

Understanding and Using American Community Survey Data

What the Business Community Needs to Know

Issued October 2020



U.S. Department of Commerce
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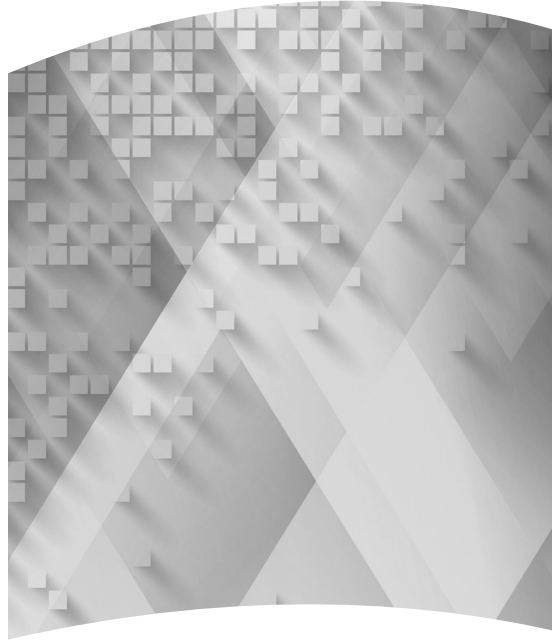
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UNDERSTANDING AND USING AMERICAN COMMUNITY SURVEY DATA: WHAT THE BUSINESS COMMUNITY NEEDS TO KNOW

Suppose a restaurant owner wants to determine the best location to start a new franchise. Managers at an engineering firm want to expand their business but need more information about the local workforce. A clothing retailer needs information about potential customers before opening a new store, distribution center, or warehouse. Where can businesses find the data they need to make informed decisions?

The U.S. Census Bureau's American Community Survey (ACS) provides corporations, small businesses, and individuals the detailed social, economic, housing, and demographic data they need to gauge the sales potential of products and services, better understand the workforce, and set strategies for growth.

This guide provides a brief overview of how businesses are using ACS data to stay competitive, run efficiently, and meet customers' needs. For many business applications, the focus is not on the ACS data themselves but on marketing products built from them. Many third-party data providers incorporate ACS data into business-friendly products, maps, and reports that help businesses with site selection, consumer segmentation, inventory and category management, and other strategies. But whether the focus is on ACS data accessed from the Census Bureau's Web site or derived, third-party products, business users should be aware of the opportunities and challenges presented by ACS data—particularly when working with data for small geographic areas.

What Is the ACS?

The ACS is a nationwide survey designed to provide communities with reliable and timely social, economic, housing, and demographic data every year. A separate annual survey, called the Puerto Rico Community Survey (PRCS), collects similar data about the population and housing units in Puerto Rico. The Census Bureau uses data collected in the ACS and the PRCS

to provide estimates on a broad range of population, housing unit, and household characteristics for states, counties, cities, school districts, congressional districts, census tracts, block groups, and many other geographic areas.

The ACS has an annual sample size of about 3.5 million addresses, with survey information collected nearly every day of the year. Data are pooled across a calendar year to produce estimates for that year. As a result, ACS estimates reflect data that have been collected over a period of time rather than for a single point in time as in the decennial census, which is conducted every 10 years and provides population counts as of April 1 of the census year.

ACS 1-year estimates are data that have been collected over a 12-month period and are available for geographic areas with at least 65,000 people. Starting with the 2014 ACS, the Census Bureau also produces "1-year Supplemental Estimates"—simplified versions of popular ACS tables—for geographic areas with at least 20,000 people. The Census Bureau combines 5 consecutive years of ACS data to produce multiyear estimates for geographic areas with fewer than 65,000 residents. These 5-year estimates represent data collected over a period of 60 months.

For more detailed information about the ACS—how to judge the accuracy of ACS estimates, understanding multiyear estimates, knowing which geographic areas are covered in the ACS, and how to access ACS data on the Census Bureau's Web site—see the Census Bureau's handbook, *Understanding and Using American Community Survey Data: What All Data Users Need to Know*.¹

¹ 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>.

1. HOW BUSINESSES USE ACS DATA

Using ACS Estimates for Site Selection

Businesses need up-to-date information about their potential customers before creating a new business or expanding an existing one. Site selection—the evaluation of business needs measured against the merits of potential locations—is a complex process that requires detailed information about local communities. As the premier source of social, economic, housing, and demographic estimates for local areas, the American Community Survey (ACS) provides businesses with a wealth of free information that they can use for selecting a new location or for evaluating the performance of existing locations:

- Social and economic characteristics (e.g., educational attainment, employment status, language spoken at home, and income).
- Housing characteristics (e.g., homeownership, housing costs, average household size, age of housing, and computer/Internet use).
- Demographic characteristics (e.g., age, sex, and family structure).

Many businesses also need workers with specific degrees and need to know where those workers live, how long it takes them to get to work, and whether they drive or take public transportation. The ACS provides detailed information about the population and workforce in local communities that can help businesses choose appropriate locations for a new store, office, or warehouse, including:

- Labor force status (e.g., employment, unemployment, and full-time/part-time status).
- Means of transportation to work and travel time to work.
- Income and occupation (e.g., household income, earnings, occupation, and industry).
- Education (e.g., highest level of education and field of bachelor's degree).

Some businesses analyze ACS data directly to inform decisions about site selection, but third parties often help businesses access the ACS data that they need. For example, the Greater Houston Partnership uses ACS data to help businesses understand how Houston's population is changing and to encourage economic development.² In Maryland, the Charles

² U.S. Census Bureau, *Stats in Action: Greater Houston Partnership Uses ACS Data, 2011*, <www.census.gov/library/video/sia_greater_houston.html>.

County Department of Economic Development analyzes ACS data to help local businesses make informed decisions that could increase sales, add jobs, and expand operations.³ The U.S. Census Bureau's State Data Centers can also help businesses access ACS and other data for decision-making.⁴

Because ACS data for small geographic areas (such as census tracts, which generally have a population size between 1,200 and 8,000 people) are only available in the form of 5-year estimates, many businesses rely on proprietary single-year estimates and 5-year demographic projections for these areas provided by private sector marketing information firms. For example, to select the best site for expansion, a business may prefer to analyze estimates of the number of households with children for block groups (statistical divisions of census tracts that typically contain between 600 and 3,000 people) in 2019 combined with projections of the number of such households in 2024, rather than rely on ACS estimates of households with children in 2014–2018. Single-year estimates are particularly important for areas experiencing recent growth or decline, but year-to-year changes are difficult to discern with 5-year estimates. While most private-sector data suppliers acknowledge the use and value of ACS data in the production of their proprietary demographic estimates and projections, many businesses that use these data are unaware of the important contribution of ACS estimates to these products.

For more information about ACS multiyear estimates, see the section on “Understanding and Using ACS Single-Year and Multiyear Estimates” in the Census Bureau's handbook, *Understanding and Using American Community Survey Data: What All Data Users Need to Know*.⁵

Using ACS Estimates for Consumer Segmentation

ACS estimates are also used for consumer segmentation—the process of dividing potential customers into groups, or segments, based on their distinctive characteristics. Consumer segmentation data provide businesses with unique insights into customer lifestyles and behaviors, and how they vary across different communities. They help businesses find their “ideal

³ Charles County Department of Economic Development *Charles County by the Numbers*, <www.meetcharlescounty.com/charles-county-by-the-numbers/>.

⁴ U.S. Census Bureau, State Data Center (SDC) Program, <www.census.gov/about/partners/sdc.html>.

⁵ 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>.

customers” and determine the best ways to market specific products and services to them. Community segmentation profiles can also help businesses understand why some existing or potential locations may perform better than others.

Consumer segmentation systems are widely used in the private sector because they enable more precise identification and targeting of potential customers than demographic data alone. Data are often provided for very small geographic areas—such as ZIP codes—and may be derived from a combination of ACS estimates and data from other public and private sources.⁶ However, given the proprietary nature of these systems, the exact role of ACS data in the production of these systems is unclear.

For more information about how businesses use ACS data, see the U.S. Department of Commerce report *The Value of the American Community Survey: Smart Government, Competitive Businesses, and Informed Citizens*.⁷

Using ACS Estimates for Small Geographic Areas

Businesses often need data for very small areas, and the ACS is the most authoritative source of annual small-area estimates available. However, because the ACS is based on a sample, rather than on all housing units and people, ACS estimates have a degree of uncertainty associated with them, called sampling error.

TIP: Sampling error is minimal for large geographic areas and population groups, but there may be large errors associated with estimates based on a small subset of the sample.

The suitability of ACS estimates for businesses depends on the application and the level of certainty required.

Some businesses may use ACS estimates for individual block groups or markets consisting of one or a few block groups. For example, a fast-food business might consider the size and characteristics of the population in a three-block group area to be critical to the success of a location. However, ACS estimates on age, income, and employment may be too uncertain to support a decision to establish a franchise at that location. Data users should examine the margins of error (MOEs) reported for the geographic areas they use to gauge

⁶ See, for example, Esri, Tapestry Segmentation, <www.esri.com/landing-pages/tapestry>; and Claritas, ZIP code Look-up, <<https://claritas360.claritas.com/mybestsegments/#zipLookup>>.

⁷ U.S. Department of Commerce, Economics & Statistics Administration, 2015, *The Value of the American Community Survey: Smart Government, Competitive Businesses, and Informed Citizens*, <www.commerce.gov/news/reports/2015/05/value-american-community-survey-smart-government-competitive-businesses-and>.

the level of uncertainty involved. If geographic areas are aggregated together, data users should calculate and examine the MOE for the derived estimate.

Many third-party data suppliers do not report MOEs with their ACS-based estimates and may further adjust ACS estimates to match single-year population and housing unit control totals. Therefore, the uncertainty around these custom estimates may be considerably greater than that of the original ACS estimates from which they are derived.

In the absence of data on individual consumers, businesses may sometimes use block group characteristics as a proxy. For example, a publisher might have the name, address, and billing history of current subscribers to one magazine but need to append income, presence of children, and education data to these subscriber records to target prospects for a new publication. Because each subscriber’s address corresponds to a block group, the publisher might infer these characteristics based on the characteristics of the block groups where subscribers live. This approach is error prone even if block group data are perfectly accurate, and the error associated with ACS estimates adds additional uncertainty.

For these reasons, many businesses tap the resources of household-level databases that are available from commercial suppliers. These databases have their own errors and often include a limited number of variables, so the temptation to use the characteristics of individual block groups persists.

However, ACS estimates for block groups have a high degree of uncertainty. The ACS might indicate that 58 percent of households in a block group have a child when the (unknown) reality is only 29 percent. Clearly, it would be a mistake to market to this block group as one with many children. But marketing efforts are not confined to a single block group, and a business might conclude that, across thousands of block groups, inferences of this type might work well enough to outperform alternatives such as targeting based on county data or untargeted blanket mailings. It is up to individual businesses to know the requirements of their applications, and to understand the limitations of ACS data before committing to applications of this type.

For more information about sampling error in the ACS, see the chapters on “Understanding Error and Determining Statistical Significance” and “Calculating Measures of Error for Derived Estimates” in the Census Bureau’s handbook, *Understanding and Using American Community Survey Data: What All Data Users Need to Know*.⁸

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>.

Using ACS Data on Population and Housing Counts

Many businesses, such as commercial developers, seek areas of rapid population and housing growth for their untapped potential and attractive demographics.

TIP: Data users need to understand that the ACS was designed to provide estimates of the characteristics of the population, not to provide counts of the population in different geographic areas or population subgroups.

Therefore, data users are encouraged to rely more upon noncount statistics, such as percent distributions or averages, when using ACS estimates.

The Census Bureau's Population Estimates Program produces and disseminates the official estimates of the population for the nation, states, counties, cities and towns, and estimates of housing units for states and counties.⁹ For 2010 and other decennial census years, the decennial census provides the official counts of population and housing units.¹⁰

As with most household surveys, the ACS data are controlled so that the numbers of housing units and people in certain categories agree with the Census Bureau's official estimates from the Population Estimates Program. The ACS uses a weighting method to ensure that ACS estimates are consistent with official Census Bureau population estimates by age, sex, race, and Hispanic origin—as well as with estimates of total housing units. ACS estimates are controlled to official population and housing units at the county level. ACS single-year estimates are controlled to population and housing unit estimates as of July 1 of the survey year, while ACS 5-year estimates are controlled to the average of the July 1 population and housing unit estimates over the 5-year period.¹¹

Starting with the 2009 survey, ACS estimates of the total population of incorporated places (self-governing cities, towns, or villages) and minor civil divisions (such as townships) are also adjusted so that they are consistent with official population estimates.

However, ACS data for small statistical areas (such as census tracts and block groups) have no control totals,

⁹ Census Bureau, Population and Housing Unit Estimates, <www.census.gov/programs-surveys/popest.html>.

¹⁰ See, for example, the U.S. Census Bureau, Census of Population and Housing, CPH-2, Population and Housing Unit Counts report series, <www.census.gov/prod/www/decennial.html>.

¹¹ In order for the ACS to make use of the best available population estimates as controls, the multiyear weighting uses the population estimates of the most recent vintage—or version—for all years in the period in order to derive the multiyear controls.

which may lead to errors in the population and housing unit estimates. In such cases, data users are again encouraged to rely more upon noncount statistics, such as percent distributions or averages. Many businesses also rely on third-party private organizations to provide them with value-added ACS data for these small geographic areas.

For more information about ACS methods, visit the Census Bureau's Design and Methodology Report Web page.¹²

Using ACS Estimates as Building Blocks for Larger Geographic Areas

Applications that use small areas as building blocks to form business-specific trade areas should be well served by ACS data. Companies may use data supplied by private organizations to examine demographic data for custom areas such as 3-mile radii around store locations, 20-minute drive times to bank branches, or telecommunications service areas.

In some cases, data users will need to construct custom ACS estimates by combining data across multiple geographic areas or population subgroups, or it may be necessary to derive a new percentage, proportion, or ratio from published ACS data.

TIP: One way to address the issue of unreliable estimates for individual census tracts or block groups is to aggregate geographic areas, yielding larger samples and more reliable estimates.

In such cases, additional calculations are needed to produce MOEs and standard errors (SEs), and to conduct tests of statistical significance for the derived estimates. For more information, see the section on "Calculating Measures of Error for Derived Estimates" in the Census Bureau's handbook, *Understanding and Using American Community Survey Data: What All Data Users Need to Know*.¹³

¹² U.S. Census Bureau, American Community Survey Design and Methodology Report, <www.census.gov/programs-surveys/acs/methodology/design-and-methodology.html>.

¹³ 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>.

2. ACS DATA PRODUCTS FOR BUSINESS USES

Census Business Builder

In September 2015, the U.S. Census Bureau launched a new data product for the business community: Census Business Builder.¹⁴ As its name implies, Census Business Builder is designed for users needing data to help start or grow a business or to better understand an area's business landscape. The data can be used in determining potential locations for new businesses or in creating a business plan for investors.

There are two editions of Census Business Builder: the Small Business Edition and the Regional Analyst Edition.¹⁵

The Small Business Edition was developed primarily for small business owners who need data for their business plans or to better understand their potential market, but large businesses can also find data for their industries by using the Search tool. The tool includes the following data:

- Social, economic, housing, and demographic data from the ACS.
- Business data from the County Business Patterns, Nonemployer Statistics, the Economic Census, and the Survey of Business Owners.
- Labor force data from the Quarterly Workforce Indicators program.

¹⁴ U.S. Census Bureau, Census Business Builder (CBB), <www.census.gov/data/data-tools/cbb.html>.

¹⁵ U.S. Census Bureau, Census Business Builder: Small Business Edition - 3.1.0, <<https://cbb.census.gov/sbe/#>>; and Regional Analyst Edition - 3.1.0, <<https://cbb.census.gov/rae/#>>.

- Employment and Wages data from the Bureau of Labor Statistics' Quarterly Census of Employment and Wages.
- Imports and Exports data from the International Trade program.
- Consumer spending data from Esri (a company that provides GIS mapping software).
- Farms data from the Census of Agriculture, USDA.

In July 2017, a new feature was added that allows users to upload and map their own data. More information about uploading data and instructions are available on the Census Business Builder Web page.¹⁶

The Small Business Edition provides easy access to information about potential customers and similar businesses. For example, the map and data dashboard displayed in Figure 2.1 present information about the share of adults with a bachelor's degree or higher in Fairfax County, Virginia, and other counties in the Washington, DC, area combined with other social, economic, and housing data from the ACS and data on the total number of Systems Design establishments (businesses providing IT expertise). The variable displayed on the map can be changed using the Map Variables menu on the top toolbar, and the Filter menu allows the user to identify specific areas that meet their own criteria. Data in the map can be downloaded as an Excel, .csv, or shapefile using the download button located in the upper right corner of the map.

¹⁶ U.S. Census Bureau, Census Business Builder (CBB), <www.census.gov/data/data-tools/cbb.How_Tos.html>.

Why this tool may be right for you	Why you may want to consider another tool
You want to open a new business or expand an existing business.	The data are limited to states, counties, places, ZIP codes, and census tracts.
The tool combines American Community Survey (ACS) data with economic data to guide your research.	Results include only a subset of all ACS topics.
Interactive maps allow you to select areas and compare results to those of neighboring areas.	
Reports are downloadable and printable.	

The interactive and customizable dashboard includes charts that show historical data for many of the mapped data variables as well as a comparison of the selected area to the state and nation (see Figure 2.2). Users can change map variables in the dashboard by

clicking the edit icons (pencils) located below each statistic on the right side of the dashboard.

After exploring the data on the map, users can also create Local Business Profile reports (by clicking the Create Report link) that include all the map variables.

Figure 2.1. Sample Map From Census Business Builder: Small Business Edition

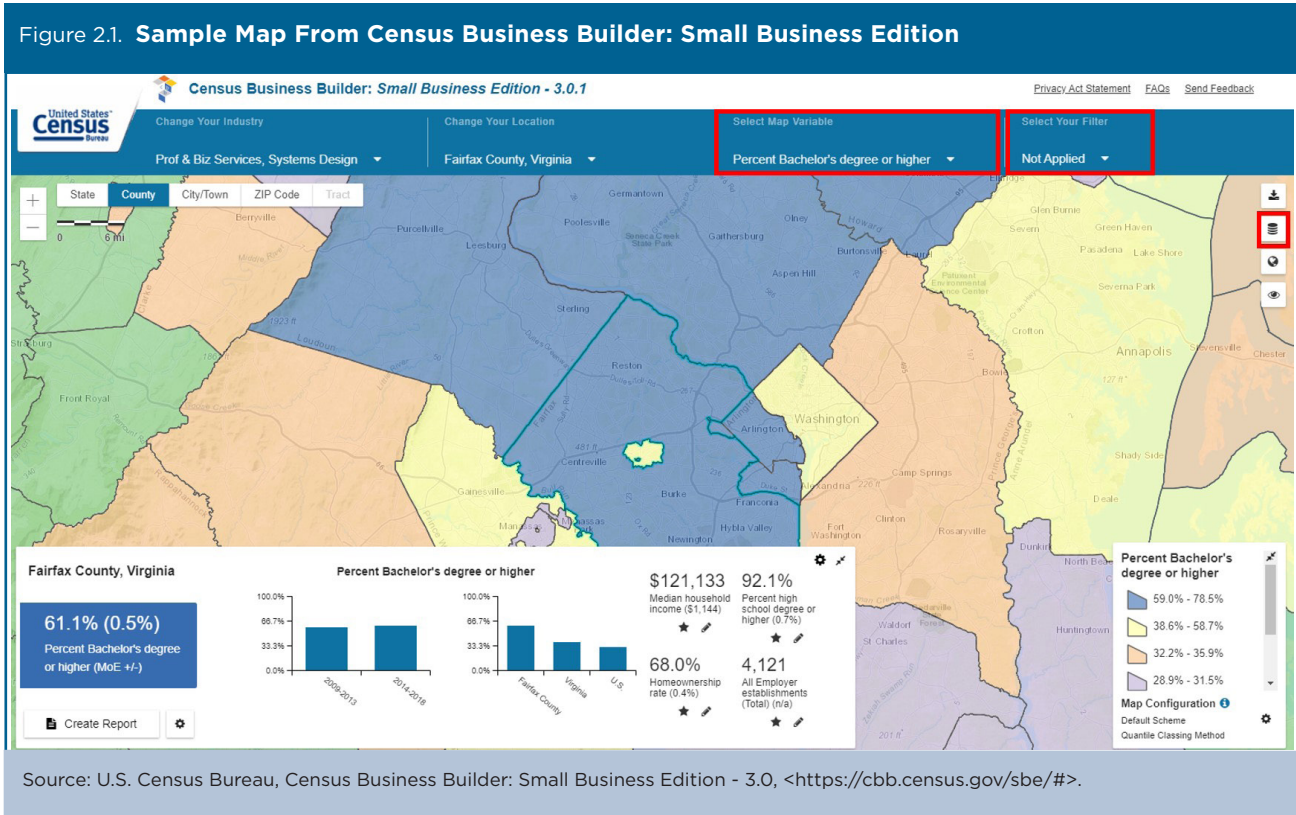
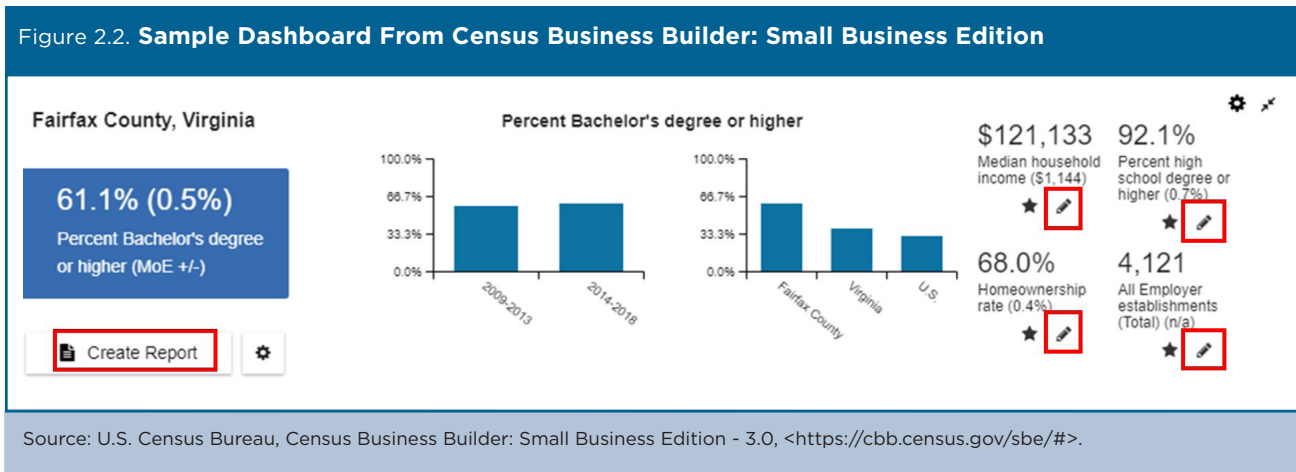


Figure 2.2. Sample Dashboard From Census Business Builder: Small Business Edition



Users can click on “My Potential Customers” on the left side of the page to display demographic, socio-economic, and housing estimates for the selected geographic area (see Figure 2.3). Reports are also available on Businesses and Consumer Spending. Users can display margins of error for estimates by checking the box at the top of the page.

The demographic and consumer spending data are available at the state, county, city/town, ZIP code, and census tract levels; economic data are available at the state, county, and city/town levels; and agriculture and trade data are available at the state level only.

The “ZIP code” data in Census Business Builder combine ZIP code Tabulation Area (ZCTA) data from the ACS with ZIP code data from other sources. ZCTAs are aggregations of census blocks that form “generalized areal representations of United States Postal Service (USPS) ZIP code service areas.”¹⁷ Many businesses use data for ZIP codes to design marketing campaigns

¹⁷ U.S. Census Bureau, ZIP code Tabulation Areas (ZCTAs), <www.census.gov/programs-surveys/geography/guidance/geo-areas/zctas.html>.

based on the characteristics of people living in different mail delivery areas.

USPS ZIP codes represent a collection of mail delivery routes rather than geographic areas with clear boundaries. While ZIP codes for sets of mailing addresses may be changed every year by USPS, the Census Bureau only updates ZCTA definitions periodically. For example, the most recent ZCTA definitions are from 2010. In contrast, many private data suppliers update their ZIP code definitions/areas at least once a year.

The Regional Analyst Edition of Census Business Builder was developed primarily for chambers of commerce, regional planners, and others who need a broader portrait of the people and businesses in their service area. It presents data for all sectors of the economy and for user-defined regions based on combinations of states, counties, cities/towns, ZIP codes, and tracts. You can also build regions by combining different types of geographic areas.



A sample map showing the percentage of individuals with a bachelor's degree or higher for the Washington, DC Metro area that was created with the Regional Analyst Edition is shown in Figure 2.4.

The Regional Analyst Edition includes the same interactive and customizable data dashboard, download options, and map features as the Small Business Edition.

Data.census.gov and Other Data Sources

Businesses with occasional or limited data needs will be well served by the prepackaged ACS data products available through data.census.gov—the Census Bureau's primary tool for accessing data from the ACS, the Puerto Rico Community Survey, the decennial census, and many other Census Bureau data sets.¹⁸ Data.census.gov provides access to ACS data for a wide range of geographic areas, including states, cities, counties, census tracts, and block groups.

Many ACS products available through data.census.gov function best as a lookup tool. If data users have a few areas in mind and want specific data and maps for those areas, they can access the relevant ACS product. For example, a small Des Moines-based retailer could go to

data.census.gov and obtain selected Detailed Tables, Data Profiles, and Subject Tables for the Sioux City, Omaha, and Lincoln metropolitan areas to determine which area is the best candidate for an initial expansion.

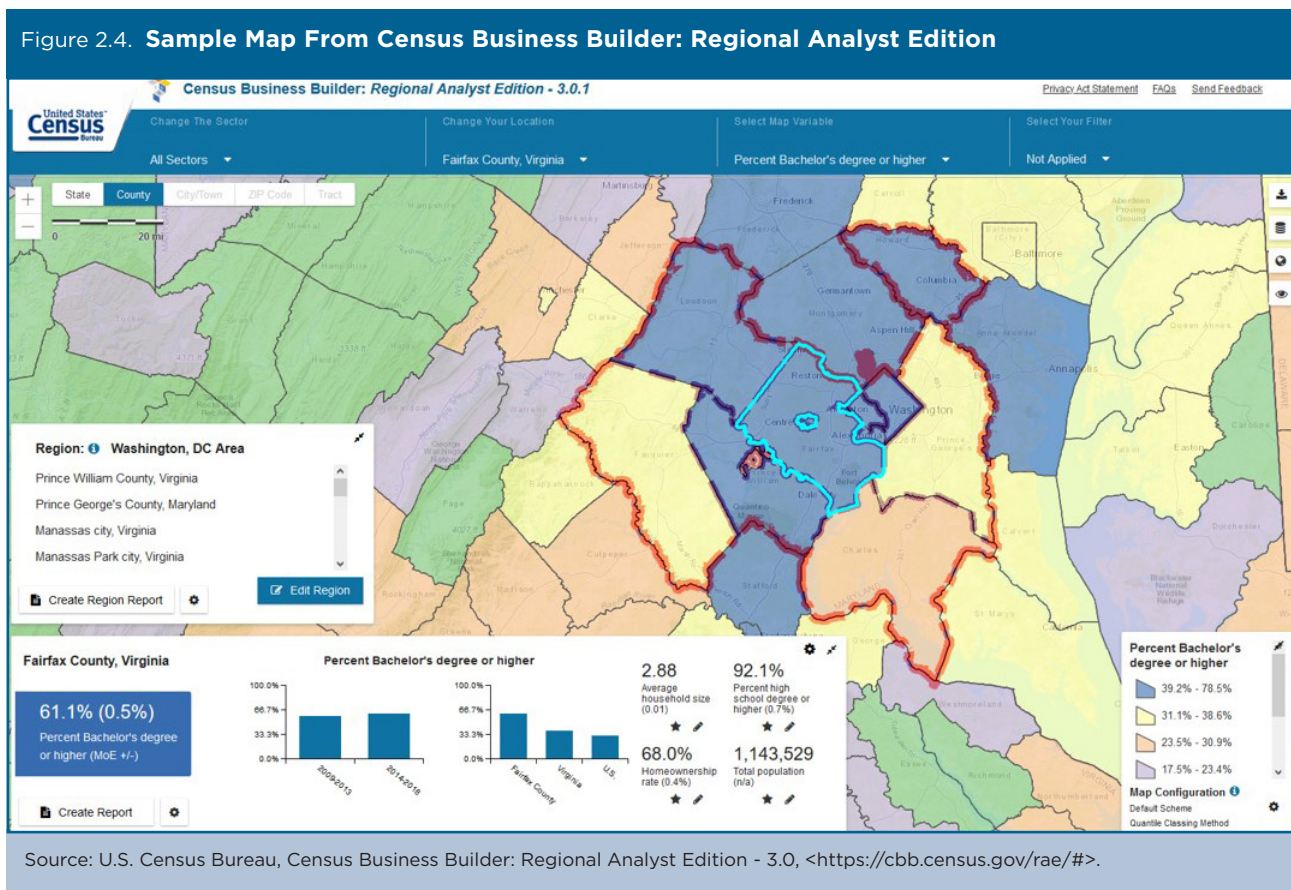
Other business users may need to access ACS estimates for many geographic areas across the country. For example, a real estate firm could download ACS data every year to help monitor the demographics in a large number of sites defined as aggregations of block groups. A financial services provider with data on the age and mortgage status of its customers might use ACS Public Use Microdata Sample data to build a model estimating the likelihood that its customers have children approaching college age. Or a business might use ACS data on housing costs as a percentage of income to identify neighborhoods where homeowners face difficulty in making house payments.

These more advanced users also have several options to access more detailed ACS data through downloadable Summary Files, the Public Use Microdata Sample Files, or the Census Bureau's Application Programming Interface (API).¹⁹

¹⁸ U.S. Census Bureau, data.census.gov, <<https://data.census.gov>>.

¹⁹ U.S. Census Bureau, American Community Survey (ACS), Summary File Data, <www.census.gov/programs-surveys/acs/data/summary-file.html>; American Community Survey (ACS), Accessing PUMS Data, <www.census.gov/programs-surveys/acs/microdata/access.html>; Developers, <www.census.gov/developers/>.

Figure 2.4. Sample Map From Census Business Builder: Regional Analyst Edition



Source: U.S. Census Bureau, Census Business Builder: Regional Analyst Edition - 3.0, <<https://cbb.census.gov/rae/#>>.

3. CASE STUDIES USING ACS DATA

Case Study #1: San Diego Region: City Data Profile

Skill Level: Introductory/Intermediate

Subject: County- and city-level demographic and socioeconomic data

Type of Analysis: Analysis and visualization of American Community Survey (ACS) data trends across the nation, state, county, and subcounty areas

Tools Used: Data.census.gov, spreadsheet, data visualization tools

Authors: Marcela Alvarez, Research Coordinator, San Diego Regional Economic Development Center (EDC); and Kirby Brady, Research Director, San Diego Regional EDC

San Diego Regional Economic Development Corporation (EDC) uses a multitude of publicly available data sets coupled with visualization software to create powerful economic development tools that provide clarity and insight into the region’s demographic and economic landscape. As part of a greater initiative to uncover and highlight subregional trends within the county, EDC produced a demographic and socioeconomic profile for the City of San Marcos, California. This profile and accompanying online interactive dashboard were created to better inform business leaders, other decision makers, and the public about the city’s social, economic, and demographic characteristics. City-level data can be compared with data for the county, state, and nation to provide additional context.

We used data from the U.S. Census Bureau’s American Community Survey (ACS) and Longitudinal Employer-Household Dynamics (LEHD) program to inform parts of the profile (see Table 3.1). The Census Bureau releases single-year ACS data for geographic areas with 65,000 people or more. Since the City of San Marcos—the smallest geographic area under consideration—meets this threshold, we were able to use 1-year estimates throughout the analysis. EDC recognizes that all estimates have an associated level of uncertainty. However, after careful consideration, margins of error were not included in the profile.

Other data sources used in the profile include the San Diego Association of Governments, Emsi (a labor market analytics firm), the State of California Employment Development Department, and ReferenceUSA.

Table 3.1. List of Key Variables and Data Sources

Variable	Data Set
Median household income	ACS 1-Year Estimates
Population below poverty level	ACS 1-Year Estimates
Educational attainment	ACS 1-Year Estimates
Field of bachelor’s degree	ACS 1-Year Estimates
Median income by industry	ACS 1-Year Estimates
Work destination	LEHD OnTheMap
Distance to work	LEHD OnTheMap

To obtain the desired data, use the data.census.gov “Advanced Search” option, as follows:

- Go to the data.census.gov Web site at <https://data.census.gov>.
- Select “Advanced Search” below the search bar (see Figure 3.1).

Figure 3.1. **Selecting Advanced Search in Data.census.gov**



Source: U.S. Census Bureau, data.census.gov, <https://data.census.gov>.

- Select “Geography” in the navigation pane on the left side of the screen to display a list of available geographies (see Figure 3.2).
- Select “Place,” then “California.” From here, you can scroll to select “San Marcos city, California” or you can use the magnifying glass icon to search for places within California. This geography will appear in the “Selected Filters” at the bottom of the page.

Figure 3.2. **Selecting Geographic Areas in Data.census.gov**

The screenshot displays the 'Advanced Search' page on data.census.gov. The interface is divided into several sections:

- Navigation:** The top left features the 'United States Census Bureau' logo and a search bar.
- Breadcrumbs:** Below the logo, it shows '// Search / Advanced Search'.
- Search Input:** A large text field for 'Table ID (e.g., DP05)' is present.
- Filter Section:** Titled 'Narrow search with filters', it includes a 'FIND A FILTER' search bar with the example text 'e.g. 336111 - Automobile Manufacturing'.
- Filter Categories:**
 - BROWSE FILTERS:** A vertical list on the left with 'Geography' highlighted by a red circle.
 - GEOGRAPHY:** A list of geographic levels including 'Place', which is highlighted by a red circle.
 - WITHIN (STATE):** A list of states including 'California', which is highlighted by a red circle.
 - CALIFORNIA:** A list of specific geographic components within California, with 'San Marcos city, California' checked and highlighted by a red circle.
- Selected Filters:** A bar at the bottom left shows 'San Marcos city, California' as the selected filter.
- Actions:** Buttons for 'CLEAR FILTERS', 'SEARCH', and 'MORE' are located at the bottom right.

Source: U.S. Census Bureau, data.census.gov, <<https://data.census.gov>>.

- Use the Geography filter to add the United States, California, and San Diego County to your selections. At the end of this step, you should have four geographic areas specified in your “Selected Filters” (see Figure 3.3).
- Then click on the “Years” filter and select “2017.” The year “2017” should appear next to the previously selected geographic areas in “Selected Filters.” For the purposes of this case study, we used 2017 because they were the most recent data available at the time.)

Figure 3.3. Selecting Years and Verifying Selected Filters in Data.census.gov

The screenshot shows the Data.census.gov interface. At the top, there is a search bar and the United States Census Bureau logo. Below the search bar, the text "Narrow search with filters" and "FIND A FILTER" is displayed. A search input field contains "e.g. 336111 - Automobile Manufacturing". On the left, under "BROWSE FILTERS", the "Years" filter is highlighted. In the "YEARS" column, the year "2017" is selected with a checkmark. At the bottom, the "Selected Filters" section shows a list of filters: "United States", "California", "San Diego County, California", "San Marcos city, California", and "2017". Each filter has a small 'x' icon to remove it. To the right of the filters are "CLEAR FILTERS" and "SEARCH" buttons.

Source: U.S. Census Bureau, data.census.gov, <<https://data.census.gov>>.

- Since we are interested in the city's socioeconomic characteristics, we begin by searching for information about educational attainment. Select “Topics,” “Education,” and “Educational Attainment.” Then, click “Search” in the lower right corner (see Figure 3.4).

Figure 3.4. Selecting the Educational Attainment Topic in Data.census.gov

The screenshot displays the 'Advanced Search' page on Data.census.gov. The interface includes a search bar at the top with the text 'Search'. Below the search bar, the page title 'Advanced Search' is prominent. A section titled 'Narrow search with filters' contains a search input field with the placeholder text 'e.g. 336111 - Automobile Manufacturing'. The main content area is divided into three columns: 'BROWSE FILTERS', 'TOPICS', and 'EDUCATION'. In the 'BROWSE FILTERS' column, 'Topics' is selected. In the 'TOPICS' column, 'Education' is selected. In the 'EDUCATION' column, 'Educational Attainment' is selected with a checkmark. At the bottom of the page, a 'Selected Filters' section shows 'United States', 'California', 'San Diego County, California', and 'San Marcos city, California'. A 'SEARCH' button is located in the bottom right corner.

United States Census Bureau

Search

// Search / Advanced Search

Advanced Search

Table ID (e.g., DP05)

Narrow search with filters

FIND A FILTER

e.g. 336111 - Automobile Manufacturing

BROWSE FILTERS	TOPICS	EDUCATION
Topics	Business and Economy	<input type="checkbox"/> Education
Geography	Education	<input checked="" type="checkbox"/> Educational Attainment
Years	Employment	School Enrollment
Surveys	Families and Living Arrangements	
Codes	Government	
	Health	
	Housing	
	Income and Poverty	
	Populations and People	
	Race and Ethnicity	

Selected Filters: United States California San Diego County, California San Marcos city, California MORE (2)

CLEAR FILTERS SEARCH MORE

Source: U.S. Census Bureau, data.census.gov, <https://data.census.gov>.

- Use the descriptive table titles to make your selection. We know we are searching for a summary table, so we select the first result, S1501: “Educational Attainment” (see Figure 3.5).²⁰

²⁰ Tables beginning with “S” are Subject Tables that focus on particular ACS subjects and include both estimates and percentages. More information about Table IDs is available on the Census Bureau’s Web site, <www.census.gov/programs-surveys/acs/guidance/which-data-tool/table-ids-explained.html>.

Figure 3.5. **Selecting an Educational Attainment Table in Data.census.gov**

The screenshot shows the Data.census.gov interface. At the top, there is a search bar with the text 'Search' and a magnifying glass icon. Below the search bar, there are navigation tabs: 'ALL', 'TABLES', 'MAPS', and 'PAGES'. The 'TABLES' tab is selected. Below the tabs, it says 'About 39,531 results | Filter'. The main section is titled 'Tables'. The first table listed is 'EDUCATIONAL ATTAINMENT', which is circled in red. Below this title, it says 'Survey/Program: American Community Survey' and 'Years: 2017 Table: S1501'. A table is displayed with the following structure:

	Total		
	Estimate	Margin of Error	Estimate
AGE BY EDUCATIONAL A...			
Population 18 to 24 yea...	30,820,412	+/-44,795	
Less than high school g...	3,919,137	+/-36,638	
High school graduate (i...	9,772,204	+/-45,539	
Some college or associ...	13,755,643	+/-57,729	

Below the first table, there are two more table entries: 'FIELD OF BACHELOR'S DEGREE FOR FIRST MAJOR' and 'SCHOOL ENROLLMENT', each with their respective survey/program and year/table information. At the bottom right of the page, there is a button that says 'VIEW ALL TABLES (63)'.

Source: U.S. Census Bureau, data.census.gov, <<https://data.census.gov>>.

- Next, select “Customize Table” (see Figure 3.6).

Figure 3.6. Customizing a Table in Data.census.gov

The screenshot shows the Data.census.gov interface for the 'EDUCATIONAL ATTAINMENT' table. The table is titled 'EDUCATIONAL ATTAINMENT' and is from the 'American Community Survey' (TableID: S1501) for the year 2017. The table is displayed in a grid format with columns for 'Estimate' and 'Margin of Error'. A red circle highlights the 'CUSTOMIZE TABLE' button in the top right corner of the table area.

	Total		Percent
	Estimate	Margin of Error	Estimate
AGE BY EDUCATIONAL A...			
Population 18 to 24 yea...	30,820,412	+/-44,795	(X)
Less than high school g...	3,919,137	+/-36,638	12.7%
High school graduate (i...	9,772,204	+/-45,539	31.7%
Some college or associ...	13,755,643	+/-57,729	44.6%
Bachelor's degree or hi...	3,373,428	+/-35,768	10.9%
Population 25 years an...	221,250,083	+/-75,372	(X)
Less than 9th grade	11,267,058	+/-78,313	5.1%
9th to 12th grade, no di...	15,315,153	+/-69,792	6.9%

Source: U.S. Census Bureau, data.census.gov, <https://data.census.gov>.

- Select “Download” at the top of the window. Then, use the Download Tables window to check the box for the 2017 ACS 1-year data. Select “CSV” as the file type and click on “Download” (see Figure 3.7).

Figure 3.7. Selecting the Survey Year(s) and File Type in Data.census.gov

The screenshot shows the 'Download Tables' window in Data.census.gov. The window is titled 'Download Tables' and contains a table for selecting table vintages. A red circle highlights the 'Download' button in the top right corner of the window.

Select Table Vintages	All	2017
S1501	<input type="checkbox"/>	<input checked="" type="checkbox"/>
1-Year	<input type="checkbox"/>	<input checked="" type="checkbox"/>
5-Year	<input type="checkbox"/>	<input type="checkbox"/>

File Type: CSV PDF

What You're Getting

- 1 .csv files (metadata)
- 1 .csv files (data)
- 1 .txt files (table title)

Uncompressed Estimated Size: 109.9 kB

Source: U.S. Census Bureau, data.census.gov, <https://data.census.gov>.

- After the files are prepared, click the “Download Now” button (see Figure 3.8).

Figure 3.8. **Downloading Tables in Data.census.gov**



Source: U.S. Census Bureau, data.census.gov, <<https://data.census.gov>>.

- This produces a ZIP file. Open the ZIP file to extract your table. The data are located in a file with prefix “ACSST1Y2017.S1501_data_with_overlays” (see Figure 3.9).
- We repeat this process for all data.census.gov topics in the profile.

Figure 3.9. **Portion of Data Table S1501 Downloaded From Data.census.gov**

	A	B	C	D
1	GEO_ID	NAME	S1501_C01_001E	S1501_C01_001M
2	id	Geographic Area Name	Total!!Estimate!!Population 18 to 24 years	Total!!Margin of Error!!Population 18 to 24 years
3	0100000US	United States	30820412	44795
4	0400000US06	California	3799994	5436
5	0500000US06073	San Diego County, California	346417	273
6	1600000US0668196	San Marcos city, California	8528	1958
7				
8				

Source: U.S. Census Bureau, data.census.gov, Table S1501: “Educational Attainment,” <<https://data.census.gov>>.

For data on commuting patterns, we access LEHD data, as follows:

- Go to the LEHD Web site at <<https://lehd.ces.census.gov/research/>>.
- Click “OnTheMap” on the left sidebar. This action will open a new window.
- Under the “Search” box, type “San Marcos” in the search bar, using the dropdown menu to select “Places” as the geography type. Then click “Search.” Be sure to select San Marcos, California, rather than San Marcos, Texas. Our selection refreshes the map view and zooms in to San Marcos (see Figure 3.10).
- Use the information bubble next to the location pin to select “Perform Analysis on Selection Area.”

Figure 3.10. Searching for a Geographic Area in OnTheMap

The screenshot displays the OnTheMap web application interface. At the top, there is a navigation bar with "OnTheMap" on the left and "LEHD Home Help and Documentation Reload Text-Only" on the right. Below the navigation bar, there are tabs for "Start", "Base Map", and "Selection". The main interface is divided into a left sidebar and a central map area. The sidebar contains several sections: "Welcome to OnTheMap!" with introductory text and a link to a data notice; a "Search" section with a search bar containing "San Marcos" and a dropdown menu showing "Places (Cities, CDPs, etc.)" selected, with a list of search results including "Lake San Marcos CDP, CA", "San Marcos city, CA", and "San Marcos city, TX"; an "Import Geography" section with links for "Import from KML", "Import from SHP", and "Import from GPS"; and a "Load OTM File" section with a "Load" button. The central map area shows a map of San Marcos, CA, with a red location pin. An information bubble is open next to the pin, displaying "San Marcos city, CA from Places (Cities, CDPs, etc.) Selection Area: 24.376 Sq. Mi Census Blocks: 801". A red circle highlights the "Perform Analysis on Selection Area" button within the bubble. Other buttons in the bubble include "Change Selection Area" and "Add Advanced Selection". The map includes a scale bar (0 to 2 km / 0 to 1 mi) and a north arrow. The bottom right corner of the map shows the coordinates "-117.23413, 33.16069".

Source: U.S. Census Bureau, OnTheMap, <<https://onthemap.ces.census.gov/>>.

- The “Analysis Settings” window opens, allowing us to refine our search.
 - Home/Work Area: Since we are interested in understanding commuting patterns, we select “Home.” This yields data based on San Marcos’ residents, rather than workers.
 - Analysis Type: We are interested in understanding where residents work. We select “Destination” and “Places” as our destination type.
 - Year: We select the most recently available data.
 - Job Type: Select “Primary Jobs.”
- Once all selections have been made, we click on “Go!” (see Figure 3.11).

Figure 3.11. **Selecting Variables for Analysis in OnTheMap**

Analysis Settings

Destination Analysis in 2015 by Primary Jobs

Home/Work Area
Determines whether the selection area is analyzed on where workers live ("Home") or where workers are employed ("Work").
 Home
 Work

Analysis Type
Determines the type of results that will be generated for the selected area.
 Area Profile
 Labor Market Segment: All Workers
 Area Comparison
 Areas to Compare: Places (Cities, CDPs, etc.)
 Labor Market Segment: All Workers
 Distance/Direction
 Destination
 Destination Type: Places (Cities, CDPs, etc.)
 Inflow/Outflow
 Note: Home/Work choice does not affect results

Year
Determines the year(s) of data that will be processed in the analysis.
 2017
 2016
 2015
 2014
 2013
 2012
 2011
 2010
 2009
 2008
 2007
 2006
 2005
 2004
 2003
 2002

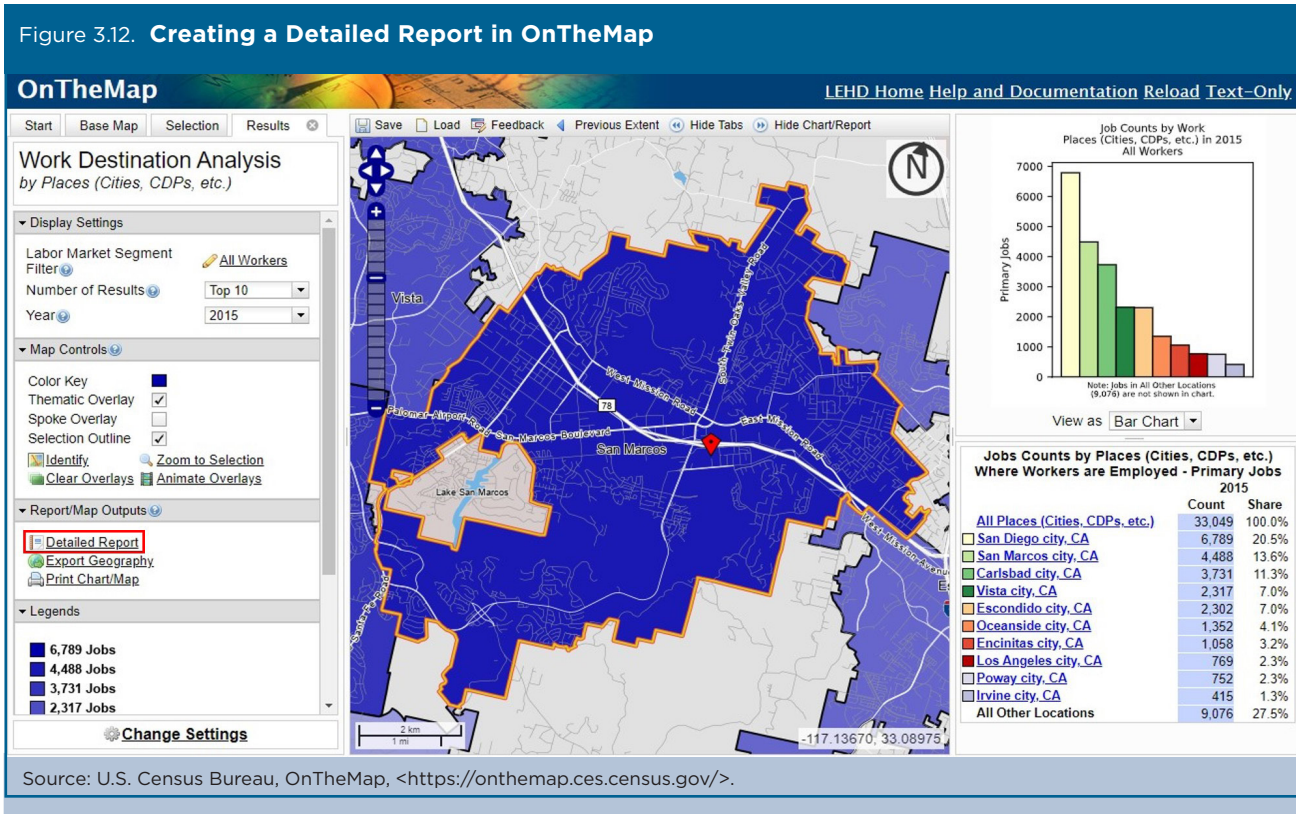
Job Type
Determines the scope of jobs that will be processed in the analysis.
 All Jobs
 Primary Jobs
 All Private Jobs
 Private Primary Jobs

Cancel **Go!**

Source: U.S. Census Bureau, OnTheMap, <<https://onthemap.ces.census.gov/>>.

- The page refreshes and populates our search results. We export the results by selecting “Detailed Report” under the left sidebar’s “Report/Map Outputs” bin and export the data in spreadsheet format (see Figure 3.12).

Figure 3.12. **Creating a Detailed Report in OnTheMap**



Source: U.S. Census Bureau, OnTheMap, <<https://onthemap.ces.census.gov/>>.

Initial analysis was conducted in a spreadsheet, by sorting results from highest to lowest and comparing the city of San Marcos to the county, state, and nation. The resulting charts were created using a mixture of spreadsheets and visualization software. Figure 3.13 illustrates how poverty data were visualized in the dashboard.

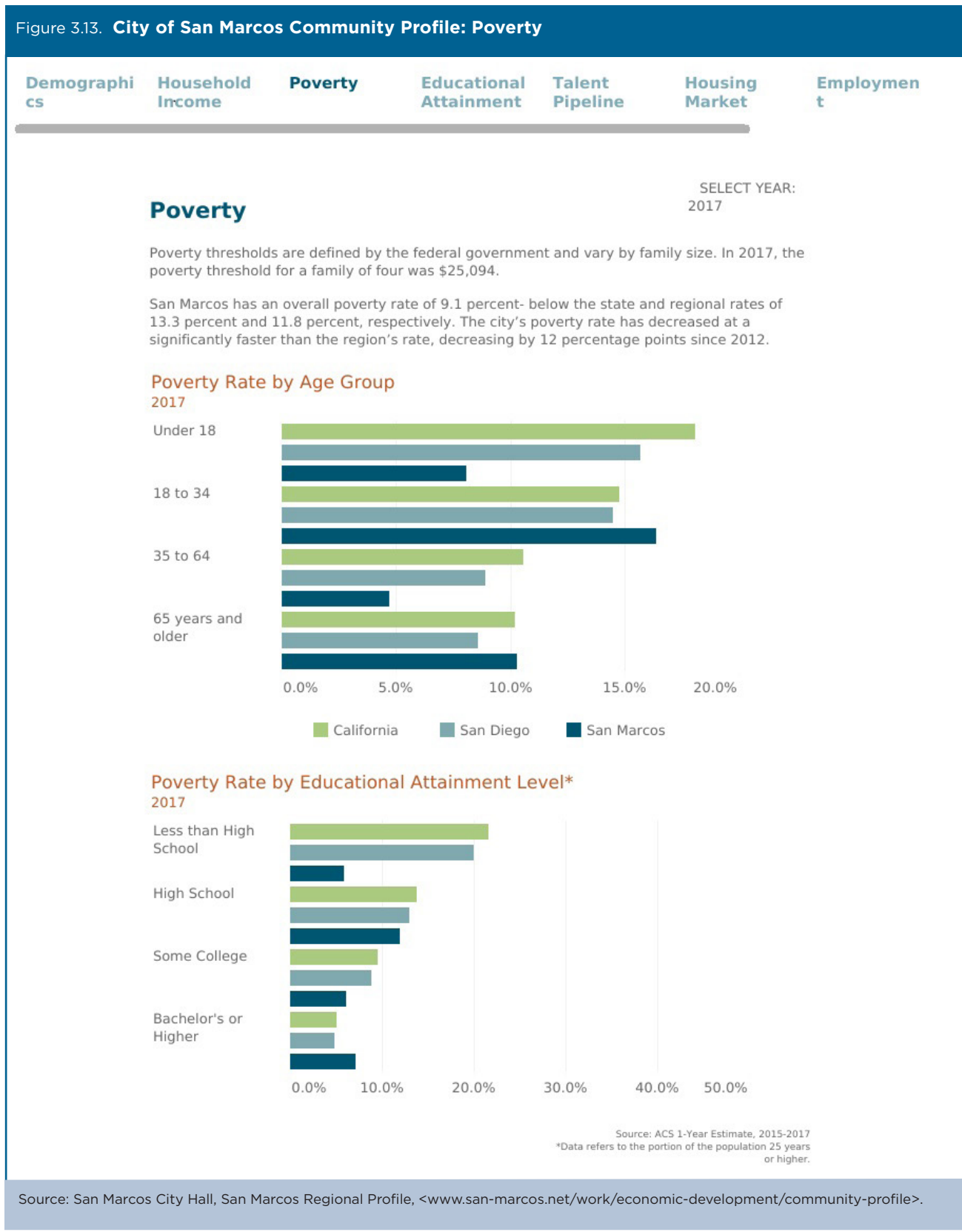
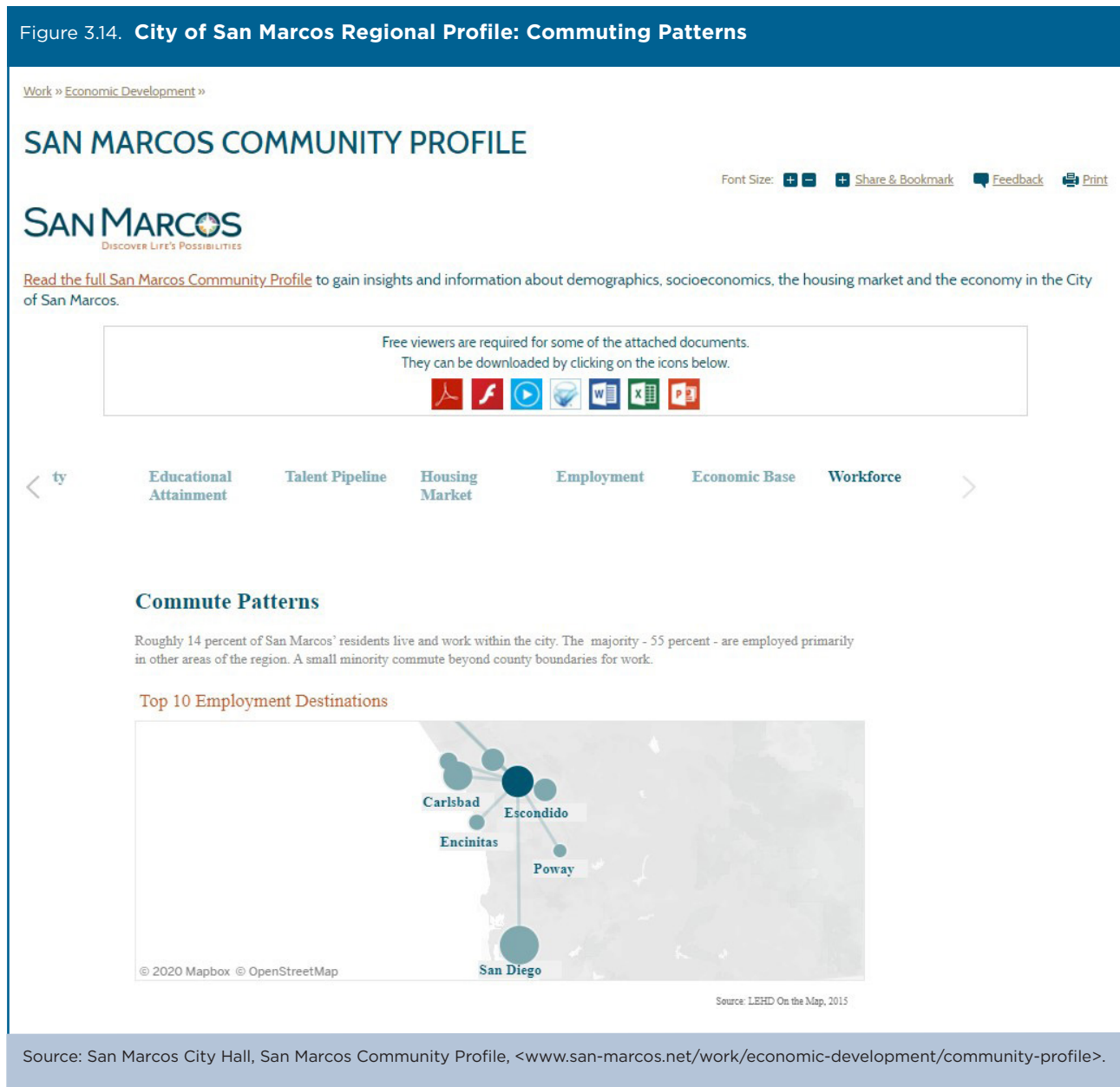


Figure 3.14 shows an interactive flow map that was created to visualize the city's commuting patterns.

The City of San Marcos Community Profile and interactive dashboard were launched in the fall of 2017. Since then, the dashboard has been actively used by the city and its partners to better inform the region's business community. In partnership with the city of San Marcos, the EDC plans on updating the profile and dashboard on an annual basis as data become available. Both products can be found on the city of San Marcos Web site.²¹

²¹ San Marcos City Hall, San Marcos Community Profile, <www.san-marcos.net/work/economic-development/community-profile>.



Case Study #2: Housing Affordability Gap

Skill Level: Intermediate

Subject: Median household income, housing affordability

Type of Analysis: Analysis of national housing trends, combining American Community Survey (ACS) data with other sources

Tools Used: ACS Public Use Microdata Sample, data.census.gov, and spreadsheet

Authors: Svenja Gudell, Chief Economist, Zillow; and Aaron Terrazas, Senior Economist, Zillow

In the years since the 2007–2009 Financial Crisis, there has been a boom in housing market data available to the public. Each month, Zillow—an online resource for home buyers and renters—produces and publishes over 100 housing market data series—including median home values and median rents—aggregated at the national, state, metro, county, ZIP code, and neighborhood levels.²²

Zillow data provide a comprehensive view into the state of the U.S. housing stock, but Zillow’s economic research and data science teams also rely on critical data inputs from the U.S. Census Bureau to analyze the full implications of changing home values and rents for American households. One prominent example is how Zillow combines proprietary data on home values with household income data from the Census Bureau’s American Community Survey (ACS) to explore the share of income that the typical household spends on a monthly mortgage payment. (Zillow also produces a similar statistic for the share of income spent on rent.)

By the middle of 2016—the most recent data available at the time of this writing—the typical American household earning the country’s national median income and buying the median-valued U.S. home could expect to pay 15.5 percent of their income on a mortgage. In the nation’s priciest markets—such as San Jose, Los Angeles, and San Francisco—these shares exceed 40 percent.

However, calculating housing affordability estimates based on median income and median home values by themselves does not provide a complete picture of affordability. Home values and incomes have consistently grown more at the top of the housing market and at the top of the labor market than at the bottom. Increasingly, affordability varies dramatically depending on a given buyer’s income level and the type of home they are trying to buy.

To illustrate these diverging trends between more affluent and less affluent Americans, Zillow also computes mortgage affordability—the share of income spent on a mortgage—for the bottom, middle, and top one-third of households by income. This more granular (and, some would argue, more powerful) tier analysis is conducted by combining Zillow’s property-level data with ACS microdata.

Calculating Mortgage Affordability

To calculate mortgage affordability, Zillow first estimates the mortgage payment for the median-valued home in a metropolitan statistical area (based on the Zillow Home Value Index for a given quarter) and the 30-year, fixed mortgage interest rate during that quarter (from the Freddie Mac Primary Mortgage Market Survey), assuming a 20 percent down payment. Zillow uses their internal property-level data to estimate mortgage payments, but data users can also access housing data—including home value and mortgage payment estimates—from the ACS.

Data on median household income are from the Census Bureau’s ACS Public Use Microdata Sample (PUMS). The PUMS files allow data users to conduct a custom analysis of the ACS data using a sample of actual responses to the survey. They are much more flexible than the aggregate data available on data.census.gov, though the PUMS files also require familiarity with statistical analysis software.

With access to appropriate software—the most common are SAS, SPSS, STATA, R, and Python—using the ACS PUMS data is straightforward. Analysts without statistical software can create detailed cross tabulations using the microdata access tool on data.census.gov.²³ The Census Bureau created a step-by-step guide on how to use this tool to produce custom estimates from the ACS 1-year PUMS file.²⁴

²² Data are published at www.zillow.com/data.

²³ This tool is still under development and is available in beta form on the Census Bureau’s Web site: <https://data.census.gov/mdat/>.

²⁴ U.S. Census Bureau, Using Microdata Access, <https://www2.census.gov/data/api-documentation/using-microdata-access/microdata-access-1-year-acs-pums.pdf>.

To download PUMS data, go to the Census Bureau’s ACS PUMS Data “Accessing PUMS Data” Web page and select the desired timeframe for the PUMS data (see Figure 3.15). Data are available from the year 2005 to the present. You can select single-year or multiyear data. The example below uses data from the 2014 ACS 1-year file.

Figure 3.15. ACS PUMS Data Repository

The screenshot shows the 'Accessing PUMS Data' page on the U.S. Census Bureau website. The page is titled 'Accessing PUMS Data' and provides information about the American Community Survey (ACS) Public Use Microdata Sample (PUMS) files. The year 2014 is highlighted in a red circle in the year selection menu. Below the year selection, there are two columns of links for accessing data: 'Access on FTP site' and 'Access on data.census.gov'. Each column lists links for '2018 ACS 1-Year PUMS' and '2018 ACS 5-Year PUMS'. The page also includes a 'Related Information' section with links to 'PUMS Documentation', 'PUBLICATION', and 'TRAINING'.

Source: U.S. Census Bureau, American Community Survey (ACS), Accessing PUMS Data, <www.census.gov/programs-surveys/acs/microdata/access.html>.

On the FTP site, click on “1-Year” to access the 2014 ACS 1-year PUMS files (see Figure 3.16).






Figure 3.16. **Selecting ACS PUMS File on the Census Bureau’s FTP Server**

The screenshot shows the 'Accessing PUMS Data' page on the Census Bureau's website. The page is titled 'Accessing PUMS Data' and features a navigation menu with options like 'BROWSE BY TOPIC', 'EXPLORE DATA', 'LIBRARY', 'SURVEYS/ PROGRAMS', 'INFORMATION FOR...', 'FIND A CODE', and 'ABOUT US'. The main content area includes a breadcrumb trail: 'Census.gov > Our Surveys & Programs > American Community Survey (ACS) > Microdata > Accessing PUMS Data'. Below this, there is a section for 'AMERICAN COMMUNITY SURVEY (ACS)' with a sub-section for 'Accessing PUMS Data'. The page provides information about the ACS Public Use Microdata Sample (PUMS) files, including a link to the 'PUMS Handbook'. A year selector shows '2014' as the selected year. Under the '2014' heading, there are two columns: 'Access on FTP site' and 'Access on data.census.gov'. In the 'Access on FTP site' column, the link '2014 ACS 1-Year PUMS' is highlighted with a red box. The 'Access on data.census.gov' column lists '2014 ACS 1-Year PUMS' and '2014 ACS 5-Year PUMS'. A footer note states: 'For PUMS documentation by year visit our PUMS Documentation page and select the specific year of interest.'

Source: U.S. Census Bureau, American Community Survey (ACS), Accessing PUMS Data, <www.census.gov/programs-surveys/acs/microdata/access.2014.html>.

The next step is to download the data set by selecting “csv_hus.zip” (see Figure 3.17). PUMS files on the Census Bureau’s FTP site are stored as ZIP files. The naming convention for PUMS files on the FTP server is based on three file features: the file format, the record type, and the state abbreviation.

Figure 3.17. ACS PUMS Downloads by Geography (Nation and States) and File (Population and Housing)

 csv_htn.zip	06-Oct-2015 16:02	5.6M
 csv_htx.zip	06-Oct-2015 16:02	20M
 csv_hus.zip	27-Oct-2015 08:15	251M
 csv_hut.zip	06-Oct-2015 16:00	2.2M
 csv_hva.zip	06-Oct-2015 16:00	6.8M

Source: U.S. Census Bureau, FTP server, <<https://www2.census.gov/programs-surveys/acs/data/pums/2014/1-Year/>>.

- File formats are comma-separated value (CSV) files and SAS data sets for UNIX.
- Record types are housing files (h) or person files (p). Zillow uses the housing file.
- State (or state equivalent) abbreviations are two letter labels such as “tx” for Texas and “dc” for District of Columbia. The abbreviation for the file containing all records in the United States is “us.” Zillow uses the United States file.

After downloading the file, Zillow loads the ACS data into R (software for statistical computing) to produce estimates of monthly owner costs as a percentage of household income for households at different income levels. The PUMS Data Dictionary can help you find the variable needed for this analysis: HINCP (Household income in the past 12 months).²⁵

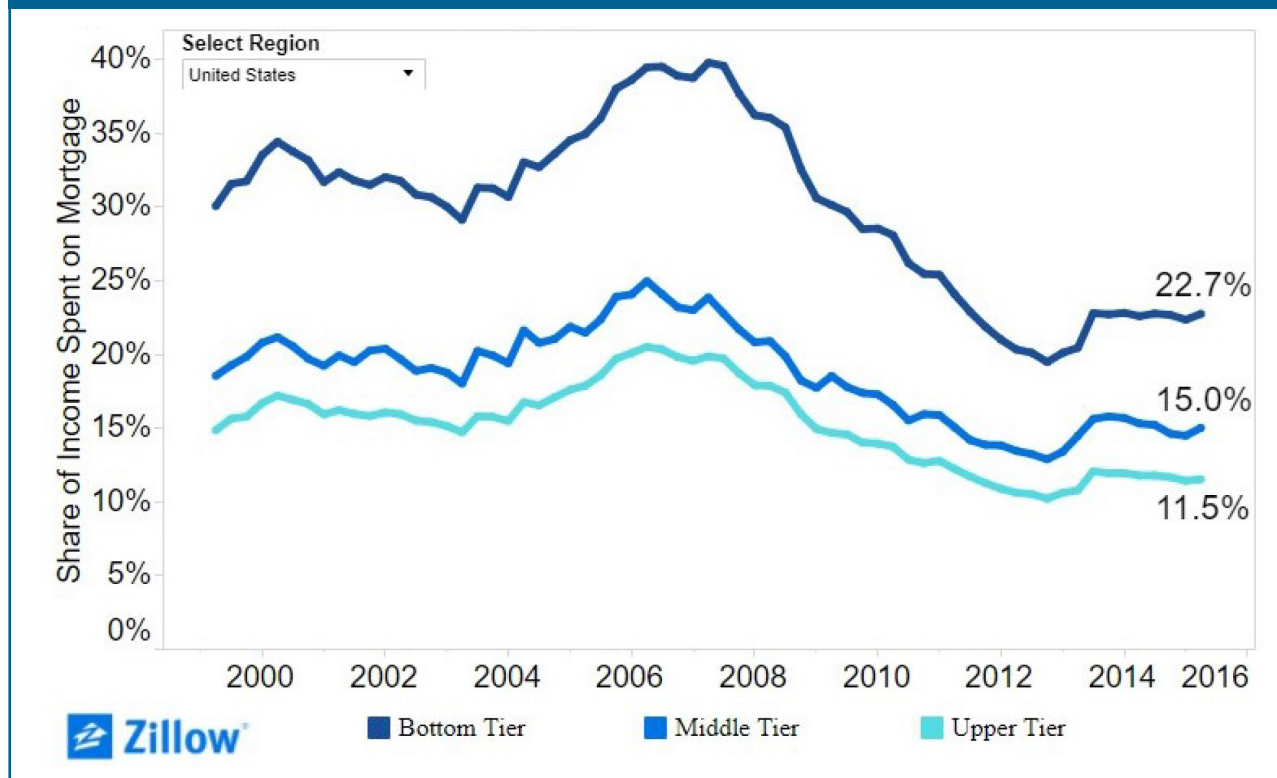
Using the HINCP variable to estimate median household income for households in the bottom one-third of the income distribution, Zillow then assumes that these households purchase a median bottom-tier home (i.e., 16.7th percentile of homes in a metro area) and then calculates the percentage of monthly income that household would have to spend to pay the mortgage.²⁶

²⁵ U.S. Census Bureau, PUMS Data Dictionary, <www.census.gov/programs-surveys/acs/microdata/documentation.html>.

²⁶ For median income used in the overall affordability analysis, Zillow chains the ACS income data forward using the Employment Cost Index (ECI), which is updated quarterly with a one-quarter lag. Income tier data are not directly published in the ECI, so to calculate tiers, Zillow relies on the Consumer Expenditure Survey (CES), which is published with a 1-year lag. For this reason, tier data are only available through Q2 2016, but overall affordability data are available through Q2 2017.

The key results from Zillow's analysis are shown in Figure 3.18. Depending on a given buyer's household income level and the kind of home they are trying to buy, affordability can vary dramatically. Nationwide, a buyer at the median household income in the bottom one-third of all incomes and who wants to buy a home valued in the bottom one-third of all homes would need to spend 23 percent of their household income on a mortgage as of Q2 2016, the latest quarter for which data were available at the time of this writing. A buyer in the top one-third of household incomes and who wants to buy a more expensive home in the top one-third of homes by value would only spend 11.5 percent of their income on a mortgage.

Figure 3.18. **Mortgage Affordability by Income Tier**



Source: Svenja Gudell, "Housing Highs & Lows: How the Home Affordability Gap Between the Rich and Poor is Widening," <www.zillow.com/research/affordability-2016q1-12763/>.

A decade after the 2007–2009 Financial Crisis and associated housing market bust, there has been a proliferation of housing market data available to consumers and researchers. Census Bureau data, particularly from the ACS, are a critical complement to Zillow's housing market data.

In an era when the gap in net worth between higher- and lower-wealth households is increasing, medians or averages cannot tell the full story of the American housing market.²⁷ Exploring within the distribution of home values and household incomes—analysis that is possible with Zillow's property-level home values and the Census Bureau's ACS PUMS data—allows for a much richer and more complete perspective on what is, for most Americans, their largest single asset.²⁸

²⁷ U.S. Census Bureau, Gap Between Higher- and Lower-Wealth Households Widens, Census Bureau Reports, <www.census.gov/newsroom/press-releases/2014/cb14-156.html>.

²⁸ Zillow updates this analysis periodically. For the most recent data and analysis, see <www.zillow.com/research/>.

Case Study #3: USAA Potential Market Size Estimation

Skill Level: Introductory/Intermediate

Subject: Housing

Type of Analysis: Comparisons of American Community Survey (ACS) data over time, across demographic groups, and across states; identifying business market(s)

Tools Used: Data.census.gov and spreadsheet

Author: Rob Galbraith, Director of Underwriting Research, Property & Casualty Insurance Group, USAA

Rob Galbraith is a director of underwriting research with the Property & Casualty Insurance Company at USAA, a large financial services member-owned association that focuses on serving active duty military, veterans, and their families. The underwriting area is challenged with providing insurance to as many eligible members as possible while not taking on excessive exposure to natural hazards that could put the company at risk of bankruptcy. American Community Survey (ACS) data are used at USAA in conjunction with advanced analytics and predictive modeling to identify segments to target for marketing three of its major lines of business: homeowners insurance, sold to those with owner-occupied homes; renters insurance, sold to those who are renting a dwelling from a landlord who owns the property; and rental property insurance, sold to those who are landlords renting their property to one or more tenants. ACS data are also used to track trends in owner- and renter-occupied housing to target marketing expenditures to achieve profitable growth.

Rob scans the documentation available for the ACS and learns that while single-year data are available for states and many large geographic areas, data for smaller areas with fewer than 65,000 people are only available in 5-year tabulations (e.g., 2012–2016). He also learns that there is uncertainty—margin of error—associated with ACS estimates, particularly for smaller geographic areas and small population groups. For this example, Rob is interested in accessing ACS housing data at the state level.

- Rob navigates to the U.S. Census Bureau’s ACS home page at <www.census.gov/programs-surveys/acs> and clicks on the “Data” link on the left side of the page (see Figure 3.19).

Figure 3.19 Selecting Data From the ACS Home Page

The screenshot shows the U.S. Census Bureau's American Community Survey (ACS) home page. At the top, there is a search bar and a navigation menu with options like 'BROWSE BY TOPIC', 'EXPLORE DATA', 'LIBRARY', 'SURVEYS/ PROGRAMS', 'INFORMATION FOR...', 'FIND A CODE', and 'ABOUT US'. Below the navigation, the breadcrumb trail reads: 'Census.gov > Our Surveys & Programs > American Community Survey (ACS)'. The main heading is 'American Community Survey (ACS)'. On the left, a sidebar menu lists various categories, with 'Data' highlighted in a red box. The main content area features a video player titled 'The Importance of the A...' and three informational cards: 'How do I respond to the ACS?', 'ACS data help with COVID-19 response efforts', and 'Should I respond to both the ACS and 2020 Census?'. The source is cited as: 'Source: U.S. Census Bureau, American Community Survey (ACS), <www.census.gov/programs-surveys/acs/>.'

- Under the subheading “Data Tables and Tools,” he clicks on “Subject Tables” (see Figure 3.20).

Figure 3.20. **Selecting ACS Subject Tables**

The screenshot shows the U.S. Census Bureau website for the American Community Survey (ACS) data. The page title is "American Community Survey Data". The main content area includes a subheading "Data Tables and Tools" with a description: "The Data Tables and Tools pages provide explanations and links to our most popular data tables on data.census.gov." Below this, there are three sections: "Data Profiles", "Narrative Profiles", and "Subject Tables". The "Subject Tables" link is circled in red. A button labeled "VIEW ALL TABLES AND TOOLS" is located at the bottom right of the main content area. The left sidebar contains a list of navigation options including "Data Tables & Tools", "Data via FTP", "Summary File Data", "PUMS Data", "Variance Replicate Tables", "Race/Ethnicity and American Indian & Alaska Native Data", and "Custom Tables". The right sidebar contains "Related Information" and "You May Be Interested In" sections.

Source: U.S. Census Bureau, American Community Survey (ACS), <www.census.gov/acs/www/data/data-tables-and-tools/subject-tables/>.

- In the search box near the top right corner of the page, he types in “housing,” navigates to the second page of results, and then selects Table S2504: “Physical Housing Characteristics for Occupied Housing Units” (see Figure 3.21). When he clicks on this link, he is redirected to data.census.gov, the Census Bureau’s primary tool for accessing data from the ACS and many other Census Bureau data sets.

Figure 3.21. Searching for ACS Housing Tables

The screenshot shows the 'American Community Survey' search results page. At the top, there is a search bar with 'housing' entered. Below the search bar, a table lists search results. The first result is 'Physical Housing Characteristics for Occupied Housing Units' with Table ID 'S2504'. The page number '2' is circled in red, indicating the current page of results.

Source: U.S. Census Bureau, American Community Survey (ACS), <www.census.gov/acs/www/data/data-tables-and-tools/subject-tables/>.

- Next, he clicks on “Customize Table” (see Figure 3.22).
- The resulting table shows the United States as the default geography, so he selects “Geographies” to change the geography filter.

Figure 3.22. Customizing a Table in Data.census.gov

The screenshot shows the 'Customize Table' page for Table S2504. The table title is 'PHYSICAL HOUSING CHARACTERISTICS FOR OCCUPIED HOUSING UNITS'. The 'CUSTOMIZE TABLE' button is circled in red. The table displays data for 'Occupied housing units' and 'Percent occupied housing units'.

	Occupied housing units		Percent occupied housing units	
	Estimate	Margin of Error	Estimate	Margin of Error
Occupied housing units	121,520,180	+/-153,217	121,520,180	+/-153,217
UNITS IN STRUCTURE				
1, detached	75,972,088	+/-191,857	62.5%	+/-
1, attached	7,333,647	+/-41,757	6.0%	+/-
2 apartments	4,138,677	+/-29,488	3.4%	+/-
3 or 4 apartments	5,127,776	+/-38,981	4.2%	+/-
5 to 9 apartments	5,659,599	+/-43,039	4.7%	+/-
10 or more apartments	16,486,881	+/-64,137	13.6%	+/-
Mobile home or other ...	6,801,512	+/-37,380	5.6%	+/-
YEAR STRUCTURE BU...				

Source: U.S. Census Bureau, data.census.gov, <https://data.census.gov>.

- Next, he selects “State,” “All States in United States,” and then closes the window to view the results (see Figure 3.23).

Figure 3.23. **Selecting Geographies in Data.census.gov**

The screenshot shows the Data.census.gov interface for the table S2504. The 'Geography' menu is open, showing a list of geographic levels: Nation, Region, Division, State, County, Tract, and Block Group. The 'State' level is selected and highlighted. Under the 'STATE' section, 'All States in United States' is checked, while other states like Alabama, Alaska, Arizona, and Arkansas are unchecked. A 'CLOSE' button is highlighted in the bottom right corner of the selection window.

Source: U.S. Census Bureau, data.census.gov, <<https://data.census.gov>>.

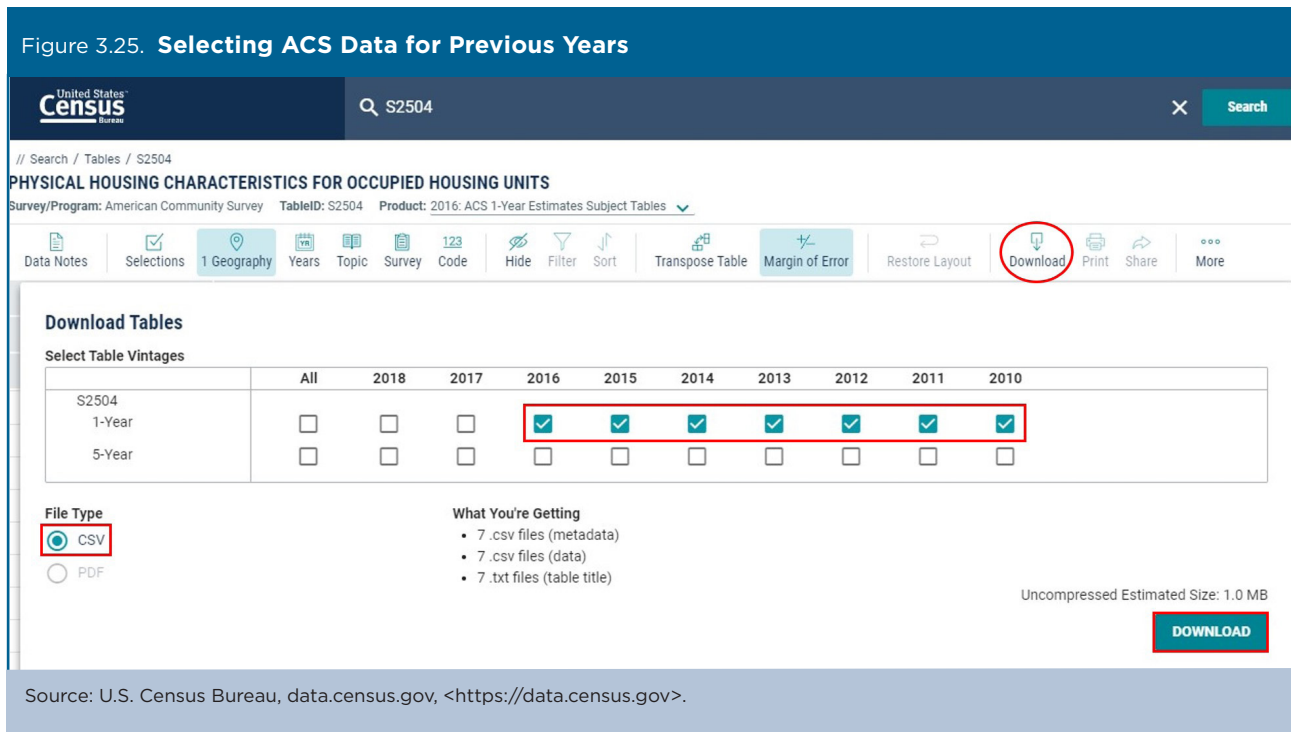
- He selects the desired survey year by clicking on the current “Product” selection. For the purposes of this case study, he is using 2016 ACS 1-year estimates. The header should read “2016 ACS 1-Year Estimates Subject Tables” (see Figure 3.24).

Figure 3.24. **Changing the Survey Year in Data.census.gov**

The screenshot shows the Data.census.gov interface for the table S2504. The 'Product' dropdown menu is open, showing a list of survey years and estimates: 2018: ACS 1-Year Estimates Subject Tables, 2018: ACS 5-Year Estimates Subject Tables, 2017: ACS 1-Year Estimates Subject Tables, 2017: ACS 5-Year Estimates Subject Tables, 2016: ACS 1-Year Estimates Subject Tables (highlighted), 2016: ACS 5-Year Estimates Subject Tables, 2015: ACS 1-Year Estimates Subject Tables, 2015: ACS 5-Year Estimates Subject Tables, 2014: ACS 1-Year Estimates Subject Tables, 2014: ACS 5-Year Estimates Subject Tables, 2013: ACS 1-Year Estimates Subject Tables, and 2013: ACS 5-Year Estimates Subject Tables. The background shows a table with columns for 'Occupied housing units', 'Estimate', 'Margin of Error', and 'Renter-occupied housing units'.

Source: U.S. Census Bureau, data.census.gov, <<https://data.census.gov>>.

- He selects “Download” at the top of the window.
- Then, he uses the Download Tables window to check the boxes for the 2016 through 2010 1-year data. Rob downloads data for multiple years to assist with the selection of target markets to recommend.
- He selects “CSV” as the file type and clicks on “Download” (see Figure 3.25).



Rob opens the CSV file and copies and pastes the owner-occupied and renter-occupied data for each state into a new table showing the data for the last 5 to 10 years (see Table 3.2). He can then use this table, compare it with internal USAA data showing the number of policies in force for each of the three lines of business, and compare the two tables to determine potential market size by state. Since the purpose of this analysis is to identify target market opportunities, the margin of error is not considered as a critical factor, as the goal is merely to gain reasonable estimates of potential market size.

If desired, this process can be replicated at a county level for further refinement of market segmentation.

Table 3.2. Owner-Occupied Housing Units by State and Year

State	2012	2013	2014	2015
Alabama	1,268,565	1,240,017	1,246,080	1,253,595
Alaska	159,427	156,107	156,006	159,922
Arizona	1,496,650	1,490,031	1,484,857	1,524,828
Arkansas	757,722	739,987	744,318	746,000
California	6,781,817	6,804,639	6,855,688	6,910,823
Colorado	1,278,158	1,291,945	1,302,533	1,322,618
Connecticut	908,452	888,478	900,039	889,035
Delaware	241,050	243,047	245,808	249,681
District of Columbia	110,681	110,513	112,492	112,555
Florida	4,724,428	4,672,482	4,693,821	4,760,071

Source: U.S. Census Bureau, data.census.gov, Table S2504: “Physical Housing Characteristics for Occupied Housing Units.”

4. ADDITIONAL RESOURCES

U.S. Census Bureau, What Is the American Community Survey?

<www.census.gov/programs-surveys/acs/about.html>

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>

U.S. Census Bureau, ACS Data Releases

<www.census.gov/programs-surveys/acs/news/data-releases.html>

U.S. Census Bureau, Geography and ACS

<www.census.gov/programs-surveys/acs/geography-acs.html>

U.S. Census Bureau, ACS Data Tables and Tools

<www.census.gov/acs/www/data/data-tables-and-tools/>

U.S. Census Bureau, Census Business Builder (CBB)

<www.census.gov/data/data-tools/cbb.html>

U.S. Census Bureau, Data.census.gov Resources

<www.census.gov/data/what-is-data-census-gov.html>

U.S. Census Bureau, State Data Center (SDC) Program

<www.census.gov/about/partners/sdc.html>

U.S. Department of Commerce, Economics & Statistics Administration, 2015, New Report on Value of the American Community Survey

<www.commerce.gov/news/reports/2015/05/value-american-community-survey-smart-government-competitive-businesses-and>

ACS Online Community

<<https://acsdatacommunity.prb.org/>>

U.S. Census Bureau, Understanding and Using the American Community Survey Public Use Microdata Sample Files: What Data Users Need to Know

<www.census.gov/programs-surveys/acs/guidance/handbooks/pums.html>

U.S. Census Bureau, Using the American Community Survey Summary File: What Data Users Need to Know

<www.census.gov/programs-surveys/acs/guidance/handbooks/summary-file.html>