Estimates for 1996-1997 Data Products

INTRODUCTION

The data contained in these Profiles and Summary Tables are based on the American Community Survey (ACS) sample interviewed in 1996 and 1997. There are two data products available based on 1996-1997 data. The first is 1996-1997 average, and the other is the 1996-1997 percent change. The purpose of this documentation is to provide data users with a basic understanding of the estimation methodology and the accuracy of the ACS data.

1996-1997 AVERAGES

Computing the Average

The combined 1996-1997 (weighted) averages are computed from the individual year estimates using the following formulas:

1996-1997 Count = (Count for 1996 + Count for 1997) / 2

1996-1997 Aggregate = (Aggregate for 1996 + Aggregate for 1997) / 2

1996-1997 Ratio = (1996-1997 numerator) / (1996-1997 denominator)
(This holds for proportions, means and per capita amounts)
The numerator and denominator could either be a count or an aggregate. For example take Summary Table P81A, the numerator is aggregate income and the denominator is count of persons.

1996-1997 Median = Median of all observations

Note on Rounding

When you sum the cell estimates in a table, it may not give you the same estimate as the universe table due to the rounding not being controlled. The cells of a table are rounded separately, and thus when summed may not add up to the corresponding universe table. An example follows for Brevard County:

Table P1

1996 estimate	1997 estimate	1996-1997 estimate not rounded	1996-1997 estimate rounded
447,416	454,603	451,009.5	451,010

Table P6

Table Stub	1996 estimate	1997 estimate	1996-1997 estimate not rounded	1996-1997 estimate rounded
White	390,683	397,366	394,024.5	394,025
Black	40,472	42,538	41,505	41,505
American Indian, Eskimo, and Aleut	2,529	2,920	2,724.5	2,725
Asian and Pacific Islander	8,310	8,360	8,335	8,335
Other Race	5,422	3,419	4,420.5	4,421
Total	447,416	454,603	451,009.5	451,011

From Table P6 we can see that the total number of people is 451,011, but from Table P1 it is 451,010. The difference here is due to rounding in the stubs of Table P6.

Computing 1996 and 1997 Standard Errors

First you need to calculate the standard errors for the 1996 and 1997 estimates. If the estimate is a ratio, then you need the standard errors for each of the estimates that make up the numerator and denominator. The procedures for calculating the standard errors for 1996 are in the Accuracy of the Data 1996 and the procedures for 1997 are in the Accuracy of the Data 1997.

Computing the 1996-1997 Average Standard Error

Once you have the standard errors for the 1996 and 1997 estimates separately, use the following formulas to obtain the standard error for the 1996-1997 average.

se for counts and aggregates = $\sqrt{\frac{1}{4} * (SE_{96}^2 + SE_{97}^2)}$

se for proportions, ratios, means and per capita amounts =

$$\frac{EST_{n96} + EST_{n97}}{EST_{d96} + EST_{d97}} \sqrt{\frac{SE_{n96}^2 + SE_{n97}^2}{(EST_{n96} + EST_{n97})^2} + \frac{SE_{d96}^2 + SE_{d97}^2}{(EST_{d96} + EST_{d97})^2}}$$

Where n stands for numerator and d for denominator. So EST_{n96} is the estimate of the numerator for 1996 and SE_{d97} is the standard error of the denominator for 1997.

Direct standard error for medians was obtained by using, with the combined data the method that was used for both the 1996 and 1997 single year data products. If the standard error turned out to be 0 for medians then the standard error was assigned a value of "*".

Examples

We will present some examples on using the formulas for the 1996-1997 averages. The 1996 estimates come from the 1996 Summary Tables (1997 Geography) and the 1997 estimates are obtained from the 1997 Summary Tables.

Example 1 - Count Estimate

The estimated number of 2 person families from Summary Table P75 for 1996 is 66,097 and for 1997 it is 71,553 for Brevard County, FL. The 1996-1997 average is $\frac{66,097 + 71,553}{2} = 68,825$. To obtain the standard error estimate for the average, we need to first obtain the standard error estimates for the 1996 and 1997 estimates either from the tables or by using the design factor approach. We will go through the design factor approach for the 1996 estimate and we will just give the 1997 standard error based on the same approach. To determine the standard error for the 1996 estimate we need the design factor for Family Type (1.2) and the N value (123,709) to use in the formula following Table A in the Accuracy of the Data 1996.

$$\text{BasicSE}(66,097) = \sqrt{\frac{85}{15} * 66,097 * (1 - \frac{66,097}{123,709})} = 418$$

The final standard error is gotten by multiplying the above BasicSE by the design factor, which is 1.2 * 418 = 502. The standard error for the 1997 estimate is 1,125. So now we are ready to obtain the standard error of the average using the standard error formula for counts and aggregates.

$$\text{AverageSE} = \sqrt{\frac{1}{4} * (502^2 + 1,125^2)} = 616$$

Example 2 - Ratio Estimate

We are interested in obtaining the mean 1997 adjusted family for 2 person families (Summary Table P76A). The 1996 aggregate adjusted income for 2 person families from Summary Table P76 is 2,965,395,639 and for 1997 it is 3,360,348,094. From Example 1 we know the estimate of 2 persons families for 1996 is 66,097 and the standard error is 502, and the

estimate of 2 person families for 1997 is 71,553 and the standard error is 1,125. The standard errors for the aggregate incomes must be gotten from the 1996 Summary Tables (1997 Geography) for 1996 and from the 1997 Summary Tables for 1997.
These standard errors are 42,929,330 for 1996 and 179,856,169 for 1997. Now we can obtain the 1996-1997 average and its standard error. The standard error formula being used is the one for proportions, ratios, means, and per capita amounts.

The 1996-1997 average is $\frac{2,965,395,639 + 3,360,348,094}{66,097 + 71,553} = 45,955$

$$\text{AverageSE} = \frac{2,965,395,639 + 3,360,348,094}{66,097 + 71,553} * \sqrt{\frac{42,929,330^2 + 179,856,169^2}{(2,965,395,639 + 3,360,348,094)^2} + \frac{502^2 + 1,125^2}{(66,097 + 71,553)^2}} = 1,405$$

1996-1997 PERCENT CHANGE

Computing the Percent Change

$$\%\text{CHG} = \frac{EST_{97} - EST_{96}}{EST_{96}} * 100$$

Exceptions to the above formula:

1. If the estimate for 1996 (EST_{96}) is less than zero then the %CHG estimate should have the opposite sign.

2. If the estimate for 1996 is equal to 0 then the %CHG estimate was given a value of "- -" and the standard error a value of '***'.

Computing 1996 and 1997 Standard Errors

First you need to calculate the standard errors for the 1996 and 1997 estimates. The procedures for calculating the standard errors for 1996 are in the Accuracy of the Data 1996 and the procedures for 1997 are in the Accuracy of the Data 1997.

Computing the 1996-1997 Percent Change Standard Error

Now that we have standard errors for both 1996 and 1997 estimates, we can calculate standard errors for the percent change from 1996 to 1997.

The standard error for the percent change is calculated as follows:

$$\text{SE(\%CHG)} = \left|\frac{EST_{97}}{EST_{96}}\right| * \sqrt{\frac{SE_{97}^2}{EST_{97}^2} + \frac{SE_{96}^2}{EST_{96}^2}} * 100$$

Exceptions to the above formula:

1. If the estimate for 1997 is equal to zero then the standard error was given a value of "****".

2. If both the 1996 and 1997 standard errors are controlled to be zero then the standard error was given a value of "*****".

Example

We will give an example computing the 1996-1997 percent change and the standard error. The estimated number of 2 person families for 1996 is 66,097 and for 1997 it is 71,553 for Brevard County, FL.

$$\text{\%CHG} = \frac{71{,}553 - 66{,}097}{66{,}097} * 100 = 8.3\%$$

To obtain the standard error estimate for the percent change, we need to first obtain the standard error estimates for the 1996 and 1997 estimates either from the tables or by using the design factor approach. These were gotten in Example 1 for the 1996-1997 averages above. The standard error for the 1996 estimate is 502 and for the 1997 estimate it is 1,125. So now we are ready to obtain the standard error of the percent change.

$$\text{SE(\%CHG)} = \left|\frac{71{,}553}{66{,}097}\right| * \sqrt{\frac{1{,}125^2}{71{,}553^2} + \frac{502^2}{66{,}097^2}} * 100 = 1.9$$

Generalized variances are used wherever applicable for both 1996 and 1997 for these data products. In calculating standard errors for the 1996-1997 data products the exact value of 85/15 was used, not the rounded value of 5.7 given in the formulas for generalized variances following Tables A and B in the Accuracy of the Data 1996.