Philadelphia's Housing Market Continues Mixed Signals
Modest price gains but a significant drop in sales activity characterizes Q2.

August 23, 2019: House prices rise slightly while sales volume falls. Here's the latest numbers for 2019 Q2:

- **The average price of Philadelphia homes rose by 1.4% in Q2 on a quality- and seasonally-adjusted basis.** This increase continues the local market's recent trend of positive, but modest price appreciation.

- **Philadelphia's house prices are currently up an average of 8.5% from one year ago (YoY).** This increase is significantly above the city's historic annual average appreciation rate of 4.5%. However, it is in line with the average annual appreciation rate of the current expansionary cycle, which has hovered in the upper single digits for the last several years.

- **The city's median house price exhibited a major rise in Q2.** The median house price in Philadelphia in Q2 was $174,900; a 21.6% increase from $143,800 in the previous quarter. However, most of this increase is a combination of seasonality as well as a bias in this quarter's sales towards higher-priced houses[1]. In the previous quarter, the median price fell a sizeable 10.7%, from $161,000 to $143,800.

- **Much like the citywide numbers, house price changes in individual submarkets were also modest and generally positive.** From smallest to largest, the average quarterly change in seasonally- and quality-adjusted house prices by submarket was: University City (-2.8%), Northwest Philadelphia (-0.9%), Center City/Fairmount (+0.1%), Lower Northeast Philadelphia (+0.3%), North Philadelphia (+0.4%), Upper Northeast Philadelphia (+0.5%), South Philadelphia (+1.7%), Kensington/Frankford (+2.5%) and West/SW Philadelphia (+3.2%).

- **Home sales activity fell sharply from a year ago.** There were 5,462 arms-length sales in Q2, down 15.4% from 6,460 home sales in the same quarter one year ago[2]. This is the largest YoY decline in Q2 home sales since the current market's recovery began in 2012. However, even with this significant decline, overall home sales volume is still running well above average: historically, ~3,900 houses change hands every quarter in Philadelphia.

[1] House prices typically rise as the calendar transitions from the cold weather months to the warm weather months, regardless of overall market conditions. In addition, this quarter's sales occurred disproportionately in higher-income neighborhoods, where relatively higher prices prevail. Hence, the increase in the median price overstates the actual increase in market values. Since the regression that computes the house price index controls for seasonality and the characteristics of the homes that transact, it shows a much more modest—and accurately measured—increase in house prices.

[2] Like raw house prices, the sales volume of homes exhibit substantial seasonal fluctuations that are independent of the market's or economy's cycle. So, it is a standard industry practice to compare these numbers to the same time period one year ago rather than to recent months or quarters.

- **The pace of home sales appears to be slowing.** The average amount of time that it takes a home in Philadelphia to sell is currently 53 days, up from 38 days one year ago[3]. From the middle of the last recession in 2011, the average days-on-market (DOM) has fallen from its peak of 95 days to a low of 38 days in 2018.

- **Housing inventories (the number of homes listed for sale) continues to remain very low.** There are currently 3,648 houses listed for sale in Philadelphia, which is essentially unchanged from the 3,363 reported three months ago. Typically, there is ~5,000 houses publicly available for sale in any given month in Philadelphia. With such a low supply, Philadelphia's market continues to favor sellers over buyers[4].

- **Zillow's forecast for Philadelphia's house prices has turned negative.** Zillow is currently predicting that house prices in the city will fall by an average of 0.2% over the next 12 months. Zillow has been steadily downgrading its forecast of Philadelphia house prices for some time. Six months ago, Zillow's forecast was predicting a 17.3% increase in prices, and three months ago, it was predicting an 8.4% increase[5].

Consistently—albeit frustratingly—the numbers continue to present a muddled picture of the housing market. Recent declines in interest rates have boosted demand for housing, as evidenced by a simultaneous uptick in mortgage applications and refinancings. However, there is near-universal agreement amongst market-watchers that this is offset by the very low supply of homes available for sale. The result is that this low supply combined with steady demand is providing upward support to house prices (since demand>supply), but is simultaneously exerting downward pressure on home sales (since supply is so limited). This is an unusual combination, as house prices and house sales tend to move together in the same direction over the course of the market's cycle. As such, the recent increases in house prices may be easily reversed once inventories finally start to increase. When that will happen is a subject of speculation, but the importance of inventory levels to the market's eventual turning is indeed a certainty.

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If you would like Dr. Gillen to address your organization, business or community group with a presentation on recent trends in the local economy and real estate market, he would be happy to do so…and it's absolutely free! Just contact him at the email address above.

See the Next Page for a Technical Addendum on Enhancements to the House Price Indices

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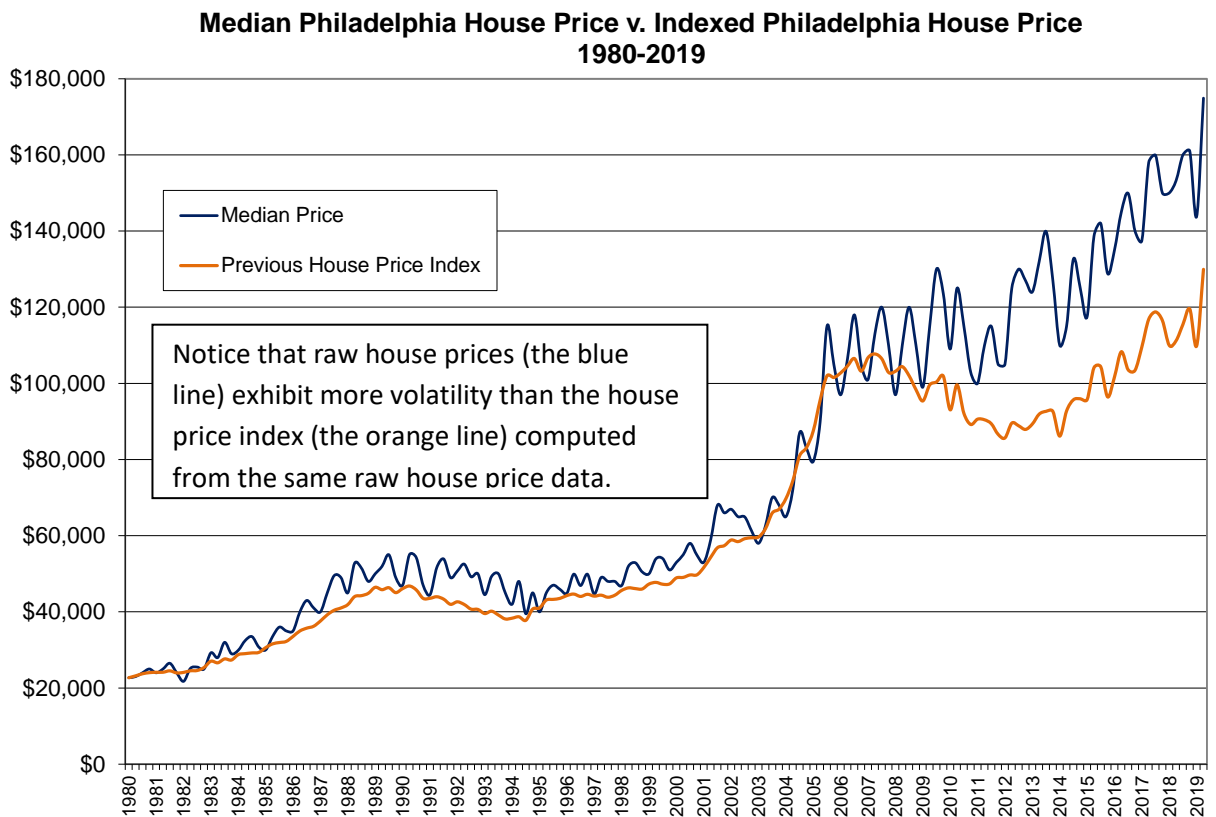[3] Much like sales and prices, the pace of sales exhibits significant seasonal fluctuations.

[4] The National Association of Realtors characterizes a market as being a "Seller's Market" if the local Months' Supply of Inventory (MSI) is less than 5 months. Philadelphia's MSI is currently 3.1 months. It has been below 5 months since 2016.

[5] It should be noted that Zillow has been consistently and overly optimistic in its forecast for Philadelphia during the current bull market.

Technical Addendum: Improving the Stability of the Philadelphia House Price Index

The primary advantage of using a house price index rather than raw sales prices to measure intertemporal changes in house values is that sales prices are prone to both seasonality and idiosyncratic noise. Seasonality refers to the habit of house prices tending to increase during warm weather months and then decline during the cold weather months, regardless of underlying market fundamentals. Idiosyncratic noise refers to the fact that recorded sales prices are just as much affected by the physical and locational characteristics of the particular sample of houses that actually sell during a given period, rather than to changes in overall market forces. The use of a regression model to compute a house price index essentially eliminates (or at least substantially reduces) the effects of these two factors, so that the resulting price index reflects purely market-driven movements in house prices.

As an example of this, consider the following chart, which plots the median house price[6] in Philadelphia against my (previous) house price index, from 1980-through 2019:

Median Philadelphia House Price v. Indexed Philadelphia House Price
1980-2019

Notice that raw house prices (the blue line) exhibit more volatility than the house price index (the orange line) computed from the same raw house price data.

Notice that the median house price is significantly more volatile than the house price index:
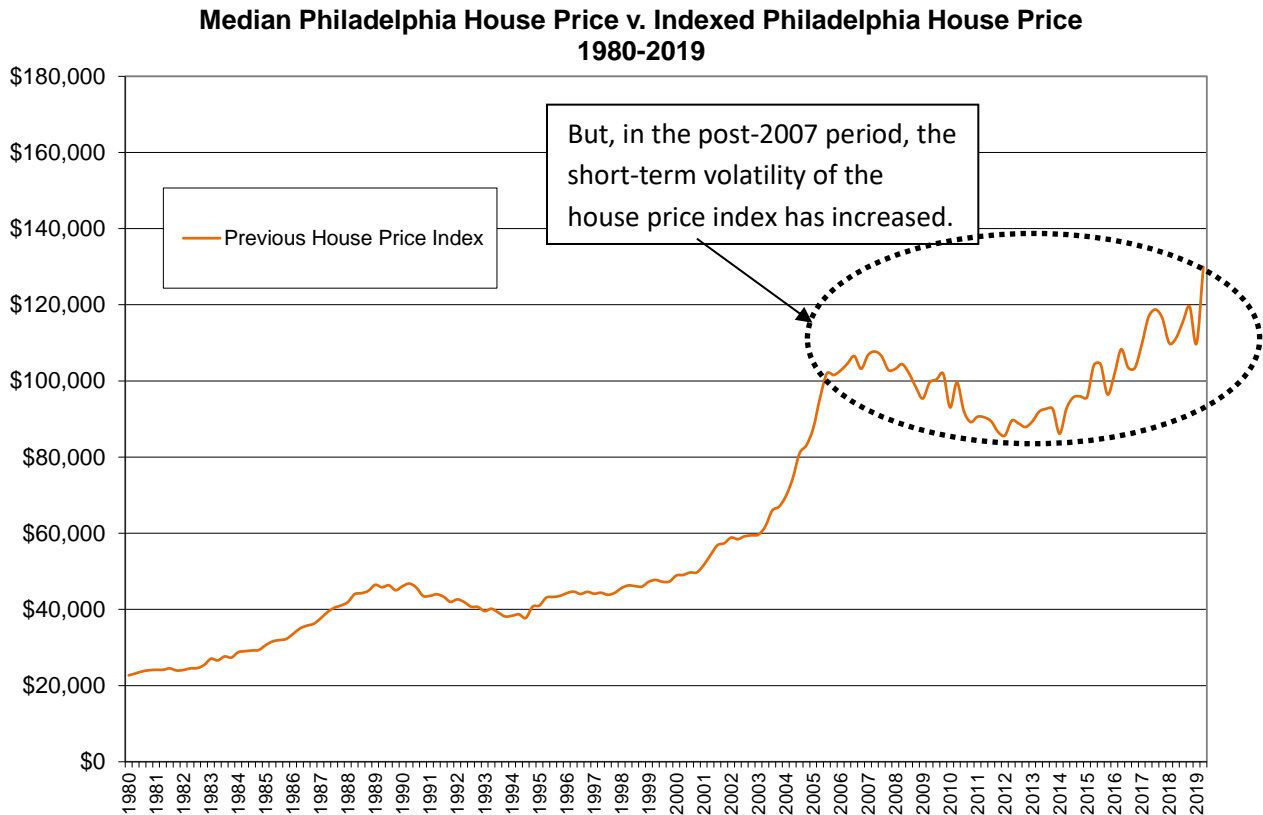- The average quarterly change in median house prices is 7.5%.
- The average quarterly change in the house price index is 2.7%.
- Hence, the house price index has a level of volatility that is less than half of what raw sales prices exhibit.

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[6] The median house price is that price point at which 50% of all sales in a given quarter sold for more, and 50% sold for less. The house price index in the chart is generated by applying the percent change in the index to the median house price in the first period of the time series, which is 1980 Q1.

This difference is caused by the combination of seasonality and noise in the raw sales data[7]. It makes short-term inferences about changes in house prices very difficult to make because these movements in house prices over time are being driven as much by non-market factors as market forces. Since the regression that computes the house price index controls for these factors, a smoother and more stable price index is the result.

BUT, let's remove the median price series from the chart and examine just the house price index:

**Median Philadelphia House Price v. Indexed Philadelphia House Price
1980-2019**

But, in the post-2007 period, the short-term volatility of the house price index has increased.

Notice that, since the housing market last peaked (and then crashed) back in 2007, the volatility of the price index has increased. This is visually evidenced by the fact that the index was fairly smooth from one quarter to the next from 1980-2007, but shows significant swings from one quarter to the next in the post-2007 period.
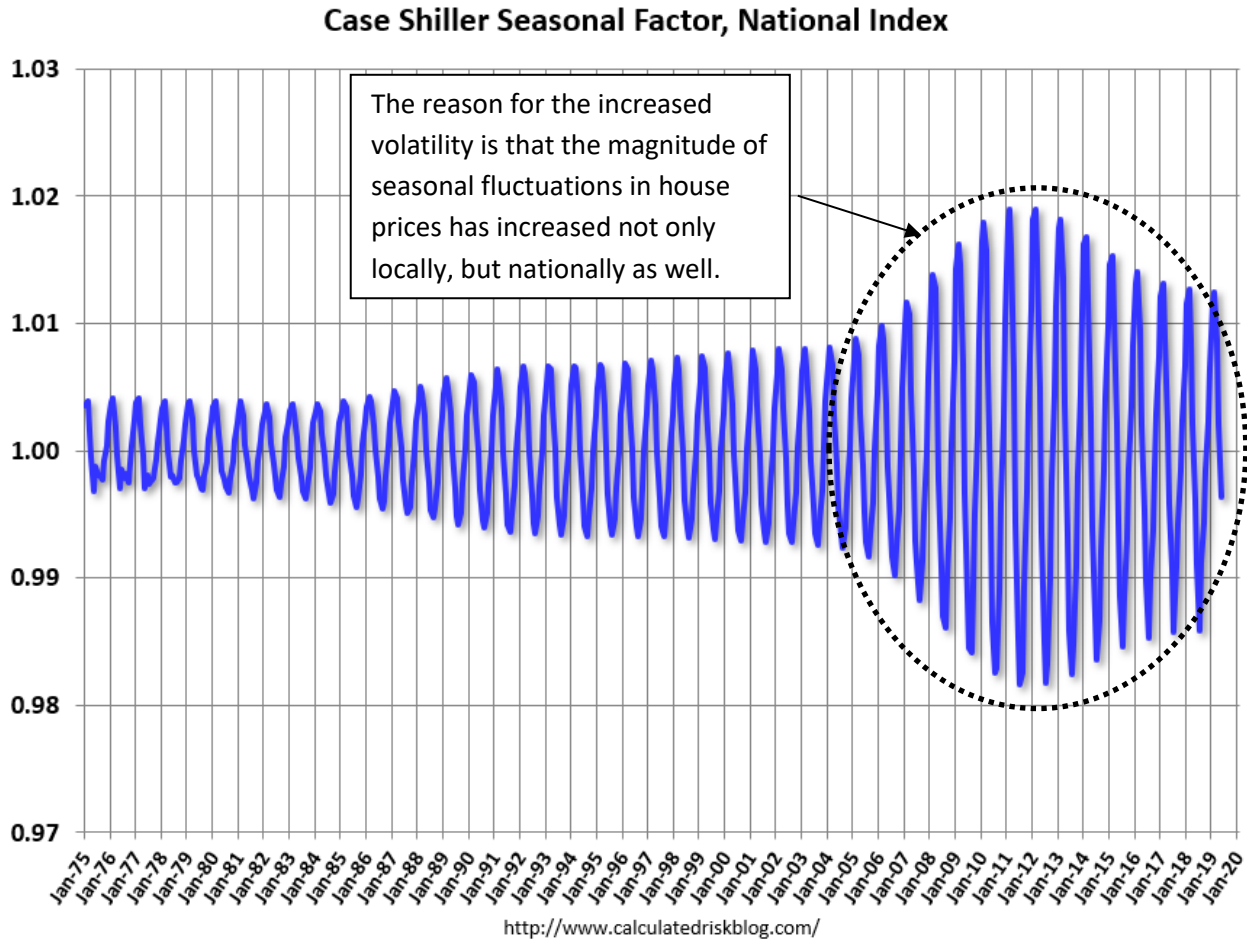
- Prior to 2007, the average quarterly change in the price index was 2.3%.
- After 2007, the average quarterly change in the price index increased to 3.6%.
- Hence, the volatility of the house price index increased after 2007.

Research into why this inter-quarter volatility has increased revealed that house prices have exhibited significantly more seasonality since the last housing cycle. In essence, homebuyers and sellers have

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[7]Astute readers may also notice that median prices generally don't exhibit the decline in house prices during the recession-driven downturn of 2007-2012. This is due to sample selection bias in home sales data: home sales during this period were skewed towards higher-priced homes in wealthier neighborhoods, as many low-income households were kept out of the market by a combination of foreclosures, subprime-driven debt, tighter lending standards and unemployment.

become much more sensitive to changes in the seasons when timing their transactions, and this increased sensitivity has become capitalized into house prices[8].

This phenomenon is not unique to Philadelphia, and is well-documented at the national level. The following chart shows the change in the seasonal factors used to de-seasonalize Case-Shiller's national house price index, from 1975 through 2019.

Case Shiller Seasonal Factor, National Index

The reason for the increased volatility is that the magnitude of seasonal fluctuations in house prices has increased not only locally, but nationally as well.

http://www.calculatedriskblog.com/

Source: https://www.calculatedriskblog.com/2019/07/update-few-comments-on-seasonal-pattern.html

Notice that the magnitude of the seasonal factors has increased in the post-2007 period, as exhibited by the larger swings in the index. This implies that the magnitude of seasonal movements in house prices has increased, since numerically larger factors must be used to seasonally adjust house price data[9].

To effectively adjust for this increased seasonality in Philadelphia's house price index, a variety of econometric and technical adjustments were made to the regression that computes the index. These adjustments include:

1) Time-varying seasonal control variables

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[8] **Why** consumers have become more seasonally sensitive has not yet been confirmed by any research known to this author. But, most hypotheses have conjectured that it is a combination of long-term shifts in consumer preferences towards warmer weather climes as well as greater consumer attunement to perceptions of climate change.

[9] For a more in-depth discussion of the recent increased seasonality in U.S. house prices, the reader is referred to: https://www.calculatedriskblog.com/2014/08/kolko-lets-improve-not-ignore-seasonal.html

2) Enhanced spatial control variables
3) An improved Weighted-Least Squares algorithm in the regression's estimation[10]
4) The application of a time-varying seasonal smoothing filter to the regression's results.

The results of these adjustments are shown in the next chart, which compares the previous Philadelphia house price index to the new one:

Philadelphia House Price Indices
1980-2019
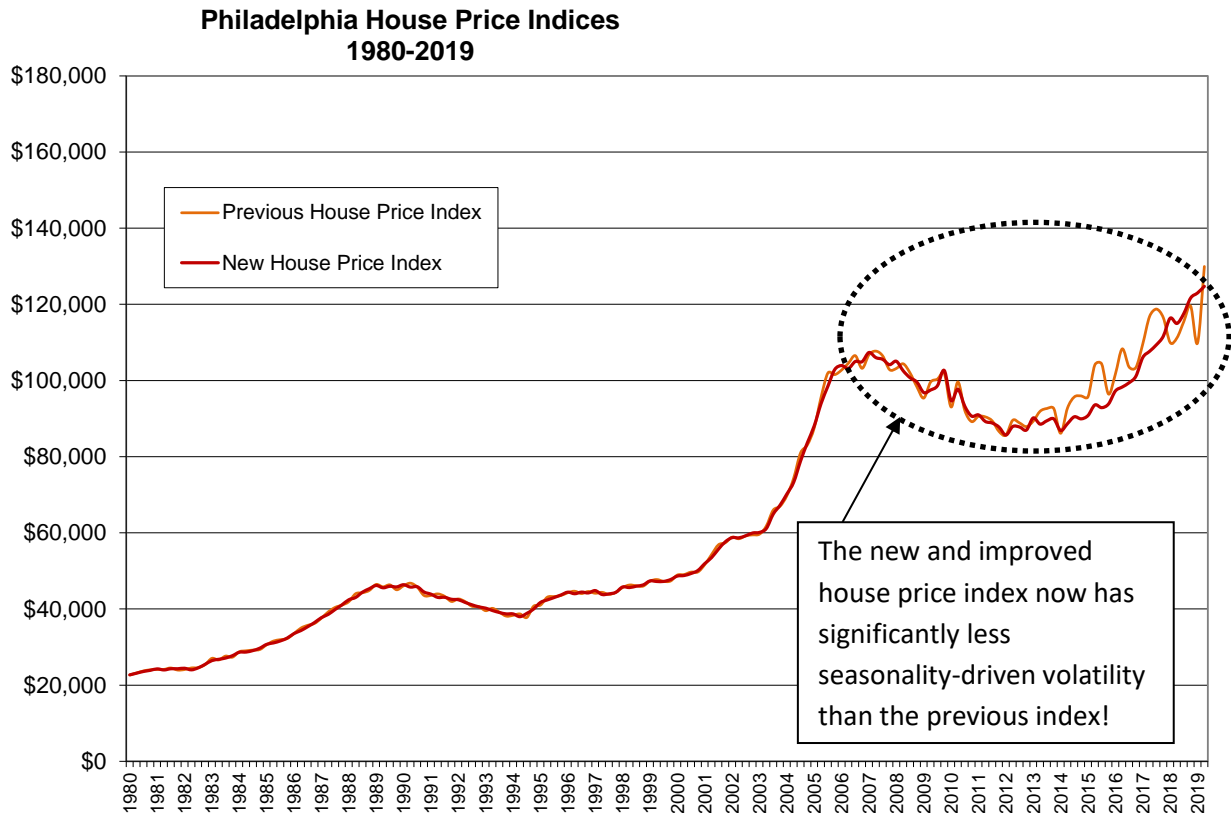
Note that the new house price index shows significantly less volatility than the previous house price index, especially in the post-2007 period:

- For the previous price index, the volatility numbers remain the same:
  - For the entire 1980-2019 period, the average quarterly change is still 2.7%.
  - Prior to 2007, the average quarterly change was 2.3%.
  - After 2007, the average quarterly change is 3.6%.

- But for the new (and improved) house price index:
  - For the entire 1980-2019 period, the average quarterly change is 2.0%.
  - Prior to 2007, the average quarterly change was 2.0%.
  - After 2007, the average quarterly change is 2.0%.

Note that the new index not only has lower quarterly volatility than the previous index, but that the average quarterly volatility (2.0%) is now constant across all sub-periods in the index's history.

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[10] Readers with a statistics or economics background will recognize that this reduces the consequences of heteroscedasticity in the data, of which seasonality is a contributor to.

Hence, the new index has reduced the seasonal volatility imparted by the data, thus resulting in a smoother and more stable index. This method is used for the current and future versions of this report, and will be applied to the submarket indices as well.

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