Comparison of Housing Information from the American Housing Survey and the American Community Survey

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Prepared by:

Frederick J. Eggers
Econometrica, Inc.
Bethesda, Maryland

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Comparison of Housing Information from the American Housing Survey and the American Community Survey

In the United States, researchers, policy analysts, and the general public have two rich sources of information on housing—the American Housing Survey (AHS) and the American Community Survey (ACS). The U.S. Department of Housing and Urban Development (HUD) sponsored this project to help users exploit the housing information in these surveys effectively. This report documents the similarities and differences between the two surveys and compares estimates of key housing statistics from the 2005 editions of the two surveys.

This report has the following four sections and an appendix:

- Section 1 provides background information on the two surveys.
- Section 2 examines the types of information on housing available from the two surveys.
- Section 3 compares data from the 2005 AHS and the 2005 ACS and points out differences in both the counts of housing units and the percentages of housing units with certain characteristics.
- Section 4 offers general guidance on how and when to use the two surveys. The first and fourth sections provide all the advice that casual analysts need to make effective use of these surveys.
- An appendix shows how the data in Section 4 compare in statistical terms.

1. Overview of the AHS and the ACS

1.1. The American Housing Survey

In the early 1970s, HUD envisioned a database that would assess the quality of the housing stock, analyze its characteristics, record what Americans paid for housing and related services, and monitor how housing units changed over time. With HUD funding, the U.S. Census Bureau (Census Bureau) launched the first AHS in 1973, and its introductory booklet provides an overview of the AHS and other housing data. (See: http://www.huduser.org/intercept.asp?loc=http://www.census.gov/prod/2004pubs/ahsr04-1.pdf.) More information can be obtained at the HUD Web site, http://www.huduser.org/datasets/ahs.html, and the Census Bureau's Web site, http://www.census.gov/hhes/www/housing/ahs/ahs.html. These sites contain the

published reports in PDF format and provide public use files that allow researchers to access the microdata after all identifying information has been eliminated.[1]

The AHS is really two surveys—a survey of the national housing stock and a collection of surveys of the housing stock in major metropolitan areas. Between 1973 and 1981, the Census Bureau conducted the national surveys annually. From 1983 to the present time, the Census Bureau has carried out the AHS national survey every 2 years in odd-number years. The most recently published data come from the 2005 survey. The national surveys have samples that range from 50,000 to 60,000-plus housing units. HUD and the Census Bureau will release data from the 2007 AHS in the summer of 2008.

The number of metropolitan areas surveyed and the period between surveys have varied over time. Originally, the AHS surveyed 60 metropolitan areas—20 per year every 3 years. Each survey includes between 3,000 to 6,000 sample housing units. Over time, the cost of surveying reduced the number of areas surveyed and the frequency of the surveys. Currently, the AHS metropolitan survey includes 21 areas that are surveyed at 6-year intervals with 7 areas surveyed every 2 years in odd-number years.

1.2. The American Community Survey

Since 1940, every decennial census has had two parts: (1) a "short form" instrument to count the population and gather basic population and housing information; and (2) a "long form" that obtains the same information plus more demographic, housing, social, and economic information from a sample of households. What we know about households—their incomes, education, and housing—at the state, city, county, and census-tract level usually comes from the long form. But there were two problems with the "long form." First, this highly valuable information became available only every 10 years. Second, the long form complicated the process mandated by the U.S. Constitution of counting the population via the short form.

In the 1990s, the Census Bureau developed the ACS as a solution to both problems. Instead of collecting data every 10 years, the ACS would collect the same information continuously and report the results as it acquired enough responses to create statistically reliable numbers. This decision meant that large places would have published numbers based on data collected in a single year, but smaller places would have published numbers based on data collected in multiple years. After testing this concept for 8 years, the Census Bureau launched the first full ACS survey in 2005.

The Census Bureau provides extensive background on the ACS at its Web site, http://www.census.gov/acs/www/. This site contains all the released tables in PDF format. The Census Bureau will begin releasing data from the 2006 ACS in August 2007.

[1] In this document, "publish" will include both printed material and material posted on the Internet in PDF or other formats.

1.3. Comparison of the AHS and the ACS

Table 1 compares the essential design features of the AHS and the ACS.

Table 1: Key Design Features of the AHS and the ACS

	American Housing Survey (national survey)	American Community Survey
Focus	• Housing units and their occupants	• Households and their housing units • Occupants of group homes (beginning with the 2006 survey)
History	• Annual surveys began in 1973 • Biennial surveys began in 1983	• First full sample survey in 2005 • Annual thereafter
Sample design	• 50,000 to 60,000-plus housing units selected using stratified sampling from 394 areas across the country • Latest sample drawn in 1985 and units added to incorporate new construction and other additions to the housing stock • Each survey returns to the same housing units	• Approximately 3 million housing units selected randomly from lists covering all census tracts • Sampling rate is higher in smaller communities • A new sample of housing units is selected each year
Geography	• National survey with separate tabulations o by census region (4); o by central city, suburb, and outside metropolitan areas; and o by urban and rural • Metropolitan AHS surveys for 21 metropolitan areas, 7 each survey year, 6 years between surveys	• Beginning in 2006, data from the previous year's survey are available annually for the nation, all states, and all counties and places with 65,000 inhabitants • Beginning in 2008, 3-year moving average data will be available annually for the nation, all states, and all counties and places with 20,000 inhabitants • Beginning in 2010, 5-year moving average data will be available annually for the nation, all states, all counties, all places, and all census tracts and block groups
Reports	• One comprehensive report for each survey in printed form or PDF format.	• Specialized tables are available at the Census Bureau's ACS Web site.

The AHS focuses primarily on housing; it also collects demographic information on households and individuals in occupied housing units. The ACS, in contrast, focuses primarily on the population and collects information on housing for the purpose of understanding the type of housing occupied by households. The AHS contains most, but not all, of the demographic information collected by the ACS. For example, the AHS does not ask whether household members are veterans, while the ACS does. The ACS releases many tables that contain information on the housing characteristics of households. While the ACS provides data on many frequently used housing variables, it

does not furnish the in-depth information contained in the AHS. Table 2 in Section 2 shows how much more in-depth information is contained in the AHS.

The ACS sample is much larger than the AHS sample. Because of its larger size, the Census Bureau is able to draw observations from every census tract in the country. For the AHS, the Census Bureau selected 394 primary sampling areas to represent the entire country.

The AHS has a unique and important feature. Unlike most surveys, including the ACS, the AHS uses a longitudinal sample, which means that the Census Bureau goes back to the same housing unit with each new survey. This longitudinal feature allows HUD and the Census Bureau to see how housing units change over time and how people served by those units change over time.

The AHS national survey has a sample large enough to create statistically reliable estimates at the national level and also for the four census regions.[2] The AHS also publishes data for all central cities combined, all suburbs combined, and all places outside of metropolitan areas combined. Because large portions of metropolitan areas are rural in character and there are many places with relatively dense population in non-metropolitan areas, the AHS also releases data for all urban areas combined and all rural areas combined. Except for the metropolitan areas that are surveyed separately, the AHS does not release information for more specific levels of geography.[3]

The ACS sample size and the decision to combine data from multiple surveys allow the ACS to provide estimates for all levels of geography identified in the decennial censuses down to block groups. The ACS currently releases data for all states and all counties and cities with populations equal to or greater than 65,000. Estimates for these places are available for 2005 and will be available for 2006 beginning in August 2007. Because the ACS sample sizes are too small to create statistically reliable estimates for places with fewer than 65,000 inhabitants using only 1 year of data, the Census Bureau will combine data from multiple years for these places. It will use 3-year moving averages for places with populations between 20,000 and 65,000 and 5-year moving averages for places with populations below 20,000, including census tracts and census block groups.[4] To ensure that users have comparable information, the Census Bureau will also provide 3-year and 5-year moving average data for all places, including places for which it releases annual data.

HUD and the Census Bureau publish a lengthy report for each AHS national and metropolitan survey. These reports are available in hardcopy from HUD USER and the

[2] The four census regions are the Northeast (9 states), the Midwest (12 states), the South (16 states and the District of Columbia), and the West (13 states).
[3] The public use files for the national AHS surveys identify all central cities and urban fringe areas having a population over 100,000.
[4] The 3-year moving average estimates for 2007 will combine data from 2005, 2006, and 2007; the 3-year moving average estimates for 2008 will combine data from 2006, 2007, and 2008. The 5-year moving average estimates for 2009 will combine data from 2005, 2006, 2007, 2008, and 2009; the 5-year moving average estimates for 2010 will combine data from 2006, 2007, 2008, 2009, and 2010.

Census Bureau and in PDF format from both the HUD USER and the Census Bureau Web sites. Analysts can also create their own tables from the more recent AHS national surveys, using the Census Bureau's DataFerrett technology available on the Census Bureau Web site. Both HUD and the Census Bureau, after removing any information that might identify respondents, also make available to analysts public use files containing the responses from individual housing units.

For the ACS, the Census Bureau has decided to release all data over the Internet. In general, the Census Bureau uses the same tables for the ACS as it used for the 2000 decennial census. In addition, the Census Bureau has created some new tables that provide comparative information. All tables are accessible at the Census Bureau's ACS Web site. Users can create special tables using DataFerrett.

2. Comparison of Housing Information Provided by the AHS and the ACS

In general, the ACS contains many of the most common variables used for housing analysis; the AHS contains all of the most commonly used variables and many other variables that allow analysts to observe very specific features of the housing stock. This section first looks at the types of housing variables presented in the surveys and then looks at how the variables are presented in published material—that is, how the published tables relate the various variables to each other.

2.1. Types of Housing Variables

Table 2 compares the AHS and the ACS on the level of detail provided in published tables on housing characteristics. The table is organized to match the format of Table 4, which compares selected percentages calculated from the two surveys. The italic entries in Table 2 represent housing characteristics available from the AHS that are not available from the ACS.

The two surveys furnish similar information on the occupancy status and tenure status of housing units. On the characteristics of the structure in which a housing unit is located, the two surveys provide the same information on structure type (for example, single-family detached or mobile home) and the year the structure was built. In addition, the AHS contains information on the number of stories in the structure and, for single-family and mobile units, information on the lot size.

Table 2: Types of Information Published by the AHS and the ACS

The italic entries represent housing characteristics available in published tables from the AHS that are not available in published tables from the ACS.

	American Housing Survey (national survey)	American Community Survey
Status of unit	• Seasonal, year-round, occupied/vacant, reason vacant • Owner/renter	• Seasonal, occupied/vacant, reason vacant • Owner/renter
Structure characteristics	• Units in structure • Year built • *Stories in structure* • *Lot size (single unit and mobile homes only)*	• Units in structure • Year built
Unit characteristics	• Number of rooms • Number of bedrooms • *Number of bathrooms* • *Square footage* • *Heat equipment* and heating fuel • *Source of water and sewage disposal*	• Number of rooms • Number of bedrooms • Heating fuel

Unit quality	• With all kitchen facilities—*by specific facility*
	• With all plumbing facilities—*by specific facility*
	• *Selected amenities, includes:*
	  o Telephone service
	  o *Air conditioning*
	  o *Fireplace*
	  o *Washing machine*
	  o *Clothes dryer*
	  o *Dishwasher*
	  o *Disposal*
	  o *Deck*
	  o *Garage or car port*
	• *Selected deficiencies, includes:*
	  o *Selected structural deficiencies, e.g., leaks or holes in floors or ceilings*
	  o *Selected plumbing problems*
	  o *Selected electrical problems*
	  o *Selected upkeep problems*
	• *Summary measure of severe and moderate physical problems*
	• *Occupants rating of unit on scale of 1 to 10*
		• With all kitchen facilities
		• With all plumbing facilities
		• Telephone service

Table 2: Types of Information Published by the AHS and the ACS (continued)

	American Housing Survey (national survey)	American Community Survey
Neighborhood characteristics and quality	• *Type and age of housing in neighborhood* • *Adequacy of schools, shopping, and public transportation* • *Problems with:* o *Crime* o *Traffic noise* o *Odors* o *Abandoned buildings* o *Litter* • *Occupants rating of neighborhood on scale of 1 to 10*	• No national-level tables • Beginning in 2010, researchers will be able to obtain for individual census tracts information on type and age of housing in census tract, housing costs in census tract, home values in census tract, and household characteristics in census tract
Renter housing costs	• Contract rent • *Utilities and other housing costs* • Gross rent—contract rent plus utilities and other housing costs • Ratio of gross rent to income • *Whether unit receives housing assistance*	• Contract rent • Gross rent • Ratio of gross rent to income
Owner housing costs	• *Utilities and other housing costs* • Real estates taxes • *Mortgage payments* • Monthly housing costs • Ratio of monthly housing costs to income	• Real estates taxes • Monthly housing costs • Ratio of monthly housing costs to income
Value of owner-occupied housing	• *Purchase price* • *Source of downpayment* • Owner estimate of value • Value by income • Ratio of value to income • Price asked for vacant units	• Owner estimate of value • Value by income • Ratio of value to income • Price asked for vacant units
Mortgage	• With or without prime mortgage • *How obtained* • *Year originated* • *Government insurance* • *Payment type, e.g., fixed-rate* • *Mortgage payment* • *Interest rate* • *Remaining years* • *Outstanding principal amount* • *Current loan as percent of value* • *Second mortgage* • *Home equity line of credit*	• With or without prime mortgage

Both surveys publish the following information related to the size of a unit: number of rooms, number of bedrooms, and number of bathrooms. The AHS also publishes information on the square footage. Both surveys report the type of fuel used for heating; the AHS also reports the type of heating equipment and how units obtain water and dispose of sewage.

As befits a survey focused primarily on housing, the AHS offers analysts a much fuller picture of housing quality than the ACS. The ACS and the AHS count units with and without complete kitchen and plumbing facilities.[5] The AHS indicates the presence or absence of each of the features that define complete kitchen or plumbing facilities and specifies whether the set of features are for the exclusive use of the household. Both surveys tell whether a unit has telephone service available.

On the amenities side, the AHS counts units with a long list of selected amenities, such as air conditioning, a fireplace, or a garage. The AHS also records information on housing deficiencies. The published reports indicate various types of structural problems, such as holes in walls; problems with various housing systems, such as heating or plumbing; and other problems, such as inadequate upkeep of the unit. Beginning in 1985, the AHS has counted the number of units with "severe physical problems" and "moderate physical problems," based on definitions that look at the condition of the overall unit.[6] Finally, the AHS contains the household's rating of its unit on a scale of 1 to 10.

The AHS also describes neighborhood conditions. Variables characterize the type of housing in the neighborhood; assess neighborhood features such as schools and public transportation; and report various types of neighborhood problems such as crime and litter. The ACS collects no information on the neighborhood around sampled housing units.

Beginning in 2010, the ACS will release data describing the demographic, housing, and income characteristics of census tracts using 5-year moving average data. However, this information will not be the same as the information provided by the AHS on neighborhoods for two reasons. First, the ACS does not collect information on availability and quality of neighborhood features, such as schools or shopping, and does not collect information on neighborhood problems, such as crime or traffic. Second, the AHS links the neighborhood information to the sampled units. For example, the 2005 AHS indicates there are 29,173,000 housing units with multifamily structures within 300

[5] A unit has complete kitchen facilities when it has all three of the following facilities: (1) a sink with piped water; (2) a range or cook top and oven; and (3) a refrigerator. All kitchen facilities must be located in the house, apartment, or mobile home, but they need not be in the same room. Complete plumbing facilities include: (1) hot and cold piped water; (2) a flush toilet; and (3) a bathtub or shower. For the ACS, all three facilities must be located inside the house, apartment, or mobile home, but not necessarily in the same room. For the AHS, these facilities must be for the exclusive use of the household.

[6] A unit has severe physical problems if it has any one of a set of conditions defined with respect to its systems (heating, electrical, or plumbing); its facilities (kitchen or plumbing); its structural soundness; or its upkeep. Moderate physical problems are defined in a similar way. A unit with both severe and moderate problems is classified as having severe problems. The AHS publication contains the full definitions of both deficiency statuses.

feet, and 7,621,000 owners report that the housing in their neighborhood is generally older than their unit. While the ACS will report information on the type and age of structures in each census tract, it cannot generate comparable information.

The AHS and ACS both report contract rent, gross rent, and the ratio of gross rent to household income. Additionally, the AHS reports the individual items that constitute the difference between contract rent and gross rent, such as the cost of electricity, the cost of water, and the cost of renter insurance. The AHS also counts units receiving public assistance to reduce rents.

With respect to the housing costs of owners, both surveys report total monthly housing costs, real estate taxes, and the ratio of total housing cost to income. The AHS also reports mortgage payments, various utility costs, and other costs such as homeowners insurance.[7]

For owner-occupied housing, the AHS and the ACS both provide the owner's estimate of the value of the property and the ratio of value to income. For vacant units for sale, both surveys report asking price. In addition, the AHS contains purchase price and the source of downpayment.

On the financing of owner-occupied housing, the ACS only indicates whether an owner-occupied unit has a first-lien mortgage. The AHS provides extensive information on all the mortgages on the property.[8]

2.2. Availability of Tables that Relate Housing Variables to Each Other

Researchers and policy analysts are generally interested in how a particular housing characteristic relates to another housing characteristic—for example, how tenure relates to the number of rooms in a unit or how a particular housing characteristic relates to a household characteristic (for example, how tenure relates to household income). Both the AHS and the ACS cross-tabulate certain variables. Users refer to these matrix-like tables as "cross-tabs." Both the AHS and ACS publish the two examples cited in the first sentence of this paragraph. However, the two surveys present cross-tabular information differently.

Beginning with the report on the 1985 AHS, the Census Bureau has used a standard format for presenting AHS data. Each report contains 172 tables, and each table contains up to 1,500 numbers. The introduction to each report contains a one-page listing of tables that explains how the 172 tables fit into three basic formats.

[7] The ACS collects information on utility costs from both owners and renters, but these data are currently not available in published tables. The data are available in the public use files but with a smaller sample size and less geographic detail.
[8] The ACS collects information on mortgage payments and on second mortgages and home equity mortgages, but these data are currently not available in published tables. The data are available in the public use files but with a smaller sample size and less geographic detail.

With the ACS, the Census Bureau has adopted the policy of publishing the same tables that it published for the long form of the decennial census plus some additional tables. Unlike the AHS, the same cross-tabs are not available for every variable. The Census Bureau provides a useful guide to the tables at http://www.census.gov/acs/www/Products/users_guide/index.htm.

Usually, users will be able to find the desired cross-tab among the published tables. If the desired cross-tab is not published, users may be able to create their own cross-tab using the Census Bureau's DataFerrett technology at http://dataferrett.census.gov/. Both the 2005 AHS and the 2005 ACS are accessible through DataFerrett.

3. Comparison of Estimates from the 2005 AHS and the 2005 ACS

This section uses published housing and housing-related statistics from the 2005 AHS and the 2005 ACS to compare the two surveys.

- The first subsection discusses the rules used by the two surveys to determine where a person—who lives in different places at different times—lives for the purpose of reporting data. These rules are called "residence rules." An understanding of these rules is crucial to understanding why the two surveys produce different counts of housing units with specific characteristics.

- The next subsection examines the count of all housing units, occupied units, and vacant units to confirm that the residence rules produced important differences in 2005 between the counts in the two surveys. The different rules lead, in the ACS, to a higher estimate of occupied units and a lower estimate of vacant units.

- A third subsection converts counts from the two surveys into percentages, so that the reader can see how closely the two surveys track one another in their depiction of the characteristics of the American housing stock. In most cases, the differences between the two surveys are small, but many are statistically significant.

- The final subsection discusses in general terms possible reasons for the small differences between the surveys.

3.1. Residence Rules and Occupied/Vacant Status

While the ACS is designed to replace the long form from the decennial census, there is a fundamental difference between the ACS and the decennial census involving "residence"—that is, involving the rules used to determine where a person or household lives if that person or household lives in different places at different times during a year.

- The decennial census records people at their "usual place of residence" on April 1 of the census year. Under the "usual residence" rule, a housing unit is occupied if it is the usual residence of one or more persons on April 1, even if no one is actually in the unit on April 1.

- The ACS collects information on "current residents" at the time of the ACS survey. A person is considered a current resident of a housing unit *if* the person is living in the unit when the unit is surveyed *and* the person *either* has been living in the unit for more than 2 months, plans to live in the unit for more than 2 months, *or* has no usual residence elsewhere.. In the ACS, a housing unit is occupied if it is the current residence of one or more persons at the time the survey instrument is filled out.

- The AHS uses the "usual residence" approach of the decennial census but without reference to April 1. In the AHS, a housing unit is occupied if it is the usual residence of one or more persons at the time of the survey.

The ACS's "current residence" rule has two consequences. First, households who split their time between two or more housing units may be counted in different places under the "usual place of residence rule." In locations with seasonal swings in populations, the ACS will survey some of the households who live there for only a few months and will count them as residents of that locality. Both the decennial census and the AHS would classify those persons as living at their "usual residence." Thus, the ACS will count more occupied housing units in areas with seasonal populations. This affects counts of households and occupied housing units at the local level but not at the national level. Since this document focuses on differences between the AHS national survey and national data from the ACS, this first consequence of the "current residence" rule is not relevant for this discussion.

The second consequence is very important in understanding the differences between the AHS and the ACS in the estimate of occupied and vacant units. The second consequence results *both* from the "current residence" rule *and* from the way the ACS collects its data. The ACS surveys a new sample of housing units each month and tries to obtain completed interviews from these households within 3 months. In the first month, the Census Bureau mails to the sampled housing unit a survey questionnaire and then a follow-up reminder. In the second month, if the Census Bureau receives no response to the mail questionnaire, it attempts to collect the information by telephone. Finally, in the third month, if there is no response in months one and two, the Census Bureau sends an interviewer to a sample of roughly one in three of the nonresponding units. A unit is not considered vacant until an interviewer visits the unit and determines it is unoccupied. This 3-month period provides time for a vacant unit to become occupied prior to the interview. For example, a unit may be vacant at the time of the mail survey and vacant again when the Census Bureau follows up with a telephone interview, but may be occupied when the Census Bureau sends an interviewer to the unit. This unit will be counted as occupied if any of the occupants have no other place of residence at the time of the interview or has stayed or plans to stay in the unit for 2 months or more.

Therefore, the ACS will overlook short-term vacancies and will count fewer units as vacant than the AHS would count as vacant. Since units are either vacant or occupied, the ACS will count more units as occupied than the AHS.

This paper has two goals: (1) to provide the reader with an overview of the AHS and the ACS and an understanding of how the two surveys differ, and (2) to use AHS and ACS data from 2005 to compare estimates from the two surveys. In this section, the two goals clash. Features of the 2005 ACS create relatively large differences in the count of occupied units (households) between the 2005 AHS and the 2005 ACS. Because these count differences reverberate through all comparisons involving occupied units and households, the paper has to adjust the 2005 AHS data to allow for useful comparisons with the 2005 ACS data. The reader has to understand why the 2005 counts of occupied units differ to understand the analysis in Tables 3 and 4 and in the appendix. However, beginning with the 2006 ACS, the Census Bureau is changing how it derives counts of occupied units (households) in the ACS. So the emphasis given here to the differences in counts in 2005 may give an exaggerated sense of their importance for the use of the 2006 and future ACS surveys.

In summary, the ACS and the AHS have different concepts of what constitutes "residence," and this conceptual difference can affect whether a unit is defined as occupied or vacant. Both concepts of residence have their advantages and disadvantages. The different concepts of residence have only minor consequences for the count of occupied units at the national level. The main reason why the 2005 AHS and 2005 ACS have relative large differences in the counts of occupied units is the *procedure* used in the ACS to determine whether a unit is vacant. The ACS procedure undercounts vacant units.[9] In and of itself, the undercount would be of minor importance. However, both surveys define a household as being the occupants of an "occupied" housing unit. Therefore, within each survey, the count of households and occupied housing units are the same. For this reason, the 2005 ACS overestimates the number of households in 2005. Beginning with the 2006 ACS survey, the Census Bureau is adjusting the count of occupied housing units to equal an independent estimate of households. This change should reduce substantially any future difference between the ACS and the AHS in the count of occupied housing units and households.

3.2. Counts of Housing Units, Seasonal Units, Vacant Units, and Occupied Units

Both the AHS and the ACS are sample surveys—that is, the Census Bureau does not collect information from every housing unit or household. For each survey, the Census Bureau draws a sample; takes counts of units in the sample with particular characteristics; and, using appropriate weights, calculates the percentage of units with the specific characteristics. Then the Census Bureau applies the percentages to counts of housing units it derives independently of the two surveys. For both the AHS and the ACS, the

[9] The "undercount" is not related to how "vacant" is defined. Making the "vacant" determination only at the time of the in-person interview results in an undercount of vacant units as the ACS defines "vacant."

Census Bureau uses estimates of the number of units in the housing stock prepared by its Population Division. The 2005 AHS reports that the housing stock contains 124,377,000 housing units; the 2005 ACS reports 124,521,886 housing units. The two estimates are different only because they refer to different points in time and because the AHS rounds to the nearest thousand.[10]

Table 3 shows that this 145,000 difference in the count of housing units represents only a 0.1 percent difference. The AHS and the ACS report vacancies differently. The AHS first eliminates seasonal units from the housing stock and reports occupied/vacant status only for "year-round" units. The ACS classifies units occupied less than 2 months as vacant units if all the occupants have other residences. Among the types of vacant units recorded by the ACS are units that are "for seasonal, recreational, or occasional use." The 2005 ACS listed 13,431,269 units as vacant, of which 3,883,975 were occupied seasonally. Table 3 presents the key housing stock numbers from the AHS and the ACS in the format used by the AHS—that is, by first subtracting seasonal units from all units before calculating occupied and vacant units.

Table 3: Comparison of Key Housing Stock Statistics[11]

	AHS	ACS	ACS – AHS	Percent Difference
2005 Housing Stock	124,377,000	124,521,886	144,886	0.1%
Seasonal Units	3,845,000	3,883,975	38,975	1.0%
Year-Round Units	120,532,000	120,637,911	105,911	0.1%
Vacant Units	11,660,000	9,547,294	-2,112,706	-22.1%
Occupied Units	108,871,000	111,090,617	2,219,617	2.0%

The estimates of seasonal units are within 1 percent. When the analysis is limited to year-round units only, the AHS reports a larger number of vacant, year-round units than the ACS—11,660,000 vs. 9,547,294. This difference results mainly from the data collection procedure that ascribes "vacant" status to a unit only after an interviewer has visited the unit. Because the ACS has a smaller number of vacant units, it also has a higher count of occupied units (111,090,617) than the AHS (108,871,000).[12]

[10] The AHS estimate refers to the middle of the interview period, which is usually April through September; the ACS estimate applies to the end of the calendar year.

[11] The ACS numbers for the housing stock and occupied units are from the housing characteristics portion of the data profiles table. The seasonal unit count comes from Table B25004 of the detailed tables. The year-round and vacancy counts are derived, respectively, by subtracting the seasonal count from the housing stock count and the vacant unit count from the housing characteristics.

[12] The procedures used by the Census Bureau to produce the 2005 ACS tables create additional confusion about the number of occupied housing units. By definition, the number of households equals the number of occupied housing units. Also, for every household, there is a "householder,"—that is, the person used by the survey respondent as the reference person in explaining how other members of the household relate to one another and in answering questions dealing with the age, sex, race, ethnicity, and other issues dealing with the core person in the household. The ACS uses a different weighting procedure, including different control totals for persons than for housing units. In tables that focus on households, such as race of householder (B25006), the count of householders equals the count of housing units (111,090,617). But in tables that focus on the overall population, such as the relationship of persons within households (B09016), the count of householders is different (114,763,475). This second count is larger compared with the AHS

The estimates in Table 3 derived from the two surveys differ by over 2 million units in their counts of occupied and vacant year-round housing units.[13] While these differences are small in relative terms, the housing stock is so large that the different starting points ensure that the AHS and the ACS will differ substantially in the count of units with particular characteristics. For example, if the AHS and the ACS both estimate that two-thirds of households own their home, the ACS would count 1.5 million more owner-occupied units simply because it counts 2.2 million more occupied units.

3.3. Comparison of Estimates of Housing Characteristics

Using the 2005 ACS, the Census Bureau published for the nation, for every state, and for every county and city with 65,000 or more residents a set of three *Data Profiles*, which present the basic social, economic, and housing characteristics of the population. This document uses the national housing profile as the basis for comparing the information generated by the AHS and the ACS.

The ACS housing profile presents counts of units with certain characteristics; the comparable AHS tables also present counts of units with the same characteristics. The preceding discussion of Table 3 shows that the ACS counts 145,000 more housing units and 2,200,000 more occupied housing units than the AHS and that these starting point differences ensure that the AHS and the ACS will differ substantially in the count of units with particular characteristics. To avoid any distortion caused by different starting points, Table 4 translates counts into percentages. This table compares what the two surveys say in percentage terms about the characteristics of the housing stock. Because the two surveys occasionally use different formats when describing the same housing characteristic, we had to calculate some of the AHS percentages using the AHS public use file.

Of the 115 characteristics in Table 4, the difference between the AHS number and the ACS number is statistically significant in 86 instances. This means that 75 percent of the characteristics we examined had statistically significant differences. The prevalence of statistically significant differences should not be surprising, because with large samples even small differences can be statistically significant.

count of housing units than the first ACS count. Beginning in 2006, the Census Bureau will adjust the count of occupied units so that the counts of householders are consistent across tables. This change in procedures will result in a difference between the count of housing units in the ACS and the control total of housing units prepared by the Population Division.

[13] As explained in footnote 12, the ACS changed the way it estimates occupied units in 2006. The change should substantially reduce the difference between the ACS and AHS counts.

This subsection focuses on whether the percentage differences are "important" from the perspective of an analyst or researcher trying to obtain an accurate picture of the housing stock and contains some discussion of why individual estimates may differ. The subsection that follows this one discusses the general reasons why the surveys may be producing slightly different results. We include an explanation of how the statistical tests were performed in an appendix.[14]

Table 4: Percentage of Housing Units with Selected Characteristics

	2005 AHS	2005 ACS	Percentage Point Difference with AHS as Base***	Statistically Different at the 0.10 Level
All Housing Units				
UNITS IN STRUCTURE				
1 unit, detached*	62.4%	61.1%	-1.3	Yes
1 unit, attached	5.7%	5.7%	0.0	No
2 units*	3.6%	4.0%	0.5	Yes
3 or 4 units*	4.1%	4.6%	0.4	Yes
5 to 9 units	4.7%	5.0%	0.3	Yes
10 to 19 units	4.6%	4.5%	-0.1	No
20 or more units	7.9%	8.0%	0.1	No
Mobile home	6.9%	7.0%	0.1	No
Boat, RV, van, etc.*	0.1%	0.1%	0.0	No
YEAR STRUCTURE BUILT				
Built 2005 or later	0.8%	0.5%	-0.3	Yes
Built 2000 to 2004	7.4%	7.9%	0.5	Yes
Built 1990 to 1999	12.9%	14.7%	1.8	Yes
Built 1980 to 1989	13.2%	14.9%	1.7	Yes
Built 1970 to 1979	20.2%	17.3%	-2.9	Yes
Built 1960 to 1969	12.2%	12.0%	-0.2	No
Built 1950 to 1959	10.5%	11.8%	1.4	Yes
Built 1940 to 1949	6.4%	6.3%	-0.1	No
Built 1939 or earlier	16.6%	14.7%	-1.9	Yes
ROOMS				
1 room	0.5%	1.0%	0.5	Yes
2 rooms	1.1%	3.2%	2.1	Yes

[14] The test of statistical difference uses a 90-percent level of confidence; more conservative tests—tests using 95 percent or 99 percent—would produce fewer cases of statistically significant differences. See the appendix.

Table 4: Percentage of Housing Units with Selected Characteristics (continued)

	2005 AHS	2005 ACS	Percentage Point Difference with AHS as Base***	Statistically Different at the 0.10 Level
3 rooms	8.8%	9.3%	0.5	Yes
4 rooms	18.3%	17.6%	-0.7	Yes
5 rooms	23.0%	21.9%	-1.1	Yes
6 rooms	20.4%	18.9%	-1.5	Yes
7 rooms	12.3%	12.2%	-0.1	No
8 rooms	7.1%	7.9%	0.8	Yes
9 rooms or more	8.5%	8.0%	-0.5	Yes
Median (rooms)*	5.7	5.4	-0.3	No
BEDROOMS				
No bedroom	1.0%	1.3%	0.2	Yes
1 bedroom	11.8%	12.0%	0.2	No
2 bedrooms	27.6%	28.2%	0.6	Yes
3 bedrooms	40.9%	39.7%	-1.2	Yes
4 bedrooms*	15.0%	15.2%	0.2	No
5 or more bedrooms*	3.7%	3.7%	0.0	No
Occupied Housing Units				
HOUSING TENURE				
Owner-occupied	68.8%	66.9%	-1.9	Yes
Renter-occupied	31.2%	33.1%	1.9	Yes
Average household size of owner-occupied unit	2.64	2.70	0.06	**
Average household size of renter-occupied unit	2.32	2.39	0.07	**
YEAR HOUSEHOLDER MOVED INTO UNIT				
Moved in 2000 or later	48.7%	48.8%	0.1	No
Moved in 1995 to 1999	17.1%	16.7%	-0.4	Yes
Moved in 1990 to 1994	9.9%	9.8%	-0.1	No
Moved in 1980 to 1989	10.4%	11.0%	0.6	Yes
Moved in 1970 to 1979	7.4%	7.3%	-0.1	No
Moved in 1969 or earlier	6.5%	6.5%	0.0	No
VEHICLES AVAILABLE				
No vehicles available*	8.5%	8.9%	0.4	Yes
1 vehicle available*	31.3%	33.1%	1.8	Yes
2 vehicles available*	38.5%	38.2%	-0.3	No
3 or more vehicles available*	21.7%	19.8%	-1.9	Yes

Table 4: Percentage of Housing Units with Selected Characteristics (continued)

	2005 AHS	2005 ACS	Percentage Point Difference with AHS as Base***	Statistically Different at the 0.10 Level
HOUSE HEATING FUEL				
Utility gas	51.7%	50.5%	-1.3	Yes
Bottled, tank, or LP gas	5.7%	6.0%	0.2	Yes
Electricity	31.5%	32.5%	1.1	Yes
Fuel oil, kerosene, etc.	9.1%	8.0%	-1.1	Yes
Coal or coke	0.1%	0.1%	0.0	Yes
Wood	1.3%	1.7%	0.4	Yes
Solar energy	0.0%	0.0%	0.0	Yes
Other fuel	0.2%	0.4%	0.2	Yes
No fuel used	0.4%	0.8%	0.4	Yes
SELECTED CHARACTERISTICS				
Lacking complete plumbing facilities	1.2%	0.4%	-0.8	Yes
Lacking complete kitchen facilities	1.6%	0.6%	-1.0	Yes
No telephone service available	2.9%	5.2%	2.3	Yes
OCCUPANTS PER ROOM				
1.00 or less	97.6%	96.9%	-0.7	Yes
1.01 to 1.50	2.0%	2.3%	0.3	Yes
1.51 or more	0.4%	0.7%	0.3	Yes
Owner-Occupied Units				
VALUE				
Less than $50,000	9.9%	9.1%	-0.7	Yes
$50,000 to $99,999	19.4%	18.1%	-1.4	Yes
$100,000 to $149,999	16.7%	17.4%	0.7	Yes
$150,000 to $199,999	13.0%	13.7%	0.6	Yes
$200,000 to $299,999	15.5%	15.1%	-0.4	Yes
$300,000 to $499,999	14.5%	15.4%	0.9	Yes
$500,000 to $999,999*	8.0%	9.3%	1.3	Yes
$1,000,000 or more*	3.0%	2.0%	-1.0	Yes
Median (dollars)	$165,344	$167,500	$2,156	No
MORTGAGE STATUS AND SELECTED MONTHLY OWNER COSTS				
Housing units with a mortgage	66.9%	67.9%	1.0	Yes
Less than $300*	1.6%	0.4%	-1.1	Yes
$300 to $499*	5.4%	3.2%	-2.2	Yes
$500 to $699*	9.5%	8.4%	-1.1	Yes
$700 to $999*	19.3%	19.3%	0.0	No

Table 4: Percentage of Housing Units with Selected Characteristics (continued)

	2005 AHS	2005 ACS	Percentage Point Difference with AHS as Base***	Statistically Different at the 0.10 Level
$1,000 to $1,499*	29.0%	29.6%	0.7	No
$1,500 to $1,999*	16.4%	18.0%	1.5	Yes
$2,000 or more*	18.8%	21.0%	2.2	Yes
Median (dollars)*	$1,219	$1,295	$76	Yes
Housing units without a mortgage	33.1%	32.1%	-1.0	Yes
Less than $100*	1.9%	1.8%	-0.1	No
$100 to $199*	11.8%	11.1%	-0.7	Yes
$200 to $299*	20.0%	21.8%	1.7	Yes
$300 to $399*	18.9%	21.4%	2.5	Yes
$400 or more*	47.3%	43.8%	-3.5	Yes
Median (dollars)*	$384	$369	-$15	Yes
SELECTED MONTHLY OWNER COSTS AS A PERCENTAGE OF HOUSEHOLD INCOME				
Housing unit with a mortgage				
Less than 20.0 percent*	42.1%	36.2%	-5.9	Yes
20.0 to 24.9 percent*	15.5%	16.7%	1.2	Yes
25.0 to 29.9 percent*	11.5%	12.5%	1.0	Yes
30.0 to 34.9 percent*	7.9%	8.8%	0.8	Yes
35.0 percent or more*	23.1%	25.9%	2.8	Yes
Housing unit without a mortgage				
Less than 10.0 percent*	37.5%	39.4%	1.9	Yes
10.0 to 14.9 percent*	17.1%	20.2%	3.1	Yes
15.0 to 19.9 percent*	11.3%	12.2%	0.9	Yes
20.0 to 24.9 percent*	7.2%	7.8%	0.6	No
25.0 to 29.9 percent*	5.2%	5.1%	0.0	No
30.0 to 34.9 percent*	3.8%	3.5%	-0.4	Yes
35.0 percent or more*	18.0%	11.9%	-6.1	Yes
Renter-occupied units				
GROSS RENT				
Less than $200	4.6%	3.3%	-1.3	Yes
$200 to $299	4.1%	3.7%	-0.5	Yes
$300 to $499	15.4%	13.6%	-1.9	Yes
$500 to $749*	29.1%	29.1%	0.0	No
$750 to $999*	20.8%	22.0%	1.2	Yes
$1,000 to $1,499	14.3%	16.1%	1.8	Yes
$1,500 or more	5.5%	6.3%	0.8	Yes

Table 4: Percentage of Housing Units with Selected Characteristics (continued)

	2005 AHS	2005 ACS	Percentage Point Difference with AHS as Base***	Statistically Different at the 0.10 Level
No cash rent	6.2%	6.0%	-0.2	No
Median (dollars)	$694	$728	$34	Yes
GROSS RENT AS A PERCENTAGE OF HOUSEHOLD INCOME				
Less than 15.0 percent	11.5%	13.0%	1.5	No
15.0 to 19.9 percent	11.2%	12.8%	1.6	Yes
20.0 to 24.9 percent	11.9%	13.0%	1.1	No
25.0 to 29.9 percent	11.7%	11.8%	0.1	Yes
30.0 to 34.9 percent	9.7%	9.0%	-0.8	Yes
35.0 percent or more	44.0%	40.5%	-3.5	Yes

* The AHS number was calculated using the AHS public use file.
** There is insufficient information to calculate statistical significance.
*** Differences in medians and averages are in real numbers or dollars.

In most cases—even in the statistically significant cases—the absolute differences are so small so as not to be important. The most important exception is the different estimates of tenure. The AHS estimates a homeownership rate that is 1.9 percentage points higher than the ACS estimate. Because of the policy attention given to the homeownership rate in the last 15 years, this 1.9 percentage point difference is substantively important.

The AHS uses the Current Population Survey to control its count of owner-occupied and renter-occupied units. The ACS does not use any control for tenure. There is no literature comparing the ACS and AHS estimates, but there are published studies comparing answers from the ACS and the census. Two of the studies by the Census Bureau discuss differences between the ACS and the census in measuring the homeownership rate. Unfortunately, the insights from the ACS/census comparisons do not shed much light on the ACS/AHS difference.

Report 4 in the series of evaluative reports on the ACS discusses differences between the decennial census and the C2SS in reporting tenure.[15] The C2SS was a prototype for the ACS, which used the same questionnaire and the same sampling and data collection techniques as the ACS. The C2SS reported a homeownership rate of 65.4 percent compared with the 66.2 percent in the decennial census.[16] This 0.8 percentage point difference is statistically significant. This report also compared the census and C2SS results for 18 counties that were oversampled in the C2SS. The homeownership rates

[15] Deborah H. Griffin, Joan K. Broadwater, Theresa F. Leslie, Susan P. Love, Sally M. Obenski, and David A. Raglin. May 2004. *Meeting 21st Century Demographic Data Needs—Implementing the American Community Survey Report 4: Comparing General Demographic and Housing Characteristics With Census 2000*. U.S. Department of Commerce, Economics and Statistics Administration, U.S. Census Bureau, pp. 42-45 and F-6.
[16] After final controls, the C2SS estimate was 65.3 percent. *Ibid*, p. A-6.

were similar in the two surveys for all 18 counties; in the five counties where the differences were statistically significant, the C2SS estimated a lower homeownership rate than the decennial census. The authors of this report, attributing these differences to better edit procedures in the C2SS, state:[17]

> The tenure information collected in the C2SS was more complete than in Census 2000, mostly due to the edits built into the CATI and CAPI collection phases. The comparison of allocation rates by mode (see Table 6, Appendix B) illustrates the positive impact in the C2SS of the use of computer-assisted instruments and the presence of related information that can be used to compensate for specific missing information. The Census 2000 allocation rate for tenure for enumerator-collected data was more than 12 percent. The C2SS CATI/CAPI data required imputation of only about 1 percent of the values of tenure. The C2SS computer-assisted instruments include edits which compare the answers to the mortgage battery of questions and the rent questions to responses to the tenure answer. These internal real-time checks of related information during an interview decrease the amount of inconsistent and missing data that the full content edit must correct. This in turn reduces the allocation rates for the CATI and CAPI data collection modes in the C2SS.

This explanation should not apply to the differences between the ACS and the AHS. The AHS includes edits similar to those used in the CATI and CAPI versions of the ACS and these edits apply to all observations. (Most ACS data are obtained from mail questionnaires and the edits are not applied to the mail responses.) As a result, the allocation rate for tenure is very low in the AHS.[18]

In the discussion of owner estimate of value, the authors of Report 10 suggest that the "current residence" rule may account, in part, for the lower homeownership rate in the C2SS compared with the census:

> The universe of specified owner-occupied units is itself significantly higher in the Census 2000 sample than in C2SS, a phenomenon that may be related not only to the higher census estimate of occupied units but also to the ACS current residence rule. This rule may have a tendency to decrease the estimate of owner-occupied units and increase the estimate of renter-occupied units over the course of a year since people can qualify as current residents in places other than where they usually live. Their usual, perhaps owned, residence would be considered vacant, while their current residence may be rented.[19]

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[17] CATI stands for computer-assisted telephone interviewing, and CAPI stands for computer-assisted personal interviewing. An allocation is when the Census Bureau fills in missing information for a household based on information from other households. The allocation rate is the percentage of times the value of a variable is based on an allocation.

[18] The AHS allocation rate in 2001 was 0.5 percent, and in 2003 it was 0.3 percent; the C2SS allocation rate was 1.4 percent.

[19] Susan P. Love, Joan K. Broadwater, Deborah H. Griffin, Theresa F. Leslie, and David A. Raglin. July 2004. *Meeting 21st Century Demographic Data Needs—Implementing the American Community Survey*

In discussions with experts at the Census Bureau, the consensus was that this explanation could account for only a small part of the observed difference in the homeownership rate between the AHS and the ACS. The Census Bureau anticipates examining the difference in homeownership rates and other differences at a later date.

The following is a list of other interesting differences in Table 4:

- The AHS finds a higher percentage of units in single-unit detached structures. Two-thirds of the difference is explained by the larger ACS count of 2- to 4-unit structures.

- The AHS finds a higher percentage of units built in 2005, probably because, on average, the AHS data are collected later in the year. The ACS estimates a higher percentage of units as built in the 1980s and 1990s and a lower percentage built in the 1970s. The AHS finds a higher percentage of units built before 1940.

- The AHS estimates a lower percentage of small units, both in terms of number of rooms and number of bedrooms, and has a higher median number of rooms. The wording of the questions related to rooms and bedrooms differs between the two surveys in significant ways.

- The AHS finds a higher percentage of units lacking complete kitchen facilities and a higher percentage lacking complete plumbing facilities. This difference may arise because, as footnote 4 explains, the two surveys use the slightly different definitions of complete kitchen and complete plumbing facilities.

- The ACS measures a higher incidence of overcrowded housing, probably because the ACS has a higher percentage of small units. This difference borders on being substantively important.

- The AHS has a higher percentage of lower-valued houses, but the medians are very close. At the top of the distribution, the AHS has a higher percentage of owner-occupied houses with values above $1 million and a lower percentage between $500,000 and $1 million.

- The AHS has fewer owners with mortgages. Among owners with mortgages, the AHS has a higher percentage at the very low end of the distribution of monthly housing costs.

Report 10: Comparing Selected Physical and Financial Characteristics of Housing With the Census 2000. U.S. Department of Commerce, Economics and Statistics Administration, U.S. Census Bureau, p. 61.

- The ACS finds a higher percentage of homeowners with mortgages paying more than 35 percent of income on housing, while the AHS finds a higher percentage of homeowners without mortgages paying more than 35 percent of income on housing.

3.4. Possible Reasons for Differences in Survey Findings

As noted previously, there have been no published studies of the differences between the ACS and the AHS. Normally, to understand why two surveys might produce different results, analysts look at these three categories of reasons:

- Statistical design:
    - Both surveys have adequate sample sizes.
    - The ACS sample is drawn from a list of addresses that is continually updated so that the Census Bureau can use the list for the 2010 decennial census. The AHS sample was drawn from the completed 1980 census, and new units have been added with each new survey to account for new construction and housing units created by other means. The weights applied to each AHS unit are adjusted to reflect information from the most recent census and information from other sources. It is possible that some of the differences seen in Table 4 could result from differences in how well the weights used in the surveys replicate the full housing stock.
- Questionnaire design:
    - The two surveys have very different questionnaires, and the design of a questionnaire can affect the responses received. The AHS questionnaire is more detailed and requires the respondent to spend more time answering questions. The wording of individual questions can vary across the surveys, and the order in which questions are asked can vary across the surveys. All of these factors are known to affect respondent answers.
- Data collection mode:
    - The AHS uses only telephone and in-person interviews. The ACS uses mail questionnaires for the majority of respondents but uses telephone and in-person interviews when respondents fail to fill in the mail questionnaires. Computer programs allow telephone and in-person interviewers to incorporate edits and queries as the questions are being asked. In general, computer-assisted techniques produce more accurate responses than mail questionnaires. The AHS also uses dependent interviewing techniques that incorporate information from previous interviews to check the reliability of current responses and to reduce the

burden on the respondent and, therefore, increase cooperation. Studies have shown that responses can vary by the mode used to collect the data.

In discussions with ACS and AHS experts at the Census Bureau, the consensus was that the observed differences between the two surveys were most likely due to differences in questionnaire design and mode of data collection.

4. Guidance on Using the AHS and the ACS for Housing Information

4.1. No Fundamental Flaws in Either Survey

Since 1973, the Census Bureau has completed 32 national AHS surveys and is currently gathering data for the 2007 national survey. HUD and the Census Bureau have refined the AHS over this period so that users can have a great deal of confidence in the information provided. The Census Bureau based the ACS on the long form used in the decennial census and field tested the ACS concept for 9 years before launching the first full ACS in 2005. The Census Bureau conducted numerous studies comparing the results of the field tests of the ACS around 2000 with the answers from the 2000 long form.[20] These tests have revealed a couple of characteristics of the ACS that users will need to keep in mind, but analysts can use the information in the ACS, including the housing information, with a great deal of confidence.

4.2. Cautions to the ACS Users

Users of the ACS should be aware of these three facts:

- First, neither the Census Bureau nor outside experts have done studies comparing the AHS and the ACS that are like the type comparing the decennial long form and the ACS. Section 3 compared counts and percentages from the 2005 AHS and the 2005 ACS. While most of the differences revealed in this analysis are minor, the reasons for the differences are not fully understood at this time.

- Second, the Census Bureau is aware that the procedures used to gather information for the ACS lead to higher estimates of the number of occupied units and lower estimates of the number of vacant units. In 2005, this feature affects all counts of characteristics of occupied or vacant units and all counts of characteristics of households. As suggested by the analysis in Section 3, this problem has little impact on percentages calculated from counts, with the exception of the vacancy rate and perhaps the homeownership rate,

[20] See the *American Community Survey 1999-2001 and Census 2000 Comparison Study* at http://www.census.gov/acs/www/AdvMeth/acs_census/index.htm and a series of 11 evaluation reports at http://www.census.gov/acs/www/AdvMeth/Reports.htm.

- Third, the ACS is evolving. The 2006 ACS will use a different approach to counting occupied and vacant households. The new approach will narrow the differences between the two surveys on these counts. The 2008 ACS may include new questions or changes in the wording of some current questions.[21]

None of these cautions should deter analysts from using the ACS to examine housing issues.

- As Section 3 shows, the differences in percentages calculated from the two surveys are generally so small as to have little practical importance. While we may not understand why the differences exist, the differences should not affect the conclusions reached from using either survey.

- The count differences resulting from the larger estimate of occupied units in the 2005 ACS is important, but most users will focus on percentages rather than counts and the count differences should be smaller in future ACS surveys.

- The AHS evolves as well. The questionnaire was changed substantially in 1997, and minor changes occur with each survey. Evolution in the context of periodic surveys generally means improvement.

The Harvard University's Joint Center for Housing Studies has sufficient confidence in the ACS that it now uses the ACS for its annual report on the *State of the Nation's Housing*, with the exception of information on homeownership rates.

4.3. Guidance for Analysis of Housing Issues at the National Level

Users who are interested in housing issues at the national level should probably use the AHS. This guidance is based on the following factors:

- For data collected in 2005, the AHS has more reliable counts of occupied and vacant units. Beginning in 2006, the Census Bureau is using new techniques to obtain better counts of occupied units (households) in the ACS. While the changes appear to be appropriate, only experience with the new data will show how effective they are.[22]

- The AHS uses multiple controls in converting sample estimates into population estimates. These controls allow the AHS to adjust its counts to match not only the Census Bureau's estimate of all housing units but also independent estimates of new construction and newly manufactured mobile homes. The AHS estimate of

[21] The Census Bureau plans to limit revisions to the ACS questionnaire to once a decade. If changes are desired, the Census Bureau will introduce them in the survey year ending in "8" so that the first 5-year moving averages using the new questionnaires for all 5 years will be centered on a decennial census year—that is, a year ending in "0."

[22] The AHS count of vacant units will continue to be higher than the ACS count. The Census Bureau is considering ways to adjust its counts of vacant units in the ACS.

the homeownership rate is linked to the estimate from the Current Population Survey.

- Because of its smaller sample size, the AHS can afford to use only telephone and in-person interviews. The ACS uses mail questionnaires for the majority of respondents, and uses telephone and in-person interviews only when respondents fail to fill in the mail questionnaires. Computer programs allow telephone and in-person interviewers to incorporate edits and queries as the questions are being asked. In general, computer-assisted techniques produce more accurate responses than mail questionnaires.

- The AHS uses dependent interviewing techniques that incorporate information from previous interviews to both reduce the burden on the respondent and increase cooperation and to check the reliability of current responses.[23]

- The AHS contains more detailed questions on housing conditions and household characteristics. Table 2 in Section 4 compares the housing questions in the two surveys. The income questions in the AHS are more extensive than those in the ACS and have recently been revised to improve accuracy.

- The longitudinal design of the AHS allows researchers—who are willing to use the public use files instead of printed reports—to track changes in individual sample units over time.[24]

The ACS does have the following two advantages for analysis of housing issues at the national level:

- ACS data are available every year instead of every 2 years.

- ACS has a few variables that the AHS does not—such as veteran status.

4.4. Guidance for Analysis of Housing Issues at the Local Level

Except for the 21 metropolitans areas that are surveyed as part of the AHS metropolitan survey, only the ACS provides data at the state, metropolitan area, county, or city levels. The 2005 and 2006 ACS provide data for all states and metropolitan areas, and for counties, cities, and Indian reservations with populations of 65,000 or more. Beginning in 2008, the Census Bureau will release moving average data for states and for all counties, cities, and Indian reservations with 20,000 or more residents based on the 2005, 2006, and 2007 ACS surveys. Beginning in 2010, the Census Bureau will release

[23] For a discussion of dependent interviewing, see *Dependent Interviewing in the American Housing Survey* at http://www.huduser.org/datasets/ahs/dependent.pdf.
[24] The longitudinal design also means that any sampling bias introduced when the sample is initially drawn or as new units are added to the sample will remain in the sample as long as those units remain in the sample.

moving average data for states and for all counties, cities, Indian reservations, census tracts, and census block groups based on the 2005, 2006, 2007, 2008, and 2009 ACS surveys.

Users of the ACS data at the local level should be aware of the three cautions mentioned above and the following additional issues:

- The smaller the population of an area, the smaller the sample used by the ACS to create estimates of the population and housing stock. The ACS provides confidence intervals for all of its estimates. The ACS will not publish an estimate if the sample size is too small to provide reasonable accuracy or if the data would allow persons to identify individual respondents. This means that not all tables will be available for all places.

- As explained in Section 3.1, the ACS uses a different concept of "occupied" than the decennial census or the AHS. The ACS counts people where they are when surveyed, unless two conditions are satisfied: (1) they have a residence elsewhere *and* (2) they are at the address where the ACS survey was received for fewer than 2 months. The ACS counts people where they are when surveyed, unless they have a residence elsewhere *and* are at the address where the ACS survey is received for 2 months or less. The decennial census and the AHS count people at the unit they designate as their usual residence. This procedural difference can result in places with seasonal populations having larger populations and more occupied housing units than in the decennial census. For some research purposes, the decennial census's definition of residence may be more useful; for other research purposes, the ACS's definition may be more useful.

4.5. Guidance for Analysis of Housing Issues for Metropolitan Areas Included in the AHS Metropolitan Survey

For the metropolitan areas included in the AHS metropolitan survey, the choice between the AHS and the ACS comes down to a trade-off among these four factors:

- *Level of detail on housing and household characteristics:* The AHS provides more extensive information on housing and household characteristics. Table 2 in Section 2 compares the level of detail in the two surveys.

- *Timeliness:* The AHS data are available every 6 years; the ACS data are available annually.

- *Level of geographic detail:* The AHS publishes data for the entire metropolitan area and for three areas within the metropolitan area, usually the principal city and the two largest counties. The county data exclude any overlap between the principal city and these counties. The AHS public use national file identifies all central cities and urban fringe areas having a population over 100,000 and, for each of the metropolitan surveys, the public use files contain information on

HUD-defined zones, which are a set of areas defined by census tracts containing at least 100,000 persons and, as a group, comprising the entire metropolitan area. The ACS publishes annual data for cities and counties with 65,000 or more inhabitants and, as explained previously, moving average data will be available for smaller places.

- *Sample size:* The AHS sample is typically 4,000 to 5,000 housing units. The ACS will sample approximately 2.5 percent of the housing units each year. For the 50 largest metropolitan areas, the ACS annual sample runs between 11,000 and 168,000.

For simple analysis, the ACS would be the logical choice with the cautions noted above; for analysis involving detailed housing or household characteristics, the AHS is the only source.

4.6. Summary

The casual user should be comfortable using either the AHS or the ACS for national analysis, particularly when the analysis involves identifying the proportion of units that have a particular feature or characteristic. Except for the vacancy rate and the homeownership rate, the differences in percentages derived from the two surveys are small and generally not "important." "Important" here means that the difference has no policy significance. For example, it matters that only a small percentage of the housing stock consists of one- and two-room units, but it does not matter whether the percentage is 1.6 percent (the AHS estimate) or 4.2 percent (the ACS estimate). "Importance" is obviously a judgment that can only be made by the analyst.

Researchers and housing analysts may want to rely more on the AHS for information about the national stock. The AHS provides many more details about the housing stock and its occupants, and utilizes computer-assisted interviewing for all respondents as well as dependent interviewing. Longitudinal data collection is also unique to the AHS. For 2005, the AHS has a more accurate count of occupied units (households) than the ACS, but this difference will probably be less important for future ACS surveys.

Except for the areas in the AHS metropolitan survey, the ACS is the only source of housing information at the local level.

These conclusions must be considered preliminary, because neither the Census Bureau nor outside researchers have carried out the type of studies needed to explain why the two surveys obtain different results. In fact, so far there has been only one ACS to compare with the AHS. It will be interesting to see if the patterns indicated in Table 4 persist when one compares the 2007 AHS with the 2007 ACS.

Appendix—Supplemental Table

This appendix replicates Table 4 with two changes. First, with the exception of a few medians, it reports counts of units instead of percentages. Second, it calculates the plus or minus spread of a 90-percent confidence interval for both surveys and calculates the critical values needed to determine whether differences between the two surveys are significant.

- Column A defines the housing characteristic being studied.

- Column B provides the count from the 2005 ACS.

- Column C provides an *adjusted* count from the 2005 AHS. Because the ACS produces different estimates of the housing stock and particularly the occupied housing stock, we know that the two surveys will differ on counts. The purpose of this table is to see whether the counts would differ for particular characteristics if the surveys agreed on the basic counts. To accomplish this, we apply the percentages derived from the AHS to the counts of the housing stock or the occupied housing stock from the ACS to produce the counts in column C.

- Column D is the difference between the ACS count and the adjusted AHS count.

- Column E is the plus or minus spread used to obtain a 90-percent confidence interval for the ACS count. The Census Bureau provides these numbers in the detailed housing profile.

- Column F is the plus or minus spread used to obtain a 90-percent confidence interval for the AHS count. We calculated these numbers using formulas in Appendix D of the 2005 AHS report.

- Column G is the critical value for a test of significance at the 90-percent level. If the absolute value of column D is greater than the value in column G, the difference between the AHS and ACS count is statistically different at the 90-percent level.

- Column H is the critical value for a test of significance at the 95-percent level. If the absolute value of column D is greater than the value in column H, the difference between the AHS and ACS count is statistically different at the 95-percent level.

- Column I is the critical value for a test of significance at the 99-percent level. If the absolute value of column D is greater than the value in column I, the difference between the AHS and ACS count is statistically different at the 99-percent level.

- Column J indicates the level of statistical significance: 3 = significant at 99-percent level; 2 = significant at 95-percent level; and 1 = significant at 90-percent level.

Of the 115 rows, the differences between the two surveys are statistically different at the 90-percent level in 86 rows; at the 95-percent level in 82 rows; and at the 99-percent level in 73 rows.

Table A-1: Statistical Comparison of ACS Counts with Adjusted AHS Counts

Characteristics of the Housing Stock	ACS Counts	Adjusted AHS Counts	ACS – Adjusted AHS	ACS 90% Confidence Interval	AHS 90% Confidence Interval	90% Critical Value	95% Critical Value	99% Critical Value	Statis-tical Signifi-cance ***
A	B	C	D	E	F	G	H	I	J
All Housing Units									
UNITS IN STRUCTURE									
1 unit, detached	76,112,065	77,699,322	-1,587,257	173,205	505,955	534,781	637,186	837,444	3
1 unit, attached	7,063,608	7,053,969	9,639	42,240	238,647	242,357	288,765	379,520	
2 units	5,029,858	4,435,989	593,869	44,965	191,314	196,527	234,160	307,753	3
3 or 4 units	5,723,743	5,167,038	556,705	48,509	205,858	211,496	251,995	331,194	3
5 to 9 units	6,179,145	5,832,983	346,162	55,117	218,120	224,976	268,057	352,303	2
10 to 19 units	5,594,120	5,727,202	-133,082	53,164	216,228	222,668	265,306	348,688	
20 or more units	9,986,844	9,871,790	115,054	47,000	278,965	282,896	337,068	443,004	
Mobile home	8,737,428	8,640,703	96,725	-50,582	262,366	267,198	318,363	418,420	
Boat, RV, van, etc.	95,075	92,890	2,185	6,196	28,173	28,846	34,370	45,172	
YEAR STRUCTURE BUILT									
Built 2005 or later	598,466	945,100	-346,634	13,590	89,561	90,586	107,932	141,854	3
Built 2000 to 2004	9,859,146	9,204,710	654,436	58,408	270,144	276,387	329,312	432,810	3
Built 1990 to 1999	18,243,968	16,006,624	2,237,344	63,248	345,746	351,484	418,789	550,408	3
Built 1980 to 1989	18,519,236	16,395,076	2,124,160	60,958	349,300	354,579	422,477	555,256	3
Built 1970 to 1979	21,517,571	25,120,228	-3,602,657	62,694	414,867	419,578	499,922	657,041	3
Built 1960 to 1969	14,949,947	15,209,697	-259,750	57,723	338,244	343,134	408,840	537,333	
Built 1950 to 1959	14,722,293	13,018,147	1,704,146	63,391	315,996	322,292	384,008	504,696	3
Built 1940 to 1949	7,788,773	7,913,207	-124,434	43,636	251,853	255,605	304,551	400,267	
Built 1939 or earlier	18,322,486	20,710,097	-2,387,611	59,641	384,808	389,402	463,968	609,787	3

Characteristics of the Housing Stock	ACS Counts	Adjusted AHS Counts	ACS – Adjusted AHS	ACS 90% Confidence Interval	AHS 90% Confidence Interval	90% Critical Value	95% Critical Value	99% Critical Value	Statis-tical Signifi-cance ***
ROOMS									
1 room	1,213,066	637,742	575,324	19,601	73,660	76,224	90,820	119,363	3
2 rooms	3,965,119	1,400,630	2,564,489	34,399	108,831	114,138	135,994	178,735	3
3 rooms	11,620,220	10,953,745	666,475	66,393	292,487	299,928	357,361	469,675	3
4 rooms	21,914,200	22,800,529	-886,329	113,906	399,749	415,661	495,255	650,907	3
5 rooms	27,262,262	28,652,338	-1,390,076	88,438	435,280	444,174	529,228	695,557	3
6 rooms	23,507,124	25,354,501	-1,847,377	73,996	416,315	422,840	503,809	662,149	3
7 rooms	15,205,052	15,301,804	-96,752	65,400	339,126	345,374	411,510	540,841	
8 rooms	9,883,642	8,867,317	1,016,325	48,822	265,529	269,980	321,678	422,777	3
9 rooms or more	9,951,201	10,554,280	-603,079	57,385	287,601	293,270	349,428	459,248	3
Median (rooms)	5.4	5.7	-0.3	0.2	0.3*	0.4*	0.4*	0.6*	
BEDROOMS									
No bedroom	1,578,114	1,271,903	306,211	22,722	114,636	116,867	139,245	183,008	3
1 bedroom	14,902,476	14,649,657	252,819	78,402	332,793	341,903	407,374	535,406	
2 bedrooms	35,087,858	34,366,218	721,640	120,504	462,568	478,006	569,540	748,538	2
3 bedrooms	49,389,388	50,927,872	-1,538,484	124,046	509,926	524,797	625,290	821,810	3
4 bedrooms	18,966,155	18,658,428	307,727	77,825	368,778	376,901	449,073	590,210	
5 or more bedrooms	4,597,895	4,647,808	-49,913	34,267	195,658	198,636	236,673	311,056	
Occupied Housing Units									
HOUSING TENURE									
Owner occupied	74,318,982	76,458,662	-2,139,680	293,104	508,252	586,711	699,060	918,765	3
Renter occupied	36,771,635	34,631,955	2,139,680	172,018	463,682	494,562	589,265	774,462	3
Average household size of owner-occupied unit	2.70	2.64	0.06	0.01	**	**	**	**	**
Average household size of renter-occupied unit	2.39	2.32	0.07	0.01	**	**	**	**	**

Characteristics of the Housing Stock	ACS Counts	Adjusted AHS Counts	ACS – Adjusted AHS	ACS 90% Confidence Interval	AHS 90% Confidence Interval	90% Critical Value	95% Critical Value	99% Critical Value	Statis-tical Signifi-cance ***
YEAR HOUSEHOLDER MOVED INTO UNIT									
Moved in 2000 or later	54,202,757	54,106,052	96,705	110,719	514,410	526,191	626,951	823,993	
Moved in 1995 to 1999	18,531,910	18,998,596	-466,686	80,788	371,537	380,219	453,026	595,406	2
Moved in 1990 to 1994	10,860,782	10,985,493	-124,711	58,602	292,871	298,676	355,869	467,714	
Moved in 1980 to 1989	12,214,301	11,551,808	662,493	65,996	299,587	306,770	365,513	480,389	3
Moved in 1970 to 1979	8,056,773	8,188,610	-131,837	52,146	255,900	261,159	311,168	408,964	
Moved in 1969 or earlier	7,224,094	7,259,037	-34,943	41,610	241,883	245,436	292,435	384,343	
VEHICLES AVAILABLE									
No vehicles available	9,850,747	9,415,121	435,626	52,269	272,969	277,929	331,149	435,224	3
1 vehicle available	36,777,998	34,816,953	1,961,045	83,266	464,450	471,855	562,210	738,904	3
2 vehicles available	42,431,495	42,738,062	-306,567	126,477	491,821	507,823	605,066	795,230	
3 or more vehicles available	22,030,377	24,120,481	-2,090,104	95,209	408,529	419,477	499,802	656,883	3
HOUSE HEATING FUEL									
Utility gas	56,073,178	57,465,168	-1,391,990	115,233	517,675	530,346	631,901	830,499	3
Bottled, tank, or LP gas	6,613,322	6,354,974	258,348	45,318	227,177	231,653	276,012	362,759	1
Electricity	36,134,273	34,961,540	1,172,733	83,437	465,046	472,471	562,945	739,870	3
Fuel oil, kerosene, etc.	8,864,398	10,131,428	-1,267,030	40,943	282,294	285,248	339,870	446,686	3
Coal or coke	133,587	96,937	36,650	5,399	28,780	29,282	34,889	45,854	2
Wood	1,866,856	1,439,767	427,089	19,645	110,323	112,059	133,517	175,479	3
Solar energy	36,682	15,306	21,376	3,119	11,440	11,857	14,128	18,568	3
Other fuel	471,122	218,363	252,759	9,923	43,174	44,300	52,783	69,372	3
No fuel used	897,199	406,114	491,085	14,771	58,835	60,661	72,277	94,992	3
SELECTED CHARACTERISTICS									
Lacking complete plumbing facilities	490,075	1,323,443	-833,368	13,286	116,916	117,669	140,201	184,264	3
Lacking complete kitchen facilities	652,427	1,729,557	-1,077,130	13,804	133,478	134,190	159,886	210,136	3

Characteristics of the Housing Stock	ACS Counts	Adjusted AHS Counts	ACS – Adjusted AHS	ACS 90% Confidence Interval	AHS 90% Confidence Interval	90% Critical Value	95% Critical Value	99% Critical Value	Statis-tical Signifi-cance ***
No telephone service available	5,731,717	3,193,813	2,537,904	83,934	163,157	183,481	218,616	287,323	3
OCCUPANTS PER ROOM									
1.00 or less	107,672,354	108,413,120	-740,766	154,725	363,207	394,790	470,389	618,225	3
1.01 to 1.50	2,594,323	2,210,160	384,163	32,076	136,267	139,991	166,798	219,220	3
1.51 or more	823,940	466,317	357,623	16,879	63,030	65,251	77,746	102,180	3
Owner-Occupied Units									
VALUE									
Less than $50,000	6,795,497	7,350,147	-554,650	42,448	243,304	246,979	294,272	386,758	3
$50,000 to $99,999	13,416,164	14,447,610	-1,031,446	91,437	330,789	343,194	408,912	537,427	3
$100,000 to $149,999	12,899,776	12,396,406	503,370	74,079	309,203	317,953	378,837	497,900	3
$150,000 to $199,999	10,146,671	9,668,900	477,771	54,778	276,323	281,701	335,643	441,131	3
$200,000 to $299,999	11,195,025	11,512,010	-316,985	54,017	299,122	303,961	362,166	475,989	1
$300,000 to $499,999	11,452,652	10,791,116	661,536	58,159	290,512	296,277	353,011	463,957	3
$500,000 to $999,999	6,924,783	5,930,655	994,128	39,707	219,850	223,406	266,186	349,845	3
$1,000,000 or more	1,488,414	2,229,569	-741,155	14,589	136,853	137,629	163,983	215,521	3
Median (dollars)	$167,500	$165,344	$2,156	322	2,256	2,279	2,715	3,568	
MORTGAGE STATUS AND SELECTED MONTHLY OWNER COSTS									
Housing units with a mortgage	50,462,973	49,745,018	717,955	201,106	507,903	546,268	650,873	855,433	2
Less than $300	224,657	797,315	-572,658	8,071	82,310	82,704	98,541	129,511	3
$300 to $499	1,638,287	2,725,001	-1,086,714	20,025	150,994	152,316	181,483	238,521	3
$500 to $699	4,222,846	4,799,029	-576,183	40,402	198,692	202,758	241,584	317,511	3
$700 to $999	9,744,750	9,739,354	5,396	60,589	277,245	283,788	338,130	444,400	
$1,000 to $1,499	14,960,148	14,624,170	335,978	80,697	332,541	342,192	407,719	535,859	

Characteristics of the Housing Stock	ACS Counts	Adjusted AHS Counts	ACS – Adjusted AHS	ACS 90% Confidence Interval	AHS 90% Confidence Interval	90% Critical Value	95% Critical Value	99% Critical Value	Statis-tical Signifi-cance ***
$1,500 to $1,999	9,060,868	8,286,020	774,848	61,271	257,312	264,506	315,156	414,205	3
$2,000 or more	10,611,417	9,492,085	1,119,332	50,403	273,993	278,590	331,937	436,260	3
Median (dollars)	$1,295	$1,219	$76	2	12.29	12	15	19	3
Housing units without a mortgage	23,856,009	24,573,964	-717,955	114,111	411,437	426,968	508,727	668,613	3
Less than $100	437,759	455,650	-17,891	10,810	62,308	63,238	75,348	99,029	
$100 to $199	2,658,344	2,817,395	-159,051	25,156	153,475	155,523	185,304	243,543	1
$200 to $299	5,196,870	4,780,744	416,126	42,713	198,328	202,876	241,724	317,695	3
$300 to $399	5,107,431	4,513,557	593,874	37,637	192,918	196,555	234,193	307,797	3
$400 or more	10,455,605	11,288,663	-833,058	55,992	296,494	301,735	359,514	472,504	3
Median (dollars)	$369	$384	$(15)	2	8	8	10	13	3
SELECTED MONTHLY OWNER COSTS AS A PERCENTAGE OF HOUSEHOLD INCOME									
Housing unit with a mortgage									
Less than 20.0 percent	18,176,763	21,224,726	-3,047,963	96,199	388,610	400,340	477,000	626,915	3
20.0 to 24.9 percent	8,374,922	7,811,668	563,254	61,530	250,339	257,790	307,154	403,688	3
25.0 to 29.9 percent	6,295,581	5,793,149	502,432	48,127	217,410	222,673	265,312	348,696	3
30.0 to 34.9 percent	4,404,050	3,996,667	407,383	34,070	181,920	185,083	220,525	289,833	3
35.0 percent or more	13,012,187	11,636,762	1,375,425	68,927	300,575	308,377	367,428	482,906	3
Housing unit without a mortgage									
Less than 10.0 percent	9,298,235	8,936,461	361,774	64,329	266,483	274,138	326,633	429,288	2
10.0 to 14.9 percent	4,764,810	4,069,835	694,975	35,937	183,523	187,009	222,819	292,848	3
15.0 to 19.9 percent	2,887,786	2,690,958	196,828	25,651	150,069	152,245	181,398	238,409	2
20.0 to 24.9 percent	1,831,282	1,715,247	116,035	21,799	120,283	122,243	145,651	191,427	
25.0 to 29.9 percent	1,213,801	1,230,970	-17,169	18,048	102,096	103,679	123,532	162,357	
30.0 to 34.9 percent	820,030	913,685	-93,655	12,361	88,071	88,934	105,964	139,267	1

Characteristics of the Housing Stock	ACS Counts	Adjusted AHS Counts	ACS – Adjusted AHS	ACS 90% Confidence Interval	AHS 90% Confidence Interval	90% Critical Value	95% Critical Value	99% Critical Value	Statis-tical Signifi-cance ***
35.0 percent or more	2,808,581	4,298,853	-1,490,272	26,039	188,440	190,230	226,657	297,892	3
Renter-Occupied Units									
GROSS RENT									
Less than $200	1,204,931	1,699,424	-494,493	20,277	119,735	121,440	144,694	190,170	3
$200 to $299	1,344,599	1,521,206	-176,607	19,278	113,364	114,991	137,011	180,071	2
$300 to $499	4,982,973	5,667,726	-684,753	49,053	215,155	220,676	262,933	345,570	3
$500 to $749	10,693,519	10,696,379	-2,860	70,131	289,353	297,730	354,743	466,233	
$750 to $999	8,101,218	7,645,634	455,584	61,727	247,838	255,409	304,317	399,960	3
$1,000 to $1,499	5,914,651	5,247,129	667,522	52,866	207,378	214,011	254,992	335,132	3
$1,500 or more	2,314,250	2,006,991	307,259	27,116	129,959	132,758	158,180	207,893	3
No cash rent	2,215,494	2,287,145	-71,651	24,739	138,577	140,768	167,723	220,437	
Median (dollars)	$728	$694	$ 34	2	10	10	12	16	3
GROSS RENT AS A PERCENTAGE OF HOUSEHOLD INCOME									
Less than 15.0 percent	4,398,171	4,220,850	177,321	50,769	186,782	193,559	230,623	303,104	
15.0 to 19.9 percent	4,357,562	4,131,349	226,213	40,074	184,859	189,152	225,373	296,204	2
20.0 to 24.9 percent	4,402,662	4,365,244	37,418	44,544	189,837	194,993	232,333	305,351	
25.0 to 29.9 percent	3,991,168	4,304,384	-313,216	39,870	188,556	192,726	229,631	301,800	3
30.0 to 34.9 percent	3,040,601	3,572,865	-532,264	35,044	172,302	175,830	209,500	275,342	3
35.0 percent or more	13,755,468	16,176,942	-2,421,474	91,998	347,312	359,290	428,091	562,633	3

* The author did not have the appropriate formula for calculating the AHS 90-percent spread. He assumed it would have to be at least 50-percent greater than the ACS spread because of the difference in sample sizes. This conservative assumption was sufficient to produce the "not statistically different" conclusion at all three levels of significance.
** The author did not have the information needed to calculate the 90-percent spread for the AHS.
*** 3 = significant at 99-percent level; 2 = significant at 95-percent level; and 1 = significant at 90-percent level.