1996 American Community Survey vs. 1990 Decennial Census -- Household Size and Characteristics by Response Mode

Pamela W. Ferrari

U.S. Census Bureau
Washington, DC 20233

ACKNOWLEDGMENTS

MOTIVATION FOR COVERAGE RESEARCH

It is essential to be able to accurately represent the target population in order to produce unbiased estimates. In both the Decennial Census and the Bureau's demographic surveys, there is evidence of significant coverage problems for some segments of the population. Under-coverage occurs when a person eligible for the Census (or survey) does not have a chance to be represented or included in the Census, either intentionally or unintentionally. Historically, there are coverage problems with low income and inner-city communities, with household surveys being worse than the Decennial Census. This is of major concern with the American Community Survey (ACS) data since the Bureau's long range plan is to possibly replace long form Census data with ACS data and provide local area long form data on an ongoing basis.

In an effort to identify any possible coverage problems associated with the ACS, a research project was initiated to compare coverage in the 1996 ACS to the 1990 Decennial Census by looking at the distribution of household size by various demographic characteristics and mode of response. From those results, we hope to identify possible causes, such as forms designs and field and processing procedures, that might contribute to the under-coverage and suggest further research and testing.

Other research projects will address within household coverage, look at residence rules, suggest alternative rostering and questionnaire design, assess the impact of nonresponse on coverage, evaluate the completeness of data for persons from large households, and experiment with methodologies to improve whole household coverage in frames for sampling.

ACS BACKGROUND

The Bureau of the Census conducted the 1996 ACS in four counties: Multnomah Oregon, Brevard Florida, Rockland New York, and Fulton Pennsylvania. The data was collected in monthly panels beginning in November 1995 and continuing through October 1996, although the December 1996 panel was interrupted by the Federal Government furlough. In the three "urban" sites, prenotice letters, initial questionnaires, reminder cards, and replacement questionnaires for nonrespondents were mailed to sample households. However in Fulton County Pennsylvania, the "rural" site, Field Representatives delivered questionnaires to sampled addresses that had been prelisted since there is not a number-street address mailing address system. Questionnaires from all four sites were expected to be mailed back. Nonrespondents were followed up by Computer-Assisted Telephone Interviewing (CATI) in the three urban sites. CATI was not conducted in Fulton County Pennsylvania since telephone numbers could not be obtained without the number-street address. A one-in-three sample of those nonrespondents who could not be contacted by telephone and of the mail nonrespondents in rural Fulton County Pennsylvania was followed up by Computer-Assisted Personal Interviewing (CAPI).

The ACS questionnaire obtains a roster of the household and collects labor force and economic data for the adult household residents and provides characteristics of children and housing units. To provide a roster of the household, the respondent lists the number of persons living in the household and then lists the names of the persons on subsequent pages. The respondent provides demographic characteristics for the first five persons listed. If six or more persons are listed, the characteristics for those persons are collected by telephone follow-up.

The mail return questionnaires undergo a clerical edit and telephone follow-up prior to data entry. Questionnaires from all three data collection modes are sent to a coding operation for several data items, proceed through the edit and allocation processing, weighting, and tabulations are then produced.

DATA USED FOR COVERAGE STUDY

The 1996 ACS data files that were produced from the edit and allocation procedure were used in this coverage study. The files at this point were unweighted because the population controls used in the weighting could mask any coverage problems. The CAPI cases, however, were given a weight of 3.27 in order to account for the one in three sample and the lost month of data during the Federal Government furlough.

The 1990 Census files used were the one hundred percent data files, rather than the sample data files since coverage was being evaluated. While the ACS questionnaires were more like the Census long form (sample data), the issue is whether the ACS adequately covered the entire population and not to compare responses or cooperation from similar questionnaires.

Distributions by household size, data collection mode and various demographic characteristics of the ACS and Census data were compared. Differences in ACS and Census household size by type of household could be evidence of coverage problems with the ACS and would point out the need for further investigation.

PRELIMINARY RESULTS

The most consistent finding across almost all characteristics examined and in three of the four sites is that the ACS has a higher percentage of smaller households and a lower percentage of larger households than the Census data. In Fulton County, Pennsylvania the four-person households was the only size category where there was a difference. This difference in larger/smaller household size distribution could be due to within household undercoverage in the ACS since that would tend to reduce household size, and hence produce a downshift in the household size distribution. Another possible explanation is that there have been changes in socio-demographic characteristics in the six years between the 1990 Census and the 1996 ACS. On the next page is a summary table of the distribution by household size for each of the four sites. Detailed tables by data collection mode and various demographic characteristics (tenure and the householder's race, Hispanic origin and sex) can be found in the Appendix.

DISTRIBUTION BY HOUSEHOLD SIZE

Number of Persons in Household	BREVARD FLORIDA		ROCKLAND NEW YORK		MULTNOMAH OREGON		FULTON PENNSYLVANIA	
	ACS	CENSUS	ACS	CENSUS	ACS	CENSUS	ACS	CENSUS
	7065	38216	2673	15058	12391	77249	315	1064
1	26.90%	23.69%	19.76%	17.75%	32.81%	31.91%	21.23%	20.71%
	0.27%		0.34%		0.24%		1.06%	
	10483	64245	4142	23481	12822	80527	507	1683
2	39.91%	39.82%	30.64%	27.68%	33.95%	33.26%	34.16%	32.76%
	0.30%		0.40%		0.24%		1.23%	
	3953	27048	2444	16093	5415	36379	286	978
3	15.05%	16.77%	18.08%	18.97%	14.34%	15.03%	19.27%	19.04%
	0.22%		0.33%		0.18%		1.02%	
	2981	20346	2314	16367	4350	29071	220	885
4	11.35%	12.61%	17.12%	19.30%	11.52%	12.01%	14.82%	17.23%
	0.20%		0.32%		0.16%		0.92%	
	1246	7786	1102	7816	1708	11747	112	367
5	4.74%	4.83%	8.15%	9.22%	4.52%	4.85%	7.55%	7.14%
	0.13%		0.24%		0.11%		0.69%	
	483	3244	597	4583	858	5952	43	151
6-7	1.84%	2.01%	4.42%	5.40%	2.27%	2.46%	2.90%	2.94%
	0.08%		0.18%		0.08%		0.44%	

	54	443	244	1417	217	1168	1	9
>=8	<u>0.21%</u>	0.27%	1.81%	1.67%	<u>0.57%</u>	0.48%	0.07%	0.18%
	0.03%		0.11%		0.04%		0.07%	
Total	**26265**	**161328**	**13517**	**84815**	**37762**	**242093**	**1484**	**5137**

The shaded numbers are standard errors and the underlined ACS proportions indicate they are significantly different at the .05 level than the corresponding census proportions.

The Fulton County Pennsylvania site has similar distributions at the summary level, but tends to show the same pattern of differences when further broken down. This is the rural site where the mail return rate for the ACS ran the lowest, but the final response rate was the highest. When these numbers are broken down by data collection mode (see Table A4 in the Appendix), we find that the large/small household size difference is quite apparent. In this rural site, coverage would not look very good at all if only mail response was attempted due to the high nonresponse to the mail. However, in total, the coverage is the best of the four sites.

When all four sites were broken down by data collection mode (refer to Tables A1- A4 in the Appendix), the difference in distributions was larger when comparing ACS and Census mail returns than comparing CAPI to Census enumerator returns. It should be noted that only five persons could be listed on the ACS questionnaire and perhaps some respondents did not indicate that they had a larger household. In Florida (Table A1), Oregon (Table A3), and New York (Table A2) the CATI distribution was generally quite different than the Census enumerator returns. In New York, the CATI distribution was fairly similar to the Census mail return; but not so in Florida and Oregon. The CAPI distribution was more similar to the Census enumerator returns, but still showed some difference in the large/small households. In Pennsylvania (Table A4), the larger household sizes were different when comparing mail returns and CAPI versus enumerator returns. A major caveat to looking at just the data collection mode is that there is too much weight for mail returns and too little for the enumerator returns in the Census numbers because the nonresponse adjustment did not account for mode.

The mail return comparisons showed that Florida, New York and Oregon have a higher percentage of one and two-person households in the ACS than Census and smaller percentage of three and larger person households. In Pennsylvania, ACS and Census had similar percentages for one and three-person households, while ACS had more two-person households and fewer four and larger person households. When CATI cases were compared to enumerator returns, there were fewer one-person households in ACS (opposite of mail returns) in all three sites with the CATI treatment. CAPI had a smaller percentage of one-person households in Oregon, a larger percentage of one-person households in Florida and similar percentages in New York and Pennsylvania.

The household size distributions were broken down by tenure, owner/renter (Tables A5- A8 in the Appendix). In Florida (Table A5), ACS had a higher percentage of owners than Census in all household size categories. In New York (Table A6), ACS had a higher percentage of owners than Census in one and two-person households, about the same for three-person households, and slightly lower percentage in four and larger person households. In Oregon (Table A7), ACS had a higher percentage of owners than Census in one-person households and about the same for two and larger person households. In Pennsylvania (Table A8), Census had a higher percentage of owners in one, four and six and larger person households, while the other size categories were similar. The same general pattern was observed when the tenure was broken down by mail returns. CATI generally had a smaller percentage of one and two-person households for both owners and renters than the Census enumerator returns. In owner occupied households, CAPI had a higher percentage of one-person households than the Census enumerator returns in all but Pennsylvania and fewer or similar percentages in two-person households. In renter occupied units the percentages varied by site and household size.

We next examined the race/Hispanic origin of the person who was listed on line one of the questionnaire (Tables A13-A20 in the Appendix). This in some sense made a household variable from a person characteristic, as did race and sex of the person on line one, so that similar comparisons could be made. Looking at the mail returns first, we found that in Oregon (Tables A17 and A18) most of the race categories had ACS with larger percentages (and in some cases similar percentages) in one and two-person households and similar or less in the larger household sizes. New York (Tables A15 and A16) and Florida (Tables A13 and A14) showed the same pattern. In Pennsylvania (Tables A19 and A20), where there is little racial diversity (The majority of people are White/Not Hispanic and in fact the tables are essentially household size by data collection mode.), there were similar percentages for one-person households, ACS had a larger percentage in two-person households, and Census had larger percentages in three and more person households. When we looked at CATI/CAPI and enumerator returns, the CATI treatment behaved very differently. CAPI was similar to the enumerator returns in Pennsylvania. However, the overall pattern of the ACS having higher percentages in the smaller household sizes and lower percentages in the larger household sizes continued.

This same general pattern was also apparent when sex (Tables A9-A12 in the Appendix) and age (no tables included) were looked at across the data collection modes. An interesting result not directly related to coverage, however, was that there is a difference between ACS and Census as to who is listed on line one in multi-person households. ACS more often lists a female on line one, while Census more often lists a male. When we looked at the total population, rather than only the line one person, the differences disappeared. The instructions for the roster list were generally the same for both ACS and Census, but perhaps there is a difference in who fills out the questionnaire or who is interviewed.

WHERE DO WE GO FROM HERE?

We plan to continue to look at additional characteristics, such as income and education to see if there are particular segments that have coverage problems. At this point in time, we see that ACS may have an undercoverage problem with larger households. Perhaps the most important additional investigations can be performed using the 1998 Census Dress Rehearsal results in Columbia, South Carolina since the ACS will also have that

location as a sample site at exactly the same time. The six year time lag between the 1990 Census and the 1996 ACS will not be an issue here. We should be able to see real differences in coverage instead of having to guess whether any differences are due to true demographic change over time or coverage problems. In addition, we want to research alternative rostering techniques and instructions to respondents. We will take a closer look at the data collection mode results, especially CATI and CAPI, to see if the mode is affecting coverage, particularly within household coverage.

APPENDIX

List of Tables

Distribution of Household Size by Data Collection Mode

Distribution of Household Size by Data Collection Mode and Tenure

Distribution of Household Size by Data Collection Mode and Sex of Person Listed on Line One

Dist. of HH Size by Data Collection Mode and Race/Hispanic Origin of Person Listed on Line One

In each of the tables, standard errors are shown as shaded and underlined ACS proportions indicate that they are significantly different than the corresponding Census proportions at the .05 level of significance.