

HPI Forecast Validation Report

February 2021

Forecast Validation – Latest Performance Results

The CoreLogic® HPI Forecast Validation Report validates our performance results by comparing the increase in our HPI Forecasts™ to the actual increase in the CoreLogic HPI™ Index over the most recent 12-month period, ending on November 30, 2020, at both the National and CBSA-levels. Our latest testing and analysis found:

- The National Index Forecast had a 5.4% change prediction and the actual index change was 8.2%, a difference of 2.8%. The National Forecast performed well, considering the unforeseeable economic volatility and uncertain conditions that impacted every market in the country beginning in mid-March 2020. Our forecast was highly accurate from the period of November 2019, through July 2020. The widest gap occurred in November 2020, as record-low mortgage rates and decreasing for-sale inventories boosted home price appreciation to levels not seen since the early 2000s.
- Seven of the top 50 CBSAs had a forecast prediction error of 1% or less versus actual home price changes over the 12-month period.
- Three large Metropolitan areas, Cambridge-Newton-Framingham, MA (0.3% forecast error) with a population of 2,400,733, West Palm Beach-Boca Raton-Delray Beach, FL (0.4%) with a population of 1,496,770, and Los Angeles-Long Beach-Glendale, CA (0.5%) with a population of 10,039,107 had the most accurate forecasts.
- Most of the major metros that made the top 10 most accurate list are new to the list in comparison to our last report in October 2020. Orlando-Kissimmee-Sanford, FL is the only holdover from our previous report.
- Once again, the San Francisco area had the largest forecasting gap, with an 11.3% over estimation of actual home prices. San Francisco also had the largest forecasting gap in our last two reports. Homebuyer concern over long term affordability and pandemic-related employment issues has caused many people to leave the area, which resulted in a decline in demand that caused prices to drop.
- Austin-Round Rock, TX was the market in which we underestimated home price growth most significantly. This metro area appreciated by 9.19% during

Market Condition Indicators – Markets to Watch

Overvalued Metro Areas:

- **Crestview-Fort Walton Beach-Destin, FL**
101% Overvalued
- **Punta Gorda, FL**
95% Overvalued
- **Lake Havasu City-Kingman, AZ**
91% Overvalued

Undervalued Metro Areas:

- **Bridgeport-Stamford-Norwalk, CT**
42% Undervalued
- **Hartford-West Hartford-East Hartford, CT**
39% Undervalued
- **New Haven-Milford, CA**
34% Undervalued

Our Market Condition Indicators are derived from long-term fundamental values—home-price “norms” based on the correlation of home prices with real disposable income per capita. Metrics above are for Single Family Combined. They are available in the CoreLogic HPI and HPI Forecasts.

the 12-month period and we forecasted that prices would fall by -0.26% based on several different factors such as housing affordability and local economic growth. There is some anecdotal evidence that many high-tech companies are relocating from high-cost areas like San Francisco and New York to alternatives such as Austin, causing prices to decline in the former and increase in the latter.

- We are closely monitoring the major metros that have seen the highest degree of absolute change over the last 12-month period and our forecast performance in those areas. Here are the results:

Top 10 Most Accurately Forecasted Metros

Ranking	Market	Population	HPI Actual Change	Forecasted Change	Difference
1	Cambridge-Newton-Framingham, MA	2,400,733	7.1%	7.4%	0.3%
2	West Palm Beach-Boca Raton-Delray Beach, FL	1,496,770	7.3%	6.9%	-0.4%
3	Los Angeles-Long Beach-Glendale, CA	10,039,107	7.2%	6.7%	-0.5%
4	Miami-Miami Beach-Kendall, FL	2,716,940	5.8%	6.3%	0.5%
5	Chicago-Naperville-Arlington Heights, IL	7,122,725	6.4%	7.0%	0.5%
6	Boston, MA	2,031,884	5.0%	5.8%	0.8%
7	Riverside-San Bernardino-Ontario, CA	4,650,631	10.9%	11.8%	0.8%
8	Pittsburgh, PA	2,317,600	4.4%	5.5%	1.1%
9	Orlando-Kissimmee-Sanford, FL	2,608,147	6.8%	5.5%	-1.3%
10	Warren-Troy-Farmington Hills, MI	2,570,286	7.1%	5.8%	-1.4%

Top Markets with large degree of price change over the 12-month period

CoreLogic is closely monitoring the top 50 major metros experiencing the largest price change over the last 12 months. The top 10 metros all had absolute changes of 9.6% and above. To the right is a look at how our Forecast compared with actual values in these markets. Many of these major metros have experienced complex economic and housing market factors over the last year due to the pandemic and longer-standing issues like increasing construction costs

Our Forecast was very close to actual home prices in high price change areas such as Riverside and Sacramento but underestimated the increases in other areas, given the unprecedented market conditions.

Rank	Major Metro	Absolute change - 12 month period	Absolute difference in actual home prices vs. forecast
1	Phoenix-Mesa-Scottsdale, AZ	12.6%	8.8%
2	Indianapolis-Carmel-Anderson, IN	12.5%	6.9%
3	Providence-Warwick, RI-MA	11.1%	5.4%
4	Riverside-San Bernardino-Ontario, CA	10.9%	0.8%
5	Seattle-Bellevue-Everett, WA	10.6%	4.6%
6	Columbus, OH	10.6%	5.9%
7	Kansas City, MO-KS	10.2%	6.0%
8	Cleveland-Elyria, OH	10.1%	5.2%
9	Austin-Round Rock, TX	9.9%	10.2%
10	Sacramento--Roseville--Arden-Arcade, CA	9.6%	2.0%

CoreLogic HPI Forecasts Validation Methodology

HPI Data

Each month, CoreLogic publishes the CoreLogic Home Price Index. The HPI contains the current and historical index values going back to January 1976. There is a 5-week lag between the HPI release date and the most current index value.

As new sales transactions are recorded and made available to the HPI, index values for previous months are restated to reflect the new sales data. Given the varying rates at which counties record sales transactions, all historical HPI values are subject to revision. Large restatements will, in general, be limited to the last 3 months of index values.

HPI Version 4.0 was first calculated in April 2016 and first published in June 2016. Each month, CoreLogic stores the published HPI for future back testing purposes.

HPI Forecasts Data

Each month, CoreLogic publishes the CoreLogic HPI Price Forecasts. The HPI Forecasts contain the predicted monthly HPI values for the ensuing 30 years.

HPI Forecasts Version 4.4 was first calculated in April 2016 and first published in June 2016. Each month, CoreLogic stores the HPI Forecasts for future back testing purposes.

Back-Testing Approach

Each month, CoreLogic conducts an ex-post back-test to determine how accurately the HPI Forecasts are predicting the HPI increase 12 months into the future. The analysis is done for Single Family Combined at the national and state level as well as for the largest 50 CBSAs.

The back-test analysis compares the actual HPI increase in the preceding 12 months to the HPI Forecasts predicted increase from 12 months earlier. For example, we compared the actual HPI increase from November 2019 – November 2020 with the increase forecast by the HPI Forecasts. Because of the HPI revisions, we back-test using HPI values after they have undergone 1 month of revision (i.e., we use index values from the prior release month.) In the “Top Markets with large degree of absolute change” analysis, the degree of change was calculated by determining the absolute difference between the index at the beginning of the time period and the index at the end of the time period.

CoreLogic HPI™

Built on industry-leading public record, servicing, and securities real-estate databases, the CoreLogic HPI incorporates more than 40 years of repeat sales transactions for analyzing historic, current, and future home price trends and producing multi-tier, multi-level market evaluations.

Learn more at corelogic.com/HPI

CoreLogic HPI Forecasts™

Based on a two-stage, error-correction econometric model that combines the equilibrium home price—as a function of real disposable income per capita—with short-run fluctuations caused by market momentum, mean-reversion, and exogenous economic shocks like changes in the unemployment rate.

Learn more at corelogic.com/HPIF

For detailed methodology and back testing information, visit corelogic.com/HPIValidation.