PUMS Accuracy of the Data (2003)

INTRODUCTION

The tabulations prepared from the public use microdata sample (PUMS) are based on a subset of the 2003 American Community Survey (ACS) sample. Estimates from the ACS PUMS file are expected to be different from the previously released ACS estimates because they are subject to additional sampling error and further data processing operations. The additional sampling error is a result of selecting the PUMS housing and person records through an additional stage of sampling. A more detailed discussion of both sampling and non-sampling error is given below. In Public Use files of household surveys, the basic or elementary unit is an individual housing unit and the persons who live in occupied housing units. Note that microdata records in this sample do not contain names or addresses. The methods used to protect confidentiality of individual responses are discussed next.

CONFIDENTIALITY OF THE DATA

To maintain the confidentiality of the data required by law, the Census Bureau applies a confidentiality edit to the ACS data to assure that published data do not disclose information about specific individuals, households, or housing units. As a result a small amount of uncertainty is introduced into the estimates of ACS characteristics. The confidentiality edit is controlled so that the basic structure and the usefulness of the data are preserved. The confidentiality edit is implemented by matching person records based on a few key characteristics and swapping their data. A larger subset of households is selected for the confidentiality edit for small areas to provide greater protection for these areas. The editing of the data is implemented in a way that maintain the quality and usefulness of the data. Since microdata records are the actual housing unit and person records, the Bureau of the Census takes further steps to prevent the identification of specific individuals, households, or housing units. The main disclosure avoidance method used is to limit the geographic detail shown in the files. At present, we are only releasing geographic identifiers for states. Furthermore, certain variables, such as income and housing value, are topcoded.

SOURCES OF ERROR IN THE DATA

- Sampling Error -- The data in the ACS Public Use Microdata Sample (PUMS) products are estimates of the actual figures that would have been obtained by interviewing the entire population using the same methodology. The estimates from the chosen sample also differ from other samples of housing units and persons within those housing units. Sampling error in data arises due to the use of probability sampling, which is necessary to ensure the integrity and representativeness of sample survey results. The implementation of statistical sampling procedures provides the basis for the statistical analysis of sample data.

- Nonsampling Error -- In addition to sampling error, data users should realize that other

types of errors may be introduced during any of the various complex operations used to collect and process survey data. For example, operations such as editing, reviewing, or keying data from questionnaires may introduce error into the estimates. These and other sources of error contribute to the nonsampling error component of the total error of survey estimates. Nonsampling errors may affect the data in two ways. Errors that are introduced randomly increase the variability of the data. Systematic errors which are consistent in one direction introduce bias into the results of a sample survey. The Census Bureau protects against the effect of systematic errors on survey estimates by conducting extensive research and evaluation programs on sampling techniques, questionnaire design, and data collection and processing procedures. In addition, an important goal of the ACS is to minimize the amount of nonsampling error introduced through nonresponse for sample housing units. One way of accomplishing this is by following up on mail nonrespondents during the CATI and CAPI phases.

- Standard Errors -- The standard error is a measure of the deviation of a sample estimate from the average of all possible samples. Sampling errors and some types of nonsampling errors are estimated by the standard error. The sample estimate and its estimated standard error permit the construction of interval estimates with a prescribed confidence that the interval includes the average result of all possible samples. The method of calculating standard errors and confidence intervals for the estimates in this ACS product is described in a later section.

CONTROL OF NONSAMPLING ERROR

As mentioned earlier, sample data are subject to nonsampling error. This component of error could introduce serious bias into the data, and the total error could increase dramatically over that which would result purely from sampling. While it is impossible to completely eliminate nonsampling error from a survey operation, the Census Bureau attempts to control the sources of such error during the collection and processing operations. Described below are the primary sources of nonsampling error and the programs instituted for control of this error. The success of these programs, however, is contingent upon how well the instructions actually were carried out during the survey.

- Undercoverage -- It is possible for some sample housing units or persons to be missed entirely by the survey. The undercoverage of persons and housing units can introduce biases into the data. A major way to avoid undercoverage in a survey is to ensure that its sampling frame, for ACS an address list in each state, is as complete and accurate as possible.

    The source of addresses was the Master Address File (MAF). The MAF is created by combining the 1990 Census Address Control File, the Delivery Sequence File of the United States Postal Service, and addresses listed for Census 2000. An attempt is made to assign all appropriate geographic codes to each MAF address via an automated procedure using the Census Bureau TIGER files. A manual coding operation based in the appropriate regional offices is attempted for addresses which could not be automatically coded. The MAF was used as the source of addresses for selecting sample housing units

and mailing questionnaires. TIGER produced the location maps for personal visit CAPI assignments.

In the CATI and CAPI nonresponse follow-up phases, efforts were made to minimize the chances that housing units that were not part of the sample were interviewed in place of units in sample by mistake. If a CATI interviewer called a mail nonresponse case and was not able to reach the exact address, no interview was conducted and the case was eligible for CAPI. During CAPI follow-up, the interviewer had to locate the exact address for each sample housing unit. In some multi-unit structures the interviewer could not locate the exact sample unit or found a different number of units than expected. In these cases the interviewers were instructed to list the units in the building and follow a specific procedure to select a replacement sample unit.

- Respondent and Interviewer Error -- The person answering the questionnaire or responding to the questions posed by an interviewer could serve as a source of error, although the questions were phrased as clearly as possible based on testing, and detailed instructions for completing the questionnaire were provided to each household. In addition, respondents' answers were edited for completeness, and problems were followed up as necessary.

- Interviewer monitoring -- The interviewer may misinterpret or otherwise incorrectly enter information given by a respondent; may fail to collect some of the information for a person or household; or may collect data for households that were not designated as part of the sample. To control these problems, the work of interviewers was monitored carefully. Field staff were prepared for their tasks by using specially developed training packages that included hands-on experience in using survey materials. A sample of the households interviewed by CAPI interviewers was reinterviewed to control for the possibility that interviewers may have fabricated data.

- Item Nonresponse -- Nonresponse to particular questions on the survey questionnaire and instrument allows for the introduction of bias into the data, since the characteristics of the nonrespondents have not been observed and may differ from those reported by respondents. As a result, any imputation procedure using respondent data may not completely reflect this difference either at the elemental level (individual person or housing unit) or on average.

Some protection against the introduction of large biases is afforded by minimizing nonresponse. In the ACS, nonresponse for the CATI and CAPI operations was reduced substantially by the requirement that the automated instrument receive a response to each question before the next one could be asked. For mail responses, the automated clerical review and follow-up operations were aimed at obtaining a response for every question on selected questionnaires. Values for any items that remain unanswered were imputed by computer using reported data for a person or housing unit with similar characteristics.

- Automated Clerical Review -- Questionnaires returned by mail were edited for completeness and acceptability. They were reviewed by computer for content omissions

and population coverage. If necessary, a telephone follow-up was made to obtain missing information. Potential coverage errors were included in this follow-up, as well as questionnaires with too many omissions to be accepted as returned.

- Processing Error -- The many phases involved in processing the survey data represent potential sources for the introduction of nonsampling error. The processing of the survey questionnaires includes the keying of data from completed questionnaires, automated clerical review, and follow-up by telephone; the manual coding of write-in responses; and the electronic data processing. The various field, coding and computer operations undergo a number of quality control checks to insure their accurate application.

- Automated Editing -- After data collection was completed, any remaining incomplete or inconsistent information was imputed during the final automated edit of the collected data. Imputations, or computer assignments of acceptable codes in place of unacceptable entries or blanks, were needed most often when an entry for a given item was lacking or when the information reported for a person or housing unit on that item was inconsistent with other information for that same person or housing unit. As in other surveys and previous censuses, the general procedure for changing unacceptable entries was to assign an entry for a person or housing unit that was consistent with entries for persons or housing units with similar characteristics. Assigning acceptable values in place of blanks or unacceptable entries enhances the usefulness of the data.

CALCULATION OF STANDARD ERRORS

Generalized Standard Errors

There are three generalized variance procedures used to calculate standard errors for PUMS data based on the type of estimate. For most sample estimates of *totals* and *proportions (percentages)* we use a design factor approach; for sample estimates of *aggregates*, we use a method we refer to as a, b, & c parameters; and for sample estimates of *means*, *medians*, *per capita amounts*, and *ratios (other than proportions)* we use a method we refer to as a & b parameters.

Design Factor Method

The information provided in Table A-2003 can be used to approximate the standard errors of most sample estimates of *totals* and *proportions*. Design factors by subject are provided in Table A-2003. The term "subject" refers to a characteristic, such as age for persons and tenure for housing units. The design factors reflect the effects of the actual sample design and estimation procedures used for the ACS. Details of the sample design and estimation procedures are provided elsewhere in this chapter. To approximate the standard error use the following formulas:

Total Formula:
$$SE(\hat{p}) \doteq 1.2 * DF * \sqrt{142 * \hat{Y}\left(1 - \frac{\hat{Y}}{N}\right)}$$

DF = Design Factor
N = Size of Geographic Area
$\hat{Y}$ = Estimate of Characteristic Total

Percent Formula
$$SE(\hat{p}) \doteq 1.2 * DF * \sqrt{\frac{142}{B} * \hat{p}(1 - \hat{p})}$$

DF = Design Factor
B = Base of Estimated Percentage
$\hat{p}$ = Estimated Percentage

An inspection of the formulas used to calculate the simple random sampling standard errors suggests that when dealing with zero estimates or very small estimates of totals and percentages the standard error estimates approach zero. This is also the case for very large estimates of totals and percentages. Zero or small estimates, like any other sample estimates, are still subject to sampling variability and therefore an estimated standard error of zero or close to zero is not adequate.

When an estimated total is less than 425 or within 425 of the total size of the tabulation area, use a basic standard error of 246. For estimated percentages that are less than 2 or greater than 98, use a value of 2 for $\hat{p}$ in the formula below Table B- 2003.

Exception

There is one exception to the above method: when the denominator of a percentage is zero. There are no sample observations available to compute an estimate of a proportion or an estimate of its standard error.

Determination of N and Design Factor

1. Obtain the number of persons, number of households or number of housing units, respectively for the geography(ies) you are interested in. If the estimate is of housing units then use the number of housing units; if the estimates is of families or households then use the number of households; otherwise use the number of persons.

2. Use Table A-2003 to obtain the appropriate design factor for the characteristic; for example, educational attainment or ancestry. If the estimate is a combination of two or

more characteristics, then use the largest design factor for this combination of characteristics. **The only exception to this is for items crossed with race or Hispanic Origin, for an item(s) crossed with race or Hispanic Origin use the largest design factor not including the race or Hispanic Origin design factor**.

a, b, & c Parameter Method

The information provided in Table B-2003 can be used to approximate the standard errors for estimates of *aggregates*. Use Table B-2003 to obtain the appropriate a, b, & c parameters for the characteristic; for example, aggregate person income. To approximate the standard error use the following formula:

$$se(estimate) \doteq 1.2 * \sqrt{a + b * estimate + c * estimate^2}$$

a & b Parameter Method

The information provided in Table C-2003 can be used to approximate the standard errors for estimates of *means*, *medians*, *per capita amounts*, and *ratios (other than proportions).* Use Table C-2003 to obtain the appropriate a & b parameters for the characteristic; for example, mean family income or median value. To approximate the standard error use the following formula:

$$se(estimate) \doteq 1.2 * \sqrt{a + b * Log(N)}$$

> Where: LOG is the natural log function and N is the universe count for medians, or the denominator of the estimate for means, per capita amounts and ratios for the geography(ies) you are interested in.

Exception

> There is one exception to the above method: when the denominator of a mean, per capita amount, or other ratio is zero. There are no sample observations available to compute an estimate or an estimate of its standard error.

Confidence Intervals

> Confidence Intervals -- A sample estimate and its estimated standard error may be used to construct confidence intervals about the estimate. These intervals are ranges that will contain the average value of the estimated characteristic that results over all possible samples, with a known probability.

> For example, if all possible samples that could result under the ACS PUMS sample design were independently selected and surveyed under the same conditions, and if the estimate and its estimated standard error were calculated for each of these samples, then:

1. Approximately 68 percent of the intervals from one estimated standard error below the estimate to one estimated standard error above the estimate would contain the average result from all possible samples;

2. Approximately 90 percent of the intervals from 1.65 times the estimated standard error below the estimate to 1.65 times the estimated standard error above the estimate would contain the average result from all possible samples.

3. Approximately 95 percent of the intervals from two estimated standard errors below the estimate to two estimated standard errors above the estimate would contain the average result from all possible samples.

The intervals are referred to as 68 percent, 90 percent, and 95 percent confidence intervals, respectively.

Lower and Upper Bounds -- The lower and upper bounds presented in the summary tables and profiles are the bounds based upon a 90% confidence interval.

Limitations -- The user should be careful when computing and interpreting confidence intervals.

1. The estimated standard errors included in this data product do not include all portions of the variability due to nonsampling error that may be present in the data. In particular, the standard errors do not reflect the effect of correlated errors introduced by interviewers, coders, or other field or processing personnel. Thus, the standard errors calculated represent a lower bound of the total error. As a result, confidence intervals formed using these estimated standard errors may not meet the stated levels of confidence (i.e., 68, 90, or 95 percent). Thus, some care must be exercised in the interpretation of the data in this data product based on the estimated standard errors.

2. Zero or small estimates; very large estimates -- The value of almost all ACS characteristics is greater than or equal to zero by definition. For zero or small estimates, use of the method given previously for calculating confidence intervals relies on large sample theory, and may result in negative values which for most characteristics are not admissible. In this case the lower limit of the confidence interval should be set to zero by default. A similar caution holds for estimates of totals close to a control total or estimated proportions near one, where the upper limit of the confidence interval should be set to its largest admissible value. In these situations the level of confidence of the adjusted range of values is less than the prescribed confidence level.

EXAMPLES- STANDARD ERROR CALCULATIONS

We will present some examples based on the 2003 PUMS data to demonstrate the use of the formulas.

Example 1 - Total Estimate

The estimated number of people 15 years or over who were never married is 1,474,785 from the PUMS data for the state of Virginia. To calculate the standard error, we use the total formula given in the section for Design Factor Method. In this formula $\hat{Y}$ is our estimate of 1,513,569 and N is the total PUMS population for the state of Virginia which is 7,150,715. The design factor (from Table A-2003) for "Marital Status" is 1.3.

$$SE(1,513,569) = 1.2*1.3*\sqrt{142*1,513,569*\left(1 - \frac{1,513,569}{7,150,715}\right)} = 20,306.0$$

To calculate the lower and upper bounds of the 90 percent confidence interval around 1,513,569 using the standard error, simply multiply 20,306.0 by 1.65, then add and subtract the product from 1,513,569. Thus the 90 percent confidence interval for this estimate is [1,513,569 - 1.65(20,306.0)] to [1,513,569 + 1.65(20,306.0)] or 1,480,064 to 1,547,074.

Example 2 - Proportion or Percentage Estimate

The estimated percent of people 25 years or over with a bachelor's degree or higher in Louisiana is 21.3 from the PUMS data and the base of the estimated percentage is 2,739,784. To calculate the standard error, we use the percent formula given in the Design Factor Method section. The design factor (from Table A-2003) for "Educational Attainment" is 1.5.

$$SE(21.3) = 1.2*1.5*\sqrt{\frac{142}{2,739,784}*21.3*(100-21.3)} = 0.46$$

To calculate the lower and upper bounds of the 90 percent confidence interval around 21.3 percent using the standard error, simply multiply 0.46 by 1.65, then add and subtract the product from 21.3. Thus the 90 percent confidence interval for this estimated percentage is [21.3 - 1.65(0.46)] to [21.3 + 1.65(0.46)] or 20.5 to 22.1.

Example 3 - Median Estimate

The estimated median age is 33.0 for the state of Arizona from the PUMS data. To calculate the standard error, we use the formula given in the a & b Parameter Method section. The parameters a and b (from Table C-2003) for "Median Age" are: 0.065958 and -0.003039, respectively. In this formula, N (the total population) is determined from the PUMS data for Arizona to be 5,490,147.

$$SE(33.0) = 1.2*\sqrt{0.065958 - 0.003039*LOG(5,490,147)} = 0.16$$

To calculate the lower and upper bounds of the 90 percent confidence interval around 33.0 using the standard error, simply multiply 0.16 by 1.65, then add and subtract the product from 33.0. Thus the 90 percent confidence interval for this estimate is [33.0 - 1.65(0.16)] to [33.0 + 1.65(0.16)] or 32.7 to 33.3.

Example 4 - Ratio Estimate

The estimated average household size is 2.39 from the PUMS data for Vermont. To calculate the standard error, we use the formula given in the a & b Parameter Method section. The parameters a and b (from Table C-2003) for "Average Household Size" are: 0.002298 and -0.000119, respectively. In this formula, N (the number of households) is determined from the PUMS data for Vermont to be 242,047.

$$SE(2.39) = 1.2 * \sqrt{0.002298 - 0.000119 * LOG(242,047)} = 0.034$$

To calculate the lower and upper bounds of the 90 percent confidence interval around 2.39 using the standard error, simply multiply 0.034 by 1.65, then add and subtract the product from 2.39. Thus the 90 percent confidence interval for this estimate is [2.39 - 1.65(0.034)] to [2.39 + 1.65(0.034)] or 2.33 to 2.45.

Example 5 - Aggregate Estimate

The estimated aggregate household income in 2003 inflation adjusted dollars is 221,852,085,242 from the PUMS data for Michigan. To determine the standard error, we use the formula given in the a, b, & c Parameter Method section. The parameters a, b, and c (from Table B-2003) for "Aggregate Household Income" are: 7569; 28,594,416.274820; and -0.000001; respectively.

$$SE(221,852,085,242) =$$

$$1.2 * \sqrt{7,569 + 28,594,416.274820 * 221,852,085,242 - 0.000001 * 221,852,085,242^2}$$

$$= 3,010,664,053$$

To calculate the lower and upper bounds of the 90 percent confidence interval around 221,852,085,242 using the standard error, simply multiply 3,010,664,053 by 1.65, then add and subtract the product from 221,852,085,242. Thus the 90 percent confidence interval for this estimate is [221,852,085,242 - 1.65(3,010,664,053)] to [221,852,085,242 + 1.65(3,010,664,053)] or 221,852,047,963 to 221,852,122,521.

SAMPLE DESIGN

Housing unit records for the ACS PUMS consist of all records from the supplementary sample and a sample of records from the 31 test sites. Persons in the selected occupied housing units constitute the ACS PUMS person sample. The process of selecting housing units from the test sites was performed independently for each state that has test sites (26 states).

The housing units in the test sites were classified into three types: vacant, occupied mail/CATI, and occupied CAPI. Sampling rates were then determined separately for each of these types. Sampling rates were determined based on the size of test site housing unit weights compared to supplementary sample housing unit weights in the same state. Weights of test site housing units are generally smaller than those in the supplementary sample, so it would be easy to identify a test site case in some instances. This is a disclosure risk that we eliminate by choosing sampling rates so that the distribution of PUMS weights for the selected test site housing units is similar to that of supplementary sample housing units so test site housing units with very small weights do not stand out. In most cases, this need necessitated the stratification of the housing units based on their weight. housing units with a weight less than a certain value would be sampled at one rate with the remaining housing units sampled at a higher rate. The table below shows two hypothetical examples of sampling rates for each type of housing unit. In state 1 for example, mail/CATI cases with weight less than 16 are sampled at a rate of 1 in 10, and the remaining mail/CATI cases are sampled at a rate of 1 in 5. In state 2, all mail/CATI cases are sampled at a rate of one in 5, and CAPI occupied housing units are sampled at a rate of 1 in 3.

State		Mail/CATI		CAPI		Vacant	
State 1	Weight	<16	≥16	<25	≥25	<23	≥23
	Sampling Interval	10	5	7	3	9	4
State 2	Weight	All		All		<41	≥41
	Sampling Interval	5		3		10	3

These combinations of housing unit type and value of weight determined the cells that the test site housing units were stratified into. In the table above, state 1 has six stratification cells and state 2 has five cells. Sampling was done independently in each cell. After stratification, the housing units in each cell were sorted. The cells for vacant housing units were sorted by reason for vacancy, census tract, and weight. The cells for occupied housing units were sorted by tenure, race of householder, census tract, and weight. The categories for vacancy, tenure, and race are:

Reason for Vacancy: For sale
                           For rent

Tenure: Owner
                           Renter

Race of Householder: White Non-Hispanic
                           Black Non-Hispanic
                           American Indian/Alaska Native Non-Hispanic

Asian Non-Hispanic
Native Hawaiian/Other Pacific Islander Non-Hispanic
Hispanic

The householder is, in most cases, the person or one of the people in whose name the home is owned, being bought, or rented and who is listed on line one of the survey questionnaire. If there is no such person in the household, any adult household member 15 years old and over could be designated as the householder.

After stratification and sorting, sampling is done in each cell as follows. A random integer between 1 and the sampling interval is generated to select the first record. After the first record is selected, every k^{th} subsequent record is chosen, where k is the sampling interval. The PUMS housing unit weight is calculated by multiplying the original housing unit weight by the sampling interval.

The PUMS person sample is obtained by selecting all persons that are in the selected housing units. The PUMS person weight is calculated by multiplying a person factor by the PUMS weight for the person's housing unit. The person factor is defined as:

$$\text{Person Factor} = \frac{\text{PWGT}}{\text{WGT}}$$

Where PWGT = The ACS person weight

WGT = The ACS housing unit weight of the person's housing unit

Under this method for calculating the PUMS person weight, the ratio of the person weight to the weight of the person's housing unit is preserved in the PUMS.

PRODUCTION OF ESTIMATES
The ACS PUMS sample is **not** self - weighted. To produce estimates or tabulations of characteristics form the ACS PUMS simply add the weights of all persons or housing units that possess the characteristic of interest. For instance, if the characteristic of interest is "total number of black teachers", simply determine the race and occupation of all persons and cumulate the weights of those who match the characteristics of interest. To get estimates of proportions simply divide the weighted estimate of persons or housing units with a given characteristic by the weighted estimate of the base. For example, the proportion of "black teachers" is obtained by dividing the weighted estimate of black teachers by the PUMS estimate of teachers.

Adjustment of Dollar Amounts
When working with dollar amounts, it is necessary to apply an adjustment factor. The factor is included in the PUMS datasets and is called ADJUST. The reason this adjustment is needed is because interviews in the ACS were conducted throughout the year. Application of the adjustment factor will convert dollar amounts to July 2003 dollars. Note that the value of ADJUST is the same for all sample cases (its value is 1.013394 for 2003). This is for disclosure avoidance

reasons, that is, so that the month of interview cannot be identified by the adjustment factor. The original dollar amounts were adjusted so that one value of ADJUST could be used for all sample cases.

When working with dollar amounts from different years, it is necessary to convert the amounts into dollars from a common year (after applying the adjustment factor described in the previous paragraph). We use the CPI-U-RS adjustment factors from the Bureau of Labor Statistics. These factors can be found at the following URL: http://www.bls.gov/cpi/cpiurstx.htm. [For example, to express year 2000 dollars in terms of 2003 dollars, multiply the 2000 dollars by 267.9/250.8 = 1.06818182].

Table A-2003. PUMS Standard Error Design Factors - 2003 American Community Survey - (Page 1 of 3)

Characteristics	Design Factor
POPULATION	
Families and Nonfamilies	1.7
Population in Households by Race/Hispanic Origin of Householder	2.7
Population in Families	2.5
Age	1.1
Sex	1.0
Population of One Race	3.2
Population of Two or More Races	2.5
White Alone	2.5
Black or African American Alone	3.1
American Indian and Alaska Native Alone, Asian Alone, Native Hawaiian and Other Pacific Islander Alone, or Some Other Race Alone	3.0
Hispanic or Latino	2.9
Not Hispanic or Latino	2.4
Marital Status	1.3
Relationship	1.4
Ancestry	2.7
Grandparents Responsible for Grandchildren	1.9
Number of Women Who Had a Birth in the Past 12 Months	0.9
Language Spoken at Home and Ability to Speak English	1.8
Linguistic Isolation	1.7
Place of Birth, Year of Entry, and Citizenship Status	2.9
Residence 1 Year Ago	3.0
School Enrollment, Level of School, and Type of School	1.3
Educational Attainment	1.5
Armed Forces Status and Veteran Status	0.7
Period of Military Service	1.5
Disability Status	1.1
Employment/Work Status	1.2
Industry, Occupation, and Class of Worker	1.6
Travel Time to Work	2.0
Means of Transportation to Work	1.7
Place of Work	2.4

Table A-2003. PUMS Standard Error Design Factors - 2003 American Community Survey - (Page 2 of 3)

Characteristics	Design Factor
Time Leaving Home to go to Work	1.8
Private Vehicle Occupancy	1.8
Work Experience, Hours Worked per Week, and Weeks Worked	1.4
Number of Workers in Family	1.5
Family Type, Household Type, and Household Size	1.7
Presence of Own Children, Presence of People Under 18 Years, Presence of People 60 Years and Over, and Presence of People 65 Years and Over	1.5
Households by Presence of Nonrelatives	2.2
Age of Own Children by Living Arrangements and Employment Status of Parents	1.8
Age of Householder	1.4
Race of Householder	1.8
Hispanic Origin of Householder	1.7
Household, Family, or Nonfamily Income	1.6
Person Earnings/Income	1.6
Type of Household Income	2.0
Poverty Status (Persons)	1.4
Poverty Status (Families/Households)	1.5
Ratio of Income to Poverty Level	3.2
Receipt of Food Stamps and Participation in Free or Reduced Price Meals	1.7
Participation in Federal Home Heating and Cooling Assistance Program	1.6
HOUSING	
Occupied Housing Units	3.2
Tenure	2.0
Vacant	2.3
Rooms and Bedrooms	1.7
Occupants per Room	1.8
Units in Structure	2.0
Year Structure Built and Year Householder Moved Into Unit	1.8
House Heating Fuel	3.1
Telephone Service Available	2.0
Vehicles Available	1.6
Plumbing Facilities and Kitchen Facilities	2.5
Gross Rent, Gross Rent as a Percentage Of Household Income, and Contract Rent	1.8

Table A-2003. PUMS Standard Error Design Factors - 2003 American Community Survey -
(Page 3 of 3)

Characteistics	Design Factor
Meals Included in Rent	1.8
Rent Asked	2.0
Inclusion of Utilities in Rent	1.9
Value	1.6
Price Asked	1.9
Mortgage Status and Selected Monthly Owner Costs	1.5
Population by Tenure	3.4

Table B-2003 PUMS a, b, & c Parameters - 2003 American Community Survey

Characteristics	a	b	c
POPULATION			
Households	7569	168.375939	-0.000001
Aggregate Travel Time to Work (In Minutes)- Total	7569	21,620.378983	-0.000001
Aggregate Travel Time to Work (In Minutes) by Travel Time to Work	7569	23,356.034680	-0.000012
Aggregate Travel Time to Work (In Minutes)- Public Transportation and Less Than 30 Minutes	7569	9,863.544864	0.000030
Aggregate Travel Time to Work (In Minutes)- Public Transportation and More Than 30 Minutes	7569	25,919.615539	0.000064
Aggregate Travel Time to Work (In Minutes)-Other Means	7569	24,321.581347	-0.000013
Aggregate Household Income, Earnings, Wages/Salary,Self-Employment, Interest, Dividends, or Net Rental Income	7569	28,594,416.274820	-0.000001
Aggregate Household Social Security Income	7569	2,048,216.240803	-0.000001
Aggregate Household Retirement Income	7569	229.157912	0.000001
Aggregate Household Supplemental Security Income, Public Assistance Income, or Food Stamp Benefits	7569	2,475,329.276977	0.000083
Aggregate Household Other Types of Income	7569	10,981,781.202064	-0.000018
Aggregate Family or Nonfamily Income	7569	29,567,917.496274	0.000001
Aggregate Family Income Deficit	7569	7,438,059.324428	-0.000016
Aggregate Person Income or Earnings	7569	32,812,284.063579	-0.000001
Aggregate Income Deficit of Unrelated Individuals	7569	4,525,198.634956	-0.000010
HOUSING			
Aggregate Number of Rooms	7569	1,805.416098	0.000001
Aggregate Number of Vehicles Available	7569	725.704506	0.000001
Aggregate Rent	7569	352,799.006120	0.000002
Aggregate Value	7569	90,827,980.267149	0.000006
Aggregate Price Asked	7569	85,671,592.559617	0.000006
Aggregate Selected Monthly Owner Costs- Total and With a Mortgage	7569	601,017.215652	0.000007
Aggregate Selected Monthly Owner Costs- Without a Mortgage	7569	146,878.851182	0.000008

Table C-2003 PUMS a & b Parameters - 2003 American Community Survey

Characteristics	a	b
POPULATION		
Average Household Size	0.002298	-0.000119
Average Family Size	0.001519	-0.000078
Median Age	0.065958	-0.003039
Median Age by Sex	0.083961	-0.003943
Birth Rate	111.468800	-6.105681
Mean Travel Time to Work (In Minutes)	0.649350	-0.034317
Median Household Income	1,986,679.113897	-107,041.610445
Mean Household Income (Total or Earnings)	1,996,053.581602	-107,240.808771
Mean Household Income (Social Security)	87,023.455777	-5,045.719235
Mean Household Income (Retirement)	1,123,616.442738	-67,259.574755
Mean Household Income (Supplemental Security)	187,951.574590	-12,281.113099
Mean Household Income or Benefits (Public Assistance or Food Stamp Benefits)	103,569.316083	-6,567.650901
Median Family Income	2,857,873.480234	-156,897.240827
Median Nonfamily Income	1,853,699.681456	-106,294.015331
Mean Family & Nonfamily Income	3,624,501.980016	-199,042.528050
Median Person Earnings	631,624.888419	-33,327.232827
Per Capita Income	394,565.415466	-20,202.202070
HOUSING		
Median Number of Rooms	0.014744	-0.000255
Median Year Built	2.552747	-0.083624
Median Year Householder Moved into Unit	1.516832	-0.027987
Median Gross/Contract Rent	263.342776	-15.089486
Median Gross Rent as a Percentage of Household Income	0.918582	-0.051989
Median Value	13,613,613.555774	-758,618.733118
Median Selected Monthly Owner Costs	542.494527	-30.095994
Median Selected Monthly Owner Costs as a Percentage of Household Income	0.224073	-0.012009