-6.5%	-4.9%
Wisconsin	-4.8%	-5.9%	-11.7%	-15.1%
Wyoming	-1.3%	-2.8%	-8.0%	-9.6%

Figure 1: Traditional Purchase-Only HPI vs. Expanded-Data HPI



Note: The Expanded-Data HPI Incorporates Sales Price Data from Enterprises, DataQuick Information Systems, and FHA