Case Studies and User Profiles

Contributed Pieces to Accompany the
Workshop on the Benefits (and Burdens) of the American Community Survey
June 14–15, 2012 • Washington, DC

June 13, 2012: This version corrects an attribution in one of the case studies and renumbers the chapters accordingly.
June 18, 2012: Corrected typoes (from formatting, not in original), in Table 23.1).

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Chapter **1**

About the Case Studies and User Profiles

To prepare for the workshop, the steering committee drafted a short "feeler" notice for distribution to various mailing lists and contact networks. This notice asked only for general indications of ACS usage and potential case studies. The basic text of the notice (less contact information) read:

> The Committee on National Statistics, with sponsorship from the Census Bureau, is convening a Workshop on the Benefits (and Burdens) of the American Community Survey. This workshop, scheduled for mid-June, is intended to showcase uses of the ACS, while at the same time taking stock of the burdens that it imposes on the public.
>
> As the steering committee for the workshop, we are trying to cast a wide net to identify potential participants in the workshop—whether as speakers in sessions or perhaps to contribute short "case studies" of innovative or important ACS data uses. At this stage, we would greatly appreciate it if you could send a brief response, indicating whether:
>
> - you are an ACS user, whether of 1-, 3-, or 5-year estimates, or particularly of the PUMS or summary files;
> - you are doing or have done work using ACS data that might be appropriate to showcase at the workshop; and
> - you know of peers who we might have missed in these mailings whom we should contact directly.
>
> To be clear, we are not at this point issuing invitations to the workshop. Rather, we are engaged in a broad scan of users (and potential users) of the ACS, to help us shape a useful and informative agenda.

These notices yielded about 70 responses—some quite detailed, and all very useful in identifying speaking slots on the workshop agenda.

From the outset, one hope for the workshop was to assemble a "poster session" of sorts: some means of presenting and incorporating ACS user experiences beyond those falling within the fixed time constraints of the workshop. Hence, we sent out a follow-up note to respondents to our "feeler" notice (plus other names compiled during the planning process, inviting submissions of case studies or user profiles.

The relevant text of that follow-up note—the basis for the contributed written pieces in this agenda book—reads:

Though the slots on the agenda itself are understandably limited, we would still like for the "record" of the workshop to include a full range of perspectives on the ACS data and its uses as we can muster. With your help, what we'd like to construct for the (public) agenda book for the workshop is akin to a poster session, compiling short written pieces from a broad segment of ACS users. This compiled book could then be an informal companion to the official report of the workshop (which will be a basic summary of the proceedings); it could be referenced by speakers (and questioners) at the workshop and will be valuable input to the Census Bureau as it continues its comprehensive review of the ACS program.

We'd like to invite you to contribute a short written piece—ideally 2-3 pages (and no more than 5) of single-spaced text (plus any graphics). Given both the tight timeline (June 1 deadline, as discussed below) and the "poster session" spirit of the idea, we're not looking for polished journal articles by any stretch. [Of course, a brief synopsis of work from existing articles would be welcome.] More informal bulleted lists of thoughts would be fine.

The workshop is intended to document the extent and the interests of the ACS user base (outside of federal agencies) at this critical juncture, now that the full range of ACS products are available. So, the kinds of short write-ups we're looking for follow a few different types:

- CASE STUDY: As indicated in our earlier query, we're particularly interested in innovative or important uses of ACS data—particular experiences you may have had in working with ACS data, and lessons learned along the way; these could include novel or insightful approaches to building models with the data or just exploring/mapping the data.
- USER PROFILES: Even if you don't have (or don't think you have) a particularly neat "story," simply hearing about how the data are being used on a day-to-day basis would be extremely useful: which ACS data products you use most often (and which you don't), which ACS variables (both population and housing) you rely on the most, whether and how you use ACS in combination with other data streams, and just particularly intriguing insights you've derived from the data. At the same time, this workshop is also an opportunity to take stock of some of the burdens of the survey, not only the time burden for respondents but also the burdens on users to deal more directly with uncertainty in estimates (and to communicate the same to clients or broader audiences), so any comments on that communication challenge would be useful as well.

In addition to the contributed write-ups, we directly contacted some of the people who provided longer responses to the initial "feeler" notice of interest, asking permission to include those original paragraphs. We also reprint testimony by the three ACS users invited to testify before a U.S. House subcommittee in March 2012 on a bill to make ACS response voluntary rather than mandatory; though the hearing topic is more focused than our workshop's more general approach, the prepared testimonies do speak to important uses of the ACS data.

The contributed pieces in this agenda book are presented without substantive editing, and have only been reformatted to provide a more uniform presentation.

Chapter **2**

Two Examples: Head Start Community Assessment and "Comparable Cities" Analysis

Patricia C. Becker
APB Associates, Inc.

Head Start Community Assessment

Head Start grantees are required, by federal regulation, to conduct a full community assessment every three years, with annual updates in-between. The grantee serving most of Detroit's eligible children is the Detroit Department of Human Services. DHS contracted with us to conduct the assessment. DHS' Head Start services are actually performed by a group of delegate agencies, each serving a designated section of the city. (Detroit Public Schools is also a delegate, but provides services in buildings citywide.)

In order to look at data for each delegate area, we have obtained custom tabulations from the Census Bureau. Initially we obtained the one-year data, as each of the delegate areas (based on the 2000 census) was over 65,000 population. However, it became clear to me that the variability of the estimates, comparing two one-year tabulations, was too high. So, for the second annual update, we switched to using the three-year (2008–10) data set. These data are used on the assessment in several ways.

First, we must estimate the number of eligible children in each delegate area. Eligibility is defined as children age 3 and 4 living in home with incomes below the poverty level. The number of children by age is derived from birth records, but the ACS is the only source for estimating the poverty rate. We use Table B17001, which provides the data for calculating the poverty rate of children under age 5.

Second, we provide a demographic and socio-economic profile for each delegate area, showing the specific area side-by-side with the data for Detroit as a whole. In our experience, this is the best way to help people to understand the meaning of data for a sub-area. The city-wide data come from tables downloaded from American FactFinder, while the custom tabulation is used for the delegate area data.

Finally, to assist the delegates in their recruitment efforts, we provide a map with a gross estimate of the number of eligible children by tract. This calculation is made by multiplying the number of births in the tract (for the appropriate two-year period) by the poverty rate for children under 5 as shown in the ACS.

Comparable Cities Analysis

Michigan has a law, called Act 312, which prohibits uniformed employees from striking and requires that they go to binding arbitration instead. The law specifically states that the arbitration panel "shall take comparable cities into account" in making its decision.

I was originally asked to define, and testify on, comparable cities back in 1983, when I was a City of Detroit employee. I used census data, of course, looking first at population size and population loss from 1950 to 1980, then at household loss, and finally at specific socio-economic characteristics: median household income, poverty rate, unemployment rate, and percent blue-collar workers. I prepare a table

showing this data set for Detroit and the cities I consider most comparable (for the record: Cleveland, Pittsburgh, St. Louis, Baltimore, Chicago, and Philadelphia). I prepare other tables, using the same format, for the cities the unions propose as comparable, both national and within Michigan, and for a small set of Michigan cities in the event that the arbitrator wishes to limit the analysis to Michigan.

I have done this work perhaps two dozen times, over the years, as the contracts and proceedings rolled around for each of the uniformed employee unions. In the 1980s, 1990s, and early 2000s, I used decennial data. With the advent of the ACS, beginning on its national scale in 2000 (for cities of 250,000 or more), I substituted ACS data for census data in order to use the most current information available.

In addition to the comparable cities tables, for each proceeding I have updated a data set which describes Detroit's socio-economic and demographic conditions, showing the decline over time and Detroit's shrinking share of the region's assets and resources. A wide variety of census data are used here, including the Economic Census, but ACS data are critical when they replace former long-form data in the trend tables.

I have been told by the attorneys, and read in the arbitrators' written award decisions, that this information has been critical to the process.

Chapter **3**

Social Equity and Transit-Oriented Development

Chris Benner
Geography Graduate Group and Department of Human and Community Development
University of California, Davis

With his permission, we reprint the executive summary from a 2011 project report authored by Chris Benner and Bidita Tithi: Social Equity and Transit-Oriented Development: Selecting Transit Priority Areas in the Sacramento Sustainable Communities Regional Planning Process*. The "vulnerability index" analysis relied on the ACS for basic neighborhood (tract-level) demographics (age, education, immigrant/nonimmigrant), and the construction of the "opportunity index" used ACS measures of middle-class income prevalence, home ownership, and commuting (by means other than driving alone).*

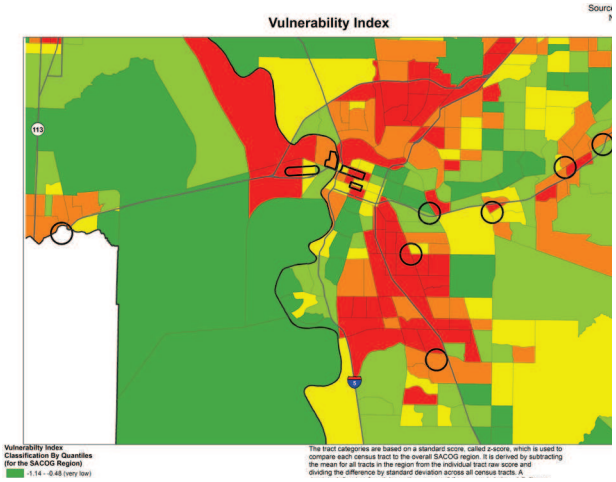
The full report, and technical appendices, may be found at http://regionalchange.ucdavis.edu/publications.

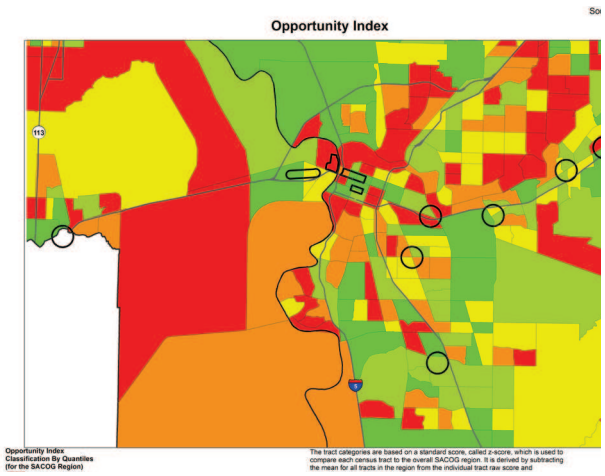
In the fall of 2010, the Sacramento Area Council of Governments (SACOG) and its partners received a grant from the U.S. Department of Housing and Urban Development for regional planning to accelerate transit-oriented development (TOD) in the Sacramento region. The first phase of the project, which ran from February through June 2011, involved assessing and selecting a limited number of Transit Priority Areas (TPAs) that would become the priority focus for SACOGâĂŹs efforts to promote transit-oriented development in subsequent phases of the project.

The focus of the work involved developing two neighborhood indices—a vulnerability index and an opportunity index—that could be used to compare the social equity characteristics of specific neighborhoods to the region as a whole. A central goal of both indices was to design them in ways that could on the one hand incorporate the complex and multi-faceted nature of social vulnerability and opportunity in the region, but on the other hand provide decision makers with an intuitive and quick way of identifying neighborhoods with high levels of social vulnerabilities, and neighborhoods that showed characteristics of high social and economic opportunity. It was also important that the indices be developed in a broad participatory process, both to incorporate the wealth of knowledge of social equity advocates in the region, and to ensure that the final product had broad public support.

The resulting vulnerability index and opportunity index (see figures below), and the specific indicators that comprised these indices, became important tools in the TPA selection process, and are now forming the basis for on-going efforts to incorporate social equity into neighborhood strategic planning, in updates to the Metropolitan Transportation Plan and in developing a framework for tracking performance in attaining social equity goals in the long term. This is an ongoing process, shaped by a variety of lessons learned to date and recognition of the limitations of indicator initiatives alone in shaping equity

outcomes. This report provides background on the initiative, details of the processes involved, discussion of the specific construction of the vulnerability and opportunity indices and what they revealed about neighborhoods near prospective TPAs, and reflections on the lessons learned and limitations encountered. Further details of the project and process are available online at http://www.sacog.org/sustainable/.





Chapter **4**

Testimony on Mandatory-or-Voluntary Debate

Andrew G. Biggs
Resident Scholar
American Enterprise Institute for Public Policy Research

With his permission, we are reprinting Andrew Biggs' testimony before the House Subcommittee on Health Care, District of Columbia, Census, and National Archives from March 6, 2012. The hearing was titled "The Pros and Cons of Making the Census Bureau's American Community Survey," and Biggs was one of three ACS users asked to provide comments at the hearing. As he put the caveat on the cover sheet for the testimony: "The views expressed in this testimony are those of the author alone and do not necessarily represent those of the American Enterprise Institute."

Thank you for the opportunity to testify with regard to the American Community Survey (ACS), and in particular the legal requirement that Americans participate in the ACS.

This issue involves important questions of both individual privacy and lawmakers' need for accurate data upon which to make important policy decisions. In the United States, we have sought to achieve an appropriate balance between these two needs. It is my opinion that mandatory participation in the ACS, coupled with legal protections for privacy of ACS respondents, maintains that balance in a reasonable way.

The American Community Survey replaced the Census long form, which previously had gathered detailed information on a subset of the U.S. population. Roughly one-in-six Census respondents were required to fill out the long form in addition to the standard Census questionnaire.

Researchers have pointed out technical pros and cons of the ACS versus the Census long form. The annual sample size of the ACS is smaller than for the Census long form, but the ACS is produced every year whereas the long form was generated only every 10 years. For that reason, the ACS allows for better real-time analysis and better tracking of trends from year to year. These abilities clearly would be of interest to policymakers in Congress and the administration.

But the ACS and the Census long form are similar in that participation in both is mandated by law. Like for the long form, mandatory participation in the ACS is controversial and raises legitimate privacy concerns of which policymakers should remain cognizant.

However, for several reasons I believe that mandatory participation in the ACS remains a reasonable policy.

First, the greater detail of information captured by the ACS has allowed the standard Census questionnaire to become less detailed. Thus, for the typical American, the Census process may have become less intrusive over time.

Second, the same law that mandates individual participation in the ACS also makes it illegal for the Census Bureau to release data in such a way that an individual's privacy might be violated. Any Census employee who violates the privacy of Census data faces significant jail time and large monetary fines. I am not aware of any instance in which ACS respondents—or, for that matter, respondents to any Census survey—have had their privacy violated.

Third, and most importantly, without good data policymakers are essentially flying blind, lacking solid knowledge of the Americans they are seeking to assist. We already suffer too much from what might be referred to as "policymaking by anecdote," where lawmakers seek to pass legislation before sufficiently examining the severity—or sometimes even the existence—of a perceived problem. Reducing the quantity and quality of data available to policymakers, analysts and researchers threatens to exacerbate this problem.

Moreover, it is likely that with voluntary participation data will fall short most for the individuals and households on whom government policy is most focused, including the poor, the less educated, and those with poorer language skills.

In my own research, I have found that the ACS filled gaps in existing data sets and allowed for analysis that would have been difficult or impossible to conduct in its absence. For instance, I am currently using the ACS in ongoing research on public sector compensation, some of which has been presented in hearings before the full Oversight Committee. For much of that research, we used the Census Bureau's Current Population Survey. However, the ACS contains more detailed information that has allowed us to better control for the different skills of public and private sector employees. Setting public-sector compensation at appropriate levels impacts the quality of the government workforce at the federal, state and local levels and can have fiscal repercussions potentially worth hundreds of billions of dollars per year. Without good data, though, this kind of analysis is extremely difficult to undertake.

Those who wish to make participation in the ACS voluntary raise important points, and we should not allow our concern for individual privacy to fade even if we judge that mandatory participation is the best policy course. In the United States, the government exists to serve the people, not vice versa. Nevertheless, I believe that government can best serve the American people by continuing to gather high quality survey data.

Chapter **5**

Gauging Hispanics' Effective Voting Strength in Proposed Redistricting Plans: Lessons Learned Using ACS Data

Thomas Bryan
Bryan Geodemographics

Peter A. Morrison
RAND (retired)

With the release of Census 2010 data, more than 10,000 jurisdictions across the Nation must redraw district boundaries to meet the one-person/one-vote criteria. The district-drawing process is subject to exacting legal standards and other criteria.[1] The legal standards are tied to the Federal Voting Rights Act (FVRA); failure to meet them may invite a legal challenge. The State of California has its own more stringent VRA—a further layer of legal entanglement. To comply with these standards, analysts need to measure populations at small-area scales using decennial census data supplemented by American Community Survey data (or other surrogate measures) to gauge the effective voting strength of legally protected minority groups.

However much one may strive to act as an honest broker of census data, the inherently political nature of the redistricting process means that redistricting is undertaken within a force-field of conflicting interests and partisan agendas. Political operatives seek to preserve or to destroy an incumbent's political base. Communities of interest voice demand that they be left intact. As a result, one may be called upon to evaluate Hispanics' effective voting strength in several key districts within a proposed redistricting plan or several competing plans.

As particular minority populations have grown in size and coalesced spatially, competition for political influence has intensified. The legal requirements and thresholds of minority concentration established by the FVRA focus attention on certain key metrics. One such metric is the number of districts in a proposed plan where a minority group constitutes a majority of the Citizen Voting Age Population (CVAP).

The straightforward metrics on CVAP available as special reports and data tabulations from previous Censuses no longer exist. Instead one must use American Community Survey (ACS) 5-year aggregated data to estimate both the metric and one's confidence in inferring that a group is a majority of eligible voters.[2]

Alternative redistricting plans may create fewer or more districts in which a particular minority predominates among the citizen voting-age population. Where such majorities are slender—e.g., 50.1%

[1]See P.A. Morrison, "Empowered or Disadvantaged? Applications of Demographic Analysis to Political Redistricting," in H.L. Kintner et al., eds., *Demographics: A Casebook for Business and Government*, Westview Press, 1994.

[2]Two significant shortcomings of using the ACS rather than Census long-form data for VRA cases are that (a) it represents a 5-year span, not a point in time; and (b) its sample frame is much smaller than the 1-in-7 rate for Census 2000, yielding significantly higher uncertainty.

Hispanic—the actual existence of a majority may be questionable statistically and hence subject to potential legal challenge. The questions that can arise, simply put, are:

- "How confident are we that group *X* is a majority in a proposed district, given that its share of CVAP is (say) 50.1% of CVAP?"
- "How confident are we that group *X* is a majority in *all n* districts in a plan, given that its share of CVAP in each of the *n* districts is only a slender majority of CVAP?"

This case study illustrates how these questions may arise and presents methods for answering them using ACS data. Our focus is on a proposed plan in which Hispanics apparently constitute a majority in 6 of the proposed districts. The issue is how much confidence to have in the claim that Hispanics are a majority in all 6 of those districts.

To address this question, we use ACS data to gauge each group's current share of the CVAP in each proposed district. We have devised a methodology for measuring and interpreting the associated margins of error with reference to three potentially applicable standards of certainty: preponderance of the evidence (more likely true than not), clear and convincing evidence (substantially more likely than not), and a high degree of scientific certainty.

We illustrate how the ACS data can be analyzed to show that by the first (weakest) standard, Hispanics are "likelier than not" to be a majority in each individual one of the 6 apparently majority districts, because their estimated number exceeds the 50% threshold number in each one.

When more stringent standards of certainty apply, the narrow effective margins of error for most of these individual districts cast doubt on the conclusion that all six districts are majority Hispanic. We show how to calculate the probability (here, nearly 0.3) that one of the 6 purportedly majority-Hispanic districts is a "false positive." A single "false positive" would invite the false conclusion that Hispanics are a majority in all 6 districts when in fact they are not.[3]

The technical details of this case study are detailed in a lengthy paper available upon request from Thomas Bryan at farvinjohnson@yahoo.com.

[3]The issue here is analogous to what a physician faces when interpreting a medical test for disease *X*. If a positive test is known to indicate the presence of the disease in 9 out of 10 "positive" patients, that is a strong basis for a positive diagnosis; the threat of a "false positive" arises with only 1 patient in 10. On the other hand, a test that gets it right only 40% of the time might draw attention to the possibility of this diagnosis but fall short of offering clear and convincing evidence that the disease is present.

Chapter **6**

Tracing the Economic Role of Immigrants in the California Economy through the American Community Survey

Ronald Campbell
The Orange County Register

In September 2010, *The Orange County Register* published a series of stories that turned conventional wisdom about immigrant labor on its head. Drawing on four decades of census data, the series showed that immigrants were responsible for most of the growth of California's labor force since 1990, that hundreds of thousands of immigrants worked in high-wage jobs as doctors, scientists or engineers, and that they had little or no apparent effect on the income of well-educated natives.[1]

It is impossible to be a reporter in California and not confront the issue of immigration. I had been puzzling for years over how to bring my own peculiar skills to bear on this issue when a crazy idea lodged in my head, an idea consisting of four capital letters: PUMS. I should explain that I have long been involved in computer-assisted reporting, my craft's attempt to use technology to tell stories, and in that field the Public Use Microdata Sample has a well-deserved reputation as a black hole that eats reporters' souls. But what the hell: Nobody ever said immigration would be an easy story.

This story had to work both as a history lesson and news. I used microdata from the 1970, 1980, 1990 and 2000 decennial censuses as well as from the 2005 through 2008 American Community Surveys. This combination of sources created several big headaches:

- Changes in definition, particularly of jobs and industries
- Changes in geographic areas
- Reductions in sample sizes from decennial census to ACS

Looming above all was a challenge unique to journalists—the public mistrust of statistics. Consider that for two decades the tobacco industry rejected overwhelming medical evidence that its products were addictive poisons, and that millions of Americans believed the industry. Consider that today 44 percent of Americans reject the scientific consensus that the climate is changing.[2]

I was challenging the received wisdom that immigrant workers were all or mostly illegal: poorly educated, poorly paid parasites on society.

For this reason I determined at the start to print results only if they met a high threshold of proof: a 95 percent confidence interval with a margin of error of plus or minus 5 percent. I also lobbied my editors to post my spreadsheets online so that readers could see all the numbers behind the series—even

[1]See Series at a Glance (http://www.ocregister.com/articles/choices- 265585-immigrants-driven.html) for links to all stories and sidebars. The stories originally were footnoted; because of a change in web design, the footnotes now appear in the text of the stories. Supporting spreadsheets are hyperlinked from the footnotes.

[2]See "In U.S., Global Warming Views Steady Despite Warm Winter," Gallup Politics, March 30, 2012. http://www.gallup.com/poll/153608/Global-Warming-Views-Steady-Despite-Warm-Winter.aspx

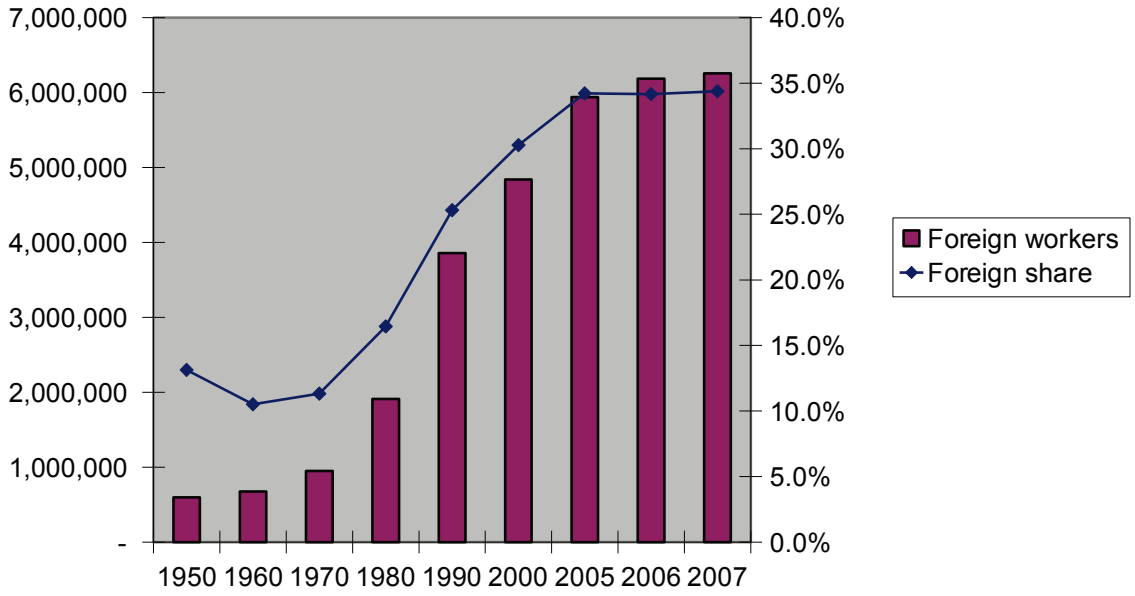


Figure 6.1 Foreign-born California workforce, 1950–2007

numbers that failed to meet my threshold. (I highlighted numbers that "flunked" my test by formatting them in bold red.)

I quickly learned that because of its much smaller sample size, the ACS is difficult to compare with a once-a-decade census. But my subject matter gave me no choice. The immigrant workforce had grown so quickly—sixfold in the space of 40 years (Figure 6.1)—that I had to use both the ACS and the decennial census.

My brutal introduction to the problems with ACS data came when I tried to pin down where foreign-born workers lived. Using 2006–2008 ACS microdata from IPUMS-USA, I attempted to calculate the number of immigrant workers in each of California's 233 Public Use Microdata Areas (PUMAs). Not one was statistically valid; the margins of error for two exceeded 40 percent! Fortunately, it is a lot easier to get a valid percentage of foreign workers than a valid number of foreign workers: Just 17 PUMAs had unreliable margins of error by that measure.[3]

The problem was magnified when I turned to job data. The Census Bureau has tracked hundreds of jobs over the decades. In 1990, when immigrants comprised 25.6 percent of the California workforce, I was able to calculate a statistically reliable foreign-born percentage for 151 of 385 job categories. Because of the much smaller sample size used in the ACS, while immigrants comprised 34.3% of the workforce in 2008, I was able to calculate reliable immigrant percentages for just 44 job categories. [4]

These complaints do not mean the ACS data was worthless—far from it. They mean that a journalist must be wary of credibility traps. I complained a moment ago that it was difficult to find more than a

[3]See "Foreign-born workforce by PUMA, 2006–2008" at: https://docs.google.com/spreadsheet/ccc?key=0Av-xv- 38h-UsdGNyZnVwVTVXd2xOdl9GejRXZXhhNXc&hl=en#gid=0. Column L, #MOE% is highlighted in bold red, indicating that all values fail the threshold test (95% confidence interval, ±5% margin of error).

[4]See "Occupations and wages, 1970–2008" at: https://docs.google.com/spreadsheet/ccc?key=0AqN9kHKZYMOdHRCZTJ2dmpHclNQWElnd1JEbDlzUUE& hl=en#gid=4. See especially the "1990" and "2008" tabs.

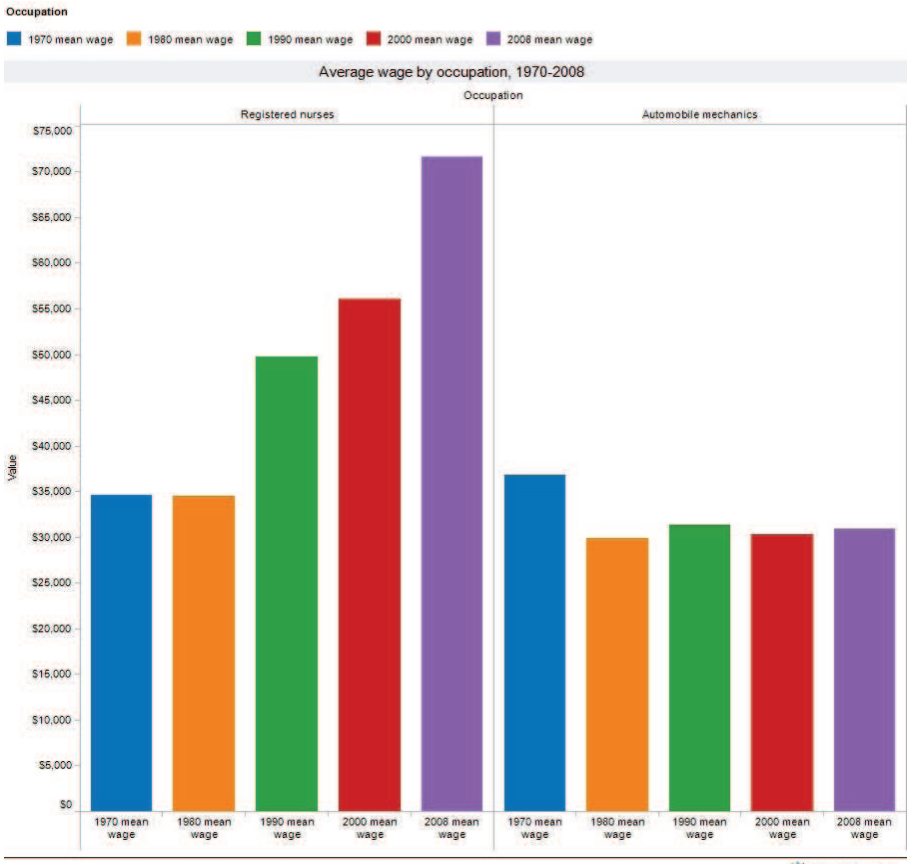


Figure 6.2 Mean inflation-adjusted wages, registered nurses and auto mechanics, 1970–2008

few dozen job categories where the percentage of foreign-born workers was reliable. But there's an easy work-around: combining data from three consecutive ACS's. By combining the 2006-2008 surveys, I got reliable data for 108 occupations. Squeezing the sample a little more—to job categories with 50,000 or more incumbents, I narrowed my list to 90 categories that together represented 80 percent of California's workforce.

I found ACS data was far more robust on two other metrics: wages and education. Using those measures against the data on immigrant labor I found one of my principal themes: that well-educated natives had competed successfully with immigrants. One of the more startling data points is encapsulated in the chart in Figure 6.2. It shows the mean, inflation-adjusted wages for registered nurses (left) and auto mechanics from 1970 through 2008.

In 1970, auto mechanics earned slightly more on average than registered nurses. By 2008, registered nurses earned more than twice as much. The background, explained in the story, is that while immigrants flocked into both occupations (45 percent of mechanics, 37 percent of registered nurses in 2008), RN's have transformed themselves educationally in the past 40 years, moving from two years of college (or less) in 1970 to a bachelor's degree at minimum in 2008, while auto mechanics have stood still.[5]

I found ACS quite accurate when dealing with broad trends. For example, I analyzed the statewide

[5]See "Who wins, loses from mass immigration to California?", *The Orange County Register*, Sept. 20, 2010. http://www.ocregister.com/articles/-267327--.html

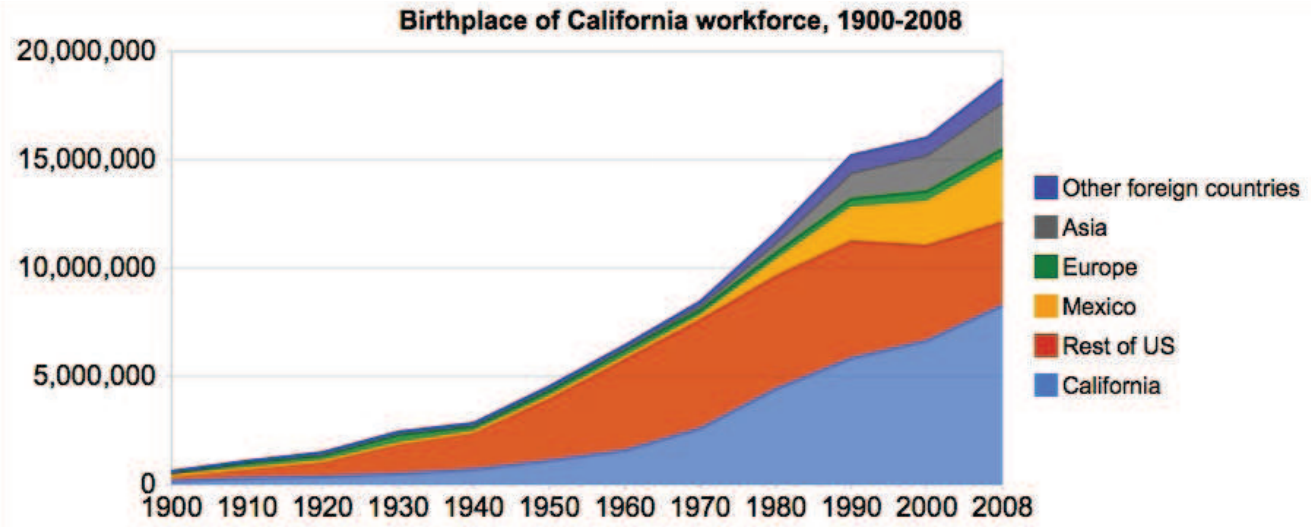


Figure 6.3 Birthplace of California workforce, 1900–2008

workforce by place of birth in each decennial year and in 2008. I also broke down the workforce by nativity and by 10-year age brackets. While certain components (for example, workers from El Salvador or Arizona or 32-year-old natives) were not statistically reliable, they easily were combined into reliable groups (Latin America, U.S. States, natives in their 30s). The chart in Figure 6.3 illustrates the growing importance of immigration—and declining role of migration from other states—in California's workforce over the past century.

Although journalists are not the primary audience for this paper, I'm going to conclude with a few recommendations for reporters contemplating a deep dive into the ACS:

- Read and become comfortable with the Census Bureau's formulas for calculating margin of error. If you are working with microdata, see if you can use the microdata to replicate published data within its published margins of error. If you can't, don't hesitate to call the Census Bureau and plead for help.
- Set your own threshold for confidence intervals and margin of error. Again, I used a 95 percent confidence interval with a 5 percent margin of error, a conservative threshold that I thought was appropriate for a hot-button issue. Your thresholds may vary. Whatever you choose, you'll have to defend it to an angry reader someday.
- Write down your methodology before you write your story. Rewrite it as you research. Publish it with your story. Readers have the right to know how you got your numbers.[6]

[6]It seems only fair to let readers see the "nerd box" (methodology) for my immigration story. See "How we did it: The numbers behind the analysis," *The Orange County Register*, Sept. 8, 2010. http://www.ocregister.com/articles/data-265631-census-percent.html

Chapter **7**

User Profile: Metropolitan Water District of Southern California

Rosa Castro
Resource Analysis Unit
Metropolitan Water District of Southern California

The Metropolitan Water District of Southern California (Metropolitan) is a cooperative of 26 cities and water agencies serving nearly 19 million people in six counties. The district imports water from the Colorado River and Northern California to supplement local supplies, and helps its members to develop increased water conservation, recycling, storage and other resource-management programs.

Metropolitan currently relies on the ACS to get estimates on household size, median household income, personal income, number and type of dwellings, group quarters population, and other data as needed. The Southern California Association of Governments (SCAG) and the San Diego Association of Governments (SANDAG) analyze the ACS data and provide Metropolitan with prorated distribution from each county for all 26 member agencies. We then use the historical ACS data along with SCAG and SANDAG's forecasts to estimate future demand through the year 2050. Prior to 2001 we obtained such data from the decennial census, but the decennial census has been reduced to a short form and no longer collects all the data we need.

Water agencies throughout the state also rely on median household income information from the ACS data to identify disadvantaged communities that qualify for special funding from California Department of Water Resources (DWR) and U.S. Bureau of Reclamation grants. Overall, the proposed legislative moves to make ACS response voluntary (rather than mandatory) or to restrict ACS funding altogether would jeopardize a great program that provides data frequently used by Metropolitan and other water agencies. If we no longer had the ACS, we would probably need to hire our own consultants to gather our own demographics.

Chapter **8**

User Profile: Asian & Pacific Islander American Health Forum

Won Kim Cook
Research & Data Manager
Asian & Pacific Islander American Health Forum

The Asian & Pacific Islander American Health Forum (APIAHF) is a national organization with a mission to influence policy, mobilizes communities, and strengthens programs and organizations to improve the health of Asian Americans (AAs), Native Hawaiians, and Pacific Islanders (NHPIs). Through its national programs in community capacity building, HIV, chronic disease, and domestic violence, and policy advocacy, APIAHF works with national networks of AA and NHPI community-based organizations (CBOs) and national organizations representing other racial minorities.

Improving data on AAs and NHPIs has been a high priority for APIAHF during the last several years. APIAHF held a series of national meetings called *Health Brain Trusts* (HBTs) from 2007 to 2009 where over 200 researchers, government officials, and community leaders and advocates were gathered to evaluate the needs for data and research on AA&NHPI health and to formulate strategies to address them. Among the needs thus identified include data disaggregated by ethnicity, given the vast cultural and economic diversity among AA and NHPI ethnic groups and national samples large enough to allow that. To help address these needs, APIAHF has engaged in various research and data advocacy efforts in collaboration with academic, government, and community partners nationwide.

In our view, ACS is critically important in understanding the socioeconomic conditions affecting our communities because of its large samples and the breadth of socioeconomic data it provides, unsurpassed by any other federal surveys. The former matters a great deal in that they carry sufficient statistical power that allows stable estimates for even small populations (including AAs and NHPIs), often unavailable from other national surveys. Supported by a language assistance program that covers several languages, ACS also reduces language-related barriers for AAs with limited English proficiency in responding to the survey and thus reduces a selection bias related to English-language proficiency. This is of tremendous significance as an English-only survey may lead to a vastly skewed sample of Asian Americans toward those with higher socioeconomic status and gross underestimation of the socioeconomic disparities affecting Asian Americans through the omission of those with limited English proficiency.

The most reliable and comprehensive sources of socioeconomic characteristics of our communities, ACS has been central in our efforts to improve understanding on the socioeconomic characteristics of our communities. APIAHF has released two extensive reports respectively entitled, *Demographic and Socioeconomic Profiles of Asian Americans, Native Hawaiians, and Pacific Islanders*, and *Native Hawaiian & Pacific Islander Health Disparities*, both drawing much data from ACS. These reports have been circulated nationwide and are used by many community-based organizations, policymakers, funding agencies, and advocates to inform their work around AAs and NHPIs. Using the 2009 Public Use Micro Sample data, we also produced estimates of currently-uninsured AAs and NHPIs of various demographic profiles who would be provided coverage under the 2010 Patient Protection and Affordable Care Act. APIAHF's

CEO and President resented the findings of this analysis at the 2011 Annual Conference of the American Public Health Association.

As a Census Information Center (CIC) and, indeed, one of the founding members of the CIC program, the Asian & Pacific Islander American Health Forum (APIAHF) seeks to support community initiatives by providing ACS data to inform their work. APIAHF frequently responds to data requests from individuals and organizations seeking information ranging from national, state, county, and even Census block levels in the efforts to guide their project initiatives using sound and reliable evidence.

Additionally, ACS has also been invaluable in our community research capacity building work. *Health Through Action* (HTA) program—APIAHF's flag-ship capacity-building program implemented in collaboration with eighteen community coalitions and organizations in fifteen states—has gone beyond conventional capacity-building activities by making training and technical assistance in data and research a high priority. Identifying the needs of local organizations that have sought resources to learn how to access socioeconomic data to better understand their communities, APIAHF hosted two webinars, "Accessing and Compiling American Community Survey Data" and "2005–2009 American Community Survey," to educate the community about the value and use of ACS. Due to these webinars and the technical assistance we provided, our community partners are now able to navigate the ACS data query system to find state and local data they need.

Chapter **9**

Use of the American Community Survey in the National Survey of Early Care and Education

A. Rupa Datta
Senior Fellow and Vice President, NORC at the University of Chicago

Kirk Wolter
Senior Fellow and Executive Vice President, NORC at the University of Chicago

Ting Yan
Senior Survey Methodologist, NORC at the University of Chicago

Robert Goerge
Chapin Hall Center for Children

The National Survey of Early Care and Education (NSECE), sponsored by the Administration of Children and Families, U.S. Department of Health and Human Services, will construct a profile of the availability of non-parental care for children under age 13 across the country, as well as understand the needs and preferences for non-parental care among families with those children. Another component of the study collects the first national data on the early care and education (ECE) workforce, across formal and informal sectors. The NSECE includes a major national data collection effort to inform extensive analyses of the supply of and demand for child care across the Nation. The NSECE involves four integrated mixed-mode nationally-representative surveys:

- A *Household Survey* conducted with a parent or guardian of a child or children under age 13.
- An *Informal Home-Based Provider Survey* conducted with individuals who regularly care in a home-based setting for children under age 13 who are not their own (and who do not appear on an administrative list of Early Care and Education (ECE) providers).
- A *Survey of Formal Providers* conducted with directors of ECE programs who can be identified from administrative lists such as state licensing lists or Head Start program records. These providers include regulated or registered home-based providers appearing on state-level lists.
- A *Workforce Survey* to be conducted with one instructional staff person from each center-based provider. Comparable labor-force participation data are also collected from home-based providers in the Informal and Formal Provider Surveys.

The NSECE is using ACS data in a variety of ways:

- construction of *"provider clusters"* for selection of the NSECE Provider samples and analyses of the NSECE data
- *selection* of the NSECE Household Sample
- *fielding* of the NSECE Household Sample

- *supply and demand analyses* using the NSECE Provider study data
- *analyses of ECE workforce dynamics*

Provider Clusters

ACS data have been critical to implementing an innovative feature of the NSECE sample design, the "provider cluster." One of the major challenges for the NSECE is to generate nationally representative estimates while capturing the very local nature of how families seek and use ECE, how providers seek and serve children, and how these things together affect the context in which ECE utilization occurs. The ECE literature indicates that most families select child care in close proximity to their homes (fewer than 30 minutes from home), although the typical travel time from home to care provider varies substantially between urban and rural areas. To approximate child care search areas appropriate to local conditions, the provider cluster of a given census tract is defined as the central census tract itself, plus any tract within the same state that intersects a 2-mile radius from the population centroid of the central tract. When households are sampled from the central tract, and formal providers are selected throughout the provider cluster, we have a flexibly defined geographic area which can approximate the areas throughout which most of the sampled households are likely to have searched for early care and education.

We illustrate this in Figure 9.1, which shows such a potential cluster in Galveston, Texas. The central yellow area represents the cluster's core of households, while the gray shaded areas depict the remainder of the cluster. Households in the yellow core are sampled for inclusion in the Household Survey. Formal providers, including center-based programs and regulated family day care, are sampled from throughout the gray and yellow portions of the cluster. Note that in densely populated areas where census tracts occupy few square miles, the provider cluster is relatively small. In more sparsely populated areas, where the census tract is very large, the provider cluster will be relatively large. These cluster sizes match the relative distances observed in other data between households and their care providers.

ACS data are necessary for construction of the provider clusters to define census tracts or tract groups of an adequate minimum size. Any given census tract may fall within the provider cluster of multiple nearby tracts; this means that construction of appropriate sampling weights requires adjustment for multiple probabilities of selection; this adjustment is done on the basis of ACS data.

The provider cluster model of linking demand and supply data would easily extend to other human service domains where services are consumed very close to home, for example, primary health care or availability of nutritious food.

Selection of the Household Sample

The NSECE has used the ACS 3 and 5 year files extensively to select the sample from which households with young children and informal home-based providers are identified and interviewed. This is a traditional address-based sampling effort in which PSU and SSU boundary definitions, measures of size, and probabilities of selection are all based on ACS data.

Fielding of the Household Sample

In addition to using the ACS to select the sample of households, the NSECE team has also used ACS data to inform a variety of data collection decisions. For example, secondary sampling units were identified for household listing procedures based on the estimated coverage ratios of postal service delivery sequence files against ACS counts. Also, the NSECE mail strategy involved sending bilingual

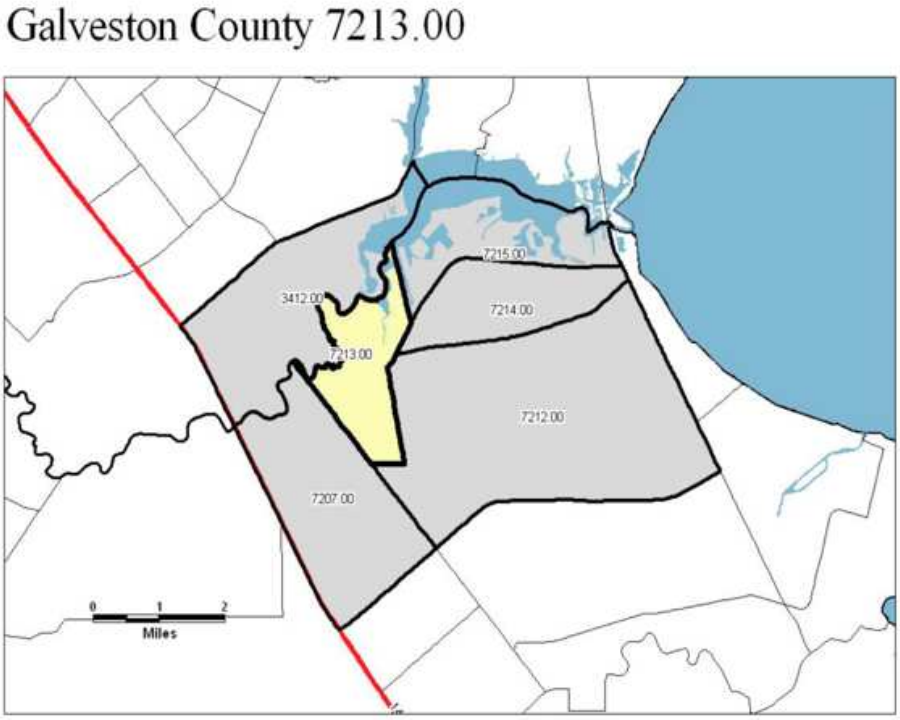


Figure 9.1 Example of an NSECE Provider Cluster

mailings to selected geographic areas. The ACS data were used to identify which geographic areas had high concentrations of Spanish-speaking families with young children so that Spanish-language materials could be most cost-effectively deployed.

Supply and Demand Analyses

For analyses of the supply and demand for early care and education, the NSECE will again make extensive use of ACS data. The provider survey data collected through the NSECE will be matched with local economic and demographic data from the ACS to understand the dynamics of child care availability. Relevant ACS variables will include percentage of households with children under age 13, fraction of local employment in retail or service or other sectors with non-traditional work schedules, and percentage of family households with all adults in the labor force. These data, matched with NSECE provider data on the availability of early care and education, will support understanding of the ways in which the supply of child care responds to and conditions demographic circumstances in local areas.

Analyses of ECE Workforce Dynamics

A central policy and business issue in ECE is the availability and retention of appropriately skilled workers to staff ECE programs. The NSECE represents the first attempt to characterize the spectrum of ECE workers providing direct care, whether in more or less formal settings. To understand employee turnover, professional development priorities, the impacts of licensing requirements, and the interactions

of public and private programs within small areas, the NSECE workforce data will be analyzed in conjunction with ACS data about the local labor markets. Relevant variables will include the mean and median wage of women with high school diplomas or some college, ACS data on employment levels and wages of individuals reporting ECE employment, and wages in related occupations such as for public school teachers or low-skill health-care professions. These analyses will be done within the provider clusters defined above.

Early care and education is a policy area in which very significant public and private investments are made, and which has long-term implications for the Nation's workforce and economic well-being. Because much policy is set at the local or state level, it is especially important to collect nationally comparable data that support rigorous analyses of the policy variations across local areas. Because of the heterogeneity of the child care sector, fluid conditions require timely data, so that the ACS schedule is more appropriate for analyses than decennial long-form data would have been. In addition, more aggregate data at the county or PUMS level would mask the local-level variations that actually generate differences and disparities in child care availability at local levels. The considerable sample sizes of the ACS are necessary to support these local-area analyses.

Chapter **10**

The Houston Housing Project and the American Community Survey

Ned English
NORC at the University of Chicago

Residential market conditions have been a major policy concern with significant economic consequences for the foreseeable future. NORC at the University of Chicago and the University of Houston Center for Public Policy are collaborating to develop a panel study for the Houston region. We are using data from the Houston Regional Real Estate Database to create a panel sample. This database includes indicators that, in conjunction with survey data, can provide information about where foreclosed-upon households end up and whether these households are having financial troubles (due to other debt issues) after foreclosure.

Because the same units will be surveyed over time, this panel survey will increase direct scientific knowledge on the individual consumption patterns that could have contributed to the current housing and more general economic situation and the role policy played in this behavior. Also, the survey data can be used to test important economic theories on consumption and to help create a literature in political science that ties in policy regimes to consumption behavior. Our plan has been to recruit households in danger of foreclosure in each of the below-described neighborhoods at wave 1, which occurred during the summer of 2011. We will be interviewing the same households whether they remained in place or moved during 2012.

A key aspect of our study design has been to ensure the inclusion of different categories of households in terms of socio-economic status, race/ethnicity, poverty, and housing types. We used the American Community Survey in concert with Census 2000 data to design our area sample with respect to the variables of interest described in table 1. Our plan was is to complete an equal number of interviews in each neighborhood, and so we fielded the same number of cases in each.

The ACS has been critical to the Houston Housing project for two key reasons. Firstly, the data have allowed us to focus our sample on neighborhoods of interest and describe them with key socio-demographic measures. So, we were able to ensure the sample resembled Houston as a whole as much as possible *a priori*. Secondly, we will be able to employ the ACS for weighting and post-stratification at the close of data-collection to ensure delivered results match key controls. As Houston has experienced high degrees of growth and immigration in comparison with the US as a whole, Census 2000 would have been too out-of-date for either purpose.

Overall, we can characterize the selected neighborhoods as follows:

- *1960 Area:* Location of original post-war Anglo flight, but with increasing African-American and Latino residents. The 1960 area has relatively high household incomes and owner-occupied housing.
- *East End:* Predominately Latino, with long-time residents of multiple generations. The East End has the highest poverty rate among examined neighborhoods.

Table 10.1 Descriptions of the Selected Houston Housing Project Neighborhoods from the 2005–2009 ACS

Neighborhood	Households[a]	Percent White Non-Hispanic[b]	Percent African-American Non-Hispanic	Percent Asian Non-Hispanic	Percent Hispanic	Median Household Income[c]	Percent Owner-Occupied[d]	Percent Pop. Below Poverty[e]
1960 Area	76,742	54.2	16.0	6.9	21.0	$76,531	66.3	8.7
East End	44,708	8.3	9.0	1.2	80.7	$31,401	50.3	26.5
Southwest Houston	71,200	21.5	30.5	7.4	39.8	$53,733	43.4	24.8
Third Ward	12,910	18.9	65.6	5.1	9.6	$38,865	35.8	26.6
West Houston	84,377	37.4	17.6	11.2	32.9	$77,138	44.0	15.3
	289,937	31.8	20.8	7.0	39.2	$57,508	50.3	18.4

[a] Household count from item B25002, Occupancy Status
[b] Calculated from B03002, Hispanic or Latino Origin by Race
[c] B19013, Median Household Income In The Past 12 Months
[d] Calculated from B25003, Tenure
[e] Calculated from C17002, Ratio Of Income To Poverty Level In The Past 12 Months

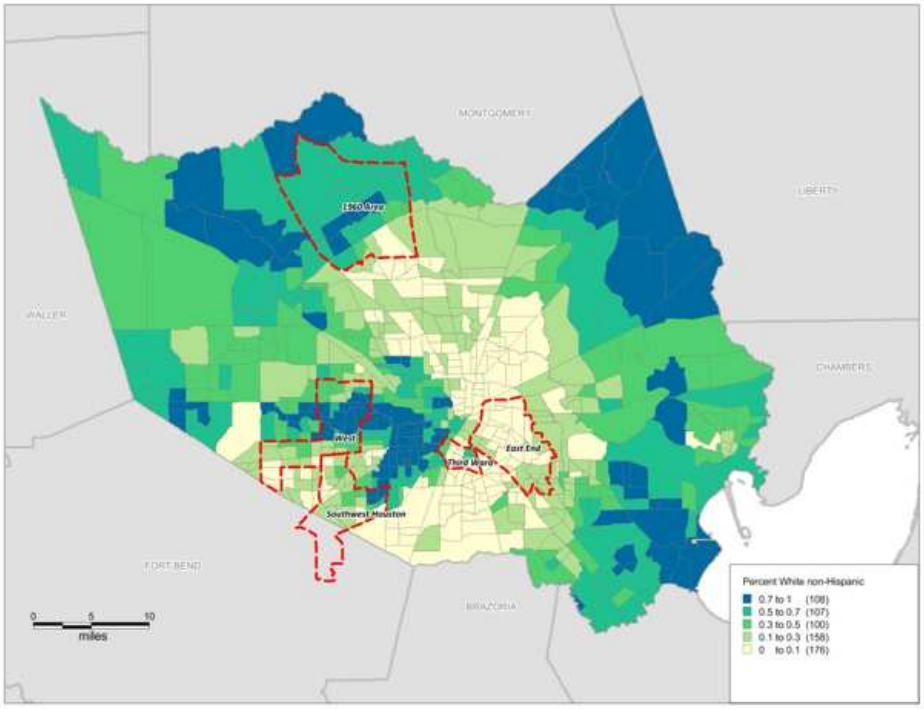


Figure 10.1 Percent White Non-Hispanic Population in the City of Houston

NOTE: Calculated from B03002, Hispanic or Latino Origin by Race.

- *Southwest Houston:* Southwest is often described as the "melting pot" of Houston with recently arrived Asian, South Asian, African, and Latino communities with pockets of more affluent whites
- *Third Ward:* The Third Ward is an African-American neighborhood that has seen some recent gentrification.
- *West Houston:* Middle and lower-middle income older White non-HIspanic, newly arrived Vietnamese, Koreans, and Latinos with distinct geographic separation (e.g., Asians in areas south of I-10 and Latinos in subdivisions north of I-10).

Characterizations of these neighborhoods from the 2005–2009 ACS are shown in Table 10.1 and in the maps in the figures.

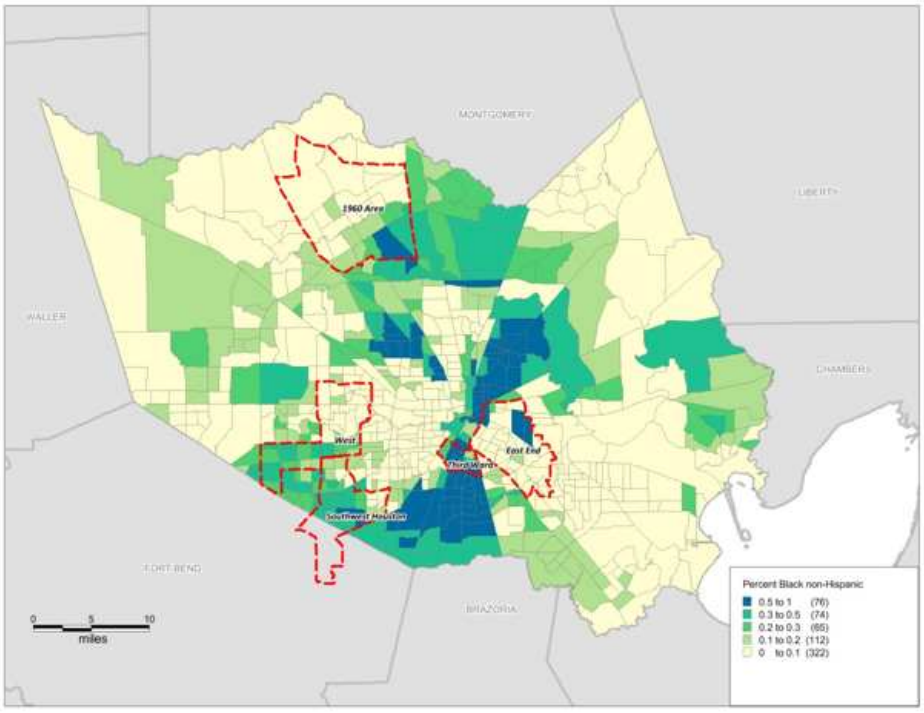


Figure 10.2 Percent African-American Non-Hispanic Population in the City of Houston

NOTE: Calculated from B03002, Hispanic or Latino Origin by Race.

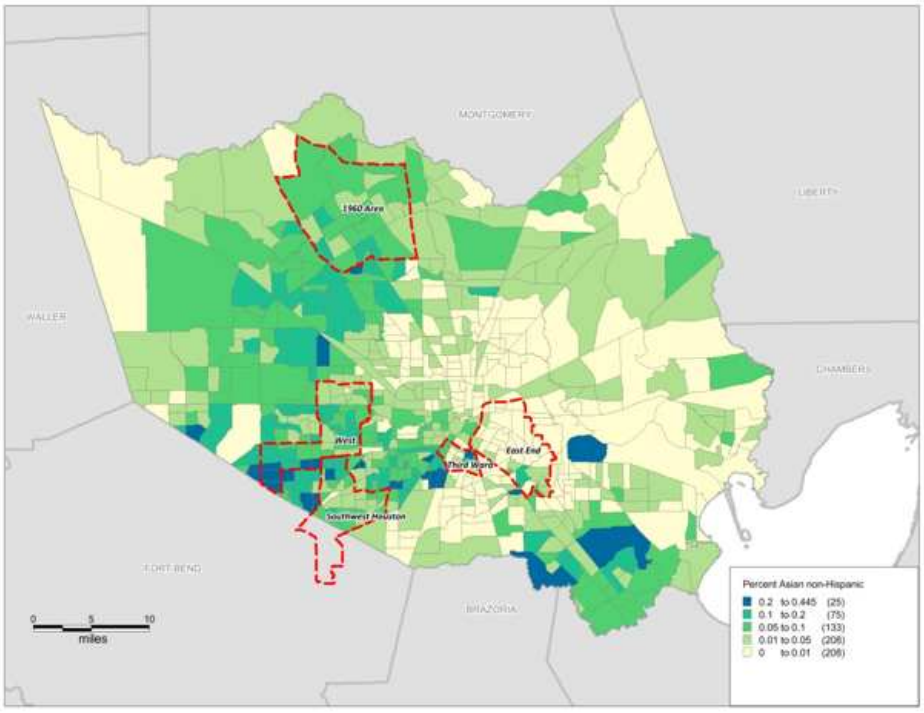


Figure 10.3 Percent Asian Non-Hispanic Population in the City of Houston

NOTE: Calculated from B03002, Hispanic or Latino Origin by Race.

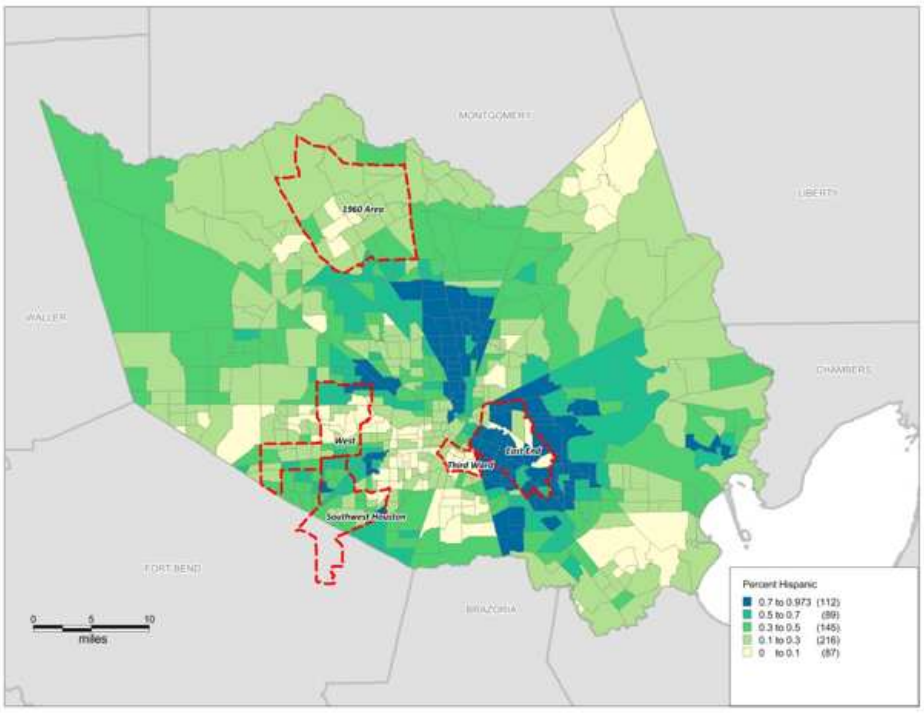


Figure 10.4 Percent Hispanic Population in the City of Houston

NOTE: Calculated from B03002, Hispanic or Latino Origin by Race.

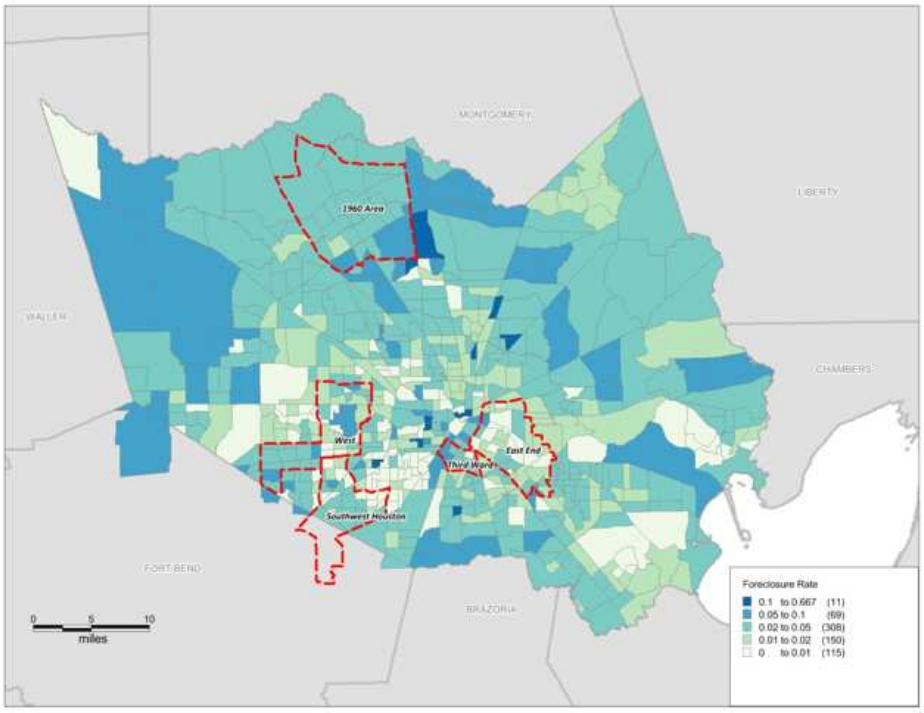


Figure 10.5 Foreclosure Rate in the City of Houston

NOTE: Rates provided by county assessor's office.

Chapter **11**

Case Study on User Burden

Nancy Gemignani
California State Census Data Center, Demographic Research Unit
California Department of Finance

Grant programs use data from the American Community Survey as criteria for awarding funding to successful applicants. The level of geography may be as small as an aggregation of census tracts. A commonly used criterion is the unemployment rate.

Unfortunately, the over-abundance of detail provided in the ACS Summary File tables makes calculating an unemployment rate a significant task by the user. The only source for basic labor force is Table B23001, "Sex by Age by Employment Status for the Population 16 Years and Over", but this requires adding up 24 cells (12 age groups × 2 gender) each for every element (In Civilian Labor Force and Unemployment) to get the unemployment rate. If the user is aggregating areas, that inflates the task.

The user should not only compute the estimate but also needs to recalculate Margin of Error (MOE) for each data element. The Census Bureau has recommended that users should not aggregate more than four ACS estimates but the very nature of the table requires more than that. So the user can calculate a basic measurement, like the unemployment rate, but the calculated MOE will not accurately reflect the reliability of that estimate.

For the subject universe, the user community needs basic data, which are currently not readily available in the ACS Summary Files. Most of the time, the difficulty is that a detail table is broken down first by gender rather than by the data topic of the table. The problem could be partially alleviated by using the Data Profiles on American FactFinder, where the unemployment rate has been calculated for each geographic area. But this "roll-up" to less detailed information is not available for the smallest level of geography—block groups—on American FactFinder. In fact, it is impossible to calculate labor force data including the unemployment rate for block groups at all. Table B23001 is not available for block groups.

The ACS Summary File needs a set of simple tables of basic measurements with their margin of error for the total universe. This would include labor force, percent in poverty, education level, etc.

For questions, contact: Julie Hoang, California State Census Data Center: (916) 327-0103, ext 2531.

Chapter **12**

Using Small-Area ACS Data to Generate Community Profiles

Mark Goldstein
Maryland Department of Planning

Columbia, Maryland is an unincorporated place of approximately 85,000 people located in Howard County. Although unincorporated, Columbia is governed by an elected body, the Columbia Association (CA), which raises revenues through assessment fees on homeowners and businesses (much like a condominium association). The CA uses these funds for capital and operating expenses, including maintaining a system of foot paths, open space and an extensive list of recreation facilities, including indoor and outdoor pools.

Members of the Columbia Association are elected from each of 10 villages that comprise Columbia. These villages also have their own elected village boards which oversee various guidelines and regulations for each village. Villages vary in population from approximately 3,200 to nearly 16,400.

The Maryland Department of Planning (MDP) was asked by the Howard County Department of Planning and Zoning and the Columbia Association to come up with demographic and socioeconomic profiles for each of Columbia's 10 villages. The demographic profiles were generated by aggregating block data from the 2010 Census. The block assignments for each of the villages was provided to MDP by Howard County P&Z (the Columbia villages are also not incorporated and do not easily match census geography).

The socioeconomic profiles were generated by aggregating block groups (with assignments also provided by Howard County P&Z) and using data from the 2006–2010 American Community Survey. Even more so than with blocks, the block group boundaries do not neatly fit into village boundaries. The number of block groups assigned to each village varied from two (for Town Center) to 10 (Hickory Ridge).

In addition to aggregating the block group data to produce the estimates, new margins of error were calculated for the aggregated estimates. Using the margins of error, an attempt was made to "caution" users about the preciseness of the data by highlighting in red those estimates where the margin of error was greater than or exceeded 49.35 percent of the estimate. A footnote for the socioeconomic tables stated that these highlighted estimates, "have a relatively large margin of error indicating the estimate maybe unreliable."

Data Reliability

Four pages were generated for each Columbia Village- two pages of estimates and two pages of percent of those estimates (where appropriate). (See Tables 12.1 and 12.2.) Using the criteria cited above to determine whether or not an estimate was "reliable," approximately one-half of the estimates were deemed "unreliable." This proportion of estimates deemed unreliable did not greatly differ between villages based on their overall size. For example, 34 of 69 estimates were shaded as unreliable for

Columbia's largest village (Long Reach at 6,939 households), while 36 of 69 estimates were shaded as unreliable for Columbia's smallest village (Town Center at 1,649 households). The share of the percents data which moves into the "unreliable" category is generally higher (around 60%) than for the level estimates data.

For the estimates of levels, the likelihood of being deemed statistically unreliable was more a function of the size of population (or household) characteristic being measured. For instance, Columbia households overall could be classified as "affluent." As such, there are a relatively small number of households in the lower income groups and for each village the estimates of the number of households in the first five income groups (from less than $1,000 to $35,000–$49,000) had margins of error exceeding 49.35 percent of the estimates.[1] The remaining four income classifications (from $50,000–$74,999 to $150,000) with their higher estimated number of households were all "reliable."

The question remains, then, are these estimates to be discarded as "unreliable" because of the relative size of their margins of error, or are they of some value because they do indicate that there are a relatively small number of households in these groups even though the precise number of these households cannot be stated with full confidence.

Comparing Data and Data Interpretation

It is inevitable that Columbia's Village Boards as well as residents of Columbia's villages will compare data for their village against all other villages. This informal (or formal) ranking involving ACS data does present problems that were not typically taken into account when all of the socioeconomic data was from the decennial census.

For example, Figure 12.1 shows the mean household income and associated upper and lower bounds of the 90 percent confidence interval for each village. What is interesting is that the difference between the mean income in Columbia's wealthiest village, River Hill, and the rest of Columbia's villages is clearly statistically significant (i.e., the confidence interval for River Hill does not overlap any other village). However, the statistical significance of the difference between Columbia's second highest income village (King's Contrivance) and other villages is not so clear. As it turns out, despite overlapping confidence intervals, a formal significance test reveals that there is a statistically significant difference between Kings Contrivance and the three villages with the lowest incomes (Oakland Mills, Wilde Lake and Owen Brown). Moreover, if one were to try and state which village has the lowest mean income, statistical testing reveals that there is no statistically significant difference between the mean incomes of the five lowest villages, (Oakland Mills, Wilde Lake, Owen Brown, Town Center and Long Reach).

These sorts of data issues—how to incorporate reliability measures and how to interpret comparative results—are key to getting the most out of the American Community Survey's prodigious output.

[1]The margin of error "reliability" cutoff is based on discussions with ACS data users in the State Data Center Program which concluded that a conservative measurement of reliability using the coefficient of variation was 30%. The MOE reliability cutoff at the 90 percent confidence interval is then 49.35% (1.645 × 30%).

Table 12.1 Sociodemographic profile for Long Reach, MD, 2006–2010, expressed in counts

	Estimate	(+/-) Margin of Error
	Total	Total
Social Characteristics		
Educational Attainment:		
Population 25 years and over	11,968	693
Less than high school diploma	737	1,313
High school graduate (Includes equivalency)	1,320	310
Some college, no degree	1,836	470
Associate degree	775	325
Bachelor's degree	3,855	375
Graduate or professional degree	3,445	473
Percent high school graduate or higher	93.8%	5.0%
Percent bachelors degree or higher	61.0%	3.6%
Commuting to Work		
Workers 16 years and over	9,489	600
Car, truck, or Van -- drove alone	7,642	592
Car, truck, or Van -- carpooled	797	225
Public transportation (including taxicab)	411	448
Walked	32	623
Other means	180	205
Worked at home	427	137
Mean travel time to work (in minutes)	31.3	11.1
Household Income in the Past 12 Months		
Households	6,939	340
Less then $1,000	198	303
$10,000 to $14,999	75	342
$15,000 to $24,999	291	397
$25,000 to $34,999	339	405
$35,000 to $49,999	533	468
$50,000 to $74,999	1,159	224
$75,000 to $99,999	1,232	245
$100,000 to $149,999	1,734	288
$150,000 or more	1,378	252
Mean household income	$106,364	$9,109
Poverty Status in the Past 12 Months		
Families for whom poverty is determined	4,676	321
Below poverty	106	323
With related children under 18 years	2,500	759
Below poverty	76	639
Families with female householder, no spouse	725	403
Below poverty	76	343
With related children under 18 years	525	393
Below poverty	76	343

* Shaded numbers have a relatively large margin of error indicating the estimate may be unreliable.
Source: U. S. Census Bureau, American Community Survey, 2006 to 2010

	Estimate	(+/-) Margin of Error
	Total	Total
Housing Characteristics		
Total housing units	7,231	341
Units in Structure		
1-unit, detached	2,504	196
1-unit, attached	2,451	244
2 to 9 units	585	551
10 or more units	1,691	542
Mobile home	0	381
Boat, RV, van, etc	0	381
Vehicles Available		
None	223	435
1	2,157	365
2	3,248	337
3 or more	1,311	719
House Value		
Specified owner-occupied units		
Mean	$413,013	$34,985
Selected Monthly Owner Costs as a Percentage of Household Income in the Past 12 Months		
Less than 20 percent	2,038	549
20.0 to 24.9 percent	1,012	414
25.0 to 29.9 percent	629	421
30.0 to 34.9 percent	392	402
35.0 percent or more	1,034	712
Not computed	0	540
Gross Rent		
Specified renter-occupied units	1,834	281
With cash rent	1,808	280
Less than $200	15	636
$200 to $299	56	495
$300 to $499	28	741
$500 to $749	197	800
$750 to $999	205	593
$1,000 or more	1,307	683
No cash rent	26	337
Selected Rent as a Percentage of Household Income in the Past 12 Months		
Less than 20 percent	510	587
20.0 to 24.9 percent	246	246
25.0 to 29.9 percent	198	326
30.0 to 34.9 percent	143	301
35.0 percent or more	641	449
Not computed	96	317

* Shaded numbers have a relatively large margin of error indicating the estimate may be unreliable.
Source: U. S. Census Bureau, American Community Survey, 2006 to 2010

Table 12.2 Sociodemographic profile for Long Reach, MD, 2006–2010, expressed in percentages

	Percent	(+/-) Percent MOE
	Total	Total
Social Characteristics		
Educational Attainment:		
Population 25 years and over	100.0%	(X)
Less than high school diploma	6.2%	11.0%
High school graduate (Includes equivalency)	11.0%	2.5%
Some college, no degree	15.3%	3.8%
Associate degree	6.5%	2.7%
Bachelor's degree	32.2%	2.5%
Graduate or professional degree	28.8%	3.6%
Percent high school graduate or higher	--	--
Percent bachelors degree or higher	--	--
Commuting to Work		
Workers 16 years and over	100.0%	(X)
Car, truck, or Van -- drove alone	80.5%	3.6%
Car, truck, or Van -- carpooled	8.4%	2.3%
Public transportation (including taxicab)	4.3%	4.7%
Walked	0.3%	6.6%
Other means	1.9%	2.2%
Worked at home	4.5%	1.4%
Mean travel time to work (in minutes)	--	--
Household Income in the Past 12 Months		
Households	100.0%	(X)
Less then $1,000	2.9%	4.4%
$10,000 to $14,999	1.1%	4.9%
$15,000 to $24,999	4.2%	5.7%
$25,000 to $34,999	4.9%	5.8%
$35,000 to $49,999	7.7%	6.7%
$50,000 to $74,999	16.7%	3.1%
$75,000 to $99,999	17.8%	3.4%
$100,000 to $149,999	25.0%	4.0%
$150,000 or more	19.9%	3.5%
Mean household income	--	--
Poverty Status in the Past 12 Months		
Families for whom poverty is determined	100.0%	(X)
Below poverty	2.3%	6.9%
With related children under 18 years	53.5%	15.8%
Below poverty	1.6%	13.7%
Families with female householder, no spouse	15.5%	8.6%
Below poverty	1.6%	7.3%
With related children under 18 years	11.2%	8.4%
Below poverty	1.6%	7.3%

* Shaded numbers have a relatively large margin of error indicating the estimate may be unreliable.
Source: U. S. Census Bureau, American Community Survey, 2006 to 2010

	Percent	(+/-) Percent MOE
	In PFA	In PFA
Housing Characteristics		
Total housing units	100.0%	(X)
Units in Structure		
1-unit, detached	34.6%	2.2%
1-unit, attached	33.9%	3.0%
2 to 9 units	8.1%	7.6%
10 or more units	23.4%	7.4%
Mobile home	0.0%	5.3%
Vehicles Available	100.0%	(X)
None	3.2%	6.3%
1	31.1%	5.0%
2	46.8%	4.3%
3 or more	18.9%	10.3%
House Value		
Specified owner-occupied units		
Mean	--	--
Selected Monthly Owner Costs as a Percentage of Household Income in the Past 12 Months	100.0%	(X)
Less than 20 percent	39.9%	10.5%
20.0 to 24.9 percent	19.8%	8.0%
25.0 to 29.9 percent	12.3%	8.2%
30.0 to 34.9 percent	7.7%	7.9%
35.0 percent or more	20.3%	13.9%
Not computed	0.0%	10.6%
Gross Rent		
Specified renter-occupied units	100.0%	(X)
With cash rent	98.6%	2.4%
Less than $200	0.8%	34.7%
$200 to $299	3.1%	27.0%
$300 to $499	1.5%	40.4%
$500 to $749	10.7%	43.6%
$750 to $999	11.2%	32.3%
$1,000 or more	71.3%	35.6%
No cash rent	1.4%	18.4%
Selected Rent as a Percentage of Household Income in the Past 12 Months	100.0%	(X)
Less than 20 percent	27.8%	32.0%
20.0 to 24.9 percent	13.4%	13.4%
25.0 to 29.9 percent	10.8%	17.8%
30.0 to 34.9 percent	7.8%	16.4%
35.0 percent or more	35.0%	24.5%
Not computed	5.2%	17.3%

* Shaded numbers have a relatively large margin of error indicating the estimate may be unreliable.
Source: U. S. Census Bureau, American Community Survey, 2006 to 2010

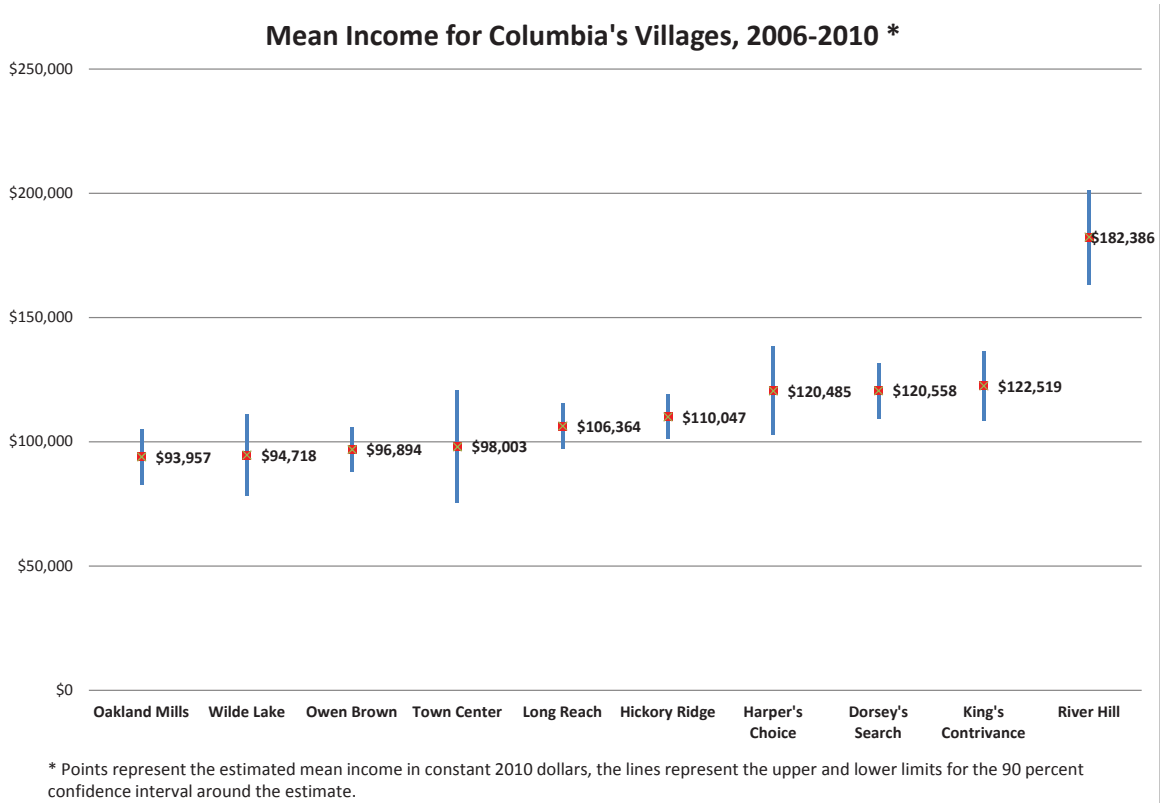


Figure 12.1 Mean income for Columbia's villages, 2006–2010

SOURCE: U.S. Census Bureau, 2006–2010 American Community Survey, as prepared by the Maryland Department of Planning

Chapter **13**

Plan East Tennessee (PlanET): An ACS User Case Study

Randy Gustafson
Tennessee State Data Center

Plan East Tennessee (PlanET) is a sustainable-communities directive initiated by the U.S. Department of Housing and Urban Development and implemented by the Knoxville/Knox County Metropolitan Planning Commission. Conceived as a community-development tool for the 5-county region surrounding Knoxville, Tennessee, PlanET draws on a vast array of sources to paint a picture of the current state of affairs and, by project's end two years from now, create a vision for the region's future.

A Philadelphia consulting firm, Wallace, Roberts and Todd, was hired to lead the project, and they in turn enlisted the Center for Regional Economic Competitiveness (CREC) in Arlington, VA, to develop an existing conditions report of the region's economic drivers as well as the region's workforce characteristics. The Tennessee State Data Center at the University of Tennessee's Center for Business and Economic Research provided analytical support to CREC's endeavors.

The Tennessee State Data Center drew on data from a wide variety of sources for inclusion into the existing conditions report. This paper only discusses those data derived from the U.S. Census Bureau's American Community Survey (ACS).

Geography: The project originally included the five counties of the Knoxville Metropolitan Statistical Area: Anderson, Blount, Knox, Loudon, and Union Counties, all in Tennessee. These five counties are quite varied, ranging from a 2010 Census population of 19,109 (with only a 1% minority population) in Union County to 432,226 (13% minority) in Knox County. Because a major employer in the area, the Oak Ridge National Laboratories, encompasses parts of both Anderson and Roane Counties, Roane County was introduced to the study area. Comparisons to the state and nation were proposed to add a depth of understanding to the statistics.

ACS Tables: Straightforward statistics, such as the educational attainment of the region's working-age population, are readily available using existing ACS tables, e.g. B15001. The geography for the PlanET region required a small amount of extra calculation to find the proportions of various levels of education for the 18 to 99 age group. The region consisted of the 5-county MSA, plus one additional county. Thus, to create Table 13.1 required four separate downloads in American FactFinder plus minor manipulations to condense categories and calculate percentages.

For more complex statistics, ACS tables are not always available. For an analysis of the unemployment rates of individuals grouped by their level of educational attainment, researchers must look beyond ACS tables and utilize the Public-Use Microdata Sample (PUMS). Access to the PUMS is gained through the University of Minnesota's Integrated Public Use Microdata Series (IPUMS). PUMS data contain the actual responses of 3 percent (in the case of 3-year ACS data) of survey participants. PUMS data are only reported for predefined Public Use Microdata Areas (PUMAs) of approximately 100,000 people each. Because PUMA definitions do not change between decennial censuses, we are constrained to those

Table 13.1 Educational Attainment of Working Age Population

Educational Attainment	PlanET	TN	US
Post-graduate	8.5%	7.1%	9.1%
4-year degree or equivalent	17.3%	14.9%	17.5%
2-year degree or equivalent	6.9%	6.3%	7.8%
Some college	18.1%	17.7%	17.8%
HS degree or equivalent	39.4%	41.7%	36.2%
Less than Grade 12	9.8%	12.3%	11.6%
Total	100.0%	100.0%	100.0%

SOURCE: American Community Survey 2008–2010

definitions. The relevant PUMAs for the area included an extra county, Monroe. The inclusion of Monroe County had an effect on the outcome but it was quite small, due to the low population in the county.

IPUMS has the capacity of defining variables for analysis. A simple variable, like employment status, can be used as is. However, a variable like educational attainment has 12 levels—many more than were needed for our analysis. IPUMS allows recoding variables to consolidate the 12 levels into a more relevant grouping: "less than high school graduate," "high school graduate," "some college or associates degree," and "bachelor's degree," or "postgraduate." Selecting employment status as the row variable, the condensed education parameters as the column variables, and filtering by age (working age—18 to 64), state, and individual PUMAs yields the results shown in Figure 13.1.

Repeating the same procedure, while simply changing the filter to reflect different geographic levels, e.g. entire state or the U.S., produces enough data to create the chart seen in Figure 13.2.

The Knoxville-East Tennessee area has a very diverse workforce, especially with respect to education. Extremely high-end jobs at Oak Ridge National Laboratories and The University of Tennessee are an important catalyst in the area's economy. However, lesser-paying jobs in retail, healthcare and social assistance, and education are far more numerous. This education-employment analysis demonstrates importance of education in keeping employment healthy. Without ACS data, we could not reveal the complex nature of the region's labor force.

Full version of report can be found here: PlanET Workforce and Economy Draft Existing Conditions Memo.

Variables					
Role	**Name**	**Label**	**Range**	**MD**	**Dataset**
Row	**empstat**	Employment status	0-3		1
Column	**educ(Recoded)**	Educational attainment	1-6		1
Weight	**perwt**	Person weight	1.00-939.00		1
Filter	**age(18-99)**	Age	0-95		1
Filter	**statefip(47)**	State (FIPS code)(=Tennessee)	1-56		1
Filter	**puma(1301,1302,1400,1500,1600)**	Public Use Microdata Area	100-77777		1

Frequency Distribution

Cells contain: **-Column percent** -Weighted N		**educ**						
		1 Less than Grade 12	2 HS Graduate or equivalent	3 Some College	4 Associates or equivalent	5 Bachelors or equivalent	6 Postgraduate	***ROW TOTAL***
empstat	1: Employed	**29.3** 21,771.0	**53.8** 133,063.0	**62.8** 65,793.0	**71.4** 28,050.0	**73.4** 73,620.0	**74.0** 38,568.0	***58.4*** *360,865.0*
	2: Unemployed	**5.9** 4,353.0	**5.8** 14,269.0	**4.7** 4,945.0	**4.5** 1,770.0	**2.5** 2,476.0	**1.5** 807.0	***4.6*** *28,620.0*
	3: Not in labor force	**64.9** 48,204.0	**40.5** 100,177.0	**32.4** 33,979.0	**24.1** 9,465.0	**24.1** 24,165.0	**24.5** 12,763.0	***37.0*** *228,753.0*

Figure 13.1 IPUMS tabulation from PlanET analysis

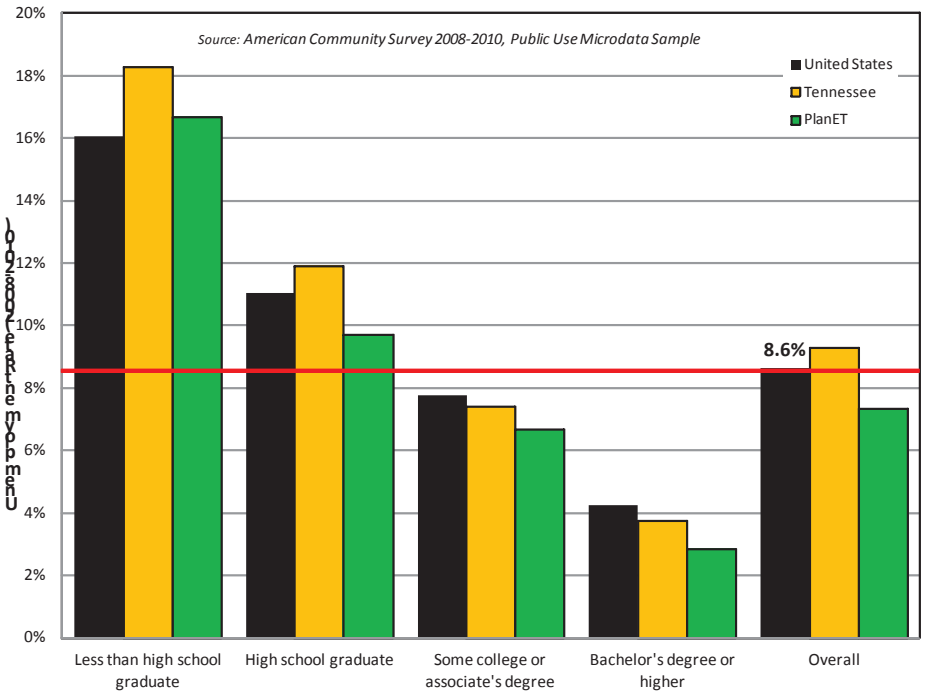


Figure 13.2 Unemployment Rates by Educational Attainment Level

Chapter **14**

Two Case Studies: ACS Educational Attainment Data and Data on Children Ages 3–5 for Nevada Counties

Jeff Hardcastle
Nevada State Demographer
University of Nevada–Reno

Educational Attainment in Washoe County, Nevada

Background

The attached table "Comparing Annual Change in Educational Attainment to Educational Attainment by Residence 1 Year Ago for Washoe County, Nevada, from the 2007 to 2010 ACS" (Table 14.1) is a continued examination of educational attainment data from the American Community Survey. The original examination was the result of call from the Economic Development Authority of Western Nevada when they needed to know the most recent change in the number of graduate degree holders for a company considering relocating to Washoe County. They needed the actual number of persons with graduate degrees and recent changes. At that time, the 2006, 2007, 2008, and 2009 ACS were looked at. This table reflects currently available ACS data. In responding to this question I was concerned by the apparent substantial fluctuation from year-to-year in the number of graduate degrees that did not make sense. Tables reporting residence one year ago by educational attainment were looked at to see if in and out migration helped provide an explanation for that fluctuation.

American Community Survey Tables Used

- B15002 Sex by Educational Attainment for the Population 25 Years and over
- B07009 Geographical Mobility in the past Year by Educational Attainment for Current Residence in the United States
- B07409 Geographical Mobility in the past Year by Educational Attainment for Residence 1 Year Ago in the United States

Comments

As stated above, the initial question was to look at the number of people holding graduate degrees and if they were increasing. Going from 2007 to 2008 there was a loss of 6.2%, in 2008 to 2009 an increase of 13.4%, and then a loss from 2009 to 2010 of 4.1%. While these differences were within the range of the margin of error (MOE), they were not supported by looking at migration data or graduation data. Also, the differences exceed the MOE in 2007 to 2008 and in 2009 to 2010 in looking at annual change in the high school diploma or equivalent category. In looking at the 2007 to 2008 period, it shows a loss in

Table 14.1 Comparing Annual Change in Educational Attainment to Educational Attainment by Residence 1 Year Ago for Washoe County, Nevada, from the 2007 to 2010 ACS

Educational Level	Year			
	2007	2008	2009	2010
Less than a high school	38,846	39,724	37,263	35,678
High school graduate (includes equivalency)	70,157	62,321	66,263	72,697
Some College Total	87,197	97,165	99,096	98,166
Bachelor's degree	47,773	48,192	44,006	46,639
Graduate Degree	25,792	24,189	27,429	26,291
	269,765	271,591	274,057	279,471
Graduate Degree Detailed Information				
Master's degree	16,036	16,339	18,576	16,877
Professional school degree	5,718	4,778	5,988	6,318
Doctorate degree	4,038	3,072	2,865	3,096
Change from Previous Year				
Master's degree		303	2,237	-1,699
Professional school degree		-940	1,210	330
Doctorate degree		-966	-207	231
Less than a high school				
Change from Previous Year		**878**	**-2,461**	**-1,585**
In Migrants With Less Than a High School Education		2,012	1,918	2,010
Out Migrants With Less Than a High School Education		634	821	1,672
Net Migrants With Less Than a High School		**1,378**	**1,097**	**338**
High school graduate (includes equivalency)				
Change from Previous Year		**-7,836**	**3,942**	**6,434**
In Migrants - High school graduate (includes equivalency)		3,982	2,934	3,579
Out Migrants - High school graduate (includes equivalency) in		1,649	3,912	3,003
Net Change - High school graduate (includes equivalency)		**2,333**	**-978**	**576**
Number of High School Graduates From Washoe County School District		***2,885***	***2,957***	***3,096***
Some College Total				
Change from Previous Year		**9,968**	**1,931**	**-930**
In Migrants With Some College		3,982	2,934	3,579
Out Migrants With Some College		2,819	3,715	3,342
Net Migrants With Some College		**1,163**	**-781**	**237**
Bachelor's degree				
Change from Previous Year		**419**	**-4,186**	**2,633**
In Migrants With Bachelor's degree		3,946	2,074	3,469
Out Migrants With Bachelor's degree		2,033	2,940	2,261
Net Migrants With Bachelor's degree		**1,913**	**-866**	**1,208**
Number of Bachelor Degree Graduates Statewide (Source: NV System of Higher Education)		***6,058***	***6,231***	***6,251***
Graduate Degree				
Change from Previous Year		**-1,603**	**3,240**	**-1,138**
In Migrants With Graduate Degree		1,404	2,119	1,731
Out Migrants With Graduate Degree		1,475	1,312	1,120
Net Migrants With Graduate Degree		**-71**	**807**	**611**
Number of Graduate Degrees Statewide (Source: NV System of Higher Education)		***2,507***	***2,418***	***2,515***

the number of high school graduates when the migration numbers and actual number of new graduates from that year indicate there should be an increase. The bottom line is, the annual change in educational attainment is not supported by the migration data or in changes due to people graduating from high school or college.

There are several questions about the educational attainment data and how to interpret it: 1.) How reliable or accurate is it for looking at the pool of potential employees?; 2.) If the question is how well an area is doing in attracting an educated workforce, then which table(s) should be used to look at how well the area has been doing and evaluate any efforts for doing that?; and 3.) How does one use these tables to look at the retention of educated workers?

When I first looked at this data and the fluctuation from year-to-year, three thoughts came to my mind: 1.) The sample size in the American Community Survey may be small enough that it will not ever capture annual changes, that is, annual change may always be within the MOE.; 2.) If that is the case, is a 10 year or five year long form snapshot better to actually capture the change in a community?; and 3.) Maybe we are mobile enough as a society that an annual survey cannot actually capture the data that is being attempted to be reported through ACS. Also, ACS data is currently being reported by cross tabulations that are in some cases much more detailed than 2000 and 1990 long form data. These small cell sizes give the impression of more information being available but it may be less reliable.

Children Between the Ages of 3 and 5 for Churchill and Lyon Counties, Nevada

Background

The attached table "Comparison of American Community Survey and 2010 Census Data for Family Type and Age for Own Children under 18 Years For Two Nevada Counties" (Table 14.2) looks at data from the 2006 to 2010 American Community Survey (ACS), the 2008 to 2010 ACS, and the 2010 Census. The original examination was the result of a wide ranging request for data on children and families with the focus being on children between the ages of 3 and 5. This table illustrates much of the difficulty in both interpreting ACS data, how to provide guidance to the end user of the data, and how to validate the data against other information, in this case the Census.

Comments

The reporting of the margin of error for ACS is touted a strength. However, if one looks at these two counties, what is interesting about the ACS estimates for male and female headed households is that one could argue that statistically they are equal in that their margins of error overlap. For the sake of illustration, let's say one policy decision is how to allocate a social service worker per 500 families. The question then is, "What guidance can be given to a program administrator when statistically the two counties are equal?"

However, the total population of the counties is quite different with Lyon County almost twice the size of Churchill County. The following table shows the intercensal estimates for the two counties:

County	2006	2007	2008	2009	2010	2006–10 Average	2008–10 Average
Churchill	24,842	24,961	25,049	25,067	24,810	24,946	24,975
Lyon	49,827	51,725	52,156	51,819	52,049	51,515	52,008

To see if these two counties are equal, I looked at the same table from the 2010 Census and compared the percentage distribution. The ACS estimates can be characterized as capturing the Census count at the edge of their margin of error with one exception. That exception is the Male Head of Household, No Wife Present category for the 2008 to 2010 ACS estimate for Lyon County where the Census proportion exceeds the estimates margin of error. However, both ACS sets of estimates under estimate the total number of single parent households reporting them at between 84% to 54% of the actual numbers from 2010. This is happening while total families are reported at 101% to 95% of the actual number and total population change has been relatively flat.

For the more specific inquiry about the conditions for children between the ages of three and five, the estimates are low compared to the 2010 Census. ACS data is reported by two relevant categories; children 3 and 4 years, and 5 years. With two counties and two sets of results that ends up being 16 sets of results when tabulating by male and female headed households. Of those 16 results the margin of error exceeds the estimate in 14 cells and would result in a negative number of cases. In one cell the estimate is "0" with a MOE of ±177. The Census result was 62.

Finally, the 2008 to 2010 ACS could be considered to be more current, capturing only the most recent three years. Without considering the MOE it would appear that there are fewer male householder, no wife present families and in the case of Churchill County, fewer female householder, no husband present families compared to the 2006 to 2010 ACS. More current results do not seem to present a better match to the 2010 Census and this reinforces that sample size matters.

Table 14.2 Comparison of ACS and 2010 Census Data for Family Type and AGe for Own Children under 18 Years For Two Nevada Counties

	2006-2010 American Community Survey 5-Year Estimates					2008-2010 American Community Survey 3-Year Estimates					2010 Census Summary File 1	
	Churchill County		Lyon County			Churchill County		Lyon County			Churchill County	Lyon County
	Estimate	Margin of Error	Estimate	Margin of Error		Estimate	Margin of Error	Estimate	Margin of Error			
Total:	5,494	+/-261	10,866	+/-497	Total:	5195	+/-410	11,288	+/-761	Total:	5,497	11,201
Male householder, no wife present:	370	+/-187	862	+/-321	Male householder, no wife present:	297	+/-236	599	+/-402	Male householder, no wife present:	506	1,114
Percent of Families with Children	6.7%	3.4%	7.9%	2.9%	Percent of Families with Children	5.7%	4.5%	5.3%	3.5%	Percent of Families with Children	9.2%	9.9%
Percent of Families Plus MOE	10.1%		10.9%		Percent of Families Plus MOE	10.2		8.8%				
3 and 4 years	*32*	*+/-37*	*84*	*+/-94*	*3 and 4 years*	*41*	*+/-62*	*124*	*+/-181*	*3 and 4 years*	*58*	*123*
5 years	*19*	*+/-31*	*134*	*+/-135*	5 years	*49*	*+/-85*	69	+/-105	*5 years*	*29*	*57*
Female householder, no husband present:	964	+/-400	1,485	+/-492	Female householder, no husband present:	866	+/-444	1,702	+/-660	Female householder, no husband present:	1,189	2,022
Percent of Families with Children	17.5%	7.2%	13.7%	4.5%	Percent of Families with Children	16.7%	8.4%	15.1%	5.8%	Percent of Families with Children	21.6%	18.1%
Percent of Families Plus MOE	24.8%		18.2%		Percent of Families Plus MOE	25.1%		20.8%				
3 and 4 years	88	+/-52	110	+/-94	*3 and 4 years*	*51*	*+/-54*	*143*	*+/-150*	*3 and 4 years*	*116*	*206*
5 years	*39*	*+/-53*	*21*	*+/-28*	*5 years*	*0*	*+/-177*	*33*	*+/-41*	*5 years*	*62*	*97*

Sources: 2006-2010 American Community Survey 5-Year Estimates, B09002 Own Children under 18 Years by Family Type and Age; 2008-2010 American Community Survey 3-Year Estimates, B09002 Own Children under 18 Years by Family Type and Age; and 2010 Census Summary File 1 Table P40, Family Type and Age for Own Children under 18 Years

Chapter **15**

User Profile: Nevada State Demographer

Jeff Hardcastle
Nevada State Demographer
University of Nevada–Reno

I consider myself an informed person who uses the American Community Survey (ACS) on an as needed basis, usually for data inquiries regarding Nevada's population and its characteristics. One of my first encounters with ACS was when there was an inquiry by the Canadian Embassy about how many Canadians there were in Nevada in the first half of the last decade. I looked to ACS for data and found, if my memory is correct, and estimate of "0" and a margin of error of ±1,500. I looked at the 2000 Census and it reported 6,910 persons with Canadian Ancestry. One of the more recent inquiries was regarding the population of the Wells Colony. The ACS reported the population as 24 with a MOE of ±30 while the 2010 Census had a population of 70. I have attached a table of selected Indian tribal areas for Nevada (Table 15.1).

ACS is a complex data product. While it is increasingly well documented with works such as the Compass products, it seems to be increasingly inaccessible to the average user. There are no comprehensive paper or CD/DVD products and the data is being disseminated through the ever evolving American FactFinder. People I talk to who are casual users find AFF very cumbersome. I was able to walk, by phone, someone through finding 2010 Census data on AFF in less than 10 minutes. I could not do the same for someone with ACS data even though we tried for over 30 minutes.

Part of the problem is that ACS data is cross tabulated in such a way that there appears to be a larger number of tables and they are more detailed in both substance and title which makes it more difficult fo find two way cross tabulations. As an example what information is actually in this table, Grandparents Living with Own Grandchildren under 18 Years by Responsibility for Own Grandchildren by Length of Time Responsible for Own Grandchildren for the Population 30 Years and over? On the other hand, a professional in the affordable housing field is still hoping for long form data to address the question of housing cost burden. I was told that the data is cross tabulated in such a way and the sample size is so small that it is unusable by people looking at affordable housing for small areas.

When I first heard of ACS at the 2000 Spring Federal State Cooperative for Population Estimates meeting it was supposed to be timely and applicable especially for small areas. Yet as I think about it, how can ACS capture and report on the housing situation for the full range of Nevada's counties and incorporated cities and towns let alone the census designated places or census tracts in a timely manner? I do not think that it can in a meaningful way for things like mortgage and rent costs.

As I state, the Census Bureau has continued to improve the documentation of ACS and disclose and provide ways to evaluate it. But this is the public's data. It is not the Census Bureau's data nor is it my data as a State Data Center affiliate who has a background in statistics. I have to ask, why should a practitioner in whatever field or a school child have to rely on me or someone else to interpret what

Table 15.1 Comparison, ACS and 2010 and 2000 Census Total Population for Selected Nevada Indian Tribal AReas

	2006 to 2010 American Community Survey		2010	Difference Between	2000
Indian Tribal Area	**Estimate**	**Margin of Error**	**Census**	**Censuses**	**Census**
Carson Colony, NV	343	126	242	-44	286
Duckwater Reservation, NV	86	47	156	7	149
Elko Colony, NV	762	151	736	7	729
Ely Reservation, NV	390	211	202	69	133
Fallon Paiute-Shoshone Colony and Off-Reservation Trust Land, NV	245	114	130	7	123
Fallon Paiute-Shoshone Reservation and Off-Reservation Trust Land, NV	333	82	581	-39	620
Lovelock Indian Colony, NV	47	39	88	-15	103
Wells Colony, NV	24	30	70	16	54

is their data? I want to again acknowledge the fact that the Census Bureau is working to improve the understanding of the data and provide better guidance fo the casual user. On one hand the Census Bureau is trying to move into the app world and provide data at a user's finger tips and on the other hand the data is more convoluted and requires data priests to interpret it.

My understanding was that ACS was meant as a true replacement for the long form. It seems not to be living up to that standard and now it is under increasing attack for funding and legislative authorization. The unfortunate thing is that there has never been a back up plan. So users like myself are put in the position of defending a product that we do not fully believe in. I value the Census Bureau not the ACS which I hope can one day live up to its promised potential.

Chapter **16**

Using the American Community Survey to Shed Light on New York City's Education and Workforce Policies

Lesley Hirsch
Director, New York City Labor Market Information Service

The Center for Urban Research at the City University of New York's Graduate Center—through its three constituent units, the CUNY Data Service, the CUNY Mapping Service, and the NYC Labor Market Information Service (NYCLMIS)—has developed a deep understanding of American Community Survey (ACS) data through its academic and applied research projects. Over several years of analyzing and visualizing these data through maps, and working closely with researchers and practitioners engaged in similar efforts, we understand well how myriad constituencies benefit from these data, whether they need a single citywide population statistic, a comprehensive demographic profile comparing neighborhoods throughout metropolitan areas, or an analysis of official record data linked to Census data for a specific geography. This abstract showcases how the NYCLMIS has used ACS to inform local workforce and education policy, and identify meaningful community boundaries for the electoral process.

Since its inception, the NYCLMIS has relied on ACS to provide more detailed information New York City's dynamic labor force than is available through any other source. Selected examples include:

- Contributions to two annual State of New York City's Workforce System including analyses of the City's changing distribution of population by county sex, age, race/ethnicity, nativity, and educational attainment—as well as the labor market status of each of the associated subgroups. These data have informed the allocation of dollars inasmuch as they have called policymakers' attention to pockets of promise as well as more intense need.
- Occupational analyses to create the City's "in-demand" occupational lists, as required under the Workforce Investment Act of 1998, and in industry profiles that inform workforce providers of employers' occupational requirements. The actual distribution of educational attainment by occupation in New York City is otherwise unknown national occupational data do not accurately reflect the education and training demands of employers in the local labor market.
- An analysis of "aging" industries, or industries that are not replacing their aging workforces with younger workers. Reliable data on the changing age distribution of the City's workforce are not available elsewhere. The purpose of this work is to identify sectors with which the public education and workforce systems can engage to assist with succession planning and implementation.
- With its sister units in the Center for Urban Research, NYCLMIS used long-form 2000 Decennial Census data (the pre-2005 equivalent to the ACS) to conduct "communities of interest" analyses for the New York City Council's redistricting commission as required under federal election law.

Loss of the American Community Survey would effectively blind the City's workforce system to the dynamics of its labor market and the opportunities and challenges it represents to the population of New York City. In an era of scarce public money and tremendous workforce need, New York City and other areas in the U.S. cannot afford to be without it. For more information, please see www.urbanresearch.org or contact nyclmis@gc.cuny.edu.

Chapter **17**

Testimony on Mandatory-or-Voluntary Debate

Patrick Jankowski
Vice President, Research
Greater Houston Partnership

With his permission, we are reprinting workshop steering committee member Patrick Jankowski's testimony before the House Subcommittee on Health Care, District of Columbia, Census, and National Archives from March 6, 2012. The hearing was titled "The Pros and Cons of Making the Census Bureau's American Community Survey," and Jankowski was one of three ACS users asked to provide comments at the hearing.

Good morning and thank you Chairman Gowdy, Ranking Member Davis, and distinguished Members of the Subcommittee for holding this hearing. My name is Patrick Jankowski and I am Vice President of Research for the Greater Houston Partnership, an economic development organization representing the 10-county Houston-Sugar Land- Baytown Metropolitan Statistical Area. I am here to talk about the American Community Survey, the importance of that survey to the business community, and the need to maintain the mandatory requirement for filling out the survey. . . .

As an economic development organization, the Greater Houston Partnership works to create prosperity in our region. The Partnership does that by working with companies to retain and create jobs, to make investments to expand the tax base, to increase general business activity, and to grow local incomes. The Greater Houston Partnership is not unique in this. There are more than a 5,000 economic development organizations in big and small towns across America working toward the same goal—increasing the prosperity and economic well-being of their communities. In essence, I am speaking not just for myself, an economic development practitioner who has worked for 30 years to build prosperity in Houston, but for the entire economic development community across the U.S. We all work toward the same purpose—recruiting business, creating jobs, and growing our tax bases.

Thirty years ago, when I began my career in economic development, a company's relocation or expansion decision was based on two main concerns—real estate and infrastructure. When a business came to look at Houston they would ask, "Do you have a piece of land and is it rail served?" Those were the driving factors in the Industrial Age. Business decisions are now data driven. Before a corporation decides to open a factory or an office, they will examine real estate costs, wage rates, tax liabilities, transportation networks and the social and demographic composition of the workforce. Today, in the Information Age and the era of global competition, a region's demographics weigh heavily in whether a company decides to invest in one's community and hire your workers.

Let me provide you with some examples as to the role demographic data plays in Houston. When a Japanese company considers opening a plant in our region, they always want to know something about

the size of Houston's Asian community. Why? They need assurance that any expat workers they assign to Houston will be comfortable there. When a European company wants to open and research and development facility in Houston, they ask about the number of engineers and scientists that live in the region. Why? They need assurance that they can find the technical talent they need to develop their new products. And when a U.S. firm seeks to open a records processing or customer service operation in Houston, the company often asks about commute times. Why? They want to know how long it will take their employees to get to work and whether this will cause staffing problems at the new operation. For the record, there are now more than 100 Japanese firms operating in Houston, the European firm mentioned above is Vestas Wind Energy, and the questions about commute times comes from just about any company that seriously looks at Houston.

Where do we get all this information? From the American Community Survey. The ACS is one of the most important tools in our kit. By providing good data to corporate decisions makers, those decisions makers can make good choices about where to expand their operations, and when they choose to expand their operations, they create jobs in our community. The ACS, along with other tools and programs (and a great business climate), helps the Greater Houston Partnership attract dozens of companies to Houston each year.

Last year, we worked with 34 companies that relocated, expanded or retained operations in Houston. These companies announced plans to create or retain nearly 9,000 direct jobs in the region. When the multiplier effect is factored in, there will be another 16,000 indirect and induced jobs associated with these projects. Those companies have also committed to investment nearly $750 million in the local economy. While the great data that comes from the ACS wasn't the sole determinant in those firms choosing Houston, it helped us make the case that Houston had the workers they needed and was thus the best place for them to expand their operations.

The survey's role in making good business decisions becomes even more important when one considers the population shifts over the past decade. Between the 2000 and 2010 Census, four U.S. metros added more than a million residents, six added more than half a million, another four dozen added more than 100,000 and another 51 metros lost population. That's more than 100 metros with significant population shifts over a decade. Without the detailed data available through the ACS, we wouldn't know what shifts were taking place in race, ethnicity, age, income and education profiles of these metros.

Which brings me to my concern about making participation in the ACS voluntary. The U.S. Census Bureau has conducted tests that determined that response rates drop significantly when the survey becomes voluntary. And with a lower response rate the quality of the data declines significantly. As the quality of the data declines, the business community's ability to make sound hiring and investment decisions declines as well. To maintain the quality of the data with a voluntary survey, the bureau would need to increase the sample size, increase the number of mailings, and engage in more telephone interviews and one-on-one meetings. This would dramatically increase the cost of conducting the ACS at a time when the federal government is already under considerable fiscal constraint. The fiscally responsible action to take, if Congress wants to continue providing its citizenry with good data upon which to make sound business decisions, would be to keep the mandatory requirement of the American Community Survey. For all these reasons, I respectfully ask that the mandatory requirement of the ACS remain in place.

Chapter **18**

User Profile: NORC at the University of Chicago

Daniel Kasprzyk
Vice President and Director, Center for Excellence in Survey Research
NORC at the University of Chicago

In response to the original query for ACS users, Daniel Kaspryzk of NORC at the University of Chicago sent the following note for the workshop steering committee's consideration. With his permission, we reprint that note here as a synopsis of NORC's uses of ACS data.

The American Community Survey (ACS) is a highly valued source of data for NORC and our clients. The NORC client base is very broad, consisting of a large number of universities, foundations, private sector organizations, and federal, state and local governments. Many of our projects, particularly with respect to large data collections, are with the federal government. ACS data are used in analytic applications, for population controls, and for sample design purposes. Some projects that may be of interest to you are:

- For an analytic project for the University of Houston, NORC used the 5-year ACS data, geocoded foreclosure data at the housing unit level and compared housing unit vacancy and poverty with foreclosure incidence to understand processes behind foreclosure in Harris County, TX. NORC used ACS 5-year aggregate data (2005–09) in the sample design phase to ensure the study encompassed the range of incomes, race/ethnicity, and housing tenure groups in Harris County.
- For an analytic project for the Gates Foundation, NORC staff used publicly available data to compare the educational attainment of youth in Chicago with those in the U.S. by different demographic characteristic such as race, ethnicity, gender, and household composition. The analysis was part of a larger project on the transition to adulthood for youth in Chicago.
- As part of the National Children's Study (NCS) Data Linkage Program (and for the National Institute for Child Health and Development (NICHD)), NORC used one-year, three-year and five-year (2005–2009) estimates from ACS tabular data publications to describe the communities that were part of the NCS Vanguard Pilot program. NORC supplied NICHD with ACS county level demographic and socio-economic profiles for each of the 40 study centers in the pilot study in both in tables and electronic files for direct study center comparisons and to enable the data to be merged with the study participant data. NICHD has also used these data to compare the performance of different field recruitment strategies and the performance of the pilot study by comparing the profile of the study participants to the ACS statistics.
- ACS statistics will also serve as covariates in the analytical models to control for socio-economic and demographic differences across NCS study participant communities to more accurately

evaluate the impact of the effects of the environment, broadly defined to include factors such as air, water, diet, sound, family dynamics, community and cultural influences, and genetics on the growth, development, and health of children across the United States. NORC expects to explore the use of the ACS tract level data to supply more geographically focused information about the neighborhoods in which the study participants live and thus improve the accuracy of the measurement of critical study relationships.

- For the National Children's Study (NCS), NORC used ACS data to help design the area sample by mapping variables such as race/ethnicity, education, gender and income in GIS. NORC also integrated ACS data with Decennial U.S. Census and birth data to create a comprehensive data picture of the NCS target areas.
- NORC used a combination of 1-year, 3-year ACS Public Use Microdata Sample (PUMS) to generate population control totals at the state-level by various socio-demographic groups (age, race/ethnicity, housing tenure, education level) for the National Survey of Children's Health (NSCH), National Survey of Children with Special Health Care Needs (NS-CSHCN), National Immunization Survey - Teen (NIS-Teen), all sponsored by the Centers for Disease Control (CDC). These population control totals are used for post-stratification adjustments. As part of a multi-step process to generate population control totals for the National Immunization Survey (NIS), 3-year ACS PUMS data are used to calculate immigration and state-to-state migration rates for 1-2 year old children. Estimates for various socio-demographic groups from ACS PUMS data are used as auxiliary data in small area models for telephone status estimates at the state-level.
- The National Survey of Early Care and Education (NSECE), sponsored by the Administration of Children and Families, U.S. Department of Health and Human Services, will construct a profile of the availability of non-parental care for children under age 13 across the country, as well as understand the needs and preferences for non-parental care among families with those children. The NSECE has used the ACS 3 and 5 year files extensively to help define the selection of the household sample from which households with young children and informal home-based providers will be identified and interviewed. ACS data have also informed the construction of "provider clusters"—collections of census tracts that approximate child care search areas from which the samples of formal providers have been selected. The formal provider sample selection process involved superimposing the provider clusters defined by ACS data and administrative data on available child care providers collected from state agencies and national entities.
- The NSECE will again make extensive use of ACS data at the analysis phase. The provider survey data collected through the NSECE will be matched with local economic and demographic data from the ACS to understand the dynamics of child care availability. Relevant variables will include percentage of households with children under age 13, fraction of local employment in retail or service or other sectors with non-traditional work schedules, percentage of family households with all adults in the labor force, and median wages of low-skill workers. The sample sizes of the ACS are necessary to support these local-area analyses.
- For developing a National sampling frame for use on projects, such as the General Social Survey and the Survey of Consumer Finances, that require a nationally-representative in-person sample, NORC used ACS 5 year aggregate data (2005–09) at the tract level to attach variables, not published by the Decennial Census, to the frame.
- For the CDC sponsored project, REACH U.S. (Racial and Ethnic Approaches to Community Health), a multi-mode study targeting race/ethnic communities across the U.S., NORC uses

varying years of ACS data at the place, county, and tract levels as control totals for post-stratification at each wave of collection, focusing on household counts by race/ethnicity. NORC used both single-year estimates and aggregates, depending on how the community was defined.

- For the Residential Energy Consumption Survey (RECS), an in-person household survey, conducted for the US Department of Energy, NORC merged ACS five-year aggregates with Census 2000 block data to create inter-censal household estimates, as Census 2000 was out-of-date at the time sample design was underway.

In addition to the above, NORC projects use ACS data in the generation of maps for presentation and for myriad descriptive and analytical purposes, and in the development of information for proposals in all sectors—academic, private, and government.

Chapter **19**

Low Income Job Growth and Affordable Housing in Charlotte, North Carolina

Thomas Ludden, Ph.D., Owen Furuseth, Ph.D., and Barbara John, Ph.D.
Metropolitan Studies and Extended Academic Programs
University of North Carolina at Charlotte

In 2008–2009, the existing data available from the 1 and 3-year PUMS at the time regarding housing tenure, size of household and rental rates were used in preparing the *Comprehensive Affordable Housing Market Study for Mecklenburg County for the Charlotte Housing Authority* (April 2010). This report was commissioned of UNC Charlotte by the Charlotte Housing Authority (CHA) largely to explore the extent of housing cost burdened households and to identify their characteristics as a first and more extensive step in creating more effective ways of working to find solutions based on both demand and supply. This study utilized the housing data, augmenting it with additional jobs data. The relationship between jobs and housing is well-documented. The literature (i.e. Galster, 1997; Lee, 2007; Salkin, 2009) strongly supports the association between availability of affordable housing and the supply of workers. In other words, the availability of jobs alone is not enough to create an attractive environment. If a region can say that it has a minimum number of housing units which are technically affordable, the more in-depth probing of where the very low income workers are living in the same region shows the reality. When the lowest earning segment of the population is either choosing or forced to pay more for their housing, then other aspects of their lives literally pay the price (i.e., Ainsworth, 2002; Allen, 1996; Belsky, 2001; Bloom, B., Simpson, G., Cohen, R. A. and Parsons, P. E., 1997; Ceballo, R., McLoyd, Vonnie, C. and Toyokawa, T. 2004).

The continued economic growth the Charlotte area experienced between 2000 and 2007 increased the demand for lower wage service workers. Generally, this segment of the population lives in rental housing units. As the employment levels for these service sectors increased, the rental housing supply did not keep pace. Information extracted from the Public Use Microdata Sample (PUMS) for the Charlotte-Gastonia-Concord MSA reveal the relationship between housing affordability and household income by occupation. As the number of very low-income households seeking affordable rental housing grew in this time period, service workers disproportionately paid more than 30% of their income for housing. The relationship between how much a person pays for his or her housing costs is directly related to the amount of income earned by that individual. The cost of housing typically includes a monthly rental or mortgage payment, which is recommended to be approximately 30 percent or less of gross monthly income. Accordingly, it follows that more affordable housing is more preferred by those with lesser incomes. What happens when a metropolitan region's workforce is increased over time? Do housing units at all levels of affordability become available and keep pace at the same rate that the change in the workforce's demand changes? If so, then the index of affordability is maintained. If not, then workers are forced to spend a higher percentage of their total income on the cost of housing. The consequences of this situation are many fold. In summary, those with any level of income who choose or must pay a

Table 19.1 Estimated Mecklenburg County Household Characteristics, 2006–2008

Composition	Family Households (Count)	Non-Family Households (Count)
1-person household	—	105,786
2-person household	92,573	21,671
3-person household	54,316	2,873
4-person household	45,506	1,376
5-or-more person household	27,422	439
Total	219,817	132,145

SOURCE: U.S. Census Bureau, 2006–2008 American Community Survey.

higher than expected percentage of their income on housing are trading off that expense as compared to other expenses, such as food, clothing, health care, etc. For people with lower incomes, the consequences of this economic trade-off can range from severe to devastating.

The Charlotte-Gastonia-Concord, NC-SC MSA covers Mecklenburg, Cabarrus, Gaston, Union, and Anson counties in North Carolina, as well as, York County, South Carolina, and is used for data compilation and selected analyses. The City of Charlotte is the largest municipality in the county and therefore, the geographic focus of this report is Mecklenburg County, North Carolina. In several areas of analyses, census tract geographies within Mecklenburg County are used to present findings. They offer a finer grained description of housing issues. For this research, the basic units of measurement are households. The U.S. Census Bureau defines a household as all persons occupying a housing unit. This term encompasses families, single persons living alone, two or more families sharing a residential structure, or unrelated persons who have shared housing arrangements. In Mecklenburg County, the Census Bureau estimates that there were nearly 352,000 households (2006–2008 American Community Survey).

American Community Survey data also tell us that most households are family households, which are defined as those households encompassing two or more persons related by birth, marriage, or adoption. Within the Charlotte MSA, 66.8 percent of all households are composed of family households as compared to 62.5 and 60.3 percent, respectively, of all Mecklenburg County and the City of Charlotte households. Among family and non-family households, smaller households constitute the most common size. For example, in Table 19.1, 42 percent of all Mecklenburg County family households are estimated to be made up of only 2 persons; and among all Mecklenburg non-family households, 80 percent have only one person in the household. The number of households with five or more members in either category is extremely limited.

Unfortunately, the size of any given household and the residential space it occupies is not simply governed by a direct relationship between household size and square feet. Nor is the distribution of various households across urban space additionally driven solely by personal selections from a choice of location. Bartlett reminds us that "the distribution and quality of housing across an urban landscape . . . [is] a constant" (p.124) and that "the growth of a low-wage economy almost inevitably implies an increased problem of housing affordability for the very poor, and a growing problem for the providers of low-income housing" (p. 125). Covington draws upon classic spatial mismatch theory in her updated

discussion of the continuing and ongoing relationship between access to jobs versus access to housing in any given U.S. metropolitan area and finds that while some slight improvement has been made in poor workers "chasing jobs" into the suburbs, her study concludes that overall affordable housing is still insufficient and gives mixed reviews to federal housing programs (Covington, 2009).

Realistically, monetary constraints define residential location decisions and rental housing is not equally offered in all geographical locations at all price points. The relationship between how much a person pays for his or her housing costs is directly related to the amount of income earned by that individual. The cost of housing typically includes a monthly rental or mortgage payment, which is recommended to be approximately 30 percent or less of gross monthly income. Accordingly, it follows that more affordable housing is more preferred by those with lesser incomes. What happens when a metropolitan region's workforce is increased over time? Do housing units at all levels of affordability become available and keep pace at the same rate that the change in the workforce's demand changes? If so, then the index of affordability is maintained. If not, then workers are forced to spend a higher percentage of their total income on the cost of housing. The consequences of this situation are many.

In spite of Charlotte-Mecklenburg's status as a global financial center, the vitality of this community requires the talents of a large and modestly compensated work force. Without hourly wage workers like bank tellers, day care workers, school bus drivers, and wait staff, and middle income professionals such as school teachers, fire fighters, nurses, and police officers, Charlotte-Mecklenburg, the second largest financial center in the U.S., could not function. As thoroughly discussed in the 2008 North Carolina Living Income Standard Study, "Making Ends Meet," research prepared by the North Carolina Justice Center, for many workers with families, "work falls far short of its promise" (Quinterno, et al., p.2). As seen in Figure 19.1, many of these workers are not able to afford the fair market rent for housing in the Charlotte metropolitan region without becoming cost burdened.

All of the primary statistical data used in the report are derived from the latest U.S. Census of Population and Housing. Local data from City of Charlotte and Mecklenburg County governmental agencies were heavily relied upon for developing the housing market analyses and constructing the economic case analyses. This research uses the standard definition for identifying very low and low-income households. Very low income households include those households earning less than 30 percent of the Metropolitan Statistical Area's (MSA) median family income. Low-income households encompass households earning between 30 and 60 percent of the MSAs median family income. In the Charlotte MSA, the Department of Housing and Urban Development (HUD) Metro Area median family income is $66,500 in 2009.

Very low income households are defined as those households earning less than 30 percent of area median family income. Low-income households refer to households earning between 30 to 60 percent of area median family income. Occupancy patterns for these households are presented and disaggregated by household size, demographic components, and geography. Estimates of cost burdened households (those paying more than 30 percent of income) are tabulated. At the end of this section, projections of future affordable housing stock with supply and demand requirements are presented.

Table 19.2 presents the maximum family income for very low and low-income households in varying household sizes. The calculation of very low median income and low median income is defined for a family of four and adjusted up or down $2,000 per person, with a cap of $4,000 additional allowable income at six or more household members.

Median family income was used as the baseline for determining these two below-median income target groups. The PUMS data provides detailed information about the ownership, household size, and characteristics. Table 19.3 shows the number of very low income renter households by household size based on the established income limits. In addition, the percentage of households paying more than

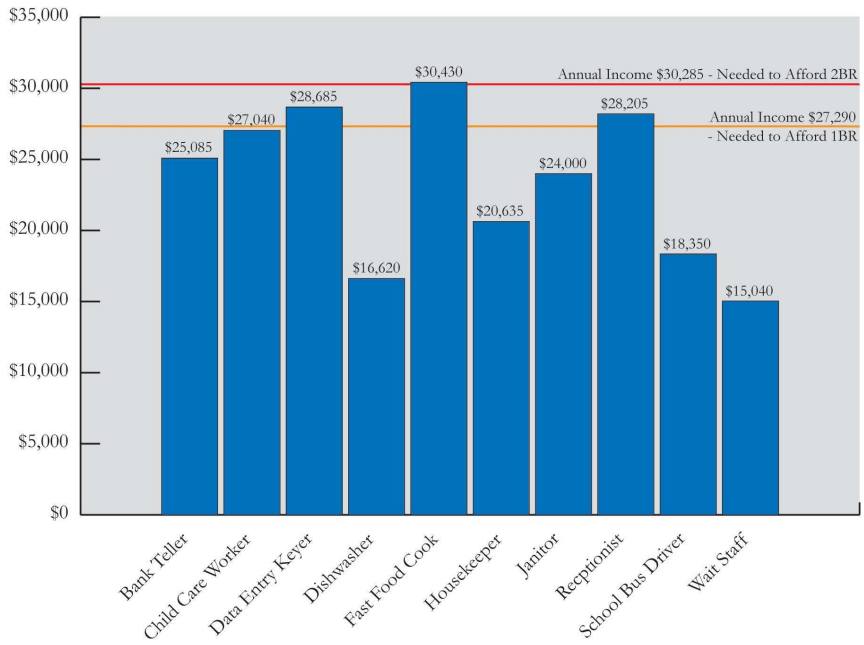


Figure 19.1 Rental Market—2008 Fair Market Rent: 1BR $682/month, 2BR $757/month

SOURCE: Copyright 2000–2009 Center for Housing Policy.

Table 19.2 Income Limits for Household Size, 2009

	Median Family Income	
Household Size	Very Low Income	Low Income
Overall	$66,500	$66,500
1 Person	13,950	27,960
2 Person	15,950	31,980
3 Person	17,950	35,940
4 Person	19,950	39,960
5 Person	21,550	43,140
6+ Person	23,150	46,380

SOURCE: Claritas, 2009; US Census; US HUD.

Table 19.3 Very Low Income Renter Households by Household Size in Mecklenburg County, 2007

Household Size	Maximum Family Income	Very Low Income Households	Very Low Income Housing Cost Burdened Households
2	$15,950	18,821	16,536
4	19,950	6,540	5,967
6	23,150	1,675	1,599
7+	24,750	77	77
Total		27,113	24,179

SOURCE: U.S. HUD; PUMS, 2007.

Table 19.4 Low Income Renter Households by Household Size in Mecklenburg County, 2007

Household Size	Maximum Family Income	Very Low Income Households	Very Low Income Housing Cost Burdened Households
2	$31,980	22,345	17,087
4	39,960	9,277	6,282
6	46,380	2,184	1,390
7+	49,500	250	115
Total		34,056	24,534

SOURCE: U.S. HUD; PUMS, 2007.

30 percent for housing, or those defined as "housing cost burdened," was included to indicate a level of affordable housing demand.

The number of very low income households paying more than 30 percent for housing is almost 90 percent of the 27,113 very low income households. The greatest numbers of housing cost burdened households were clustered in the two smallest categories of households. Nearly two-thirds (68.3 percent) of housing cost burdened households had two or fewer members. Almost one-quarter (24.7 percent) were households with two to four members.

The numbers of low-income households who are housing cost burdened in the low-income category are presented on Table 19.4. Although the number of low-income renter households is over 34,000, the proportion of housing cost burdened households is less among very low income households. Nonetheless, over 72 percent of low income households pay more than 30 percent of their income for their housing. As with the very low income renter group, the largest concentration of housing cost burdened renters are found in the smallest households. Slightly more than two-thirds (69.6 percent) of the housing cost burdened come from households with two or fewer members. The next largest concentration is among households with two to four members (25.6 percent). When combined, an estimated 48,713 renter households in 2007 were housing cost burdened. Thus, almost 80 percent of all low and very low income households renting their housing units at that time were housing cost burdened.

Table 19.5 Rental Housing Supply in Mecklenburg County, 2007

Rent Range	Subsidized Units	Market Rate Units	Total
$0–$406 (Very Low Income)	9,802	215	10,017
$407–$812 (Low Income)	4,468	90,959	95,427
Total	14,270	91,174	105,444

SOURCE: U.S. HUD; PUMS 2007.

The supply of subsidized rental housing in Mecklenburg County was compiled from local, state, and national data providers. These data sources included the Charlotte Housing Authority, the North Carolina Housing Finance Agency, and HUD. Table 19.5 offers an overview of the subsidized rental housing market, with a comparison to the market rate rental inventory. Slightly more than 14,000 units of subsidized rental housing are available across the county. The largest component of these homes and apartments (69 percent) are offered with rents affordable to very low income households. In contrast, the private market presents a very limited inventory, only 215 units, available for the lowest income segment of the population. Because income ranges are based on the 2009 income estimates, the values in the PUMS database have been adjusted to match 2009 dollar values. Using the income limits described previously, the maximum monthly rent was calculated not to exceed 30 percent of the monthly income. Following the HUD fair housing practices, the maximum household size for a particular unit was also calculated. Consequently, the maximum household size for a Studio or 1 Bedroom unit is to be two people. For each additional bedroom, the household size maximum could be increased by two people. Based on these maximum rent and unit size parameters, the number of units was selected from the PUMS.

Table 19.6 presents a more detailed discussion of the types of subsidized rental housing in Mecklenburg County. In this regard, qualifying rules may limit rental opportunities available to special populations. Therefore, the total inventory of subsidized rental units is not an accurate representation of the market opportunities. The table is organized to represent subsidized housing stock for very low income and low income households by categories of householders. In turn, the types of rental subsidies are also presented in this table. The unit classifications are based upon agency or program descriptions. Section 8 Vouchers enable households to rent housing in the private rental market through subsidies to the landlord. Public housing units include all units directly managed by the Charlotte Housing Authority. Sections 202/811 are housing units and group homes that are designed specifically for the elderly or disabled. Section 8 Project units include specific housing projects where tenants must apply to live. Section 236 is a legacy program that provides subsidized housing to low and moderate income renting households through loan subsidies. The North Carolina Housing Finance Agency coordinates the current programs offered by the US Housing and Urban Development and the State of North Carolina. These include, but are not limited to, Low-Income Housing Tax Credits, Multifamily Bond Program, Housing Trust Fund, and Home Program.

For classification purposes, family units include those occupied by at least a two-person family household. Elderly units generally consist of households with one or more members who are 62 years of age or older. Disabled households include one or more members who have a disability requiring special modifications to the housing units and/or additional assistance from an outside member of the family. A definitional standard or client requirement may vary depending on a specific program or agency.

As seen in Table 19.7, Mecklenburg County contained over 10,017 very low income rental housing

Table 19.6 Subsidized Rental Housing Units in Mecklenburg County, 2008

	Units Occupied by Very Low Income Households					Units Occupied by Low Income Households				
Subsidy Type	Family	Elderly	Disabled	Other	Total	Family	Elderly	Disabled	Other	Total
Section 8 Voucher	2,838	412	511	428	4,190	149	22	27	23	221
Public Housing Units	1,805	595	446	384	3,229	94	31	23	20	169
Section 202/811 (Elderly)	0	152	152	0	304	0	8	8	0	16
Section 8 Project, 236, Tax Credit, Loan Subsidies	2,080	0	0	0	2,080	4,062	0	0	0	4,062
Total (by Category)	6,722	1,159	1,109	812	9,802	4,306	61	58	43	4,468

SOURCE: Charlotte Housing Authority, 2008; North Carolina Housing Finance Agency, 2008; U.S. HUD, 2008.

Table 19.7 Very Low Income Rental Housing Inventory by Unit Size in Mecklenburg County, 2007

Minimum Unit Size	Maximum Household Size	Maximum Family Income	Maximum Monthly Rent	Units in Price Range and Unit Size	Vacant Units
Studio/1 Bedroom	2	$15,950	$399	6,349	478
2 Bedrooms	4	19,950	499	2,704	388
3 Bedrooms	6	23,150	579	865	75
4+ Bedrooms	7+	24,750	619	99	0
Total				10,017	941

SOURCE: U.S. HUD; PUMS, 2007.

Table 19.8 Low Income Rental Housing Inventory by Unit Size in Mecklenburg County, 2007

Minimum Unit Size	Maximum Household Size	Maximum Family Income	Maximum Monthly Rent	Units in Price Range and Unit Size	Vacant Units
Studio/1 Bedroom	2	$31,980	$800	60,598	6,137
2 Bedrooms	4	39,960	999	26,443	2,180
3 Bedrooms	6	46,380	1,160	7,981	402
4+ Bedrooms	7+	49,500	1,238	405	0
Total				95,427	8,719

SOURCE: U.S. HUD; PUMS, 2007.

units in 2007. The term "vacant unit" includes units for rent and units rented but not currently occupied. The largest supply of affordable very low income housing was targeted at the smallest households. That is, those households with two members that would occupy studio and one bedroom units. Nearly 64 percent or 6,349 rental units were available in this category. As household size increases, the available rental housing stock declines. Table 19.8 shows that Mecklenburg County has 95,427 housing units in the low income rental housing inventory. There were 8,719 vacant units in 2007. The largest inventory of affordable low income housing, 63.5 percent, is provided to the smallest households comprising two persons and limited to one bedroom. Conversely, households with seven or more members have the fewest options, less than one percent of the inventory.

In order to better understand the households who make up the housing cost burdened population in Mecklenburg County, demographic profiles were compiled by age, race, employment status, and educational attainment. Figure 19.2 demonstrates the differences and similarities among the five broad population groups of (1) 18 years of age and younger; (2) 19-34 years of age; (3) 35-49 years of age; (4) 50-64 years of age; and (5) 65 years of age and older. Figure 19.3 offers insights into the distribution of housing cost burdened households linked to employment status. Three categories are utilized. Employed and unemployed refer to active participation in the labor market. Those not in the labor force group encompasses retired workers, disabled and handicapped persons, homemakers, students, and those not

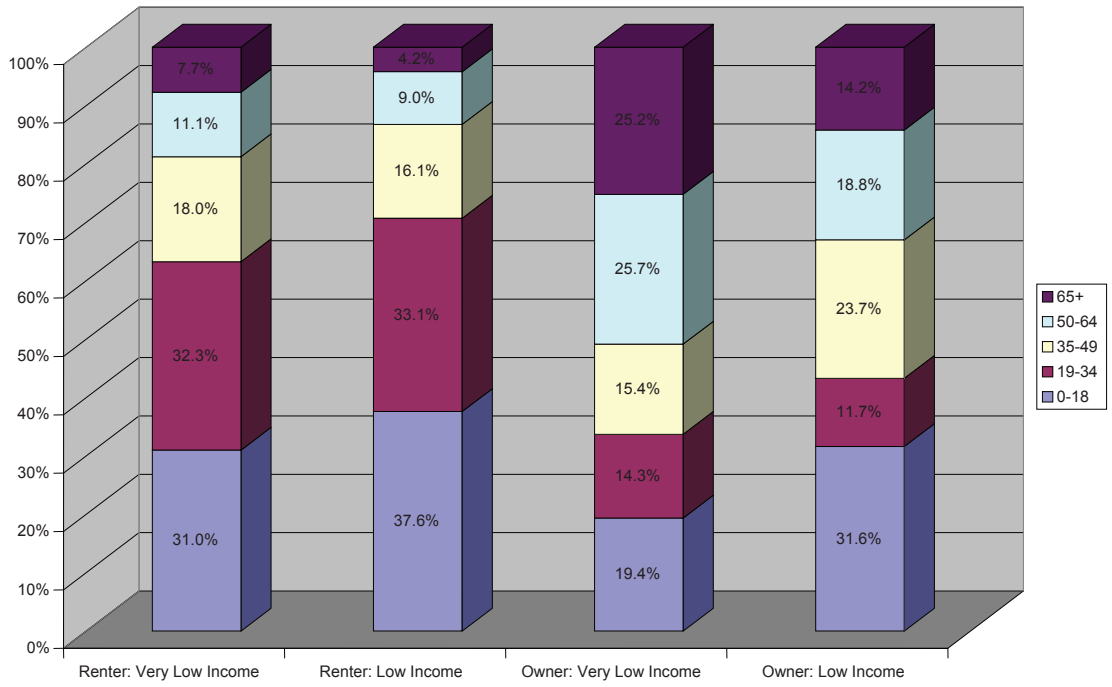


Figure 19.2 Housing Cost Burdened Households by Age Group: Households Paying More than 30 Percent for Housing Costs, Household Members by Age Groups

SOURCE: PUMS, 2007.

looking for employment. The graph shows an approximately one-third split each among those employed, unemployed, and those not in the labor force for the very low income households who are renters. The percentage of those employed increases for the low income households in the renter group, and both the very low and low income owner-occupied households. An interesting observation is how almost one-half of those households with very low income who occupy owner households units are not in the labor force.

By combining housing supply and household estimates, a rental and homeowner housing needs assessment was developed. Following the format used in the earlier analyses, very low and low income household housing needs are identified. Geographic distributions of housing needs at the census tract scale were also developed for each subcategory. As seen in Table 19.9, there are 24,179 very low income households experiencing housing cost burdened conditions. Among the very low income households, only 4,010 live in housing available at these income levels. The largest proportion of rental housing stock in this rental range is occupied by households earning higher income levels. Because of the shortage of housing stock, 20,169 very low income households are forced to rent higher costing housing options. Figure 19.4 presents the location of housing cost burdened very low income renters at the tract level. A review of the map shows the largest concentration of householders live in Westside and North Charlotte neighborhoods, immediately adjacent to Center City. Select neighborhoods in Eastside Charlotte and the University City area also host large proportions of housing cost burdened renters.

Table 19.10 and Figure 19.5 provide the results for low income renter households. While the supply

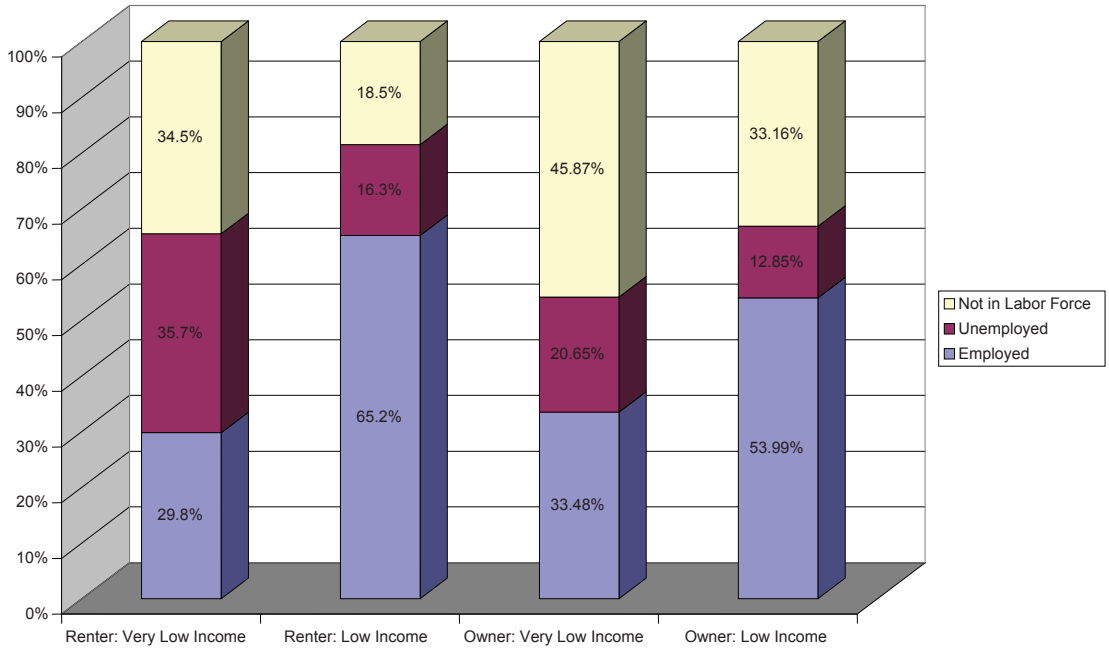


Figure 19.3 Households Paying More than 30 Percent for Housing: Employment Status for Household Members between Ages 25–65

SOURCE: PUMS, 2007.

Table 19.9 Very Low Income Rental Housing Cost Burdened Households and Rental Housing Stock in Mecklenburg County, 2007

HUD Fair Market Standards				Housing Inventory		Occupying Households		Other Very Low Income Households	
Minimum Unit Size	Max Household Size Maximum	Maximum Family Income	Maximum Rent (30% of Monthly Income)	Units in Price Range and Unit Size	Vacant Units	Very Low Income Housing Burdened Households	All Non-burdened Households	Additional Cost Burdened Households	Total Very Low Income Housing Burdened Households
Studio/1 Bedroom	2	$15,950	$399	6,349	478	2,589	3,282	13,947	16,536
2 Bedrooms	4	$19,950	$499	2,704	388	1,054	1,262	4,913	5,967
3 Bedrooms	6	$23,150	$579	865	75	313	477	1,286	1,599
4+Bedrooms	7+	$24,750	$619	99	0	54	45	23	77
Total				10,017	941	4,010	5,066	20,169	24,179

SOURCE: U.S. HUD; PUMS, 2007.

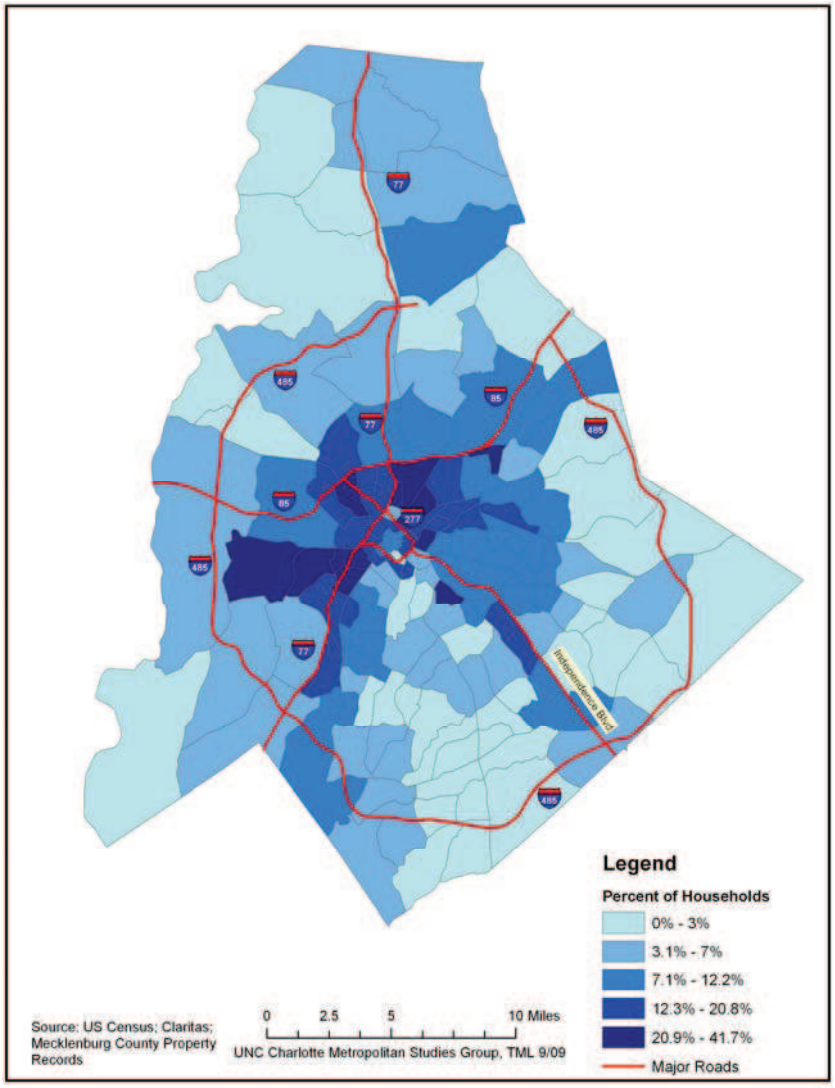


Figure 19.4 Estimated Very Low Income Renter-Occupied Households Paying More than 30 Percent in Housing Costs, 2009

of rental housing stock is much larger (95,427 occupied units), the pattern of occupancy and inadequate supply are still strongly evidenced. The number of low income households experiencing housing cost burdened status is 24,874. Nearly 19,500 low income residents are renting housing in the low income rental price range, but a majority of housing stock is occupied by households with higher income levels.

As seen in the mapped results, low income housing cost burdened renters are less concentrated than low income households (Figure 19.5). Moreover, the proportion of struggling households is far lower at the individual census tract level. The highest concentration for very low income households was over 40 percent, but for low income households, the highest level was 16.6 percent. Geographically, the largest percentages of low income householders with housing cost burdened challenges are found in Northeast Charlotte, the University City area, Eastside Charlotte, and Southwest Charlotte. There is not the same level of concentration or clustering of census tracts that was evidenced for very low income renters.

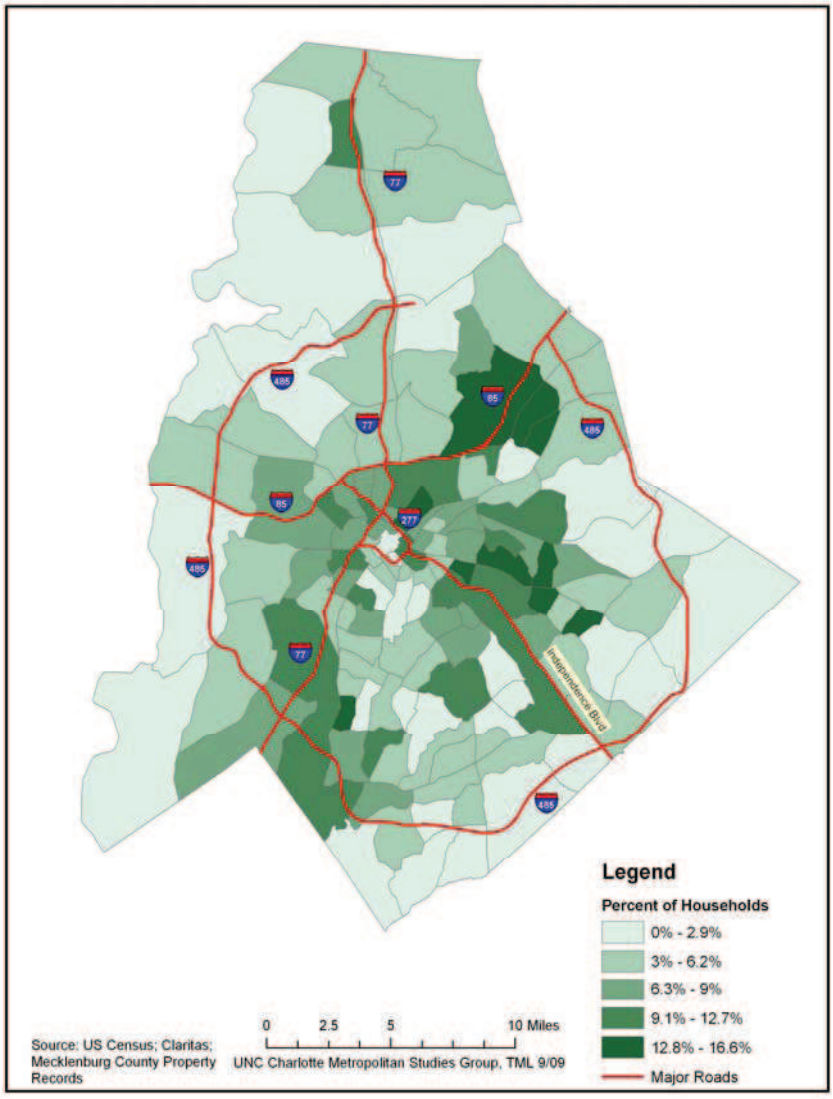


Figure 19.5 Estimated Low Income Renter-Occupied Households Paying More than 30 Percent in Housing Costs, 2009

Table 19.10 Low Income Rental Housing Cost Burdened Households and Rental Housing Stock in Mecklenburg County, 2007

HUD Fair Market Standards				Housing Inventory		Occupying Households			Other Low Income Households	
Minimum Unit Size	Max Household Size Maximum	Maximum Family Income	Maximum Rent (30% of Monthly Income)	Units in Price Range and Unit Size	Vacant Units	Low Income Housing Burdened Households	Other Housing Burdened Households	All Non-burdened Households	Additional Cost Burdened Households	Total Low Income Housing Burdened Households
Studio/1 Bedroom	2	$31,980	$800	60,598	6,137	11,705	13,855	28,901	5,382	17,087
2 Bedrooms	4	$39,960	$999	26,443	2,180	6,282	5,470	12,511	0	6,282
3 Bedrooms	6	$46,380	$1,160	7,981	402	1,390	2,705	3,484	0	1,390
4+Bedrooms	7+	$49,500	$1,238	405	0	58	137	210	57	115
Total				95,427	8,719	19,435	22,167	45,106	5,439	24,874

SOURCE: U.S. HUD; PUMS, 2007.

Table 19.11 Mecklenburg County Renter Households: Paying More than 30 Percent of Income

Year	1990	2000	2010	2020
Number of Households	26,917	37,139	53,102	62,936

SOURCE: North Carolina Office of State Budget and Management, 2009; Claritas.

Between 1990 and 2009, the proportion of the rental households in Mecklenburg County paying more than 30 percent for housing has remained constant at around 35 percent. Assuming the proportion of housing cost burdened rental households is stable between 2010 and 2020, the estimated number of households renting homes will increase by almost 1,000 a year to almost 63,000 in 2020 (Table 19.11).

Such data analyses include the evidence needed to support policy options of increasing and preserving the low and moderate income housing stock. A region must be able to sustain the housing affordability for all levels of wage earners. Without adequate data available regarding the number of households earning certain low levels of income, then a geographical distribution of these housing rental units is not as effective. The study will be expanded to the 14 county region around Mecklenburg County in 2012 and will include the 5-year ACS data at the census tract level.

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Chapter **20**

Children in High-Poverty Neighborhoods: Trends Since 2000

Mark Mather and Genevieve Dupuis
Population Reference Bureau

Research has shown that children growing up in high-poverty neighborhoods—defined here as census tracts with poverty rates of 30 percent or more—are at higher risk of health problems, teen pregnancy, dropping out of school, and other social and economic problems compared to children living in more affluent communities (National Research Council and Institute of Medicine, 2000). Many of these neighborhood effects persist even after controlling for family characteristics (Brooks-Gunn et al., 1994), and may limit children's ability to make successful transitions to adulthood.

While there was an increase in neighborhood poverty during the 1980s, the trend reversed during the 1990s—a period of strong economic growth (Jargowsky, 2003; Kingsley and Pettit, 2003). In this paper, we use data from the 2000 Census and the 2006–2010 American Community Survey (ACS) to measure more recent trends in children living in high-poverty neighborhoods. We address key racial/ethnic and spatial variations to determine whether certain population subgroups or geographic areas have fared better than others. Results from this analysis will help policymakers target programs to improve the lives of children and families.

Trends in High-Poverty Neighborhoods

Results presented in Table 20.1 indicate that neighborhood poverty levels have increased since 2000, along with the number and share of people living in those neighborhoods, putting more families at risk of negative outcomes. In 2006–2010, 10.6 percent of U.S. children lived in high-poverty neighborhoods, up from 8.7 percent in 2000. The share of adults ages 18 and older living in high-poverty neighborhoods also increased, from 7.1 percent to 9.2 percent. There were over 29 million people—including nearly 8 million children under age 18—living in high-poverty neighborhoods in 2006–2010.

The increase in high-poverty neighborhoods since 2000 is not just limited to communities with poverty rates of 30 percent or more. There are also more people residing in neighborhoods with higher poverty rates that exceed 40 percent. Between 2000 and 2006–2010, the share of children living in these "extreme-poverty" neighborhoods increased from 3.2 percent to 3.5 percent.

Racial/Ethnic Differences

Given the high levels of residential segregation in the United States, it is perhaps not surprising that minority children constitute the overwhelming majority of children living in high-poverty neighborhoods. In 2006–2010, African American and Latino children together accounted for 37 percent of the total population under age 18, but they made up 76 percent of the child population living in high-poverty neighborhoods.

Table 20.1 Children and Adults Living in High-Poverty Neighborhoods, 2000 and 2006–2010

	2000		2006–2010	
Age group	Number (000s)	Percent	Number (000s)	Percent
All ages	21,161	7.5	29,071	9.6
Children under age 18	6,301	8.7	7,879	10.6
Adults ages 18 and older	14,860	7.1	21,192	9.2

NOTES: High-poverty neighborhoods are neighborhoods with poverty rates of 30 percent or more. Estimates are subject to both sampling size and nonsampling error.
SOURCE: PRB analysis of 2000 Census and 2006–2010 ACS data.

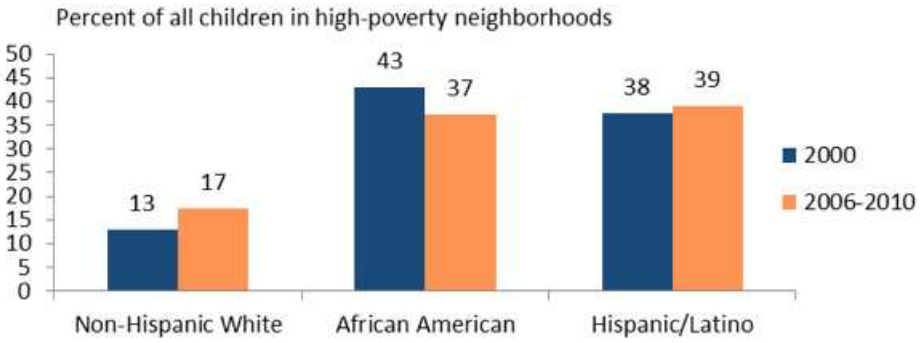

Figure 20.1 Distribution of children in high-poverty neighborhoods

However, the racial/ethnic composition of high-poverty neighborhoods has shifted somewhat since 2000. Non-Hispanic whites, who made up 13 percent of the population under age 18 in high-poverty neighborhoods in 2000, accounted for 17 percent of the child population in such neighborhoods in 2006–2010 (see Figure 1). This increase occurred despite the declining share of non-Hispanic white children nationwide during this period, from 61 percent to 55 percent. Since 2000, the share of children in high-poverty neighborhoods who are African American has dropped sharply, from 43 percent to 37 percent, while the share of Latino children has increased slightly, from 38 percent to 39 percent, so that Latino children now outnumber black children in America's high-poverty neighborhoods.

Despite these changes in the racial/ethnic composition of poor communities, black children are still much more likely to live in high-poverty neighborhoods (27 percent), compared with Latino children (19 percent) or white children (3 percent).

Geographic Patterns

States in the South—stretching from Arizona to Mississippi—had the highest proportions of children in high-poverty neighborhoods in 2006–2010 (see Figure 20.2). Arizona, Louisiana, Mississippi, New Mexico, New York, and Texas had the highest shares of children living in high-poverty neighborhoods, with more than 15 percent each. In terms of absolute numbers, California and Texas had the most children in high-poverty neighborhoods (more than 1 million each), followed by New York (670,000).

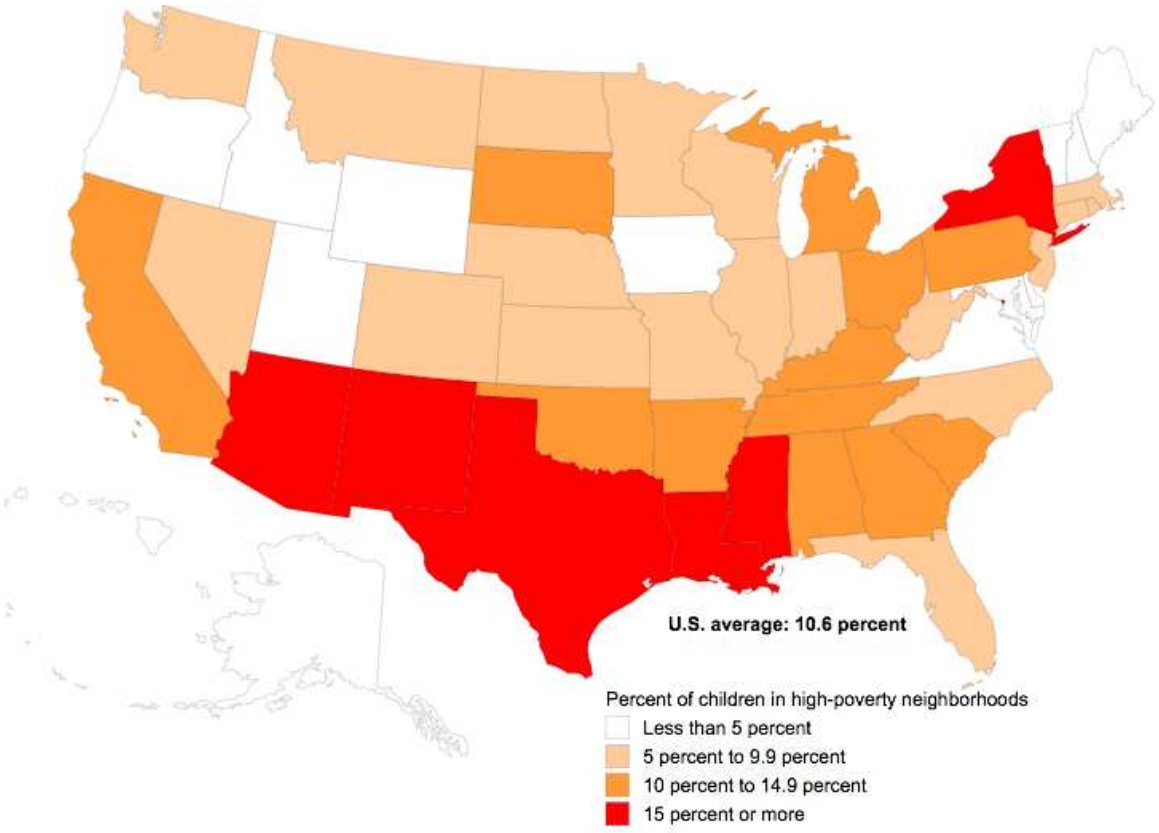

Figure 20.2 Children in High-Poverty Neighborhoods, 2006–2010 (Percent)

SOURCE: PRB analysis of 2006–2010 ACS data.

Together, California, New York, and Texas accounted for more than a third of all children living in high-poverty neighborhoods in 2006–2010. In the District of Columbia, 32 percent of children lived in high-poverty neighborhoods in 2006–2010.

There were eight states where the proportions of children in high-poverty neighborhoods declined since 2000: California, Louisiana, Maryland, Montana, New Mexico, New York, Rhode Island, and Wyoming. The District of Columbia also experienced a 7 percentage-point drop since 2000. There were also seven states where the share of children in high-poverty neighborhoods increased by 5 percentage points or more: Colorado, Indiana, Michigan, North Carolina, Oklahoma, Tennessee, and South Carolina.

Reliability of the ACS Data

Data from the long form of the decennial census have typically been reported as though they represent a 100% count of the population, but of course this is not the case. The long form data from Census 2000 are based on a 1-in-6 sample of U.S. households and are subject to both sampling and nonsampling error. However, there are two main advantages of the 2000 Census over the ACS in terms of reporting trends in neighborhood poverty. First, the decennial census long form data are based on a much larger sample

Table 20.2 Average Coefficients of Variation for Tract-Level Poverty Rates

Tract population	Number of Tracts	Mean CV
Less than 1,000	1,445	49.0
1,000–2,999	19,314	37.1
3,000–4,999	31,006	33.4
5,000–6,999	16,120	31.9
7,000+	5,172	30.2

NOTES: CV = (Standard error/Estimate) × 100.
SOURCE: PRB analysis of 2000 Census and 2006–2010 ACS data.

of households. Second, counts of people living in high-poverty neighborhoods in 2000 are based on data from the short form questionnaire, which are not subject to sampling error. In the ACS, we rely on sample data for both poverty estimates and tract-level population counts.

What are the implications of sampling error in the ACS for measuring neighborhood change? We compared coefficients of variation (CVs) across tracts of varying population size (see Table 20.2). For smaller tracts with fewer than 1000 people, the average CV is close to 50 percent. That means that the standard error is, on average, nearly half the size of the poverty estimate. For a typical tract with 3,000–5,000 people, the average CV drops down to 30 percent. However, this still represents a considerable level of uncertainty. For an average-size neighborhood with a poverty rate of 20 percent, a 30-percent CV means that the 90-percent confidence interval would range from roughly 9 percent to 31 percent.

If the sampling errors in the ACS are randomly distributed across U.S. neighborhoods, then they may cancel each other at the state and national level (Logan and Stultz, 2010). But large and/or systematic errors in the data that vary across geographic areas or population subgroups would result in biased estimates. For example, if poverty rates are less accurate for majority-minority tracts (neighborhoods that are less than 50 percent white), then the rising proportion of white children in high-poverty neighborhoods may be a statistical artifact linked to the underestimation and misclassification of neighborhood poverty for majority-black or Latino neighborhoods.

The large standard errors in the tract-level ACS estimates raise a more general question about the validity of the results. We identified 7.9 million children living in census tracts at or above the 30-percent poverty threshold in 2006–2010 (see Table 20.3). But based on the margins of error associated with the tract-level poverty rates, the actual number of children in high-poverty tracts could range from roughly 2.6 million (based on the lower bound) to 16.4 million (based on the upper bound).

Data from the ACS can be extremely valuable for monitoring state and local trends in child and family well-being or broader social, economic, and demographic changes in the U.S. population. However, this is still a relatively new survey with a new approach to measuring change in our communities. Given the large errors associated with the tract-level data, more research is needed to evaluate the usefulness of the ACS for measuring change in America's neighborhoods.

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Table 20.3 Children in High-Poverty Neighborhoods, 2006–2010

	Number (000s)	Percent
Lower Bound	2,597	3.5
Estimate	**7,879**	**10.6**
Upper Bound	16,412	22.2

SOURCE: PRB analysis of 2000 Census and 2006–2010 ACS data.

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Chapter **21**

The Regional Equity Atlas 2.0: A Neighborhood-Level Analysis and Exercise in Frustration

Meg Merrick
Institute of Portland Metropolitan Studies
Portland State University

In 2007, the Coalition for a Livable Future (CLF) published the first edition of the *Regional Equity Atlas*, a geospatial exploration and analysis of access to opportunities and the impacts of growth and change on vulnerable populations in the Portland-Vancouver metropolitan area. For this analysis, CLF partnered with the Institute of Portland Metropolitan Studies and the Population Research Center at Portland State University.

Key to this analysis was high quality data at the neighborhood level. As a result, the *Regional Equity Atlas*' analyses were highly dependent on both the Short Form and Long Form data from the 1990 and 2000 Censuses for both point-in-time and change-over-time data at the Census block, blockgroup, and tract levels. Using the findings from these analyses, the *Atlas*' maps, and neighborhood summary table of the statistics, the Coalition was able to substantively engage policymakers and community members in the issue of equity and influence regional policy on a variety of fronts.

The *Regional Equity Atlas* was seen by CLF as the baseline by which future decades would be measured. Little was known, at the time that the first *Atlas* was being conceived, about how the substitution of the American Community Survey (ACS) for the Long Form Census (with its relatively low sample size) would affect any equity analysis requiring neighborhood level geographies. Key to the exploration of equity conditions are not only demographic data related to race and ethnicity as well as age (variables that are available from the Census at the block level) but also a host of other indicators including poverty status, the educational attainment of adults, recent immigration, low English proficiency, foreign-born, housing and move-in costs, employment status, mode of transportation, and travel time to work.

As CLF has embarked on the second iteration of the *Atlas*, the deficiencies of the ACS have become abundantly clear and impossible to work around. The low sample size requiring 5-year estimates for the reporting of these data at the Census tract level have meant that the changeover- time analyses between 1990 to 2000 and 2000 to 2010 for the Long Form variables is impossible. The Portland-Vancouver region has experienced dramatic demographic shifts over the last decade. The 5-year estimates mask those changes. Furthermore, after having calculated the coefficients of variation of the margins of error (MOE) for the 5-year estimates, it has been determined that the only variable that will be used at the tract level will be median income for households. The poverty status variables that were a foundation of the first *Atlas* will not be used. Instead, the first category break, for mapping, will be at the federal poverty income threshold for a family of four. Other proxies for poverty status such as free and reduced priced lunch data by school will be included, however, these data are not reflective of areas where there are few school-aged children or in school districts, like Portland's, where students don't necessarily attend their local school.

Because the stakeholders for the *Atlas* have insisted on the inclusion of the previously mentioned ACS variables in version 2.0, they are being mapped at the PUMA level where the MOEs are acceptable. However, the lack geographic precision of the PUMA level data make them much less meaningful in the context of a regional, neighborhood level analysis and for informing policy.

Trying to find high quality substitutes for these data have been time-consuming and generally fruitless. The hopes for the *Equity Atlas* 2.0 have been high since it is moving from flat maps in book form to an interactive web-based mapping platform, but those expectations have been dampened considerably with the lack of utility of these data which will only get worse as the sample size remains the same and the nation's population only gets bigger.

Chapter **22**

Bicycle Commuting Trends in the United States

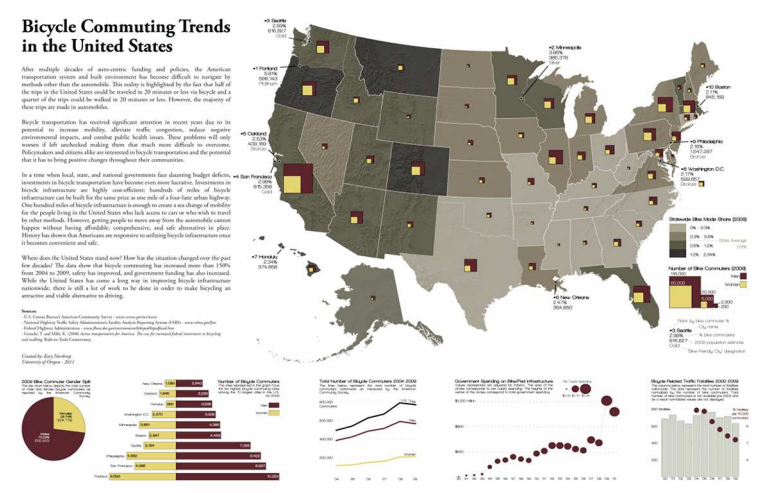
Kory Northrop
Graduate Student in Environmental Studies
University of Oregon

Graduate student Kory Northrop used ACS data to construct a data visualization poster on bicycle commuting trends; we asked him to write some introductory comments to the poster, and received permission to reprint the poster in this agenda book. An overview of the poster is shown in Figure 22.1 and individual "panes" of the poster are shown in the figures that follow.

An updated, interactive version of the project, with additional graphics, can be found at http://korynorthrop.com/flash/bicycle-commuting-trends/.

Much of my motivation to complete this project was to help raise awareness about bicycle transportation being an affordable and effective way to strengthen our national infrastructure network, mitigate negative environmental effects, and make our built environment more pleasant to live in and move through. With the economy being in a fragile state and funding for infrastructure improvements dwindling, cost-effective solutions are imperative. Bicycle transportation has been found to be extremely cost effective and associated with a host of other benefits. Despite all of its positives and potential to improve American cities, bicycling is often viewed as being an unsafe mode of transportation, which is the largest deterrent for many Americans interested in leaving their car(s) at home. This project is an attempt to communicate the reality that safety is improving in the U.S. as more people utilize bicycles and more funding is allocated to bicycle infrastructure improvements. Bicycling is a marginalized form of transportation in the U.S. and the benefits that it poses to bestow upon our nation can only be had if we treat it like a legitimate transportation option.

My intention was to create a useful tool that could be used by the public to get informed and ask questions, bicycle advocates to further their work in improving bicycling conditions, and policy makers to make informed decisions. The responses I've received have been very positive giving me the impression that I succeeded to some degree. I was incredibly humbled and ecstatic to win the USDOT's Student Data Visualization Competition and have the opportunity to present this work at the Transportation Research Board conference and USDOT headquarters in Washington, D.C. Additionally, it's been an honor to see my work endorsed by the League of American Bicyclists and be used in the New York Times and other media outlets. Working on this project helped me discover my interest in data, communication, and computer programming. I hope to combine all of those things going forward in my pursuits to advocate for human-oriented cities and a more livable future.



Bicycle Commuting Trends in the United States

After multiple decades of auto-centric funding and policies, the American transportation system and built environment has become difficult to navigate by methods other than the automobile. This reality is highlighted by the fact that half of the trips in the United States could be traveled in 20 minutes or less via bicycle and a quarter of the trips could be walked in 20 minutes or less. However, the majority of these trips are made in automobiles.

Bicycle transportation has received significant attention in recent years due to its potential to increase mobility, alleviate traffic congestion, reduce negative environmental impacts, and combat public health issues. These problems will only worsen if left unchecked making them that much more difficult to overcome. Policymakers and citizens alike are interested in bicycle transportation and the potential that it has to bring positive changes throughout their communities.

In a time when local, state, and national governments face daunting budget deficits, investments in bicycle transportation have become even more lucrative. Investments in bicycle infrastructure are highly cost-efficient; hundreds of miles of bicycle infrastructure can be built for the same price as one mile of a four-lane urban highway. One hundred miles of bicycle infrastructure is enough to create a sea change of mobility for the people living in the United States who lack access to cars or who wish to travel by other methods. However, getting people to move away from the automobile cannot happen without having affordable, comprehensive, and safe alternatives in place. History has shown that Americans are responsive to utilizing bicycle infrastructure once it becomes convenient and safe.

Where does the United States stand now? How has the situation changed over the past few decades? The data show that bicycle commuting has increased more than 150% from 2004 to 2009, safety has improved, and government funding has also increased. While the United States has come a long way in improving bicycle infrastructure nationwide, there is still a lot of work to be done in order to make bicycling an attractive and viable alternative to driving.

Sources:
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Created by: Kory Northrop
University of Oregon - 2011

Figure 22.1 (Greatly) Reduced View of, and Text Box from, Bicycle Commuting Trends Poster

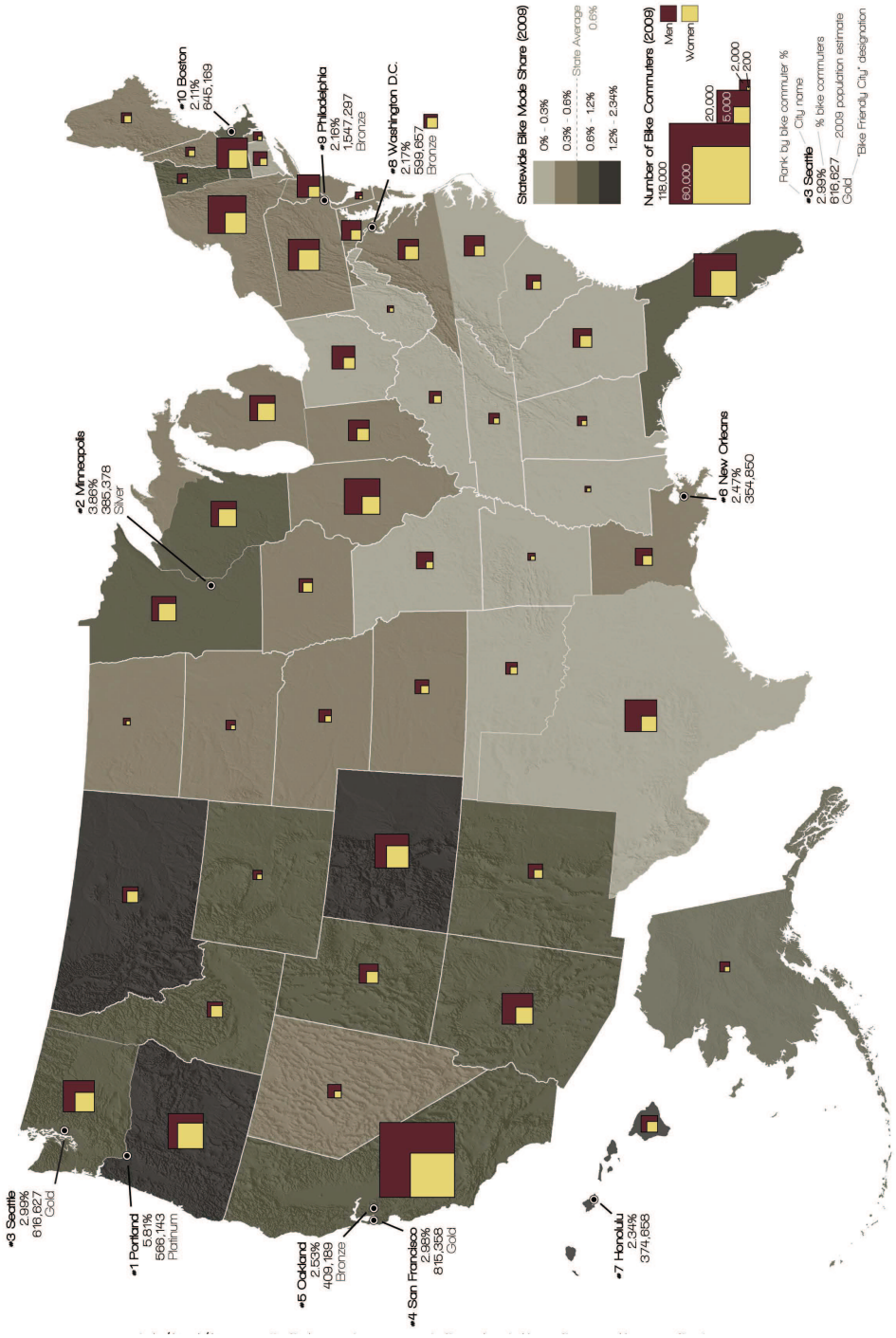

Figure 22.2 Central Map from Bicycle Commuting Trends Poster

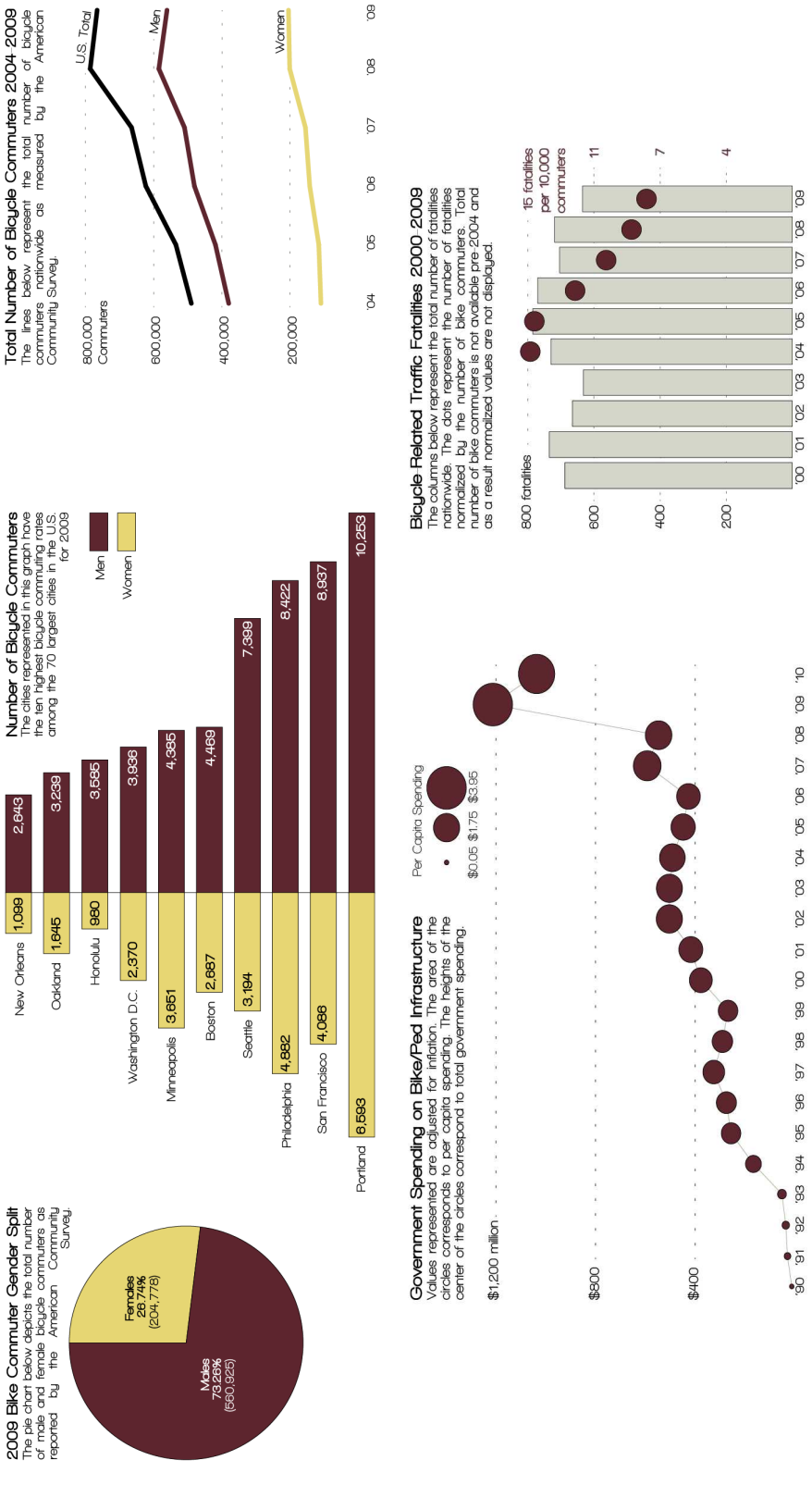

Figure 22.3 Data Panels from Bicycle Commuting Trends Poster

Chapter **23**

Measuring Racial Inequality in the ACS

Becky Pettit
University of Washington

Bryan Sykes
DePaul University

Individuals living in households differ in measurable ways from those living in group quarters. Although the American Community Survey (ACS) was initially limited to individuals living in households, in 2006 the ACS expanded its sampling frame to include individuals living in group quarters. Individuals living in group quarters are a diverse and sometimes difficult population to survey and there has been some discussion about the possible elimination of the group quarters population from the ACS (see, for example, Marton and Voss 2010). Our research shows that assessments of the population that exclude the group quarters population may be biased in ways that misrepresent facts and the factors thought to produce them, thus compromising the integrity of scientific research and public policy.

Researchers commonly rely on data collected from surveys of individuals living in households, like the Current Population Survey, to describe and explain social, economic, and political outcomes ranging from high school completion to political participation. Such data is also used for the design and evaluation of social policy and the allocation of federal resources to states and localities. Yet individuals and social groups who are highly mobile, have loose connections to households, or don't live in households are commonly overlooked by surveys that draw their samples from people living in households and on which our assessments of the population are based. The ACS is an important source of intercensal data about Americans not living in households including those in institutions or other group quarters.

Mass incarceration has influenced the representativeness of individuals living in households so profoundly that it undermines the establishment of facts, explanations of the factors thought to produce them, and policy that relies on them (Pettit 2012). Over the past 35 years the penal population has increased five-fold. Although current crime rates are on par with levels observed during the 1960s, incarceration is at historic highs. The total inmate population now tops 2.3 million and represents one percent of the adult population in the United States (Pew 2008). Incarceration is disproportionately concentrated among young, low-skill, black men. Using data from surveys of the institutionalized population collected by the Bureau of Justice Statistics, combined with population estimates from the Census Bureau, our research shows that one in nine black men was incarcerated on any given day in 2008 and 37 percent of young, black, male high school dropouts were behind bars (Pettit, Sykes and Western 2009).

High rates of incarceration, disproportionately concentrated among young, low-skill, black men, have implications for the way data are collected and interpreted. When they are incarcerated, inmates live in correctional institutions, not households, and so they are excluded from surveys that draw their

samples from people living in households. Consequently, surveys like the Current Population Survey fail to fully account for some of the most disadvantaged segments of the population. Conventional data sources generate overly optimistic accounts of black progress through the decades of penal growth on a range of measures from high school completion to political participation (Western and Pettit 2001; Ewert, Sykes and Pettit 2010; Rosenfeld, Laird, Sykes and Pettit 2011; Pettit 2012).

The ACS currently includes the incarcerated population, like other individuals living in group quarters, as a special population. And, although there is some debate about the quality of the group quarters data (Marton and Voss 2010), our estimates using the 2006-2010 ACS data show that excluding the institutionalized population has measurable consequences on estimates of basic social indicators. Bias associated with the exclusion of the institutionalized from surveys is most acute in those subgroups of the population where incarceration rates are highest, namely among young, black men with low levels of education.

Table 23.1 compares assessments of common social indicators for young men aged 20-34 using data from the 2006-2010 ACS. The top panel of the table shows data for young black men and the bottom panel shows data for young white men. The first column shows institutionalization rates. There are many different forms of institutionalization (e.g., nursing homes, long-term care facilities, correctional facilities including prisons, and jails). Among young men, however, the primary form of institutionalization is in prison or jail. According to the ACS, 9.8% of young black men and 1.7% of young white men were institutionalized. ACS data generate institutionalization rates lower than estimates from other sources (Pettit, Sykes, and Western 2009; Table 5). However, consistent with other data, institutionalization rates reported in ACS are higher among blacks than among whites and highest among young men with low levels of education: 29% of young black male high school dropouts and 7.8% of young white male high school dropouts are institutionalized in these data.

Table 23.1 also shows estimates of education, employment, veteran status, and marriage status for the household population and the total population, including the institutionalized. Excluding the institutionalized generates a high school dropout rate of 11.8% among young black men. Including the institutionalized generates a high school dropout rate of 15.0%. Thus, excluding those in institutions from estimates of the high school dropout rate would lead researchers to understate dropout rates by as much as 27.1%. The effects are similar, though not as large, among young white men. The high school dropout rate among the non-institutionalized is 6.4% and it is 6.9% in the total population, a bias of 6.6%. Similar bias affects employment rates. Excluding the institutionalized generates an employment rate of 37.9% among young, black, low-skill men. Including the institutionalized, the employment rate falls to 26.9%. According to the ACS data, young black men who have dropped out of high school are more likely to be institutionalized than they are to be working but we can only observe this fact if we include the institutionalized in estimates of the population.

Again, however, estimates derived from the ACS differ from those produced by other sources but there are two consistent observations. First, the institutionalized population differs in measurable ways from the non-institutionalized, or household, population. Second, excluding the institutionalized population leads to underestimates of racial inequality in educational and employment outcomes at the least. For example, using data from the Current Population Survey and information on inmates from the Bureau of Justice Statistics suggests a nationwide high school dropout rate among young black men of 19 percent in 2008, 40 percent higher than conventional estimates (13.5%) using the Current Population Survey alone. Moreover, including inmates in assessments of high school completion indicates no improvement in the black-white gap in high school graduation rates among men since the early 1990s (Ewert, Sykes and Pettit 2010; Pettit 2012).

Researchers, policymakers, and the public rarely consider the limitations and implications of our

reliance on survey data limited to people living in households. Growth in the criminal justice system fundamentally challenges the measurement of social indicators derived from surveys limited to those living in households. Data from the non-institutionalized household population is not adequate to understand the general population. Relying on data from the non-institutionalized population alone risks misrepresenting racial inequality, especially in the educational and economic progress of African American men.

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Table 23.1 Estimates of Social Indicators, Household (HH) and Total Population, Men 20–34, 2006–2010 ACS

		Education			Employed			Veteran Status			Married		
	Institutionalized	HH Only	Total	% Diff	HH Only	Total	% Diff	HH Only	Total	% Diff	HH Only	Total	% Diff
Non-Hispanic Black													
Some College	2.3%	41.8%	38.7%	7.6%	75.4%	73.7%	2.3%	6.4%	6.4%	0.1%	23.8%	23.6%	1.0%
HS/GED	9.7%	46.3%	46.3%	0.0%	63.0%	56.9%	9.7%	5.4%	5.1%	5.9%	18.8%	18.0%	4.4%
Less than HS	29.0%	11.8%	15.0%	−27.1%	37.9%	26.9%	29.0%	0.7%	0.7%	11.0%	12.6%	11.3%	14.2%
All	9.8%				65.2%	58.9%	9.8%	5.3%	4.9%	6.4%	20.2%	19.2%	5.2%
Non-Hispanic White													
Some College	0.4%	55.8%	55.1%	1.3%	83.3%	82.9%	0.4%	5.1%	5.2%	−0.5%	35.3%	35.3%	0.2%
HS/GED	2.4%	37.7%	38.0%	−0.7%	79.2%	77.3%	2.4%	6.7%	6.6%	0.6%	31.6%	31.1%	1.5%
Less than HS	7.8%	6.4%	6.9%	−6.6%	63.5%	58.5%	7.8%	0.8%	0.8%	−3.9%	30.4%	28.9%	4.8%
All	1.7%				80.4%	79.1%	1.7%	5.4%	5.4%	0.2%	33.6%	33.2%	1.1%

Chapter **24**

Use of American Community Survey Data to Develop Urban Travel Demand Modules

Rosella Picado
Parsons Brinckerhoff
Seattle, WA

All metropolitan areas rely on travel demand models to develop their long range transportation plans and to evaluate the merits and costs of transportation projects under various short and long term land use scenarios. One important property of a travel demand model is that it should reproduce current travel patterns. For the last decade the American Community Survey (ACS) has provided key information that helps modelers understand how people travel in many urban areas throughout the country. At the same time, ACS, along with the decennial census, provides the data required to know the location and composition of households—data that is the basis for forecasting the trips produced by persons living in these households. This paper presents various examples of how ACS data have been used to develop various components of travel demand models. These examples were drawn from work conducted by Parsons Brinckerhoff staff on behalf of various clients.

Case I—Transit Alternatives Analysis, Minneapolis–St. Paul

The ACS worker flows data are used routinely to validate the output from trip distribution models. A trip distribution model connects trip origins with trip destinations. In the case of work trips, it forecasts the workplace location of workers in the model area, given information about their residential location, household characteristics, and the transportation options. Being able to reproduce the pattern of worker flows for a base year is an important model validation test, as it is a key input to the mode choice model. In this particular application, ACS was used to produce origin-destination worker flows between Eau Claire, Wisconsin, and St. Paul and Minneapolis—a 100 mile corridor. A home interview survey was available for the Minneapolis–St. Paul metropolitan area, but it did not include households located as far as Eau Claire. This was an important transit market, and as such a critical component of the analysis was to have confidence regarding the number of trips by all modes observed in this market. ACS provided the data required to calibrate and validate the model.

The ACS worker flow data have been used in the validation of many other trip distribution models, both urban area models and statewide models. Recent examples include Southern California, Orange County, Maryland Statewide, North Carolina Statewide, and Southeast Florida. Current releases of the ACS worker flow data are available only at relatively large geographies—county and place—which limit their use for urban model validation because many urban areas include only a few counties. In contrast, the 2000 CTPP worker flows, produced from the census long form, provided information at smaller geographies (Transportation Analysis Zones, or TAZs), albeit with a great deal of suppression. Availability of the worker flow data at TAZ level allows constructing other measures of validation besides aggregate flows, such as trip length frequency distributions. In terms of origin-destination validation,

the ideal geography for model validation purposes would be districts consisting of 50–100 traffic analysis zones. This level of aggregation would provide the required geographical detail while preserving data confidentiality, and presumably would be less subject to suppression issues.

The five-year releases have proved the most useful for worker flow validation, given the larger sample sizes. However, care must be taken to ensure the representativeness of the five-year data when compared to the model base year. In one recent case, we have found that the 2006-2010 ACS worker flows are not representative of the 2010 base year conditions because during the survey period the region lost a substantial amount of employment. In fact, due to the fast changing economy the entire dataset is probably not representative of any one o the five years that it includes. This is problematic for travel demand model validation because the survey data are always compared against a single, base year. This example illustrates one of the shortcomings of pooling data from various years. In this particular case other data sources are being consulted, including the National Household Travel Survey and the Longitudinal Employment Household Dynamics Census product.

Case II—Sound Transit Mode Choice Model Calibration, Seattle, Washington

The ACS worker flows data are also helpful to understand transit shares over relatively large geographies. Because transit shares are very small in the vast majority of urban regions, this use of the ACS data is not very common, given the limitations of available sample sizes. Nonetheless, for the Sound Transit (ST) Incremental Mode Choice Model, a combination of ACS transit shares with local survey data was successfully used to calibrate the model to 2010 conditions. Earlier versions of the ST model relied on the U.S. Census Journey to Work (JTW) information to provide the base inter-zonal auto and transit shares. Given the discontinuation of the census long form, these data were not available from the 2010 Census. In their place, the 2006-2008 ACS worker flows data by mode were used to scale the transit shares calculated from the local Commute Trip Reduction (CTR) Act survey. The CTR survey is mandated in Washington State for all businesses that employ 100 or more people. The survey is administered every two years and records the commute options of all employees. Due to the size of businesses that are required to report, it was expected that the CTR survey would over-estimate the transit share of the entire work force. However the CTR survey provides more geographic detail than ACS, hence the interest in using both surveys. The model region was subdivided into six large districts following major transit markets, and a scaling process was developed to combine the transit share data from both surveys at an origin-destination district interchange. Future work with the ST model is expected to rely on the five-year ACS releases, as well as expected releases of worker flow data at smaller geographies.

Case III—San Diego Population Synthesizer

The most advanced class of travel demand models, activity-based models, rely on person and household based information, rather than the zonal-based data used by traditional models. These disaggregate data—essentially a 100% sample survey of the model region—are developed via micro-simulation, starting with a sample of households and persons representative of the model area. The process used to simulate the regional population is referred to as population synthesis. In 2010-2011, the San Diego Association of Governments developed a second generation population synthesizer, and tested it with two regional population samples: the 2000 Census Public Use Micro Sample (2000 PUMS) and the 2005-2009 ACS PUMS. In addition to the PUMS datasets, the population synthesizer uses multiple tabulations of household and person attributes for each traffic analysis zone, derived also from Census

and ACS data. These attributes include household size, income and number of workers, person age, gender and ethnicity, group quarters population, and worker occupation.

The synthesized population is compared against the observed population (whether the 2000 or 2005-2009 samples) using four measures of validation at the PUMA level:

- Mean percentage difference, which represents bias.
- Standard deviation, which represents average magnitude of difference.
- Minimum percentage difference, which represents the negative extreme difference.
- Maximum percentage difference, which represents the positive extreme difference.

These validation measures are shown for multiple household attributes in Figures 24.1 and 24.2 below. Both datasets produce reasonably good validations; however, the 2000 Census data produce better results. One possible explanation is that the 2005-2009 ACS exhibits somewhat inconsistent weights between the summary tables and PUMS. Further investigation of these weights is currently on-going.

Synthetic populations can be built with virtually any population sample, such as for example a home interview survey or a National Household Travel Survey sample. However, smaller samples tend to dampen the variability of population attributes in the synthetic population, and raise questions about its representativeness. To date virtually all population synthesizers implemented for major metropolitan areas rely on ACS PUMS data (or its precursor, 2000 Census PUMS). In this respect, the ACS program is supporting the next generation of travel demand models throughout the U.S.

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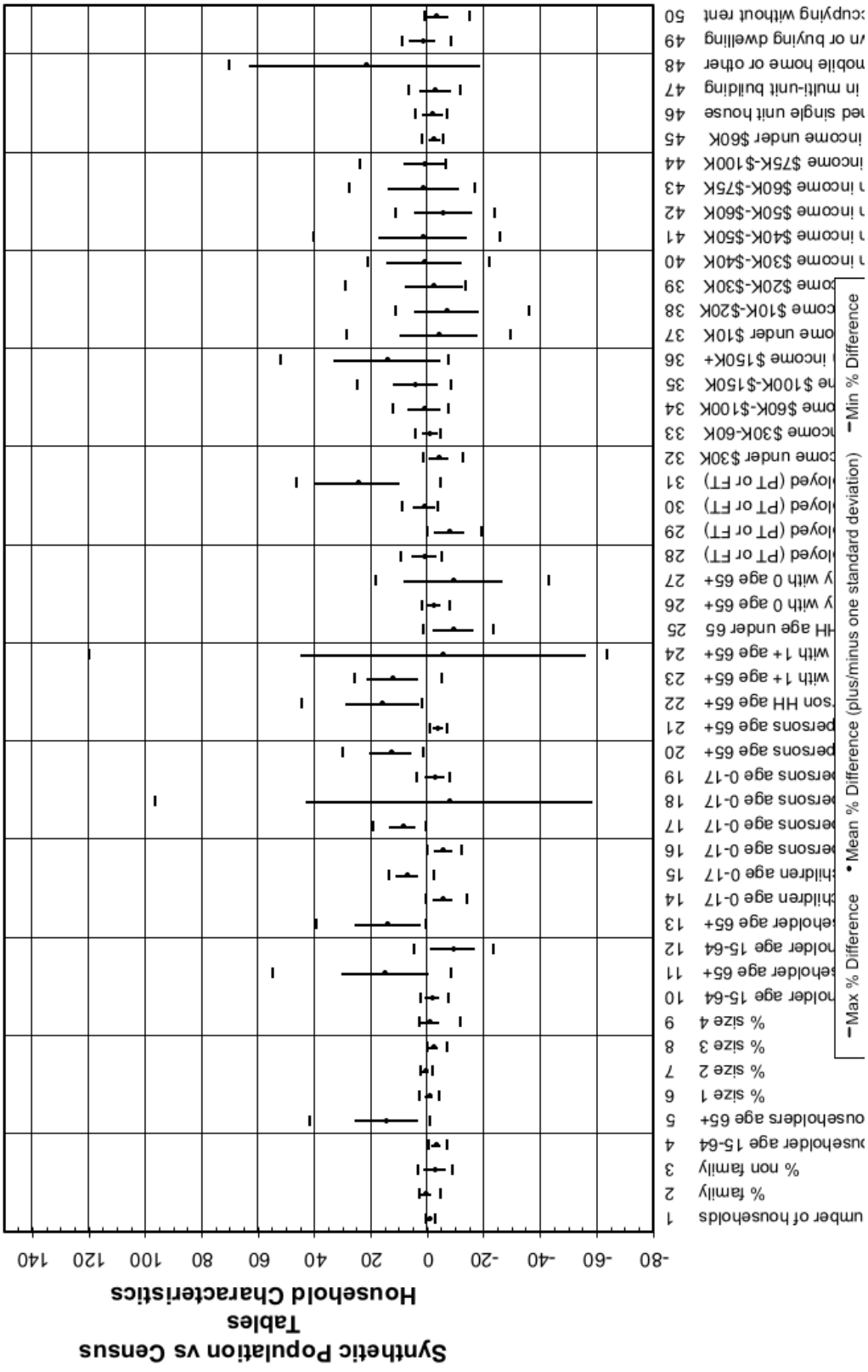


Figure 24.1 2000 Census-Based PopSyn Validation Results—Household Attributes

SOURCe: San Diego Association of Governments.

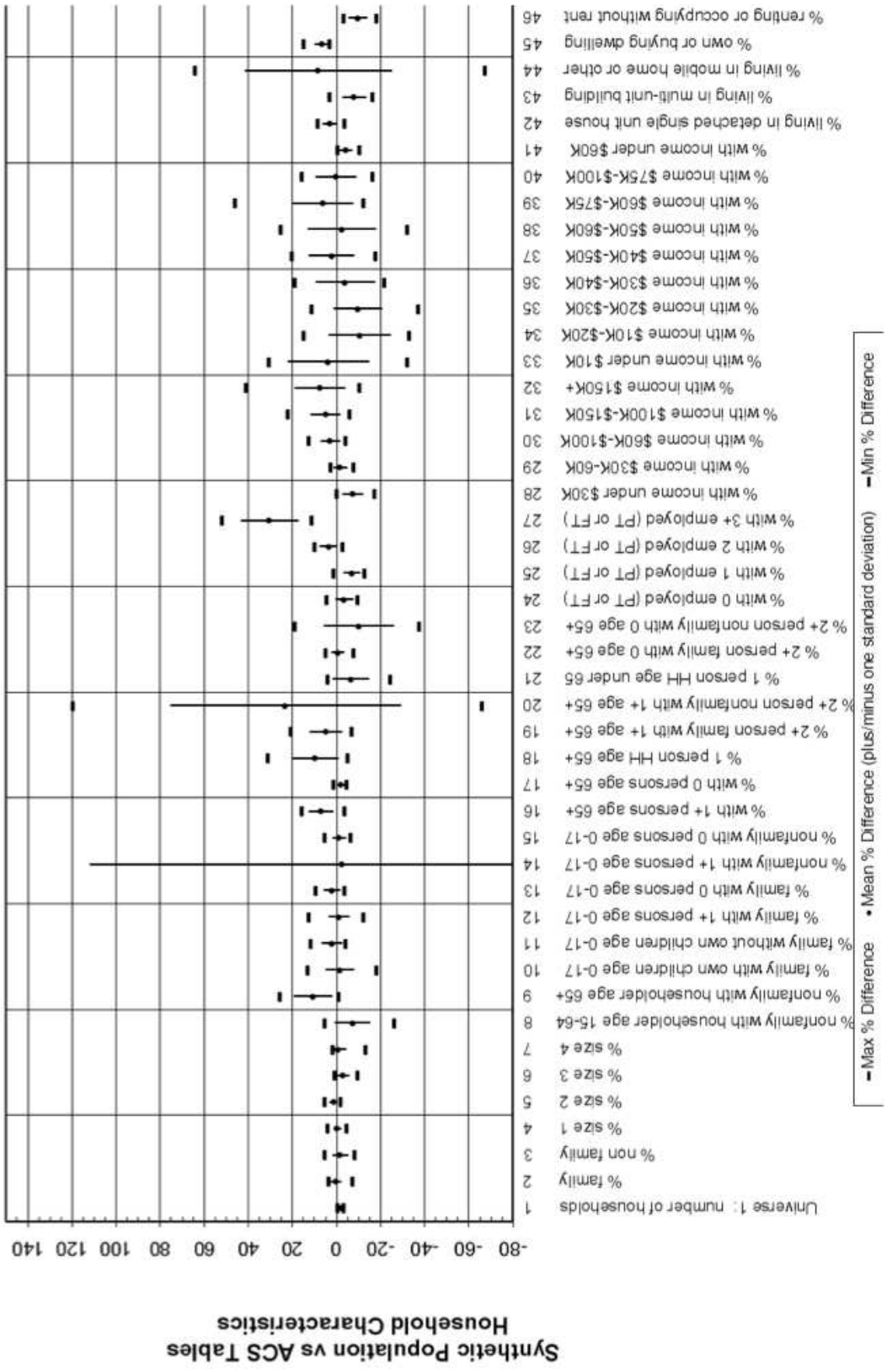


Figure 24.2 2005–2009 ACS-Based PopSyn Validation Results—Household Attributes

SOURCe: San Diego Association of Governments.

Chapter **25**

Use of American Community Survey Data in Journalism

Phillip Reese
Reporter/Data Analysis
The Sacramento Bee

As the data specialist at *The Sacramento Bee*, a 250,000-circulation daily in central California, I use figures from the American Community Survey almost every day. Without the ACS, dozens of important stories published in the Bee over the last few years would not have appeared.

Here's a sampling of some of the stories we've published that relied heavily on the American Community Survey:

- DESPITE DEGREES, MANY IN STATE UNDEREMPLOYED 12/11/11
  "Since the start of the recession, the number of new college graduates in California working as cashiers, office clerks, retail salespersons, bartenders, secretaries, child care workers, tellers and customer service representatives has jumped by 40 percent, or 12,000, according to a *Bee* review of census data. Meanwhile, the number of new grads employed in their chosen professions as schoolteachers, architects, accountants and myriad other careers has fallen."
- NO-PROOF LOANS FED MORTGAGE BUBBLE 11/18/2007
  "The *Bee*'s analysis of census data shows that the region's homebuyers earned a median income of $84,000 last year, but the area's mortgage applications listed a median income of $102,000."
- SOME MAJORS WORTH MORE THAN OTHERS 11/20/10
  "Is your child, for instance, thinking about . . . a philosophy degree? Philosophy graduates in California last year were about five times as likely to be unemployed as nursing graduates. . . . ethnic studies? Computer engineering graduates in California typically make twice as much . . . a drama degree? Theater majors were about eight times as likely to work in the food services industry as those with accounting degrees."
- SURGE IN 85-AND-OVER FOLKS POSES CHALLENGES 8/7/2008
  "The number of Sacramento metropolitan area residents over 85 has jumped 50 percent since 2000—more than triple the rate of growth for the region's other age groups and higher than state and nationwide averages, according to U.S. census figures released today."
- 33% OF AREA'S NEW GRADS UNEMPLOYED 9/22/11
  "No experience, no college degree, no job. That's the story for one of every three new high school graduates in the Sacramento region not attending college, according to census figures released today. The 33 percent unemployment rate among these 18- and 19-year-olds is nearly triple the regionwide overall unemployment rate of 12 percent."
- SOUTHEAST ASIANS MAKE STRIDES IN U.S 10/18/10
  "In 1990, half the Sacramento region's Southeast Asians were poor. Today, 52 percent own homes,

according to a *Bee* analysis of census data. They enjoy a median household income of $50,000 annually, up from $17,350 in 1990—about $28,500, adjusted for inflation."

- RETIREMENT? MORE SENIORS SAY: "NO, IT'S OFF TO WORK I GO" 9/12/2007
  "A rising number of local seniors are waking up to the reality of another day on the job, according to a *Bee* analysis of U.S. census figures released today. Whether they approach workdays with dread or gusto, out of need or desire, more than one of every five Sacramento area residents ages 65 to 74 were still in the labor force in 2006."
- UNEMPLOYMENT RATE BRUTAL FOR THOSE WHO LEFT CALIFORNIA 12/11/11
  "As California buckled under layoffs and hiring freezes last year, tens of thousands of residents saw lower unemployment rates in other states and decided to move. Many couldn't find jobs near their new homes either. The unemployment rate in 2010 among former Californians who had left the state during the previous 12 months was 19 percent, according to a *Bee* analysis of new U.S. census data. By comparison, the unemployment rate in the state they left behind was 12 percent."

In short, I rely heavily on ACS data in all its forms—one-year; three-year; five-year and PUMS. Without the ACS, hundreds of thousands of our readers would know less about the world around them.

Chapter **26**

Experiences Using American Community Survey Data in Updating a Regional Travel Demand Tool

Paul Reim
Central Transportation Planning Staff
Boston Region Metropolitan Planning Organization

Introduction

The Central Transportation Planning Staff (CTPS) is the technical staff of the Boston Region Metropolitan Planning Organization (MPO). The MPO is composed of state and regional agencies and authorities and local governments including the city of Boston and 100 surrounding communities. Among many other tasks, CTPS is responsible for developing and maintaining the MPO's regional travel demand model. The agency recently built a new 2010 base year model set using updated input data from sources including the 2010 Census and 2006–2010 American Community Survey (ACS).

Requirements

The trip generation step of the travel demand modeling process requires a variety of demographic inputs, including: population by age; households by size; households by income quartile; households by vehicles available; and households by number of workers. The first two items were obtained from the 2010 Census Summary File 1. The remaining tables, built in past years from the Census long form sample data, were derived from the 2010 American Community Survey 5-Year Summary File.

Data Analysis

Like most planning agencies, CTPS today uses powerful modeling software that allows the agency to divide its study area into a much larger number of travel analysis zones (TAZs) than previously possible. The modeled region includes the 101 MPO member communities plus an additional 63 surrounding cities and towns, and is further divided into 2,727 TAZs. In terms of Census geography, the modeled region is made up of 1,099 Census tracts which in turn are divided into 3,481 block groups. Essentially, the typical TAZ is approximately the size of a block group.

When the current TAZs were delineated a decade ago, CTPS dropped the requirement that TAZ boundaries respect Census geography. While the new zone structure is better suited than past versions to accurately predict trip-making behavior, it does make the tabulation of demographic statistics at the zone level more complicated. Indeed, while in past decades only a handful of special-case TAZs would split Census blocks, today more than 2,000 blocks from the most recent decennial Census (out of over 86,000) are split between 2 or more zones.

Through the use of field reconnaissance and interpretation of aerial imagery, CTPS assigned housing units, household population and group quarters population to the various TAZs overlaying each block, resulting in a table of 2010 block-to-TAZ allocation factors. The agency then used these factors in combination with 2010 Census data to generate tract-to-TAZ and block group-to-TAZ factors for a variety of data universes including total population, household population, group quarters population, households, families, and housing units.

The strength of the ACS is in describing the distribution of population and household characteristics of a particular area of geography. Expansion of the survey is controlled to Census estimates at the county or county subdivision level. As a result, ACS estimates of total households for a particular tract or block group may differ significantly from the 2010 Census count of households for the same area. Since the 5-year period covered by the most recent ACS data included the Census year, CTPS chose to apply the distributions of any ACS characteristics to the 2010 Census total for the relevant statistic.

For example, here are the unadjusted and adjusted household income data for zone 62 in Boston:

	Total HH	Under $35K	$35–75K	$75–125K	Over $125K
2010 Census	822				
2006–2010 ACS Estimates	700	328	101	49	222
2006–2010 ACS Adjusted	823	385	119	58	261

Given that the typical TAZ is smaller in population than a Census tract, CTPS initially chose to use block group statistics from the ACS, where available, as the base for estimating TAZ-level inputs to the trip generation model. The results were not particularly good. For example, consider the table summarizing households by income quartile by TAZ. Despite collapsing 16 income categories to 4, 75 percent of TAZs had at least one cell fail the test for significance at the 90 percent confidence level. When the same summary table was produced using tract-level data as the base, only 14 percent of zones had at least one statistically insignificant cell. One thing to keep in mind, however, is that in using the tract-level rather than block group-level data, we assume a uniform demographic profile over a larger geographic area. We are trading descriptive quality for statistical precision.

Conclusions

The replacement of the decennial Census long form survey with the smaller-sample American Community Survey provides both benefits and disadvantages. On the positive side, a new ACS release every year ensures that users will always have relevant demographic data available. Because the survey expansion is controlled to estimates for large geographic units, use of the ACS data should be limited to applying the distribution of characteristics to population or household totals in which the user has confidence. At CTPS, these totals will be drawn from the 2010 Census as long as the ACS data being used is based on survey years overlapping the Census year, in this case from the current 2006-2010 data through the 2010-2014 release. Beyond 2014, use of the ACS data will likely be limited to the county subdivision and TAZ levels of geography, with the distribution of characteristics applied to locally-produced estimates of population, households and employment.

On the negative side, the small sample size of the ACS limits the use of block group data to the construction of custom geographic units that are tract-size combinations of block groups. As the CTPS experience indicates, when the custom geographic units are themselves the size of block groups, the number of cells in a table that fail statistical tests of significance may be too large for the data to be useful. However, when tract-level data is used to build TAZ summaries, the demographic distinctions between nearby zones are blurred.

Chapter **27**

User Profile: Puerto Rico Institute of Statistics

Idania R. Rodríguez Ayuso
Statistical Project Manager
Puerto Rico Institute of Statistics

Introduction

The Puerto Rico Institute of Statistics (PRIS) was created to ensure universal and timely access to reliable and comprehensive statistical information on Puerto Rico. For the past five years, the PRIS has developed several initiatives to fulfill the needs of Puerto Rico data users. One of these initiatives is a data request service, in which data users send their statistical requests and PRIS's personnel provide them with the data they are seeking and/or guidance on how to obtain the information. Some of the data requests are related to the demographic or economic characteristics of the population of Puerto Rico. The American Community Survey (ACS) and Puerto Rico Community Survey (PRCS) are the primary source of information regarding population and housing characteristics. In addition to providing data, the PRIS offers technical assistance to data users that are interested in obtaining information regarding the processes and products used or produced by the U.S. Census Bureau regarding Puerto Rico.

ACS Users' Profile

From January 2011 to May 2012, the PRIS has attended to more than 500 data requests. Among these, nearly 10% were answered using ACS/PRCS data. Some of these requests were complex and requires PRIS's personnel to use the ACS/PRCS PUMS. Other petitions involved multiple questions that were answered using different tables obtained from the American FactFinder (AFF).

ACS/PRCS data users include policymakers, businesses, media, academia, students, and government employees. Some of the data has been used to compare characteristics among (a) municipios (counties) in Puerto Rico, or (b) Puerto Rico and other states. The products that we have used the most are the detailed tables, followed by subject tables, selected population profiles, data profiles, and geographic comparisons.

Most of the data requested is demographic: population distribution by age and sex, disability characteristics of the population, poverty status, educational attainment, school enrollment, household/family income, individual earnings, occupations, and types of family. Users have also asked about data on grandparents in charge of grandsons with or without parents' present at home, family income by poverty status, and the Gini index of income inequality. Other information requested includes characteristics of teenagers (aged 15 to 19 years), demographic/socioeconomic information for a specific municipio or for Puerto Rico, and demographic and economic characteristics of the female population.

Some requests entailed custom-tailored tabulations using the PUMS for policy makers, media and students. One of these requests was the occupations of people younger than 21 years that were employed. Another user requested an estimate for the number of people between 16 and 34 years old that were

neither working nor studying. A third petition was employment status by educational attainment in youth. Finally, continuous requests regarding the migrant population promoted the development of 2 migrant profiles.

In more than 25% of the requests of demographic or socioeconomic data that could be answered using ACS/PRCS, PRIS's personnel offered technical assistance on how they cold access the data. This technical assistance was given by phone or through a manual on how to use AFF to access data. When the AFF Legacy existed, the PRIS developed manuals on how to conduct a search for 1 year, 3 year, and 5 year datasets. Since the availability of the new AFF, we have relied on the Census self-study guide on AFF2. Finally, we offered a presentation to 60 statisticicans from the Government of Puerto Rico and its municipios on how to use the new AFF.

Conclusion

As with any survey, the ACS/PRCS has limitations. For the PRCS, there are no data on housing coverage rates. Additionally, the coverage rates for the total population decreased from 2005 to 2009, reaching 79.5% in 2009. Additionally, in Puerto Rico, the number of final interviews as a percent of initial addresses selected ranged from 60% to 65%. These rates have raised concerns among users. However, the PRCS is an invaluable source for critical information on the demographic and economic characteristics of Puerto Rico.

Chapter **28**

Puerto Rico Migrant Profiles

Idania R. Rodríguez Ayuso
Statistical Project Manager
Puerto Rico Institute of Statistics

Introduction

For the past 2 years, the Puerto Rico Institute of Statistics (PRIS) has used data from the American Community Survey (ACS) and Puerto Rico Community Survey (PRCS) as the primary source of information to develop Migrant Profiles. We published these profiles at the beginning and the end of 2011; the first one included data from 2002–2009, and the other data for 2010. The ACS/PRCS is our only source of information regarding migration data, since is the only survey conducted by the U.S. Census Bureau in both United States and Puerto Rico.

These migrant profiles are relevant to us because for the first time in recorded history a census showed a decrease in the population of Puerto Rico. Additionally, census figures indicated that there are more Puerto Ricans living in United States than in Puerto Rico. Therefore, it is imperative for the Puerto Rico government to identify, in a timely and cost-effective manner, the characteristics of the people that migrate to and from the United States and Puerto Rico. This knowledge will allow the development of strategies and policies in this area.

Methodology

The ACS/PRCS collects socio-demographic and housing information from the participants. The tables from the American FactFinder (AFF) used to develop the profiles were those shown in Table 28.1.

In addition, the PRIS used the Public Use Microdata Sample (PUMS) to obtain other characteristics of the migrant population that we were not available on standard ACS/PRCS products. Geographical mobility was used to determine migration status. Within the ACS' PUMS we selected data from people that indicated having lived in Puerto Rico the past year. For the PRCS, we selected those who indicated that lived in the United States the past year. Data from the PUMS was useful to develop detailed tables of the migrants' characteristics for years 2005-2007. For 2010, we used the PUMS to (a) identify the percentage of migrants who were not in the labor force and (b) obtained the occupation of the migrants. Finally, for 2010 data, we calculated the margin of error using the Generalized Standard Errors with Design Factors proposed by the U.S. Census Bureau.

Results

According to the ACS/PRCS data, between 2005 and 2010 more than 364,000 people living in Puerto Rico moved to United States. On the other hand, more than 192,000 people living in the United

Table 28.1 ACS/PRCS tables used to develop the migrant profiles

Year(s)	Tables
2002–2003 (U.S. only)	P041
2004 (U.S. only)	B07202
2005–2009 (both)	B07101, B07001-PR, B07002-PR, B07003-PR, B07004I-PR, B07007-PR, B07008-PR, B07009-PR B07010-PR, B07011-PR, B07012-PR, B07013-PR, B07204, B07204-PR, B07401-PR, B07402-PR, B07403-PR, B07404I-PR, B07408-PR, B07407-PR, B07409-PR, B07410-PR, B07411-PR, B07412-PR, B07413-PR
2010 (both)	B07101, B07204, B07001-PR, B07002-PR, B07003-PR, B07004I-PR, B07007-PR, B07008-PR, B07009-PR, B07010-PR, B07011-PR, B07012-PR, B07013-PR B07401-PR, B07402-PR, B07403-PR, B07404I-PR, B07407-PR, B07408-PR, B07409-PR, B07410-PR, B07411-PR, B07412-PR, B07413-PR

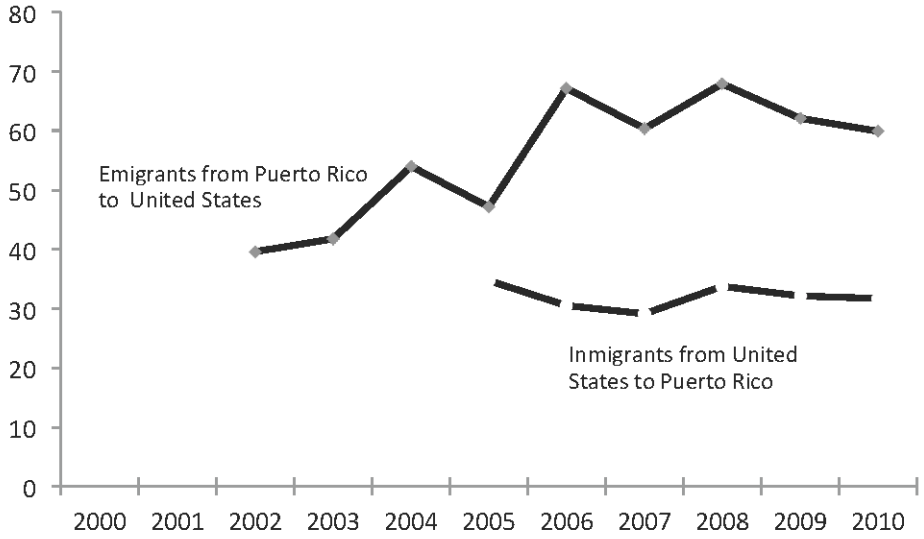


Figure 28.1 Migration movement by year (in thousands)

SOURCE: U.S. Census Bureau. Puerto Rico Community Survey.

States moved to Puerto Rico, producing a net balance of more than −172,000 people in the last 6 years (Figure 28.1).

In 2010, the median age of the migrant population was similar (28.1 years in emigrants vs. 28.1 years in immigrants). These medians differ considerably from the median age of the Puerto Rico population, which is 37.2 years. Prior to 2009, the median age of emigrants was lower than the median age of immigrants. However, immigrants' median age decreased 3.8 years since 2005, while the median age of emigrants only decreased 1 year during the same period (Figure 28.2).

The age and sex distribution of emigrants and immigrants were different in 2010. Males among group ages 20 to 24 years and 25 to 29 years are the primary groups that migrated to United States.

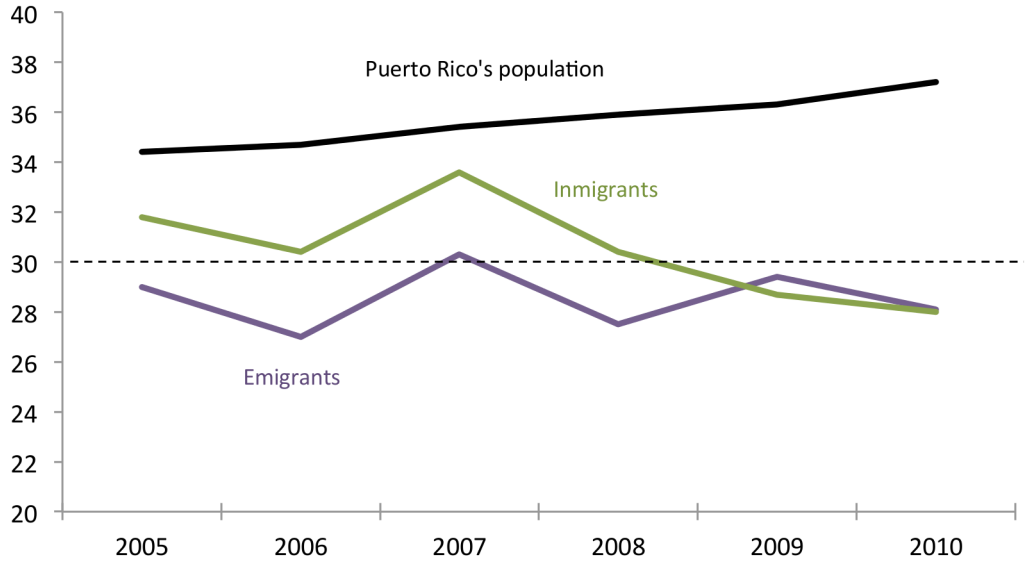


Figure 28.2 Median age of migrants (emigrants and immigrants) in Puerto Rico

SOURCE: U.S. Census Bureau. Puerto Rico Community Survey.

Furthermore, 58% of males that migrated to United States were younger than 30 years old. On the other hand, the primary age groups of female migrants to United States were between ages 20 to 24 and 15 to 19. However, less than 50% of females that migrated to United States were younger than 30 years old (Figure 28.3).

In 2010, the percentage of emigrants who were not in labor force had an increase of 20 percentage points from 2008 and 2009. Additionally, this percentage was higher than in the immigrant population (Figure 4). Finally, among those who emigrated and had professional or managerial positions, 416 (±643) were teachers, 109 (±301) layers, and 64 (± 231) physicians. On the other hand, there were 557 (± 603) teachers, 231 (± 409) physicians, and 94 (± 250) nurses who immigrated to Puerto Rico. Some of the characteristics of the migrant population are described on Table 28.2.

Lessons Learned

The ACS/PRCS provides useful data to develop profiles for the population of interest. During the process we were able to explore the PUMS and learned about the vast array of different variables that are available. This allowed us to use different variables to validate mobility status and to identify the country of origin of the population. After obtaining the data, we were able to elaborate hypothesis about the factors that could have promoted the migration of people with these characteristics. We are looking forward to obtaining 2011 data to develop more cross tabulations and learn more about this group of interest.

To access the profiles (in Spanish) see the following links:
http://www.estadisticas.gobierno.pr/iepr/Estadisticas/Publicaciones.aspx#pm
http://www.estadisticas.gobierno.pr/iepr/Estadisticas/Publicaciones.aspx#pm2012

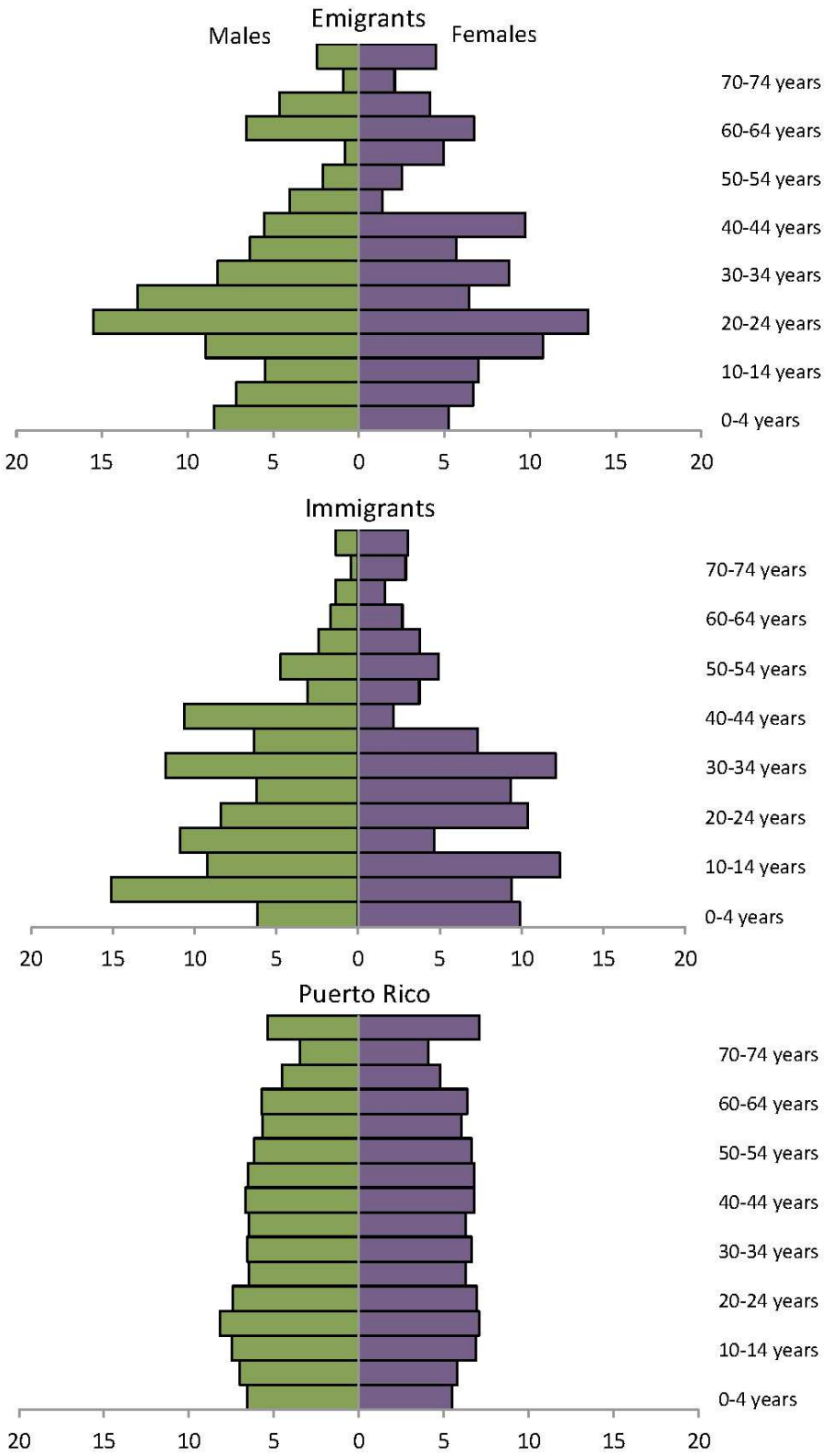


Figure 28.3 Age and sex distributions of migrants and general Puerto Rico population, 2010

SOURCE: U.S. Census Bureau. Puerto Rico Community Survey.

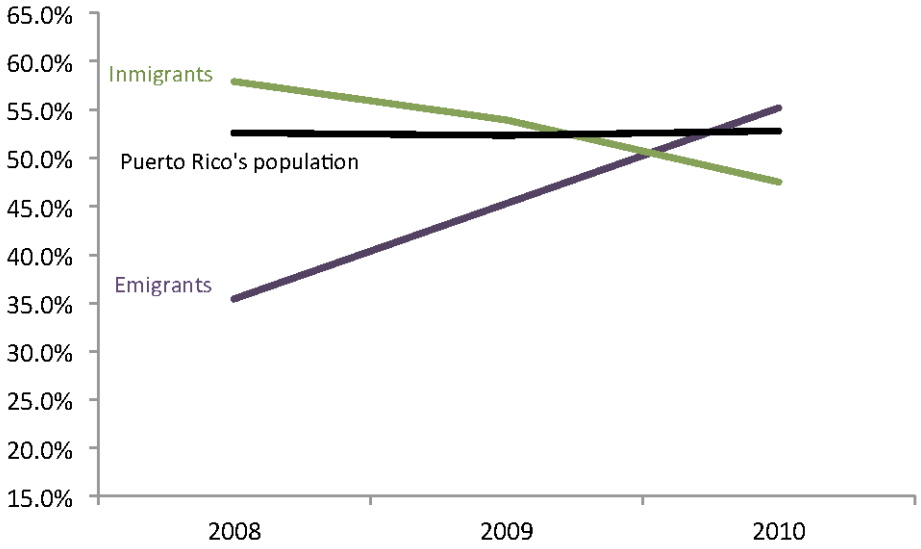


Figure 28.4 Migrants not in labor force

SOURCE: U.S. Census Bureau. Puerto Rico Community Survey.

Table 28.2 Puerto Rico Migrants' Chracteristics, 2010

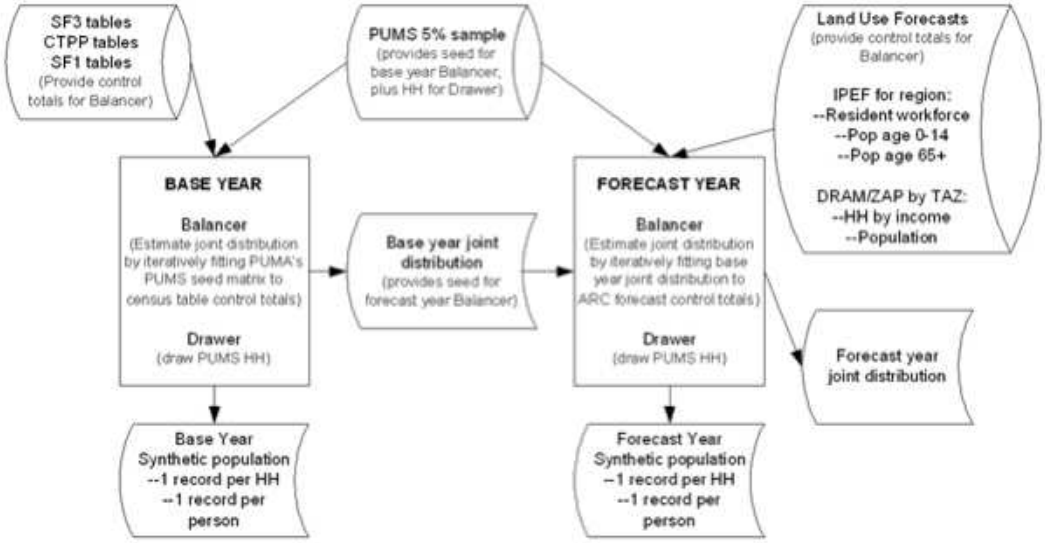
	Emigrants to U.S.A.		Immigrants from U.S.A.		Immigrants from Other Countries	
	Margin	MOE	Margin	MOE	Margin	MOE
Total	59,885	±6,923	31,732	±4,381	4,989	±1,988
Hispanic origin	51,010	±6,616	29,808	±4,018	4,813	±1,924
Born in PR or U.S.A	52,235	±6,608	30,357	±4,297	2,449	±1,163
Born elsewhere	7,650	±2,179	1,375	±640	2,540	±1,190
Naturalized	1,448	±674	186	±213	471	±510
Not American citizenship	6,202	±2,043	1,189	±641	2,069	±979
Educational attainment (>25 years)	34,490	±4,464	17,058	±2,657	2,972	±1,034
Less than high school	11,605	±2,302	5,278	±1,367	510	±363
High school	9,133	±1,898	5,370	±1,403	851	±495
Some tertiary education	6,776	±1,670	3,429	±1,177	296	±209
Bachelor degree	5,279	±1,558	1,666	±559	482	±359
Graduate or professional level	1,697	±888	1,315	±615	833	±450
Median income	12,069	±2,109	9,300	±1,243	9,736	±7,567
Poverty status						
Lower than 100%	22,248	±3,821	19,585	±3,662	1,835	±759
Between 100 to 149	8,368	±2,751	2,813	±1,185	595	±665
In or above 150%	25,526	±4,267	8,739	±2,221	2,471	±1,534
Moved from/to (U.S.A Region)						
Northeast	21,395	±3,821	11,115	±2,462		
Midwest	7,843	±2,157	2,877	±1,789		
South	25,350	±5,072	14,485	±2,857		
West	5,297	±2,096	3,255	±1,925		

Chapter **29**

Using ACS in Population Synthesis for the Atlanta Activity-Based Model: Issues & Challenges

Guy Rousseau
Atlanta Regional Commission

The Atlanta Regional Commission's Travel Demand Model uses a four-step trip-based model process to periodically update the area's Regional Transportation Plan. In addition, it has a disaggregate activity-based model. One component of that overall model—the Population Synthesizer (PopSyn)—has historically relied heavily on decennial census data (in particular the Census Transportation Planning Package produced using the long-form sample and the Summary File tabulations), and is in the process of converting to American Community Survey (and ACS Public Use Microdata Sample [PUMS]) data. A diagram showing the concept of the current PopSyn is shown below, followed by Guy Rousseau's summary of issues related to the conversion to ACS. Additional information about the Travel Demand Model can be found at http://www.atlantaregional.com/transportation/travel-demand-model.



ACS & ARC's Population Synthesizer: Define & Set up ACS Control Data

- Define geographic categories that:
  - Aggregate Traffic Analysis Zones (TAZ)
  - Represent the most disaggregate partition of Atlanta 20-county region for which ACS control values are available from Census Bureau.
- Select control data items from those available in ACS tables.

ACS Data Use, Continued…

- Manipulate standard tables:
  - Provided by Census
  - Into the chosen "most disaggregate" dimension

Modify Population Synthesizer

- Re-engineer PopSyn so that:
  - It will accept & use control table input at the new ACS level of aggregation
  - Above TAZ but smaller than the entire region

Continued…

- Modify the population synthesizer forecast year so that:
  - It will work in forecast mode like it works in base year mode
  - Using TAZ, intermediate or regional controls
  - Defined as numbers of households in the category (rather than as averages or person values)

Continued…

- Modify Validator so that it can:
  - Aggregate results to the new ACS aggregation dimension &
  - Compare the synthetic population to the ACS data items for controlled and uncontrolled variables.
- This retains the ability to perform some validation, as was done with the 1990 backcast

Continued…

- Modify the population synthesizer so that it can:
  - Read and draw households from ACS PUMS data instead of 2000 census PUMS data
  - ***Issue***: Ensure that PUMS data dictionary of ACS PUMS is same as that of 2000 Census
  - Could use ACS controls but draw 2000 Census PUMS households to satisfy controls

PopSyn, ACS version

- Re-specify the population synthesizer input control files for a configuration that is:
  - Compatible with the new tabulation dimension
- Create new population synthesizer, ACS version, compare and evaluate results

Enhance Population Synthesizer to Integrate ACS Data: In Summary:

- Use ACS Data to Provide Control Data
- Synthetic Population Generated for Any Year for which ACS Data is Available
- Use ACS PUMS to supply Households in Synthetic Population
- Use 2006 Distribution of 2005 ACS Data & Combo of County & PUMA Data, since Tract-Level is in 2010
- Modify PopSyn Balancer to Handle Controls at 2005 ACS Level of Geography, by Simultaneously Using TAZ, ACS and ARC Regional Control Totals
- Population Synthesizer's Drawer would Draw Households from 2000 PUMS or ACS PUMS

Other Issues Related to Model Development

- New CTPP: ACS Sample means no Long Form for 2010
- So, use first 5 years of ACS (2005-2009) for Tracts, Block Groups, TAZ special tabs
- What does a 5-year data accumulation mean for small area geography?

A Plausible Scenario…

- 1st CTPP release with ACS uses 2005-2009 data (1st possible release of small area)
- Next CTPP with ACS uses 2010-2014 data
- TAZ level data (5-year summary) might show a difference (sample sizes in ACS are smaller than decennial census long form)
- 5-year summary issue: overlapping years implies potential problems for data analysis
- Use a 2008-2012 5-year summary CTPP to approximate 2010?
- If so, how will Census weight 5-year summary data? Should each year have the same weight? Or should the newest years have more weight?

Other Key Questions for Model Development

- After the first 5 years of ACS, Census can release small area data (2005-2009, 2006-2010, 2007-2011, etc…)
- So once Census has 5 years of data, Census would publish annual estimates at the smallest viable area
- But 4 of the survey sample years will remain same
- Margin of error likely high for small geographic units.
- So, how'bout 2005-2009 (1st release of small area data), then,
- 2008-2012, but would the weights be adjusted using 2010 Census block data by age and sex, or,
- Would the weights be adjusted using 2010 Census for the 2007-2011 accumulation?
- So estimates for 2010 (based on 2008-2012) could be controlled to the census counts at the BG level and up

Chapter **30**

A Loss Function Approach to Examining ACS Estimates: A Case Study of 2010 "Persons Per Household" Estimates for California Counties

David A. Swanson
Department of Sociology
University of California, Riverside

George C. Hough, Jr.
Hobby Center for the Study of Texas
Rice University

Summary

The American Community Survey (ACS) is a U.S. 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 call for ACS to serve not only as a substitute for the decennial census long-form, but as a means of providing annual data at the national, state, county, and subcounty levels. In addition to being highly ambitious, this approach represents a major change in how data are collected and interpreted. Given this major change, little is known about ACS error. This case study explores ACS error by examining "Persons Per Household (PPH)," a variable of high interest to demographers and others preparing regular post-censal population estimates. We use a loss function approach in this case study of 1-Year 2010 ACS PPH Estimates for California counties by comparing them to 2010 Census PPH values. The loss function we use takes the form of Root Mean Squared Error (RMSE), which incorporates both the variance of an estimator and its bias. The case study suggests that, on average, variance accounts for 55% of the RMSE and bias, 45%. We conclude by suggesting further use of the loss function approach.

Methods

The mean squared error (MSE) of an estimator represents a way to measure the difference between values implied by an estimator and the true values of the quantity being estimated. Because MSE corresponds to the expected value of the squared error loss, it can be viewed as a loss function. It measures the average of the squares of the "errors." The error is the amount by which the value implied by the estimator differs from the quantity to be estimated. MSE incorporates both the variance of the estimator and its bias:

$$\mathrm{MSE}(\hat{\theta}) = \mathrm{Var}(\hat{\theta}) + \left(\mathrm{Bias}(\hat{\theta}, \theta)\right)^2.$$

where $\hat{\theta}$ is an estimator of parameter θ. (Treat the ACS PPH estimate as $\hat{\theta}$ and the Census PPH value as θ.)

Table 30.1 California 2010 ACS and Census PPH with RMSE Analysis

1 YEAR 2010 ACS			2010 CENSUS	MEASURES OF ERROR				RMSE = SE + BIAS		
Geography	PPH	PPH Margin of Error	PPH	ACS PPH - CENSUS PPH = ERROR	MSE	VARIANCE	BIAS^2	ACS Standard Error	ACS BIAS	RMSE
Alameda County	2.76	0.02	2.70	0.06	0.00360	0.00015	0.00001	0.0122	0.0478	0.0600
Butte County	2.53	0.06	2.45	0.08	0.00640	0.00133	0.00003	0.0365	0.0435	0.0800
Contra Costa County	2.83	0.03	2.77	0.06	0.00360	0.00033	0.00001	0.0182	0.0418	0.0600
El Dorado County	2.67	0.09	2.55	0.12	0.01440	0.00299	0.00013	0.0547	0.0653	0.1200
Fresno County	3.23	0.04	3.15	0.08	0.00640	0.00059	0.00003	0.0243	0.0557	0.0800
Humboldt County	2.39	0.05	2.31	0.08	0.00640	0.00092	0.00003	0.0304	0.0496	0.0800
Imperial County	3.41	0.11	3.34	0.07	0.00490	0.00447	0.00000	0.0669	0.0031	0.0700
Kern County	3.21	0.04	3.15	0.06	0.00360	0.00059	0.00001	0.0243	0.0357	0.0600
Kings County	3.37	0.09	3.19	0.18	0.03240	0.00299	0.00086	0.0547	0.1253	0.1800
Lake County	2.64	0.18	2.39	0.25	0.06250	0.01197	0.00255	0.1094	0.1406	0.2500
Los Angeles County	3.01	0.01	2.98	0.03	0.00090	0.00004	0.00000	0.0061	0.0239	0.0300
Madera County	3.40	0.13	3.28	0.12	0.01440	0.00625	0.00007	0.0790	0.0410	0.1200
Marin County	2.37	0.04	2.36	0.01	0.00010	0.00059	0.00000	0.0243	-0.0143	0.0100
Mendocino County	2.55	0.13	2.46	0.09	0.00810	0.00625	0.00000	0.0790	0.0110	0.0900
Merced County	3.43	0.09	3.32	0.11	0.01210	0.00299	0.00008	0.0547	0.0553	0.1100
Monterey County	3.17	0.05	3.15	0.02	0.00040	0.00092	0.00000	0.0304	-0.0104	0.0200
Napa County	2.64	0.06	2.69	-0.05	0.00250	0.00133	0.00000	0.0365	0.0135	0.0500
Nevada County	2.39	0.12	2.35	0.04	0.00160	0.00532	0.00001	0.0729	-0.0329	0.0400
Orange County	3.02	0.01	2.99	0.03	0.00090	0.00004	0.00000	0.0061	0.0239	0.0300
Placer County	2.65	0.06	2.60	0.05	0.00250	0.00133	0.00000	0.0365	0.0135	0.0500
Riverside County	3.24	0.03	3.14	0.10	0.01000	0.00033	0.00009	0.0182	0.0818	0.1000
Sacramento County	2.70	0.02	2.71	-0.01	0.00010	0.00015	0.00000	0.0122	-0.0022	0.0100
San Bernardino County	3.37	0.04	3.26	0.11	0.01210	0.00059	0.00013	0.0243	0.0857	0.1100
San Diego County	2.83	0.02	2.75	0.08	0.00640	0.00015	0.00004	0.0122	0.0678	0.0800
San Francisco County	2.37	0.03	2.26	0.11	0.01210	0.00033	0.00014	0.0182	0.0918	0.1100
San Joaquin County	3.10	0.04	3.12	-0.02	0.00040	0.00059	0.00000	0.0243	-0.0043	0.0200
San Luis Obispo County	2.56	0.06	2.48	0.08	0.00640	0.00133	0.00003	0.0365	0.0435	0.0800
San Mateo County	2.77	0.03	2.75	0.02	0.00040	0.00033	0.00000	0.0182	0.0018	0.0200
Santa Barbara County	2.90	0.05	2.86	0.04	0.00160	0.00092	0.00000	0.0304	0.0096	0.0400
Santa Clara County	2.94	0.02	2.90	0.04	0.00160	0.00015	0.00000	0.0122	0.0278	0.0400
Santa Cruz County	2.65	0.06	2.66	-0.01	0.00010	0.00133	0.00000	0.0365	-0.0265	0.0100
Shasta County	2.57	0.07	2.48	0.09	0.00810	0.00181	0.00004	0.0426	0.0474	0.0900
Solano County	2.87	0.05	2.83	0.04	0.00160	0.00092	0.00000	0.0304	0.0096	0.0400
Sonoma County	2.57	0.03	2.55	0.02	0.00040	0.00033	0.00000	0.0182	0.0018	0.0200
Stanislaus County	3.07	0.04	3.08	-0.01	0.00010	0.00059	0.00000	0.0243	-0.0143	0.0100
Sutter County	2.90	0.06	2.98	-0.08	0.00640	0.00133	0.00003	0.0365	0.0435	0.0800
Tulare County	3.39	0.05	3.36	0.03	0.00090	0.00092	0.00000	0.0304	-0.0004	0.0300
Ventura County	3.05	0.03	3.04	0.01	0.00010	0.00033	0.00000	0.0182	-0.0082	0.0100
Yolo County	2.69	0.06	2.74	-0.05	0.00250	0.00133	0.00000	0.0365	0.0135	0.0500
Yuba County	3.01	0.18	2.92	0.09	0.00810	0.01197	0.00002	0.1094	-0.0194	0.0900
Mean	**2.8805**		**2.82625**				**MEAN**	**0.0361702**	**0.02958**	**0.06575**
						Proportion of	**RMSE**	**0.5501**	**0.4499**	

If bias is zero, then MSE reduces to one component, variance (Var). By taking the square root of MSE, one obtains Root Mean Square Error (RMSE), which is convenient because its metric is the same as those being estimates. As is the case, with MSE, if bias is zero, then RMSE reduces to one component, the square root of variance, the standard error (SE). RMSE is defined as:

$$\mathrm{RMSE}(\hat{\theta}) = \mathrm{SE}(\hat{\theta}) + \mathrm{Bias}(\hat{\theta}, \theta)$$

Data and Results

We evaluate 2010 1-year ACS PPH estimates for the 40 counties in California against their 2010 census counterparts. The study data are shown in Table 1 along with the results for MSE, RMSE, SE, and Bias. As can be seen in Table 30.1, the average RMSE is .06575, while average SE is .03617 and average bias is .02958. Expressed as proportional components of RMSE, SE represents 55% and bias, 45%.

Conclusions and Future Research

The loss function approach presented here complements an examination of ACS PPH values by Swanson and Hough (2012) as well as continues the loss function approach Hough and Swanson (2006) used in an earlier ACS evaluation. We suggest that future research proceed by first examining 2010 ACS PPH estimates for counties and other geographical levels for which 1-Year estimates are available. We believe that it is not worthwhile to conduct this type of research for multi-year ACS estimates since the temporal aggregation found in these estimates does not yield a set of estimates that can be compared to census values. Following this, we suggest using the loss function approach with other ACS variables, such as vacancy estimates (see e.g., Cresce, 2012).

References

Cresce, A.R. 2012. Evaluation of gross vacancy rates from the 2010 census versus current surveys: early findings from comparisons of the 2010 census and the 2010 ACS 1-year estimates. *SEHSD Working Paper 2012-07*. Social, Economic and Housing Statistics Division, U.S. Census Bureau.

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Chapter **31**

Online Mapping for Displaying ACS Estimates and Reliability Measures

Jane Traynham
Maryland State Data Center

Presenting ACS estimates with corresponding margins of error (MOE) in a way that is meaningful to both experienced and novice data users is challenging. Many users choose to ignore the MOEs completely, others may refer to the MOEs in their analysis or reports and a few may actually consider whether the estimates are reliable enough to use for their purposes based on the relative size of the MOEs.

The Maryland Department of Planning, using an ArcGIS mapping extension developed by the Department of Geography and Geoinformation Science at George Mason University, prepared nine thematic map layers of socioeconomic characteristics such as median household income, percent of persons below poverty, unemployment rate and percent of persons with a bachelor's degree or higher, using the 2006–2010 ACS census tract data. A corresponding overlay was prepared by calculating the coefficient of variation (CV) for each MOE associated with an estimate; the CV, used to judge data reliability, is calculated by dividing the standard error by the estimate.

Several options were considered in determining the most useful way to show both the thematic map of the estimate as well as the associated reliability of the estimate. Preparing two separate thematic maps per data item, with one showing the estimate and the other the CV for the estimate, required data users to switch back and forth between the two maps. This process seemed cumbersome so developing a patterned overlay of the CV provided a way to show both the map of the characteristic (estimate) alone as well as an indicator for the reliability of the estimate by adding the CV layer on top of the estimate. The ranges for the overlay were divided into four categories ranging from "no data" to "not reliable".

Users may easily toggle between displaying the estimate map and the map showing the estimate with the CV as an overlay using radial buttons in the application. (See Figures 31.1 and 31.2). Clicking on an individual census tract on the map provides the census tract number as well as the value for the characteristic displayed—either the estimate or the CV of the estimate.

Determining Appropriate Reliability Ranges—The coefficients of variation were grouped into four categories—no data, values of 0.01–14.99 were designated reliable; 15.00–29.99 less reliable; and those 30.00+ were classified as not reliable. One problem noted with mapping percentages is that because percentages are relatively small, i.e. vary from 0 to 100, CV calculations typically yield higher values placing most of the estimates that are percentages into the less reliable or not reliable categories.

Determining the appropriate ranges to use for CVs for percentages versus CVs of larger numbers remains an issue that has not been addressed in the current application. The reliability ranges selected above were based on discussions with other ACS data users in the State Data Center program. We would welcome additional discussions or guidance on how best to categorize ranges to show the relative reliability of the data.

Figure 31.1 Thematic map showing median household income for census tracts in Maryland, ACS 2006–2010

Figure 31.2 Household income map with overlay showing the coefficient of variation (CV) on top

NOTE: The three CV ranges are categorized as reliable, less reliable, or unreliable.

Figure 31.3 Thematic map displaying percent of persons over 65 years, below poverty, for Maryland census tracts, ACS 2006–2010

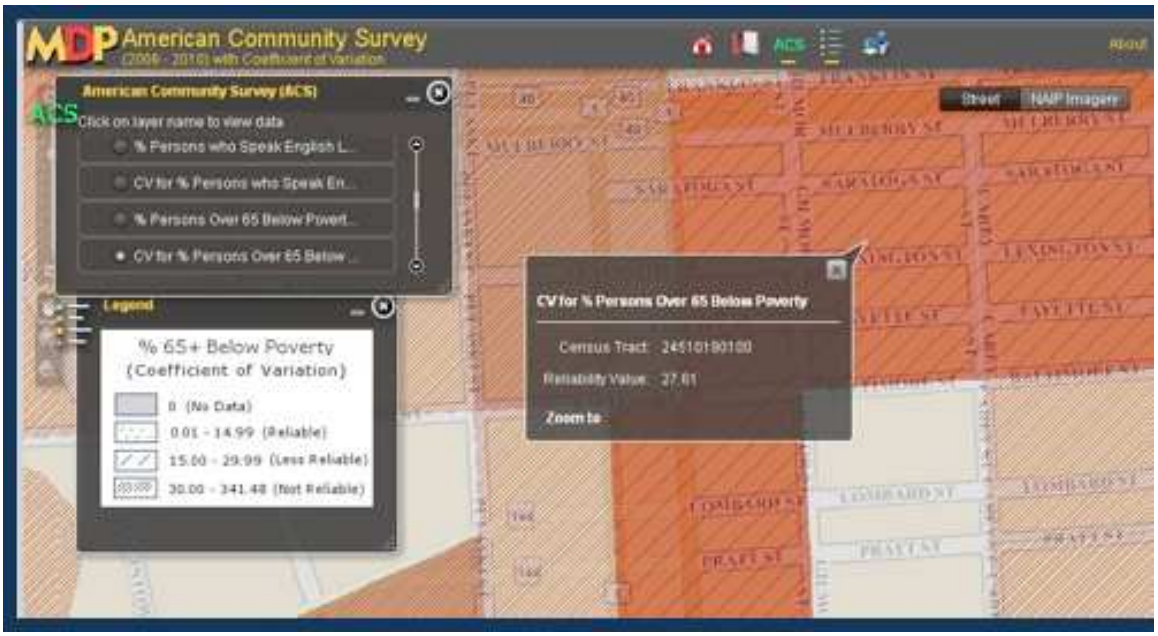

Figure 31.4 Thematic map displaying CVs for percent of persons over 65 years, below poverty, for Maryland census tracts, ACS 2006–2010

NOTE: The CVs are higher for percents, therefore more areas fall into the less reliable and the not reliable categories.

Chapter **32**

Examples of ACS Products for Chapters of the Navajo Nation

Lester Tsosie
Division of Economic Development
The Navajo Nation

As supplement to his presentation in Session E at the workshop, speaker Lester Tsosie provides examples of the tabulations from the ACS that he derives for individual chapters of the Navajo Nation:

- *A tabulation, expressed in terms of counts, of plumbing facilities (presence or absence of complete plumbing facilities) for all housing units, shown for all chapters;*
- *A tabulation, expressed in terms of counts, of financial characteristics (for brevity's sake, only the top-line results for the whole Navajo Nation Reservation and Off-Reservation Trust Land and one chapter are shown here); and*
- *A narrative profile for the Whitehorse Lake Chapter.*

Presence or Absence of Complete Plumbing Facilities (estimates as counts)

U.S. Census Bureau

AMERICAN FactFinder

B25047

PLUMBING FACILITIES FOR ALL HOUSING UNITS
Universe: Housing units
2006-2010 American Community Survey 5-Year Estimates

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Sample size and data quality measures (including coverage rates, allocation rates, and response rates) can be found on the American Community Survey website in the Methodology section.

Although the American Community Survey (ACS) produces population, demographic and housing unit estimates, for 2010, the 2010 Census provides the official counts of the population and housing units for the nation, states, counties, cities and towns. For 2006 to 2009, the Population Estimates Program provides intercensal estimates of the population for the nation, states, and counties.

	Navajo Nation Reservation and Off-Reservation Trust Land, AZ--NM--UT		Alamo Chapter; Navajo Nation Reservation and Off-Reservation Trust Land, AZ--NM--UT		Aneth Chapter; Navajo Nation Reservation and Off-Reservation Trust Land, AZ--NM--UT
	Estimate	Margin of Error	Estimate	Margin of Error	Estimate
Total:	71,571	+/-840	573	+/-90	705
Complete plumbing facilities	41,739	+/-828	404	+/-77	587
Lacking complete plumbing facilities	29,832	+/-680	169	+/-51	118

	Aneth Chapter; Navajo Nation Reservation and Off-Reservation Trust Land, AZ--NM--UT	Baca Chapter; Navajo Nation Reservation and Off-Reservation Trust Land, AZ--NM--UT		Becenti Chapter; Navajo Nation Reservation and Off-Reservation Trust Land, AZ--NM--UT	
	Margin of Error	Estimate	Margin of Error	Estimate	Margin of Error
Total:	+/-87	413	+/-75	202	+/-47
Complete plumbing facilities	+/-86	176	+/-54	84	+/-29
Lacking complete plumbing facilities	+/-44	237	+/-63	118	+/-41

	Beclabito Chapter; Navajo Nation Reservation and Off-Reservation Trust Land, AZ--NM--UT		Bird Springs Chapter; Navajo Nation Reservation and Off-Reservation Trust Land, AZ--NM--UT		Black Mesa Chapter; Navajo Nation Reservation and Off-Reservation Trust Land, AZ--NM--UT
	Estimate	Margin of Error	Estimate	Margin of Error	Estimate
Total:	348	+/-68	316	+/-61	327
Complete plumbing facilities	270	+/-65	115	+/-39	107
Lacking complete plumbing facilities	78	+/-34	201	+/-48	220

	Black Mesa Chapter; Navajo Nation Reservation and Off-Reservation Trust Land, AZ--NM--UT	Bodaway Chapter; Navajo Nation Reservation and Off-Reservation Trust Land, AZ--NM--UT		Bread Springs Chapter; Navajo Nation Reservation and Off-Reservation Trust Land, AZ--NM--UT	
	Margin of Error	Estimate	Margin of Error	Estimate	Margin of Error
Total:	+/-70	607	+/-90	387	+/-100
Complete plumbing facilities	+/-50	190	+/-50	237	+/-79
Lacking complete plumbing facilities	+/-64	417	+/-77	150	+/-51

	Burnham Chapter; Navajo Nation Reservation and Off-Reservation Trust Land, AZ--NM--UT		Cameron Chapter; Navajo Nation Reservation and Off-Reservation Trust Land, AZ--NM--UT		Cañoncito Chapter; Navajo Nation Reservation and Off-Reservation Trust Land, AZ--NM--UT
	Estimate	Margin of Error	Estimate	Margin of Error	Estimate
Total:	131	+/-46	506	+/-87	416
Complete plumbing facilities	76	+/-39	209	+/-61	250
Lacking complete plumbing facilities	55	+/-28	297	+/-71	166

	Cañoncito Chapter; Navajo Nation Reservation and Off-Reservation Trust Land, AZ--NM--UT	Casamero Lake Chapter; Navajo Nation Reservation and Off-Reservation Trust Land, AZ--NM--UT		Chi Chil Tah Chapter; Navajo Nation Reservation and Off-Reservation Trust Land, AZ--NM--UT	
	Margin of Error	Estimate	Margin of Error	Estimate	Margin of Error
Total:	+/-82	219	+/-51	676	+/-86
Complete plumbing facilities	+/-64	121	+/-41	207	+/-58
Lacking complete plumbing facilities	+/-52	98	+/-37	469	+/-78

	Chilchinbeto Chapter; Navajo Nation Reservation and Off-Reservation Trust Land, AZ--NM--UT		Chinle Chapter; Navajo Nation Reservation and Off-Reservation Trust Land, AZ--NM--UT		Church Rock Chapter; Navajo Nation Reservation and Off-Reservation Trust Land, AZ--NM--UT
	Estimate	Margin of Error	Estimate	Margin of Error	Estimate
Total:	506	+/-77	2,803	+/-154	807
Complete plumbing facilities	323	+/-66	1,695	+/-176	421
Lacking complete plumbing facilities	183	+/-52	1,108	+/-175	386

	Church Rock Chapter; Navajo Nation Reservation and Off-Reservation Trust Land, AZ--NM--UT	Coalmine Mesa Chapter; Navajo Nation Reservation and Off-Reservation Trust Land, AZ--NM--UT		Coppermine Chapter; Navajo Nation Reservation and Off-Reservation Trust Land, AZ--NM--UT	
	Margin of Error	Estimate	Margin of Error	Estimate	Margin of Error
Total:	+/-106	264	+/-51	217	+/-39
Complete plumbing facilities	+/-84	81	+/-34	61	+/-25
Lacking complete plumbing facilities	+/-75	183	+/-46	156	+/-32

	Cornfields Chapter; Navajo Nation Reservation and Off-Reservation Trust Land, AZ--NM--UT		Counselor Chapter; Navajo Nation Reservation and Off-Reservation Trust Land, AZ--NM--UT		Cove Chapter; Navajo Nation Reservation and Off-Reservation Trust Land, AZ--NM--UT
	Estimate	Margin of Error	Estimate	Margin of Error	Estimate
Total:	344	+/-74	463	+/-69	182
Complete plumbing facilities	161	+/-59	213	+/-50	86
Lacking complete plumbing facilities	183	+/-60	250	+/-72	96

	Cove Chapter; Navajo Nation Reservation and Off-Reservation Trust Land, AZ--NM--UT	Coyote Canyon Chapter; Navajo Nation Reservation and Off-Reservation Trust Land, AZ--NM--UT		Crownpoint Chapter; Navajo Nation Reservation and Off-Reservation Trust Land, AZ--NM--UT	
	Margin of Error	Estimate	Margin of Error	Estimate	Margin of Error
Total:	+/-37	484	+/-56	957	+/-84
Complete plumbing facilities	+/-27	263	+/-67	768	+/-84
Lacking complete plumbing facilities	+/-37	221	+/-37	189	+/-48

	Crystal Chapter; Navajo Nation Reservation and Off-Reservation Trust Land, AZ--NM--UT		Dennehotso Chapter; Navajo Nation Reservation and Off-Reservation Trust Land, AZ--NM--UT		Dilcon Chapter; Navajo Nation Reservation and Off-Reservation Trust Land, AZ--NM--UT
	Estimate	Margin of Error	Estimate	Margin of Error	Estimate
Total:	367	+/-62	716	+/-65	932
Complete plumbing facilities	185	+/-53	354	+/-63	582
Lacking complete plumbing facilities	182	+/-47	362	+/-61	350

	Dilcon Chapter; Navajo Nation Reservation and Off-Reservation Trust Land, AZ--NM--UT	Forest Lake Chapter; Navajo Nation Reservation and Off-Reservation Trust Land, AZ--NM--UT		Fort Defiance Chapter; Navajo Nation Reservation and Off-Reservation Trust Land, AZ--NM--UT	
	Margin of Error	Estimate	Margin of Error	Estimate	Margin of Error
Total:	+/-88	215	+/-40	2,004	+/-158
Complete plumbing facilities	+/-86	70	+/-23	1,524	+/-176
Lacking complete plumbing facilities	+/-74	145	+/-40	480	+/-118

	Fruitland Chapter; Navajo Nation Reservation and Off-Reservation Trust Land, AZ--NM--UT		Gadii'ahi Chapter; Navajo Nation Reservation and Off-Reservation Trust Land, AZ--NM--UT		Ganado Chapter; Navajo Nation Reservation and Off-Reservation Trust Land, AZ--NM--UT
	Estimate	Margin of Error	Estimate	Margin of Error	Estimate
Total:	868	+/-92	309	+/-83	1,061
Complete plumbing facilities	663	+/-83	219	+/-82	709
Lacking complete plumbing facilities	205	+/-70	90	+/-39	352

	Ganado Chapter; Navajo Nation Reservation and Off-Reservation Trust Land, AZ--NM--UT	Greasewood Chapter; Navajo Nation Reservation and Off-Reservation Trust Land, AZ--NM--UT		Hard Rock Chapter; Navajo Nation Reservation and Off-Reservation Trust Land, AZ--NM--UT	
	Margin of Error	Estimate	Margin of Error	Estimate	Margin of Error
Total:	+/-118	689	+/-91	639	+/-81
Complete plumbing facilities	+/-117	345	+/-76	364	+/-69
Lacking complete plumbing facilities	+/-87	344	+/-80	275	+/-70

	Hogback Chapter; Navajo Nation Reservation and Off-Reservation Trust Land, AZ--NM--UT		Houck Chapter; Navajo Nation Reservation and Off-Reservation Trust Land, AZ--NM--UT		Huerfano Chapter; Navajo Nation Reservation and Off-Reservation Trust Land, AZ--NM--UT
	Estimate	Margin of Error	Estimate	Margin of Error	Estimate
Total:	468	+/-95	697	+/-80	831
Complete plumbing facilities	365	+/-83	316	+/-61	577
Lacking complete plumbing facilities	103	+/-47	381	+/-67	254

	Huerfano Chapter; Navajo Nation Reservation and Off-Reservation Trust Land, AZ--NM--UT	Indian Wells Chapter; Navajo Nation Reservation and Off-Reservation Trust Land, AZ--NM--UT		Inscription House Chapter; Navajo Nation Reservation and Off-Reservation Trust Land, AZ--NM--UT	
	Margin of Error	Estimate	Margin of Error	Estimate	Margin of Error
Total:	+/-136	381	+/-85	454	+/-86
Complete plumbing facilities	+/-122	152	+/-57	288	+/-89
Lacking complete plumbing facilities	+/-66	229	+/-75	166	+/-45

	Iyanbito Chapter; Navajo Nation Reservation and Off-Reservation Trust Land, AZ--NM--UT		Jeddito Chapter; Navajo Nation Reservation and Off-Reservation Trust Land, AZ--NM--UT		Kaibeto Chapter; Navajo Nation Reservation and Off-Reservation Trust Land, AZ--NM--UT
	Estimate	Margin of Error	Estimate	Margin of Error	Estimate
Total:	401	+/-82	616	+/-81	703
Complete plumbing facilities	193	+/-73	328	+/-79	472
Lacking complete plumbing facilities	208	+/-57	288	+/-71	231

	Kaibeto Chapter; Navajo Nation Reservation and Off-Reservation Trust Land, AZ--NM--UT	Kayenta Chapter; Navajo Nation Reservation and Off-Reservation Trust Land, AZ--NM--UT		Kinlichee Chapter; Navajo Nation Reservation and Off-Reservation Trust Land, AZ--NM--UT	
	Margin of Error	Estimate	Margin of Error	Estimate	Margin of Error
Total:	+/-80	2,463	+/-161	789	+/-100
Complete plumbing facilities	+/-71	1,904	+/-163	169	+/-46
Lacking complete plumbing facilities	+/-54	559	+/-109	620	+/-90

	Klagetoh Chapter; Navajo Nation Reservation and Off-Reservation Trust Land, AZ--NM--UT		Lake Valley Chapter; Navajo Nation Reservation and Off-Reservation Trust Land, AZ--NM--UT		LeChee Chapter; Navajo Nation Reservation and Off-Reservation Trust Land, AZ--NM--UT
	Estimate	Margin of Error	Estimate	Margin of Error	Estimate
Total:	590	+/-90	177	+/-44	566
Complete plumbing facilities	227	+/-54	65	+/-22	375
Lacking complete plumbing facilities	363	+/-81	112	+/-45	191

	LeChee Chapter; Navajo Nation Reservation and Off-Reservation Trust Land, AZ--NM--UT	Leupp Chapter; Navajo Nation Reservation and Off-Reservation Trust Land, AZ--NM--UT		Littlewater Chapter; Navajo Nation Reservation and Off-Reservation Trust Land, AZ--NM--UT	
	Margin of Error	Estimate	Margin of Error	Estimate	Margin of Error
Total:	+/-98	579	+/-83	193	+/-40
Complete plumbing facilities	+/-80	294	+/-72	78	+/-33
Lacking complete plumbing facilities	+/-60	285	+/-69	115	+/-33

	Low Mountain Chapter; Navajo Nation Reservation and Off-Reservation Trust Land, AZ--NM--UT		Lukachukai Chapter; Navajo Nation Reservation and Off-Reservation Trust Land, AZ--NM--UT		Lupton Chapter; Navajo Nation Reservation and Off-Reservation Trust Land, AZ--NM--UT
	Estimate	Margin of Error	Estimate	Margin of Error	Estimate
Total:	333	+/-75	905	+/-91	452
Complete plumbing facilities	147	+/-46	506	+/-95	250
Lacking complete plumbing facilities	186	+/-69	399	+/-67	202

	Lupton Chapter; Navajo Nation Reservation and Off-Reservation Trust Land, AZ--NM--UT	Manuelito Chapter; Navajo Nation Reservation and Off-Reservation Trust Land, AZ--NM--UT		Many Farms Chapter; Navajo Nation Reservation and Off-Reservation Trust Land, AZ--NM--UT	
	Margin of Error	Estimate	Margin of Error	Estimate	Margin of Error
Total:	+/-72	143	+/-49	1,218	+/-105
Complete plumbing facilities	+/-71	9	+/-10	716	+/-100
Lacking complete plumbing facilities	+/-48	134	+/-49	502	+/-71

	Mariano Lake Chapter; Navajo Nation Reservation and Off-Reservation Trust Land, AZ--NM--UT		Mexican Springs Chapter; Navajo Nation Reservation and Off-Reservation Trust Land, AZ--NM--UT		Mexican Water Chapter; Navajo Nation Reservation and Off-Reservation Trust Land, AZ--NM--UT
	Estimate	Margin of Error	Estimate	Margin of Error	Estimate
Total:	328	+/-59	620	+/-74	374
Complete plumbing facilities	153	+/-48	356	+/-68	205
Lacking complete plumbing facilities	175	+/-45	264	+/-60	169

	Mexican Water Chapter; Navajo Nation Reservation and Off-Reservation Trust Land, AZ--NM--UT	Nageezi Chapter; Navajo Nation Reservation and Off-Reservation Trust Land, AZ--NM--UT		Nahatadziil Chapter; Navajo Nation Reservation and Off-Reservation Trust Land, AZ--NM--UT	
	Margin of Error	Estimate	Margin of Error	Estimate	Margin of Error
Total:	+/-76	519	+/-84	564	+/-69
Complete plumbing facilities	+/-65	257	+/-70	459	+/-78
Lacking complete plumbing facilities	+/-51	262	+/-65	105	+/-51

	Nahodishgish Chapter; Navajo Nation Reservation and Off-Reservation Trust Land, AZ--NM--UT		Naschitti Chapter; Navajo Nation Reservation and Off-Reservation Trust Land, AZ--NM--UT		Navajo Mountain Chapter; Navajo Nation Reservation and Off-Reservation Trust Land, AZ--NM--UT
	Estimate	Margin of Error	Estimate	Margin of Error	Estimate
Total:	156	+/-36	900	+/-65	314
Complete plumbing facilities	69	+/-27	455	+/-75	158
Lacking complete plumbing facilities	87	+/-34	445	+/-61	156

	Navajo Mountain Chapter; Navajo Nation Reservation and Off-Reservation Trust Land, AZ--NM--UT	Nazlini Chapter; Navajo Nation Reservation and Off-Reservation Trust Land, AZ--NM--UT		Nenahnezad/San Juan Chapter; Navajo Nation Reservation and Off-Reservation Trust Land, AZ--NM--UT	
	Margin of Error	Estimate	Margin of Error	Estimate	Margin of Error
Total:	+/-61	563	+/-74	665	+/-74
Complete plumbing facilities	+/-47	249	+/-61	473	+/-81
Lacking complete plumbing facilities	+/-45	314	+/-60	192	+/-59

	Newcomb Chapter; Navajo Nation Reservation and Off-Reservation Trust Land, AZ--NM--UT		Oak Springs Chapter; Navajo Nation Reservation and Off-Reservation Trust Land, AZ--NM--UT		Ojo Encino Chapter; Navajo Nation Reservation and Off-Reservation Trust Land, AZ--NM--UT
	Estimate	Margin of Error	Estimate	Margin of Error	Estimate
Total:	297	+/-54	294	+/-65	247
Complete plumbing facilities	204	+/-50	149	+/-51	152
Lacking complete plumbing facilities	93	+/-36	145	+/-53	95

	Ojo Encino Chapter; Navajo Nation Reservation and Off-Reservation Trust Land, AZ--NM--UT	Oljato Chapter; Navajo Nation Reservation and Off-Reservation Trust Land, AZ--NM--UT		Pinedale Chapter; Navajo Nation Reservation and Off-Reservation Trust Land, AZ--NM--UT	
	Margin of Error	Estimate	Margin of Error	Estimate	Margin of Error
Total:	+/-57	1,112	+/-106	323	+/-58
Complete plumbing facilities	+/-51	536	+/-94	139	+/-46
Lacking complete plumbing facilities	+/-25	576	+/-92	184	+/-49

	Piñon Chapter; Navajo Nation Reservation and Off-Reservation Trust Land, AZ--NM--UT		Pueblo Pintado Chapter; Navajo Nation Reservation and Off-Reservation Trust Land, AZ--NM--UT		Ramah Chapter; Navajo Nation Reservation and Off-Reservation Trust Land, AZ--NM--UT
	Estimate	Margin of Error	Estimate	Margin of Error	Estimate
Total:	1,089	+/-114	191	+/-53	675
Complete plumbing facilities	644	+/-100	107	+/-39	375
Lacking complete plumbing facilities	445	+/-84	84	+/-36	300

	Ramah Chapter; Navajo Nation Reservation and Off-Reservation Trust Land, AZ--NM--UT	Red Lake Chapter; Navajo Nation Reservation and Off-Reservation Trust Land, AZ--NM--UT		Red Mesa Chapter; Navajo Nation Reservation and Off-Reservation Trust Land, AZ--NM--UT	
	Margin of Error	Estimate	Margin of Error	Estimate	Margin of Error
Total:	+/-93	693	+/-94	500	+/-65
Complete plumbing facilities	+/-84	597	+/-91	377	+/-71
Lacking complete plumbing facilities	+/-76	96	+/-36	123	+/-37

	Red Rock Chapter; Navajo Nation Reservation and Off-Reservation Trust Land, AZ--NM--UT		Red Valley Chapter; Navajo Nation Reservation and Off-Reservation Trust Land, AZ--NM--UT		Rock Point Chapter; Navajo Nation Reservation and Off-Reservation Trust Land, AZ--NM--UT
	Estimate	Margin of Error	Estimate	Margin of Error	Estimate
Total:	706	+/-117	828	+/-91	563
Complete plumbing facilities	344	+/-86	523	+/-86	282
Lacking complete plumbing facilities	362	+/-84	305	+/-61	281

	Rock Point Chapter; Navajo Nation Reservation and Off-Reservation Trust Land, AZ--NM--UT	Rock Springs Chapter; Navajo Nation Reservation and Off-Reservation Trust Land, AZ--NM--UT		Rough Rock Chapter; Navajo Nation Reservation and Off-Reservation Trust Land, AZ--NM--UT	
	Margin of Error	Estimate	Margin of Error	Estimate	Margin of Error
Total:	+/-88	292	+/-76	372	+/-68
Complete plumbing facilities	+/-71	137	+/-57	164	+/-53
Lacking complete plumbing facilities	+/-64	155	+/-50	208	+/-50

	Round Rock Chapter; Navajo Nation Reservation and Off-Reservation Trust Land, AZ--NM--UT		St. Michaels Chapter; Navajo Nation Reservation and Off-Reservation Trust Land, AZ--NM--UT		San Juan Southern Paiute Northern Area; Navajo Nation Reservation and Off-Reservation Trust Land, AZ--NM--UT
	Estimate	Margin of Error	Estimate	Margin of Error	Estimate
Total:	573	+/-85	1,919	+/-154	4
Complete plumbing facilities	307	+/-72	1,371	+/-158	0
Lacking complete plumbing facilities	266	+/-51	548	+/-124	4

	San Juan Southern Paiute Northern Area; Navajo Nation Reservation and Off-Reservation Trust Land, AZ--NM--UT	San Juan Southern Paiute Southern Area; Navajo Nation Reservation and Off-Reservation Trust Land, AZ--NM--UT		Sanostee Chapter; Navajo Nation Reservation and Off-Reservation Trust Land, AZ--NM--UT	
	Margin of Error	Estimate	Margin of Error	Estimate	Margin of Error
Total:	+/-7	20	+/-20	1,149	+/-98
Complete plumbing facilities	+/-119	0	+/-119	576	+/-88
Lacking complete plumbing facilities	+/-7	20	+/-20	573	+/-79

	Sawmill Chapter; Navajo Nation Reservation and Off-Reservation Trust Land, AZ--NM--UT		Sheep Springs Chapter; Navajo Nation Reservation and Off-Reservation Trust Land, AZ--NM--UT		Shiprock Chapter; Navajo Nation Reservation and Off-Reservation Trust Land, AZ--NM--UT
	Estimate	Margin of Error	Estimate	Margin of Error	Estimate
Total:	402	+/-64	530	+/-67	3,201
Complete plumbing facilities	88	+/-39	276	+/-63	2,668
Lacking complete plumbing facilities	314	+/-59	254	+/-57	533

	Shiprock Chapter; Navajo Nation Reservation and Off-Reservation Trust Land, AZ--NM--UT	Shonto Chapter; Navajo Nation Reservation and Off-Reservation Trust Land, AZ--NM--UT		Smith Lake Chapter; Navajo Nation Reservation and Off-Reservation Trust Land, AZ--NM--UT	
	Margin of Error	Estimate	Margin of Error	Estimate	Margin of Error
Total:	+/-193	992	+/-80	492	+/-85
Complete plumbing facilities	+/-188	496	+/-75	222	+/-68
Lacking complete plumbing facilities	+/-171	496	+/-87	270	+/-58

	Standing Rock Chapter; Navajo Nation Reservation and Off-Reservation Trust Land, AZ--NM--UT		Steamboat Chapter; Navajo Nation Reservation and Off-Reservation Trust Land, AZ--NM--UT		Sweetwater Chapter; Navajo Nation Reservation and Off-Reservation Trust Land, AZ--NM--UT
	Estimate	Margin of Error	Estimate	Margin of Error	Estimate
Total:	307	+/-59	791	+/-99	658
Complete plumbing facilities	179	+/-61	333	+/-69	320
Lacking complete plumbing facilities	128	+/-36	458	+/-90	338

	Sweetwater Chapter; Navajo Nation Reservation and Off-Reservation Trust Land, AZ--NM--UT	Tachee Chapter; Navajo Nation Reservation and Off-Reservation Trust Land, AZ--NM--UT		Teec Nos Pos Chapter; Navajo Nation Reservation and Off-Reservation Trust Land, AZ--NM--UT	
	Margin of Error	Estimate	Margin of Error	Estimate	Margin of Error
Total:	+/-82	784	+/-87	721	+/-95
Complete plumbing facilities	+/-76	367	+/-56	462	+/-89
Lacking complete plumbing facilities	+/-69	417	+/-87	259	+/-68

	Teesto Chapter; Navajo Nation Reservation and Off-Reservation Trust Land, AZ--NM--UT		Thoreau Chapter; Navajo Nation Reservation and Off-Reservation Trust Land, AZ--NM--UT		Tohatchi Chapter; Navajo Nation Reservation and Off-Reservation Trust Land, AZ--NM--UT
	Estimate	Margin of Error	Estimate	Margin of Error	Estimate
Total:	454	+/-79	426	+/-77	752
Complete plumbing facilities	305	+/-73	266	+/-72	399
Lacking complete plumbing facilities	149	+/-52	160	+/-52	353

	Tohatchi Chapter; Navajo Nation Reservation and Off-Reservation Trust Land, AZ--NM--UT	Tolani Lake Chapter; Navajo Nation Reservation and Off-Reservation Trust Land, AZ--NM--UT		Tonalea Chapter; Navajo Nation Reservation and Off-Reservation Trust Land, AZ--NM--UT	
	Margin of Error	Estimate	Margin of Error	Estimate	Margin of Error
Total:	+/-76	285	+/-53	852	+/-93
Complete plumbing facilities	+/-70	101	+/-39	584	+/-91
Lacking complete plumbing facilities	+/-56	184	+/-38	268	+/-60

	Torreon Chapter; Navajo Nation Reservation and Off-Reservation Trust Land, AZ--NM--UT		Tsaile-Wheatfields Chapter; Navajo Nation Reservation and Off-Reservation Trust Land, AZ--NM--UT		Tsayatoh Chapter; Navajo Nation Reservation and Off-Reservation Trust Land, AZ--NM--UT
	Estimate	Margin of Error	Estimate	Margin of Error	Estimate
Total:	609	+/-83	1,095	+/-86	261
Complete plumbing facilities	328	+/-69	402	+/-62	115
Lacking complete plumbing facilities	281	+/-63	693	+/-79	146

	Tsayatoh Chapter; Navajo Nation Reservation and Off-Reservation Trust Land, AZ--NM--UT	Tselani Chapter; Navajo Nation Reservation and Off-Reservation Trust Land, AZ--NM--UT		Tuba City Chapter; Navajo Nation Reservation and Off-Reservation Trust Land, AZ--NM--UT	
	Margin of Error	Estimate	Margin of Error	Estimate	Margin of Error
Total:	+/-54	779	+/-82	2,989	+/-175
Complete plumbing facilities	+/-44	323	+/-64	2,323	+/-198
Lacking complete plumbing facilities	+/-41	456	+/-69	666	+/-158

	Twin Lakes Chapter; Navajo Nation Reservation and Off-Reservation Trust Land, AZ--NM--UT		Two Grey Hills Chapter; Navajo Nation Reservation and Off-Reservation Trust Land, AZ--NM--UT		Whippoorwill Chapter; Navajo Nation Reservation and Off-Reservation Trust Land, AZ--NM--UT
	Estimate	Margin of Error	Estimate	Margin of Error	Estimate
Total:	862	+/-94	683	+/-91	579
Complete plumbing facilities	473	+/-80	473	+/-78	319
Lacking complete plumbing facilities	389	+/-69	210	+/-54	260

	Whippoorwill Chapter; Navajo Nation Reservation and Off-Reservation Trust Land, AZ--NM--UT	White Cone Chapter; Navajo Nation Reservation and Off-Reservation Trust Land, AZ--NM--UT		White Horse Lake Chapter; Navajo Nation Reservation and Off-Reservation Trust Land, AZ--NM--UT	
	Margin of Error	Estimate	Margin of Error	Estimate	Margin of Error
Total:	+/-76	630	+/-78	225	+/-50
Complete plumbing facilities	+/-87	282	+/-65	69	+/-36
Lacking complete plumbing facilities	+/-64	348	+/-61	156	+/-44

	White Rock Chapter; Navajo Nation Reservation and Off-Reservation Trust Land, AZ--NM--UT		Wide Ruins Chapter; Navajo Nation Reservation and Off-Reservation Trust Land, AZ--NM--UT	
	Estimate	Margin of Error	Estimate	Margin of Error
Total:	62	+/-32	688	+/-86
Complete plumbing facilities	12	+/-9	185	+/-67
Lacking complete plumbing facilities	50	+/-31	503	+/-83

Data are based on a sample and are subject to sampling variability. The degree of uncertainty for an estimate arising from sampling variability is represented through the use of a margin of error. The value shown here is the 90 percent margin of error. The margin of error can be interpreted roughly as providing a 90 percent probability that the interval defined by the estimate minus the margin of error and the estimate plus the margin of error (the lower and upper confidence bounds) contains the true value. In addition to sampling variability, the ACS estimates are subject to nonsampling error (for a discussion of nonsampling variability, see Accuracy of the Data). The effect of nonsampling error is not represented in these tables.

While the 2006-2010 American Community Survey (ACS) data generally reflect the December 2009 Office of Management and Budget (OMB) definitions of metropolitan and micropolitan statistical areas; in certain instances the names, codes, and boundaries of the principal cities shown in ACS tables may differ from the OMB definitions due to differences in the effective dates of the geographic entities.

Estimates of urban and rural population, housing units, and characteristics reflect boundaries of urban areas defined based on Census 2000 data. Boundaries for urban areas have not been updated since Census 2000. As a result, data for urban and rural areas from the ACS do not necessarily reflect the results of ongoing urbanization.

Source: U.S. Census Bureau, 2006-2010 American Community Survey

Explanation of Symbols:

1. An '**' entry in the margin of error column indicates that either no sample observations or too few sample observations were available to compute a standard error and thus the margin of error. A statistical test is not appropriate.
2. An '-' entry in the estimate column indicates that either no sample observations or too few sample observations were available to compute an estimate, or a ratio of medians cannot be calculated because one or both of the median estimates falls in the lowest interval or upper interval of an open-ended distribution.
3. An '-' following a median estimate means the median falls in the lowest interval of an open-ended distribution.
4. An '+' following a median estimate means the median falls in the upper interval of an open-ended distribution.
5. An '***' entry in the margin of error column indicates that the median falls in the lowest interval or upper interval of an open-ended distribution. A statistical test is not appropriate.
6. An '*****' entry in the margin of error column indicates that the estimate is controlled. A statistical test for sampling variability is not appropriate.
7. An 'N' entry in the estimate and margin of error columns indicates that data for this geographic area cannot be displayed because the number of sample cases is too small.
8. An '(X)' means that the estimate is not applicable or not available.

Financial Characteristics by Chapter (estimates as percentages)

U.S. Census Bureau

AMERICAN FactFinder

S2503 | FINANCIAL CHARACTERISTICS

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Subject	Navajo Nation Reservation and Off-Reservation Trust Land, AZ--NM--UT				
	Occupied housing units		Owner-occupied housing units		Renter-occupied housing units
	Estimate	Margin of Error	Estimate	Margin of Error	Estimate
Occupied housing units	43,398	+/-876	32,539	+/-797	10,859
HOUSEHOLD INCOME IN THE PAST 12 MONTHS (IN 2010 INFLATION-ADJUSTED DOLLARS)					
Less than $5,000	11.0%	+/-0.7	11.5%	+/-0.9	9.3%
$5,000 to $9,999	12.5%	+/-0.8	13.4%	+/-0.9	9.8%
$10,000 to $14,999	8.9%	+/-0.7	9.3%	+/-0.9	8.0%
$15,000 to $19,999	8.6%	+/-0.8	8.5%	+/-0.8	8.9%
$20,000 to $24,999	7.6%	+/-0.6	7.1%	+/-0.7	9.0%
$25,000 to $34,999	11.8%	+/-0.8	11.7%	+/-1.0	12.3%
$35,000 to $49,999	13.1%	+/-1.0	12.5%	+/-1.0	14.9%
$50,000 to $74,999	13.4%	+/-0.9	13.5%	+/-1.0	13.0%
$75,000 to $99,999	7.5%	+/-0.7	7.5%	+/-0.8	7.5%
$100,000 to $149,999	4.4%	+/-0.5	4.1%	+/-0.5	5.5%
$150,000 or more	1.2%	+/-0.4	0.9%	+/-0.3	2.0%
Median household income (dollars)	26,232	+/-988	25,111	+/-1,137	29,803
MONTHLY HOUSING COSTS					
Less than $100	20.0%	+/-0.9	26.3%	+/-1.2	1.0%
$100 to $199	22.9%	+/-1.1	28.6%	+/-1.3	5.7%
$200 to $299	15.8%	+/-0.9	17.0%	+/-1.1	12.3%
$300 to $399	10.2%	+/-0.8	9.0%	+/-0.8	13.8%
$400 to $499	6.8%	+/-0.7	4.6%	+/-0.6	13.6%
$500 to $599	6.6%	+/-0.9	3.9%	+/-0.7	14.7%
$600 to $699	4.3%	+/-0.5	3.2%	+/-0.5	7.5%
$700 to $799	3.4%	+/-0.5	2.5%	+/-0.5	6.1%
$800 to $899	1.9%	+/-0.4	1.4%	+/-0.3	3.3%
$900 to $999	1.2%	+/-0.3	1.1%	+/-0.3	1.5%
$1,000 to $1,499	1.6%	+/-0.4	1.3%	+/-0.3	2.7%
$1,500 to $1,999	0.6%	+/-0.3	0.7%	+/-0.3	0.6%
$2,000 or more	0.4%	+/-0.2	0.5%	+/-0.3	0.0%
No cash rent	4.3%	+/-0.5	(X)	(X)	17.1%
Median (dollars)	236	+/-7	190	+/-5	460
MONTHLY HOUSING COSTS AS A PERCENTAGE OF HOUSEHOLD INCOME IN THE PAST 12 MONTHS					
Less than $20,000	34.7%	+/-1.2	37.6%	+/-1.4	25.9%
Less than 20 percent	17.2%	+/-1.0	21.6%	+/-1.3	4.1%

Subject	Navajo Nation Reservation and Off-Reservation Trust Land, AZ--NM--UT				
	Occupied housing units		Owner-occupied housing units		Renter-occupied housing units
	Estimate	Margin of Error	Estimate	Margin of Error	Estimate
20 to 29 percent	5.3%	+/-0.6	5.6%	+/-0.6	4.2%
30 percent or more	12.2%	+/-1.0	10.4%	+/-1.0	17.6%
$20,000 to $34,999	18.5%	+/-1.0	18.8%	+/-1.1	17.8%
Less than 20 percent	14.1%	+/-0.9	16.2%	+/-1.1	7.9%
20 to 29 percent	2.5%	+/-0.5	1.5%	+/-0.4	5.6%
30 percent or more	1.9%	+/-0.4	1.1%	+/-0.3	4.3%
$35,000 to $49,999	12.6%	+/-1.0	12.5%	+/-1.0	13.0%
Less than 20 percent	10.9%	+/-0.9	11.0%	+/-0.9	10.6%
20 to 29 percent	1.2%	+/-0.3	1.0%	+/-0.3	2.0%
30 percent or more	0.5%	+/-0.2	0.5%	+/-0.2	0.4%
$50,000 to $74,999	12.9%	+/-0.9	13.5%	+/-1.0	11.0%
Less than 20 percent	12.0%	+/-0.9	12.5%	+/-1.0	10.6%
20 to 29 percent	0.7%	+/-0.2	0.7%	+/-0.3	0.5%
30 percent or more	0.2%	+/-0.1	0.3%	+/-0.2	0.0%
$75,000 or more	12.6%	+/-0.9	12.5%	+/-0.9	13.1%
Less than 20 percent	12.4%	+/-0.9	12.2%	+/-0.9	12.9%
20 to 29 percent	0.2%	+/-0.1	0.2%	+/-0.2	0.2%
30 percent or more	0.1%	+/-0.1	0.1%	+/-0.1	0.0%
Zero or negative income	4.3%	+/-0.5	5.1%	+/-0.6	2.0%
No cash rent	4.3%	+/-0.5	(X)	(X)	17.1%
PERCENT IMPUTED					
Tenure	1.4%	(X)	(X)	(X)	(X)
Monthly housing costs	(X)	(X)	30.6%	(X)	(X)
Gross rent	(X)	(X)	(X)	(X)	27.2%

Subject	Navajo Nation Reservation and Off-Reservation Trust Land, AZ--NM--UT	Alamo Chapter; Navajo Nation Reservation and Off-Reservation Trust Land, AZ--NM--UT			
	Renter-occupied housing units	Occupied housing units		Owner-occupied housing units	
	Margin of Error	Estimate	Margin of Error	Estimate	Margin of Error
Occupied housing units	+/-646	367	+/-79	253	+/-66
HOUSEHOLD INCOME IN THE PAST 12 MONTHS (IN 2010 INFLATION-ADJUSTED DOLLARS)					
Less than $5,000	+/-1.8	7.4%	+/-7.1	2.4%	+/-3.6
$5,000 to $9,999	+/-1.6	22.3%	+/-11.4	23.3%	+/-15.6
$10,000 to $14,999	+/-1.5	15.8%	+/-9.0	20.6%	+/-12.4
$15,000 to $19,999	+/-1.6	4.4%	+/-3.5	2.4%	+/-3.9
$20,000 to $24,999	+/-1.7	9.3%	+/-8.1	11.9%	+/-11.1
$25,000 to $34,999	+/-1.5	13.1%	+/-6.8	11.5%	+/-8.3
$35,000 to $49,999	+/-2.1	11.7%	+/-7.0	10.3%	+/-7.9
$50,000 to $74,999	+/-2.2	13.1%	+/-7.0	13.4%	+/-9.2
$75,000 to $99,999	+/-1.5	1.6%	+/-2.5	2.4%	+/-3.7
$100,000 to $149,999	+/-1.3	1.4%	+/-2.4	2.0%	+/-3.5
$150,000 or more	+/-1.2	0.0%	+/-8.5	0.0%	+/-12.0
Median household income (dollars)	+/-1,943	20,313	+/-10,473	22,792	+/-14,629
MONTHLY HOUSING COSTS					
Less than $100	+/-0.5	6.3%	+/-4.4	9.1%	+/-6.1
$100 to $199	+/-1.3	28.3%	+/-13.1	41.1%	+/-17.1
$200 to $299	+/-1.9	27.0%	+/-11.9	36.4%	+/-16.2
$300 to $399	+/-2.2	6.8%	+/-6.5	4.3%	+/-5.0
$400 to $499	+/-2.2	0.0%	+/-8.5	0.0%	+/-12.0
$500 to $599	+/-2.6	0.0%	+/-8.5	0.0%	+/-12.0
$600 to $699	+/-1.5	0.0%	+/-8.5	0.0%	+/-12.0
$700 to $799	+/-1.5	3.3%	+/-3.8	4.7%	+/-5.5
$800 to $899	+/-1.2	2.5%	+/-3.8	0.0%	+/-12.0
$900 to $999	+/-0.7	1.6%	+/-2.7	2.4%	+/-3.9
$1,000 to $1,499	+/-1.1	1.4%	+/-2.2	2.0%	+/-3.2
$1,500 to $1,999	+/-0.5	0.0%	+/-8.5	0.0%	+/-12.0
$2,000 or more	+/-0.3	0.0%	+/-8.5	0.0%	+/-12.0
No cash rent	+/-1.8	22.9%	+/-9.8	(X)	(X)
Median (dollars)	+/-22	213	+/-33	203	+/-38
MONTHLY HOUSING COSTS AS A PERCENTAGE OF HOUSEHOLD INCOME IN THE PAST 12 MONTHS					
Less than $20,000	+/-2.3	33.5%	+/-11.7	48.6%	+/-15.0
Less than 20 percent	+/-1.0	9.3%	+/-5.8	13.4%	+/-8.3
20 to 29 percent	+/-1.3	2.7%	+/-3.0	4.0%	+/-4.4
30 percent or more	+/-2.5	21.5%	+/-11.1	31.2%	+/-15.1
$20,000 to $34,999	+/-2.1	17.2%	+/-9.3	23.3%	+/-12.6
Less than 20 percent	+/-1.6	14.4%	+/-9.0	19.4%	+/-12.4
20 to 29 percent	+/-1.7	1.4%	+/-2.2	2.0%	+/-3.1
30 percent or more	+/-1.3	1.4%	+/-2.4	2.0%	+/-3.4
$35,000 to $49,999	+/-2.0	10.4%	+/-6.4	10.3%	+/-7.9
Less than 20 percent	+/-1.9	6.5%	+/-4.8	8.3%	+/-7.0
20 to 29 percent	+/-1.0	2.5%	+/-3.8	0.0%	+/-12.0
30 percent or more	+/-0.4	1.4%	+/-2.2	2.0%	+/-3.2
$50,000 to $74,999	+/-2.1	13.1%	+/-7.0	13.4%	+/-9.2
Less than 20 percent	+/-2.1	13.1%	+/-7.0	13.4%	+/-9.2
20 to 29 percent	+/-0.3	0.0%	+/-8.5	0.0%	+/-12.0
30 percent or more	+/-0.3	0.0%	+/-8.5	0.0%	+/-12.0
$75,000 or more	+/-2.3	3.0%	+/-3.5	4.3%	+/-5.2
Less than 20 percent	+/-2.3	3.0%	+/-3.5	4.3%	+/-5.2
20 to 29 percent	+/-0.3	0.0%	+/-8.5	0.0%	+/-12.0
30 percent or more	+/-0.3	0.0%	+/-8.5	0.0%	+/-12.0
Zero or negative income	+/-0.7	0.0%	+/-8.5	0.0%	+/-12.0
No cash rent	+/-1.8	22.9%	+/-9.8	(X)	(X)

Subject	Navajo Nation Reservation and Off-Reservation Trust Land, AZ--NM--UT	Alamo Chapter; Navajo Nation Reservation and Off-Reservation Trust Land, AZ--NM--UT			
	Renter-occupied housing units	Occupied housing units		Owner-occupied housing units	
	Margin of Error	Estimate	Margin of Error	Estimate	Margin of Error
PERCENT IMPUTED					
Tenure	(X)	0.0%	(X)	(X)	(X)
Monthly housing costs	(X)	(X)	(X)	21.3%	(X)
Gross rent	(X)	(X)	(X)	(X)	(X)

Subject	Alamo Chapter; Navajo Nation Reservation and Off-Reservation Trust Land, AZ--NM--UT	
	Renter-occupied housing units	
	Estimate	Margin of Error
Occupied housing units	114	+/-50
HOUSEHOLD INCOME IN THE PAST 12 MONTHS (IN 2010 INFLATION-ADJUSTED DOLLARS)		
Less than $5,000	18.4%	+/-20.7
$5,000 to $9,999	20.2%	+/-16.3
$10,000 to $14,999	5.3%	+/-7.4
$15,000 to $19,999	8.8%	+/-7.6
$20,000 to $24,999	3.5%	+/-5.8
$25,000 to $34,999	16.7%	+/-14.8
$35,000 to $49,999	14.9%	+/-14.1
$50,000 to $74,999	12.3%	+/-17.3
$75,000 to $99,999	0.0%	+/-24.4
$100,000 to $149,999	0.0%	+/-24.4
$150,000 or more	0.0%	+/-24.4
Median household income (dollars)	18,500	+/-18,401
MONTHLY HOUSING COSTS		
Less than $100	0.0%	+/-24.4
$100 to $199	0.0%	+/-24.4
$200 to $299	6.1%	+/-6.9
$300 to $399	12.3%	+/-17.3
$400 to $499	0.0%	+/-24.4
$500 to $599	0.0%	+/-24.4
$600 to $699	0.0%	+/-24.4
$700 to $799	0.0%	+/-24.4
$800 to $899	7.9%	+/-12.0
$900 to $999	0.0%	+/-24.4
$1,000 to $1,499	0.0%	+/-24.4
$1,500 to $1,999	0.0%	+/-24.4
$2,000 or more	0.0%	+/-24.4
No cash rent	73.7%	+/-20.8
Median (dollars)	379	+/-340
MONTHLY HOUSING COSTS AS A PERCENTAGE OF HOUSEHOLD INCOME IN THE PAST 12 MONTHS		
Less than $20,000	0.0%	+/-24.4
Less than 20 percent	0.0%	+/-24.4
20 to 29 percent	0.0%	+/-24.4
30 percent or more	0.0%	+/-24.4
$20,000 to $34,999	3.5%	+/-5.8
Less than 20 percent	3.5%	+/-5.8
20 to 29 percent	0.0%	+/-24.4
30 percent or more	0.0%	+/-24.4
$35,000 to $49,999	10.5%	+/-12.1
Less than 20 percent	2.6%	+/-3.7
20 to 29 percent	7.9%	+/-12.0
30 percent or more	0.0%	+/-24.4
$50,000 to $74,999	12.3%	+/-17.3
Less than 20 percent	12.3%	+/-17.3
20 to 29 percent	0.0%	+/-24.4
30 percent or more	0.0%	+/-24.4
$75,000 or more	0.0%	+/-24.4
Less than 20 percent	0.0%	+/-24.4
20 to 29 percent	0.0%	+/-24.4
30 percent or more	0.0%	+/-24.4
Zero or negative income	0.0%	+/-24.4
No cash rent	73.7%	+/-20.8
PERCENT IMPUTED		

Subject	Alamo Chapter; Navajo Nation Reservation and Off-Reservation Trust Land, AZ--NM--UT	
	Renter-occupied housing units	
	Estimate	Margin of Error
Tenure	(X)	(X)
Monthly housing costs	(X)	(X)
Gross rent	2.6%	(X)

Narrative Profile for Whitehorse Lake Chapter

White Horse Lake Chapter, Navajo Nation Reservation and Off-Reservation Trust Land, AZ--NM--UT
Population and Housing Narrative Profile: 2005-2009
Data Set: **2005-2009 American Community Survey 5-Year Estimates**
Survey: **American Community Survey**

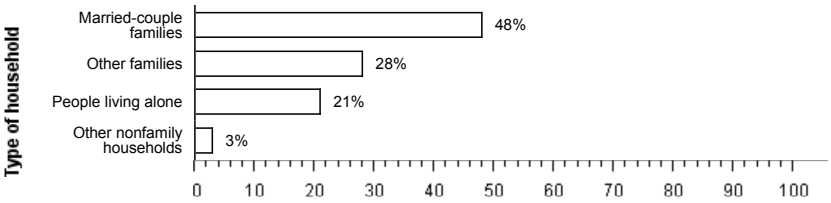
NOTE. Although the American Community Survey (ACS) produces population, demographic and housing unit estimates, it is the Census Bureau's Population Estimates Program that produces and disseminates the official estimates of the population for the nation, states, counties, cities and towns and estimates of housing units for states and counties.

For more information on confidentiality protection, sampling error, nonsampling error, and definitions, see Survey Methodology.

HOUSEHOLDS AND FAMILIES: In 2005-2009 there were 130 households in White Horse Lake Chapter. The average household size was 4.2 people.

Families made up 75 percent of the households in White Horse Lake Chapter. This figure includes both married-couple families (48 percent) and other families (28 percent). Nonfamily households made up 25 percent of all households in White Horse Lake Chapter. Most of the nonfamily households were people living alone, but some were composed of people living in households in which no one was related to the householder.

The Types of Households in White Horse Lake Chapter; Navajo Nation Reservation and Off-Reservation Trust Land, AZ--NM--UT in 2005-2009

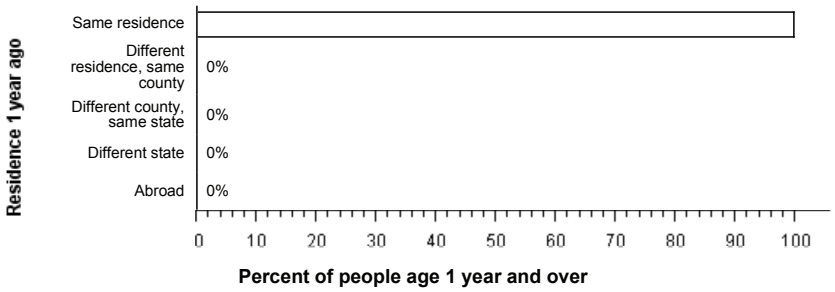


Source: American Community Survey, 2005-2009

NATIVITY AND LANGUAGE: Less than 0.5 percent of the people living in White Horse Lake Chapter in 2005-2009 were foreign born. One hundred percent was nativeAmong people at least five years old living in White Horse Lake Chapter in 2005-2009, 56 percent spoke a language other than English at home. Of those speaking a language other than English at home, less than 0.5 percent spoke Spanish and 100 percent spoke some other language; 37 percent reported that they did not speak English "very well."

GEOGRAPHIC MOBILITY: In 2005-2009, 100 percent of the people at least one year old living in White Horse Lake Chapter were living in the same residence one year earlier; less than 0.5 percent had moved during the past year from another residence in the same county, less than 0.5 percent from another county in the same state, less than 0.5 percent from another state, and less than 0.5 percent from abroad.

Geographic Mobility of Residents of White Horse Lake Chapter; Navajo Nation Reservation and Off-Reservation Trust Land, AZ--NM--UT in 2005-2009

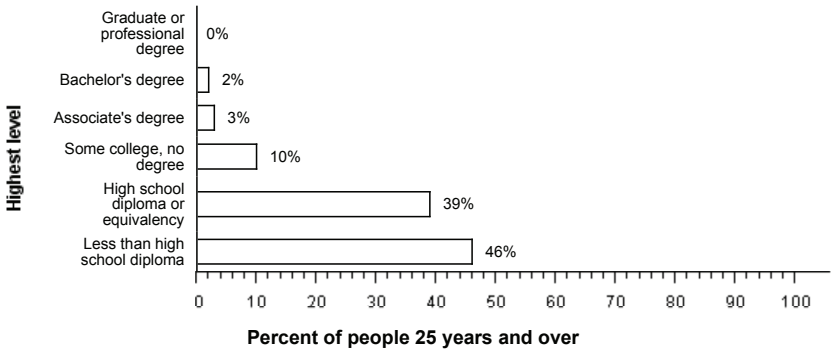


Source: American Community Survey, 2005-2009

EDUCATION: In 2005-2009, 54 percent of people 25 years and over had at least graduated from high school and 2 percent had a bachelor's degree or higher. Forty-six percent were dropouts; they were not enrolled in school and had not graduated from high school.

The total school enrollment in White Horse Lake Chapter was 220 in 2005-2009. Nursery school and kindergarten enrollment was less than 0.5 and elementary or high school enrollment was 220 children. College or graduate school enrollment was less than 0.5.

The Educational Attainment of People in White Horse Lake Chapter; Navajo Nation Reservation and Off-Reservation Trust Land, AZ--NM--UT in 2005-2009

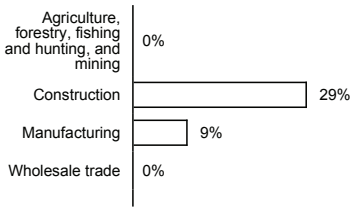


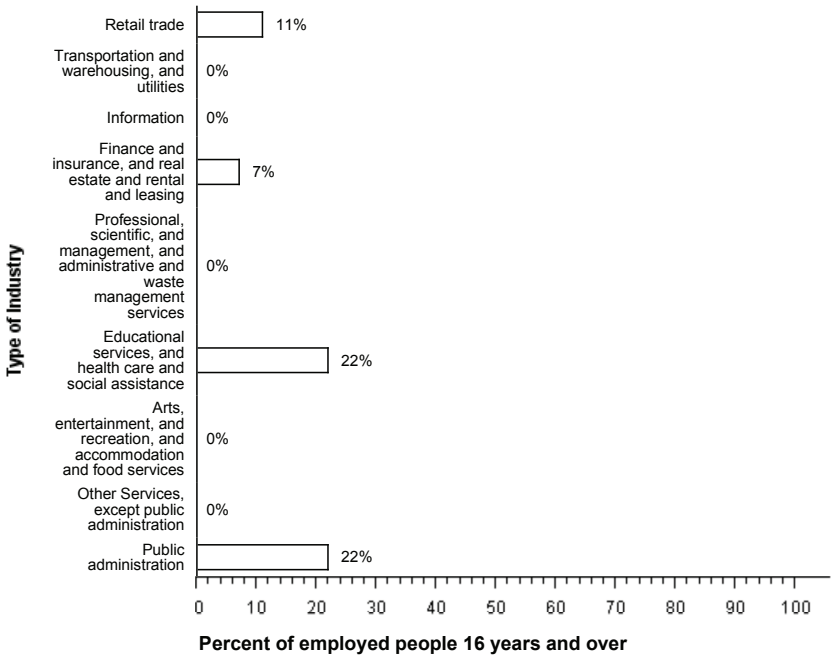
Source: American Community Survey, 2005-2009

DISABILITY: In White Horse Lake Chapter, among people at least five years old in 2005-2009, percent reported a disability. The likelihood of having a disability varied by age - from percent of people 5 to 15 years old, to percent of people 16 to 64 years old, and to percent of those 65 and older.

INDUSTRIES: In 2005-2009, for the employed population 16 years and older, the leading industries in White Horse Lake Chapter were Construction, 29 percent, and Educational services, and health care, and social assistance, 22 percent.

Employment by Industry in White Horse Lake Chapter; Navajo Nation Reservation and Off-Reservation Trust Land, AZ--NM--UT in 2005-2009





Source: American Community Survey, 2005-2009

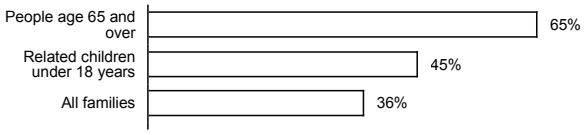
OCCUPATIONS AND TYPE OF EMPLOYER: Among the most common occupations were: Service occupations, 29 percent; Production, transportation, and material moving occupations, 27 percent; Sales and office occupations, 23 percent; Construction, extraction, maintenance, and repair occupations, 18 percent; and Management, professional, and related occupations, 3 percent. Fifty-eight percent of the people employed were Private wage and salary workers; 29 percent was Federal, state, or local government workers; and 13 percent was Self-employed in own not incorporated business workers.

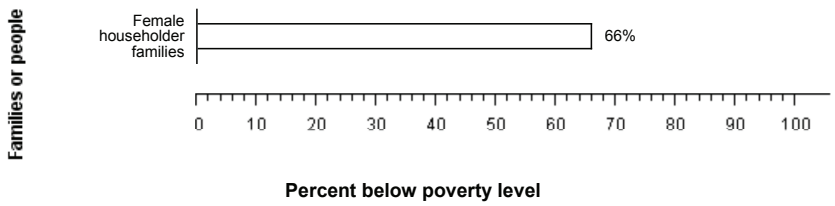
TRAVEL TO WORK: Sixty-three percent of White Horse Lake Chapter workers drove to work alone in 2005-2009, 21 percent carpooled, less than 0.5 percent took public transportation, and 4 percent used other means. The remaining 12 percent worked at home. Among those who commuted to work, it took them on average 65.1 minutes to get to work.

INCOME: The median income of households in White Horse Lake Chapter was $20,833. Sixty-seven percent of the households received earnings and 2 percent received retirement income other than Social Security. Twenty-two percent of the households received Social Security. The average income from Social Security was $6,982. These income sources are not mutually exclusive; that is, some households received income from more than one source.

POVERTY AND PARTICIPATION IN GOVERNMENT PROGRAMS: In 2005-2009, 49 percent of people were in poverty. Forty-five percent of related children under 18 were below the poverty level, compared with 65 percent of people 65 years old and over. Thirty-six percent of all families and 66 percent of families with a female householder and no husband present had incomes below the poverty level.

Poverty Rates in White Horse Lake Chapter; Navajo Nation Reservation and Off-Reservation Trust Land, AZ--NM--UT in 2005-2009

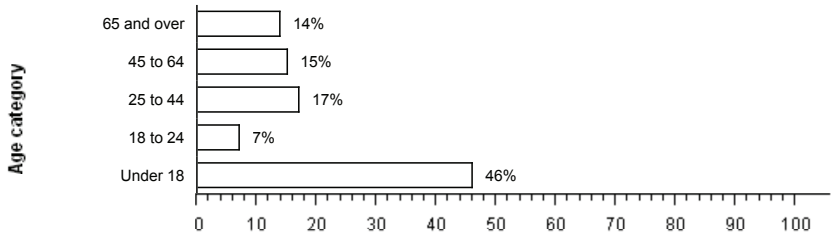




Source: American Community Survey, 2005-2009

POPULATION OF White Horse Lake Chapter: In 2005-2009, White Horse Lake Chapter had a total population of 530 - 300 (56 percent) females and 240 (44 percent) males. The median age was 21.4 years. Forty-six percent of the population was under 18 years and 14 percent was 65 years and older.

The Age Distribution of People in White Horse Lake Chapter; Navajo Nation Reservation and Off-Reservation Trust Land, AZ--NM--UT in 2005-2009

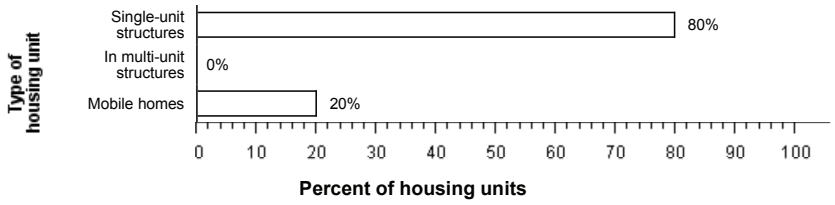


Source: American Community Survey, 2005-2009

For people reporting one race alone, 1 percent was White; less than 0.5 percent was Black or African American; 99 percent was American Indian and Alaska Native; less than 0.5 percent was Asian; less than 0.5 percent was Native Hawaiian and Other Pacific Islander, and less than 0.5 percent was Some other race. Less than 0.5 percent reported Two or more races. Less than 0.5 percent of the people in White Horse Lake Chapter was Hispanic. One percent of the people in White Horse Lake Chapter was White non-Hispanic. People of Hispanic origin may be of any race.

HOUSING CHARACTERISTICS: In 2005-2009, White Horse Lake Chapter had a total of 310 housing units, 59 percent of which were vacant. Of the total housing units, 80 percent was in single-unit structures, less than 0.5 percent was in multi-unit structures, and 20 percent was mobile homes. Seventeen percent of the housing units were built since 1990.

The Types of Housing Units in White Horse Lake Chapter; Navajo Nation Reservation and Off-Reservation Trust Land, AZ--NM--UT in 2005-2009



Source: American Community Survey, 2005-2009

OCCUPIED HOUSING UNIT CHARACTERISTICS: In 2005-2009, White Horse Lake Chapter had 130 occupied housing units - 120 (93 percent) owner occupied and 9 (7 percent) renter occupied. Seventy-six percent of the households did not have telephone service and 29 percent of the households did not have access to a car, truck, or van for private use. Fourteen percent had two vehicles and another 19 percent had three or more.

HOUSING COSTS: Data for this section cannot be displayed because the number of sample cases is too small. Displaying the data would risk disclosing information for individuals.

Source: U.S. Census Bureau, 2005-2009 American Community Survey

The U.S. Census Bureau's Population Estimates Program produces the official population estimates for the nation, states, counties and places, and the official estimates of housing units for states and counties. The population and housing characteristics included above are derived from the American Community Survey.

Notes:
· Detail may not add to totals due to rounding.
· Percentages are based on unrounded numbers.

Chapter **33**

Hispanic Self-Employment Across U.S. Metropolitan Labor Markets

Qingfang Wang, Ph.D.
Geography and Earth Sciences
University of North Carolina at Charlotte

Entrepreneurship plays an important role in stimulating economic development and growth. Many U.S. local and regional governments have added programs that promote entrepreneurship to their economic development policies in recent years (Acs 2007; Hart 2008; Headd 2010; Malecki 1993). Previous studies have identified a number of factors associated with the formation and development of ethnic enterprises (Aldrich 1985, 1989; Bates 2011; Light 1972; Kloosterman and Rath 2003; Waldinger et al. 1990; Zhou 2004). However, most of them do not explicitly articulate the theoretical sources and nature of power of places in this process (Wang 2012). Although some studies have examined the relationship between ethnic neighborhoods and ethnic businesses that are predominantly small-scale and low-skilled (Chagnti and Greene 2002), studies of the relationship between ethnic entrepreneurship and the macro labor market environment are scant. Systematic comparisons in self-employment or entrepreneurship between the foreign-born and the native-born from the same ethnic groups are extremely scarce. Even less is known about how gender interacts in this process. Therefore, through a multilevel research design, the objective of this study is to examine how metropolitan area labor market conditions are associated with the propensity of self-employment for the ethnic minority labor force in the United States, and how this relationship differs between the foreign-born and the native born, between men and women.

Data in this study come from the Public Use Microdata Sample (PUMS) of 2006-2010 American Community Survey (ACS). A hierarchical logistic regression model is used to examine the characteristics at the personal, household and metropolitan area level associated with each individual labor force's probability of self-employment. Individual level characteristics include age, gender, foreign-born status, education, family size, marital status, hours working per week, and whether one has a spouse who is also self-employed. For the purpose of this study, I particularly examine how the metropolitan area level characteristics are associated with self-employment for Hispanic labor force, after controlling for these individual person and household characteristics. The metro-level characteristics include general economic conditions, industrial structure, and ethnic composition.

Figure 33.1 presents the rate of self-employment for Hispanics compared with other ethnic groups. For Non-Hispanic whites and blacks, foreign-born males have a higher rate of self-employment than US-born co-ethnic males. Likewise, foreign-born females have a higher rate than US-born co-ethnic females. That is, for whites and blacks, foreign-born males have a highest rate among their co-ethnics, followed by US-born males. US-born females have the lowest rate of self-employment. The pattern is different for Hispanics and Asians. For these two groups, the foreign-born civilian employed labor force, regardless of gender, has a higher rate than the US-born co-ethnics. That is, foreign-born females even

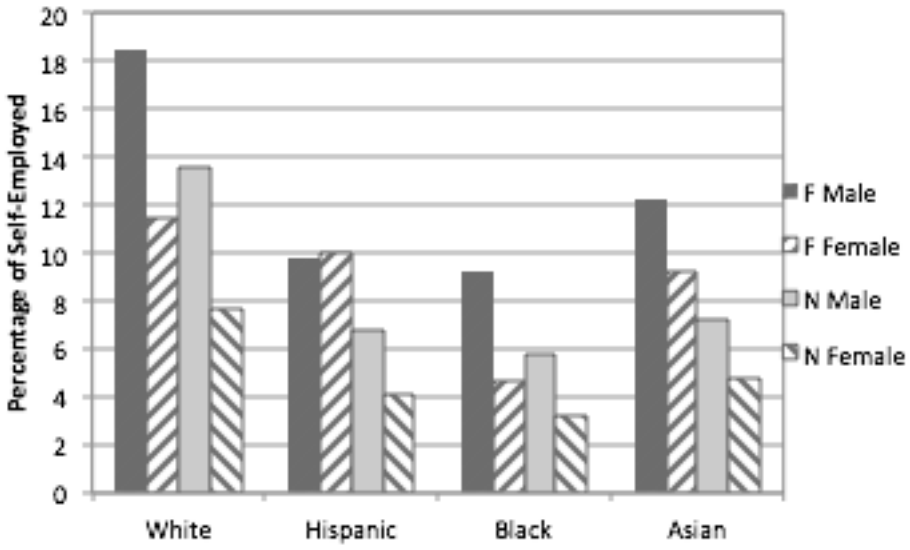


Figure 33.1 Rate of self-employment of Hispanics compared with other groups

have a higher rate of self-employment than that of native-born males. For the Hispanics, the rate of self-employment for foreign-born females is even slightly higher than the rate for foreign-born Hispanic males. This pattern indicates that foreign-born status may have surpassed gender effects in shaping the self-employment patterns across ethnic groups, especially for Hispanic groups.

Due to space limit, regression results are omitted from this presentation. Overall, findings from this study suggest that the spatial organization of metropolitan employment opportunities in terms of the demographic composition, economic structure, and number, quality and distribution of jobs is important for Hispanic self-employment. First of all, a higher concentration of co-ethnic population could provide more resources and favorable environments for Latino business ownership. Such a positive effect is most likely shared within the foreign-born labor force, regardless of gender.

Regional industrial structure also defines the opportunity structures for Hispanic self-employment in metropolitan labor markets. Consistent with Hispanic robust concentration in construction industry, a higher percentage of construction industry in a metropolitan area predicts significantly higher probabilities of self-employment for Latinos, regardless of gender and place of birth. However, changes in the size of manufacturing and trade have significantly reshaped gender differences in the probability of self-employment, regardless of the foreign-born status. At the same time, increase of regional service jobs has widened the differences between the foreign-born and the US-born.

Putting all the factors together, the following graphs (Figure 33.2) depict the predicted probability for the four Latino groups in Miami, Atlanta, and Detroit for a "hypothetical" Latino worker whose individual characteristics are at the "average" level of the entire Latino group. The selected three metropolitan areas are distinct in their overall economic condition, industrial structure, and immigration history. As shown here, for an "average" Latino civilian employee worker, the foreign-born male is much more likely to start his own business in Miami than in the other two metropolitan areas. Especially in Detroit, the likelihood is much lower. In newly emergent immigration destinations such as Atlanta, a foreign-born woman seems to be doing much better than she is in Miami. For US-born Hispanics,

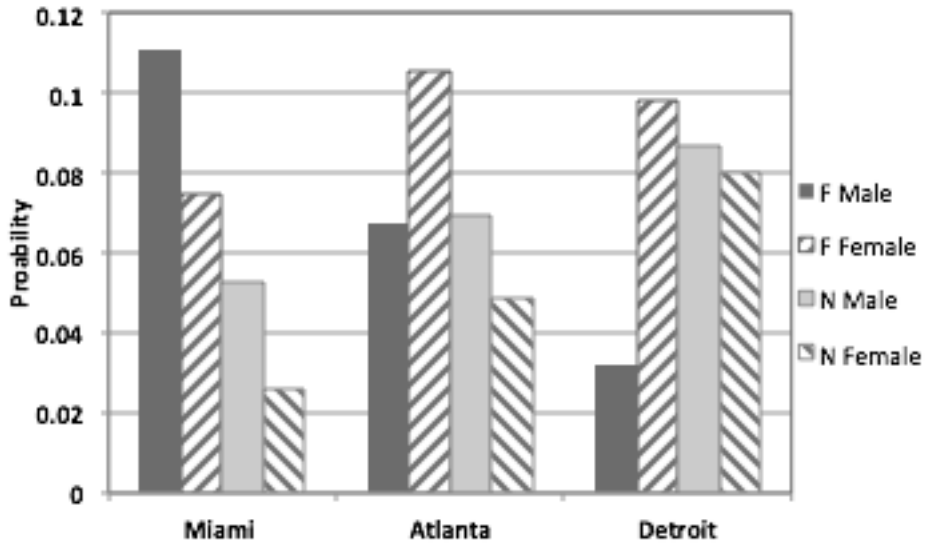


Figure 33.2 Predicted probability of self-employment for a hypothetical Latino labor force in different immigration gateways

regardless of gender, there is a much better chance for business ownership in Detroit than in Miami. While traditional perspectives on ethnic entrepreneurship or self-employment have been dominantly shaped by the experiences of foreign-born male workers, insights from this study have demonstrated divergent paths for women and the later generations of these immigrants.

For policy-makers, an understanding of these metropolitan area level factors refocuses debate on the broader range of correlates and questions regarding the best mix of policy response. A large number of case studies have documented the positive effects of self-employment and ethnic businesses on ethnic minority and immigrant upward mobility. Places, measured at the metropolitan area level in this study, are powerful in shaping the process of moving upward through entrepreneurship for immigrant and ethnic minority labor force. However, the power of place is not equal. Foreign-born status and gender not only directly define ethnic minority labor force in what they "have" and "have-not," but also interact with place to forge more nuanced lines across accessibility and upward mobility.

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Chapter **34**

Using ACS Data for Geographical Research: A Methodological Perspective

David W. Wong
Department of Geography and GeoInformation Science
George Mason University

This "short piece" for the workshop is probably different from most pieces, as it is not specifically about a particular application of ACS data, nor does it highlight the need for ACS data in a specific area. Instead, it focuses on some methodological issues related to the use of ACS data in geographical applications and provides a summary of a series of development efforts underway to facilitate the use of ACS data in geographical research.

A common concern of those using ACS data is the statistical uncertainty of ACS estimates when the data are used for small area applications. Local government officials have a need for ACS data to understand the characteristics of their communities, but relatively large margins of error (MOEs) or coefficients of variation (CVs) for ACS estimates at the local or neighborhood level (e.g., census tracts or block groups) is of concern to them. No comparable data from another source are available: the ACS has served as the primary source of data about social, economic, demographic, and housing characteristics of U.S. society since it replaced the decennial census long form survey. The reliability of ACS estimates is a concern that cuts across all types of users regardless of their disciplines, but the issue creates quite unique problems for the use of ACS in geographical research.

Variables in decennial censuses have been used in mapping frequently (e.g., Brewer and Suchan, 2001; Suchan et al., 2007). In such mapping exercises, the statistical errors in census variables were often not considered, as they were relatively small. However, considering MOEs or CVs is a necessary for comparing ACS estimates in traditional statistical analysis (Citro and Kalton, 2007). When ACS estimates are used in geographical studies, they are often treated as if they possess the same quality as estimates in decennial censuses. Even if the statistical error associated with ACS estimates has been acknowledged in mapping applications, it has rarely been incorporated effectively to assist map readers in extracting spatial information from the estimates (MacDonald and Peters, 2011).

When data are mapped, readers often have the tendency to look for the presence of spatial patterns. Spatial patterns emerge when differences between mapped values exhibit certain systematic patterns, for example, when areal units in close proximity have highly similar values. But if the mapped values have substantial levels of statistical uncertainty, then differences between values may not be statistically significant. If the differences between mapped values are not real, then the observed spatial pattern also may not exist for the underlying population. Therefore, mapping ACS data without considering data quality information may mislead readers to believe the presence of a particular spatial pattern, but in fact, the pattern does not exist, committing the Type I error.

Incorporating estimate error information when mapping ACS data is critical in extracting reliable information to describe a community's characteristics accurately, and in supporting decision making

and policy formulations. While mapping is often the initial step in exploratory spatial data analysis, more sophisticated spatial analytical procedures and models may be used subsequently. Again, when ACS data are used in these analytical and spatial statistical procedures, taking into account the statistical uncertainty of ACS estimates is essential. However, little evidence shows that this guidance has been followed, partly because frameworks to include error information in spatial analytical procedures have not been fully developed, and partly because geographers who have used ACS data have not recognized the implications of ignoring this guidance.

The need to visualize quality of spatial data has been a research agenda for at least two decades (Beard and Buttenfield, 1991). Numerous methods have been proposed to map data quality information to assist readers in recognizing the quality of mapped values (e.g., Leitner and Buttenfield, 2000; MacEachren et al., 1998; MacEachren et al., 2005), but no methods have been adopted as the standards in mapping data quality information, and no tools in GIS have been developed to address this specific need. A concise review of some approaches to include data quality information in mapping can be found in Sun and Wong (2010). Even if a choropleth map of ACS estimates includes the levels of estimate error, map readers will still have difficulties to discern if differences between estimates are true or not, and subsequently, interpret the spatial patterns to be true.

Recently, a series of efforts was launched to develop tools in mapping to assist and promote the use of ACS data with error information. These tools were packaged as an extension for ArcGIS. Besides the function to join ACS tables with the corresponding shapefiles, functions in the extension fall into two general categories of mapping ACS estimates: (1) imposing hatch or crosshatch patterns indicating error levels on the color shades showing the estimate values and, (2) identifying observations (areal units) on the choropleth map with estimates that are significantly different from estimates for selected observations.

Figure 34.1 includes the drop-down menu items of functions of the extension (top), and two maps showing these two general types of functions. The upper map shows the CVs of ACS estimates in patterns on the top of color shades showing the estimate values. CVs are derived from MOEs accompanying all ACS estimates, and CVs are used instead of MOEs to show the quality of estimates because CVs are less sensitive to the absolute values or scales of the estimates (e.g., MOEs of income in New York City are definitely larger than those in rural West Virginia just because the former has higher income levels than the latter region in general). On the map at the bottom, a county in southern Texas was chosen as the reference area (cross-hatched) such that the ACS estimate for this county was compared with values in all other units statistically. The tool determines if the value in the reference area is statistically higher, lower, or not statistically different from values for other areas. Results are shown by patterns overlaid onto the choropleth map showing the original estimate values. This specific way of comparing estimates is just one of several functions in the extension designed to compare estimates statistically.

A full description of the extension features can be found in Wong and Sun (2012), and the extension can be freely downloaded from http://gesg.gmu.edu/census. Two versions of the extension are currently available, supporting ArcGIS 9.3 and 10.0. A new version is needed for ArcGIS 10.1, as it has significant compatibility issues with version 10.0. The new version for 10.1 will be developed in the near future. The project also considers augmenting the capabilities of the extension in handling large datasets that are stored in geodatabase format, and supporting the comparisons of estimates found in different data layers. A longer term goal is to make available some or all functions in the extension on the web such that ACS data users without access to ArcGIS can still implement our concepts in mapping and comparing ACS estimates.

While functions in the ArcGIS extension can help with the uncertainty of ACS estimates, we believe that other approaches could be fruitful. New map designs and other visualization techniques are potentially useful to incorporate data quality information into the mapping of ACS data. Evaluating

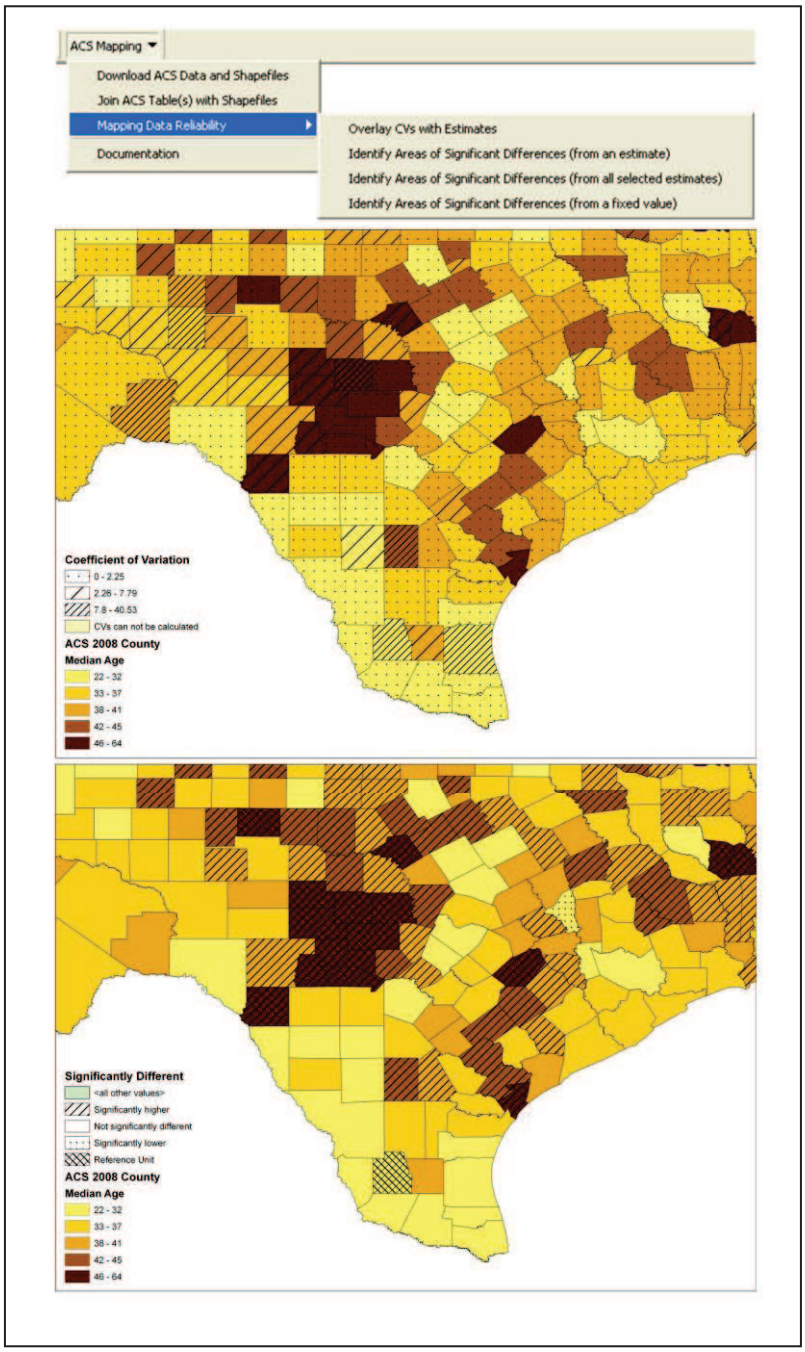

Figure 34.1 Illustration of ACS Mapping Extensions for ArcGIS

NOTE: Figure shows: Drop-down menu items for the ACS Mapping Extensions for ArcGIS (upper), a map with coefficients of variation overlaid on the ACS estimates (middle), and a map indicating counties with estimates significantly different from the estimate of the chosen county (lower).

spatial patterns in ACS data quantitatively is still a challenging task. Existing tools in the ArcGIS extension and future tools can assist experienced GIS users in mapping ACS data more effectively, but educating general ACS data users about the need to consider error information in mapping and spatial analysis should be a priority task.

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Chapter **35**

Testimony on Mandatory-or-Voluntary Debate

Lawrence Yun
Senior Vice President and Chief Economist
National Association of Realtors

With his permission, we are reprinting Lawrence Yun's testimony before the House Subcommittee on Health Care, District of Columbia, Census, and National Archives from March 6, 2012. The hearing was titled "The Pros and Cons of Making the Census Bureau's American Community Survey," and Yun was one of three ACS users asked to provide comments at the hearing. This reprinting includes only his main testimony, and not a lengthy example of rebenchmarking Existing Home Sales data that he contributed for the hearing record.

Introduction

Chairman Gowdy, Ranking Member Davis, and members of the Subcommittee, thank you for inviting me to testify today and to offer the REALTOR® perspective on the American Community Survey, a survey that reports on an annual basis important demographic, income, and housing characteristics information for the approximately 114 million households in this country.

I am Lawrence Yun, Senior Vice President and Chief Economist of the National Association of REALTORS®. I have worked for NAR since 2000, analyzing and advising on real estate and research issues. I hold a Ph.D. in economics from the University of Maryland and a B.S. in Mechanical Engineering from Purdue University.

I am here to testify on behalf of the approximately 1 million REALTORS® who are involved in residential and commercial real estate as brokers, sales people, property managers, appraisers, counselors, and in other capacities involving the real estate profession. NAR members belong to one or more of some 1,400 local REALTOR® associations and boards, and 54 state and territory REALTOR® associations.

My testimony addresses the value of the American Community Survey. We thank the Subcommittee on Health Care, District of Columbia, Census, and the National Archives for holding this important hearing concerning the Survey.

The American Community Survey Provides Key Data for Understanding Major National Issues

The ACS is part of the decennial census and is the most relied-upon source for up-to-date socio-economic, housing, and financial information, not only for the nation, but also for states and cities. The ACS is unique in that it reports detailed data for small areas, such as census blocks.

The importance of the Survey is highlighted by some of its uses. For example, more than $400 billion in Federal funds are allocated annually to state and local governments based on census data, including data from the ACS. The ACS provides the data needed to address major housing issues. Data collected from nearly 3 million households per year allows researchers to analyze changing demographic patterns and to provide current assessments of local real estate market conditions.

ACS Data Use by NAR

To be more specific, I would like to discuss how NAR uses the Survey. The ACS provides an important input to NAR's estimation of Existing Home Sales (EHS), as delineated in the Appendix of this testimony. NAR's monthly sales estimates are based on information from a comprehensive sample of Multiple Listing Services around the country. However, NAR does not obtain information on every single sale. Rather, NAR has data for a representative sample of home sales on a monthly basis. The monthly information is then grossed–up to obtain an estimate of total national existing home sales each month.

Information from the ACS provides the basis for the gross–up. Based on information in the yearly ACS we are able to obtain a benchmarked level of sales—that is, an estimated level of total existing home sales in a given year. We then use the sample data from the Multiple Listing Services to estimate total monthly sales, based on the benchmark.

Without the availability of the ACS we probably would not have an accurate measure of the Existing Home Sales markets, and it is well known that home sales are one of the important drivers of the economy. Timely information on an important part of the economy would no longer be available. This combination of public and private data provides information on a major part of our economy—information that is of interest to decision makers, the homeowner, and a variety of stakeholders.

Another use of the ACS is in computing the housing affordability index at the local market level. NAR publishes a closely watched affordability index, which is based on prevailing mortgage rates, local home prices, and local household incomes. We rely on the ACS to provide the local income measurements.

One of the popular reports we provide for our REALTOR® members is the Local Housing Market Report. Included in the report are sales, prices, and housing starts trends. We also include information on population shifts and income trends, the data set that comes from the ACS. Our REALTOR® members from the faster growing states such as Arizona, Utah, Texas, Florida, North Carolina, and my home state of South Carolina are particularly delighted to hear about the changing population shifts in their state's favor, recognizing that my observations are based on anecdotal conversations that I have had with REALTOR® members.

ACS Survey Quality Is Very Important

The major value of the ACS is that it is based on a random, statistically accurate sample permitting research analysis at the national, state, and local levels. The key word is "Random." A significant non-response error could be introduced to the analysis if participation in the Survey were optional. Moving to a voluntary response to the ACS would no doubt reduce response rates, particularly among minority households, low income households and from rural communities.

The accuracy and comprehensiveness of the Survey is extremely important. Conclusions from a non-random survey could be incorrect and misleading. For these reasons it is important that households

selected for the survey be counted in the database. The option of not answering the survey could bias or render meaningless conclusions based on the database.

NAR's Recommendations and Conclusions

I thank you for this opportunity to present our comments on the American Community Survey. It is my understanding that the Survey is used by a number of stakeholders and is a major input to decisions involving billions of dollars. In the case of the housing markets, the ACS serves as a major input to the computation of Existing Home Sales data and the Housing Affordability Index—information of crucial importance in recent years in addressing the nation's housing problems and issues.

Data integrity is important, and I hope that the American Community Survey can continue to obtain the necessary response rates needed to assure the development of accurate and meaningful conclusions.