data.census.gov: A Brief Demonstration

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https://libguides.brown.edu/gis_data_tutorials/census

Introduction

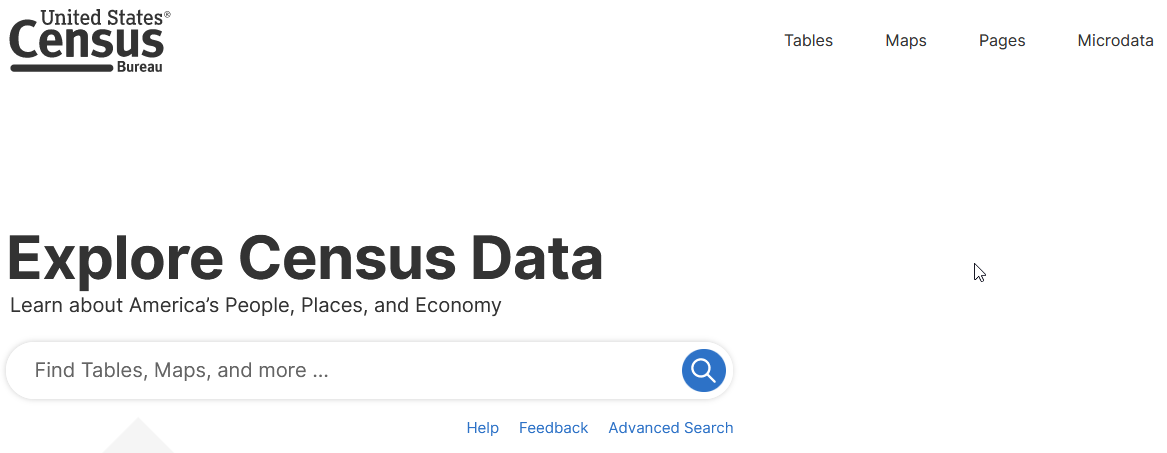
This tutorial demonstrates how to use data.census.gov to access and download US census data, highlighting a specific approach using the advanced search feature. Given the size and complexity of census data it's best to apply filters to narrow your choices down, based on dataset, geography, and time period. In these examples we'll access data profiles for a city and download home value data for all county subdivisions in a state from the American Community Survey (ACS). We'll conclude with summaries of the census datasets and geographies.

1 Methods for Searching data.census.gov

The Census Bureau's primary portal for accessing its data is data.census.gov at `https://data.census.gov/cedsci/`. There are two principal options for obtaining data:

1. To get basic data for a state, county, city, town, or ZIP Code, type the name in the search box. You will be able to preview recent data for these places, and navigate to individual tables. You can even type the name of a topic, like educational attainment, to find all tables related to this subject. This type of search allows you to casually browse and access data.

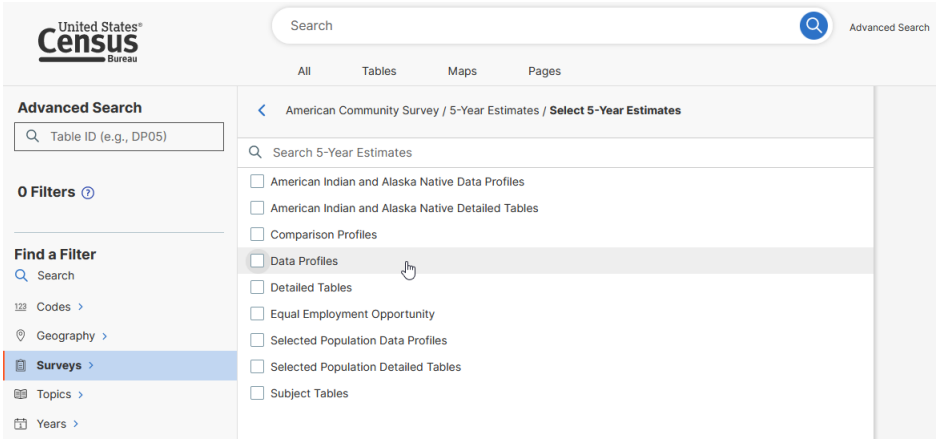
2. If you want to chart a straight path to access the data you need, and you want to see the full range of datasets, topics, and geographies, use the *Advanced Search*. The following two sections focus on using this method, which brings you more directly to the data you're looking for. The overview of datasets and census geography in the final sections provide you with necessary context for making decisions on how to filter data.



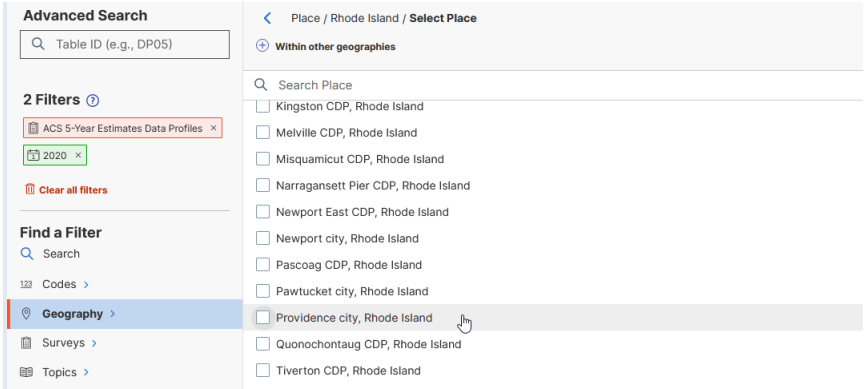
2 Downloading a Data Profile from the ACS

In this section we'll download a data profile for Providence, Rhode Island that will give us a broad overview of the population. We will look at the American Community Survey (ACS), as this is the dataset that contains detailed socio-economic characteristics of the population on an on-going basis (the ten-year census contains just basic demographic counts). Since Providence has a population that's greater than 65,000 people, it is included in both the 1-year and 5-year estimate series from the ACS. We will look at the 5-year estimates as they have a lower margin of error.

1. Go to `https://data.census.gov/cedsci/`.
2. Under the search box select the *Advanced Search* option.
3. In the *Filters* menu on the left, select *Surveys*. In the list of surveys select `American Community Survey`, then choose `5-Year Estimates`, then check `Data Profiles`.



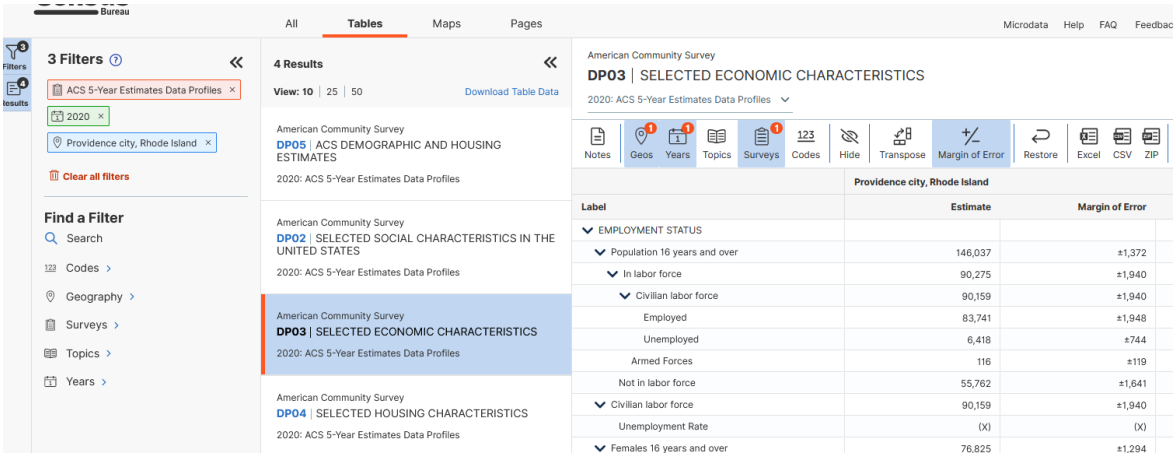
4. In the *Filters* menu on the left select *Years*, and check 2020.
5. In the *Filters* menu select *Geography*. Under *Most commonly used geographies* at the top choose the *Place* option. When the next menu opens, select `Rhode Island`, then scroll through the list and check `Providence city`. Places include legally incorporated cities and towns (but just cities in New England) and unincorporated settlements (census designated places or CDPs).



6. Hit the *Search* button in the lower right-hand corner.

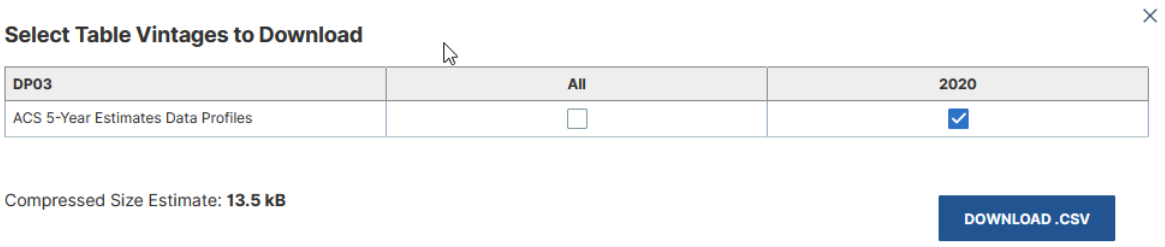
7. This takes you to a page that has results for tables, maps, and pages. At the top of the screen where it says *All*, click on the option for *Tables*.

8. This brings you to the *Tables* result screen. The four tables that are returned, with ID numbers DP02 to DP05, are data profile tables. They contain a large swath of data divided into broad topics: demographic, social, economic, and housing. Clicking on a table listed in the center provides a preview on the right. Click on the `Selected Economic Characteristics` table to preview it. You'll see estimates with margins of error and percent totals for each value. In this example, we would say with 90% confidence that Providence had 90,275 people in the labor force between 2016 and 2020, plus or minus 1,940 people. We can tell that the labor force is a subset of the population 16 years and over, as it appears indented under this category.



9. Note that by clicking the « arrows in the upper right-hand corner of the *Filters* and *Results* menus, you can hide the menus to see the table more clearly. Hitting the *Filters* and *Results* buttons on the far left will re-open these menus if you closed them.

10. In the toolbar above the table preview, the *ZIP* button will save this table as a database friendly-file (with rows representing geography and columns representing attributes). Clicking the *Excel* or *CSV* button will save the table the way it appears on the screen, in a presentation format. Click the *ZIP* button. Hit the *Download* button on the next screen, and when prompted save the file on your computer. If the file doesn't seem to finish downloading, make sure your web browser is not blocking pop-ups.



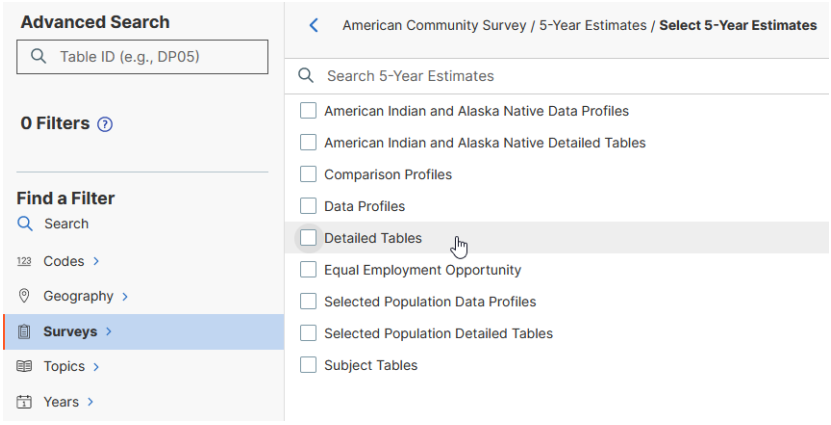
11. All data that you download will be compressed in a zip file. Navigate to where the file was downloaded, right click, and choose the option to unzip the file (this step will vary based on your web browser and operating system). The csv file that contains the word `data` is the actual data file, while the csv with the word `metadata` contains a list of all the columns in the file. CSV files can be opened with any spreadsheet package, like Excel or Calc.

3 Downloading a Detailed Table from the ACS

The data profile tables are useful for obtaining a cross-section of different variables. If you want something more focused, either fewer variables or a crosstab of data not published in the profiles, you'll want to search for detailed tables instead. You may also want to compare data for multiple geographies. In this section we'll download ACS data on home values for all county subdivisions in Rhode Island.

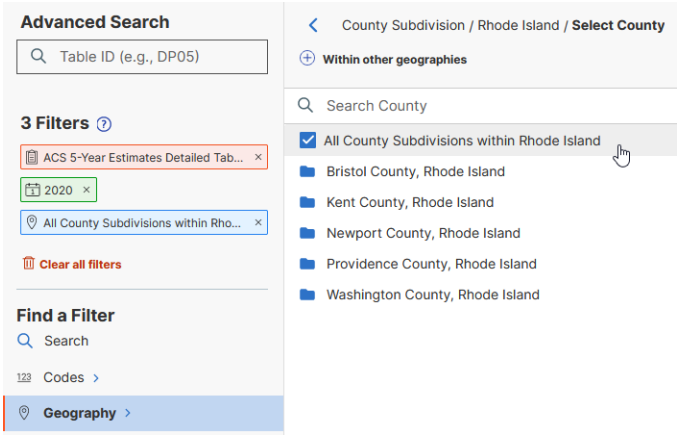
1. Go to `https://data.census.gov/cedsci/` and select the *Advanced Search* option. If you did the last exercise and the previous filters still appear, clear them.

2. In the *Filters* menu select *Surveys*. In the list of surveys select `American Community Survey`, then choose `5-Year Estimates`, then check `Detailed Tables`.

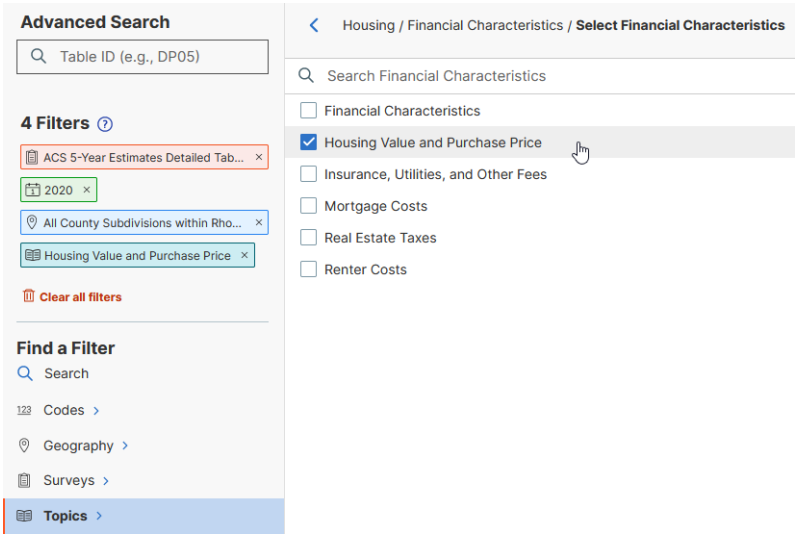


3. In the menu on the left select *Years*, and check `2020`.

4. In the menu select *Geography*. Scroll through the options under *All Geographies* and choose *County Subdivision*. Select `Rhode Island` as the state, and check the box that says `All County Subdivisions within Rhode Island`. County subdivisions are either legal administrative divisions (municipalities or MCDs) in states that have them (like Rhode Island), or statistical subdivisions created by the Census Bureau (CCDs) for states that don't.



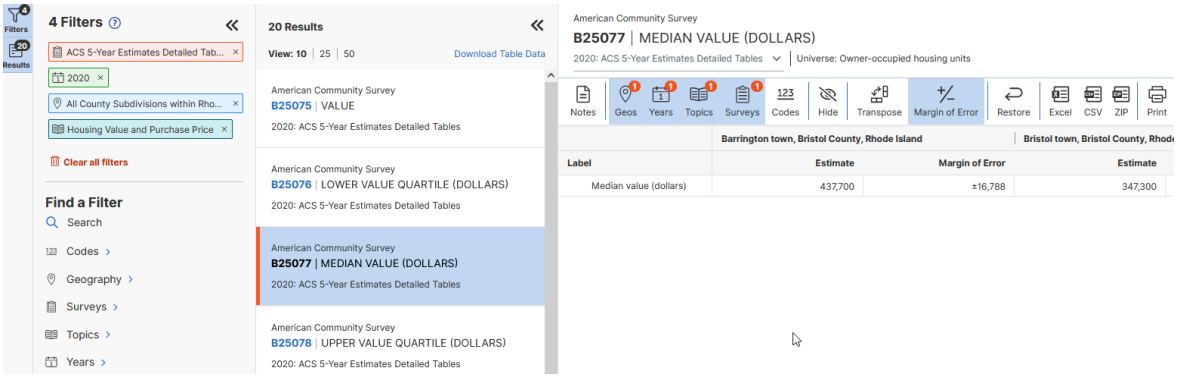
5. In the *Filter* menu select *Topics*. Choose *Housing*, then *Financial Characteristics*, then *Housing Value and Purchase Price*.



6. Hit the *Search* button in the lower right-hand corner.

7. This takes you to a page that has results for tables, maps, and pages. At the top of the screen where it says *All*, click on the option for *Tables*.

8. The *Table* results window includes several tables that are associated with housing value. Select a table in the list on the left to view it on the right. Each of the detailed tables begins with a letter 'B' for base table, which means it's a detailed table focused on a narrow characteristic. Tables that begin with a 'C' are consolidated tables with fewer categories. Data is summarized in different ways; the `Value` table *B25075* estimates the number of occupied housing units (the *Universe* printed above the table) in different value brackets, while `Median Value` table *B25077* provides the median or middle dollar value of all owner-occupied homes.



9. Select the `Median Value Table B25077` in the results. In the toolbar above the table hit the *ZIP* button to download a zip file that contains this table. Save the file on your computer.

10. Unzip the file, then open the csv file that contains the word `data` in Excel or Calc. You'll notice that each row represents a piece of geography and each column is an attribute, which is the opposite of the way it was displayed on the website.

	A	B	C
1	GEO_ID	NAME	B25077_001E
2	Geography	Geographic Area Name	Estimate!!Median value (dollars)
3	0600000US4400105140	Barrington town, Bristol County, Rhode Island	437700
4	0600000US4400109280	Bristol town, Bristol County, Rhode Island	347300
5	0600000US4400173760	Warren town, Bristol County, Rhode Island	297900
6	0600000US4400318640	Coventry town, Kent County, Rhode Island	245500
7	0600000US4400322240	East Greenwich town, Kent County, Rhode Island	457700
8	0600000US4400374300	Warwick city, Kent County, Rhode Island	238300
9	0600000US4400377720	West Greenwich town, Kent County, Rhode Island	360800
10	0600000US4400378440	West Warwick town, Kent County, Rhode Island	223600

4 Other Tips

1. In the ACS, subject tables are an alternative that sit in-between the profile and detailed tables. They are more focused than the profile tables in that they contain a narrower range of related variables, but they include more variables relative to the detailed tables. Access them via the *Surveys* menu, their ID numbers begin with the letter 'S'.

2. 1-year ACS estimates are only available for geographies that have 65,000 people or more. If you need data for small areas (tracts, ZCTAs) or need complete coverage for a geography that contains a mix of places above and below 65k (counties, places), use the 5-year ACS. 5-year ACS estimates also have lower margins of error compared to the 1-year ACS.

3. The decennial census contains fewer variables but is an actual count of the population. Under *Surveys*, Summary File 1 is the main file for the 2010 census. The Demographic Housing Characteristics (DHC) file will be the main file for 2020 (at present, Redistricting Data PL 94-171 is the only 2020 data available). Tables are prefixed with the letter P for population counts and H for housing counts.

4. If you know the ID number of the table you are looking for, you can type it into the initial search box and then filter by year, geography, and topic in the table view to narrow down the results. Lists of tables are available in the technical documentation for both the ACS and decennial census on the Census Bureau's website.

5 Dataset Summary

Decennial Census

The decennial census is a 100% count of the population taken every ten years. The data represents a snapshot of the nation at a fixed point in time. Variables are limited to basic demographic and housing characteristics: race, sex, age, households, family relations, housing units, housing occupancy, and tenure (owner versus renter occupied). Decennial census data is available for practically all geographic areas. The most commonly used series is Summary File 1 (2010) / Demographic Housing Characteristics (2020). Redistricting Data (PL 94-171) contains few variables but is the first series to be released.

American Community Survey (ACS)

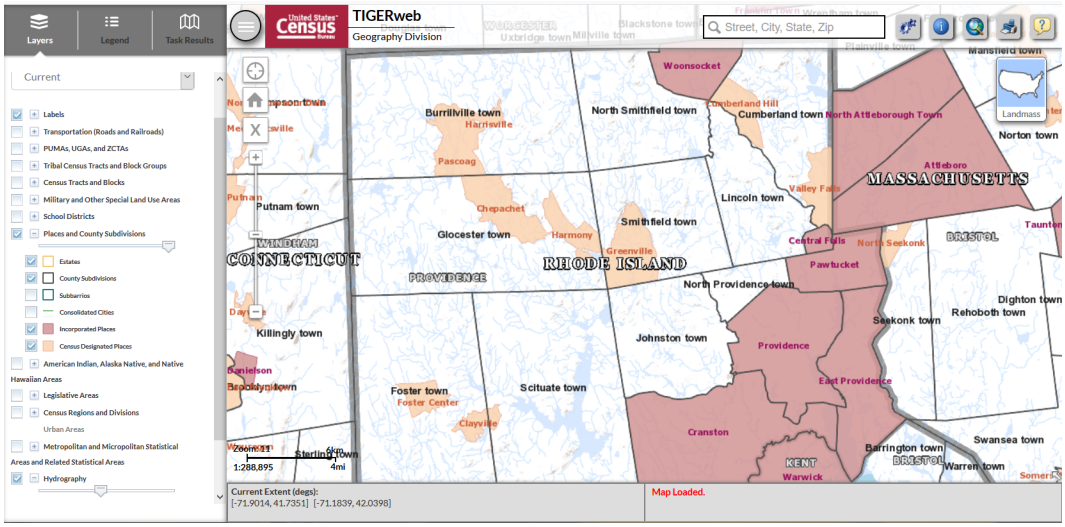
The ACS is a sample survey of the population that's compiled every year. Since it's a survey (based on rolling monthly samples) and not a count, the values represent estimates with a 90% confidence interval and margins of error for 1-year and 5-year periods. The number of variables is more extensive than the decennial census; in addition to basic demographic characteristics the ACS also includes socio-economic data like citizenship, educational attainment, income, occupation, home value, and much more. Geographically the data is more limited; geographic areas with 65k residents or more are published annually, and areas with less than 65k residents down to census block groups are published as 5-year averages. New data is published near the end of each year.

Population Estimates

Population estimates are a third census dataset for population and housing. Annual estimates are calculated using the last decennial census as a baseline and factor in births, deaths, and migration at the county level from year to year. Variables are limited to age, sex, race, and housing units and are only published for states, counties, metropolitan areas, and incorporated places. These estimates are treated like counts, since they are generated from calculations and not from a sample survey.

Geography in Brief

To view census geography for an area, visit TIGERweb at `https://tigerweb.geo.census.gov/tigerweb/`. Choose the type of geography you want to see, check some reference layers to turn them on, and zoom into an area or do a search for an address. You can choose between different vintages of geography; statistical areas are updated every ten years with each decennial census, while legal areas are updated on an annual basis.



Census Tract : a statistical area designed to have an optimal size of 4,000 residents, with a general range of 1,200 to 8,000. Tracts never cross county boundaries. Available in the decennial census and 5-year ACS.

County : the legal and administrative subdivisions of states; there are over 3,000 counties in the US. Available in the decennial census and the ACS (partial 1-year, fully 5-year).

County Subdivision : legal subdivisions of counties (municipal civil divisions or MCDs) in states that have them, and areas created by the Census Bureau (Census County Divisions or CCDs) in states that don't. Available in the decennial census and 5-year ACS.

Metropolitan Area : a concentrated, urban population center surrounded by adjacent areas that have a high degree of social and economic interaction with that center, created by aggregating counties. Available in the decennial census and the ACS.

Place : a concentrated settlement of people. Places include legally incorporated cities and towns, as well as unincorporated statistical areas delineated by the Census Bureau (CDPs). Available in the decennial census and the ACS (partial 1-year, fully 5-year).

PUMA : Public Use Microdata Area - a statistical area designed to have an optimal size of 100k residents, created by aggregating census tracts. PUMAs never cross state boundaries. Available in the ACS.

ZCTA : ZIP Code Tabulation Area - the Census Bureau's approximation of USPS ZIP Code delivery areas, created by aggregating census blocks. ZCTAs may cross any boundary, including state boundaries. Available in the decennial census and 5-year ACS. (Population data is *not* published for 5-digit ZIP Codes; this option appears in data.census.gov's geography filters for economic datasets only).