Summary Comparison of National Home Price Indices		
	S&P/Case-Shiller© U.S. National Home Price Index ("S&P/CSI")	**Zillow National Home Value Index ("ZHVI")**
Primary Purpose	Benchmark for home price-linked financial product development, trading and settlement	Housing market analysis and research
Methodology	Repeat Sales[1] • Weighted composite of 9 underlying Census Division repeat sales indices • Seasonally- & non-seasonally-adjusted versions	Hedonic Imputation[2] • Median of actual and estimated market values of all homes within a market (or market segment) • 3-month smoothed, using a Henderson Filter • Seasonally-adjusted only
Underlying Data	Sale pairs for single-family homes only[3], i.e., SF homes for which: • A sale price (distressed or non-distressed) is recorded within the current index reporting period and for which a prior historical sale price is also available • Excludes newly-constructed homes • Index data history to 1987	Actual and estimated values of 83 million individual single-family homes, condos, and co-ops: • Actual, non-distressed sale prices recorded during the index reporting period • Estimated non-distressed market values for every home in the Zillow database that does not sell during the reporting period • Includes newly constructed homes • Index data history to 1997
Coverage	@71% of US housing stock by market value	@95% of US housing stock by market value
Release Frequency	Quarterly	Monthly
Reporting Lag[4]	56 – 61 days	18-23 days

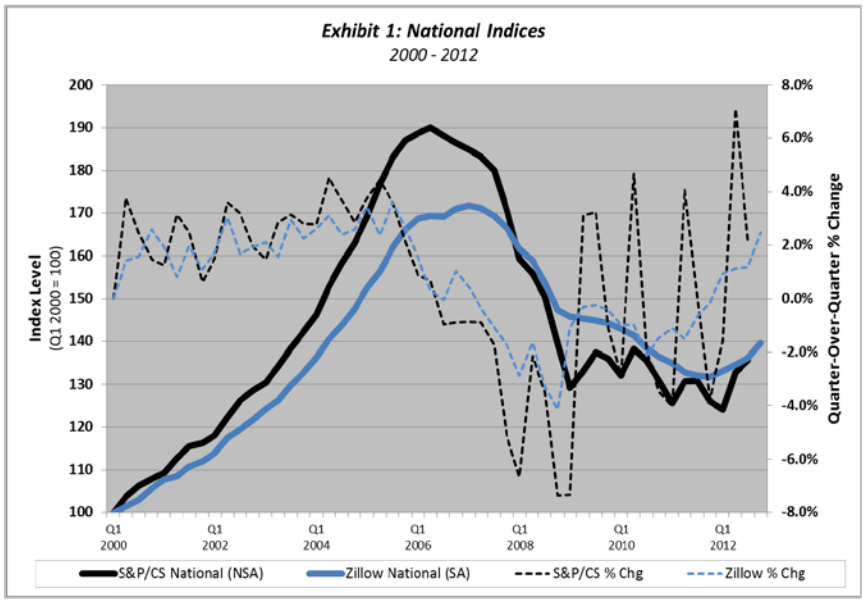


Exhibit 1 plots the levels and quarter-over-quarter percentage changes in the headline national indices from S&P/Case-Shiller and Zillow[5].

There are similarities, but the trends diverge as the U.S. housing bubble gathered momentum in 2000. The divergence is attributable to a combination of factors, e.g., differences in:

- Geographic footprint and property types covered
- Data sample sizes used to update each index
- Methodology used to compute each index

Compared to the S&P/CSI, the ZHVI shows a later peak and a somewhat less dramatic boom and bust. Intuitively, this pattern seems consistent with a housing index that reflects a broader geographic footprint, i.e., one that complements coverage of larger, "coastal", and speculative markets that fueled the early stages of the boom with data related to a larger number of smaller, slower-moving, and less volatile real estate markets[6].

[1] For more information, see https://www.pulsenomics.com/uploads/S_PCSI_Methodology_Nov2009.pdf
[2] For more information, see http://www.zillow.com/blog/research/2012/01/21/zillow-home-value-index-methodology/
[3] In addition to the U.S. National HPI, S&P also updates and publishes single-family home price indices for 20 metro areas, and condo indices for 5 metro areas on a monthly basis using a 3-month moving average. Fiserv, the index calculation agent for the S&P/CSIs, separately maintains and licenses several thousand home price indices that are updated on a quarterly basis. Zillow updates and publishes over 250,000 distinct home value indices each month for a variety of geographic strata and market segments.
[4] "Reporting Lag" refers to the typical delay in index publication following the close of the reporting period. For example, for the December 2012 reporting period, Zillow published its index levels January 22, 2013, and S&P will do so on February 26, 2013.
[5] S&P does publish seasonally-adjusted data, but the headline S&P/CSIs are not seasonally-adjusted ("NSA"). Zillow produces seasonally-adjusted ZHVIs only.
[6] S&P claims that the S&P/Case-Shiller U.S. National HPI covers 70.8% of the country's aggregate housing stock value, while Zillow claims that its national ZHVI covers 95%.

A greater degree of index volatility is also evident in the S&P/CSI starting in 2008. This is likely attributable to the interplay of the factors noted previously with the unprecedented market conditions that emerged in the aftermath of the historic bust and linger to this day, e.g.,

- The effects of the ongoing foreclosure crisis (generating record-high numbers of distressed sale transactions)
- Millions of underwater homeowners (constraining supply and sales volume to abnormally-low levels)
- Persistent government intervention[7]

These and other factors have conspired to alter the mix and quantity of home sales data available for inclusion within repeat-sales data samples relative to historical, pre-bust norms[8].

Exhibit 2 depicts changes in the U.S. foreclosure re-sale rate[9] and the national S&P/CSIs and ZHVI. When foreclosure sales comprise an unusually large portion of total sales that occur within a given reporting period—or, when foreclosure re-sale frequency is especially volatile across reporting periods—sale prices of distressed properties can drive a repeat-sales index to degrees and in directions that may not reflect the value trends of the (far larger) non-distressed segment of the housing market[10].

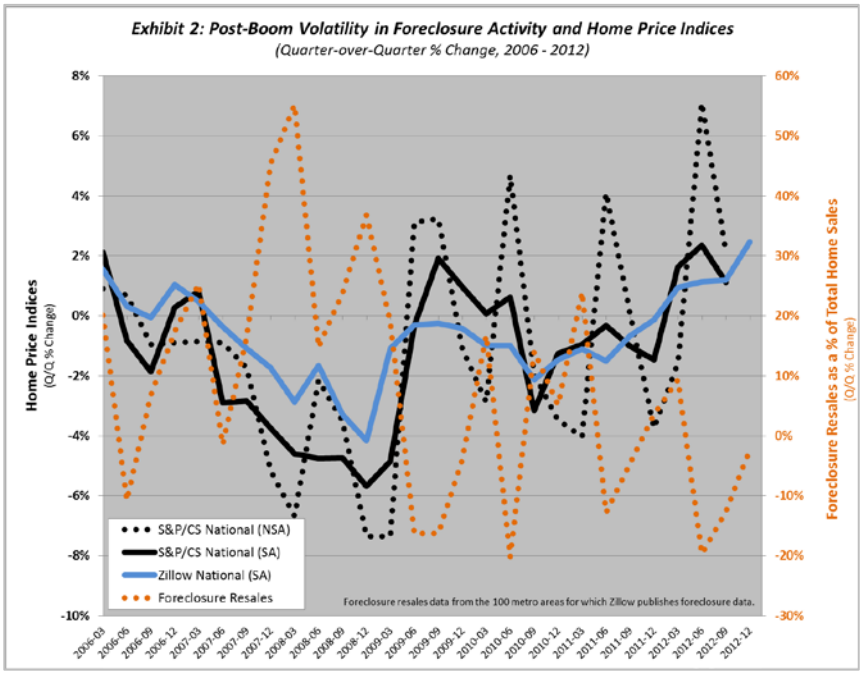
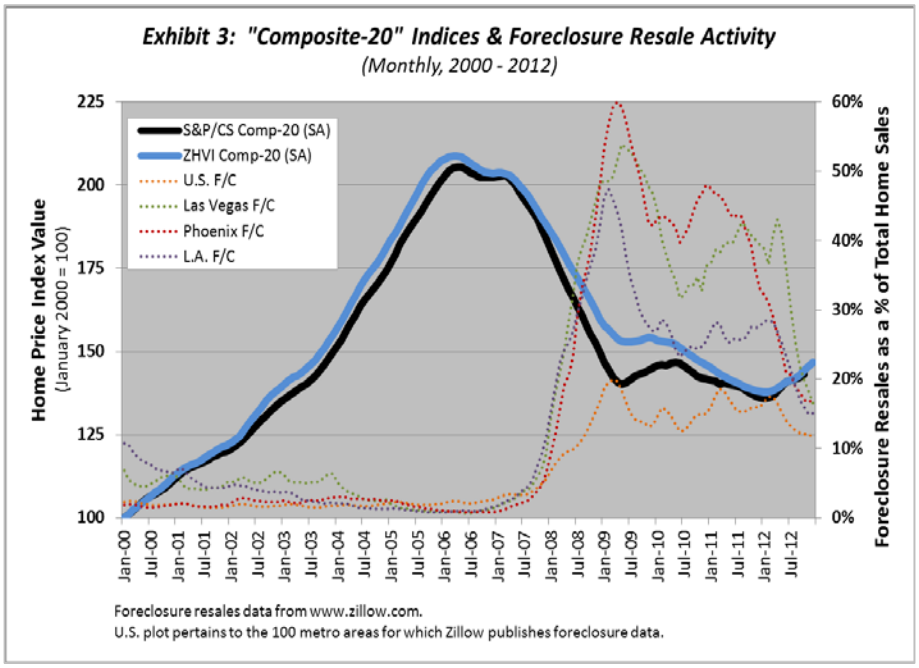


Exhibit 3 includes plots of the S&P/Case-Shiller Composite-20 Home Price Index ("S&P/CS Comp-20") and the Zillow Home Value Index for the same 20 metro markets ("ZHVI Comp-20"), both seasonally-adjusted. In contrast to the trends in the headline national index levels illustrated on page one (Exhibit 1), when controlling for geographic footprint (and seasonality), the trends (and timing of the market peak) are nearly identical until the bust began to accelerate in 2007.

The data plotted against the right-hand y-axis in Exhibit 3 reveals that, in 2007, foreclosure re-sales as a percentage of total home sales began to skyrocket. During the boom years, this percentage was relatively stable and averaged about 2% - 3% nationally. Between the start of 2008 and the end of 2012, foreclosure re-sales as a percentage of total home sales jumped to an average of 14.5% nationally, ranging from 6.7% to 19.9% per month. Several individual metro area housing markets that comprise the S&P/CS Comp-20 have had extraordinarily high and volatile foreclosure activity in the wake of their historic booms. For example, during 2009, the foreclosure re-sale rate in Phoenix reached 60%, and it approached or exceeded 50% in several other large metro areas.



The fundamental difference in how each index method reflects foreclosure market activity is a significant factor in the steeper decline in the S&P/CS Comp20 relative to the ZHVI-Comp20 during the bust. This disparity, coupled with geographic footprint and property type coverage differences, explains most of the performance variance between the national home price indices illustrated in Exhibits 1 and Exhibit 2.

[7] E.g., Aggressive and persistent monetary stimulus by The Federal Reserve Bank; Federal and State tax credits for first-time home buyers during 2009 and 2010 stimulated higher than normal sales volume of lower-priced homes relative to all other homes.

[8] S&P does not publish statistics re: the percentage of sale pairs in a given period affected by a foreclosure transaction. Although S&P does not publish sale pair counts pertaining to the U.S. National HPI, the number of sale pairs used to update the S&P/CS Comp-20 each month has diminished by an average of 35% since the beginning of 2008 according to reports published by S&P. According to Zillow, ZHVI is designed to accurately measure the average value of all homes in typical, "non-distressed" condition, and thus, it uses only arms-length, non-foreclosure sales to calibrate the home valuation models that feed ZHVI. ZHVI reflects foreclosure price contagion to the extent that sale prices of non-distressed properties are impacted by discounted prices of similar, nearby homes.

[9] Aggregate foreclosure re-sale data is from the 100 metro areas for which Zillow publishes foreclosure data.

[10] Exhibit 2 also illustrates the tendency of the foreclosure re-sale rate to spike during winter months and then fall off in the spring and summer. In April 2010, S&P published an analysis of the S&P/CSIs that recognized a growing "irregular" component of index changes, and concluded that "the seasonal factors expanded over the last five years, suggesting that the market is either changing or some other factors are affecting home prices," and "…for the present, the unadjusted [NSA] series is a more reliable indicator." For more information, see https://www.pulsenomics.com/uploads/S_PCSI_SeasonalAdjustmentNotice_April_2010.pdf