Housing Vulnerability Cluster Analysis

Data used, all data at the census tract level:

Variable	Description	Year, Source
Density	Number of housing units per acre of land	2010 Census
Median Year Built	Median year that housing units in the tract were built	2009-2014 ACS
Homes Lacking Plumbing	Percent of housing units lacking full plumbing facilities (hot and cold running water, a flush toilet, a bathtub or shower, and a sink with a faucet)	2009-2014 ACS
Mobile Homes	Percent of housing units that are mobile homes	2009-2014 ACS
Vacancy	Percent of housing units that are vacant	2010 Census
2nd Homes	Percent of housing units that are vacant because they are not the primary residence	2009-2014 ACS
Owner to Renter Ratio	Ratio of housing units occupied by owners to those occupied by renters	2010, Census
Median Home Value	Median value of homes occupied by owners	2009-2014 ACS
Median Gross Rent	Median gross rent paid by renters	2009-2014 ACS
Median Year Owners Moved In	Median year owners moved into their homes	2009-2014 ACS
Median Year Renters Moved In	Median year renters moved into their homes	2009-2014 ACS
Home Purchase Loans	Number of approved loans for home purchases divided by the number of housing units in the tract	2012-2014 HMDA

Method of analysis:

We conducted a k-means cluster analysis using the "cluster kmeans" command in the Stata software program. All of the variables listed above were standardized to z-scores with zero means and unit variances to avoid any confounding effects that might arise from using variables of different magnitudes in the analysis. We ran the cluster command setting the number of clusters to 30. We repeated the cluster command 500 times using a different set of randomly selected initial values for each run and selected the run with the smallest SSE for this map. For each of the 30 clusters we reviewed each cluster's prototype and made a determination of vulnerability based on the prototype's full characterization. While the clusters are numbered for identification purposes, the numbers themselves have no significance.