2. CONSIDERATIONS WHEN WORKING WITH ACS DATA

Considerations When Working With ACS Data

Rural and other sparsely populated areas have unique characteristics that can lead to challenges for American Community Survey (ACS) data users.

Many micropolitan counties and counties outside of metropolitan and micropolitan statistical areas do not meet the 65,000-population threshold required for ACS 1-year estimates. In 2018, 114 out of 661 micropolitan counties (17.2 percent) and only 3 out of 1,321 counties outside of metropolitan and micropolitan statistical areas (0.2 percent) received 1-year estimates (see Table 2.1). By contrast, roughly three in five (58.2 percent) metropolitan counties received 1-year estimates. ACS 5-year estimates are available for all counties, regardless of population size or OMB classification.

Table 2.1. **Availability of ACS Estimates for Counties in Metropolitan Statistical Areas, Micropolitan Statistical Areas, and Counties Outside of Metropolitan/Micropolitan Statistical Areas**

	All U.S. counties		Counties inside metropolitan statistical areas		Counties inside micropolitan statistical areas		Counties outside metropolitan and micropolitan statistical areas	
	Number	Percent	Number	Percent	Number	Percent	Number	Percent
5-year estimates available	3,220	100.0	1,238	100.0	661	100.0	1,321	100.0
1-year Supplemental estimates available (20,000+ population)	1,910	59.3	1,050	84.8	548	82.9	312	23.6
1-year estimates available (65,000+ population)	838	26.0	721	58.2	114	17.2	3	0.2

Note: Data include Puerto Rico.
Source: U.S. Census Bureau, 2018 American Community Survey, Tables B01003 and K200101, <https://data.census.gov>; and August 2017 Delineation Files for core-based statistical areas, <www.census.gov/geographies/reference-files/time-series/demo/metro-micro/delineation-files.html>.

Most county subdivisions (such as townships, other types of minor civil divisions, and census county divisions) and places (cities and towns) also rely on 5-year estimates. As Table 2.2 shows, 97 percent of the nearly 37,000 county subdivisions only receive 5-year estimates annually, as do 92 percent of the almost 30,000 incorporated and census designated places.

Table 2.2. **Availability of ACS Estimates for County Subdivisions and Places**

	County subdivisions (townships and other minor civil divisions)		Places (incorporated places and census designated places)	
	Number	Percent	Number	Percent
5-year estimates available	36,630	100.0	29,573	100.0
1-year Supplemental estimates available (20,000+ population)	1,186	3.2	2,323	7.9
1-year estimates available (65,000+ population)	226	0.6	630	2.1

Note: Data include Puerto Rico.
Source: U.S. Census Bureau, Areas Published, <www.census.gov/programs-surveys/acs/geography-acs/areas-published.html>.

ACS 5-year estimates require some considerations that 1-year estimates do not. For example, multiyear estimates released in consecutive years consist mostly of overlapping shared data. For example, ACS estimates from 2013–2017 and 2014–2018 share sample data for the years 2014, 2015, 2016, and 2017. As a result, it is best for users to work with nonoverlapping estimates (for example, comparing 2009–2013 estimates with those from the 2014–2018 period) to assess change over time in rural communities.

Five-year estimates also provide less current information because they are based on both data from the previous year and data that are 2 to 5 years old. For rural areas undergoing minimal change, using the "less current" multiyear estimates may not have a substantial influence on the estimates. However, in areas experiencing major changes over a given time period, the multiyear estimates may be quite different from the single-year estimates for any of the individual years.

ACS estimates have a degree of uncertainty associated with them, called sampling error, because they are based on a sample. In general, the larger the sample, the smaller the level of sampling error. Rural communities tend to have smaller samples than large cities, so the "margin of error"—a measure of the precision of an estimate at a given level of confidence—likely will be larger for rural areas. The U.S. Census Bureau provides margins of error at the 90 percent level of confidence for each published ACS estimate. (For more information about sampling error, see the section on "Understanding Error and Determining Statistical Significance" in the Census Bureau's handbook on *Understanding and Using American Community Survey Data: What All Data Users Need to Know*.[8])

Suppose a data user is interested in homeownership rates for Pike and Martin Counties in eastern Kentucky. While both 1-year Supplemental and 5-year estimates are available for Pike County (population 58,000), only ACS 5-year estimates are available for Martin County (population 11,000).[9] As Table 2.3 shows, the margin of error for the percentage of owner-occupied units in 2014–2018 was 1.8 in Pike County but was more than twice that in Martin County (5.2). By comparison, the margin of error for the homeownership rate was just 0.5 for Jefferson County, Kentucky, which had a population of more than 750,000.

Yet, there are strategies that data users can use to improve estimates for rural areas—either by combining

[8] U.S. Census Bureau, *Understanding and Using American Community Survey Data: What All Data Users Need to Know*, <www.census.gov/programs-surveys/acs/guidance/handbooks/general.html>.

[9] U.S. Census Bureau, Population Division, 2018 Population Estimates. The estimated 2018 population for Pike County was listed as 58,402, while Martin County's estimated 2018 population stood at 11,323.

Table 2.3. **Percentage of Owner-Occupied Housing Units in Pike, Martin, and Jefferson Counties in Kentucky: 2014–2018**

	Pike County, Kentucky	Martin County, Kentucky	Jefferson County, Kentucky
Estimate	72.6	72.3	61.7
Margin of error (+/-)	1.8	5.2	0.5
Confidence interval (90% level)	70.8 to 74.4	67.1 to 77.5	61.2 to 62.2

Source: U.S. Census Bureau, 2014–2018 American Community Survey, 5-Year Estimates, Table DP04, <https://data.census.gov>.

data across geographic areas or by consolidating data for population subgroups. For example, Table 2.4 shows homeownership levels in the five-county Big Sandy Area Development District in eastern Kentucky—a region that includes Pike and Martin Counties from the previous example (also see Figure 3.4 for an image of the area). As Table 2.4 shows, the margin of error for the five-county area (1.3) is lower than the error margins for any of the five individual counties (ranging from 1.8 to 5.2).

Table 2.4. **Percentage of Owner-Occupied Housing Units in Big Sandy Area Development District, Kentucky: 2014–2018**

	Estimate	Margin of error (+/-)
Floyd County	70.4	2.3
Johnson County	72.3	3.3
Magoffin County	71.2	3.8
Martin County	72.3	5.2
Pike County	72.6	1.8
Combined five-county area (Big Sandy Area)	**71.9**	**1.3**

Source: U.S. Census Bureau, 2014–2018 American Community Survey, 5-Year Estimates, Table DP04, <https://data.census.gov>.

When producing such custom estimates by combining data across geographic areas, the user must calculate the associated margins of error for those new estimates, as described in the section on "Calculating Measures of Error for Derived Estimates" in the Census Bureau's handbook on *Understanding and Using American Community Survey Data: What All Data Users Need to Know*.[10]

[10] U.S. Census Bureau, *Understanding and Using American Community Survey Data: What All Data Users Need to Know*, <www.census.gov/programs-surveys/acs/guidance/handbooks/general.html>.

Special Considerations for Areas With Large Seasonal Populations

TIP: The fact that the ACS collects data throughout the calendar year and counts residents at their "current residence" (provided their stay exceeds, or will exceed, 2 months) can present additional challenges for rural (and other) communities that have large seasonal populations—in particular, college towns and resort areas. Users need to exercise caution when analyzing data for such areas—especially when looking at estimates for such characteristics as housing vacancy or income/poverty status.

For example, Appalachian State University is located in Boone, North Carolina—a town of about 20,000 people.[11] As Table 2.5 shows, Boone's poverty rate for people aged 3 and over was approximately 56 percent in 2014–2018—more than four times the national average. A closer look, however, shows that about eight in 10 poor people in Boone were enrolled in college, graduate, or professional school. Removing the university student population reduces the town's poverty rate to less than 24 percent—much closer to the national average.

[11] U.S. Census Bureau, Population Division, 2018 Population Estimates. The town of Boone is part of the Boone, North Carolina Micropolitan Statistical Area.

Table 2.5. **Poverty Status of People Aged 3 and Over in Boone, North Carolina, and the United States by School Enrollment Status: 2014–2018**

	Boone, North Carolina		United States	
	Estimate	Margin of error (+/-)	Estimate	Margin of error (+/-)
All people aged 3 and over for whom poverty status is determined	13,154	376	303,463,789	19,661
Number below poverty level	7,363	513	41,756,137	259,564
Percent below poverty level	56.0	3.6	13.8	0.1
People (aged 3 and over) enrolled in college, graduate, or professional school	6,852	601	19,769,916	58,240
Number below poverty level	5,855	531	4,259,802	19,121
Percent below poverty level	85.4	2.0	21.5	0.1
People (aged 3 and over) NOT enrolled in college, graduate, or professional school	6,302	593	283,693,873	198,706
Number below poverty level	1,508	356	37,496,335	162,730
Percent below poverty level	23.9	5.2	13.2	0.1

Source: U.S. Census Bureau, 2014–2018 American Community Survey, 5-Year Estimates, Table B14006, <https://data.census.gov>.

Nantucket County, Massachusetts (population 11,198 in 2018), provides another example.[12] ACS 5-year data for 2014–2018 show that 69.5 percent of Nantucket's housing was vacant, compared with just 12.2 percent of housing nationwide (see Table 2.6). Further examination, however, reveals that more than 90 percent of Nantucket's vacant units were designated for seasonal or occasional use, reflecting the county's status as a vacation hub. Nationwide, almost one-third (32.8 percent) of vacant units were designated for such use. As in the previous example, it is important to pay attention to the circumstances of small geographic areas when using ACS data.

[12] U.S. Census Bureau, Population Division, Vintage 2019 Population Estimates.

Table 2.6. **Vacancy Status of Housing Units in Nantucket County, Massachusetts, and the United States: 2014–2018**

	Nantucket County, Massachusetts		United States	
	Estimate	Margin of error (+/-)	Estimate	Margin of error (+/-)
Total housing units	12,191	60	136,384,292	6,639
Number of vacant housing units	8,469	246	16,654,164	226,286
Percentage of all housing units that are vacant	69.5	2.0	12.2	0.2
Number of vacant housing units designated for seasonal, recreational, or occasional use	7,677	267	5,465,886	40,538
Percentage of vacant housing units designated for seasonal, recreational, or occasional use	90.6	1.7	32.8	0.5

Source: U.S. Census Bureau, 2014–2018 American Community Survey, 5-Year Estimates, Tables DP04 and B25004, <https://data.census.gov>.