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An evaluation of the American Community Survey: results from the Oregon test site

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Abstract The American Community Survey (ACS) is a Census Bureau product designed to provide accurate and timely demographic and economic indicators on an annual basis for both large and small geographic areas within the United States. Operational plans for Census 2010 call for ACS to replace the decennial census long form (Census LF), pending the results of evaluation studies. This plan represents a major change in that variables that traditionally have been collected on a ''snapshot'' basis once every 10 years would be collected on a ''rolling'' annual basis. Using a loss function analysis and other tools, this paper reports preliminary findings from a comparison of ACS and Census 2000 results in Multnomah County, Oregon, one of five national ''local expert'' test sites set up to compare ACS data collected at the time of Census 2000. The preliminary findings suggest that there are notable differences between some of the corresponding variables found in the ACS and Census LF that require more detailed examination. For example, the loss function analysis reveals notable differences for race and disability variables. In other comparisons of corresponding variables between ACS and Census 2000, differences are found within each of the four major areas of interest: (1) demographic characteristics, (2) social characteristics, (3) economic characteristics, and (4) housing characteristics, with housing characteristics showing the least similarity overall. These results also suggest that more detailed examinations are needed to understand differences between corresponding variables collected by ACS and the Census LF.

Keywords American Community Survey · Loss function · Portland test site

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Introduction

The American Community Survey (ACS) promises to meet 21st Century demographic data needs by ''provid[ing] accurate and timely demographic and economic indicators throughout the decade for federal, state and local governments'' (U.S. Census Bureau, 2001a, 2004). It promises to produce a video of your community through time, not a frozen snapshot every decade. Current prospects regarding research on the ACS look hopeful (Hough & Swanson, 1998; McLaughlin, Melz, Lichter, & Gardner, 2001; Salvo & Lobo, 1997). However, as current operational plans for Census 2010 call for ACS to replace the decennial census long form (Census LF), further research needs to evaluate the quality of the ACS data.

Background

Under the auspices of the ACS, Multnomah County, Oregon (which includes the city of Portland) was selected as one of four 1996 test sites for the ''continuous measurement'' option that was being considered for Census 2000 and is now part of the Operation Plan for Census 2010 (U.S. Census Bureau, 2003). There are important conceptual differences between ACS and Census LF data. As its name suggests, continuous measurement, unlike the long form, is not designed to provide a ''snapshot'' at a single point in time. Instead, it is aimed more at providing information that can monitor change over time. For most users, however, this distinction may not be apparent. It is highly likely that ACS data will be used as if they did represent a snapshot at a given point in time if for no other reason than that ACS is viewed as a replacement for Census LF (Hodges, 1996). Bolstering this viewpoint is the fact that ACS data will have to be ''controlled'' to independently estimated population and housing unit values so that its results can be adjusted to provide information on the entire population (Love, Dalzell, & Alexander, 1995; Smith, 1998; Taeuber, Lane, & Stevens, 2000).

Yet another issue in regard to ACS is the accuracy of information available for populations that have had the highest net undercount errors. For all of the problems with the traditional decennial census, it at least provided estimates of net undercount by area for different populations (Robinson, Ahmed, Das Gupta, & Woodrow, 1991). The possibility of ACS serving as a substitute for the long form calls for some type of evaluation in regard to errors, particularly in regard to the ''hard to enumerate'' populations.

Because of issues like those just listed, the National Research Council's Panel on ''Census Requirements in the Year 2000 and Beyond'' (National Research Council, 1995) recommended against substituting the ACS for the long form in the 2000 Census. The recommendation was largely based on the fact that ''...there are too many unanswered questions for which research is needed'' (National Research Council 1995, p. 135). The major areas cited for which research was needed are: (1) costs, (2) data quality, (3) conceptual issues involving the use of cumulated data, (4) the relationship of ACS to existing household surveys, and (5) the cost/benefit ratio of ACS compared to other methods of obtaining small area data frequently. This research agenda is a very large task, well beyond the scope of this paper, which is to initiate an empirically based discussion of the capability of the ACS to provide small

area data comparable in quality to that provided by the 2000 Census Long Form, the current ''gold standard'' for small area data.

To that end, the three main research questions to be addressed here are:

(1) Does the ACS represent a reasonable replacement to the Census Long Form? Are the two surveys similar in data quality?
(2) Do the observed substantive and statistical differences between the two surveys represent meaningful differences? Can local experts provide insight that may explain these differences?
(3) Do traditional indicators associated with data quality assist in explaining differences between Census LF and ACS?

Brief description of Multnomah County, Oregon

Multnomah County is the most populous county in Oregon, and contains almost all of the city of Portland. For the 2000 Census, the county was divided into 170 census tracts (see Fig. 1, which shows differences in response rates by tract for the ACS and the 2000 Census). Multnomah County is part of the metropolitan region's ''silicon forest,'' and also home to the creative arts industries. It is also noted for its sustainable development and high quality of life. The county population of 660,000 represents more than 20% of the state's total population.

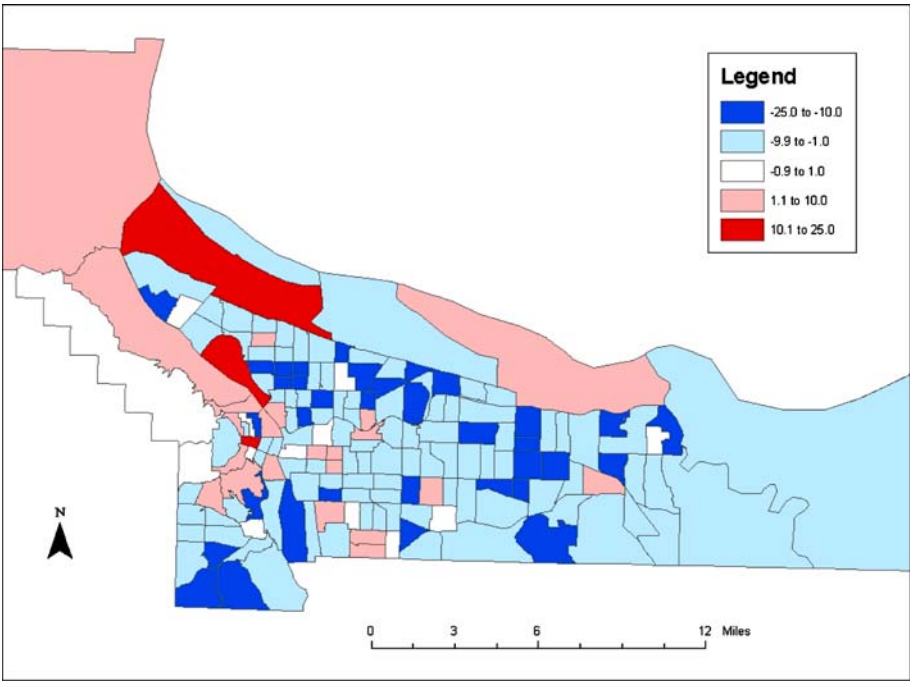

Fig. 1 Differences in self-response rates for Multnomah County, Oregon (ACS—Census)

The county population grew 13% from the time of the 1990 Census to that of the 2000 Census. Net migration accounted for over 55% of that growth. Most of the positive net migration occurred for those 20–39 years of age, with negative net migration occurring for all segments outside the 15–44 age groups. Additionally, most of the population growth took place in East Multnomah County where there was still available land.

Multnomah County became more diverse between 1990 and 2000, with large growth occurring to the racial and ethnic minorities. The Hispanic/Latino population grew by 170% and totaled 50,000 members by 2000, a result of in-migration and high fertility. The Asian population also experienced substantial growth as a result of in-migration. These trends are expected to continue in the coming decades. The 2000 Census also found that Multnomah County had proportionately more renter-occupied housing units and fewer vacant units, and fewer persons per household than the state. Median income and educational attainment were higher and unemployment was lower in the county than in the state.

Figure 1 shows the general outline of Multnomah County and the 170 census tracts that it comprises. It also shows the differences by census tract in self-response rates between the ACS and the 2000 Census, which gives a general idea of comparative data quality between the two forms of data collection. For the county as a whole, the census had a self-response rate of 70.4% while the ACS had a lower rate of 65%.

A comparison of Census 2000 and the 1999–2001 ACS

With 357 equivalent variables between Census 2000 and the ACS for each test site, there is a lot of room for type I errors in using, say, the *t*-test as a means of comparison between the Census results and the ACS results. For example, with $\alpha = .10$, the probability of making at least one type I error is virtually 1.000 [P(type I error) = $1–((.9)^{357})] \approx 1.00$]. One possible way (of several) to reduce this probability is to use the Bonferroni Correction (Kirk 1968; Perenger, 1998), which is a simple but conservative way to reduce the probability of making type I errors:

$$\text{Bonferroni Correction} = \acute{\alpha} = \alpha/n$$

However, with $\alpha = .10$, the conservative nature of the Bonferroni correction yields $\acute{\alpha} = .00028$, in our case (.00028 = .10/357), which, not surprisingly, increases the probability of making a type II error, i.e., it yields a test with low power. With 357 comparisons, this serves as a simple example showing that other alpha levels and other procedures for reducing the probability of making a type I error all have their drawbacks.

To avoid these problems, we chose in this section of the paper not to use statistical inference in analyzing differences between values of similar variables collected for Multnomah County as a whole by Census 2000 and the 1999–2001 ACS. Instead we focus on two measures of difference: (1) the absolute numerical difference, and (2) the absolute percent difference. Both serve to capture important dimensions of error and are used in the most common summary measures of differences (National Academy of Sciences, 1980; Swanson, Tayman, & Barr, 2000). Both of them also can be summarized in a single summary measure known as a loss function (Bryan, 2000;

National Academy of Sciences, 1980), which serves our analytic goals by avoiding tedium on the one hand and yielding potential insights on the other. Thus our goal is to identify variables for which there are really marked differences between Census LF and ACS, and to do this we use a loss function analysis.

At the initiation of our analysis there were many tabular presentations for which comparisons were available, many of which are hierarchical in nature. All of the variables and subvariables found in these tabular presentations are measured at either the ordinal or nominal level. That is, each variable and subvariable is measured in terms of categories—ranges of values. We selected for our analysis only those variables for which their categorical values were mutually exclusive and exhaustive. That is, we selected those variables that were not subsets of hierarchies. This selection process yielded 26 variables for analysis. These 26 variables (see Table 1 for a list) represent each of the major dimensions of both the 2000 Census LF and the ACS. For each of these 26 variables, the absolute numerical difference and absolute percent difference for each category were found between the Census LF and the ACS. For example, as shown in Table 2, the variable ''DISABILITY'' has three age categories that are exhaustive and mutually exclusive.

As can be seen in Table 2, the absolute numerical difference between Census LF and ACS is 2,480 for the category ''Pop 5–20 years with a disability,'' and the absolute percent difference is 21.91. These same differences are shown in Table 2 for the remaining two categories of this variable.

The loss function summarizes the information in the absolute numeric and absolute percent differences by combining them in a weighted fashion. The key to

Table 1 Summary statistics for loss function values of 26 variables

Variable	Observations	Maximum	Minimum	Median	Mean	*SD*
Age	13	4.42	0.02	0.94	1.60	1.29
Race 1	16	85.85	0.11	7.09	14.48	20.90
Race 2	6	127.11	1.43	13.27	30.86	47.93
Hispanic	4	11.32	0.99	4.78	5.47	4.58
School enroll	5	7.73	0.91	2.52	3.56	2.63
Ed attainment	7	6.45	0.86	3.79	3.53	2.35
Marital status	5	9.24	0.45	6.15	5.47	3.49
Disability status	3	32.35	0.54	13.29	15.39	16.01
Nativity/pob	3	11.54	2.16	2.73	5.48	5.26
Rob-foreign born	6	1.83	0.05	0.98	0.94	0.71
Ancestry	27	33.86	0.14	5.81	9.38	10.00
Commuting	6	15.87	2.64	5.65	7.52	4.84
Occupation	6	5.18	0.01	1.47	1.96	1.99
Industry	13	5.89	0.10	2.17	2.45	1.94
Class of worker	4	8.35	0.91	4.98	4.81	3.25
Household income	10	6.08	0.03	3.64	3.21	1.94
Family income	10	4.34	0.82	2.18	2.45	1.19
Units in structure	9	23.90	0.80	10.59	9.90	8.36
Year structure BLT	8	16.15	0.97	3.16	5.71	5.49
Rooms	9	15.62	0.08	5.97	6.85	5.33
Year moved in	5	18.77	0.15	2.69	3.52	3.48
Vehicles	4	8.02	1.66	4.04	4.44	2.73
House heating fuel	9	18.77	0.41	4.72	5.82	5.83
Housing value	8	4.47	0.34	1.78	2.01	1.62
Mortgage/cost	8	5.72	0.15	3.55	2.98	1.68
Gross rent	9	4.08	0.15	3.26	2.63	1.42

Table 2 Disability status comparison of Census Long Form and ACS

Subject: Disability status	Variable	Census 2000	ACS 3-Year Avg 1999–2001	Absolute numerical difference	Absolute percent difference	Loss function value
1	Pop 5–20 yrs With a disability	11,320	8,840	2,480	21.91	13.29
2	Pop 21–64 yrs With a disability	70,910	54,039	16,871	23.79	32.35
3	Pop 65+ with a disability	28,690	28,520	170	0.59	0.54

developing a meaningful loss function is based on the ''weighting'' scheme used. Bryan (2000) describes a procedure used by the U.S. Census Bureau for the evaluation of multiple estimate series, namely,

$$w = 1 - [(\ln(\text{range}))/25],$$

where range is the difference between the highest and lowest value in a ''census'' observation for a given variable. In the case of the DISABILITY variable shown in Table 2, range = 70,910–11,320 = 59,590 and w = 1–[(ln(59,590))/25] = .56.

As shown by National Academy of Sciences (1980), a loss function has several algebraic equivalent expressions. One that is convenient for calculation is

$$L = [(\text{ABS}(e-c))/(c^w)].$$

Using the data in Table 2, the loss function value for category 1 (Pop 5–20 years with a disability) is:

$$[(\text{ABS}(8,840 - 11,320))/(11,320^{.56})] = 13.29.$$

Similar loss functions were computed for each of the other 25 variables in the list.

Once the loss functions were computed, summary measures were calculated within each variable. The summary variables include the maximum, median, mean, and standard deviation. In the case of DISABILITY, the maximum is 32.35, the median is 13.29, the mean is 15.39, and the standard deviation is 16.00. Each of these four summary measures was computed for the loss function of each of the remaining 25 variables. These values are shown in Table 1.

Four of the summary measures (maximum, median, mean, and standard deviation) shown in Table 1 were then examined by use of the box plot procedure, which facilitates the identification of outliers (see, for example, Hough & Swanson, 1998). These plots are shown as Figs. 2–5

In Fig. 2, the two outliers seen for the maximum loss function values are for RACE2 and RACE1, respectively. The maximum loss function value for RACE2 is 127.1, while for RACE1 it is 85.85. In Fig. 3, the outlier seen for the median loss function values is for RACE2 (13.27). In Fig. 4, the three outliers seen for the mean loss function values are for RACE2, DISABILITY, and RACE1, respectively. The mean loss function value for RACE2 is 30.86, for DISABILITY, it is 15.39, and for RACE1 it is 14.48. In Fig. 5, the three outliers seen for the standard deviation of the

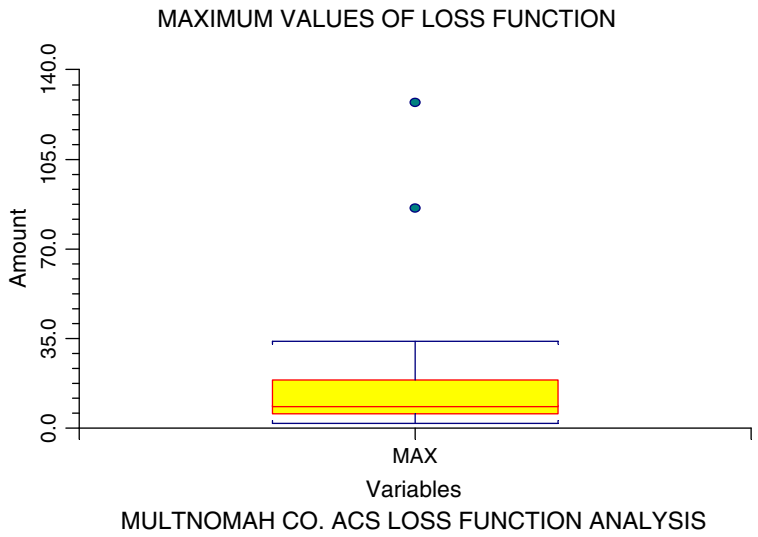

Fig. 2 Maximum values of the loss function

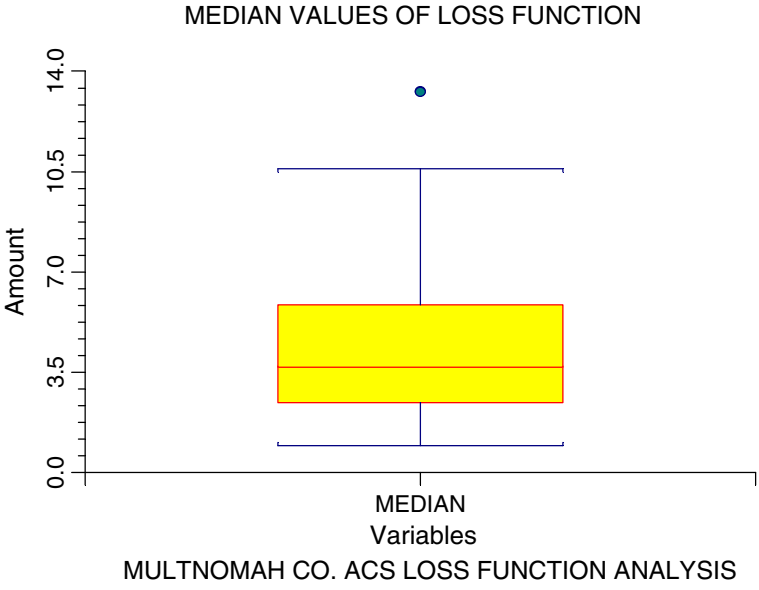

Fig. 3 Median values of the loss function

loss function values are for RACE2, RACE1, and DISABILITY, respectively. The mean loss function value for RACE2 is 47.93, for RACE1 it is 20.90, and for DISABILITY, it is 16.01.

Our analysis to this point suggests that there are three variables that warrant more detailed investigation in Multnomah County, Oregon: RACE2, RACE1, and DISABILITY. We return to these variables in the following section.

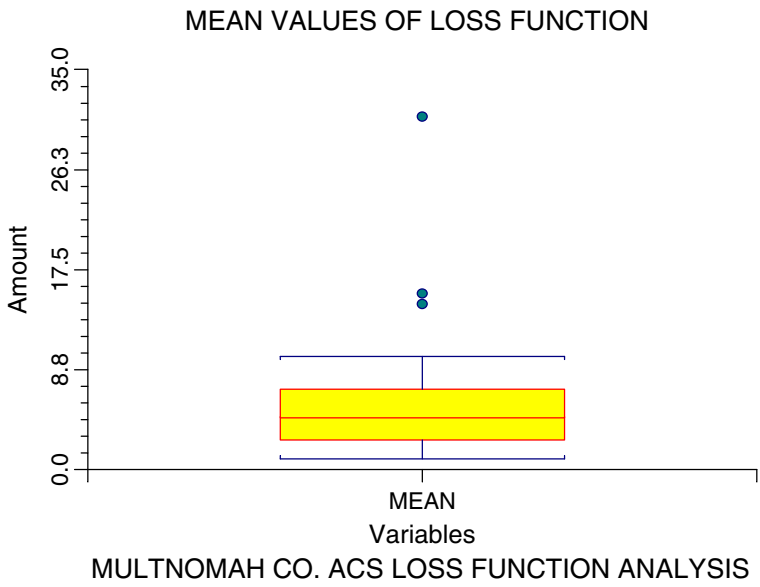

Fig. 4 Mean values of the loss function

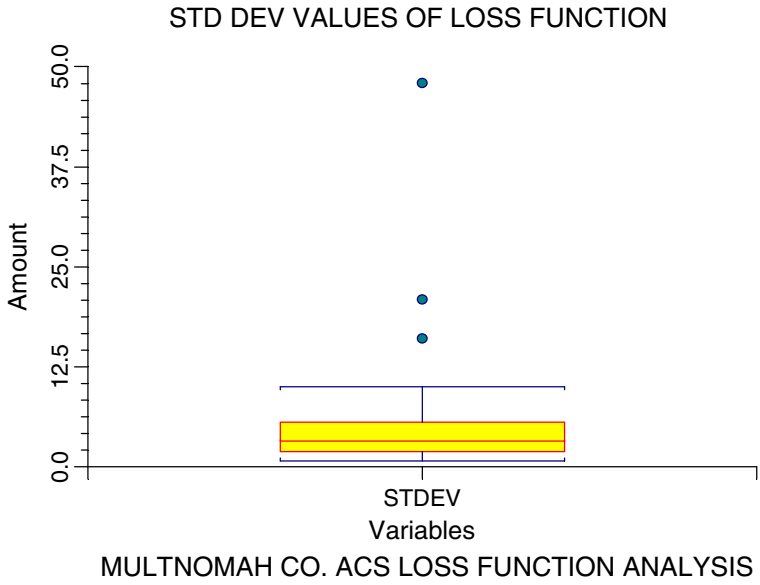

Fig. 5 Standard deviation values of the loss function

General comparison of Census 2000 and 1999–2001 ACS profiles

The Census Bureau provided a set of four profiles for Multnomah County representing 82 demographic, 92 social, 93 economic, and 97 housing characteristics. The

profile data were provided for both the Census 2000 long form and 3-year averaged ACS estimates (1999–2001) for comparative analyses. Table 3 presents the number of characteristics for each of the major tables within each profile, the number of comparisons for each profile and subtables within each profile, the number and

Table 3 Demographic, social, economic, and housing characteristics 1999–2001 ACS and Census 2000 estimates, Multnomah County, Oregon

	Comparisons	Similar		Different	
Total (364 items)	357	225	63.0%	132	37.0%
Demographic Profile (82 Items)	78	52	66.7%	26	33.3%
Total population (1)					
Sex and age (22)	22	20	90.9%	2	9.1%
Race (24)	24	15	62.5%	9	37.5%
Hispanic origin and race (8)	7	5	71.4%	2	28.6%
Household relationship (7)	6	3	50.0%	3	50.0%
Household and family type (12)	12	4	33.3%	8	66.7%
Housing occupancy (3)	2	2	100.0%	0	0.0%
Housing tenure (5)	5	3	60.0%	2	40.0%
Social profile (92 items)	90	58	64.4%	32	35.6%
School enrollment (6)	6	4	66.7%	2	33.3%
Educational attainment (10)	10	5	50.0%	5	50.0%
Marital status (8)	8	5	62.5%	3	37.5%
Grandparents as caregivers (2)	2	2	100.0%	0	0.0%
Veteran status (2)	2	1	50.0%	1	50.0%
Disability status (9)	9	4	44.4%	5	55.6%
Nativity and place of birth (10)	9	7	77.8%	2	22.2%
Region of birth of the foreign born (7)	7	5	71.4%	2	28.6%
Language spoken at home (10)	10	7	70.0%	3	30.0%
Ancestry (28)	27	18	66.7%	9	33.3%
Economic profile (93 items)	93	62	66.7%	31	33.3%
Employment status (14)	14	8	57.1%	6	42.9%
Commuting to work (8)	8	5	62.5%	3	37.5%
Occupation (7)	7	7	100.0%	0	0.0%
Industry (13)	13	10	76.9%	3	23.1%
Class of worker (4)	4	3	75.0%	1	25.0%
Income in 1999 (37)	37	22	59.5%	15	40.5%
Poverty status in 1999 (10)	10	7	70.0%	3	30.0%
Housing profile (97 items)	96	53	55.2%	43	44.8%
Total housing units (1)					
Units n structure (9)	9	4	44.4%	5	55.6%
Year structure built (8)	8	4	50.0%	4	50.0%
Rooms (10)	10	3	30.0%	7	70.0%
Year householder moved into unit (6)	6	4	66.7%	2	33.3%
Vehicles available (4) [This item is not related to housing]	4	1	25.0%	3	75.0%
House heating fuel (9)	9	4	44.4%	5	55.6%
Selected characteristics (3)	3	2	66.7%	1	33.3%
Occupants per room (3)	3	0	0.0%	3	100.0%
Value of owner-occupied housing units (10)	10	7	70.0%	3	30.0%
Mortgage status and selected monthly owner costs (11)	11	8	72.7%	3	27.3%
Monthly owner costs as a percentage of household income (6)	6	5	83.3%	1	16.7%
Gross rent (10)	10	7	70.0%	3	30.0%
Gross rent as a percentage of household income (7)	7	4	57.1%	3	42.9%

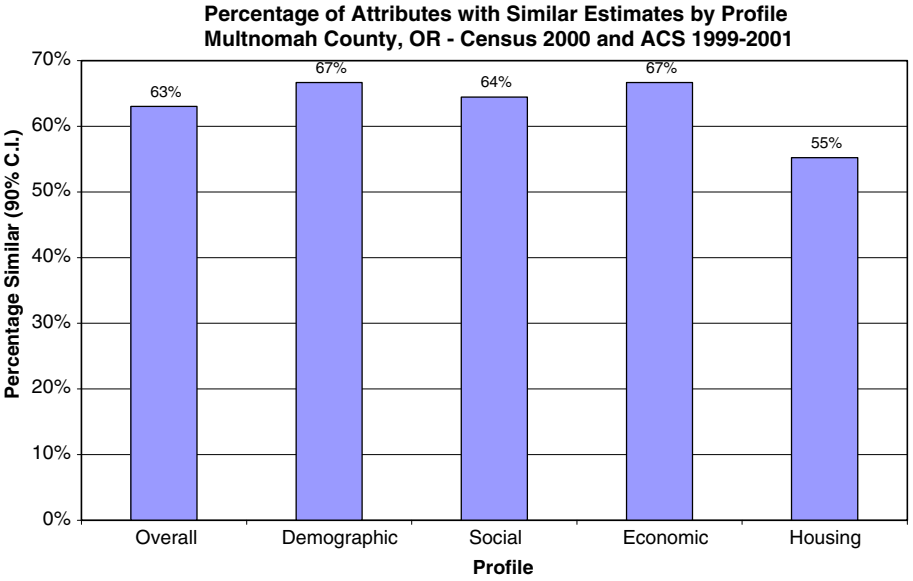

Fig. 6 Percentage of attributes with similar estimates by profile Multnomah County, OR—Census 2000 and ACS 1999–2001

percentage of similar results from the ACS average and the Census LF, and finally the number and percentage of significantly different results.[1] Figure 6 provides a graphic summary of these data.

Based upon these 364 characteristics, the Census Bureau calculated tests of statistical significance for 357 of the items (the remaining seven characteristics represent control totals). Comparing the Multnomah County attributes, 225 (63%) of the characteristics did not display statistically significant differences at the 90% confidence level; or conversely, 37% were significantly different. The housing profile results displayed the lowest degree of similarity, although over half the items were similar. In the next section, we will examine the more informative questions: Which individual characteristics were statistically different, and can we explain these differences?

ACS and Census 2000 characteristics: statistical and meaningful differences

Here, we compare individual characteristics from the 3-year averages of 1999–2001 ACS data with results from the 2000 Census LF. The analysis begins with an examination of differences at the county level. The aim is to identify significant differences between the two sets of data, highlight the most meaningful differences, and ideally, understand the reasons for these differences.

[1] Per the specifications of our contract, we were required to review the statistical similarities and differences of the four standard profiles for ACS and Census LF data. As stated in the section on the loss function analysis, it is known that with multiple comparisons the probability for finding statistically significant differences is inflated (Kirk, 1968; Perenger, 1998), but we elected to go with the tests in lieu of using any corrections (e.g., the Bonferroni) at this time. In future work, less conservative alternatives to the Bonferroni correction could be considered.

Demographic profile

Age and sex (22 characteristics; 20 similar, 2 significantly different)

The two main variables of demographic research are age and sex. No significant differences exist for the male and female proportions between the two sources, although two significant differences do exist for the Multnomah County age distributions: under age 5, and 35–44 years. The significant difference for the population under age five has implications for current research being conducted for the Portland Public Schools by the Population Research Center into reasons for declining enrollment, and an accurate estimate of the population under five could provide a proxy for potential students (Edmonston & Lee, 2001; Population Research Center, n.d.; U.S. Census Bureau, 2001b). Concentrating on Multnomah County, Fig. 7 shows a comparison of Census 2000 population under age five, the 1999–2001 ACS population under age five, and the birth cohorts under five for 1999, 2000, and 2001 (1995–1999, 1996–2000, and 1997–2001 births respectively).

Examining Fig. 7, it is apparent that neither the ACS estimates nor the Census estimate for children under age five resemble their respective birth cohorts. Further examination of administrative records revealed that these differences were not due to childhood mortality or patterns of net out-migration. As a positive trend, however, it appears that the ACS estimates are converging towards the birth cohorts.

As part of the school enrollment research for the Portland Public Schools, the Population Research Center geocoded birth data for the Oregon Health Department from 1994 to 2001 to provide more accurate administrative records at smaller

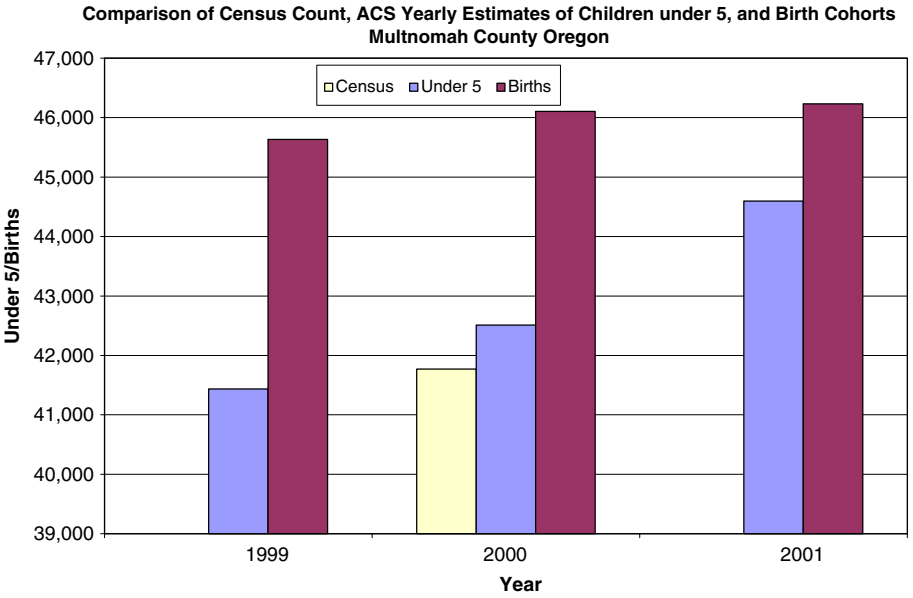

Fig. 7 Comparison of Census Count, ACS Yearly Estimates of Children under 5, and Birth Cohorts Multnomah County, Oregon

geographic levels, in this case by census tract. Future research may concentrate on comparing these three data series at the census tract level.

Race/ethnicity (24 characteristics; 15 similar, 9 significantly different)

Those listing one race differ significantly between the Census 2000 estimates and the 1999–2001 ACS estimates (''RACE1'' in Table 2). The magnitude of the difference resembles expected differences that may occur over a decade, not within a similar time frame, given exact question wording. As most of the two race responses from Census 2000 involved the inclusion of a Hispanic origin/Latino response in the ''Other Race'' category, it would be expected that this difference would occur if the ''Other Race'' category is lower in the ACS samples (''RACE2'' in Table 2). This is indeed the case. It must also be noted that this difference occurs only for the white and black populations.

Another explanation may involve the population control totals constructed to weight the ACS samples, but details regarding this are not available at this time. It may also be necessary to examine some of the quality measures to offer explanations for the large increase in the white and black categories, and corresponding decrease in the other race category, e.g., trained ACS staff conducting computer assisted personal interviews (CAPI) at households may reduce responses in the Other race category relative to self-response mail-out/mail-back forms.

It is also suggested that the Census Bureau release these estimates only for the major racial groupings, as most of the specific race subgroups (or subrace categories) are too small to offer meaningful explanations, especially if analysis is sought at the census tract level.

Hispanic origin and race (7 characteristics; 5 similar, 2 significantly different)

In regard to Hispanic or Latino responses, the significant results observed between the Census 2000 and the 1999–2001 ACS estimates largely reflect the trend of an increasing Mexican population in Multnomah County (see Fig. 8). Likewise, this increasing trend in ''Mexican'' responses is coupled with a corresponding decrease in the Other Hispanic or Latino category. This analysis should also be carried out at the census tract level as there are ethnic communities in which the Mexican population is located.

Household relationship (6 characteristics; 3 similar, 3 significant differences)

For researchers, it may not be possible to accurately compare household relationship differences between the two surveys. Census 2000 and ACS weighting differ in the control totals used to produce these estimates so as to make any comparison meaningless, or at least suspect. ACS weights the household relationship distribution using population control totals solely, whereas Census 2000 utilizes population, housing unit, and household control totals. The latter ensures agreement between households and householders, whereas in the former, agreement may occur but is not guaranteed (Diffendal, n.d.). For the current comparison, the lack of household constraint for the ACS results produces over 5,000 householders without households.

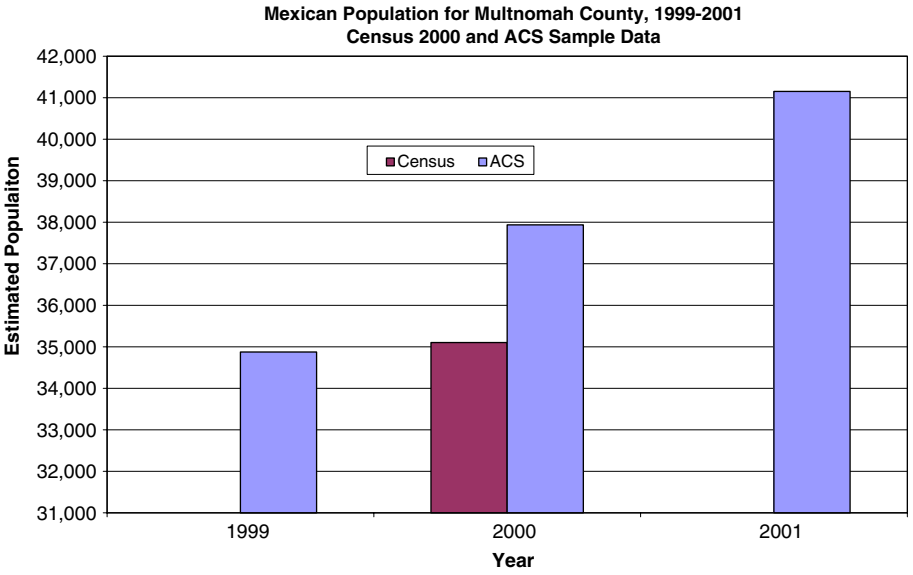

Fig. 8 Mexican Population for Multnomah County, 1999–2001 Census 2000 and ACS Sample data

As shown in Table 4, data for both *Spouse* and *Other Relatives* also differed significantly between the two surveys. An analysis of the trend data reveal that the 1999–2001 ACS data did not produce constant proportions for each of the years for the Householder or Other Relatives. The ACS data for spouses just underrepresent their proportions relative to Census 2000. Thus, it appears that sampling variation between the two types of surveys may be the cause for the significant differences.

Households by type (12 characteristics; 4 similar, 8 significant differences)

Comparing household and family types after the aforementioned caveats on comparing household relationships is also complicated by weighting issues. Here, at least, the control totals for both the ACS average and Census long form data represent total households. However, given the observed differences in the household relationships from the preceding section, one would expect significant differences in the household and family types. For example, given the lower estimates of the number of spouses in the ACS household relationship data, one would expect to also find a lower number of family households in the 1999–2001 ACS data. This is indeed the case. Additionally, the number of families with children is also significantly lower in the ACS data. Further exploration at the tract level may reveal there to be rapidly

Table 4 Selected household types by year—ACS samples

	1999 (%)	2000 (%)	2001 (%)
Householder	42.9	42.6	43.6
Spouse	17.5	17.1	17.5
Other relatives	5.3	5.3	4.4

changing areas of the city and county. Finally, the persons-per-family was significantly higher in the ACS samples than the Census results. Given the previous discussion on household relationships and types, it is hard to assess the reliability of this finding—is it an artifact produced by the other differences?

Housing occupancy (2 characteristics; 2 similar, 0 significant differences)

There was complete agreement between Census 2000 and ACS results regarding occupancy of housing units.

Housing tenure (5 characteristics; 3 similar, 2 significant differences)

Census long form and ACS results were similar with the exception of tenure, with the Census displaying a higher percentage of owner-occupied units.

Social profile

Rather than focusing on every table within each profile, the analysis will now focus on results that are statistically significant and also meaningful for the local area.

Educational attainment (10 characteristics; 5 similar, 5 significantly different)

Educational attainment reflects some of the key benchmarks tracked at a local level (Portland/Multnomah County) as well as at the state of Oregon level. The ACS average displays higher levels of educational attainment. Examining the 1999–2001 ACS data reveals an increasing trend in these data. This is consistent with migration patterns into Multnomah County. Further analysis may pursue the relationship between these variables.

Disability status (9 characteristics; 4 similar, 5 significantly different)

The Population Research Center also has conducted a number of studies for the Multnomah County Agency on Aging and Disability Services. An examination of Census 2000 data revealed questionable data for the numbers and percentages of adults 18–64 with disabilities (especially for mobility limitations). These data are consistent with those findings as the ACS results display lower percentages of persons with disabilities (''DISABILITY STATUS'' in Table 2). These differences may be due to response error in the Census question wording (Stern, 2003).

Language spoken at home (10 characteristics; 7 similar, 3 significantly different)

Although most of the results for language items were similar between the two surveys, the three significant items are the most meaningful for the local level. In particular, the large influx of eastern Europeans into the Portland–Vancouver (Washington) metropolitan area has increased the demand for services to be provided in languages other than Spanish and Vietnamese, in particular, Romanian and Russian. As these groups tend to live in ethnic enclaves, a more detailed analysis at

the census tract level may provide a more meaningful portrait of these statistical differences.

Economic profile

Employment status (14 characteristics; 8 similar, 6 significantly different)

Oregon has historically had a higher unemployment rate compared to the rest of the nation. ''Beginning in the latter half of 2001, Oregon has had one of the highest unemployment rates in the nation'' (Ayre, 2003). According to *Portland Labor Metro Trends*, the unemployment rate for December 2001 was 7.5%, up from 3.4% for December 2000 (VanderVliet, 2002). Thus, as indicated in Fig. 9, it appears that the ACS data are reflecting the trends not measured by the March 2000 point of reference used by the Census long form.

Concluding remarks

The ACS promises to hold great potential for future research. Rather than waiting for 10 years for refreshed data from each decennial census, local data can be made available each year. Evaluation research is currently ongoing regarding the accuracy of the ACS estimates, and we hope the researchers will provide insights to strengthen the results for these timely data.

In regard to the overall quality of data collection for Multnomah County as a whole, the ACS outperformed the 2000 Census in three of five summary measures: sample unit nonresponse rate, occupied sample unit nonresponse rate, and the

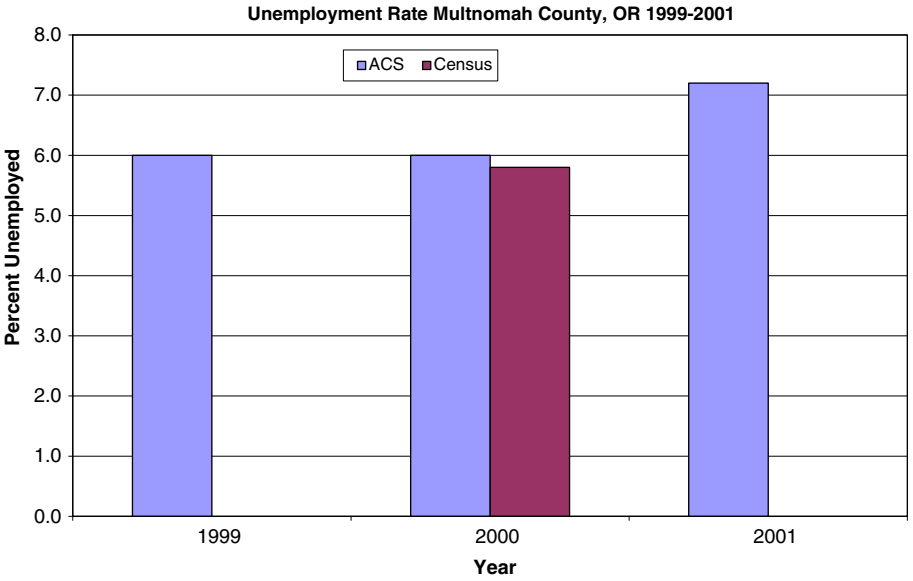

Fig. 9 Data unemployment rate Multnomah County, OR 1999–2001

housing unit sample completeness ratio. The 2000 Census outperformed the ACS in the self-response rate, while in the population sample completeness ratio there was no difference between ACS and the 2000 Census.

The loss function analysis identified three variables where there are really marked differences between Census 2000 and ACS, two of which are related to race, with the third related to disability status. As discussed in the preceding section, these differences highlight areas in which there may be interpretation issues with the wording and placement of questions in the self-administered Census long form.

For the Multnomah County, Oregon site, the ACS samples represented better quality in the collected data. Multnomah County was one of the few sites that collected sample data 1999–2001 similar to the sample size collected in Census 2000. Data quality results reported for this site should also be compared to sites with smaller samples, and monitored for changes when the sample size for Multnomah County is reduced for the 2002 and future samples.

Results reported for the Census 2000 long form and ACS 1999–2001 samples were quite similar for most of the items presented in the profiles. However, local knowledge played a major role in interpreting many of the statistical differences observed in the current research. This served to focus attention on specific items in ACS and the Census long form that were designed to be equivalent, but for which ''meaningful'' differences were found. In the case of DISABIITY, RACE1, and RACE2, these meaningful differences suggest there are differences in the wording of questions, weights, and controls that need to be made more consistent. Additional resources will need to be devoted to develop training materials that provide guidance to numerous other practitioners who will seek to utilize this new data series.

The 1999 ACS sample tabulations, as first released, were controlled to post-1990 Census estimates. However, significant differences between 2000 population and housing estimates and Census 2000 counts resulted in the 1999 ACS sample being reweighted and re-released to reflect this reality. This realignment of the data calls into question the accuracy of the Census Bureau estimates. In order to evaluate the full range of differences in population and housing characteristics between the long form and ACS samples, research is needed to compare uncontrolled estimates from the ACS versus the controlled estimates presented here.

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