Alfred M. Pollard,
Office of Chief Counsel
Federal Housing Finance Agency
Constitution Center
400 Seventh Street SW, 8th Floor
Washington, DC 20024

Re: Docket No. 2015-N-03, Notice of Establishment of Housing Price Index: Notice and Request for Input

Dear Mr. Pollard:

CoreLogic, a leading global property information, analytics and data-enabled services provider, appreciates the opportunity to review and comment on the Federal Housing Finance Agency (FHFA) home price index (HPI) used for assessing the national average single-family house price for purposes of adjusting Fannie Mae and Freddie Mac (Enterprises or GSEs) conforming loan limits. Given the existing market share of the GSEs, limitations or expansion of the loan size eligible for purchase by the GSEs can result in national changes to families attempting to access reasonable mortgage financing. Exercising the most advanced methods, expansive data and currency of information should therefore be a priority when making the determination to change either the maximum conforming or high-cost purchase limits.

CoreLogic is generally supportive of the methodology selected by FHFA, which utilizes an "expanded-data" repeat transaction model in constructing the HPI and is a similar approach used for both the CoreLogic HPI and CoreLogic Case-Shiller indexes. Furthermore, the regularity of reporting and announcement of any changes to the limits on a regular schedule will assist in delivering certainty to the real estate sector that may have a pipeline of real estate transactions relying upon the existing standard.

FHFA provided a review and determination for not selecting other measures in adjusting loan limits including the CoreLogic HPI and CoreLogic Case-Shiller HPI. As FHFA continues to calibrate the expanded-data HPI, CoreLogic would encourage FHFA to continue consideration of the impact additional transaction data could have to the overall accuracy of their model and thus the appropriate measure of loan limit. In response to concerns identified by FHFA surrounding the risks of outside HPI producers, CoreLogic has provided further context regarding the methods and reporting history of the two indexes maintained by the company and detailed some further considerations for FHFA.

Discussion of HPIs

1. *The CoreLogic HPI*

CoreLogic leverages 30 years of real estate transaction data to produce the broad and comprehensive geographic coverage of HPI since January 1976, including non-disclosure states, following the ground-breaking research on the repeated-sales housing price indexes by Dr. Karl Case and Dr. Robert Shiller. The CoreLogic HPI is built using the nation's largest public record real estate property and ownership database covering over 98% of the US population, as well as the largest contributory mortgage servicing and securities databases.

The CoreLogic HPI has a quarterly weighting schema that signals market turning points sooner than competing indexes. Index revision is an inherent feature of repeat sale methods. The CoreLogic HPI uses a within-index estimation smoothing method to reduce index revision volatility. Additionally, the index is inspected after estimation to determine if it exhibits reasonable dynamics. To differentiate between index volatility driven by market dynamics versus spurious index volatility caused by 'bad' data, the approach taken in the CoreLogic HPI is to place a ceiling on the acceleration rate implied by the index value. This allows for an index to calculate appreciation or depreciation without bound as long as the acceleration or deceleration of the growth rates is reasonable. By bounding the acceleration rate, the model detects sudden changes in the direction of growth as well as sudden changes in the growth rate themselves. If a suspect index value is identified by this spurious index volatility procedure, it is removed from the index.

Again, following Shiller (1991), the CoreLogic HPI calculates the arithmetic average home prices, unlike the FHFA index where geometric average home prices are measured. The geometric average is derived by taking logarithms of home prices, regressing and then exponentiating the result.[1] Because the geometric average of a set of values is bounded by the arithmetic average, the geometric repeated-sales method tends to underestimate the true average growth rate. Even though the FHFA index has a post-index correction method similar to Goetzmann (1992), arithmetic approaches like CoreLogic HPI are still more accurate in measuring changes in average US home prices.[2]

2. *The CoreLogic Case-Shiller and Standard & Poor's / Case-Shiller Indexes*

The CoreLogic Case-Shiller and Standard & Poor's / Case-Shiller indexes are value-weighted arithmetic repeat sale home price indexes.[3] The repeat sale pair observations used in the calculation of both sets of Case-Shiller indexes measure the arithmetic percentage changes in individual home prices. Furthermore, each repeat sale pair is weighted by the value of its first transaction. These value-weighted arithmetic percentage changes are the observations that are combined in the Case-Shiller model to generate home price index values. This means that, by design, the Case-Shiller indexes track the average value of home prices within a market.

---

[1] Shiller, R. (1991), "Arithmetic Repeated Sales Price Estimators," Journal of Housing Economics, 1, 110-125.

[2] Goetzmann, W. (1992), "The Accuracy of real Estate Indexes: Repeat Sale Estimators," Journal of Real Estate Finance and Economics, 5, 5-53

[3] The CoreLogic and Standard & Poor's repeat sales methodologies are nearly identical. The methodology for calculating the CoreLogic Case-Shiller indexes is available upon request from CoreLogic. The methodology for calculating the Standard & Poor's Case-Shiller indexes is available at http://us.spindices.com/documents/methodologies/methodology-sp-cs-home-price-indices.pdf?force_download=true

The FHFA home price indexes are unweighted geometric repeat sale home prices indexes. Because repeat sale pairs are unweighted in the FHFA model, each house carries equal weight within the FHFA home price indexes. So, instead of tracking average home values, the FHFA indexes measure market-level price changes for the median-valued house. In addition, the repeat sale pairs used in the FHFA index calculations measure the log difference changes in individual home prices. Consequently, the FHFA indexes track changes in the geometric mean level of home prices, as opposed to the Case-Shiller indexes which track changes in the arithmetic mean.

The geometric mean of a set of numbers (i.e., individual home price changes) always has a smaller magnitude than the arithmetic mean. In practice, this means that when home prices are rising, a geometric repeat sales index will increase more slowly than an arithmetic repeat sales index.[4] As a consequence, if conforming loan limits are updated with a geometric index[5], they will increase more slowly than they would if they were updated with an arithmetic index. In general, the year-to-year differences between the growth rates of geometric and arithmetic indexes will be small, but over time these small differences could compound leading to substantial differences in future conforming loan limits.

The Case-Shiller methodology is designed to limit revisions to estimated index values. Residential real estate transaction data is often observed with considerable lag, which means that transactions that pre-date recently estimated index points often become available after index values are calculated. When index values are updated for these recent time periods during subsequent updates, newly available lagged transaction data can generate substantial revisions to the previously estimated index values. The Case-Shiller methodology limits these revisions by waiting 7-8 weeks before releasing an index value for a particular month to allow for more complete collection of potentially lagged transaction data.[6] In addition, Case-Shiller index values are updated using a chain-weighted calculation method which limits the extent to which repeat sale pairs with lagged second transactions can influence previously estimated index values. Finally, revisions to the Case-Shiller index values are typically restricted to the most recent two years – all index points prior to the two-year revision period are kept fixed.

The repeat sale pairs used to calculate the Case-Shiller indexes are constructed from transaction prices taken from public deed records. In some "non-disclosure" regions transaction prices are not recorded on deeds. For markets in these states and other regions and/or time periods lacking sufficient public record deed transactions, indexes from the FHFA may be included in the index sets delivered to clients who purchase the CoreLogic Case-Shiller indexes.

The Case-Shiller national home price index is a composite of Case-Shiller indexes calculated for the nine U.S. Census Divisions. Since Texas is a non-disclosure state, the Case-Shiller index for the West South Central Census Division is calculated as a composite of the FHFA index for Texas and Case-Shiller indexes for Arkansas, Louisiana and Oklahoma. Consequently, the national Case-Shiller index is partly based on the FHFA index for Texas. The contribution of the

---

[4] The divergence between geometric and arithmetic home price indexes depends on the heterogeneity of individual home price changes. If the prices for all homes are increasing at an identical rate, then calculated arithmetic and geometric indexes will be identical. The divergence between arithmetic and geometric index increases as the dispersion in individual home price changes increases.

[5] Or a composite of geometric indexes.

[6] For example, an index value for March will be released during the last week of May.

FHFA Texas index to the national Case-Shiller index is proportional to the Texas share of the value of U.S. single-family housing stock.

CoreLogic Feedback

CoreLogic is supportive of the use of the "expanded data" HPI and believes it is important that the agency will continue to consider the utilization of more data and monitor advances in new methods on a go forward basis. CoreLogic encourages FHFA to continue measuring any future divergences between commercially available home price indexes that may use different data or methods such as the two maintained by CoreLogic. Furthermore, it is important that FHFA continue to make archival data available upon revising the index to ensure that outside researchers and private entities can continue to monitor any expansion between the initial quarterly releases and the revision statements.

Consideration should also be made for how these changes will impact certain aspects of the secondary markets. From a valuation perspective, the frequency and magnitude of conforming loan limit adjustments can drive prepayment speeds up or down, as borrower refinance incentives are suddenly influenced by alternative loan programs that offer lower rates. This will occur more commonly on seasoned portfolios or securities where considerable amortization has occurred and the balance of individual loans are closer to the conforming loan threshold. The same threshold dictates where the conventional or government backed market ends and the private market begins, so in addition, there may be liquidity implications if limits decrease and the private market lags on filling the gap.

Sincerely,

Stergios Theologides
Senior Vice President and General Counsel

cc:
Andrew Leventis, Principal Economist, FHFA
Faith Schwartz, SVP, Government Affairs, CoreLogic
Michael Bradley, SVP, Modeling and Analytics, CoreLogic
Frank Nothaft, SVP, Chief Economist, CoreLogic
David Stiff, Principal Economist II, CoreLogic