Frequently Asked Questions

Experimental Datasets for Local House Price Indices

DATASETS:

- National: https://www.fhfa.gov/DataTools/Downloads/Documents/HPI/HPI_AT_BDL_national.xlsx
- State: https://www.fhfa.gov/DataTools/Downloads/Documents/HPI/HPI_AT_BDL_state.xlsx
- CBSA: https://www.fhfa.gov/DataTools/Downloads/Documents/HPI/HPI_AT_BDL_cbsa.xlsx
- County: https://www.fhfa.gov/DataTools/Downloads/Documents/HPI/HPI_AT_BDL_county.xlsx
- ZIP3: https://www.fhfa.gov/DataTools/Downloads/Documents/HPI/HPI_AT_BDL_ZIP3.xlsx
- ZIP5: http://www.fhfa.gov/DataTools/Downloads/Documents/HPI/HPI_AT_ZIP5.xlsx
- Tract: https://www.fhfa.gov/DataTools/Downloads/Documents/HPI/HPI_AT_BDL_tract.csv

FHFA WORKING PAPERS:

- Local House Price Dynamics: https://www.fhfa.gov/papers/wp1601.aspx
- Local House Price Growth Accelerations: https://www.fhfa.gov/papers/wp1602.aspx
- Missing the Mark: https://www.fhfa.gov/papers/wp1604.aspx

Q1: What is measured by the House Price Index (HPI)?

A: The HPI provides a means to measure annual appreciation in single-family house prices over certain periods. It also provides housing and real estate economists with an analytical tool that is useful for estimating changes in the rates of mortgage defaults, prepayments and housing affordability in an area. The HPI is a measure designed to capture constant-quality changes, which is slightly different from existing measures, like medians and averages, that cannot distinguish between changes in housing stock and house prices. We are able to focus directly on price changes because our methodology compares the value of the same house at two points in time.

In our datasets, we construct HPIs for localized areas on an annual frequency. For naming, we refer to the ZIP code series as "ZIP5" HPIs to distinguish them from "ZIP3" HPIs (i.e. the first three-digits in a ZIP code, like 202 for downtown Washington, DC). "CBSA" HPIs include both metropolitan statistical areas and micropolitan statistical areas (FHFA usually covers only the former).

Q2: Are these the same as the standard FHFA indices?

A: No, they are very close but minor adjustments were made to produce more localized measures. We have released indices computed at a variety of geographies and have written several working papers to explain trends and insights (see above links). ZIP code-level HPIs were released in May 2016 to stimulate discussion and comment. County-level HPIs were released in November 2016. Those datasets were updated in February 2017 when we also released HPIs for other geographic levels: nation, state, CBSA, ZIP3, and Census tract.

Additional updates were applied to all datasets in February 2018, April 2019, May 2020, February 2021, February 2022, and March 2023. Tracts reflect the 2020 Census data boundaries. Please cite one of the appropriate working papers (all of them are now published in peer-reviewed academic journals) when using the data so we can follow how they are being used and make improvements if needed.

Q3: Are the local HPIs made in a way that differs from other FHFA HPIs?

A: No, the indices use the same fundamental "repeat-sales" or "repeat-transactions" methodology that is used to construct the standard FHFA HPIs. The new measures do apply slightly different data filters for model estimation. These alternate filters generally allow for slightly larger sample sizes, which makes it possible to produce HPIs at the local levels of geography. The working papers have more detailed descriptions on the data filters and methodology.

Q4: What data are used to make the indices?

A: The initial dataset has transactions involving conforming, conventional mortgages that are purchased or securitized by Fannie Mae or Freddie Mac. A filtered set of single-family homes are included (condominiums, cooperatives, multi-unit properties, and planned unit developments are excluded). We use a statistical method to measure the annual price change in repeat sales or refinancings on the same property with data that extend back to the mid-1970s. The underlying information is the same as used in the standard "all-transactions" FHFA HPIs and is based on approximately 100 million observations.

Q5: What are the observation counts for each level of geography?

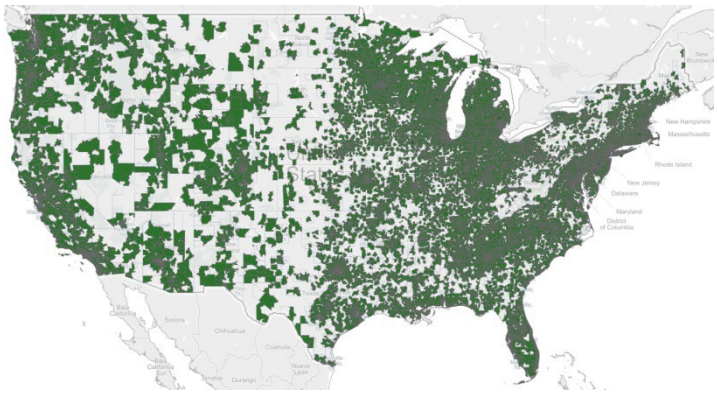
A: The table below shows the total number indices for each geography as well as the total number of observations for data through 2022. The counts increase each year; imports should have at least that many observations for each geography.

Observation Counts for Annual House Price Indices

	Total Indices	*Total Observations*
National	1	48
State	51	2,448
ZIP3	879	39,419
CBSA	968	40,707
County	2,783	97,661
ZIP5	18,964	630,578
Census Tract	63,902	1,986,393

Q6: Why are there missing index values in the database?

A: Missing index values were initially estimated but removed from the final dataset because of a small number of observations. We felt it was prudent to include the missing fields as indicators of where adequate information is not present. While we do not have complete coverage, HPIs are available for most urbanized areas across the country as shown with the ZIP5 indices in the map below.



Q7: How do you create indices for areas that do not have enough data?

A: We do not create them. If not enough data exist, then you will see it as a missing observation or we will not report it (if the index has not started yet). Some industry data providers may differ from our approach by interpolating with nearby areas, smoothing over time, or substituting an index from a higher level of geography (like inserting a city or state index). We want to be transparent about providing indices in a raw form that have been constructed with the same methodology everywhere. Data providers do not always indicate when alterations have been made because coverage is limited or does not exist. We prefer to be upfront and allow our users to make any additional adjustments.

Q8: Why do indices for some locations start in different time periods?

A: For each area, the index begins in the first year when at least 25 half-pairs are observed.[1] The value conveys the cumulative change in house prices since that first year when it begins at 100. For example, a value of 125 would indicate that house prices have, on average, increased by 25% since the first year. Sometimes, though, it might be useful for the cumulative change to be expressed with the same start year for all areas. We also offer HPIs that start at 100 for all locations in two common years, 1990 and 2000. If a location has no index for 1990 or

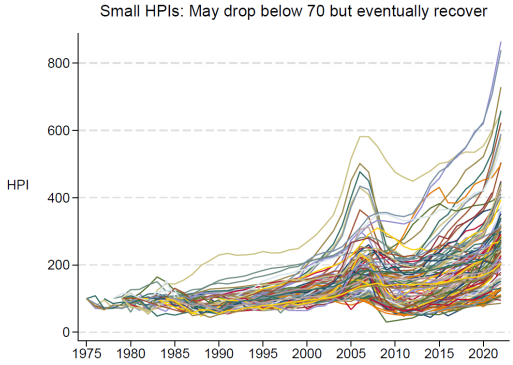
[1] "Half-pairs" are transactions where either the first or second transaction occurs in a particular year.

2000, then these indices are missing in the particular column. Depending on the output file, missing values are recorded with a blank or period.

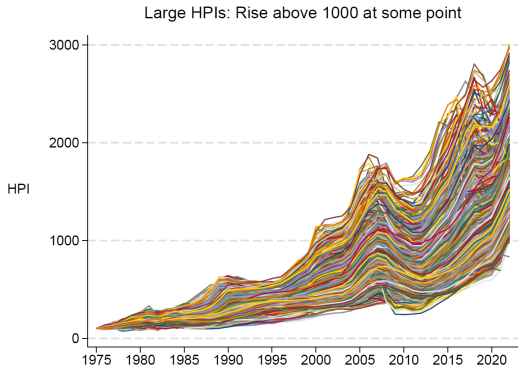
Q9: Some values look very large or very small. Are these incorrect?

A: No. We have conducted a number of quality checks, and to the best of our knowledge they are accurate. Extreme values are present in locations where the index is measured over a long time period. By using a base year of 1990 or 2000, HPI values appear more reasonable (and annual appreciation rates are identical).

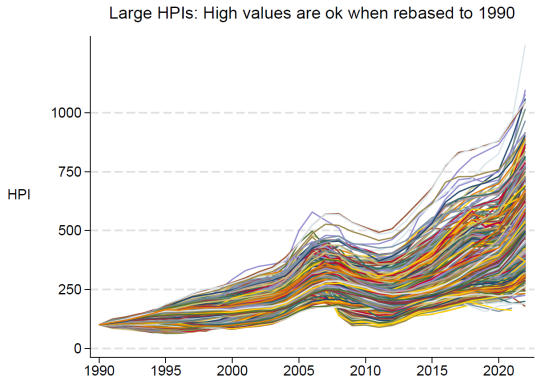
For example, when an area has very small index values (less than 70), the graphic below shows that HPIs they eventually recover most of the time.

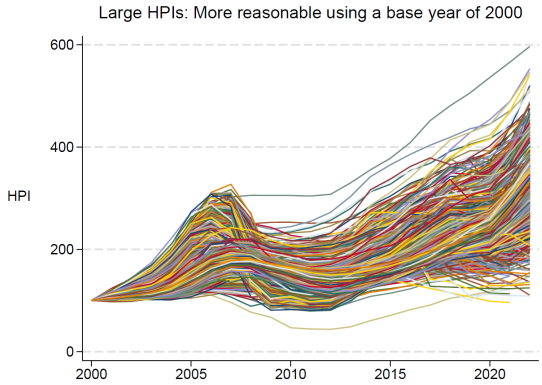


As another example, when a ZIP code has very large HPI values (over 1000), the magnitude reflects strong cumulative appreciation (i.e., annualized growth rates exceeding 6% from 1975 to 2015).



The large HPI values are still high but look better when rebased to 1990 (shown below to the left). The same ZIP codes have much more reasonable HPIs when values are rebased to 2000 (shown below to the right).





Q10: How could I adjust the nominal house price values to real terms?

A: For inflation adjustments, you might consider the Consumer Price Index produced by the Bureau of Labor Statistics (http://data.bls.gov/cgi-bin/srgate). The most common series used for these adjustments are the "all items" (CUUR0000SA0) and "all items less shelter" (CUUR0000SA0L2).

Q11: How do I compute price appreciation over several years for an area?

A: We already present annual appreciations (in the third column of our dataset). Further calculations depend on whether you want a cumulative or annual change between two years. For the index, you may choose any of the three HPI columns ("HPI", "HPI with 1990 base", or "HPI with 2000 base") but use the same column for all numerical values. For a simple cumulative change (not annualized), use:

(HPI in later year – HPI in initial year) / (HPI in initial year) * 100

This is, mathematically, the same as computing the ratio and subtracting one, or

[(HPI in later year / HPI in initial year) – 1] * 100

As an example, if the index value in 2005 is 180 and the index value in 2000 is 150 then the five-year cumulative change using the first formula is (180 – 150) / (150) * 100 = 20%. With the second formula, it is [(180 / 150) – 1]*100 = [1.2 –1]*100 = 20%, which yields the same answer that house prices have increased 20% over the five years.

In an annualized format, compound annual growth is measured as:

(HPI in later year / HPI in initial year)^(1 / years between)

The growth rate per year is (180 / 150)^(1/5) = 1.037 or 3.7% over the five years.

Q12: Are the indices smoothed or adjusted for seasonality?

A: No, we have not adjusted the indices in any way beyond meeting certain sample requirements for the number of paired transactions. We offer raw data series so that researchers and analysts can make adjustments as they deem appropriate.

Q13: What transaction date is used to estimate the indices?

A: The loan origination data is used as the relevant transaction date.

Q14: How might one connect demographic data with these HPIs?

A: Each of the datasets has a numerical code that can usually be linked to Census or other demographic data. For ZIP codes we suggest using ZCTAs (ZIP Code Tabulation Areas) that are defined by the Census Bureau because a variety of statistics are collected and reported. More information can be found at https://www.census.gov/geo/reference/zctas.html. To our knowledge, the Census Bureau does not offer a crosswalk mapping but third-party providers have already created such databases. One such example is on the UDS Mapper website at http://www.udsmapper.org/zcta-crosswalk.cfm.

Q15: My area is not listed or is missing a value for a year. Can you provide it?

A: Unfortunately, data limitations (e.g. too few sales) typically prevent us from providing indices in certain areas or years. We only release information when it has been aggregated to an appropriate level. If you believe your region has been overlooked, you are welcome to let us know and we can investigate further.

Q16: Will my house's sales appear in multiple indices if the CBSA, county, or ZIP code has changed?

A: No. We match house sales based on the physical address with current location defined by the USPS. For example, if a house sells in 2010 while it is located in ZIP code 12345 then it sells again in 2015 after the ZIP code has changed to 54321 then we will record it under the ZIP code 54321 for all years where we observe a sale. The same thing would happen if CBSA or other codes change. We do not retroactively assign houses to older codes based on former definitions.

Q17: Do you have a map where I can see the data in a more interactive form?

A: Yes. Under the "Data & Tools" part of the FHFA website, there are interactive maps called "HPI ZIP5 Map" and "HPI County Map" where users can change the location or year. The map can be embedded, the URL can be shared, or a still image can be saved.