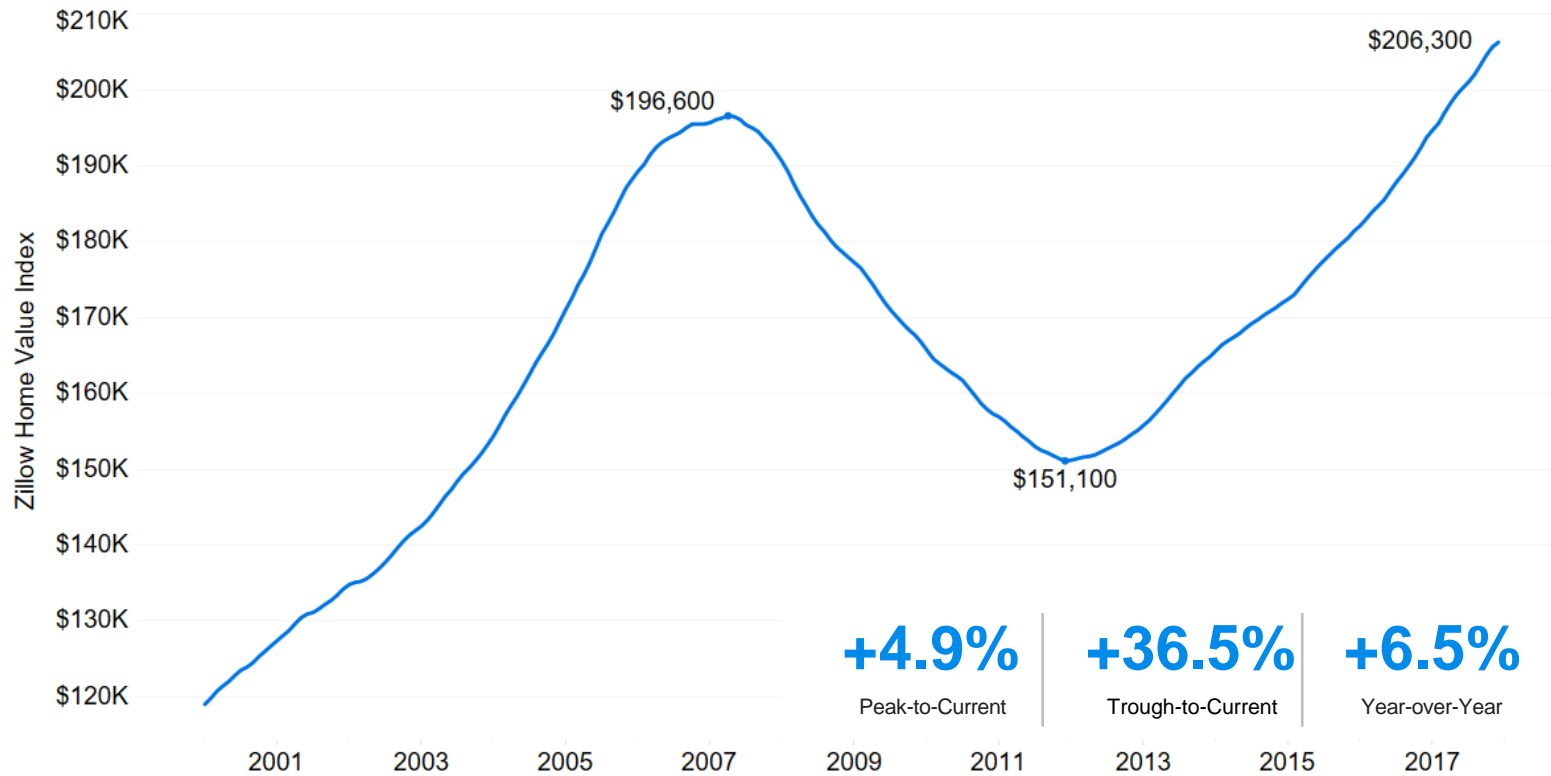


A photograph of a modern, single-story house at dusk. The house has large windows and a dark roofline. The interior lights are on, and the sky is a deep blue. There are trees and bushes in the foreground and background.

ZILLOW HOUSING INDICES:

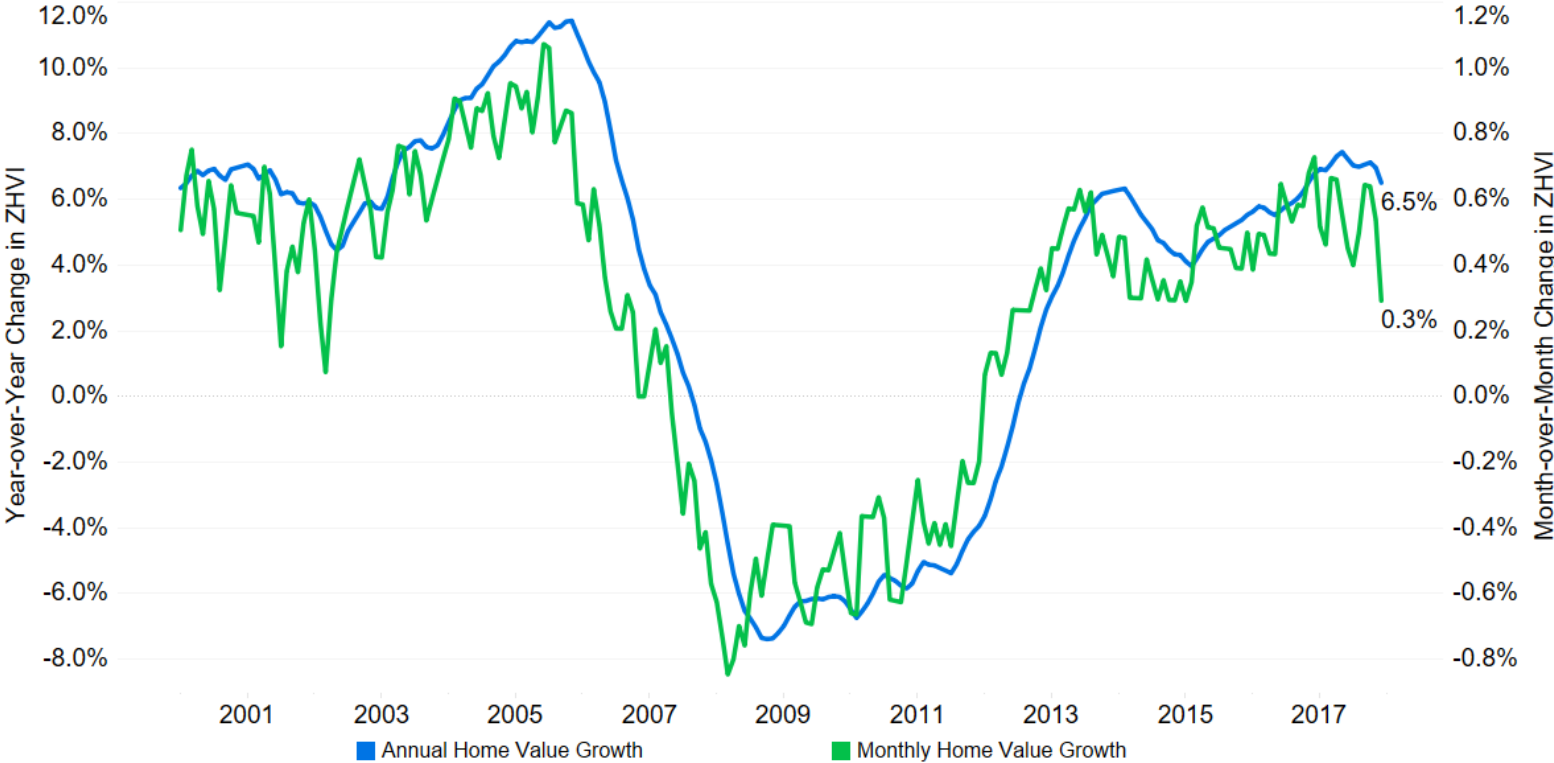
Skylar Olsen, PhD, Director of Economic Research and Outreach

Zillow Home Value Index: SSA median of US Home Values



Source: Zillow Home Value Index (Dec 2017)

U.S. home values have just surpassed pre-recession highs

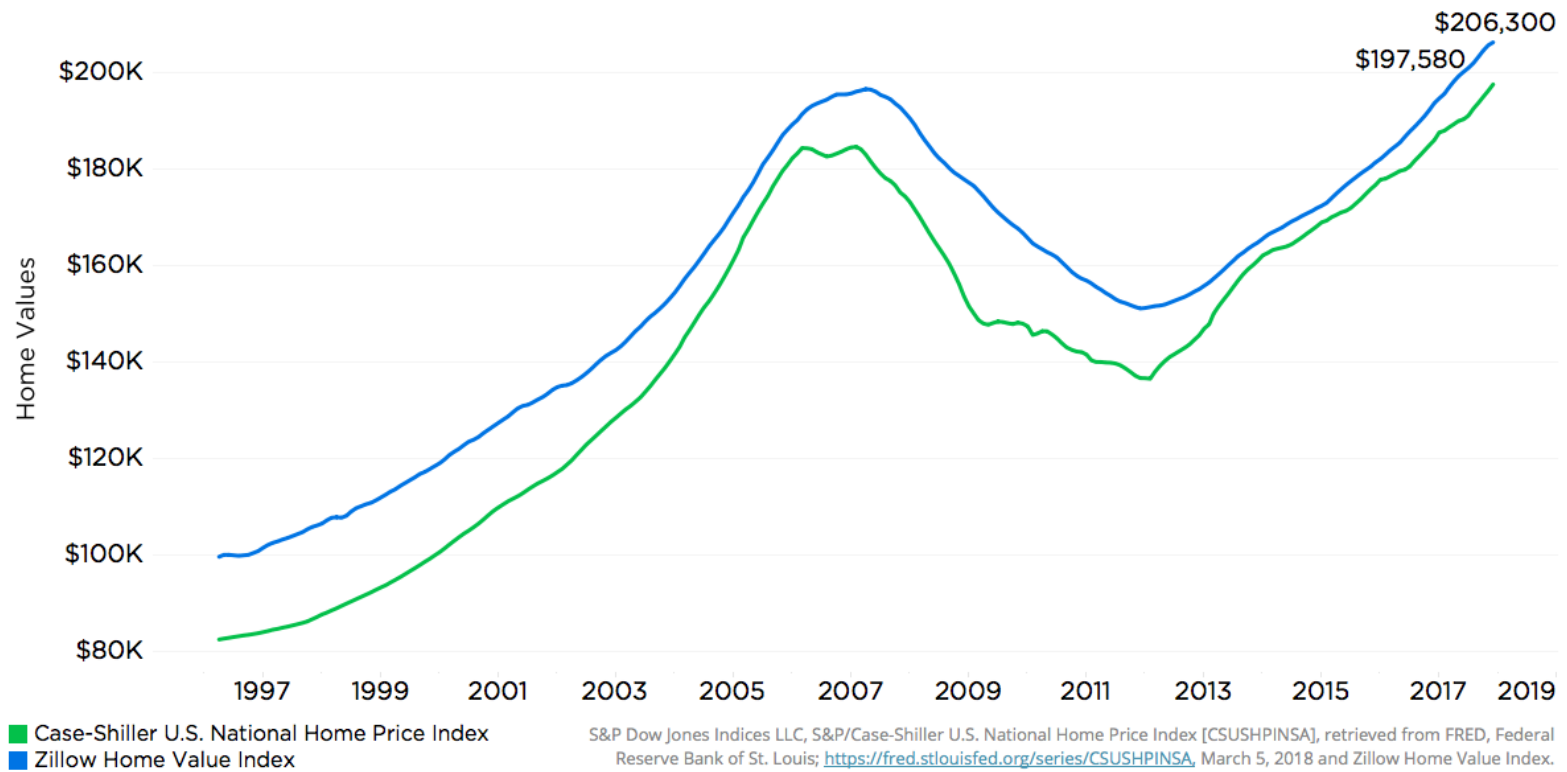


Source: Zillow Home Value Index (Dec 2017)



National ZHVI vs Headline Case-Shiller

- ZHVI as dollar denominated alternative to repeat sales index
 - Stock weighted vs flow
 - Larger footprint

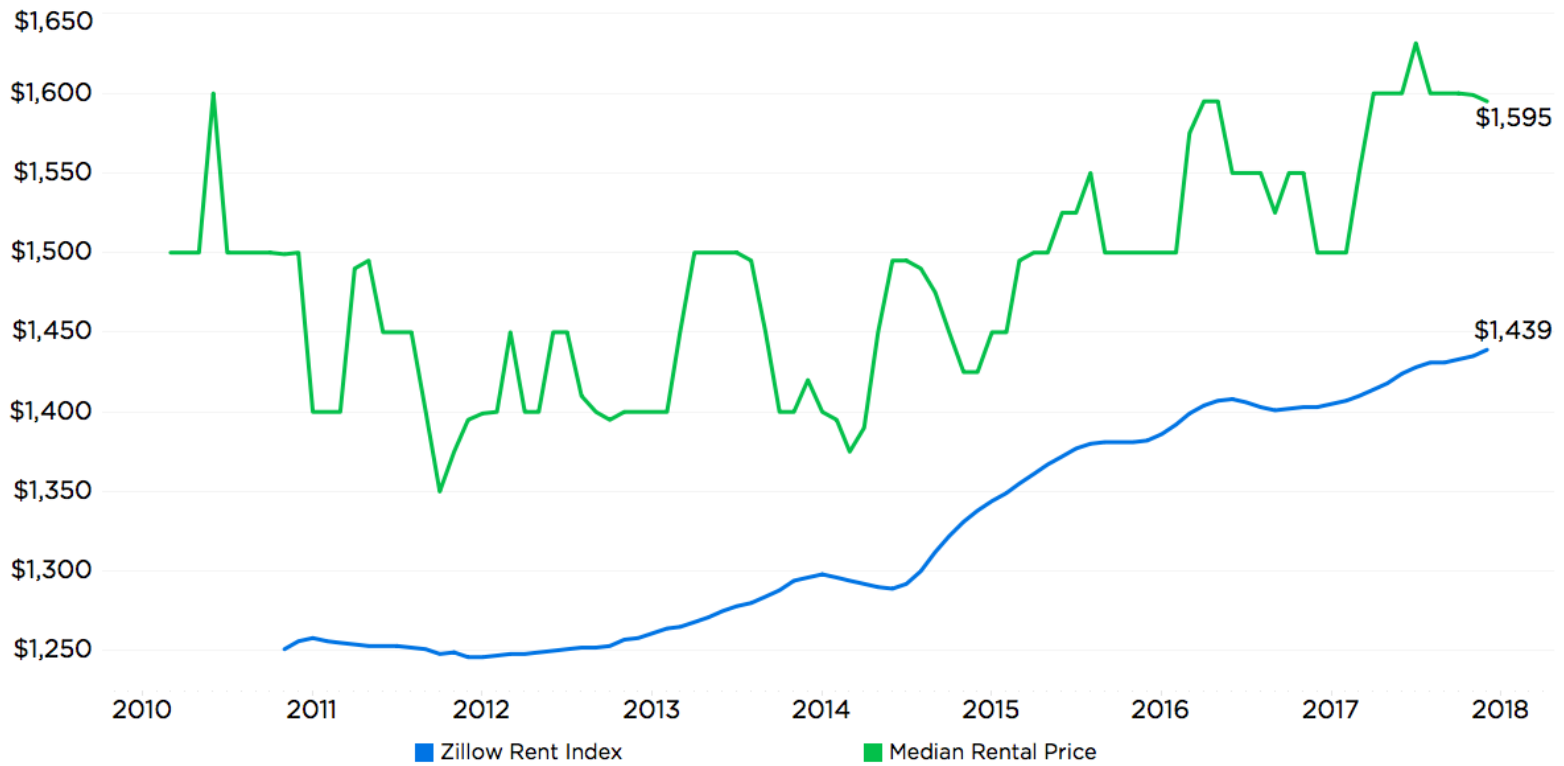


Zillow Rental Index: SSA monthly median of estimated market rate rent across full housing stock



Source: Zillow Rent Index (Dec 2017)

ZRI versus median rent list price



Source: Zillow Rent Index and Zillow Median Rental List Price (Dec 2017)

Geographic Coverage and User base

- Regional Coverage:
 - Currently available:
 - Nation
 - States
 - 2013 Census Defined CBSAs
 - County
 - Cities (formed by postal address designation)
 - ZIP code
 - Neighborhoods (combination of city definitions and custom Zillow boundaries)
 - Upcoming:
 - Urban/rural metro areas
 - Census tracts
 - Congressional districts
- User base:
 - Consumers, media, industry and finance professionals, academic & other researchers, policy makers
- Access points:
 - CSV downloads from [Zillow.com/data](https://www.zillow.com/data)
 - Zillow API
 - Bloomberg terminal
 - Kaggle
 - Data.World
 - ...

Greater Adoption Sophisticated Use Drives Greater Transparency

- Core/basic methodology briefs are posted/published
 - ZHVI methodology [here](#).
 - ZRI methodology [here](#).
 - Building blocks (Zestimate and Rental Zestimate): zillow.com/zestimate/
- Challenges to Transparency
 - Users bring a wide range of sophistication
 - Protecting intellectual property
- Greater adoption means more transparency need, different sources for different users:
 - Challenge: there is no truth
 - Upcoming:
 - ZHVI White Paper: Simulating housing stock, true prices, and index performance when assumptions breakdown
 - Zestimate White Paper
 - ZRI revision: Rental stock weighted => White Paper

Recent data enhancements and/or methodology improvements

- Common/regular: Teaching moments, educating lay users about latency
 - Restatement monthly. Bias adjustment is continually performed as latent sale records received
 - Re-Zestimation of historical Zestimates annually (eventually to be quarterly)
- Switched data sources – emphasize future potential to users
- Overhaul technology stack – emphasize future potential, innovation to users
- Major Zestimate algorithm changes – emphasize best in class AVM, continual improvement
 - Challenge: Two distinct Zestimates now produced on every home
 - Index Zestimate: Constant stock, fixed algorithm
 - Consumer Zestimate: Evolving stock, evolving algorithm optimized for current period

Undermining users trust and announcing changes

- User trust is something we worry about a lot.
- A scientist's caution in story telling, especially for small geographies
- Always honest but not always loud
 - Optimize for low volatility/restatement as well as accuracy
 - Core methodology consistent, but refined, then no big announcement
 - National series impacted significantly? Investigate source/cause, have explanation ready, emphasize merits to method
 - Inflection points move?
 - Magnitude of peaks to trough, trough to current substantially different?
 - $YoY(t=T) \llcorner \llcorner \llcorner YoY'(t=T)$
- Core methodology change/innovation: Big announcement, shout from the roof tops
- Demonstrating integrity as often as possible
 - Zillow Transaction and Assessor Dataset (ZTRAX): Zillow's raw and dirty public record database made freely available to academic, non-profit, and policy researchers
 - Long honest conversations with media, analysts, government orgs
 - Providing more detailed accuracy information where appropriate

