# Documentation for the 2010-2014 Variance Replicate Estimates Tables

# Introduction

## What are the Variance Replicate Estimates Tables?

The 2010-2014 Variance Replicate Table package provides augmented versions of 107 detailed tables from the American Community Survey (ACS) that are published on the American FactFinder (AFF).  For this limited set of tables, in addition to the original published estimates and margins of error (MOE) for each characteristic, the standard errors and eighty variance replicate estimates (Var_Rep) are provided.  This additional information makes it possible for data users to compute variances using a methodology similar to the one utilized by the ACS during its production.  The benefit of using this set of expanded tables is that it allows advanced data users to calculate MOEs for their own defined characteristics without using approximation formulas.  This includes forming their own aggregate estimates across geographies or aggregating categories within a table, as well as ratios, proportions, and percentages.  Previously, computing the MOE for such user-derived characteristics was done using approximation formulas that could not account for the covariance between the estimates used in the calculation. The detailed tables selected for this package include a wide range of topics and are the source of many of the estimates in the Data Profile product.

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## What is a Variance Replicate Estimate?

The ACS uses a successive differences replication (SDR) variance estimation methodology[1] to derive the MOEs that appear in tables on AFF. This involves computing the official ACS

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[1] More information on the SDR may be found in Fay, Robert E., and Train, George F. (1995), "Aspects of Survey and Model-Based Postcensal Estimation of Income and Poverty Characteristics for States and Counties", ASA Proceedings of the Section on Government Statistics, 154-159, American Statistical Association (Alexandria, VA). The location of the paper is: http://www.census.gov/did/www/saipe/publications/files/FayTrain95.pdf

estimate for a characteristic as well as eighty pseudo-estimates. They are called Var_Rep followed by a number ranging from one to eighty. For example, the fourth variance replicate estimate is named Var_Rep4.

For the majority of ACS estimates, these values are used to form the variance of the estimate. The formula is provided in the next section. Taking the square root of the variance produces the standard error. The 90% confidence level MOE is derived when the standard error is multiplied by 1.645.

A technical description of the full process is located in Chapter 12 of the Design and Methodology report, which may be found at http://www.census.gov/programs-surveys/acs/methodology/design-and-methodology.html. In addition, this methodology is also used to calculate the MOE in the ACS Public Use Microdata Sample (PUMS).

However, there are several special situations where this methodology is not suitable. These situations will be discussed later in this documentation.

Data users should be aware that variance replicate estimates may have negative or zero values, even for characteristics where negative values are not normally found. The variance replicate estimates are solely designed for calculating the SDR variance estimates and MOEs and have no other use and no independent meaning.

Data users also need to be aware that, due to certain limitations, there may be times when a user-derived MOE, following all instructions in this documentation, will not match the published MOE for an estimate on AFF. The published margin of error is the official value regardless of the value calculated using the variance replicate estimates.

## Calculating the Margin of Error Using the Successive Differences Replicate Methodology

As mentioned in the introduction, the variance and standard error of an estimate must be calculated before computing the MOE. The SDR variance is calculated using the official ACS estimate and the eighty variance replicate estimates (Var_Rep1 to Var_Rep80).[2] The variance is the sum of the squared differences between the estimate and each of the eighty variance replicate estimates, multiplied by 4/80. The MOE is calculated by multiplying the standard error (the square root of the variance) by the factor 1.645 which is associated with a 90 percent confidence level.

$$Variance = \frac{4}{80} \sum_{i=1}^{80} (Var\_Rep_i - Estimate)^2 \tag{1}$$

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[2] The SDR variance estimation methodology used with the ACS has the advantage that the variance estimate may be computed without consideration of the form of the statistic (i.e. count, mean, ratio, etc.) or the complexity of the sampling and weighting procedures.

$$Margin\ of\ Error\ (90\%\ confidence\ level) = 1.645 \times Standard\ Error \qquad (2)$$
$$= 1.645 \times \sqrt{Variance}$$

The factor of 4/80 outside of the summation for the variance is an artifact of using the SDR methodology with eighty variance replicate estimates.

Formula (1) above can be used to calculate the variance for any type of estimate, including, but not limited to, sums (within a table or across geographic areas), percents, and means. A user should calculate their measure using the published estimates and the eighty variance replicate estimates, and use those replicate estimates to calculate the variance of their measure. Two basic examples follow. One is for creating the MOE of a sum and the other for the MOE of a percent.

## Example 1: MOEs for Count Characteristics for Combined Estimates

Suppose you wish to calculate the count estimate and MOE for the characteristic of males under the age of fifteen[3]. Currently this characteristic is not available in the standard ACS detailed tables on AFF. Several lines within the table for Age by Sex (table ID B01001) will need to be collapsed to form this characteristic. Table 1A shows the first five lines of this table for a hypothetical county in the new variance replicate estimates package. The first two lines give the total population and the total male population. The next three lines (shaded in gray) are the three characteristics which need to be combined for males under the age of 15. This table shows the ACS estimate and four of the eighty variance replicate estimates. Although only four variance replicate estimates are shown, it is implied that all eighty are used in the calculation.

Table 1A: First Five Lines of Sex by Age (Table ID B01001)

| Characteristic | ACS Estimate | Var_Rep1 | Var_Rep2 | Var_Rep3 | … | Var_Rep80 |
|---|---|---|---|---|---|---|
| Total | 934,215 | 934,215 | 934,215 | 934,215 | … | 934,215 |
| Male | 454,762 | 454,766 | 454,729 | 454,765 | … | 454,727 |
| Under 5 years | 28,230 | 28,141 | 29,092 | 28,265 | … | 27,962 |
| 5 to 9 years | 31,636 | 31,691 | 31,602 | 32,094 | … | 31,651 |
| 10 to 14 years | 34,567 | 34,555 | 34,725 | 34,489 | … | 34,817 |

Begin the MOE calculation by summing the three age characteristics together for the ACS estimate and for each of the eighty variance replicate estimates to form eighty-one sums of males under the age of 15 (males <15).

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[3] A count estimate is a count of the number of people, households or housing units for a particular characteristic.

Table 1B: Forming the Sums of Males < 15

| Characteristic | ACS Estimate | Var_Rep1 | Var_Rep2 | Var_Rep3 | ... | Var_Rep80 |
|---|---|---|---|---|---|---|
| Under 5 years | 28,230 | 28,141 | 29,092 | 28,265 | ... | 27,962 |
| 5 to 9 years | 31,636 | 31,691 | 31,602 | 32,094 | ... | 31,651 |
| 10 to 14 years | 34,567 | 34,555 | 34,725 | 34,489 | ... | 34,817 |
| Sum of Males < 15 | 94,433 | 94,387 | 95,419 | 94,848 | ... | 94,430 |

Take the difference between each of the eighty variance replicate estimates and the ACS estimate and square the result. For example, the difference between the first variance replicate estimate and the ACS Estimate is 94,387 – 94,433 = -46. The difference is then squared which equals 2,116. This is seen in the first line of Table 1C below.

Calculate the variance by summing the eighty squared difference terms and then multiply by the factor 4/80. For this example, the sum of all eighty squared differences is 5,446,546. When it is multiplied by 4/80, the result is 272,327.3.

Calculate the 90% confidence level MOE by taking the square root of the variance to form the standard error (521.8499) and then multiply it by 1.645. In this example, the resulting MOE is 858 after rounding to the nearest integer. Note that for MOEs on AFF, rounding is only done once, as the final step. Values shown in the examples in this document are rounded for convenient display, but the unrounded values are used for the calculations.

Table 1C: Calculating the Margin of Error For Males < 15

| Variable | Replicate Estimates | ACS Estimates | Difference | Difference Squared |
|---|---|---|---|---|
| Var_Rep1 | 94,387 | 94,433 | -46 | 2,116 |
| Var_Rep2 | 95,419 | 94,433 | 986 | 972,196 |
| Var_Rep3 | 94,848 | 94,433 | 415 | 172,225 |
| ... | ... | ... | ... | ... |
| Var_Rep80 | 94,430 | 94,433 | -3 | 9 |
| | | Sum of Squared Differences | | 5,446,546 |
| | | Variance | | 272,327.3000 |
| | | Standard Error | | 521.8499 |
| | | Margin of Error | | 858.4431 |

$$\text{MOE for Males} < 15 \ = 1.645 \times \sqrt{272{,}327.3} = 1.645 \ \times 521.8499 = 858.4431$$

The final result is an estimate of 94,433 for males under the age of 15 with a MOE of 858.


## Example 2: MOEs for Percent Characteristic for Combined Geographies

Suppose you wish to calculate the percentage estimate and its MOE for males under the age of 15 for a combined three county area. For this example we will use the estimate of all males as the denominator. This characteristic is not available in any of the standard ACS detailed tables

on AFF. The result produced in Example 1 is used as the numerator for this example. Nine estimates are needed to create the estimate for males under the age of 15 (three characteristics by three counties). Similarly, nine estimates are needed for the denominator. Table 2A shows the ACS estimate and four variance replicate estimates for males < 15 for each county. Although only four variance replicate estimates are shown, it is implied that all eighty are used in the calculation. The first line of this table shows the males < 15 results from Example 1. Lines two and three show the males < 15 results for the other two counties.

Begin the MOE calculation by summing the three ACS estimates for males < 15 together for each county. Repeat for each of the eighty variance replicate estimates to form eighty-one total sums. These will be the numerators for our percent estimate and eighty variance replicate estimates.

Table 2A: Forming Sums of Males Under the age of 15 for a Combined Three County Area (Numerator)

| Males < 15 years | ACS Estimate | Var_Rep1 | Var_Rep2 | Var_Rep3 | ... | Var_Rep80 |
|---|---|---|---|---|---|---|
| County 1 | 94,433 | 94,387 | 95,419 | 94,848 | ... | 94,430 |
| County 2 | 21,636 | 21,691 | 21,602 | 22,094 | ... | 21,651 |
| County 3 | 4,567 | 4,555 | 4,725 | 4,489 | ... | 4,817 |
| Sum of Males < 15 | 120,636 | 120,633 | 121,746 | 121,431 | ... | 120,898 |

To form the denominator, the same process needs to be performed on the three county estimates for the total count of males. Table 2B shows the ACS estimate and four variance replicate estimates for total males for each area. Again, although only four variance replicate estimates are shown, it is implied that all eighty are used in the calculation.

Table 2B: Forming Sums of Total Males for a Combined Three County Area (Denominator)

| Total Males | ACS Estimate | Var_Rep1 | Var_Rep2 | Var_Rep3 | ... | Var_Rep80 |
|---|---|---|---|---|---|---|
| County 1 | 454,762 | 454,766 | 454,729 | 454,765 | ... | 454,727 |
| County 2 | 108,180 | 108,455 | 108,010 | 110,470 | ... | 108,255 |
| County 3 | 22,835 | 22,775 | 23,625 | 22,445 | ... | 24,085 |
| Sum of Total Males | 585,777 | 585,996 | 586,364 | 587,680 | ... | 587,067 |

To calculate the percent, divide the estimate of males < 15 for the three county area by the estimate of total males for the same area and multiply by 100. Repeat this calculation for each variance replicate estimate.

Table 2C: Calculating the Percent of Males Under the Age of 15 for a Combined Three County Area

| Characteristic | ACS Estimate | Var_Rep1 | Var_Rep2 | Var_Rep3 | ... | Var_Rep80 |
|---|---|---|---|---|---|---|
| Males < 15 | 120,636 | 120,633 | 121,746 | 121,431 | ... | 120,898 |
| Total Males | 585,777 | 585,996 | 586,364 | 587,680 | ... | 587,067 |
| Percent | 20.5942 | 20.5860 | 20.7629 | 20.6628 | ... | 20.5936 |

To calculate the MOE for the percent, we will again use the equation (1). This time, use the ACS percent estimate and the eighty variance replicate percent estimates. Take the difference between each of the eighty variance replicate estimates and the ACS estimate and square each difference. For example, the difference between the first variance replicate estimate and the ACS Estimate is 20.5860 – 20.5942 = -0.00821. The squared difference is then equal to 0.0000674. This may be seen in Table 2D below. Note that rounding should only be done on the final result. To calculate the MOE, use the unrounded SE and variance in your calculations.

Calculate the variance by summing the eighty differences squared terms and then multiply by 4/80. For this example, the sum of all eighty squared differences is 0.273793. When multiplied by 4/80, the result is 0.0136896.

Calculate the 90% confidence level MOE by taking the square root of the variance to form the standard error 0.117003. Then multiply it by 1.645. In this example, the result is 0.19247

Table 2D: Calculating the Margin of Error for Percent of Males<15 Over Total Males for a Combined Three County Area

| Variable | Replicate Estimate | ACS Estimate | Difference | Difference Squared |
|---|---|---|---|---|
| Var_Rep1 | 20.5860 | 20.5942 | -0.00821 | 0.0000674 |
| Var_Rep2 | 20.7629 | 20.5942 | 0.16869 | 0.0288455 |
| Var_Rep3 | 20.6628 | 20.5942 | 0.06859 | 0.0047047 |
| … | … | … | … | … |
| Var_Rep80 | 20.5936 | 20.5942 | -0.00062 | 0.0000039 |
| | | | Sum of Difference Squared | 0.2737930 |
| | | | Variance | 0.0136896 |
| | | | Standard Error | 0.1170028 |
| | | | Margin of Error | 0.1924696 |

$$\text{Margin of Error} = 1.645 \times \sqrt{0.0136896} = 1.645 \times 0.117003 = 0.19247$$

Users can round the estimate and the MOE to the desired number of decimal place. If rounded to the hundredth decimal place, the final result for the percent males under the age of 15 for the combined three-county area is 20.59% with a MOE of 0.19%.[4]

# MOEs for Zero Counts and Percent Estimates of Zero or 100 Percent

The standard replicate variance formula does not provide an acceptable value when a count estimate is zero, or a percent estimate is zero percent or 100 percent. For these three cases, all

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[4] ACS rounds to one decimal place for both percentage estimates and their MOEs. In addition, if the MOE rounds to zero, the ACS tables display the MOE as 0.1.

variance replicate estimates will be the same as the production estimate, and the resulting variance from the variance replicate estimates will be zero. In each case, the estimate should have sampling error, as persons or housing units not selected in sample may have the given characteristic.

For zero count, zero percent, and 100 percent estimates, the ACS uses models to provide reasonable margins of error for these estimates. Formulas for these special cases are provided below.

## Margins of Error for Zero Count Estimates

The margin of error for a zero count estimate is based on two values, the average weight and the k-value.

$$MOE(0 \ count) = 1.645 \times \sqrt{average \ weight \ \times k\text{-}value} \qquad (3)$$

The average weight is the maximum of the average person weight and average housing unit weight, and is calculated for the nation, the 50 states, the District of Columbia and Puerto Rico. Average weight values for the 2010-2014 ACS 5-year data may be found at the end of this document in Appendix A. If the geographic area lies entirely within a state, then use that state's average weight in the formula. Otherwise, use the national average weight.

The k-value is assigned based on the total population size of the geographic area. See Appendix A for instructions on selected the correct k-value.

Data users should be aware that the actual k-value and average weight are created using internal files which are not available to the public. Therefore, the published MOE may differ from the calculated MOE using the values and methods presented in this document.

Chapter 12 of the Design and Methodology report[5] has a brief discussion of the derivation of this methodology.

## Example 3: Calculating the MOE for a Zero Count Estimate

Suppose your zero estimate is for a geographic area in the state of Maryland with a total population of 25,000. Using Appendix A, we see that the k-value is 14. In addition, the average weight for Maryland is 13.

$$MOE(0) = 1.645 \times \sqrt{average \ weight \ \times k\text{-}value}$$
$$= 1.645 \times \sqrt{13 \times 14}$$
$$= 1.645 \times \sqrt{182} = 22$$

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[5] The Design and Methodology document is located here: http://www.census.gov/programs-surveys/acs/methodology/design-and-methodology.html.

## Margins of Error for Zero Percent or 100 Percent Estimates

There is a different formula used for zero and 100 percent estimates. The average weight is also used in the formula, but the k-value is not. First, define p*, using the average weight and the denominator of the percent estimate:

$$p^* = \frac{2.3 \times average\ weight}{denominator} \ ; \ \ If\ p^* > 0.5, then\ use\ p^* = 0.5\ instead. \tag{4}$$

$$MOE(0\%\ or\ 100\%) = 100\% \times 1.645 \times \sqrt{p^* \times (1 - p^*) \times \frac{average\ weight}{denominator}} \tag{5}$$

## Example 4: Calculating the MOE for a 100 Percent Estimate

This example demonstrates how to calculate the MOE for a 100 percent estimate. Suppose the estimate is in the state of New Mexico and the denominator is 6,000. Using Appendix A, we see that the average weight for New Mexico is 13.

$$p^* = \frac{2.3 \times average\ weight}{denominator}$$

$$= \frac{2.3 \times 13}{6,000} = 0.00498$$

$$MOE(100\%) = 100\% \times 1.645 \times \sqrt{p^* \times (1 - p^*) \times \frac{average\ weight}{denominator}}$$

$$= 100\% \times 1.645 \times \sqrt{0.00498 \times (1 - 0.00498) \times \frac{13}{6,000}}$$

$$= 0.5\%$$

A zero percent estimate in the same geographic area and with the same denominator would have the same margin of error, MOE(0%) = 0.5%.

## Example 5: Alternate Method for Calculating the MOE for a Zero Count Estimate

When summing zero count estimates and using approximation methods to calculate the sum's margin of error, we have recommended using the largest MOE of the zero estimates in the

approximation formula.  This avoided the issue of the approximate MOE becoming unusable when many zero estimates were included in a sum.  Data users may still use this method if they wish because the MOE for zero estimates is model-based.

Table 3 shows an example of three zero estimates and their sum.

Table 3:  Sum of Zero Count Estimates for a Combined Three Tract Area

| Characteristic | ACS Estimate | Var_Rep1 | Var_Rep2 | Var_Rep3 | ... | Var_Rep80 | Published MOE |
|---|---|---|---|---|---|---|---|
| Tract 1 | 0 | 0 | 0 | 0 | ... | 0 | 11 |
| Tract 2 | 0 | 0 | 0 | 0 | ... | 0 | 11 |
| Tract 3 | 0 | 0 | 0 | 0 | ... | 0 | 13 |
| Sum of Tracts | 0 | 0 | 0 | 0 | ... | 0 | |

As previously mentioned, the MOE cannot be zero because the zero estimate may actually be non-zero when the full population is examined.  For this example, instead of using the average weight and k-value, simply examine the published MOEs.  Assign the zero estimate for the sum a MOE of 13 as that is the largest published MOE for the three estimates.  This method may underestimate the MOE as compared with the average weight and k-value method.

# Controlled Estimates and Other Estimates Where All Variance Replicate Estimates Are Equal

Users of ACS data are likely aware that some ACS estimates are controlled to be equal or nearly equal to the official Population Estimates.  The population estimates are the official intercensal estimates produced by the Census Bureau.  Controlled ACS estimates can occur for only a limited number of demographic characteristics such as totals by age and sex.[6]  ACS estimates which are controlled are assigned a MOE of five asterisks (*****) on AFF.  Because they are forced to match a fixed value, they are assumed to have no sampling error.  That is, the MOE is zero.  In the variance replicate estimate files, the variable called CME will have a value of five asterisks ('*****').

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[6] Controlled estimates only occur for counties, areas that are equivalent to a county, or areas that are combinations of complete counties.  Estimates of subgroups of the total population are controlled only if they are combinations of specific age ranges, sex, and Hispanic origin.  No estimate involving a race group is ever controlled.  The total population in housing units, in group quarters, and for certain group quarters types may also be controlled for states, areas that are equivalent to a state, or areas that are combinations of states.

## Handling Controlled Estimates

If a data user sums two or more controlled estimates together, the sum will be controlled. Any percent or ratio estimate where both the numerator and denominator are entirely made up of controlled estimates will be controlled as well

The estimate and the eighty variance replicate estimates for a controlled estimate are often the same value. However, this is not always the case. Table 4 shows the estimate and eighty variance replicate estimates for the total population of the United States.

Table 4: Total Population for the United States (Table ID: B01003)

| Characteristic | ACS Estimate | Var_Rep1 | Var_Rep2 | … | Var_Rep80 | Published MOE |
|---|---|---|---|---|---|---|
| Total Population | 314,107,084 | 314,107,058 | 314,107,058 | … | 314,107,058 | ***** |

Although the variance replicate estimates are all identical, the ACS estimate is different from them. Differences like these arise due to the complex ACS weighting, and is sometimes due to rounding the ACS weights to whole numbers.[7]

## Non-Controlled Estimates

Sometimes a data user sums estimates within a table or across geographies and the results is a published, controlled estimate on AFF. If the data user knows the published estimate is controlled, then the sum is also controlled.

However, if a data user combines two or more estimates to form an estimate which is not published on AFF and the calculated MOE is zero, assume that the estimate is not controlled and calculate the MOE using the methods specified earlier in this document in equations (4) or (5), as if the estimate were zero.

## Example 6: Calculating the MOEs for Non-Controlled Estimates

This example demonstrates how to calculate the MOE for an estimate which is not controlled, but has a calculated MOE of zero. Table 5 shows two county estimates for the population of 18 and 19 years of age. In both cases, the estimates are not controlled. They each have a calculated MOE of zero, but a published MOE which is not zero. Suppose the data user wants to sum these estimates for an estimate for the combined area. The sum will have a calculated MOE of zero like the original estimates and, like them, a non-zero MOE must be assigned. In this case, the MOE is calculated using the same methodology for zero estimates.

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[7] For more information on the ACS weighting process, see Chapter 11 of the ACS Design & Methodology report. http://www.census.gov/programs-surveys/acs/methodology/design-and-methodology.html

Table 5: Forming the Sum of Estimates with Calculated MOEs of Zero

| Characteristic | ACS Estimate | Var_Rep1 | Var_Rep2 | Var_Rep3 | … | Var_Rep80 | Published MOE |
|---|---|---|---|---|---|---|---|
| Autauga County, Alabama, Age 18 and 19 | 725 | 725 | 725 | 725 | … | 725 | 27 |
| Butler County, Alabama, Age 18 and 19 | 231 | 231 | 231 | 231 | … | 231 | 21 |
| Sum of the Two Counties, Age 18 and 19 | 956 | 956 | 956 | 956 | … | 956 | |

Source: 2010-2014 ACS 5-year data, Table ID B01001

The estimates are from Alabama and therefore the result is entirely in Alabama as well. Using Appendix A, the average weight for Alabama is 12. To determine the k-value, we use the table for Total Population (Table ID: B01003) and find that the total population for Autauga County is 55,136. The total population for Butler County is 20,523. The combined total population is therefore 55,136 + 20,523 or 75,659. The table for the k-value parameter indicates that any geography with a population over 50,000 should use a k-value of 22.

Thus, the margin of error is:

$$MOE(956) = 1.645 \times \sqrt{average\ weight \times k\text{-}value}$$
$$= 1.645 \times \sqrt{12 \times 22} = 27$$

# Percent or Ratio Estimate with One or More Undefined Variance Replicate Estimates

Another special case may arise for percentages or ratios. In this case, the percent or ratio is defined, but one or more of the variance replicate estimates of the percent or ratio is undefined because the denominator is zero. In these cases, substitute a value of zero for the percent or ratio variance replicates that are undefined.

### Example 7:  Calculating a Variance Replicate Estimate with a Denominator of Zero for a Percent or Ratio

For example, if the second variance replicate estimate for the numerator of your percent estimate is 35 and the denominator is zero, as seen in Table 6. Assign a value of zero for the second replicate percent estimate when calculating the squared difference for that variance replicate estimate.

Table 6: Assigning a Value to an Undefined Variance Replicate Percent

|  | Replicate Numerator | Replicate Denominator | Replicate Percent | ACS Est | Difference | Difference Squared |
|---|---|---|---|---|---|---|
| **Var_Rep1** | 30 | 50 | 60.0 | 80.0 | -20.0 | 400.0 |
| **Var_Rep2** | 35 | 0 | N/A | 80.0 | -80.0 | 6400.0 |

## Note on File Layout

The data for the variance replicate estimate tables are in comma separated value (CSV) files. CSV files may be imported into a wide range of statistical programs, such as SAS, SPSS, STATA, and R. Excel will also also open CSV files.

Data users who import the data into SAS may encounter an issue where the last variable in the file is not read in correctly. This may be due to the end-of-line character on the CSV file. Beginning in SAS 9.2, the INFILE statement TERMSTR= CRLF may be used to correct this issue. Below is example SAS code which demonstrates this.

```
%macro import_vre_data(path=,table_id=);
data vre_data;
 INFILE "&path./&table_id..csv"
    DELIMITER = "," MISSOVER DSD LRECL=32767 FIRSTOBS=4 TERMSTR=CRLF ;
    INFORMAT tblid $12. geoid $40. name $1000. order 8. title $400. estimate 8. moe 8.
        cme $20. se 8. %do i = 1 %to 80; Var_Rep&i. 8. %end; ;
    FORMAT tblid $12. geoid $40. name $1000. order 8. title $400. estimate 8. moe 8. cme $20.
        se 8. %do j = 1 %to 80; Var_Rep&j. 8. %end; ;
    INPUT tblid $ geoid $ name $ order title $ estimate moe cme $ se
        %do k = 1 %to 80; Var_Rep&k. %end; ;
run;
%mend;

%import_vre_data(path=<specify location of file>,table_id=<Table ID, e.g. B01001>);
```

## Note on File Size and Excel

Data users should be aware that issues may arise when opening large files in Excel due to the file exceeding the row limit (1,048,576 in current versions), causing Excel to truncate the data. Not all files will have this issue. Data users may need to use other programs to examine the data in these large files.

If you need any additional information or have more questions, please e-mail acso.users.support@census.gov. If you have questions or comments about the American Community Survey, you can submit a question online at https://ask.census.gov/.

# References

Fay, Robert E., and Train, George F. (1995), "Aspects of Survey and Model-Based Postcensal Estimation of Income and Poverty Characteristics for States and Counties", ASA Proceedings of the Section on Government Statistics, 154-159, American Statistical Association (Alexandria, VA).  http://www.census.gov/did/www/saipe/publications/files/FayTrain95.pdf

U.S. Census Bureau (2014), "American Community Survey Design and Methodology (January 2014)", http://www.census.gov/programs-surveys/acs/methodology/design-and-methodology.html

# Appendix A – Average Weights and K-Values

Table APP1: Average Weight by State for 2010-2014 ACS 5-Year Data

| Geography | FIPS State Code | Average Weight | Geography | FIPS State Code | Average Weight |
|---|---|---|---|---|---|
| United States | - | 12 | | | |
| Alabama | 01 | 12 | Montana | 30 | 9 |
| Alaska | 02 | 8 | Nebraska | 31 | 8 |
| Arizona | 04 | 15 | Nevada | 32 | 15 |
| Arkansas | 05 | 12 | New Hampshire | 33 | 11 |
| California | 06 | 14 | New Jersey | 34 | 13 |
| Colorado | 08 | 13 | New Mexico | 35 | 13 |
| Connecticut | 09 | 13 | New York | 36 | 12 |
| Delaware | 10 | 12 | North Carolina | 37 | 14 |
| District of Columbia | 11 | 14 | North Dakota | 38 | 7 |
| Florida | 12 | 16 | Ohio | 39 | 12 |
| Georgia | 13 | 15 | Oklahoma | 40 | 8 |
| Hawaii | 15 | 11 | Oregon | 41 | 13 |
| Idaho | 16 | 12 | Pennsylvania | 42 | 10 |
| Illinois | 17 | 11 | Rhode Island | 44 | 14 |
| Indiana | 18 | 12 | South Carolina | 45 | 14 |
| Iowa | 19 | 8 | South Dakota | 46 | 8 |
| Kansas | 20 | 10 | Tennessee | 47 | 14 |
| Kentucky | 21 | 12 | Texas | 48 | 15 |
| Louisiana | 22 | 13 | Utah | 49 | 12 |
| Maine | 23 | 9 | Vermont | 50 | 7 |
| Maryland | 24 | 13 | Virginia | 51 | 13 |
| Massachusetts | 25 | 14 | Washington | 53 | 13 |
| Michigan | 26 | 9 | West Virginia | 54 | 12 |
| Minnesota | 27 | 7 | Wisconsin | 55 | 7 |
| Mississippi | 28 | 14 | Wyoming | 56 | 12 |
| Missouri | 29 | 11 | Puerto Rico | 72 | 15 |

Table APP2: Assigning K-Value Based on an Area's Total Population

| Total Population Range | K-Value |
|---|---|
| 4,999 or less | 4 |
| 5,000 to 9,999 | 8 |
| 10,000 to 19,999 | 10 |
| 20,000 to 29,999 | 14 |
| 30,000 to 49,999 | 18 |
| 50,000 or more | 22 |