The Housing Confidence Index™

Methodology

March 2018

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Pulsenomics LLC

HCI Methodology

Each Housing Confidence Index (HCI)[1] is a weighted composite measure of three underlying factor sub-indexes, each of which quantify a unique dimension of confidence in the housing market:

- The Housing Market Conditions Index (HMCI)
- The Housing Expectations Index (HEI)
- The Homeownership Aspirations Index (HAI)

HEADLINE INDEX

> **Housing Confidence™ Index**
> (HCI)

INDICATOR INDICES

Housing Market Conditions Index (HMCI)	**Housing Expectations Index** (HEI)	**Homeownership Aspirations Index** (HAI)
25% Weight in HCI	**50% Weight in HCI**	**25% Weight in HCI**
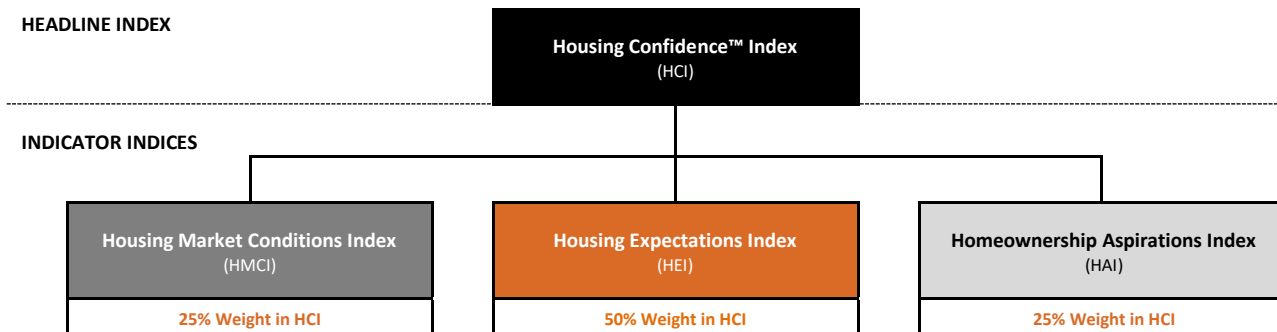
Pulsenomics calculates a headline HCI and the three underlying sub-indexes at national, regional, and individual U.S. metropolitan market levels using more than 700,000 individual consumer responses gathered from each edition of *The U.S. Housing Confidence Survey™* (HCS).[2] In addition headline indices and indicator sub-indices for the total of all surveyed households, Pulsenomics calculates tenure-specific index sets, i.e., *The Homeowner Confidence Index™* (HOCI) and The Renter Confidence Index™ (RCI). Pulsenomics also calculates headline indices and sub-indices for households headed by members of the millennial generation. Each edition of HCI is comprised of 768 index values.[3]

All-Household HCIs

Number of markets:	32	[1 National, 4 Regional, 25 Metro-level, 2 Metro composites]
HCIs:	x 4	[1 Headline HCI, 3 indicator indices (HMCI, HEI, HAI)]
Tenure Categories:	x 3	[All Households, Homeowner Households, Renter Households]
	384	

Millennial Household HCIs

Number of markets:	32	[1 National, 4 Regional, 25 Metro-level, 2 Metro composites]
HCIs:	x 4	[1 Headline HCI, 3 indicator indices (HMCI, HEI, HAI)]
Tenure Categories:	x 3	[All Households, Homeowner Households, Renter Households]
	384	

HCS data are collected and compiled by Pulsenomics as close as possible to each index publication date to enhance the timeliness and currency of HCI.

HCI is computed using a weighted diffusion index methodology. Diffusion indices measure the degree that data are diffused (dispersed) within a sample. Leading U.S. economic data series are commonly summarized or indexed using this approach.[4]

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[1] Pulsenomics®, Housing Confidence Survey™, Housing Confidence Index™, Homeowner Confidence Index™, Renter Confidence Index™, Housing Market Conditions Index™, Housing Expectations Index™, and Homeownership Aspirations Index™ are trademarks of Pulsenomics LLC.

[2] Presently, HCIs are calculated for each of 25 of the largest U.S. metropolitan statistical areas, selected combinations of those MSAs (Composite HCIs), for each of the four major U.S. geographic Regions, and for the nation as a whole (U.S. HCI). Composite HCIs are calculated by combining and balancing selected metro-level HCIs according to the weighting factors provided within the tables presented on pages 7-9.

[3] Prior to 2018, Pulsenomics published 252 index series. In 2018, with the addition of five new metro-area samples and a large nationwide sample, the total number of HCS respondents increased 55%, and Pulsenomics expanded HCI production with newly-added metro-level HCIs, national HCIs, regional HCIs, and millennial HCIs.

[4] A few examples: *The Wells Fargo Homebuilder Confidence Index; The Institute of Supply Management's (ISM) Purchasing Managers' Index; The Conference Board's Consumer Confidence Index, Present Situations Index, and Expectations Index;* and *The University of Michigan's Index of Consumer Sentiment, Index of Current Economic Conditions and Index of Consumer Expectations.*

Each metro-level all-tenure HCI value is based on data compiled from 500 completed HCS questionnaires. Presently, HCI are updated semiannually.

HCI directly reflects what residential real estate stakeholders are thinking about topics that are pertinent to housing market confidence. Table 1 (below) provides an overview of key HCS themes and the factors that comprise HCI components.

Interpreting Housing Confidence Index™ (HCI) values

For any index reporting period:

- An index value exceeding 50 designates a *positive degree of confidence*
- An index value equal to 50 indicates a *neutral degree of confidence*
- An index values less than 50 indicates a *negative degree of confidence*.

The **maximum index value of 100** would indicate maximum confidence (i.e., uniformly positive answers to relevant questions within *The U.S. Housing Confidence Survey™ (HCS)* were provided by respondents); the **minimum index value of 0** would indicate no confidence (i.e., uniformly negative answers to relevant questions within HCS were provided by respondents).

TABLE 1

HCI Indicator (Weight)		Survey Theme (Summary Description)	Factor	Factor Weights: Homeowner Confidence Sub-Index	Renter Confidence Sub-Index
HMCI (25%)	1	**Recent and prevailing home value trends**	• Local home values relative to inflation (past 12 mos)	25%	25%
			• Current direction of local housing market	25%	25%
	2	**Current buying/selling conditions**	• Local market buying conditions assessment	25%	25%
			• Local market selling conditions assessment	25%	25%
HEI (50%)	3	**Expected near- and long-term changes in local home values**	• Near-term: Expected direction and pace of local home value change over the coming 12-month period, relative to expected inflation	10%	10%
			• Long-term: Expected direction and pace of local home value changes over the coming 10-year period, relative to expected inflation	40%	40%
	4	**Affordability of homeownership**	• Confidence re: future affordability of current home	20%	n/a
			• Confidence re: future affordability of homeownership	n/a	20%
	5	**Relative value of homeownership**	• Financial value of homeownership vs. renting	15%	15%
			• Investment value of homeownership vs. other investment options	15%	15%
HAI (25%)	6	**Homeownership aspirations**	Assessment of whether owning a home:		
			• Provides more (or less) freedom than renting	20%	20%
			• Is necessary to live The Good Life and The American Dream	20%	20%
			• Is necessary to achieve social status and earn respect	20%	20%
			• Homeowners planning to buy again in the future	40%	n/a
			• Renters planning to buy within next 5 years	n/a	20%
			• Homeownership mind share among renters	n/a	20%

Compiling and Weighting HCS Data

1. The response data from the completed survey questionnaires from each of the 25 metro area samples are segregated.

2. Using data from the United States Census Bureau, the raw survey data from each metropolitan area sample are weighted to gender, age, race/ethnicity, and tenure.[5] These weights are specific to each metropolitan area, and are applied in order to balance the sample according to the metro area's unique mix of population characteristics and household tenure profile (i.e., owner-occupied and renter-occupied housing).[6]

Computing HCI Factor Diffusion Scores

A raw diffusion score is computed for each applicable HCI factor by analyzing relevant HCS response data. For every completed HCS questionnaire, each survey response that pertains to an HCI factor is classified as a "positive", "negative", or "neutral" contributor to housing confidence. For example, consider the following survey question and response choices:

Right now, would you say the values of homes where you live are… ?

      a.   Going up
      b.   Going down
      c.   Staying the same
      d.   Not sure

For this example, answer choice "a" would be classified as positive; "b" would be classified as negative; and "c" and "d" would be classified as neutral. For each question from the HCS survey instrument that relates to an HCI factor, a diffusion score is derived by adding the percentage of "positive" responses to one-half the percentage of "neutral" responses.

Home Value Change Diffusion Scores

Three HCI factors are derived from each HCS respondent's assessment of the past and current value of **a typical home where the respondent lives**, and his/her expectations for the short-term and long-term future values of that typical home:

- Assessed percentage change over the past 12-month period
- Expected percentage change over the next 12-month period
- Expected average annual percentage change over the next ten-year period

The diffusion scores for these "home value change" factors are calculated as follows:

1. *Past 12-month home value change factor*

   a) A tolerance of plus-minus one-percent (+/- 1%) is applied to the actual inflation rate for the prior 12-month period to establish a tolerance range for the factor.[7] For example, if the actual 12-month inflation rate is 1.5%, the tolerance range is +0.5% to +2.5%.

   b) The survey respondent's assessments of the value of a typical home in his/her market (i) on the survey date and (ii) one year prior to the survey date are used to compute a (past) 12-month percentage change. This percentage change figure is then compared to the tolerance range (established in the preceding step) to determine the diffusion score, i.e., if the past 12-month percentage change:

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[5] The weighting factors used to balance HCS respondent data and compute HCIs are based on demographic and housing tenure data from the American Community Survey (ACS 5-year Estimates). Prior to 2018, these weighting factors were derived from demographic and housing tenure data collected in the 2010 Decennial Census.

[6] A small minority of HCS respondents are boarders (i.e., non-owner adults living in a home and not paying rent) or have some other non-owner tenure status. These non-owners are classified as renters for the purpose of calculating HCIs. Respondent data collected in the national sample (used to produce the U.S. HCIs) are also weighted by geographic region.

[7] This inflation adjustment uses the percentage change in The Consumer Price Index for All Urban Consumers (CPI-U), non-seasonally adjusted, for the previous 12-month period, as last reported by The Bureau of Labor Statistics as of the HCI calculation update date.

- exceeds the upper bound of the tolerance range, the response is classified as "positive"
- is within the range (or equal to a range boundary), the response is classified as "neutral"
- is less than the lower bound of the tolerance range, the response is classified as "negative"

2. *Expected short-term home value change factor*

a) A tolerance of plus-minus one-percent (i.e., +/- 1%) is applied to the prevailing one-year *expected* annual inflation rate to establish a tolerance range for the factor.[8] For example, if the expected one-year annual inflation rate is 2.0%, the tolerance range is +1.0% to +3.0%.

b) The survey respondent's assessment of the value of a typical home in his/her market (i) on the survey date and (ii) his/her expected value of that typical home in one year are used to compute an expected short-term (12-month) home value percentage change. This percentage change figure is then compared to the tolerance range (established in the preceding step) to determine the diffusion score, i.e., if the expected short-term home value percentage change:

- exceeds the upper bound of the tolerance range, the response is classified as "positive"
- is within the range (or equal to a range boundary), the response is classified as "neutral"
- is less than the lower bound of the tolerance range, the response is classified as "negative"

3. *Expected long-term home value change factor*

a) A tolerance of plus-minus one-percent (i.e., +/- 1%) is applied to the prevailing 10-year *expected* annual inflation rate to establish a tolerance range for the factor. For example, if the 10-year expected annual inflation rate is 2.1%, the tolerance range is +1.1% to +3.1%.

b) The survey respondent's assessment of the value of a typical home in his/her market (i) on the survey date and (ii) his/her expected value of that typical home in ten years are used to compute an expected long-term (10-year) average annual home value percentage change. This percentage change figure is then compared to the tolerance range (established in the preceding step) to determine the diffusion score, i.e., if the expected long-term home value percentage change:

- exceeds the upper bound of the tolerance range, the response is classified as "positive"
- is within the range (or equal to a range boundary), the response is classified as "neutral"
- is less than the lower bound of the tolerance range, the response is classified as "negative"

Indicator Sub-Indexes for the U.S., Regions, and Individual Metro Areas

After the raw diffusion scores are computed for all HCI factors for the U.S. and each metropolitan area data set:

1. Each raw diffusion score is aligned with its corresponding survey theme and housing confidence indicator sub-index. For example, the first four HCI factors that appear in Table 1 (page 3) are associated with the "recent and prevailing home value trends" and "current buying/selling conditions" themes, which are components of the Housing Market Conditions (Indicator) Index, or HMCI.

> **Examples:**
>
> *The Las Vegas Housing Market Conditions Index*
> *The San Jose Housing Expectations Index*
> *The Detroit Homeownership Aspirations Index*

2. The applicable HCI factor weights (these appear in the last two columns of Table 1) are then applied to the raw HCI factor diffusion scores to produce a weighted diffusion score for each HCI factor.

3. Each of the three housing confidence indicator sub-indices is computed by adding the weighted diffusion scores of their associated HCI factors.[9]

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[8] The expected annual inflation rate data used to compute the expected home value change factors are calculated and published by The Federal Reserve Bank of Cleveland. For more information, see http://www.clevelandfed.org/research/data/inflation_expectations/

[9] It is not necessary to weight the diffusion scores (or indicator index components) for tenure profile because the raw survey response data are already balanced for this variable at the metro area level during the post-stratification weighting process (see *Compiling and Weighting Housing Confidence Survey Data* on page 4).

4. The sum of the weighted diffusion scores pertaining to each housing confidence indicator index is then multiplied by 100 to determine the index values for each metro area.

5. To compute tenure sub-indices for theses indicator indices, the above four steps are repeated after first segregating the raw diffusion scores according to the tenure category of each survey respondent.

Headline HCI for the U.S., Regions, and Individual Metro Areas

For the U.S. and each metropolitan area, the headline HCI is a simple weighted average of its three housing confidence indicator indices:

> **Example:**
>
> *The Houston Housing Confidence Index*

$$[\ (\textbf{HMCI Value})\ \textbf{x}\ (W_{HMCI})\ ]\ +\ [\ (\textbf{HEI Value})\ \textbf{x}\ (W_{HEI})\ ]\ +\ [\ (\textbf{HAI Value})\ \textbf{x}\ (W_{HAI})\ ]$$

Where (W_{HMCI}) is the weight assigned to the Housing Market Conditions Indicator Index (25%);
(W_{HEI}) is the weight assigned to the Housing Expectations Indicator Index (50%); and
(W_{HAI}) is the weight assigned to the Housing Aspirations Indicator Index (25%)

Headline Tenure Sub-Indices for the U.S., Regions, and Individual Metro Areas

For each of the three housing confidence indicator indices:

1. The raw diffusion score associated with each HCI factor for each of the homeowner and renter sub-samples is multiplied by the applicable factor weight (see last two columns of Table 1 on page 3), and

> **Examples:**
>
> *The Houston Homeowner Confidence Index*
> *The Houston Renter Confidence Index*

2. The resulting weighted diffusion scores for each tenure sub-sample are separately added, and then each multiplied by 100 to determine the associated headline tenure (homeowner and renter) sub-index values for each metro area

Composite Indices (Composite 25 and Composite 20)

- **Composite Indicator Indices**

1. For each metro area included in a composite index, the housing confidence indicator index values are multiplied by the applicable metro area occupied housing unit weight[10]

> **Examples:**
>
> *The Composite-25 Housing Market Conditions Index*
> *The Composite-25 Housing Expectations Index*
> *The Composite-25 Homeownership Aspirations Index*

2. The weighted Housing Market Conditions Index values (calculated in the preceding step) for the metropolitan markets that comprise the composite HCI are summed to produce the (composite) Housing Expectations Index

3. The weighted Housing Expectations Index values (calculated in Step 1) for the metropolitan markets that comprise the composite HCI are summed to produce the (composite) U.S. Housing Expectations Index

4. The weighted Housing Aspirations Index values (calculated in Step 1) for the metropolitan markets that comprise the composite HCI are summed to produce the (composite) U.S. Housing Aspirations Index

- **Composite Headline HCIs**

1. The headline HCI values for each metro area included in a composite index are multiplied by the applicable metro area occupied housing unit weight

> **Example:**
>
> *The Composite-25 Housing Confidence Index*

2. The weighted headline HCI values (calculated in the preceding step) for the metropolitan markets that comprise the composite HCI are summed to produce the headline (composite) Housing Confidence Index

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[10] The *occupied* housing unit weights are derived from tenure data for occupied housing units per United States Census data. The weighting factors used to compute HCIs are based on demographic and housing tenure data from the American Community Survey (ACS 5-year Estimates). Prior to 2018, these weighting factors were derived from demographic and housing tenure data collected in the 2010 Decennial Census. The occupied housing unit weights are calculated by dividing the number of occupied housing units in each metro area by the total number of occupied housing units across all metro areas that comprise the composite HCI.

Tables 2 and 3 contain the weights used for calculating the Composite 25 HCI and Composite 20 HCI (for all households), respectively; Table 4 summarizes occupied housing and population statistics for the four U.S. Census Regions; Table 5 contains the weights used for calculating the Composite Millennial HCIs.

TABLE 2

Composite 25 Metro Area Markets and Weights	OCCUPIED HOUSING UNITS						TENURE %			
United States:	Total Occupied Units		Owner Occupied		Renter Occupied		Owner Occupied	Renter Occupied	Population	
	117,716,237		74,881,068		42,835,169		63.6%	36.4%	318,558,162	
		% of 25 MSAs		% of 25 MSAs		% of 25 MSAs				% of U.S.
Atlanta-Sandy Springs-Marietta, GA	1,994,730	4.3%	1,256,680	4.6%	738,050	3.9%	63.0%	37.0%	5,612,777	1.8%
Boston-Cambridge-Quincy, MA-NH	1,784,448	3.8%	1,093,867	4.0%	690,581	3.6%	61.3%	38.7%	4,728,844	1.5%
Chicago-Joliet-Naperville, IL-IN-WI	3,464,942	7.5%	2,224,493	8.1%	1,240,449	6.5%	64.2%	35.8%	9,528,396	3.0%
Columbus, OH	764,973	1.6%	467,399	1.7%	297,574	1.6%	61.1%	38.9%	1,995,004	0.6%
Dallas-Fort Worth-Arlington, TX	2,451,163	5.3%	1,463,344	5.3%	987,819	5.2%	59.7%	40.3%	6,957,123	2.2%
Denver-Aurora-Broomfield, CO	1,058,467	2.3%	670,010	2.4%	388,457	2.0%	63.3%	36.7%	2,752,056	0.9%
Detroit-Warren-Livonia, MI	1,672,081	3.6%	1,147,048	4.2%	525,033	2.8%	68.6%	31.4%	4,296,731	1.3%
Houston-Sugar Land-Baytown, TX	2,223,829	4.8%	1,338,745	4.9%	885,084	4.7%	60.2%	39.8%	6,482,592	2.0%
Indianapolis-Carmel, IN	749,799	1.6%	485,120	1.8%	264,679	1.4%	64.7%	35.3%	1,968,768	0.6%
Las Vegas-Henderson-Paradise, NV	735,475	1.6%	384,653	1.4%	350,822	1.9%	52.3%	47.7%	2,070,153	0.6%
Los Angeles-Long Beach-Santa Ana, CA	4,298,857	9.3%	2,080,647	7.6%	2,218,210	11.7%	48.4%	51.6%	13,189,366	4.1%
Miami-Fort Lauderdale-Pompano Beach, FL	2,065,161	4.4%	1,241,162	4.5%	823,999	4.3%	60.1%	39.9%	5,926,955	1.9%
Minneapolis-St. Paul-Bloomington, MN-WI	1,343,140	2.9%	936,169	3.4%	406,971	2.1%	69.7%	30.3%	3,488,436	1.1%
New York-Northern New Jersey-Long Island, NY-NJ-PA	7,138,559	15.4%	3,676,358	13.4%	3,462,201	18.3%	51.5%	48.5%	20,031,443	6.3%
Orlando-Kissimmee-Sanford, FL	816,428	1.8%	491,490	1.8%	324,938	1.7%	60.2%	39.8%	2,328,508	0.7%
Philadelphia-Camden-Wilmington, PA-NJ-DE-MD	2,235,205	4.8%	1,506,528	5.5%	728,677	3.8%	67.4%	32.6%	6,047,721	1.9%
Phoenix-Mesa-Glendale, AZ	1,596,641	3.4%	980,338	3.6%	616,303	3.3%	61.4%	38.6%	4,486,153	1.4%
Saint Louis, MO-IL	1,107,468	2.4%	764,153	2.8%	343,315	1.8%	69.0%	31.0%	2,803,449	0.9%
San Antonio-New Braunfels, TX	786,156	1.7%	488,203	1.8%	297,953	1.6%	62.1%	37.9%	2,332,345	0.7%
San Diego-Carlsbad-San Marcos, CA	1,103,128	2.4%	581,348	2.1%	521,780	2.8%	52.7%	47.3%	3,253,356	1.0%
San Francisco-Oakland-Fremont, CA	1,674,040	3.6%	898,959	3.3%	775,081	4.1%	53.7%	46.3%	4,577,530	1.4%
San Jose-Sunnyvale-Santa Clara, CA	643,969	1.4%	365,130	1.3%	278,839	1.5%	56.7%	43.3%	1,943,107	0.6%
Seattle-Tacoma-Bellevue, WA	1,417,727	3.1%	847,801	3.1%	569,926	3.0%	59.8%	40.2%	3,671,095	1.2%
Tampa-St. Petersburg-Clearwater, FL	1,161,839	2.5%	742,415	2.7%	419,424	2.2%	63.9%	36.1%	2,927,714	0.9%
Washington-Arlington-Alexandria, DC-VA-MD-WV	2,155,967	4.6%	1,358,259	4.9%	797,708	4.2%	63.0%	37.0%	6,011,752	1.9%
Occupied Housing Units in the 25 MSAs (#)	46,444,192	100%	27,490,317	100%	18,953,875	100%	59.2%	40.8%	129,411,374	40.6%
% of U.S. Total	39.5%		36.7%		44.2%		Avg Tenure % in the 25 MSAs		Population in the 25 MSAs	

Data Source: United States Census, 2012-2016 American Community Survey 5-Year Estimates

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TABLE 3

Composite 20 Metro Area Markets and Weights	OCCUPIED HOUSING UNITS						TENURE %		Population	
	Total Occupied Units		Owner Occupied		Renter Occupied		Owner Occupied	Renter Occupied		
United States:	117,716,237		74,881,068		42,835,169		63.6%	36.4%	318,558,162	
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Occupied Housing Units in the 20 MSAs (#)	41,103,007	100%	24,219,361	100%	16,883,646	100%	58.9%	41.1%	114,304,157	35.9%
% of U.S. Total	34.9%		32.3%		39.4%		**Avg Tenure % in the 20 MSAs**		**Population in the 20 MSAs**	

(Left vertical label: COMPOSITE 20 METRO AREA COMPONENTS)

Data Source: United States Census, 2012-2016 American Community Survey 5-Year Estimates

TABLE 4

Regional Markets and Weights	OCCUPIED HOUSING UNITS						TENURE %		Population	
	Total Occupied Units		Owner Occupied		Renter Occupied		Owner Occupi	Renter Occupi		
United States:	117,716,237		74,881,068		42,835,169		63.6%	36.4%	318,558,162	
		% of U.S.		% of U.S.		% of U.S.				% of U.S.
Northeast	21,076,561	17.9%	13,045,807	17.4%	8,030,754	18.7%	61.9%	38.1%	56,065,769	17.6%
Midwest	26,334,492	22.4%	17,853,429	23.8%	8,481,063	19.8%	67.8%	32.2%	67,676,480	21.2%
South	44,105,282	37.5%	28,585,236	38.2%	15,520,046	36.2%	64.8%	35.2%	119,755,723	37.6%
West	26,199,902	22.3%	15,396,596	20.6%	10,803,306	25.2%	58.8%	41.2%	75,060,190	23.6%

(Left vertical label: U.S. REGIONS)

Data Source: United States Census, 2012-2016 American Community Survey 5-Year Estimates

Composition of the four U.S. Census Regions

Region 1: **Northeast**
Division 1: New England *(Connecticut, Maine, Massachusetts, New Hampshire, Rhode Island, and Vermont)*
Division 2: Mid-Atlantic *(New Jersey, New York, and Pennsylvania)*

Region 2: **Midwest**
Division 3: East North Central *(Illinois, Indiana, Michigan, Ohio, and Wisconsin)*
Division 4: West North Central *(Iowa, Kansas, Minnesota, Missouri, Nebraska, North Dakota, and South Dakota)*

Region 3: **South**
Division 5: South Atlantic *(Delaware, Florida, Georgia, Maryland, North Carolina, South Carolina, Virginia, District of Columbia, and West Virginia)*
Division 6: East South Central *(Alabama, Kentucky, Mississippi, and Tennessee)*
Division 7: West South Central *(Arkansas, Louisiana, Oklahoma, and Texas)*

Region 4: **West**
Division 8: Mountain *(Arizona, Colorado, Idaho, Montana, Nevada, New Mexico, Utah, and Wyoming)*
Division 9: Pacific *(Alaska, California, Hawaii, Oregon, and Washington)*

TABLE 5

Weights for Composite Millennial HCI	OCCUPIED HOUSING UNITS			TENURE %	
	Total Occupied Units	Owner Occupied	Renter Occupied	OWNER	RENTER
United States - All Households:	117,716,237	74,881,068	42,835,169	63.6%	36.4%
United States - Millennial-headed households:	22,530,680	7,342,870	15,187,810	32.6%	67.4%
% of Households headed by a Millennial:	19.1%	9.8%	35.5%		

OCCUPIED HOUSING UNITS HEADED BY MILLENNIALS

METRO AREA COMPONENTS FOR COMPOSITE MILLENNIAL HCI	Total Occupied Units #	% of 20 MSAs	% of 25 MSAs	Owner Occupied #	% of 20 MSAs	% of 25 MSAs	Renter Occupied #	% of 20 MSAs	% of 25 MSAs	OWNER	RENTER
Atlanta-Sandy Springs-Marietta, GA	397,693	5.2%	4.5%	127,895	5.9%	5.0%	269,798	4.9%	4.3%	32.2%	67.8%
Boston-Cambridge-Quincy, MA-NH	326,208	4.2%	3.7%	90,674	4.2%	3.6%	235,534	4.3%	3.7%	27.8%	72.2%
Chicago-Joliet-Naperville, IL-IN-WI	665,493	8.6%	7.5%	219,371	10.1%	8.6%	446,122	8.1%	7.0%	33.0%	67.0%
Columbus, OH	178,083	n/a	2.0%	56,590	n/a	2.2%	121,493	n/a	1.9%	31.8%	68.2%
Dallas-Fort Worth-Arlington, TX	560,678	7.3%	6.3%	161,085	7.4%	6.3%	399,593	7.2%	6.3%	28.7%	71.3%
Denver-Aurora-Broomfield, CO	240,842	3.1%	2.7%	81,903	3.8%	3.2%	158,939	2.9%	2.5%	34.0%	66.0%
Detroit-Warren-Livonia, MI	273,080	3.5%	3.1%	111,575	5.1%	4.4%	161,505	2.9%	2.5%	40.9%	59.1%
Houston-Sugar Land-Baytown, TX	500,576	n/a	5.6%	155,006	n/a	6.1%	345,570	n/a	5.4%	31.0%	69.0%
Indianapolis-Carmel, IN	164,975	n/a	1.9%	61,199	n/a	2.4%	103,776	n/a	1.6%	37.1%	62.9%
Las Vegas-Henderson-Paradise, NV	151,731	2.0%	1.7%	43,034	2.0%	1.7%	108,697	2.0%	1.7%	28.4%	71.6%
Los Angeles-Long Beach-Santa Ana, CA	796,291	10.3%	9.0%	143,740	6.6%	5.7%	652,551	11.8%	10.3%	18.1%	81.9%
Miami-Fort Lauderdale-Pompano Beach, FL	303,289	3.9%	3.4%	82,123	3.8%	3.2%	221,166	4.0%	3.5%	27.1%	72.9%
Minneapolis-St. Paul-Bloomington, MN-WI	287,958	3.7%	3.2%	123,662	5.7%	4.9%	164,296	3.0%	2.6%	42.9%	57.1%
New York-Northern New Jersey-Long Island, NY-NJ-PA	1,178,493	15.3%	13.3%	245,612	11.3%	9.7%	932,881	16.8%	14.7%	20.8%	79.2%
Orlando-Kissimmee-Sanford, FL	165,477	n/a	1.9%	45,898	n/a	1.8%	119,579	n/a	1.9%	27.7%	72.3%
Philadelphia-Camden-Wilmington, PA-NJ-DE-MD	386,219	5.0%	4.3%	136,168	6.3%	5.4%	250,051	4.5%	3.9%	35.3%	64.7%
Phoenix-Mesa-Glendale, AZ	332,322	4.3%	3.7%	106,893	4.9%	4.2%	225,429	4.1%	3.6%	32.2%	67.8%
Saint Louis, MO-IL	212,063	2.8%	2.4%	87,052	4.0%	3.4%	125,011	2.3%	2.0%	41.1%	58.9%
San Antonio-New Braunfels, TX	168,617	n/a	1.9%	51,625	n/a	2.0%	116,992	n/a	1.8%	30.6%	69.4%
San Diego-Carlsbad-San Marcos, CA	240,280	3.1%	2.7%	47,927	2.2%	1.9%	192,353	3.5%	3.0%	19.9%	80.1%
San Francisco-Oakland-Fremont, CA	308,725	4.0%	3.5%	62,725	2.9%	2.5%	246,000	4.4%	3.9%	20.3%	79.7%
San Jose-Sunnyvale-Santa Clara, CA	120,646	1.6%	1.4%	25,633	1.2%	1.0%	95,013	1.7%	1.5%	21.2%	78.8%
Seattle-Tacoma-Bellevue, WA	316,422	4.1%	3.6%	88,502	4.1%	3.5%	227,920	4.1%	3.6%	28.0%	72.0%
Tampa-St. Petersburg-Clearwater, FL	190,708	2.5%	2.1%	53,997	2.5%	2.1%	136,711	2.5%	2.2%	28.3%	71.7%
Washington-Arlington-Alexandria, DC-VA-MD-WV	419,618	5.4%	4.7%	131,361	6.1%	5.2%	288,257	5.2%	4.5%	31.3%	68.7%
Occupied Housing Units (Composite-20 MSAs, #)	7,708,759	100%	n/a	2,170,932	100%	n/a	5,537,827	100%	n/a	28.2%	71.8%
Occupied Housing Units (Composite-25 MSAs, #)	8,886,487	n/a	100%	2,541,250	n/a	100%	6,345,237	n/a	100%	28.6%	71.4%

Data Source: United States Census, 2012-2016 American Community Survey 5-Year Estimates

Note: The housing unit data presented in this table correspond to 2016 United States Census counts of households headed by individuals under 35 years of age. For metropolitan statistical areas, The Census Bureau reports household tenure data by a limited number of static age ranges. Although age cohorts that comprise a given generation catgeory--such as "millennials"--can evolve with each passing year, these data are the most authoritative available for the purpose of weighting the components of the Composite Millennial HCI.

- **Indicator Tenure Sub-Indices**

  Homeowners

1. For each metro area surveyed, the homeowner sub-index value pertaining to each of the three indicator HCIs is multiplied by the applicable metro area owner-occupied housing unit weight[11]

   | **Examples:** |
   | *The Composite-25 Homeowner Market Conditions Index* |
   | *The Composite-25 Homeowner Expectations Index* |
   | *The Composite-25 Homeowner Aspirations Index* |

2. To compute the U.S. Homeowner Market Conditions Index, the weighted Housing Market Conditions homeowner sub-index values (calculated in the preceding step) are added for all metropolitan markets surveyed

3. To compute the U.S. Homeowner Expectations Index, the weighted Housing Expectations homeowner sub-index values (calculated in Step 1) are added for all metropolitan markets surveyed

4. To compute the U.S. Homeowner Aspirations Index, the weighted Homeownership Aspirations homeowner sub-index values (calculated in Step 1) are added for all metropolitan markets surveyed

   Renters

1. For each metro area surveyed, the renter sub-index value pertaining to each of the three indicator HCI is multiplied by the applicable metro area renter-occupied housing unit weight[12]

   | **Examples:** |
   | *The Composite-20 Renter Market Conditions Index* |
   | *The Composite-20 Renter Expectations Index* |
   | *The Composite-20 Renter Aspirations Index* |

2. To compute the U.S. Renter Market Conditions Index, the weighted Housing Market Conditions renter sub-index values (calculated in the preceding step) are added for all metropolitan markets surveyed

3. To compute the U.S. Renter Expectations Index, the weighted Housing Expectations renter sub-index values (calculated in Step 1) are added for all metropolitan markets surveyed

4. To compute the U.S. Renter Aspirations Index, the weighted Homeownership Aspirations renter sub-index values (calculated in Step 1) are added for all metropolitan markets surveyed

- **Headline Tenure Indices**

  Homeowners

1. The headline homeowner sub-index values for each metro area are multiplied by the applicable metro area *owner-occupied* housing unit weight

   | **Example:** |
   | *The Composite-25 Homeowner Confidence Index* |

2. The weighted homeowner sub-index values (calculated in the preceding step) are added for all metropolitan markets surveyed

   Renters

1. The headline renter sub-index values for each metro area are multiplied by the applicable metro area *renter-occupied* housing unit weight

   | **Example:** |
   | *The Composite-20 Renter Confidence Index* |

2. The weighted renter sub-index values (calculated in the preceding step) are added for all metropolitan markets surveyed

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[11] The *owner-occupied* housing unit weights are derived from tenure data for owner-occupied housing units per the United States Census. The weighting factors used to compute HCIs are based on demographic and housing tenure data from the American Community Survey (ACS 5-year Estimates).

[12] The *renter-occupied* housing unit weights are derived from tenure data for renter-occupied housing units per the United States Census. The weighting factors used to compute HCIs are based on demographic and housing tenure data from the American Community Survey (ACS 5-year Estimates).