

Technical Memorandum to MARC’s Modification of Up for Growth’s Housing Underproduction

Data Sources, Years and Geographies

This analysis primarily relies on publicly available data from the U.S. Census Bureau that is available and updated annually so that a consistent methodology can be applied for each year of the estimates and for future reports. The main source of data was the Census Bureau’s American Community Survey 1-year samples.

The unit of geography in this study is the Kansas City, MO-KS Metropolitan Statistical Area (MSA). Up for Growth’s (UFG) analysis covers the entire nation and is divided into 309 metro regions and 505 non-metro regions. For this reason, UFG used the Census Bureau’s Public Use Microdata (PUMS) samples and Public Use Microdata Areas (PUMAs). The PUMS data is released yearly and is presented at region, division, state and PUMA geographies. MARC was unable to use this same approach due to PUMAs changing geography every 10 years and not precisely nesting to the Kansas City MSA. The objective of MARC’s analysis is to compare the housing underproduction each year over a long period of time, which would not be possible using the PUMAs.

Calculating Underproduction

Step 1: Determining the Target Units

To gauge underproduction, headship rates across age cohorts were analyzed using ACS 1-year data, compared against a benchmark derived from the 2000 decennial census data. The headship rate is computed by dividing the number of heads of households within a specific age cohort by the total population within the same age cohort. The age groups analyzed are 15 to 24, 25 to 34, 35 to 44, and 45 to 54. These initial calculations rely on decennial census 2000 tables P12 (sex by age), P21 (household type by age of householder), and ACS tables B01001 (sex by age) and B25007 (tenure by age of householder).

Each data point from the ACS 1-year dataset is contrasted with the 2000 figures. If the headship rate in an ACS year is lower, "missing households" are computed by multiplying the ACS total population by the 2000 headship rate and then deducting this from the actual number of households. For instance:

Age group (25 to 34)	2015	2000
Headship rate	0.47	0.502
Head of households	138,562	130,110
Population	290,413	259,073

Expected households: $290,413 \times 0.502 = 145,787$

Missing households: $145,787 - 138,562 = 7,225$

The missing number of households across each age group are totaled to ascertain the overall missing households for a given year.

Subsequently, the total actual number of households is augmented by the missing households, and a 5% vacancy rate is applied. This yields the "ideal" number of households for a specific year.

(Total missing households + total existing households) * 1.05 vacancy rate

Step 2: Assessing the Housing Stock for Occupancy

Next, we estimate the count of viable units available and suitable for occupancy. This involves excluding seasonal/vacation homes and vacant units lacking plumbing and kitchen facilities from the total unit count.

Seasonal/vacation homes are identified using ACS table B25004 (vacancy status), under the variable "for seasonal, recreational, or occasional use."

Identifying vacant units without plumbing and kitchen facilities is a more complex process. While one could cross-tabulate using PUMS data to find vacant units AND no kitchen AND no plumbing, this approach is hindered by the aforementioned issues (changing and nonnesting PUMA geography). Instead, MARC adopted an alternative approach, utilizing PUMS data to gauge the prevalence of vacant housing units without a kitchen or plumbing as derived from the ACS.

For each study year, PUMS data is acquired and aggregated to account for vacant units lacking plumbing, those lacking kitchen facilities, and those lacking both. A ratio is then established using the formula:

$(\text{Vacant units with no kitchen nor plumbing}) \div (\text{vacant units no plumbing} + \text{vacant units no kitchen})$

This ratio is then applied to the count of vacant units lacking plumbing and those lacking kitchen facilities. While not readily available in an ACS table, data on plumbing and kitchen facilities can be obtained from sources such as plumbing by tenure (B25049), kitchen by tenure (B25053), plumbing for all housing units (B25047), and kitchen for all housing units (B25051). A calculation for vacant units can be derived by subtracting occupied housing units (both owner-occupied and renter-occupied) from the total housing units.

For instance:

All housing units lacking plumbing - (owner occupied units lacking plumbing + renter occupied units lacking plumbing)

The final step involves subtracting the count of obsolete or uninhabitable units (vacation homes and vacant units lacking kitchen or plumbing) from the "ideal" households, as determined in the previous step. This yields an estimate of the housing unit underproduction within the area.

Instead, MARC used the PUMS data to weight vacant housing units derived from the ACS.

For each study year, PUMS data is downloaded and summed for vacant units with no plumbing, vacant units with no kitchen, and vacant units with no plumbing nor kitchen. A ratio was developed by using the following formula:

$\text{Vacant units with no kitchen nor plumbing} \div (\text{vacant units no plumbing} + \text{vacant units no kitchen})$

This ratio is applied against a count of vacant units with no plumbing and vacant units with no kitchen. These data aren't immediately available in an ACS table, but there are data on plumbing by tenure (B25049), kitchen by tenure (B25053), plumbing for all housing units (B25047), and kitchen for all housing units (B25051). A vacant units tabulation can be calculated by subtracting the occupied housing units (owner + renter in B25049 and owner + renter in B25053) from all housing units (B25047 and B25051).

For example:

All housing units lacking plumbing - (owner-occupied units lacking plumbing + renter-occupied units lacking plumbing)

The final calculation takes the "ideal" households (calculated in the prior step) and subtracts the obsolete or uninhabitable units (vacation + vacant no kitchen/plumbing). This results in an estimate of the underproduction of housing units in the area.