PHILADELPHIA HOUSE PRICE INDICES

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These HPIs are current through 2016Q4 only.

"MSA"=Metropolitan Statistical Area, which is the entire 10-county region.

* Empirically estimated by Kevin C. Gillen, Ph.D.

**Courtesy of the Federal Housing Finance Agency (FHFA).
Total House Price Appreciation Rates by Geographic Market

<table>
<thead>
<tr>
<th>Period</th>
<th>Philadelphia County*</th>
<th>Philadelphia MSA**</th>
<th>U.S.A.**</th>
</tr>
</thead>
<tbody>
<tr>
<td>39-Year</td>
<td>430.6%</td>
<td>559.7%</td>
<td>340.2%</td>
</tr>
<tr>
<td>10-Year</td>
<td>25.6%</td>
<td>22.5%</td>
<td>30.8%</td>
</tr>
<tr>
<td>1-Year</td>
<td>-1.2%</td>
<td>8.4%</td>
<td>6.5%</td>
</tr>
<tr>
<td>1-Quarter</td>
<td>-5.7%</td>
<td>2.4%</td>
<td>1.3%</td>
</tr>
</tbody>
</table>

*Empirically estimated by Kevin C. Gillen Ph.D.

**Source: U.S. Federal Housing Finance Agency (FHFA). These numbers are through 2018Q4 only. “MSA”=“Metropolitan Statistical Area”, which is the entire 10-county region.
House Price Appreciation 1987-2019: Philadelphia v. 10-City Composite

*Source: S&P/Case-Shiller. The 10-City Composite index includes Boston, Chicago, Denver, Las Vegas, Los Angeles, Miami, New York, San Diego, San Francisco, and Washington, DC. It does not include Philadelphia.
This chart shows the percent change in the respective house price indices from one year ago, which proxies for the annual average house price appreciation rate in each market.

*Source: S&P/Case-Shiller. The 10-City Composite index includes Boston, Chicago, Denver, Las Vegas, Los Angeles, Miami, New York, San Diego, San Francisco, and Washington, DC. It does not include Philadelphia.
1980Q1=100

* All indices empirically estimated by Kevin C. Gillen, Ph.D.
### Philadelphia House Price Appreciation Rates by Submarket

<table>
<thead>
<tr>
<th></th>
<th></th>
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<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>39-year</td>
<td>548.3%</td>
<td>566.0%</td>
<td>414.3%</td>
<td>509.4%</td>
<td>496.7%</td>
<td>883.5%</td>
<td>717.5%</td>
<td>508.8%</td>
<td>595.0%</td>
</tr>
<tr>
<td>10-year</td>
<td>33.1%</td>
<td>45.7%</td>
<td>31.1%</td>
<td>30.1%</td>
<td>2.8%</td>
<td>66.8%</td>
<td>47.5%</td>
<td>15.9%</td>
<td>45.0%</td>
</tr>
<tr>
<td>1-Year</td>
<td>0.0%</td>
<td>10.6%</td>
<td>8.6%</td>
<td>3.4%</td>
<td>-3.1%</td>
<td>5.7%</td>
<td>-5.3%</td>
<td>4.7%</td>
<td>12.6%</td>
</tr>
<tr>
<td>1-Quarter</td>
<td>-0.6%</td>
<td>6.7%</td>
<td>-0.8%</td>
<td>-8.1%</td>
<td>-7.5%</td>
<td>2.0%</td>
<td>-15.2%</td>
<td>-1.8%</td>
<td>3.0%</td>
</tr>
</tbody>
</table>

This table gives the total % change in average house values by submarket, through 2019 Q1, from different starting points in time.
Median Philadelphia House Price v. Indexed Philadelphia House Price
1980-2019

* Empirically estimated by Kevin C. Gillen, PhD
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*Only arms-length transactions between private sector entities were included in these numbers.
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Philadelphia House Sales in 2019 Q1

Note: Sales are color-coded by the quintiles of the distribution of $Price/SqFt. Hence, each of the five categories covers exactly 20% of all sales.

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Center City House Sales in 2019 Q1

$Price/SqFt

- >$190
- $130-190
- $90-130
- $45-90
- <$45
South Philadelphia House Sales in 2019 Q1

$Price/SqFt

- >$190
- $130-190
- $90-130
- $45-90
- <$45
Kensington/Frankford House Sales in 2019 Q1

$Price/SqFt
- $>190
- $130-190
- $90-130
- $45-90
- <$45
West/SW Philadelphia House Sales in 2019 Q1

$Price/SqFt

- $190
- $130-190
- $90-130
- $45-90
- <$45
North Philadelphia House Sales in 2019 Q1

$Price/SqFt

- >$190
- $130-190
- $90-130
- $45-90
- <$45
Northwest Philadelphia House Sales in 2019 Q1

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Northeast Philadelphia House Sales in 2019 Q1

$Price/SqFt

- $>190
- $130-190
- $90-130
- $45-90
- <$45

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2019 Q1 House Price Rate of Change by Submarket

Upper NE Phila: -1.8%
Lower NE Phila: -0.8%
North Phila: -8.1%
Kensington/Frankford: +6.7%
Center City/Fairmount: -0.6%
South Phila: +2.0%
NW Phila: -7.5%
Univ. City: -15.2%
West/SW Phila: +3.0%

Note: Each submarket is extruded by its average change in house values during 2019 Q1 in order to reflect its growth (or depreciation) rate relative to other neighborhoods.
+$1 Million Dollar House Sales in 2019 Q1

<table>
<thead>
<tr>
<th>PRICE</th>
<th>ADDRESS</th>
</tr>
</thead>
<tbody>
<tr>
<td>$1,000,000</td>
<td>246 LOCUST ST</td>
</tr>
<tr>
<td>$1,000,000</td>
<td>1703 RITTENHOUSE SQ</td>
</tr>
<tr>
<td>$1,050,000</td>
<td>9011 CREFELD ST</td>
</tr>
<tr>
<td>$1,100,000</td>
<td>834 S 02ND ST</td>
</tr>
<tr>
<td>$1,149,995</td>
<td>3213 HAVERFORD AVE</td>
</tr>
<tr>
<td>$1,150,000</td>
<td>2125 GREEN ST</td>
</tr>
<tr>
<td>$1,200,000</td>
<td>8124 SAINT MARTINS LN</td>
</tr>
<tr>
<td>$1,225,000</td>
<td>120 BAINBRIDG ST</td>
</tr>
<tr>
<td>$1,271,000</td>
<td>115 W CHESTNUT AVE</td>
</tr>
<tr>
<td>$1,345,000</td>
<td>2330 PINE ST</td>
</tr>
<tr>
<td>$1,386,000</td>
<td>1930 PINE ST</td>
</tr>
<tr>
<td>$1,400,000</td>
<td>1733 PINE ST</td>
</tr>
<tr>
<td>$1,400,000</td>
<td>636 N 16TH ST</td>
</tr>
<tr>
<td>$1,425,000</td>
<td>741 S 15TH ST</td>
</tr>
<tr>
<td>$1,450,000</td>
<td>2050 LOMBARD ST</td>
</tr>
<tr>
<td>$1,450,000</td>
<td>414 S 46TH ST</td>
</tr>
<tr>
<td>$1,499,000</td>
<td>929 N HANCOCK ST</td>
</tr>
<tr>
<td>$1,500,000</td>
<td>814 S 10TH ST</td>
</tr>
<tr>
<td>$1,525,000</td>
<td>622 SPRUCE ST</td>
</tr>
<tr>
<td>$1,800,000</td>
<td>2206 DELANCEY PL</td>
</tr>
<tr>
<td>$1,825,000</td>
<td>1529 PINE ST</td>
</tr>
<tr>
<td>$3,200,000</td>
<td>528 N 34TH ST</td>
</tr>
</tbody>
</table>
The diffusion index measures how varied the direction of house price changes are across Philadelphia neighborhoods. It is computed as the percent difference between the number of neighborhoods in which prices rose in a given quarter, and the number of neighborhoods in which prices fell. A value of -100% indicates that prices fell in all neighborhoods in a given quarter, while a value of +100% indicates that prices rose in all neighborhoods. A value of 0% indicates that house price changes were evenly split between increases and decreases, across neighborhoods. Diffusion indexes are commonly used in financial economics as a leading indicator of turning points in a market's direction.
This chart compares the Philadelphia House Price Index (in red) to the percent of Philadelphia neighborhoods that experienced house price declines (in blue), in each quarter from 1980-2019.
The Dispersion Index measures how varied house price changes are across the city's neighborhoods. It is computed as the standard deviation of quarterly house prices changes across submarkets. High values of the index imply large variation in house price changes between different neighborhoods, while low values imply that house price changes are relatively the same across the city. High values of the index are often an indicator that the market is reaching a turning point; i.e. a peak or trough.
Philadelphia Housing Affordability* Index: 1980-2019

*Affordability is measured as the ratio of the median Philadelphia house price to the median Philadelphia household income. High values of the index mean that housing has become less affordable to the average Philadelphian. Contact Kevin.C.Gillen@Drexel.edu for details.
Average House Price-to-Rent Ratios*: 1980-2019
Philadelphia v. U.S.

*Computed by taking the ratio of average house price to the average annual rent of a comparable housing unit. The P/R ratio is to real estate what the P/E ratio is to other assets. Contact Kevin.C.Gillen@Drexel.edu for further details.
Inflation-Adjusted* Philadelphia House Price Index 1980-2019
1980Q1=100

*The empirically estimated house price index is deflated by the rate of inflation over time, using the national Consumer Price Index as the proxy for the national rate of inflation. This procedure converts the house price index from "nominal" to "real" terms, and thus shows house price changes net of general inflation.
"%Absorbed" is defined as the percent of homes listed for sale in a given month that also sold in that same month.

Source: Trend MLS
Months Supply of Inventory in Philadelphia

Months Supply of Inventory measures how many months it would take to completely burn off the existing inventory of homes currently listed for sale, given their current pace of sales. 5-7 months is considered a normal, balanced market. More than 7 months indicates a Buyer's market, and less than 5 months indicates a Seller's market.
Average Days-on-Market* for Philadelphia Homes

*Days-on-Market (DOM) is the average number of days it takes for a listed house to sell.

Source: Trend MLS
The Index represents the current sentiment of U.S. homebuilders. The index is computed via a regular monthly survey of homebuilders. An index value above 50 indicates that more builders are optimistic than pessimistic, while an index value below 50 indicates that more builders are pessimistic than optimistic.
The PHLX Housing Sector Index is a modified cap-weighted index composed of 20 companies whose primary lines of business are directly associated with the U.S. housing construction market. The index composition encompasses residential builders, suppliers of aggregate, lumber and other construction materials, manufactured housing and mortgage insurers.

- Single-Family*
- Multifamily**
- Center City Pop.

*Structures with 1-4 dwelling units
**Structures with >=5 dwelling units
***Note: 2019 Numbers are YTD numbers through March 2019.

Sources: U.S. Census, Center City District

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Zillow.com is currently forecasting Philadelphia house prices to rise an average of 8.4% over the course of the next twelve months. This is a substantial downgrade from its previous forecast of 17.3% made three months ago. Curiously (and bizarrely), Zillow also changed its rating of Philadelphia’s housing market temperature from “Warm” to “Very Hot” this past month. It should be noted that Zillow’s forecast for Philadelphia has been consistently and overly optimistic over the course of the past year.

Source: http://www.zillow.com/philadelphia-pa/home-values/