

# Fannie Mae's Home Price Index (FNM-HPI) FAQs

## 1. What is Fannie Mae's Home Price Index (FNM-HPI)?

The Fannie Mae Home Price Index (FNM-HPI) is a national, repeat-transaction home price index measuring the average, quarterly price change for all single-family properties since Q1 1975 in the U.S., excluding condos and foreclosure sales. The index is produced by aggregating county-level data to create both seasonally adjusted and non-seasonally adjusted national indices that are representative of the whole country and designed to serve as indicators of general single-family home price trends.

## 2. How often is the FNM-HPI released?

The FNM-HPI is produced quarterly and released mid-month following the end of each calendar quarter (i.e., April for Q1, July for Q2, October for Q3, and January for Q4).

## 3. What data are used in calculating the FNM-HPI?

The input data for the FNM-HPI are property transactions from Fannie Mae's and Freddie Mac's single-family mortgage acquisitions (purchase and refinance), public deed data for property sale transactions, and comparable sales used by appraisers. Condominium and foreclosure sales data are excluded from the FNM-HPI.

## 4. What is the geographic coverage of the input data?

The FNM-HPI is produced by aggregating county-level home price changes to create a national index. The input data currently cover 3,124 of the 3,138 counties in the U.S., with enough data density to estimate FNM-HPI in more than 2,580 of 3,138 counties, representing 98.6% of U.S. single-family housing stock units. U.S. territories, including Puerto Rico, Guam, and the U.S. Virgin Islands, are not represented.

## 5. What is the methodology used to compute FNM-HPI?

The Trunk Branch Repeat Transaction Index (TB-RTI) model is used to estimate the FNM-HPI. This is a modified version of the original Repeat Transaction Index (RTI) model proposed by Bailey et al (1963)<sup>1</sup>. Like the RTI model, the TB-RTI model uses repeat property transactions to calculate quarterly HPI at various levels of geography. Specifically, the observed price changes between pairs of repeated transactions of individual homes are used to derive the aggregate home price changes of a given geography. However, compared to the traditional RTI model, the TB-RTI model utilizes both purchase and refinance transaction data (with appraisal bias correction) to mitigate the thin data problem at local geographic levels, when needed, to obtain a reliable index. Read the [methodology](#) document for additional details on how the index is constructed.

## 6. Do you seasonally adjust the FNM-HPI?

We produce both seasonally adjusted and non-seasonally adjusted HPIs.

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<sup>1</sup> Bailey, M., Muth, R., and Nourse, H. (1963), "A Regression Method for Real Estate Price Index Construction," *Journal of American Statistical Association*, 58, 933-942.



## 7. Are regional or state-level HPIs available?

No, the index data published are only available at the national level.

## 8. What other HPI methodologies exist?

We chose to use a RTI model, but there are three other commonly accepted models used in the housing industry to compute home price trends, including median/mean, hedonic, and spatial regression. We believe the median/mean method is too simple to capture true market trends and is highly susceptible to being influenced by particular data samples observed in a given period. While the hedonic method is often used to estimate property values, it can be difficult to apply directly to HPI estimation due to the need for additional large data collection for home attributes. Finally, we deemed the spatial regression method too theoretically complex and computationally intensive. The RTI model is also used by other commonly used measures of home price appreciation, including the [S&P CoreLogic Case-Shiller Home Price Indices](#) and the [Federal Housing Finance Agency Home Price Index](#)<sup>®</sup> (FHFA HPI<sup>®</sup>).

## 9. Why are foreclosure sales data excluded from the FNM-HPI?

A key assumption of the TB-RTI model is constant quality. Put differently, the homes are assumed to be in essentially the same condition at the times of the first and second sales. If there is evidence of significant home improvement or deterioration between the two sales in a pair, the pair should not be included in HPI estimation. The foreclosed homes can be significantly different from non-foreclosed homes in several ways, such as maintenance and condition, seller's motivations, and seller's knowledge of the home. Therefore, to maintain the integrity of the RTI model, we exclude foreclosure sales data to produce HPI for non-distressed homes.

## 10. Why are condo sales excluded from the FNM-HPI?

It is commonly known that home price trends for the condominium market often differ from that of single-family detached homes and townhomes. Therefore, we believe separate home price indexes using separate data should be used for these two markets.

## 11. Do you adjust historical values?

Yes. Each quarter, as we receive updated input data on transactions, we apply the TB-RTI model to all home transaction data to update the FNM-HPI. Therefore, with each update of the FNM-HPI, the historical HPI is recalculated using the incrementally expanded dataset. Revision in historical index values occurs because recent transactions are paired with older transactions, which affects the estimates of historical home price growth. Data lag can also introduce revisions to the index.

## 12. What are the key differences between the FNM- HPI and the [FHFA HPI](#)?

The [FHFA HPI](#) includes several indices for different market geographies and periods. All of its indices are created in the same technical manner. The index most commonly referenced is FHFA's Purchase-Only Index.

There are five major differences between the FNM-HPI and FHFA's Purchase-Only Index:

- Measurement focus: FNM-HPI measures average home price changes of all non-distressed sales transactions, with and without mortgages. FHFA's Purchase-Only Index measures average home price changes of home purchase mortgages acquired or securitized by Fannie Mae and Freddie Mac.



- Data source: Fannie Mae's input data come from Fannie Mae and Freddie Mac loan acquisitions, public deed data, and comparable sales data from appraisers. Data of distressed home sales are excluded from the FNM-HPI calculation. FHFA's input data come from Fannie Mae and Freddie Mac loan acquisitions (excluding refinance loans), which does not include the non-GSE market, such as jumbo market sales and cash sales. Additionally, distressed home sales data are not excluded from FHFA's calculation.
- Model: Fannie Mae uses the TB-RTI model, in which refinance data are used for small geographic areas with thin data, and applies it to log of prices (geometric average). FHFA employs the RTI model and applies it to log of prices (geometric average).
- Geographic coverage: FNM-HPI covers more than 2,580 of 3,138 counties, representing 98.6% of U.S. single-family housing stock units. With fewer data, the FHFA Purchase-Only Index is likely to cover a smaller geographic area.
- Aggregation: FNM-HPI calculates the weighted average of individual county HPIs. FHFA's Purchase-Only Index calculates the weighted average of Census-division HPIs.

### **13. What are the key differences between the FNM-HPI and the [S&P CoreLogic Case-Shiller U.S. National HPI](#)?**

The indices differ in five areas:

- Measurement focus: FNM-HPI measures average home price changes of non-distressed sale transactions. The S&P CoreLogic Case-Shiller HPI measures value changes of the entire single-family housing stock.
- Data source: Fannie Mae's input data come from Fannie Mae and Freddie Mac loan acquisitions, public deed data, and comparable sales data from appraisers. Data of distressed home sales are excluded from the FNM-HPI calculation. S&P CoreLogic Case-Shiller input data come primarily from public deed data of house transactions. Therefore, S&P CoreLogic Case-Shiller lacks data in approximately a dozen non-disclosure states where the deed data cannot be disclosed publicly.
- Model: FNM-HPI uses the TB-RTI model and applies it to log of prices (geometric average). S&P CoreLogic Case-Shiller employs the RTI model and applies it to price ratio (arithmetic average), weighted by property value.
- Geographic coverage: FNM-HPI covers more than 2,580 of 3,138 counties, representing 98.6% of US single family housing stock unit. S&P CoreLogic Case-Shiller lacks representation from non-disclosure states.
- Aggregation: FNM-HPI is the weighted average of county HPIs. The S&P CoreLogic Case-Shiller U.S. National HPI is housing stock value weighted average of Census-division HPIs (estimated by the RTI model).

### **14. What are the key differences between the FNM-HPI and the [Freddie Mac House Price Index \(FMHPI®\)](#)?**

The indices differ in five areas:

- Measurement focus: FNM-HPI measures average home price changes of all non-distressed sales transactions, transactions with and without mortgages. The FMHPI U.S. national HPI measures average home price changes based on the combined portfolio of loans that were purchased by either Freddie Mac or Fannie Mae, weighted by Freddie Mac active loans.



- Data source: Fannie Mae's input data come from Fannie Mae and Freddie Mac loan acquisitions, public deed data, and comparable sales used by appraisers, with distressed home sales excluded. Data used for calculation of FMHPI include only Fannie Mae and Freddie Mac loan acquisitions.
- Model: Fannie Mae uses the TB-RTI model, in which refinance data are used for small geographic areas with thin data, after correction of valuation difference of refinance transactions, and the model is applied to log of prices (geometric average). The FMHPI uses the RTI model on log of prices (geometric average) with refinance adjustment terms (refinance-to-refinance matched pairs are excluded from the calculations).
- Geographic coverage: FNM-HPI covers more than 2,580 of 3,138 counties, representing 98.6% of US single-family housing stock units. The FMHPI uses only Fannie Mae and Freddie Mac loan acquisition data and likely represents fewer geographic areas.
- Aggregation: FNM-HPI is the weighted average of county HPIs with housing stock units as the weights. The FMHPI is a weighted average of state HPI, where the weights are estimated property values underlying Freddie Mac's active loans.