The 1999-2001 American Community Survey and the 2000 Census

Data Quality and Data Comparisons

Multnomah County, Oregon

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March 9, 2004

Prepared by the Authors for the Census Bureau
Order No. YA1323-03-SE-0319
May 7, 2003
Requisition/Reference No. 03-32183-0-0

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Background

Under the auspices of the "American Community Survey" (ACS), Multnomah County, Oregon (which includes the city of Portland) was selected as one of four 1996 test sites for the "Continuous Measurement" (CM) option that was being considered for Census 2000 and is now part of the Operation Plan for Census 2010 [12, 14, 17]. There are important conceptual differences between ACS and long form data. As its name suggests, CM, unlike the long form, is not designed to provide a "snapshot" at a single point in time [4, 12, 15]. 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 then that ACS is viewed as a replacement for the long form [1,2,3]. Bolstering this viewpoint is the fact that ACS data will have to be "controlled" to independently estimated population and housing values so that its results can be adjusted to provide information on the entire population [15].

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 [9]. 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," recommended against substituting the ACS for the long form in the 2000 census [6]. The recommendation was largely based on the fact that "…there are too many unanswered questions for which research is needed." [6: 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 the cost/benefit ratio of ACS compared to other methods of frequently obtaining small area data. 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 [5]. To this end, four 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?
4) Can we summarize the results in a meaningful way?

Description of Multnomah County, Oregon

Multnomah County is the most populous county in Oregon, and contains almost all of the city of Portland. 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 twenty percent of the state's total population.

The county population grew 13 percent since the 1990 census. Net migration accounted for over 55 percent 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 has become more ethnically and racially diverse over the decade. The Hispanic/Latino population grew by 170 percent and now totals 50,000 members, 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 for the coming decades.

Multnomah County has more renter-occupied housing units, less vacant units, and fewer persons per household than the state. Median income and educational attainment are higher and unemployment is lower in the county than in the state.

Quality of Data Collection

Before starting our analysis, it is useful to note that for all comparisons, the Census Bureau ACS Staff suggested that statistical tests of significance should be done using t-tests with α=.10, while also acknowledging the fact that this procedure increases the probability of making Type I errors (rejecting a true null hypothesis) because of the multiple t-test effect. In making multiple t-tests, the probability of making a type I error is P(Type I error) = $1 - ((.9)^n$, where n is the number of tests to be made. As a simple example, in the case making 357 tests, there is virtually a 100% chance that making a Type I Error at least once: P(Type I Error) = $[1 - ((.9)^{357})] \cong 1.00$. There are ways to reduce this probability, such as the Bonferroni procedure, in which the original desired alpha level is divided by the number of tests to be made ($\alpha' = \alpha/n$). This is a simple and highly effective way to reduce the probability of making Type I errors, but it considerably increases the probability of making Type II Errors (failing to reject a false null hypothesis). Again, using the case of making 357 tests, and the choice of $\alpha = .10$, the Bonferroni Correction yields $\alpha' \cong 2.8E\text{-}04$, which obviously increases the probability of making Type II errors and almost guarantees that no "differences" will be found. Keeping these limitations in mind, we nonetheless continue with the multiple tests suggested, with α=.10. However, we also use an alternative means of evaluation – The Loss Function – following the multiple tests of significance.

Before one can ascertain comparisons between the data disseminated by both the 1999-2001 ACS and the 2000 Census, a thorough analysis of survey quality focusing on the data collection processes is warranted. In particular, "…(n)on-response error is the most visible and well-known source of non-sampling error" [14: 17]. As a start, the analysis will focus on survey self-response rates, unit non-response rates, and completion ratios, and later turn to an analysis of item non-response rates.

Multnomah County as a Whole

Table 1 presents the results for the quality measures for the Multnomah County site. As expected, the Census long form outperformed the 1999-2001 ACS in terms of self-response rates. Census 2000 was a $7 billion venture with a large operating budget for television, radio, and print advertising, whereas response to the ACS is based largely upon civic duty.

Table 1. Quality Measures for Multnomah County, Oregon

	ACS	Census	ACS - Census	Significance
Self-Response Rate (in %)	65.004	70.408	-5.403	ACS significantly lower
Sample Unit Non-response Rate (in %)	3.615	5.005	-1.389	ACS significantly lower
Occupied Sample Unit Non-response Rate (in %)	3.832	5.069	-1.237	ACS significantly lower
Housing Unit Sample Completeness Ratio	0.963	0.950	0.013	ACS significantly higher
Household Population Sample Completeness Ratio	0.939	0.944	-0.005	No significant difference

In most of the other aspects, the ACS outperformed the Census, with the exception of the Population Sample Completeness Ratio where the ACS and the Census results showed no difference. Another way of viewing these differences is to chart the differences along with their accompanying standard errors. Because the ACS data are expected to have larger standard errors, the confidence intervals constructed around ACS values are likely to be wider than those for the Census sample data. Figures 1-4 show the values for the ACS and Census from Table 1 with 90 percent confidence intervals.

From Figure 1, we can see that Census 2000 self-response rates outperform the 1999-2001 ACS average by over 5 percentage points, and that the standard error for the ACS results is much wider. Figure 2 shows that the ACS does better than the Census at sample non-response rates whether the unit is occupied or not, and that although somewhat higher, the standard errors for ACS are comparable to those found in the census results.

Figure 1. Self-Response Rates.

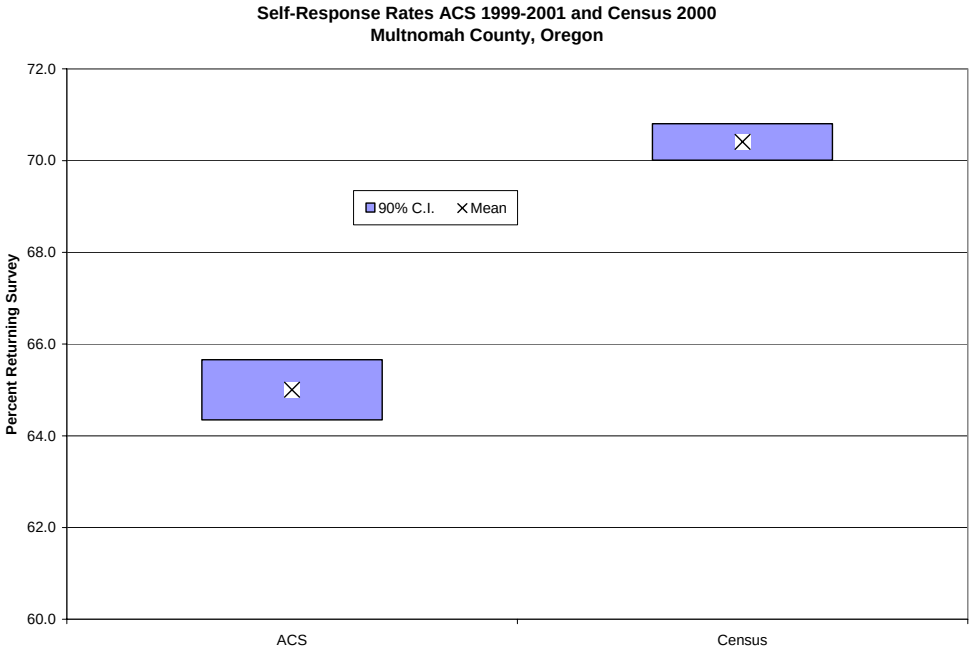
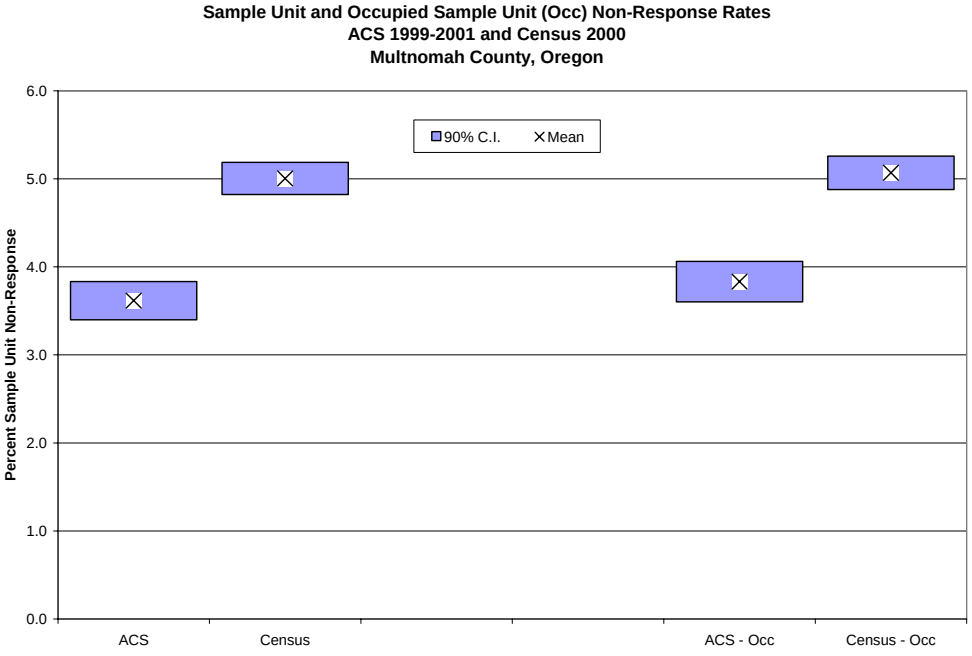


Figure 2. Sample Unit Non-Response Rates.



From Figure 3, it can be seen that the housing unit sample completion ratio is higher for the Multnomah County ACS than the Census, although the ACS standard error is quite a bit larger. From Figure 4, it can be seen that the household population completion ratio is higher for the Census than the ACS, but that the large standard error of the ACS encompasses the value for the Census at the 90 percent confidence interval.

Figure 3. Housing Unit Sample Completeness Ratios.

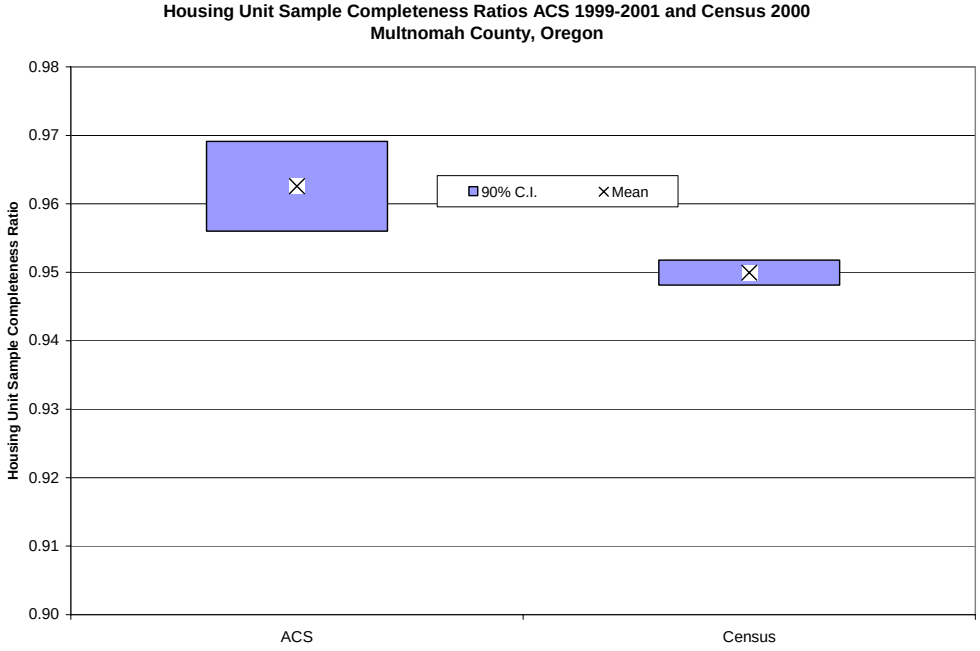
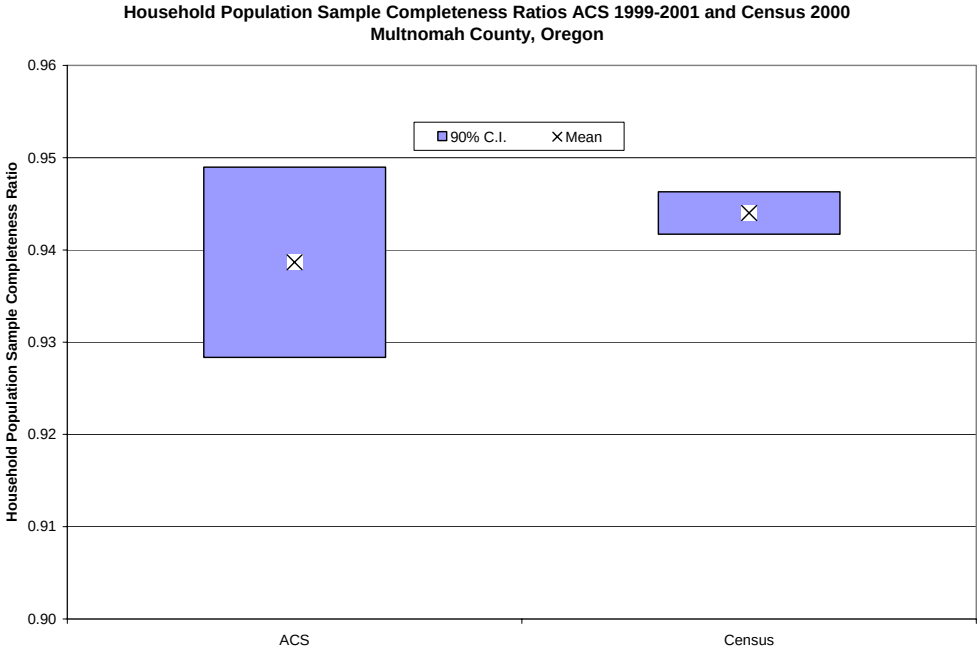


Figure 4. Household Population Sample Completeness Ratios.



Tract Level Analysis of Quality Measures

Having commented on the overall pattern of the quality measures for Multnomah County, Oregon, what patterns exist when we examine the census tract results for quality measures? Are there geographic patterns that must be addressed? Are certain areas of the county responding to the Census, but not ACS?

Self-Response Rates

Figure 5 displays the differences in self-response rates between the 1999-2001 ACS average and Census 2000. Remembering the results cited above, the overall self-response rate from the Census was 5 percentage points higher than for the ACS (70% vs. 65%). The range of these results reveals that there were numerous tracts that ranged from 10 to 25 percentage points higher for the census, and a few tracts in the equally strong but opposite direction for ACS. Most of the differences at the census tract level favor the Census results in the -1% to -9.9% range, as can be expected with an overall difference of 5 percentage points.

Figure 5. Differences in self-response rates for Multnomah County, OR (ACS – Census).

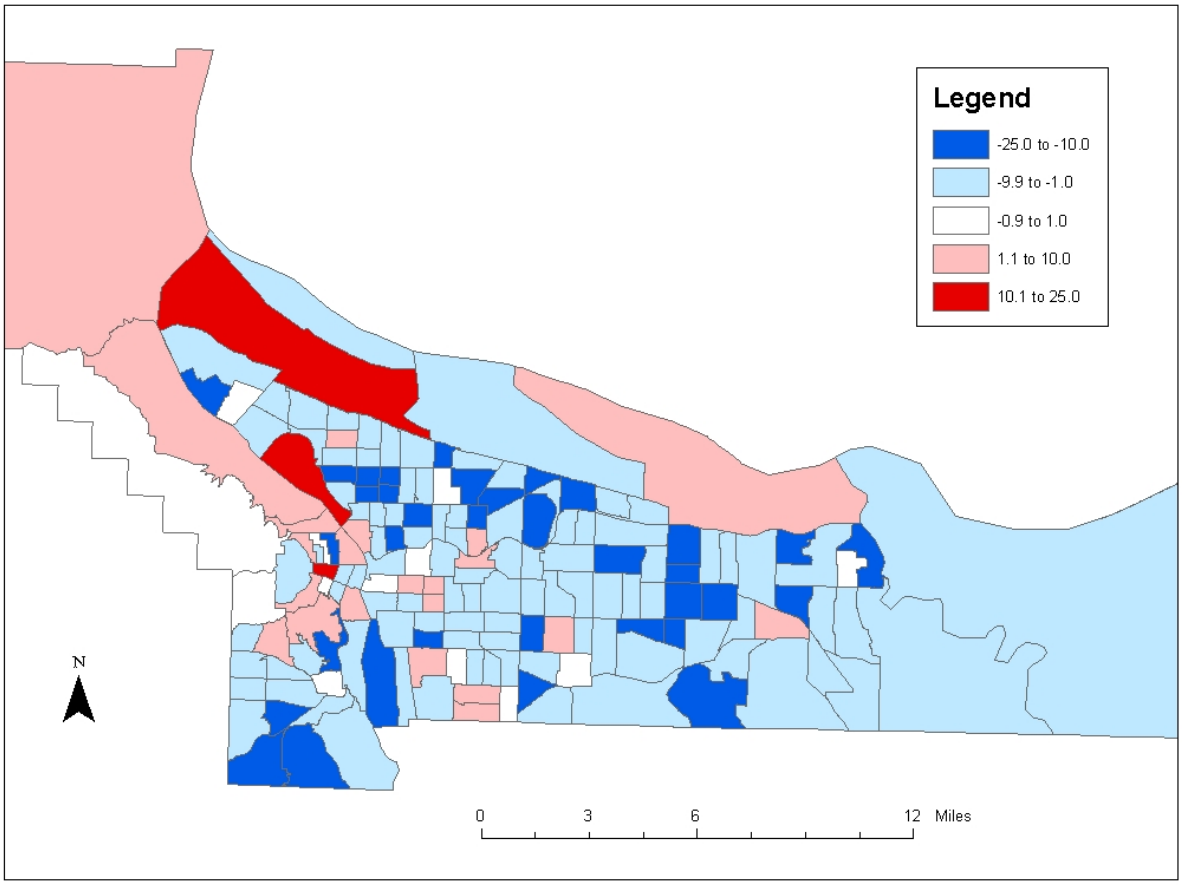
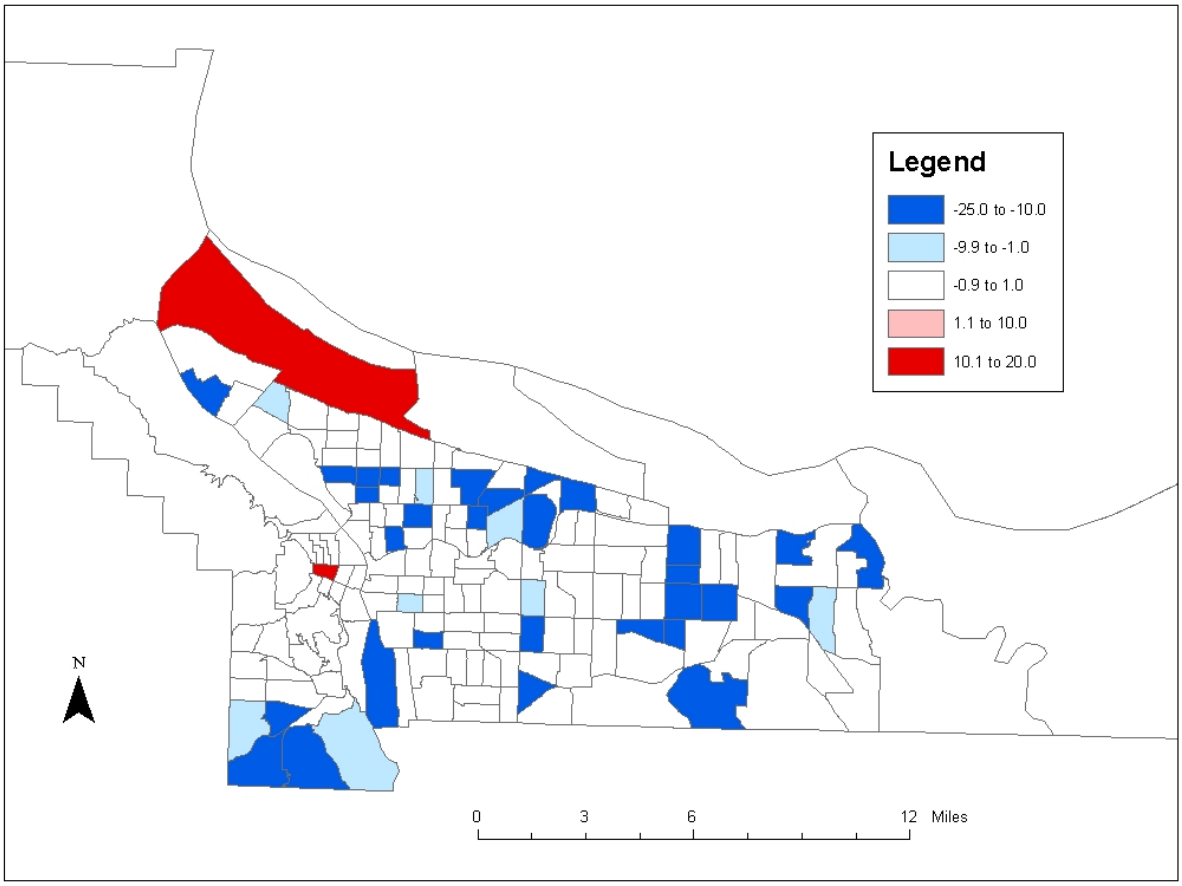


Figure 6 displays the same results once the results are controlled for significant effects at the 90 percent confidence level. What remains are some very significant areas where the census self-response rates exceed the ACS results by 10 to 25 percentage points within a census tract, another 8 census tracts where the census results exceed the ACS results by 1 to 9.9 percentage points, and two sites where the ACS results exceed the Census self-response rates by 10.1 to 20 percentage points. If the only data collected came from self-response, further analyses would need to be performed as some of the areas in which the Census holds significant advantage over the ACS are areas where there are concentrations of minority populations (Black/African-American in Tracts 33.01, 3401 and 34.02 in Portland and Hispanic/Latino in Tracts 97.02 and 98.01 in Gresham). However, we have additional information as to overall completion of the surveys, or non-response rates which we explore in the next two sections.

Figure 6. Significant differences in self-response rates (90% confidence level) for Multnomah County, OR (ACS – Census).*



* The areas shown in white (not shaded) are those in which there are no statistically significant differences

Sample Unit Non-Response Rates

Figure 7 displays the differences in sample unit non-response rates between the 1999-2001 ACS average and the Census 2000 results. From Table 1 above, the overall difference for Multnomah County was 1.4% (3.6% vs. 5.0%). Examining Figure 7 leads to the opposite story told above. Here, ACS holds advantage over the census sample. Many of the census tracts show the ACS unit non-response rates to be 5 to 11 percentage points lower than the census results. Also, many more are 1 to 4.9 points lower. An almost equal number of results are obtained for the Census unit non-response rates being lower by 1 to 5 points, but only a few of the Census results display ACS results exceeding them by over 5 percentage points.

Figure 7. Differences in sample unit non-response rates for Multnomah County, OR (ACS-Census).

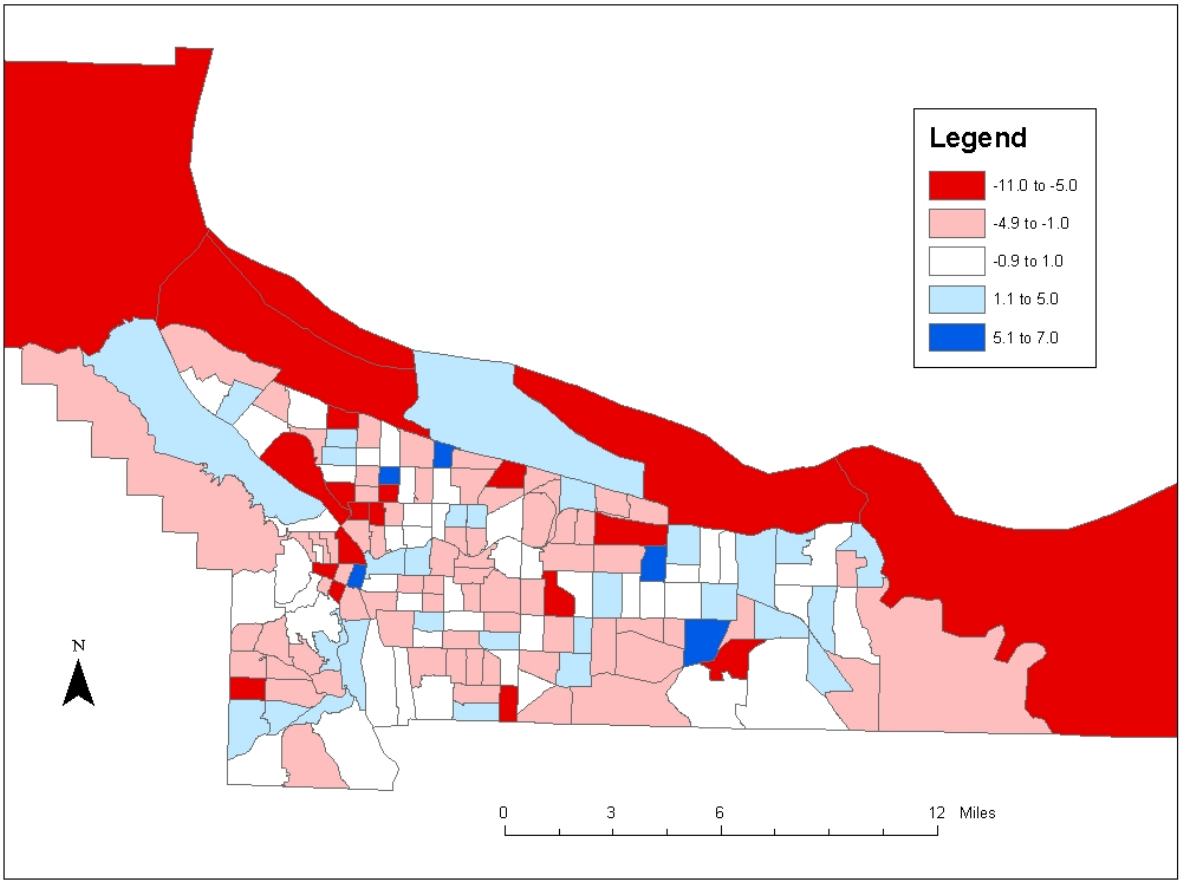
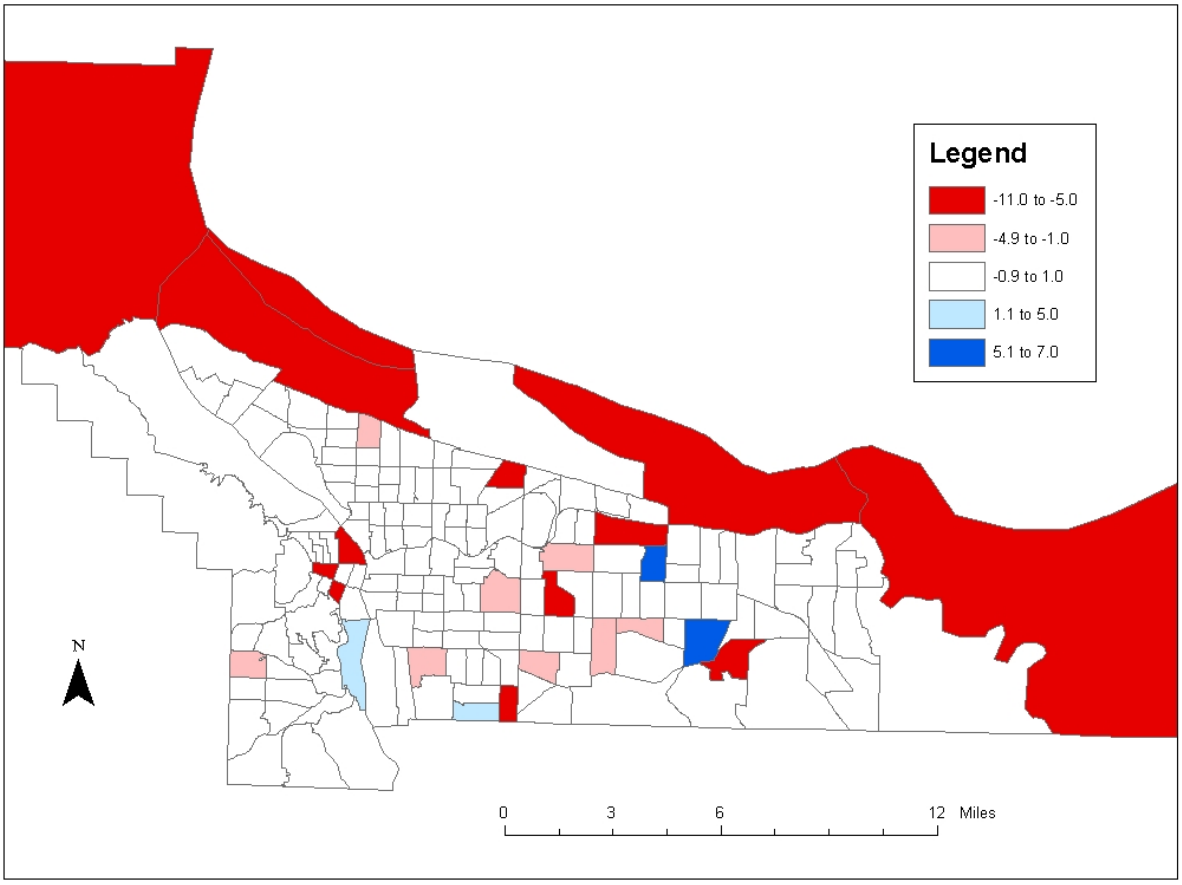

Legend
-11.0 to -5.0
-4.9 to -1.0
-0.9 to 1.0
1.1 to 5.0
5.1 to 7.0
N
0
3
6
12
Miles

Figure 8, where the insignificant differences in sample unit non-response rates have been dissolved, displays a pattern where strong, significant ACS advantage remains. Most of the initial differences in the middle of the distribution have vanished, and the census tracts where ACS non-response rates are 5 to 11 percentage points lower still remain. The major areas are the more rural/remote areas of Multnomah County (to the east and along the north to northwest), with random areas throughout the county. There are only a few census tracts where significant results favor census results over the ACS. More importantly the census tracts identified in Figure 6 above, representing minority concentrations with lower ACS self-response rates, no longer represent areas of concern here.

Figure 8. Significant differences in sample unit non-response rates (90% confidence level) for Multnomah County, OR (ACS – Census).*



*The areas shown in white (not shaded) are those in which there are no statistically significant differences

Occupied Unit Non-Response Rates

Figure 9 displays the differences in occupied sample unit non-response rates between the 1999-2001 ACS average and the Census 2000 results. From Table 1 above, the overall difference for Multnomah County was 1.2% (3.8% vs. 5.0%). The results resemble those of the total unit non-response rates (Figures 7 and 8), so a detailed discussion will not be included.

Figure 9. Differences in occupied sample unit non-response rates for Multnomah County, OR (ACS-Census).

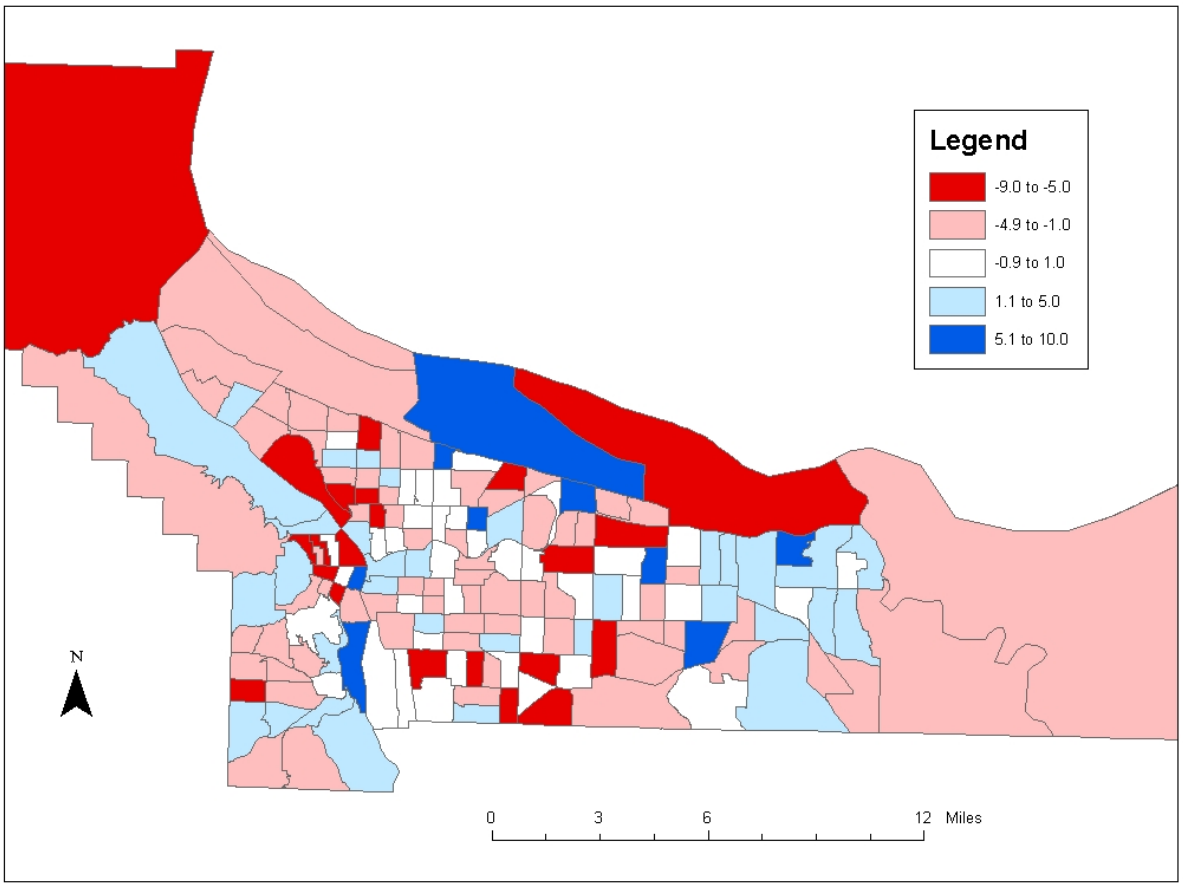
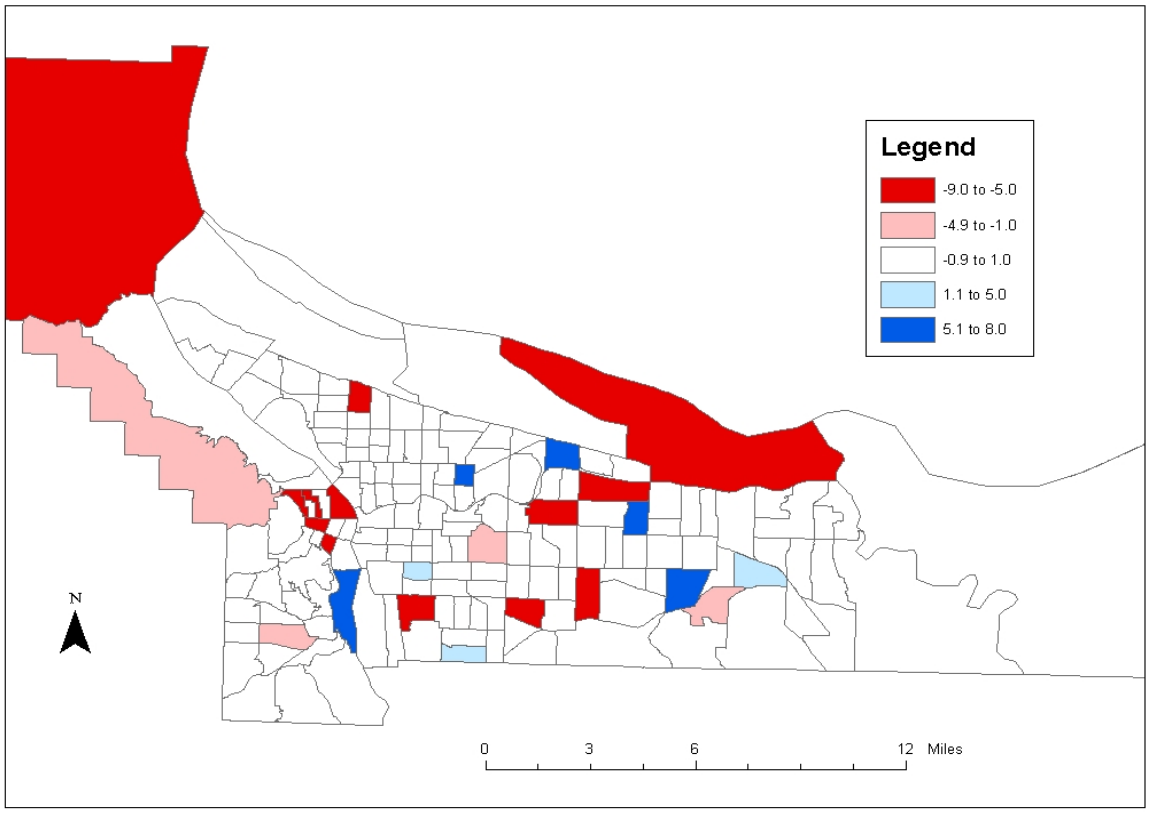


Figure 10 displays only the significant differences in the occupied sample unit non-response rates. ACS has twice as many significant differences than the census results at the extreme values, and an equal number at the lower, but still significant, intervals. Most of the census tracts show equal non-response rates in occupied sample units for the two surveys. Once again the census tracts identified in Figure 6 above; areas representing minority concentrations with lower ACS self-response rates than the census sample, no longer represent areas of concern here.

Figure 10. Significant differences in the occupied sample unit non-response rates (90% confidence level) for Multnomah County, OR (ACS – Census). *



The areas shown in white (not shaded) are those in which there are no statistically significant differences

Allocation Rates (Item Imputation)

Item imputation is another factor contributing to non-response error. The final estimates of any survey can be adversely affected when item non-response is high. How do Census 2000 sample and the 1999-2001 ACS compare on item non-response for both population and housing unit (both occupied and vacant) items? There are 54 comparable population items, and 30 comparable housing unit items (29 required for occupied housing units, and 12 for vacant housing units).

Multnomah County

Table 2 presents a comparison of the differences between the item non-response rates for the population and housing unit items from Census 2000 and the 1999-2001 ACS samples for the entire Multnomah County site. For the population items, ACS has significantly lower item non-response rates than the census. The Census results fair better when comparing the self-response allocation rates, perhaps as a reflection of the importance attached to the census. ACS enumerator item non-response rates are significantly lower on all but two items, perhaps reflecting the efforts of a more highly trained staff relative to the census enumerators. Similar observations can be made about the middle panel of the table on the occupied housing units, where ACS has significantly lower item non-response rates than the census. ACS does not do as well as the census when examining vacant housing unit non-response rates. ACS item non-response to these items is quite high and exceeds 10 percent in half the comparisons. ACS field staff should more thoroughly examine the characteristics of the vacant units to help reduce the non-response items.

Table 2. Multnomah County, OR Comparisons of Item Non-response Rates

	Population Items			
Comparison	ACS Significantly Lower	No Significant Difference	Census Significantly Lower	Total Items
Total item non-response rate	47	2	5	54
Self-response item non-response rate	38	5	11	54
Enumerator-response item non-response rate	52	1	1	54
	Occupied Housing Unit Items			
Total item non-response rate	28	0	1	29
Self-response item non-response rate	27	1	1	29
Enumerator-response item non-response rate	25	2	2	29
	Vacant Housing Unit Items			
Total item non-response rate	2	5	5	12

Census Tracts in Multnomah County

Table 3 presents the results for comparisons between the Population Item allocation rates for the ACS and the census samples. The first column lists the population item. The next item reports the number of census tracts the ACS had significantly lower allocation rates than the census. Column three reports the number of census tracts finding no significant differences between ACS and census allocation rates. Column four reports the number of census tracts where the census sample has significantly lower allocation rates than ACS. The final column labeled "No

Comparison Base" reports the number of census tracts with sample sizes not having a sufficient base from which to calculate a standard error, and hence no statistical test was performed. (Similar column headings appear in Tables 4 and 5 and should be interpreted likewise).

Reviewing Table 3, there are no significant differences between allocation rates for the two surveys for 5,903 comparisons, or 65 percent of the population items for which there are comparisons available (9,079 = 9,180-101). In another 3,120 comparisons, or 34.4 percent of the cases, the ACS has lower allocation rates at the 90% confidence level. Finally, only 56 of the 9,079 valid comparisons favored the Census, 0.6 percent. The single item that accounted for one-quarter of this overall finding was related to the variable qmils (periods of military service), and was the only item to outperform the ACS results.

Table 3. Significant Differences in Allocation Rates – Population Items, summarized across Multnomah County, Oregon Census Tracts.

Item	ACS Significantly Lower	No Significant Difference	Census Significantly Lower	No Comparison Base	Total Tracts
qabgo = Difficulty going out	96	74			170
qabmen = Mental difficulty	68	102			170
qsbphys = Self-care difficulty	77	93			170
qabwork = Difficulty working at a job	118	52			170
qage = Age	18	143	9		170
qattend = School enrollment	73	97			170
qcarpol = Carpool size	67	102		1	170
qcitizen = Citizenship	1	169			170
qcommute = Transportation to work	58	111	1		170
qcow = Class of worker	132	38			170
qctime = Commuting time	45	124	1		170
qendabil = English ability	4	165		1	170
qesr = Employment status recode	116	54			170
qgrade = Grade attending	20	149		1	170
qgrandc = Grandchildren living in home	21	149			170
qhigh = Educational attainment	68	102			170
qhowlong = Months responsible for grandchildren		103		67	170
qincint = Interest, dividend, etc. income	117	53			170
qincoth = Other income	118	52			170
qincpa = Public assistance	125	45			170
qincret = Retirement income	118	52			170
qincse = Self-employment income	83	87			170
qincss = Social security/railroad retirement	118	52			170
qincssi = Supplemental security income	132	38			170
qinctsome = At least one income item allocated	67	103			170
qincwg = Wages & salary income	49	120	1		170
qind = Industry	92	78			170

Table 3. Significant Differences in Allocation Rates – Population Items, summarized across Multnomah County, Oregon Census Tracts (continued).

Item	ACS Significantly Lower	No Significant Difference	Census Significantly Lower	No Comparison Base	Total Tracts
qlang = Language spoken	7	162		1	170
qlastwk = When last worked	110	60			170
qleavetm = Time of departure	34	134	2		170
qlmob = Physical difficulty	53	115	2		170
qmig = Mobility status	36	133	1		170
qmigco = Migration – county	3	161	6		170
qmigpl = Migration – place	3	162	5		170
qmigst = Migration – state	2	165	3		170
qmil = Periods of military service	1	154	14	1	170
qmilad = Served in armed forces	78	92			170
qmiltot = Years of active duty	3	166		1	170
qms = Marital status	19	150	1		170
qocc = Occupation	100	70			170
qpob = Place of birth	64	105	1		170
qpowco = Place of work - county	67	103			170
qpowpl = Place of work – place	66	104			170
qpowst = Place of work – state	63	107			170
qrace = Race	16	154			170
qrel = Relationship	30	139	1		170
qrespnsbl = Responsible for grandchildren		144		26	170
qsense = Vision of hearing difficulty	41	127	2		170
qsex = Sex	3	167			170
qspan = Hispanic	9	158	3		170
qspeak = Non-English language	34	133	3		170
qwklyrhr = Hours worked each week	125	45			170
qwklyrwk = Weeks worked last year	136	34			170
qyr2us = Year of entry	16	152		2	170
Grand Total	3,120	5,903	56	101	9,180

Table 4 presents the results for Occupied Housing Unit Item allocation rates. There are no significant differences between allocation rates for the two surveys for 3,562 comparisons, or 76 percent of the occupied housing unit items for which there are comparisons available (4,712 = 4,930-218). In another 1,115 comparisons, or 24 percent of the cases, the ACS has lower allocation rates at the 90% confidence level. Finally, only 35 of the 4,712 valid comparisons favored the Census, 0.7 percent. The only item to outperform the ACS results, representing 21 of the 35 significant findings was related to the variable syrblt (year built).

Table 4. Significant Differences in Allocation Rates – Occupied Housing Unit Items, summarized across Multnomah County, Oregon Census Tracts

Item	ACS Significantly Lower	No Significant Difference	Census Significantly Lower	No Comparison Base	Total Tracts
sacres = Lot size	69	99		2	170
sagsales = Agricultural sales	1	102		67	170
sautos = Number of vehicles	36	134			170
sbedrm = Bedrooms	55	112	3		170
sbiz = Business on property	33	135		2	170
sbldgsz = Units in structure	3	166	1		170
sckitch = Complete kitchen	3	167			170
scplumb = Complete plumbing	2	168			170
selecdx = Electricity cost	105	65			170
sfuel = Heating fuel	41	129			170
sgasdx = Gas cost	139	31			170
sincins = payment incls insurance	31	137		2	170
sinctax = Payment incls property taxes	32	136		2	170
sinsd = yearly property insurance	65	102	1	2	170
smeals = meals in rent	5	164		1	170
smhcost = Total cost on mobile home	3	43		124	170
smortg = mortgage	12	156		2	170
smortg2d = second mortgage payment	2	161		7	170
smortgd = mortgage payment	37	131		2	170
smovein = Year moved in	17	148	5		170
soildx = Other fuel cost	123	47			170
srent = monthly rent	31	138		1	170
sroom = Rooms	33	134	3		170
staxd = yearly real estate taxes	79	89		2	170
stel = Telephone	12	158			170
stenure = Tenure	2	168			170
svalue = Value	22	145	1	2	170
swaterdx = Water and sewer cost	116	54			170
Syrblt = Year built	6	143	21		170
Grand Total	1,115	3,562	35	218	4,930

Table 5 presents the results for Vacant Housing Unit Item allocation rates. There are no significant differences between allocation rates for the two surveys for 1,758 comparisons, or 99.7 percent of the vacant housing unit items for which there are comparisons available (1,763 = 1,956-193).

Table 5. Significant Differences in Allocation Rates – Vacant Housing Unit Items, summarized across Multnomah County, Oregon Census Tracts

Item	ACS Significantly Lower	No Significant Difference	Census Significantly Lower	No Comparison Base	Total Tracts
sacres = Lot size		145		18	163
sbedrm = Bedrooms		163			163
sbiz = Business on property		141	4	18	163
sbldgsz = Units in structure		163			163
sckitch = Complete kitchen		163			163
scplumb = Complete plumbing		163			163
sisvac = Vacancy Status		163			163
smeals = meals in rent		126		37	163
Srent = monthly rent	1	125		37	163
Sroom = Rooms		163			163
svalue = Value		80		83	163
Syrblt = Year built		163			163
Grand Total	1	1,758	4	193	1,956

In sum, the preceding analysis of data quality focusing on measures of non-response as the most visible and well-known source of non-sampling error, has revealed a number of significant conclusions. First, if data collection relied solely on citizen participation as measured by the self-response rate (and if one ignores the enormous difference in resources expended), the quality of data collected by the census is far superior to data collected following the ACS design. More importantly, further examination at the census tract level revealed that many of the sub-areas reflecting significantly better census self-response also represented areas that offered meaningful challenges for ACS data collection – many of the areas contain high concentrations of minority populations. Next, self-response roughly represents initial participation and first-stage data quality, and examination of additional measures representing the quality of completed samples reveals that ACS follow-up procedures eliminated the initial differences observed in communities with high minority representation, as well as surpassed census data quality.

Final results suggest that ACS samples provide better data quality than the census for sample unit non-response rates, occupied sample unit non-response rates, and housing unit sample completeness ratios, with no significant difference observed for the household population sample completeness ratios. As a reflection of overall better data quality collection, ACS also had similar or significantly lower rates of item allocation (imputation) for both population and occupied housing unit data items. The overall results lead to the conclusion that the quality of ACS data collected are as good and often better than data collected by the decennial census, with the exception of self-response. These results also suggest that ACS data collection procedures

combined with a more permanent and better-trained field staff eventually produce samples with less non-response (lower non-sampling error) than the decennial census sample.

General Comparison of Census and 1999-2001 ACS Profiles

The Census Bureau provided a set of four profiles for Multnomah County representing 87 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 American Community Survey estimates (1999-2001) for comparative analyses. Table 6 presents the number of characteristics for each of the major tables within each profile, the number of comparisons for each profile and sub-tables within each profile, the number and percentage of similar results from the ACS average and the Census 2000 long form, and finally the number and percentage of significantly different results. Figure 11 displays these data in graphic form.

Based upon these 364 characteristics, the Census Bureau calculated tests of statistical significance for 357 of the items (the remaining 7 characteristics represent control totals). Comparing the Multnomah County attributes, 225 (63 percent) of the characteristics did not display statistically significant differences at the 90% confidence level; or conversely, 37 percent 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?

Figure 11

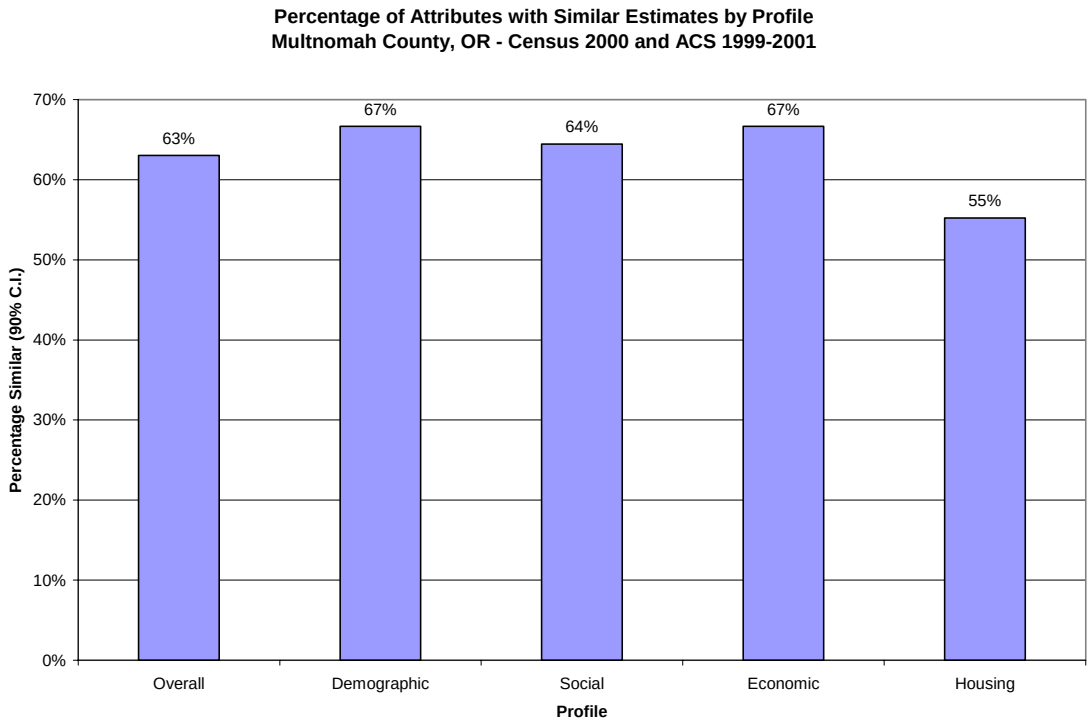


Table 6. Demographic, Social, Economic, and Housing Characteristics 1999-2001 ACS and Census 2000 Estimates Multnomah County, Oregon

	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 1999/1999-2001 (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)	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%

ACS and Census 2000 Characteristics: Statistical and Meaningful Differences

The current section will focus on comparing individual characteristics from the three year averages of 1999-2001 ACS data with results from the 2000 Census long form. The analysis will begin with an examination of differences at the county level. Proceeding by tables within each profile, the aim is to identify significant differences between the two sets of data, highlight the most meaningful differences, and hopefully, explain the reasons for these differences. Table 6 presents the general summaries of the four profiles to be examined: Demographic Characteristics, Social Characteristics, Economic Characteristics, and Detailed Housing Characteristics. Appendix Table A (in the form of an Excel Spreadsheet that accompanies this report) presents the more detailed statistical tests on the individual characteristics within each of the variable distributions to be discussed here.

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 (PPS) by the Population Research Center (PRC) [16, 18, 19]. Basically, Portland Public School student enrollment has declined over a number of years, and PRC has been hired to forecast future enrollment. Hence, an accurate estimate of the population under five could provide a proxy for potential students. Concentrating on Multnomah County, Figure 12 shows a comparison of Census 2000 sample population under age five, the 1999-2001 ACS population under age five, and the birth cohorts under five for 1999, 2000 and 2001 (1995-99, 1996-2000, and 1997-2001, births respectively). The births have been adjusted for infant deaths, but not for net-migration.

Figure 12 displays the age distributions for the two samples, and highlights the significant differences for ages 0-4 and 35-44. Extending the analysis and examining Figure 13 it is apparent that neither the ACS estimates, nor the Census sample estimate for children under age five resemble their respective birth cohorts. As a positive trend, however, it appears that the ACS estimates are converging towards the births cohorts.

Figure 12

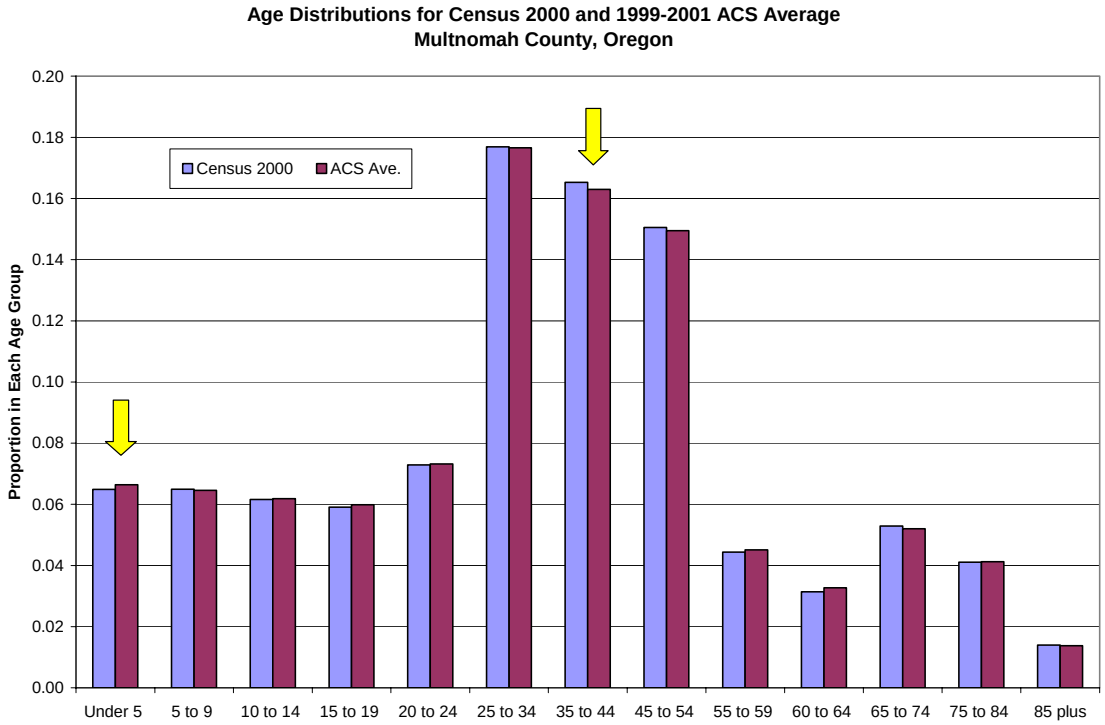
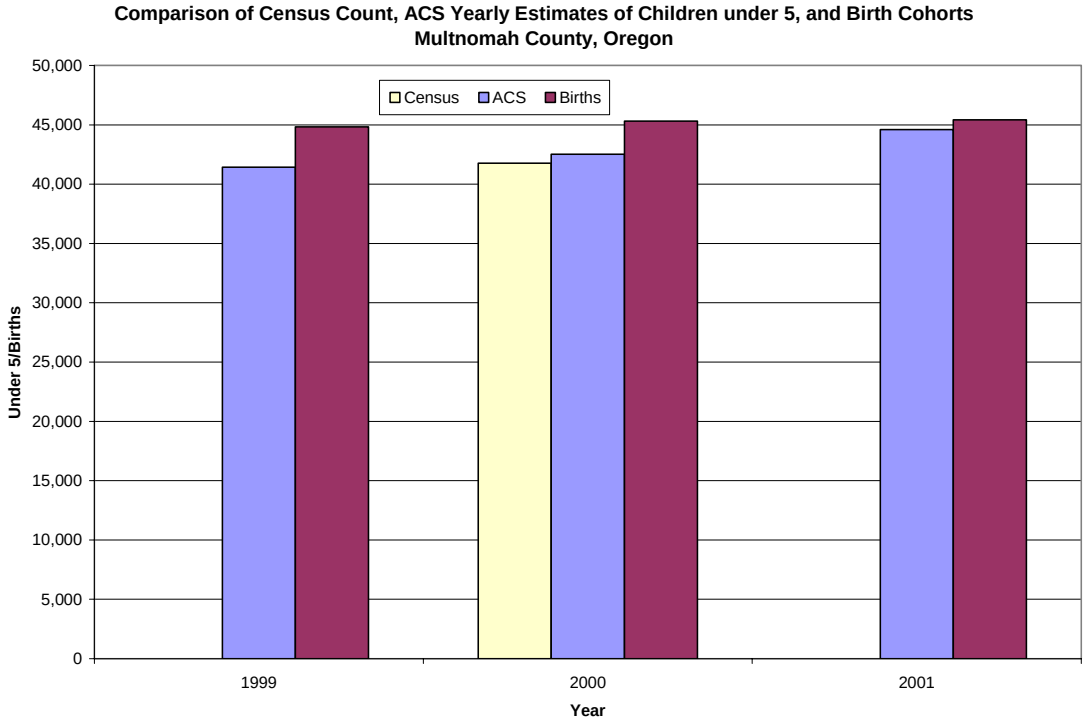


Figure 13.



As part of the school enrollment research for PPS, PRC has geocoded birth data for the Oregon Health Department from 1994-2001 to provide more accurate administrative records at smaller geographic levels – 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 sample estimates and the 1999-2001 ACS estimates. 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. This is indeed the case. It must also be noted that this difference only occurs for the White and Black populations.

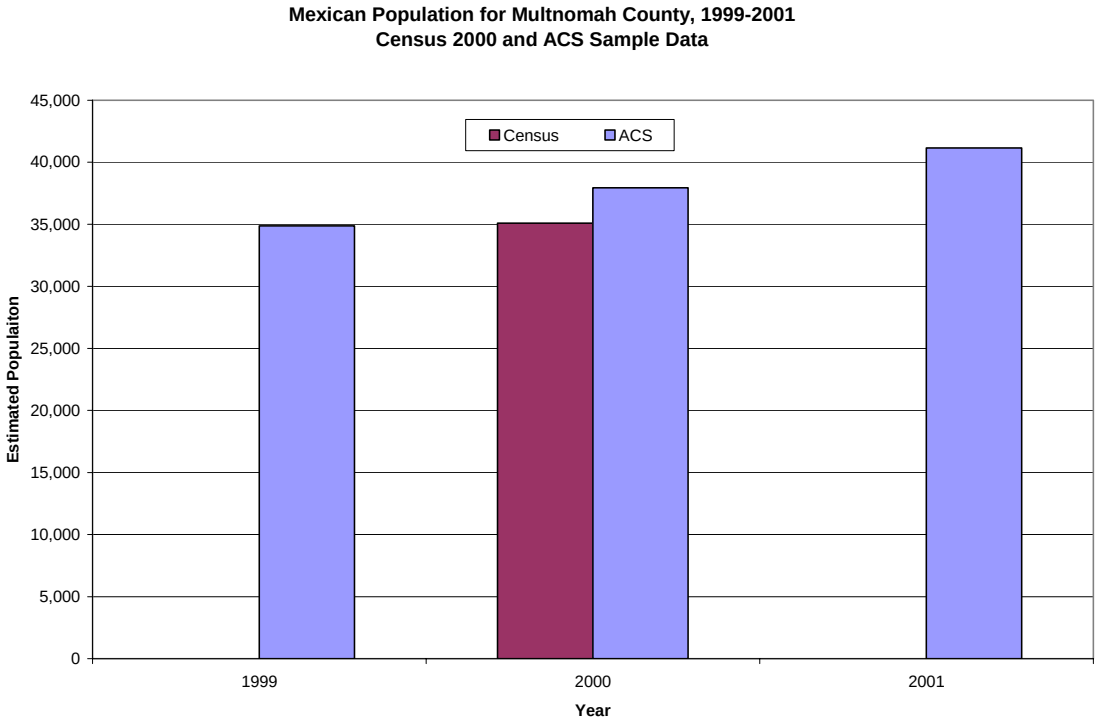
Another explanation may involve the population control totals constructed to weight the ACS samples, but details regarding this are not available at this time. It may also be necessary to examine some of the quality measures to offer explanations for the large increase in the white and black categories, 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 only release these estimates for the major racial groupings as most of the specific race subgroups (or sub-race 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)

With regards to Hispanic or Latino responses, the significant results observed between the Census 2000 sample and the 1999-2001 ACS estimates largely reflect the trend of an increasing Mexican Population in Multnomah County (see Figure 14). Likewise, this increasing trend in Mexican responses is coupled with a corresponding decrease in the Other Hispanic or Latino category. This analysis will also be carried out on a census tract basis as there are ethnic communities in which the Mexican population is located.

Figure 14.



Household Relationship (6 characteristics, 3 similar, 3 significant differences)

As a researcher, it may not be possible to accurately compare household relationship differences between the two surveys. Census 2000 sample 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 the Census 2000 sample utilizes population, housing unit and household control totals [8]. The latter ensures agreement between households and householders, whereas in the former agreement may occur but is not guaranteed [20]. For the current comparison, the lack of household constraint for the ACS results produces over 5,000 householders without households.

Data for Spouses and Other Relatives also differed significantly between the two surveys. An analysis of the trend data shown in Table 7 reveals 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 consistently present proportions below Census 2000 sample results. Thus, it appears that weighting variation between the two types of surveys may be the cause for the significant differences.

Table 7. Selected Household Relationships by Year - ACS and Census 2000 Samples

	1999	2000	2001	1999-2001 ACS	Census 2000
Householder	42.9%	42.6%	43.6%	43.0%	42.3%
Spouse	17.5%	17.1%	17.5%	17.4%	18.0%
Other relatives	5.3%	5.3%	4.4%	5.0%	4.7%

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 them to be the rapidly changing areas of the city and county. Finally, the average number of 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 or a true difference?

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 sample displaying a higher percentage of owner-occupied units.

Social Profile:

Rather than continue to focus 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 (Portland/ Multnomah Progress Board) as well as State of Oregon level (Oregon Progress Board). 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 has also conducted a number of studies for the Multnomah County Agency on Aging and Disability Services. An examination of Census 2000 sample data revealed questionable data for the numbers and percentages of adults 18-64 with disabilities (esp. for mobility limitations). These data are consistent with those findings as the ACS results display lower percentages of persons with disabilities. These differences may be due to response error in the Census question wording [26].

Language Spoke at Home (10 characteristics; 7 similar, 3 significantly different)

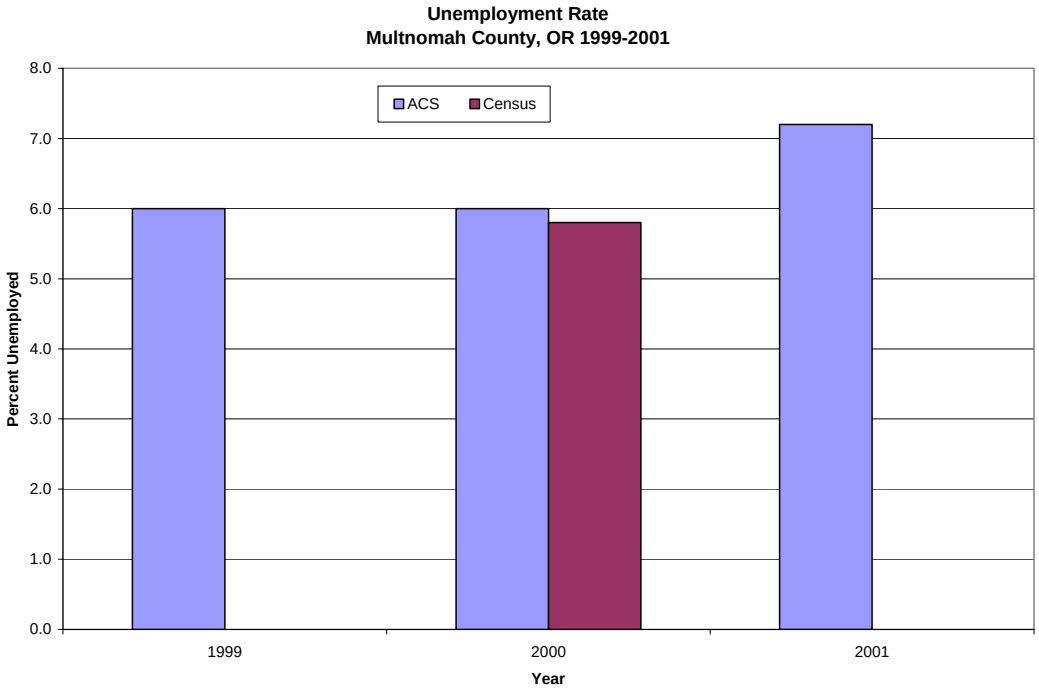
Although most of the results for language items were similar between the two surveys, the three significant items are the most meaningful for the local level. In particular, the large influx of eastern Europeans into the Portland-Vancouver Metropolitan area has increased the demand for services to be 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" [24]. And according to Portland Labor Metro Trends, the unemployment rate for December 2001 was 7.5% up from 3.4% for December 2000 [25]. Although neither sample contains the unemployment rates referenced by the local employment department, 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, as suggested by Figure 15.

Figure 15.

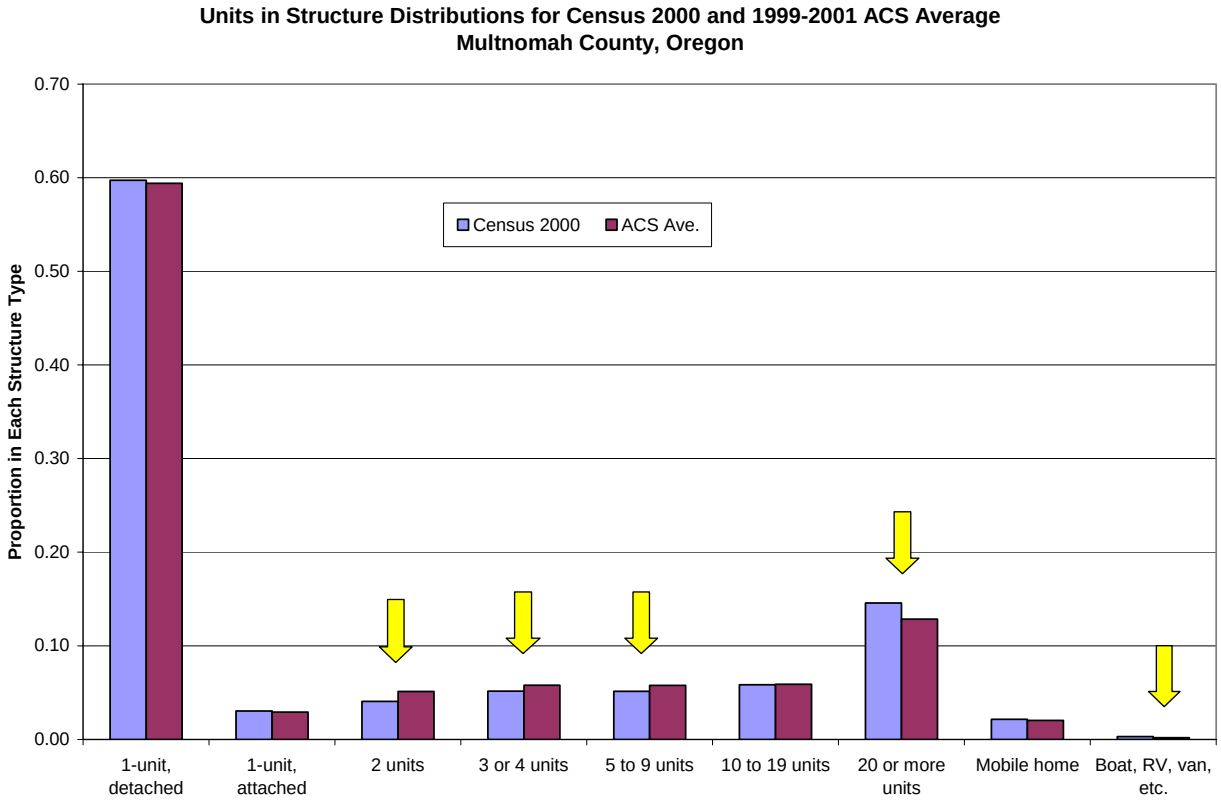


Housing Profile:

<u>Units in Structure</u>

Serving no mandatory federal legislative requirement to collect information at the block level, Census 2000 collected information on units in structure only on the long form. Given a sampling frame similar to ACS, the expectation would be that data on units is structure would be collected from similar samples. Figure 16 reveals significant differences for units in structure, especially for multiple family residences (2 or more units). Obviously, additionally research should explore these differences.

Figure 16.



This section examined differences at the county level. Proceeding by tables within each profile, significant differences were identified between the two sets of data, highlighted the most meaningful differences, and offered some explanations for these differences.

Loss Function Analysis

In this section, we explore a data mining technique to identify the most salient differences between the two surveys. That is, we do not 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. The large sample sizes at the county level along with the high number of variables make such a comparison tedious and, in our opinion, render little in the way of potential insights. 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 [22, 23]. Both of them also can be summarized in a single summary measure known as a Loss Function [21, 22], which serves our analytic goals of 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 2000 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 sub-variables found in these tabular presentations are measured at either the ordinal or nominal level. That is, each variable and sub-variable 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, those variables that were not subsets of hierarchies. This selection process yielded 25 variables for analysis. These 25 variables represent each of the major dimensions of both Census 2000 and the ACS. They are listed in Table 9.

For each of these variables, the absolute numerical and absolute percent difference for each category was found between the census long form and the ACS. For example, as shown in Table 8, the variable "DISABILITY" has three categories that are exhaustive (the three categories cover those age 20 and over who have a disability) and mutually exclusive.

Table 8. Disability Status Comparison of Census Long Form and ACS for Multnomah County

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

As can be seen in Table 8, the absolute numerical difference between Census 200 and ACS is 2,480 for the category "Pop 5-20 yrs with a disability" and the absolute percent difference is 21.91. These same differences are shown in Table 8 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 developing a meaningful loss function is based on the "weighting" scheme used. Bryan [21] describes a procedure used by the US 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 8, range = 70,910 – 11,320 = 59,590 and w = 1 – [(ln(59,590))/25] = .56.

As shown by National Academy of Sciences, a Loss Function has several algebraic equivalent expressions [22]. One that is convenient for calculation is

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

Using the data in Table 8, the Loss Function value for category 1 (Pop 5-20 yrs with a disability) is:

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

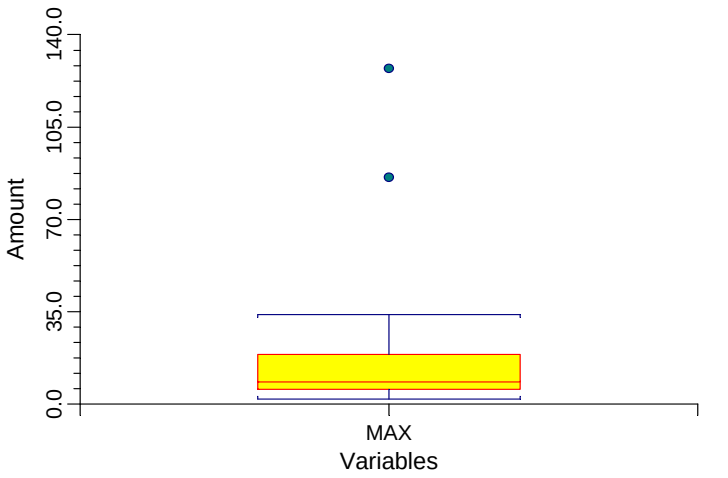
Similar Loss functions were computed for each of the other 24 variables in the list. Once the Loss functions were computed, summary measures were calculated within each variable. The summary variables include the maximum, median, mean, and standard deviation. In the case of DISABILITY, the maximum is 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 24 variables. These values are shown in Table 9.

Table 9. Summary Statistics for Loss Function Values of 25 Variables, Multnomah County

Variable	Observations	MAXIMUM	MINIMUM	MEDIAN	MEAN	STDDEV
AGE	13	4.42	0.02	0.94	1.60	1.29
RACE1 – race alone	16	85.85	0.11	7.09	14.48	20.90
RACE 2 – race alone or in combination with one or more races	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
YR 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

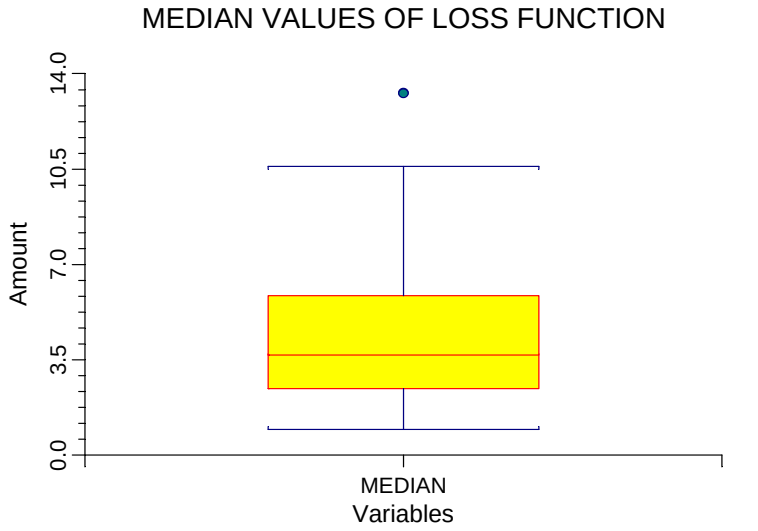
Four of the summary measures (Maximum, Median, Mean, and Standard Deviation) shown in Table 9 were then examined by use of the Box Plot procedure, which facilitates the identification of outliers [10]. These plots are shown as figures 17 through 20.

FIGURE 17 MAXIMUM VALUES OF THE LOSS FUNCTION



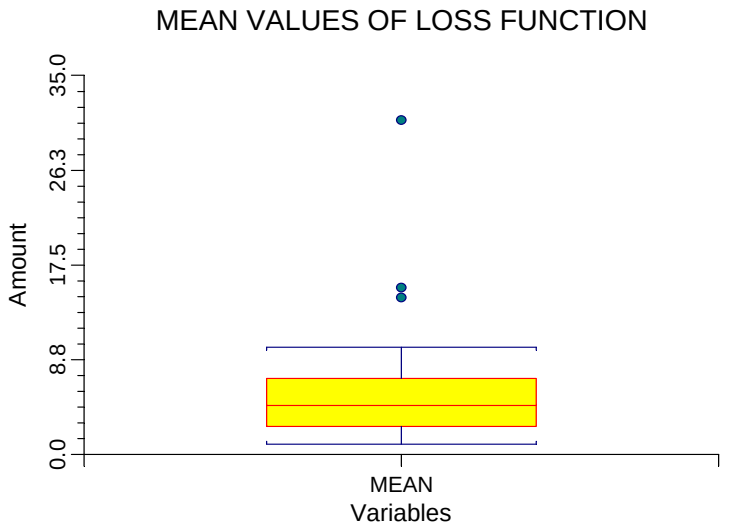
In Figure 17, the two outliers seen for the maximum loss function values are for RACE2 and RACE1, respectively. The maximum loss function value for RACE2 is 127.1, while for RACE1 it is 85.85. RACE1 represents the variable race alone and RACE2 represents the variable race alone or in combination with one or more races.

FIGURE 18 MEDIAN VALUES OF THE LOSS FUNCTION



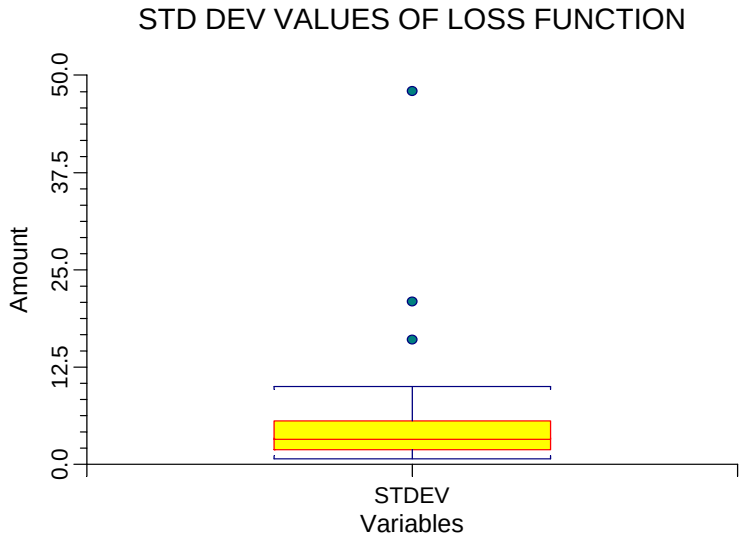
In Figure 18, the outlier seen for the median loss function values is for RACE2 (13.27).

FIGURE 19 MEAN VALUE OF THE LOSS FUNCTION



In Figure 19, 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.

FIGURE 20 STANDARD DEVIATION VALUES OF THE LOSS FUNCTION



In Figure 20, the three outliers seen for the standard deviation of the 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.

In summary, the loss function identified many of the characteristics discussed in the section on Statistical and Meaningful Differences. Thus, it provides a valuable tool allowing researchers a starting point to begin their analysis of statistical differences that may also be meaningful at a local level. The loss function also has an obvious shortcoming in that it is not appropriate for all the variable distributions presented in the four profiles. Further research utilizing this approach should be conducted using data from the other sites to evaluate the utility of the loss function.

Concluding Remarks

The ACS promises to hold great potential for data users. 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 hopefully 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 five of eight summary measure areas, sample unit non-response rate, occupied sample unit non-response rate, the housing unit sample completeness ratio, population allocation rates, and occupied housing units allocation rates. The 2000 Census sample outperformed the ACS in the self-response rate, and also for the few items with the vacant housing unit allocation rates. Finally, there was no difference between ACS and the 2000 Census regarding the household population sample completeness ratio.

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. 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.

The analysis of some of the statistical differences that represented meaningful differences at the local level were largely explained as representing trends reflected in the ACS samples, or reflective of administrative data available at the local level. That is, knowledge of the local area provided insight to significant statistical differences in the observed data.

Conclusions and Concerns Regarding ACS as a Replacement for the Census Sample

For the Multnomah County, Oregon site, the ACS samples represented better quality in the collected data. Multnomah County was one of the 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 sample 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 and meaningful differences observed in the current research.

Additional resources will need to be devoted to develop training materials that provide guidance to numerous other practitioners that 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 re-weighted and re-released to reflect this reality. This re-alignment of the data calls into question the accuracy of the Census Bureau estimates; especially as the ACS design plans to incorporate "vintage" estimates as control totals for the ACS samples. Additionally, the Census Bureau needs to reconcile the population and household controls to provide consistency between people and their housing units.

The most important issue underlying all these concerns is funding the ACS effort. Continuous measurement assumes continuous funding. Despite Census Bureau commitments to implementing the ACS design in their 2010 Census plans, current budget deficits and delays in budget appropriations have left the ACS design in jeopardy. Sufficient funding for implementing the 2010 ACS plan must be ensured for a longer time horizon than the annual federal budget process now allocates. In addition, this funding must not come at the expense of, and should provide additional funds for the numerous Census Bureau activities that are vital for supporting this effort, e.g., the population estimates. Only with this guaranteed financial support can the ACS plan provide results that are more timely and accurate.

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Appendix A

Census 2000 and 1999-2001 American Community Survey
Demographic, Social, Economic and Housing Profiles
Multnomah County, Oregon

Appendix Table A. SITE: Multnomah County Subject	Variable	Census 2000	Census Standard Error	ACS 3-Year Avg	ACS Standard Error	Census Proportion	ACS Proportion	Difference	Standard Error of Difference	Z-Score	P-Value
GENERAL CHARACTERISTICS: POPULATION AND HOUSING	Total population (POP)	643,770	.	645,035	*****	.	.	1265	*****	.	.
Sex and Age	Male	317,250	1,116	318,709	87	0.4928	0.4941	0.001	0.002	0.7449	0.4563
	Female	326,520	1,116	326,326	87	0.5072	0.5059	-0.001	0.002	-0.7449	0.4563
	Under 5 years	41,770	566	42,848	74	0.0649	0.0664	0.002	0.001	1.7407	0.0817
	5 to 9 years	41,850	567	41,678	558	0.0650	0.0646	0	0.001	-0.3195	0.7494
	10 to 14 years	39,650	553	39,907	559	0.0616	0.0619	0	0.001	0.2272	0.8203
	15 to 19 years	38,020	542	38,630	89	0.0591	0.0599	0.001	0.001	0.9731	0.3305
	20 to 24 years	46,950	598	47,214	101	0.0729	0.0732	0	0.001	0.2834	0.7769
	25 to 34 years	113,910	877	113,922	113	0.1769	0.1766	0	0.001	-0.2394	0.8108
	35 to 44 years	106,420	854	105,161	87	0.1653	0.1630	-0.002	0.001	-1.7072	0.0878
	45 to 54 years	96,870	822	96,422	84	0.1505	0.1495	-0.001	0.001	-0.7716	0.4403
	55 to 59 years	28,570	473	29,069	388	0.0444	0.0451	0.001	0.001	0.7225	0.4700
	60 to 64 years	20,210	401	21,121	378	0.0314	0.0327	0.001	0.001	1.5797	0.1142
	65 to 74 years	34,040	514	33,540	64	0.0529	0.0520	-0.001	0.001	-1.0914	0.2751
	75 to 84 years	26,490	457	26,605	279	0.0411	0.0412	0	0.001	0.1169	0.9069
	85 years and over	9,020	270	8,919	276	0.0140	0.0138	0	0.001	-0.2790	0.7802
	Median age (years)	35.0	0	34.8	0.1	.	.	-0.2	0.1	-1.4142	0.1573
	18 years and over	497,480	963	497,207	*****	0.7728	0.7708	-0.002	0.001	-1.2955	0.1951
	21 years and over	473,870	1,013	473,866	380	0.7361	0.7346	-0.001	0.002	-0.8626	0.3884
	62 years and over	81,060	763	81,143	344	0.1259	0.1258	0	0.001	-0.0906	0.9278
	65 years and over	69,550	714	69,064	50	0.1080	0.1071	-0.001	0.001	-0.8688	0.3850
	Male	27,750	467	27,606	58	0.3990	0.3997	0.001	0.005	0.1344	0.8931
	Female	41,810	566	41,458	18	0.6012	0.6003	-0.001	0.014	-0.0623	0.9504
RACE	One race	614,530	797	623,138	710	0.9546	0.9661	0.011	0.002	6.9253	0.0000
	White	508,240	1,561	524,748	955	0.7895	0.8135	0.024	0.003	8.4650	0.0000
	Black or African American	34,430	861	37,248	424	0.0535	0.0577	0.004	0.001	2.8605	0.0042
	Amer Indian and Alaska Native	6,360	379	5,346	337	0.0099	0.0083	-0.002	0.001	-1.6193	0.1054
	Asian	36,710	888	37,834	404	0.0570	0.0587	0.002	0.002	1.0771	0.2814
	Asian Indian	1,950	210	1,706	228	0.0030	0.0026	0	0.001	-0.4243	0.6713
	Filipino	3,390	277	3,980	422	0.0053	0.0062	0.001	0.001	0.8545	0.3928
	Japanese	3,520	282	3,182	271	0.0055	0.0049	-0.001	0.001	-0.5741	0.5659
	Korean	2,540	240	2,386	276	0.0039	0.0037	0	0.001	-0.2634	0.7922
	Vietnamese	11,410	505	10,808	660	0.0177	0.0168	-0.001	0.001	-0.7336	0.4632
	Chinese and Other Asian	13,900	556	15,772	541	0.0216	0.0245	0.003	0.001	2.0890	0.0367
	Native Hawaiian, Other Pacific Islander	2,450	236	2,359	182	0.0038	0.0037	0	0.001	-0.1690	0.8658
	Native Hawaiian	470	103	472	102	0.0007	0.0007	0	0.001	0.0020	0.9984
	Guamanian or Chamorro	280	80	313	91	0.0004	0.0005	0	0.001	0.0590	0.9530
	Samoan	220	71	131	60	0.0003	0.0002	0	0.001	-0.1662	0.8680
	Other Pacific Islander	1,480	183	1,444	183	0.0023	0.0022	0	0.001	-0.0692	0.9449
	Some other race	26,350	758	15,604	911	0.0409	0.0242	-0.017	0.002	-9.1025	0.0000
	Two or more races	29,240	797	21,896	710	0.0454	0.0339	-0.011	0.002	-6.9253	0.0000
Race alone or in	White	532,530	1,447	544,696	1082	0.8272	0.8444	0.017	0.003	6.1467	0.0000
combination w/one	Black or African American	42,270	948	43,313	276	0.0657	0.0671	0.001	0.002	0.9704	0.3319
or more races	Amer Indian and Alaska Native	15,110	580	14,514	325	0.0235	0.0225	-0.001	0.001	-0.9411	0.3467
	Asian	44,260	969	44,034	185	0.0688	0.0683	0	0.002	-0.3168	0.7514
	Native Hawaiian, Other Pacific Islander	4,950	334	3,845	171	0.0077	0.0060	-0.002	0.001	-1.9790	0.0478
	Some other race	36,900	890	18,527	935	0.0573	0.0287	-0.029	0.002	-14.2754	0.0000
HISPANIC OR LATINO	Total POP	643,770		645,035	*****	.	.	1265	*****	.	.
RACE	Hispanic or Latino (of any race)	48,320	1,022	49,010	*****	0.0751	0.0760	0.001	0.002	0.5812	0.5611
	Mexican	35,100	881	37,989	644	0.0545	0.0589	0.004	0.002	2.5814	0.0098
	Puerto Rican	1,160	164	1,326	178	0.0018	0.0021	0	0.001	0.2865	0.7745
	Cuban	1,300	174	1,363	196	0.0020	0.0021	0	0.001	0.1039	0.9172
	Other Hispanic or Latino	10,770	497	8,332	578	0.0167	0.0129	-0.004	0.001	-3.0984	0.0019
	Not Hispanic or Latino	595,450	1,022	596,025	*****	0.9249	0.9240	-0.001	0.002	-0.5812	0.5611
	White alone	492,210	1,646	495,175	240	0.7646	0.7677	0.003	0.003	1.1993	0.2304
RELATIONSHIP TO	Household POP	643,770	.	645,035	*****	.	.	1265	*****	.	.
HOUSEHOLDER	Householder (HHR)	272,360	1,003	277,521	878	0.4231	0.4302	0.007	0.002	3.4649	0.0005
	Spouse	115,650	780	111,941	732	0.1796	0.1735	-0.006	0.002	-3.6752	0.0002
	Child	166,190	889	164,539	837	0.2582	0.2551	-0.003	0.002	-1.6177	0.1057
	Other relatives	30,000	428	32,355	818	0.0466	0.0502	0.004	0.001	2.4849	0.0130
	Nonrelatives	59,570	589	58,679	977	0.0925	0.0910	-0.002	0.002	-0.8839	0.3767
	Unmarried partner	20,610	358	21,191	518	0.0320	0.0329	0.001	0.001	0.8589	0.3904
HOUSEHOLDS	Total households (HH)	272,355	22	272,267	539	.	.	-88	539	-0.1639	0.8698
BY TYPE	Family HH (families)	153,830	655	149,700	947	0.5648	0.5498	-0.015	0.004	-3.6668	0.0002
	With own children under 18 yrs	74,050	669	70,585	728	0.2719	0.2592	-0.013	0.004	-3.5162	0.0004
	Married-couple families	114,315	652	109,502	882	0.4197	0.4022	-0.018	0.004	-4.4411	0.0000
	With own children under 18 yrs	51,440	589	47,057	621	0.1889	0.1728	-0.016	0.003	-5.1365	0.0000
	Female HHR, no husband present	28,260	403	28,796	562	0.1038	0.1058	0.002	0.003	0.7909	0.4290
	With own children under 18 yrs	16,915	363	18,000	489	0.0621	0.0661	0.004	0.002	1.7934	0.0729
	Nonfamily households	118,525	655	122,567	970	0.4352	0.4502	0.015	0.004	3.5629	0.0004
	HHR living alone	88,275	618	91,087	903	0.3241	0.3346	0.010	0.004	2.6315	0.0085
	65 years and over	24,365	408	23,778	422	0.0895	0.0873	-0.002	0.002	-0.9902	0.3221
	Average HH size	2.36	0.07	2.37	0.00	.	.	0.01	0.07	0.1301	0.8965
	Average family size	3.03	0.02	3.09	0.02	.	.	0.06	0.03	1.8973	0.0578
HOUSING OCCUPANCY	Total housing units	288,560		288,528	*****	.	.	-32	*****	.	.
	Occupied housing units	272,100	380	272,267	539	0.9430	0.9436	0.001	0.002	0.2982	0.7655
	Vacant housing units	16,465	380	16,262	539	0.0571	0.0564	-0.001	0.002	-0.3058	0.7598
HOUSING TENURE	Occupied housing units	272,100	380	272,267	539	.	.	167	659	0.2529	0.8004
	Owner-occupied	154,785	660	152,624	857	0.5689	0.5606	-0.008	0.004	-2.2024	0.0276
	Renter-occupied	117,315	650	119,642	890	0.4311	0.4394	0.008	0.004	2.1107	0.0348
	Avg HH size of owner-occupied unit	2.50	0.02	2.52	0.02	.	.	0.02	0.03	0.7511	0.4526
	Avg HH size of renter-occupied unit	2.13	0.02	2.17	0.03	.	.	0.04	0.03	1.3775	0.1684

Appendix Table A. (continued) SITE: Multnomah County Subject	Variable	Census 2000	Census Standard Error	ACS 3-Year Avg	ACS Standard Error	Census Proportion	ACS Proportion	Difference	Standard Error of Difference	Z-Score	P-Value
SOCIAL CHARACTERISTICS: EDUCATION, ANCESTRY, LANGUAGE, MORE	POP 3 yrs and over enrolled in school	156,960	1,125	155,646	991	.	.	-1314	1499	-0.8767	0.3806
SCHOOL ENROLLMENT	Nursery school, preschool	9,760	320	8,415	329	0.0622	0.0541	-0.008	0.003	-2.8179	0.0048
	Kindergarten	7,700	285	8,357	326	0.0491	0.0537	0.005	0.003	1.6991	0.0893
	Elementary school (grades 1-8)	65,250	791	63,978	451	0.4157	0.4111	-0.005	0.004	-1.0972	0.2725
	High school (HS) (grades 9-12)	31,280	563	30,975	426	0.1993	0.1990	0	0.004	-0.0671	0.9465
	College or graduate school	42,990	654	43,920	794	0.2739	0.2822	0.008	0.006	1.3759	0.1688
EDUCATIONAL	Population 25 years and over	435,530	1,075	434,758	88	.	.	-772	1079	-0.7161	0.4739
ATTAINMENT	Less than 9th grade	21,520	397	21,270	560	0.0494	0.0489	0	0.002	-0.3092	0.7572
	9th to 12th grade, no diploma	38,840	526	36,838	698	0.0892	0.0847	-0.004	0.002	-2.2244	0.0261
	HS graduate (including equivalency)	99,510	799	101,469	1155	0.2285	0.2334	0.005	0.003	1.5431	0.1228
	Some college, no degree	113,200	842	110,257	1062	0.2599	0.2536	-0.006	0.003	-2.0664	0.0388
	Associate degree	26,990	443	26,772	634	0.0620	0.0616	0	0.002	-0.2203	0.8256
	Bachelor's degree	89,000	763	89,749	1029	0.2043	0.2064	0.002	0.003	0.7178	0.4729
	Graduate or professional degree	46,470	572	48,402	695	0.1067	0.1113	0.005	0.002	2.2566	0.0240
	Percent HS graduate or higher	86.1	0.14	86.6	0.2	.	.	0.5	0.2	2.2225	0.0263
	Percent bachelor's degree or higher	31.1	0.19	31.8	0.3	.	.	0.7	0.3	2.0585	0.0395
MARITAL STATUS	Population 15 years and over	520,510	904	520,602	62	.	.	92	905	0.1017	0.9190
	Never married	169,340	845	172,787	682	0.3253	0.3319	0.007	0.003	2.4758	0.0133
	Now married, except separated	243,660	931	240,409	823	0.4681	0.4618	-0.006	0.003	-1.9991	0.0456
	Separated	10,270	240	11,256	320	0.0197	0.0216	0.002	0.001	1.9534	0.0508
	Widowed	29,040	398	28,958	388	0.0558	0.0556	0	0.001	-0.1432	0.8862
	Female	23,680	420	23,505	388	0.0455	0.0451	0	0.001	-0.3147	0.7530
	Divorced	68,210	591	67,192	596	0.1310	0.1291	-0.002	0.002	-0.9753	0.3294
	Female	38,630	530	38,561	596	0.0742	0.0741	0	0.002	-0.0953	0.9241
GRANDPARENTS	under 18 years in households	9,710	313	9,476	412	.	.	-234	517	-0.4522	0.6511
AS CAREGIVERS	Responsible for grandchildren	3,840	198	4,039	265	0.3955	0.4263	0.031	0.026	1.1739	0.2404
VETERAN STATUS	Civilian population 18 yrs and over	497,240	864	496,907	69	.	.	-333	867	-0.3838	0.7011
	Civilian veterans	61,570	606	59,502	692	0.1238	0.1197	-0.004	0.002	-2.2183	0.0265
DISABILITY STATUS	Population 5 to 20 years	128,120	918	128,290	381	.	.	170	994	0.1714	0.8639
	With a disability	11,320	318	8,840	382	0.0884	0.0689	-0.019	0.004	-5.0980	0.0000
	Population 21 to 64 years	404,090	1,111	404,533	396	.	.	443	1179	0.3753	0.7074
	With a disability	70,910	757	54,039	830	0.1755	0.1336	-0.042	0.003	-15.3555	0.0000
	Percent employed	61	1	50	1.3	.	.	-10.6	1.4	-7.6875	0.0000
	No disability	333,180	1,209	350,493	850	0.8245	0.8664	0.042	0.003	15.8895	0.0000
	Percent employed	80	0	81	0.4	.	.	1	0.4	2.2161	0.0267
	Population 65 years and over	69,550	714	69,064	50	.	.	-486	716	-0.6790	0.4971
	With a disability	28,690	499	28,520	402	0.4125	0.4130	0	0.008	0.0546	0.9565
NATIVITY AND PLACE	Total population	643,770	.	645,035	*****	.	.	1,265	*****	.	.
OF BIRTH	Native	561,000	874	562,833	1368	0.8714	0.8726	0.001	0.003	0.4499	0.6528
	Born in United States	554,570	902	555,671	1406	0.8614	0.8615	0	0.003	0.0071	0.9943
	State of residence	291,070	1,299	290,723	1850	0.4521	0.4507	-0.001	0.004	-0.4062	0.6846
	Different state	263,500	1,284	264,948	1808	0.4093	0.4108	0.001	0.003	0.4195	0.6749
	born outside the US to Amer parent(s)	6,440	260	7,161	373	0.0100	0.0111	0.001	0.001	1.3559	0.1751
	Foreign born	82,770	874	82,202	1368	0.1286	0.1274	-0.001	0.003	-0.4499	0.6528
	Entered 1990 or later	45,650	790	45,775	1290	0.5515	0.5569	0.005	0.014	0.3730	0.7091
	Naturalized citizen	28,550	582	25,895	651	0.3449	0.3150	-0.03	0.008	-3.5984	0.0003
	Not a citizen	54,220	785	56,307	1375	0.6551	0.6850	0.03	0.014	2.2063	0.0274
REGION OF BIRTH	Foreign-born POP w/region of birth repor	82,770	874	82,192	1368	.	.	-578	1623	-0.3561	0.7217
OF FOREIGN BORN	Europe	20,050	453	18,248	899	0.2422	0.2220	-0.02	0.011	-1.7783	0.0754
	Asia	28,890	540	29,866	548	0.3490	0.3634	0.014	0.006	2.3576	0.0184
	Africa	2,630	167	2,917	354	0.0318	0.0355	0.004	0.005	0.7906	0.4292
	Oceania	2,010	146	1,700	191	0.0243	0.0207	-0.004	0.003	-1.2457	0.2129
	Latin America	25,310	507	25,598	661	0.3058	0.3114	0.006	0.008	0.7009	0.4833
	Northern America	3,880	202	3,863	226	0.0469	0.0470	0	0.004	0.0345	0.9725
LANGUAGE SPOKEN	Population 5 years and over	602,010	566	602,187	74	.	.	177	571	0.3095	0.7570
AT HOME	English only	501,820	1,161	502,634	1335	0.8336	0.8347	0.001	0.003	0.3990	0.6899
	Language other than English	100,180	1,015	99,552	1337	0.1664	0.1653	-0.001	0.003	-0.3923	0.6948
	Speak English less than "very well"	54,120	777	53,544	1129	0.0899	0.0889	-0.001	0.002	-0.4325	0.6654
	Spanish	37,460	655	38,666	669	0.0622	0.0642	0.002	0.002	1.2765	0.2018
	Speak English less than "very well"	21,260	500	22,081	617	0.0353	0.0367	0.001	0.001	1.0261	0.3049
	Other Indo-European languages	28,660	577	25,116	969	0.0476	0.0417	-0.006	0.002	-3.1517	0.0016
	Speak English less than "very well"	13,200	397	10,958	674	0.0219	0.0182	-0.004	0.001	-2.8721	0.0041
	Asian and Pacific Islander languages	29,760	588	31,544	588	0.0494	0.0524	0.003	0.001	2.1365	0.0326
	Speak English less than "very well"	17,980	461	18,564	559	0.0299	0.0308	0.001	0.001	0.7991	0.4242
ANCESTRY	Total Population	643,770	.	645,035	*****	.	.	1,265	*****	.	.
(single or multiple)	Arab	2,820	211	2,808	299	0.0044	0.0044	0	0.001	-0.0332	0.9735
	Czech	4,770	274	3,731	258	0.0074	0.0058	-0.002	0.001	-2.0276	0.0426
	Danish	7,300	338	7,670	353	0.0113	0.0119	0.001	0.001	0.6241	0.5325
	Dutch	13,500	458	15,560	597	0.0210	0.0241	0.003	0.001	2.7021	0.0069
	English	76,290	1,032	89,495	1281	0.1185	0.1387	0.02	0.003	7.9299	0.0000
	French (except Basque)	23,130	594	27,441	729	0.0359	0.0425	0.007	0.001	4.5304	0.0000
	French Canadian	5,880	304	5,649	330	0.0091	0.0088	0	0.001	-0.4353	0.6633
	German	125,150	1,264	139,003	1575	0.1944	0.2155	0.021	0.003	6.7335	0.0000
	Greek	2,770	209	2,977	322	0.0043	0.0046	0	0.001	0.3655	0.7148
	Hungarian	2,690	206	2,886	238	0.0042	0.0045	0	0.001	0.3759	0.7070
	Irish	78,220	1,043	84,787	1261	0.1215	0.1314	0.01	0.003	3.9147	0.0001
	Italian	24,560	612	25,064	737	0.0382	0.0389	0.001	0.001	0.4759	0.6342
	Lithuanian	1,180	137	1,022	146	0.0018	0.0016	0	0.001	-0.3411	0.7330
	Norwegian	30,340	677	28,950	764	0.0471	0.0449	-0.002	0.002	-1.4190	0.1559
	Polish	11,760	428	12,662	495	0.0183	0.0196	0.001	0.001	1.3168	0.1879
	Portuguese	1,880	172	1,889	213	0.0029	0.0029	0	0.001	0.0114	0.9909
	Russian	11,900	430	13,977	787	0.0185	0.0217	0.003	0.001	2.2674	0.0234
	Scotch-Irish	13,280	454	18,336	604	0.0206	0.0284	0.008	0.001	6.6499	0.0000
	Scottish	19,930	553	24,097	655	0.0310	0.0374	0.006	0.001	4.8103	0.0000
	Slovak	550	93	554	86	0.0009	0.0009	0	0.001	0.0057	0.9955
	Subsaharan African	4,550	268	3,761	425	0.0071	0.0058	-0.001	0.001	-1.2912	0.1966
	Swedish	21,950	579	23,167	736	0.0341	0.0359	0.002	0.001	1.2522	0.2105
	Swiss	5,100	283	5,527	308	0.0079	0.0086	0.001	0.001	0.7663	0.4435
	Ukrainian	6,710	324	6,485	656	0.0104	0.0101	0	0.001	-0.3000	0.7642
	United States or American	27,090	641	25,715	832	0.0421	0.0399	-0.002	0.002	-1.3595	0.1740
	Welsh	8,000	354	8,184	369	0.0124	0.0127	0	0.001	0.2895	0.7722
	West Indian (excluding Hispanic origin gr	850	116	898	237	0.0013	0.0014	0	0.001	0.0914	0.9271

Appendix Table A. (continued) SITE: Multnomah County Subject	Variable	Census 2000	Census Standard Error	ACS 3-Year Avg	ACS Standard Error	Census Proportion	ACS Proportion	Difference	Standard Error of Difference	Z-Score	P-Value
ECONOMIC CHARACTERISTICS: EMPLOYMENT, INCOME, POVERTY, AND MORE	Population 16 years and over	512,740	926	512,600	260	.	.	-140	962	-0.1456	0.8843
EMPLOYMENT STATUS	In labor force	359,150	1,055	362,611	1062	0.7005	0.7074	0.007	0.003	2.6179	0.0088
	Civilian labor force	358,920	1,055	362,312	1080	0.7000	0.7068	0.007	0.003	2.5406	0.0111
	Employed	337,930	1,061	339,113	1192	0.6591	0.6616	0.002	0.003	0.8599	0.3898
	Unemployed	20,990	377	23,199	599	0.0409	0.0453	0.004	0.001	3.1316	0.0017
	Percent unemployed	5.8	0.1	6.4	0.2	.	.	0.6	0.2	3.1047	0.0019
	Armed Forces	230	40	300	69	0.0004	0.0006	0	0.001	0.2542	0.7994
	Not in labor force	153,590	906	149,989	1061	0.2995	0.2926	-0.007	0.003	-2.6002	0.0093
	Females 16 years and over	262,680	1,130	261,425	200	.	.	-1255	1148	-1.0936	0.2741
	In labor force	167,270	932	167,782	761	0.6368	0.6418	0.005	0.004	1.3216	0.1863
	Civilian labor force	167,190	932	167,735	764	0.6365	0.6416	0.005	0.004	1.3510	0.1767
	Employed	158,390	915	157,874	788	0.6030	0.6039	0.001	0.004	0.2357	0.8137
	Own children under 6 years	47,090	602	48,370	405	.	.	1280	726	1.7636	0.0778
	All parents in family in labor force	28,700	477	28,866	571	0.6095	0.5968	-0.013	0.013	-1.0144	0.3104
COMMUTING TO WORK	Workers 16 years and over	331,720	1,149	329,956	1182	.	.	-1,764	1648	-1.0700	0.2846
	Car, truck, or van -- drove alone	219,470	1,142	216,443	1287	0.6616	0.6560	-0.006	0.004	-1.4193	0.1558
	Car, truck, or van -- carpooled	39,950	581	37,625	778	0.1204	0.1140	-0.006	0.003	-2.2266	0.0260
	Public transportation (including taxicab)	36,780	559	37,788	805	0.1109	0.1145	0.004	0.003	1.2531	0.2102
	Walked	13,520	345	14,227	498	0.0408	0.0431	0.002	0.002	1.2961	0.1949
	Other means	7,720	262	9,238	369	0.0233	0.0280	0.005	0.001	3.4686	0.0005
	Worked at home	14,290	355	14,636	453	0.0431	0.0444	0.001	0.002	0.7408	0.4588
	Mean travel time to work (minutes)	24	0	23	0.2	.	.	-0.8	0.3	-2.8325	0.0046
OCCUPATION	Employed civilian POP 16 yrs and over	337,930	1,148	339,113	1192	.	.	1,183	1655	0.7148	0.4748
	Mgt, professional, and related occupation	121,190	884	121,194	1094	0.3586	0.3574	-0.001	0.004	-0.3285	0.7425
	Service occupations	50,570	608	52,223	900	0.1496	0.1540	0.004	0.003	1.3943	0.1632
	Sales and office occupations	91,210	788	91,320	953	0.2699	0.2693	-0.001	0.003	-0.1810	0.8564
	Farming, fishing, and forestry occupations	1,350	103	1,506	178	0.0040	0.0044	0	0.001	0.5188	0.6039
	Construction, extraction, maintenance oc	25,710	443	25,305	546	0.0761	0.0746	-0.001	0.002	-0.7139	0.4753
	Production, transport., material moving oc	47,910	593	47,565	785	0.1418	0.1403	-0.002	0.003	-0.5353	0.5925
INDUSTRY	Agri., forestry, fishing and hunting, mining	2,000	132	2,260	185	0.0059	0.0067	0.001	0.001	0.8349	0.4038
	Construction	19,780	408	20,089	531	0.0585	0.0592	0.001	0.002	0.3613	0.7179
	Manufacturing	43,060	591	43,148	731	0.1274	0.1272	0	0.003	-0.0688	0.9451
	Wholesale trade	16,180	370	15,088	439	0.0479	0.0445	-0.003	0.002	-2.0154	0.0439
	Retail trade	39,850	570	39,084	712	0.1179	0.1153	-0.003	0.003	-1.0142	0.3105
	Transportation and warehousing, and utili	19,570	406	18,928	487	0.0579	0.0558	-0.002	0.002	-1.1322	0.2576
	Information	10,110	294	10,012	373	0.0299	0.0295	0	0.001	-0.2829	0.7773
	Finance, insur., real estate, rental/leasing	24,030	449	25,187	520	0.0711	0.0743	0.003	0.002	1.5858	0.1128
	Prof., scientific, mgt., admin., waste mgt.	38,500	561	40,653	726	0.1139	0.1199	0.006	0.003	2.2489	0.0245
	Educational, health, and social services	63,590	706	63,720	859	0.1882	0.1879	0	0.003	-0.0865	0.9311
	Arts, entertainment, rec., accom., food se	30,940	506	31,641	747	0.0916	0.0933	0.002	0.003	0.6662	0.5053
	Other services (except public administrat	18,390	394	17,391	453	0.0544	0.0513	-0.003	0.002	-1.7862	0.0741
	Public administration	11,930	319	11,911	373	0.0353	0.0351	0	0.001	-0.1252	0.9003
CLASS OF WORKER	Private wage and salary workers	271,160	1,184	273,026	1,324	0.8024	0.8051	0.003	0.003	0.8003	0.4236
	Government workers	40,270	581	38,599	690	0.1192	0.1138	-0.005	0.003	-2.0562	0.0398
	Self-employed in own not incorp. busines	25,620	469	26,635	557	0.0758	0.0785	0.003	0.002	1.2897	0.1972
	Unpaid family workers	880	89	853	99	0.0026	0.0025	0	0.001	-0.1130	0.9100
INCOME IN 1999	Total households	272,355	18	272,267	539	.	.	-88	539	-0.1639	0.8698
	Less than $10,000	25,260	421	26,521	607	0.0927	0.0974	0.005	0.003	1.7237	0.0848
	$10,000 to $14,999	16,485	346	17,624	457	0.0605	0.0647	0.004	0.002	1.9994	0.0456
	$15,000 to $24,999	35,270	487	37,567	667	0.1295	0.1380	0.008	0.003	2.8090	0.0050
	$25,000 to $34,999	37,135	498	35,996	639	0.1363	0.1322	-0.004	0.003	-1.3975	0.1623
	$35,000 to $49,999	47,340	549	47,433	681	0.1738	0.1742	0	0.003	0.1242	0.9012
	$50,000 to $74,999	55,220	583	52,982	707	0.2028	0.1946	-0.008	0.003	-2.4388	0.0147
	$75,000 to $99,999	27,060	434	25,714	512	0.0994	0.0944	-0.005	0.002	-1.9973	0.0458
	$100,000 to $149,999	18,470	365	18,463	427	0.0678	0.0678	0	0.002	-0.0018	0.9986
	$150,000 to $199,999	4,695	189	4,961	228	0.0172	0.0182	0.001	0.001	0.8762	0.3809
	$200,000 or more	5,430	203	5,006	211	0.0199	0.0184	-0.002	0.001	-1.4409	0.1496
	Median household income (dollars)	41,278	221	40,290	261	.	.	-988	342	-2.8889	0.0039
	With earnings	225,005	622	225,387	712	0.8261	0.8278	0.002	0.003	0.5462	0.5849
	Mean earnings (dollars)	52,793	338	52,385	399	.	.	-408	523	-0.7795	0.4357
	With Social Security	58,555	674	58,745	492	0.2150	0.2158	0.001	0.003	0.2528	0.8004
	Mean Social Security income (dollars)	11,442	123	11,578	145	.	.	136	190	0.7187	0.4723
	With retirement income	38,460	572	36,024	490	0.1412	0.1323	-0.009	0.003	-3.2350	0.0012
	Mean retirement income (dollars)	17,315	431	16,080	509	.	.	-1235	667	-1.8517	0.0641
	With Supplemental Security Income	10,270	313	8,933	336	0.0377	0.0328	-0.005	0.002	-2.9089	0.0036
	Mean Supplemental Security Inc. (dollars	6,604	294	6,156	347	.	.	-448	455	-0.9858	0.3243
	With cash public assistance income	11,480	330	7,290	302	0.0422	0.0268	-0.015	0.002	-9.3691	0.0000
	Mean cash public assistance inc. (dollars	2,624	186	2,956	220	.	.	332	288	1.1527	0.2490
	Families	153,830	655	149,700	947	.	.	-4130	1152	-3.5864	0.0003
	Less than $10,000	7,825	244	8,271	364	0.0509	0.0553	0.004	0.003	1.5269	0.1268
	$10,000 to $14,999	5,750	210	6,147	291	0.0374	0.0411	0.004	0.002	1.5665	0.1172
	$15,000 to $24,999	15,295	336	16,402	465	0.0994	0.1096	0.01	0.004	2.7383	0.0062
	$25,000 to $34,999	18,395	366	17,509	506	0.1196	0.1170	-0.003	0.004	-0.6498	0.5158
	$35,000 to $49,999	27,360	438	26,456	525	0.1779	0.1767	-0.001	0.004	-0.2630	0.7926
	$50,000 to $74,999	37,195	501	34,868	601	0.2418	0.2329	-0.009	0.005	-1.8407	0.0657
	$75,000 to $99,999	19,755	378	18,253	440	0.1284	0.1219	-0.006	0.004	-1.7516	0.0798
	$100,000 to $149,999	14,170	329	13,864	360	0.0921	0.0926	0	0.003	0.1597	0.8731
	$150,000 to $199,999	3,745	170	3,856	195	0.0243	0.0258	0.001	0.002	0.8327	0.4050
	$200,000 or more	4,345	183	4,073	189	0.0282	0.0272	-0.001	0.002	-0.6017	0.5474
	Median family income (dollars)	51,118	332	50,038	392	.	.	-1,080	514	-2.1024	0.0355
	Per capita income (dollars)	22,962	124	22,781	147	.	.	-181	192	-0.9411	0.3467
	Male full-time, year-round workers	36,085	206	36,380	244	.	.	295	319	0.9238	0.3556
	Female full-time, year-round workers	29,384	206	28,938	244	.	.	-446	319	-1.3967	0.1625
POVERTY STATUS IN	Families	12,595	306	13,558	448	.	.	963	542	1.7747	0.0759
1999 (below poverty level)	With related children under 18 years	10,130	285	10,959	421	0.8043	0.8083	0.004	0.019	0.2153	0.8295
	Families with female HHR, no husband p	6,445	229	6,912	332	.	.	467	404	1.1572	0.2472
	With related children under 18 years	5,820	217	6,213	324	0.9030	0.8988	-0.004	0.021	-0.1982	0.8429
	Individuals	78,310	883	83,491	1,806	.	.	5,181	2,010	2.5775	0.0100
	18 years and over	55,390	757	57,686	1,104	0.7073	0.6909	-0.016	0.014	-1.1657	0.2437
	65 years and over	6,440	269	6,624	321	0.0822	0.0793	-0.003	0.005	-0.6082	0.5430
	Related children under 18 years	21,730	488	24,504	973	0.2775	0.2935	0.016	0.011	1.4342	0.1515
	Related children 5 to 17 years	14,540	401	15,964	748	0.1857	0.1912	0.006	0.009	0.6000	0.5485
	Unrelated individuals 15 years and over	35,090	613	36,251	816	0.4481	0.4342	-0.014	0.007	-2.1206	0.0340

Appendix Table A. (continued) SITE: Multnomah County Subject	Variable	Census 2000	Census Standard Error	ACS 3-Year Avg	ACS Standard Error	Census Proportion	ACS Proportion	Difference	Standard Error of Difference	Z-Score	P-Value
HOUSING CHARACTISTICS: VALUE, RENT, OWNER COSTS, MORE	Total housing units	288,560	.	288,528	*****	.	.	-32	*****	.	.
UNITS IN STRUCTURE	1-unit, detached	172,315	607	171,365	915	0.5972	0.5939	-0.003	0.004	-0.8479	0.3965
	1-unit, attached	8,775	212	8,449	318	0.0304	0.0293	-0.001	0.001	-0.8506	0.3950
	2 units	11,705	244	14,764	466	0.0406	0.0512	0.011	0.002	5.8148	0.0000
	3 or 4 units	14,915	274	16,739	489	0.0517	0.0580	0.006	0.002	3.2599	0.0011
	5 to 9 units	14,795	273	16,681	507	0.0513	0.0578	0.007	0.002	3.2788	0.0010
	10 to 19 units	16,880	290	17,004	499	0.0585	0.0589	0	0.002	0.2179	0.8275
	20 or more units	42,100	437	37,102	596	0.1459	0.1286	-0.017	0.003	-6.7576	0.0000
	Mobile home	6,185	179	5,888	237	0.0214	0.0204	-0.001	0.001	-0.9978	0.3184
	Boat, RV, van, etc.	895	69	537	90	0.0031	0.0019	-0.001	0.001	-1.8339	0.0667
YEAR STRUCTURE	1999 or later	6,215	205	4,245	252	0.0215	0.0147	-0.007	0.001	-6.0612	0.0000
BUILT	1995 to 1998	18,305	345	15,964	449	0.0634	0.0553	-0.008	0.002	-4.1311	0.0000
	1990 to 1994	14,275	307	13,934	411	0.0495	0.0483	-0.001	0.002	-0.6610	0.5086
	1980 to 1989	21,595	372	22,695	514	0.0748	0.0787	0.004	0.002	1.7369	0.0824
	1970 to 1979	43,570	507	42,942	683	0.1510	0.1488	-0.002	0.003	-0.7331	0.4635
	1960 to 1969	33,220	452	32,722	627	0.1151	0.1134	-0.002	0.003	-0.6404	0.5219
	1940 to 1959	68,250	601	68,694	578	0.2365	0.2381	0.002	0.003	0.4732	0.6360
	1939 or earlier	83,130	641	87,332	879	0.2881	0.3027	0.015	0.004	3.8705	0.0001
ROOMS	1 room	13,440	298	10,972	353	0.0466	0.0380	-0.009	0.002	-5.3405	0.0000
	2 rooms	21,025	368	16,138	426	0.0729	0.0559	-0.017	0.002	-8.6770	0.0000
	3 rooms	32,605	448	32,637	623	0.1130	0.1131	0	0.003	0.0463	0.9630
	4 rooms	48,480	530	55,422	820	0.1680	0.1921	0.024	0.003	7.1186	0.0000
	5 rooms	52,325	546	55,488	709	0.1813	0.1923	0.011	0.003	3.5407	0.0004
	6 rooms	44,900	513	46,436	611	0.1556	0.1609	0.005	0.003	1.9302	0.0536
	7 rooms	32,435	447	31,202	556	0.1124	0.1081	-0.004	0.002	-1.7225	0.0850
	8 rooms	21,395	371	19,144	413	0.0741	0.0664	-0.008	0.002	-4.0499	0.0001
	9 rooms or more	21,955	376	21,089	445	0.0761	0.0731	-0.003	0.002	-1.4823	0.1382
	Median (rooms)	5	0	5	0.1	.	.	0	0.1	0.0000	1.0000
YEAR HOUSEHOLDER	Occupied housing units	272,100	380	272,267	539	.	.	167	659	0.2529	0.8004
MOVED INTO UNIT	1995 or later	153,825	709	155,193	894	0.5653	0.5700	0.005	0.004	1.1631	0.2448
	1990 to 1994	42,540	504	40,419	661	0.1563	0.1485	-0.008	0.003	-2.6001	0.0093
	1980 to 1989	34,075	459	35,867	554	0.1252	0.1317	0.007	0.003	2.4768	0.0133
	1970 to 1979	20,805	368	20,174	427	0.0765	0.0741	-0.002	0.002	-1.1459	0.2518
	1969 or earlier	20,850	368	20,614	396	0.0766	0.0757	-0.001	0.002	-0.4611	0.6448
VEHICLES AVAILABLE	No vehicles available	34,550	457	32,951	592	0.1270	0.1210	-0.006	0.003	-2.1774	0.0295
	1	104,575	676	102,670	880	0.3843	0.3771	-0.007	0.004	-1.8166	0.0693
	2	95,700	662	96,650	803	0.3517	0.3550	0.003	0.004	0.8767	0.3806
	3 or more	37,270	472	39,995	627	0.1370	0.1469	0.01	0.003	3.4679	0.0005
HOUSE HEATING FUEL	Utility gas	123,955	656	121,748	960	0.4555	0.4472	-0.008	0.004	-2.0222	0.0432
	Bottled, tank, or LP gas	2,630	126	2,667	158	0.0097	0.0098	0	0.001	0.1462	0.8838
	Electricity	99,305	629	101,978	981	0.3650	0.3746	0.01	0.004	2.2864	0.0222
	Fuel oil, kerosene, etc.	40,360	459	38,506	604	0.1483	0.1414	-0.007	0.003	-2.4929	0.0127
	Coal or coke	20	18	18	39	0.0001	0.0001	0	0.001	-0.0109	0.9913
	Wood	3,055	136	3,389	187	0.0112	0.0124	0.001	0.001	1.2809	0.2002
	Solar energy	65	20	57	22	0.0002	0.0002	0	0.001	-0.0461	0.9632
	Other fuel	1,950	109	2,515	199	0.0072	0.0092	0.002	0.001	2.1010	0.0356
	No fuel used	755	68	1,388	132	0.0028	0.0051	0.002	0.001	2.8322	0.0046
SELECTED	Lacking complete plumbing facilities	1,895	112	1,955	169	0.0070	0.0072	0	0.001	0.2337	0.8153
CHARACTERISTICS	Lacking complete kitchen facilities	2,545	108	2,532	176	0.0094	0.0093	0	0.001	-0.0603	0.9519
	No telephone service available	4,325	157	6,345	360	0.0159	0.0233	0.007	0.001	5.0358	0.0000
OCCUPANTS PER ROOM	1.00 or less	257,240	509	261,932	647	0.9454	0.9620	0.017	0.002	8.5558	0.0000
	1.01 to 1.50	7,620	263	6,517	282	0.0280	0.0239	-0.004	0.001	-2.8778	0.0040
	1.51 or more	7,235	256	3,818	223	0.0266	0.0140	-0.013	0.001	-10.0877	0.0000
VALUE	Specified owner-occupied units	137,165	818	137,748	863	.	.	583	1189	0.4899	0.6242
	Less than $50,000	1,010	83	1,117	94	0.0074	0.0081	0.001	0.001	0.6216	0.5342
	$50,000 to $99,999	11,430	273	11,082	342	0.0833	0.0805	-0.003	0.003	-0.9238	0.3556
	$100,000 to $149,999	48,670	525	47,815	645	0.3548	0.3471	-0.008	0.005	-1.4416	0.1494
	$150,000 to $199,999	38,935	479	39,072	586	0.2839	0.2837	0	0.005	-0.0407	0.9675
	$200,000 to $299,999	23,400	383	23,664	469	0.1706	0.1718	0.001	0.004	0.2859	0.7750
	$300,000 to $499,999	10,240	259	11,094	285	0.0747	0.0805	0.006	0.003	2.1552	0.0311
	$500,000 to $999,999	2,970	141	3,379	162	0.0217	0.0245	0.003	0.002	1.8576	0.0632
	$1,000,000 or more	510	59	524	64	0.0037	0.0038	0	0.001	0.0766	0.9389
	Median (dollars)	157,900	413	159,204	487	.	.	1304	639	2.0421	0.0411
MORTGAGE STATUS AND	Housing units with a mortgage	105,055	699	103,404	843	.	.	-1651	1095	-1.5068	0.1319
SELECTED MONTHLY	Less than $300	155	34	290	48	0.0011	0.0021	0.001	0.001	0.9057	0.3651
OWNER COSTS	$300 to $499	2,295	129	2,403	166	0.0167	0.0174	0.001	0.002	0.4515	0.6516
	$500 to $699	8,365	244	8,159	268	0.0610	0.0592	-0.002	0.003	-0.6781	0.4977
	$700 to $999	24,670	406	23,866	494	0.1799	0.1733	-0.007	0.004	-1.4938	0.1352
	$1,000 to $1,499	41,280	509	41,851	626	0.3010	0.3038	0.003	0.005	0.5407	0.5887
	$1,500 to $1,999	17,480	346	16,370	419	0.1274	0.1188	-0.009	0.004	-2.2480	0.0246
	$2,000 or more	10,815	276	10,466	301	0.0788	0.0760	-0.003	0.003	-0.9886	0.3228
	Median (dollars)	1,181	4	1,180	5	.	.	-1	6	-0.1562	0.8759
SELECTED MONTHLY	Less than 20 percent	61,860	599	61,410	198	0.4510	0.4458	-0.005	0.005	-0.9615	0.3363
OWNER COSTS	20.0 to 24.9 percent	21,655	384	20,887	155	0.1579	0.1516	-0.006	0.004	-1.5198	0.1286
AS A PERCENTAGE	25.0 to 29.9 percent	15,170	326	16,161	148	0.1106	0.1173	0.007	0.004	1.8853	0.0594
OF HH INCOME IN 1999	30.0 to 34.9 percent	10,905	278	11,105	110	0.0795	0.0806	0.001	0.003	0.3500	0.7263
	35.0 percent or more	26,805	424	27,466	187	0.1954	0.1994	0.004	0.005	0.8316	0.4056
	Not computed	765	75	720	67	0.0056	0.0052	0	0.001	-0.2818	0.7781
GROSS RENT	Specified renter-occupied units	117,125	804	119,364	890	.	.	2,239	1200	1.8667	0.0619
	Less than $200	4,965	186	4,770	254	0.0424	0.0400	-0.002	0.003	-0.9232	0.3559
	$200 to $299	3,510	157	3,372	212	0.0300	0.0282	-0.002	0.002	-0.7795	0.4357
	$300 to $499	18,000	347	17,090	487	0.1537	0.1432	-0.011	0.005	-2.1715	0.0299
	$500 to $749	53,290	556	55,220	752	0.4550	0.4626	0.008	0.007	1.1655	0.2438
	$750 to $999	21,715	378	22,766	529	0.1854	0.1907	0.005	0.005	1.0288	0.3036
	$1,000 to $1,499	11,090	276	11,060	420	0.0947	0.0927	-0.002	0.004	-0.4903	0.6239
	$1,500 or more	1,695	110	1,895	143	0.0145	0.0159	0.001	0.002	0.8654	0.3868
	No cash rent	2,860	142	3,193	215	0.0244	0.0267	0.002	0.002	1.0807	0.2798
	Median (dollars)	633	3	640	3	.	.	7	4	1.6499	0.0990
GROSS RENT AS A	Less than 15 percent	16,180	340	14,128	443	0.1381	0.1184	-0.02	0.005	-4.3468	0.0000
PERCENTAGE OF	15.0 to 19.9 percent	16,460	343	16,658	475	0.1405	0.1396	-0.001	0.005	-0.2052	0.8374
HH INCOME IN 1999	20.0 to 24.9 percent	16,665	345	16,816	471	0.1423	0.1409	-0.001	0.005	-0.2971	0.7664
	25.0 to 29.9 percent	14,510	323	14,680	491	0.1239	0.1230	-0.001	0.005	-0.1877	0.8511
	30.0 to 34.9 percent	9,685	266	10,385	361	0.0827	0.0870	0.004	0.004	1.1682	0.2427
	35.0 percent or more	38,530	503	42,133	744	0.3290	0.3530	0.024	0.007	3.5336	0.0004
	Not computed	5,095	195	4,565	265	0.0435	0.0382	-0.005	0.003	-1.9139	0.0556

*** = Significant difference at the P-Value is <= 0.1 level**
**** = Significant difference at the P-Value is <= .05 level**
***** = Significant difference at the P-Value is <=.01 level**
- = No significance
. = No P Value given