Comparison of Migration Data: 2013 American Community Survey and 2013 Annual Social and Economic Supplement of the Current Population Survey

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Abstract

Several of the U.S. Census Bureau's surveys measure geographic mobility. This paper focuses on 2013 migration data collected through two different surveys, the American Community Survey (ACS) and the Annual Social and Economic Supplement (ASEC) of the Current Population Survey.

The ASEC offers a historical perspective on annual migration that is unparalleled. It first asked respondents about their movement in 1948. Data are available at the national and regional levels. There are two important, additional measures offered by ASEC: reason for move and distance moved. Neither is currently available through the ACS.

While the ACS cannot highlight long-term trends, its strengths include the ability to focus on smaller geographies and populations. Migration data are available to the city/town level. There are also ACS flow products available down to the county level. This level of detail is too refined for ASEC migration data.

Even though the two surveys have similar migration questions, design and methodological differences result in different estimates. This paper discusses these differences and notes changes since full ACS implementation in 2005. The analysis evaluates national mover rates for each survey, and includes an exercise to create a hypothetical ACS mover rate using only counties in the CPS sample to illustrate if county coverage in the CPS sample contributes to observable differences in mover rates between the surveys.

General guidance is provided regarding when to use the ACS or ASEC for migration estimates. The main conclusion of this paper is that there is no single, easily identifiable reason why migration estimates differ across these two surveys. Instead, there are a surplus of factors that each contribute to observed differences, which are summarized in a quick reference comparison matrix of the various factors provided in the appendix section. This is the first in a series of planned evaluations of Census migration data compared to other surveys, population estimates, and administrative records. Numerous elements discussed in this paper will be explored in-depth in future papers.

Introduction

The U.S. Census Bureau publishes migration estimates from several sources, including the American Community Survey (ACS) and the Annual Social and Economic Supplement (ASEC) of the Current Population Survey (CPS). [2]

[1] This paper reports the results of research and analysis undertaken by U.S. Census Bureau staff. It has undergone more limited review than official publications and is released to inform interested parties of ongoing research and to encourage discussion of work in progress. Any views expressed are those of the authors and not necessarily those of the U.S. Census Bureau.

[2] Other Census Bureau surveys that collect migration data include the American Housing Survey and the Survey of Income and Program Participation. Migration estimates, based on administrative data, are also published by the Census Bureau's Population Estimates Program.

This paper revisits previous work comparing ACS and ASEC migration estimates by Koerber (2007).[3] His analysis occurred prior to full implementation of the ACS. Since that time, several things have changed for the ACS and ASEC. The ACS improvements include the use of subcounty population controls, the creation and implementation of an Internet interview instrument, and question modifications to collect more detailed migration information based on results from a 2006 content test. ASEC improvements include updating the sampling frame in 2005, altering processing for imputing type of move information, and changing the schedule of sampling frame updates beginning in 2015.[4] Some of these improvements are discussed in additional detail in later sections of this paper.

This report begins by providing a brief history of each survey and related content highlights. From there the national mover rates are reviewed starting with 2005, the year after the last comparison report ended. We then discuss differences between the ACS and ASEC that may contribute to the divergent migration rates. Finally, the report concludes with general guidance on when to use migration estimates from each survey. It should be noted that this is the first in a series of evaluations planned to help users better understand Census Bureau surveys, migration estimates, how they differ, and how to select an estimate to use.

Survey Background

The CPS is a joint effort between the U.S. Census Bureau and the Bureau of Labor Statistics primarily designed to collect information on labor force statistics. It has collected migration data since 1948.[5] The 2013 ASEC had a sample size of roughly 99,000 households. Data are available at the national and regional levels.[6] There are two important migration measures offered by ASEC, reason for move and distance moved. Neither is currently available through the ACS.

With its limited history, the ACS cannot highlight long-term trends. It first reached full implementation in 2005 for the household population.[7] The population living in group quarters was added to the sample in 2006. [8] When added together, the household and group quarters populations equate to the total U.S. resident population. The survey's strength is in the ability to focus on smaller geographies and populations, with its initial, annual sample size of approximately 3.5 million housing units. Migration data are available down to the city/town level on American FactFinder.[9] There are also ACS migration flow products available down to the county level.[10] This level of detail is too refined for ASEC migration data.

Before delving into survey differences, it is helpful to look at the national mover rate by survey from 2005 to 2013. According to data in **Table 1**, the 2012 to 2013 period had a mover rate of 11.7 percent in ASEC and 15.0 percent in the ACS for the population 1 year and over.[11] As the table clearly demonstrates, the gap in the mover rate is not a

[3] The appendix of the report, "Geographical Mobility: 2008 to 2009" by Ihrke et al. (2011) also discusses differences between the ACS and ASEC. The report is available at: http://www.census.gov/prod/2011pubs/p20-565.pdf.
[4] More information about this processing change is available a note for data users on the Impact of Processing on Interstate Migration Rates, 2000-2006, available at: http://www.census.gov/hhes/migration/files/CPSnote.pdf.
[5] The historical tables and figures for migration are available at: http://www.census.gov/hhes/migration/data/cps/historical.html. Some years are not comparable due to changes in the migration questionnaire wording.
[6] ASEC detailed migration tables are available at: http://www.census.gov/hhes/migration/data/cps.html.
[7] The precursor to the ACS, the Long Form Decennial Census, asked migration questions from 1940 to 2000. However, the reference period for migration was 5 years, except in 1950, and not comparable to the 1-year ACS data.
[8] Group quarters include college residence halls, residential treatment centers, skilled nursing facilities, group homes, military barracks, correctional facilities, and workers' dormitories.
[9] The URL for American Factfinder is http://factfinder.census.gov.
[10] Migration flows are available at the geographic summary levels of state, county, minor civil division (for selected states), and metropolitan statistical areas on the ACS Migration webpage, available at: http://www.census.gov/hhes/migration/data/acs.html.
[11] The 2013 data were used because the 2014 ACS estimates were not publicly available when this report was written.

new phenomenon. Quite the contrary, differences in the mover rate are fully expected. The survey differences section below begins to answer the all-important question of "why".

Table 1. Mover Rate of the Population 1 Year and Over by Survey: 2005 to 2013

	ASEC				ACS			
Mobility Period	Civilian Noninstitutionalized Population (in thousands)	MOE	Mover Rate	MOE	Resident Population (in thousands)	MOE	Mover Rate	MOE
2012-2013	307,243	35	11.7	0.2	312,433	29	15.0	0.1
2011-2012	304,924	35	12.0	0.2	310,213	26	15.0	0.1
2010-2011	302,640	35	11.6	0.2	307,900	30	15.2	0.1
2009-2010	300,419	35	12.5	0.2	305,629	30	15.4	0.1
2008-2009	297,182	34	12.5	0.2	302,952	35	15.4	0.1
2007-2008	294,851	34	11.9	0.2	299,926	31	15.6	0.1
2006-2007	292,749	34	13.2	0.2	297,545	28	16.0	0.1
2005-2006	289,781	34	13.7	0.2	295,345	30	16.8	0.1
2004-2005	287,148	34	13.9	0.2	284,367	32	16.1*	0.1

* Group Quarters were not included in the ACS for this year.
MOE = Margin of error based on 90% confidence interval.
Sources: U.S. Census Bureau, Current Population Survey, Annual Social and Economic Supplement, 2005 to 2013; American Community Survey, 2005 to 2013, 1-year estimates.

Survey Differences

There is not a single, easily identifiable reason that explains why migration estimates differ between surveys. Instead, the interplay of several factors contributes to observable differences. Some of the differences may be attributed to design and methodological differences between the ACS and ASEC.[12,13] The remaining sections focus on factors that we believe are important contributors to differences in migration estimates.

Questionnaire Wording

The migration section in both surveys begins with a question about mobility status. The ACS asks, "Did this person live in this house or apartment 1 year ago?" The ASEC has slightly different wording, "Was (reference person) living in this house or apartment 1 year ago?" A subtle difference, but a difference nonetheless. The choices for mobility status also have slight variations by survey and mode of response. The ASEC options are: *Yes, this house (or apartment)*; *No, different house/apartment in the U.S.*; and *No, outside the U.S.* The ACS options closely mirror those of ASEC, with a few notable exceptions. For respondents who complete the ACS by mail, there is an option to select "Person is under 1 year old." All other modes of collection are automated, so they are able to check the age of the respondent and apply skip patterns as necessary.[14] A second difference applies to the "No, different house/apartment in the U.S." response category. Because there is an equivalent survey to the ACS conducted in Puerto Rico, the Puerto Rico Community Survey (PRCS), the ACS option appears as "No, different house in the United States or Puerto Rico."[15]

[12] See Koerber (2007) and pages 17 and 18 of Ihrke et al., (2011).
[13] For quick reference to some of these differences, see the comparison matrix in the Appendix A of this report.
[14] Modes of data collection are discussed in more detail in the next section.
[15] For tabulation purposes, people currently living in Puerto Rico are excluded from calculations of United States' movers and mover rates.

For both surveys, the second part of the migration question asks for specifics of where the respondent lived 1 year ago. People who moved from abroad are asked to provide their country of previous residence. Those who moved within the United States are asked for the place (i.e. city or township), county, state, and zip code of their previous residence.[16] The ASEC asks two additional migration questions not found on the ACS. One asks about the respondent's main reason for moving. The other asks whether the respondent lived within the city limits of their previous place of residence. The ACS does not need to ask about city limits because it collects more detailed address information by way of house or unit number and street name.[17] This added information is part of what allows the ACS to produce tables down to the place level.

Modes of Data Collection

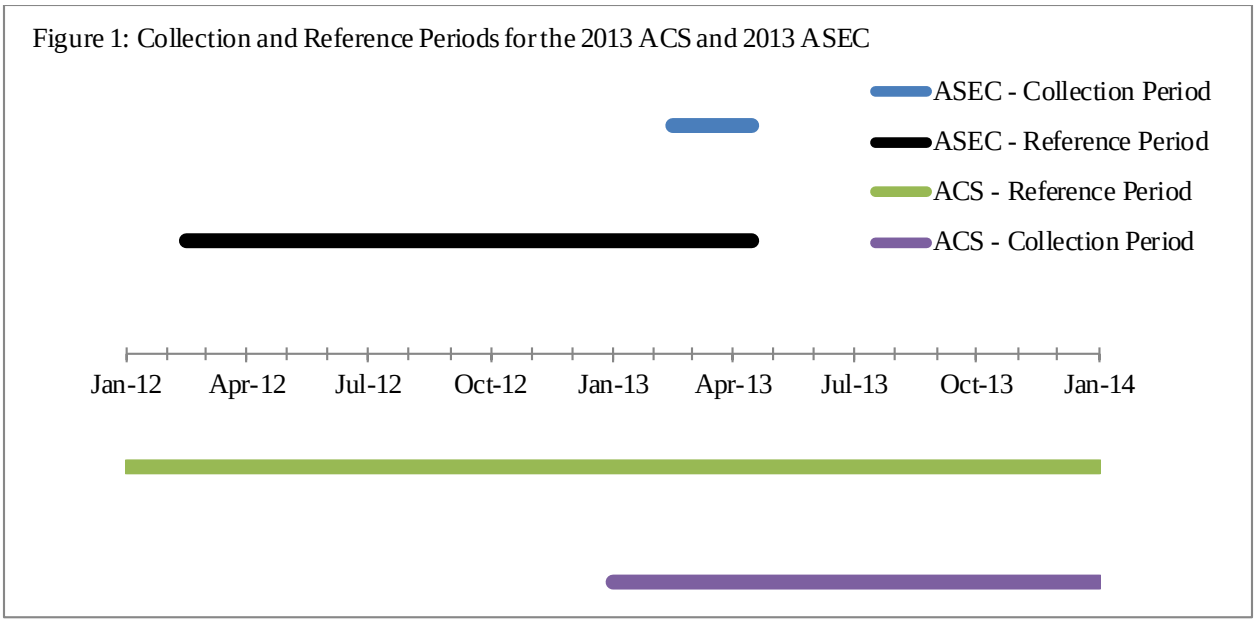
Two modes of data collection are used for ASEC: computed-assisted telephone interviews (CATI) and computer-assisted in-person interviews (CAPI). The four main ACS collection modes are Internet, mail, CATI, and CAPI.[18]

There are key differences in CATI and CAPI operations between surveys. With all other things being equal, it should be easier to find ASEC respondents and collect their information. Most ASEC respondents have been contacted at an earlier point within the last year because they were included in the basic monthly CPS sample. Therefore, the Census Bureau has current address information available from prior interviews. Because the ACS is not a longitudinal survey, respondents have not been in contact with the Census Bureau prior to receiving the survey. Initial contact is made through the mail.[19] CATI and CAPI are secondary methods of contacting respondents in the ACS, while they are the only methods in ASEC. Respondents who do not complete their ACS questionnaire via mail or Internet within one month are forwarded to CATI, if the Census Bureau has a telephone number for that address.[20] After several attempts, a subsample of nonresponse cases is sent for CAPI.

Reference Period

[16] In the ACS/PRCS, respondents who lived in Puerto Rico 1 year ago are also asked to provide detailed information about their previous residence.
[17] The collection of house or unit number and street name began in 2008. Before implementation, the feasibility of collecting and coding down to the place level was tested. To read results of the 2006 Content Test on this subject, see the Evaluation Report Covering Residence 1-Year Ago (Migration), available at: http://www.census.gov/library/working-papers/2007/acs/2007_Boertlein_01.html.
[18] The Internet mode was first utilized in 2013 for the ACS.
[19] In certain circumstances, initial contact is made through CAPI. For example, data collection for residents of remote areas in Alaska.
[20] In order to reach respondents through CATI, the Census Bureau contracts with commercial vendors to obtain telephone numbers. The Census Bureau then attempts to match ACS addresses with telephone numbers in the databases.

Figure 1: Collection and Reference Periods for the 2013 ACS and 2013 ASEC



There is a considerable amount of overlap between the ASEC and the ACS reference periods, from February of the previous year to the end of April of the survey year (see **Figure 1**).[21] Because ASEC does not collect data after April of the survey year, any changes in migration occurring after April will show up in that survey year for the ACS but not until the next year for ASEC. To demonstrate the point, we can use the natural disaster of Hurricanes Katrina and Rita as an impetus to a sudden increase in movement. Beginning in late August of 2005, many people were forced to move after their houses were flooded or destroyed. Some of these moves should have appeared in the 2005 ACS. ASEC collections had already ceased in April for the 2005 survey year, meaning the surge in migration would not appear until the 2006 data. During these sudden migration events, differences in reference periods between surveys are very important.

As shown in **Figure 1**, the ASEC has a much shorter collection period than the ACS. The ASEC data are collected between the months of February and April. Respondents have a very limited amount of time to respond in ASEC. Responses are only collected during one week in the month that the household is in sample. In contrast, the ACS collection operations are ongoing throughout the year. Responses are collected during a three-month period. People who do not respond to the ACS through mail or the Internet are contacted via telephone on the second month and subsamples of those who have still not responded are contacted by CAPI in the third month. The continuous nature of the ACS allows for more contact points over a longer period compared to ASEC.

Population Universe

Another important difference is the population universe, which can be thought of as the people who are eligible to be included in the survey. The ASEC limits its population universe to the civilian noninstitutionalized population living in the United States, whereas the population universe for the ACS is the resident population living in housing units and group quarters. People living in institutional group quarters, members of the armed forces, and students living in dormitories are included in the population universe of the ACS but not ASEC.[22,23,24] For comparison

[21] The reference period for migration covered by each survey was thoroughly discussed in the Geographic Mobility: 2008 to 2009 report, available at: http://www.census.gov/prod/2011pubs/p20-565.pdf. **Figure 1** is an updated version of the graphic presented in this report.
[22] Examples of institutional group quarters include adult correctional facilities and nursing homes.
[23] Members of the Armed Forces are included in ASEC if they live off base or live with their civilian families on base.
[24] ASEC does not typically visit college dormitories for sampling purposes. Therefore, students are either reported at their usual residence outside the dormitories, such as their parents' home, or not captured by the survey.

purposes, **Table 2** contains estimates for the total population, total persons in households, and total persons in group quarters captured in each survey for data year 2013. There are about 5 million more people in the ACS total population estimate than ASEC. This is primarily due to the difference of about 7.8 million in estimates of group quarter residents in the ACS (8.0 million) versus the ASEC (180,000). There is also a difference in the estimates of the household population, with a difference of around 2.8 million in the ACS (308.1 million) versus the ASEC (310.9 million).

Table 2. Population Estimates by Survey: 2013

(Numbers in thousands)

Survey	Total population	Household Population	Group Quarters Population[1]
ASEC	311,116	310,936	180
ACS	316,129	308,099	8,030

Note: This table includes the population of all ages, including those under 1.

[1] The group quarters population estimated in the ASEC includes only noninstitutionalized group quarters residents while the ACS includes both institutionalized and noninstitutionalized residents.

Sources: U.S. Census Bureau, Current Population Survey, Annual Social and Economic Supplement, 2013; American Community Survey, 2013.

Why does the inclusion of group quarters matter, especially as it relates to migration? The 2013 ACS data in **Table 3**, show group quarters' residents are more mobile than the population living in housing units. In fact, most types of group quarters have mover rates between 40 and 60 percent, far greater than the 14.2 percent of people living in housing units. This helps partially to explain why migration estimates differ between the surveys.

Table 3. Population and Mover Rate by Housing Unit and Selected Group Quarters Types: 2013 ACS

Population Universe	Population, 1 year and over (in thousands)	MOE	Mover Rate	MOE
Total	312,433	29	15.0	0.1
Total in Housing Units	304,407	29	14.2	0.1
Total in Group Quarters	8,026	1	47.9	0.3
Institutionalized Group Quarters	3,959	1	43.0	0.4
Adult Correctional Facilities	2,234	1	51.0	0.6
Nursing Facilities/Skilled Nursing Facilities	1,500	1	28.8	0.5
Noninstitutionalized Group Quarters	4,068	2	52.6	0.4
College/University Housing	2,605	1	57.0	0.5

MOE = Margin of error based on 90% confidence interval.
Source: U.S. Census Bureau, American Community Survey, 2013 1-year estimates.

Residency Rules

Residency rules play a critical part in surveys, and by extension migration data, as they dictate where respondents are recorded as living. The ACS has a "two-month rule." A person is considered to be living or staying at a location if they stayed there, or planned to stay, for more than two months.[25] The ASEC utilizes the "usual residence" rule, where respondents determine where they usually reside. College students present unique challenges for both surveys. In terms of ASEC, the student may be living in the dormitory but their parents think of them as a usual resident in the family home. In this scenario, the college student's usual residence would be the parental home, even though they may not be physically living there at the time of the survey. However, if the parents do not record them as a usual resident and they are living in a college dorm, then they would not be included because ASEC does not attempt to collect information at college dormitories. The ACS differs because a student could be surveyed at either the parental home or dormitory, which may change their mobility status depending on the situation.[26] For example, a college student who returned home for 2 months over summer break would be considered a resident of their parents' home. Another possibility is that the student is recorded as living in a college dormitory during the school year. In the latter case, it is likely that the student would be reported as a mover if they lived in different student housing or their parents' house 1 year prior.

Sampling Frames

Until recently, the ASEC and the ACS used different sources for their sampling frames, which varied in how new addresses were handled. The initial ACS sample sourced the Master Address File (MAF) from the 2000 Census. Since then, the MAF has been continuously updated using change of addresses from the United States Postal Service Delivery Sequence File, the ACS non-response follow up, updates from special census operations, Demographic Area Address Listing Operations, and the Community Address Updating System. Updates from the 2010 Census operations were included in the ACS sampling frame in the middle of 2010.[27]

[25] If a person has no other place to stay for more than two months, they can be considered a resident even if they do not plan to live there for two months.
[26] Starting in 2013, assignment of college dormitories in the GQ sample was restricted to January through April and September through December. These months capture a majority of the typical college school year, reducing the chances of visiting an empty group quarters facility.
[27] For more information, see Chapter 3 of the American Community Survey Design and Methodology (January 2014) document, available at http://www.census.gov/acs/www/Downloads/survey_methodology/acs_design_methodology_report_2014.pdf.

Previously, the CPS used multiple-frame sampling.[28] This included a *unit frame*, which contained addresses from the decennial census; an *area frame*, which contained addresses collected from field operations; a *permit frame*, which contained new construction addresses recorded in building permit offices; and a *group quarters frame*. New addresses were added through the building permit frame and the unit frame for areas without building permit coverage. The sampling frame based on Census 2000 results was implemented in 2004 and 2005, several years after the ACS update. Samples for an entire decade were drawn when the frame was updated.

The most recent CPS update followed a similar timeline to earlier CPS updates. Results from the 2010 Census were integrated into the sample frame between April 2014 and July 2015. Sponsors of the CPS decided to abandon the old multi-frame approach of updating the sampling frame. As of July 2015, the MAF will be the source for all future updates.[29] One other important change to note is that samples are now drawn on a yearly basis as opposed to the old method of once per decade. These changes to CPS sample frame methodology reduce the differences between the two surveys. The impact will be more apparent once the 2015 ACS data are available.

Sample Design and County Coverage

The CPS consists of a state-based sample design where there are independent samples for each state and the District of Columbia.[30] The states are divided into primary sampling units (PSU), which is a metropolitan area, large county, or group of smaller counties. The PSUs are grouped into strata so that they are as homogeneous as possible when it comes to the composition of their labor force. A PSU is sampled from each stratum. Housing units are sampled within the selected PSUs.[31] For the 2013 ASEC, households were sampled in 1,347 out of 3,144 counties or county equivalents in the United States. In many cases, the weights applied to these selected households not only represented others in their county, but also households in counties not sampled in their state.

The ACS selects an independent housing unit address sample for each county or county equivalent in the United States and each Municipio in Puerto Rico.[32] Thus, a person in a housing unit that is in sample only represents people within their county. However, group quarters are selected at the state level rather than the county level.[33]

In order to determine if coverage at the county level is an issue, we looked at how the ASEC mover rate would change if the ACS county-level mover rates were applied to the weighted population estimates for the 1,347 counties sampled in the 2013 ASEC, which is limited to a subset of counties. The weighted population for each county in the 2013 ASEC was multiplied by the 2009-2013 5-year ACS county mover rates to obtain a weighted number of movers for each sampled county.[34] Five-year ACS data were used because all counties are represented, whereas only counties with populations of 65,000 or more were represented in 1-year datasets. The aggregate of the number of movers for counties divided by the national population produced a mover rate of 15.10 percent. This compares to 15.11 percent for the 2009-2013 ACS mover rate. Based on the findings, we concluded that the county coverage in CPS-ASEC had no sizeable effect on the national mover rate.

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[28] As a reminder, the ASEC is a supplement of the CPS.

[29] For more information, see the Bureau of Labor Statistics Current Population Survey Technical Document April 2014, available at: http://www.bls.gov/cps/sample_redesign_2014.pdf.

[30] Los Angeles County and New York City are independent samples, so the states of California and New York are split into two independent samples each.

[31] For more information, see Design and Methodology: Current Population Survey Technical Paper 66, chapter 3.

[32] Municipios are the Primary legal divisions of Puerto Rico and treated as county equivalents.

[33] For more information, see chapter 4 of the ACS Design and Methodology (January 2014) document, available at: http://www.census.gov/history/pdf/acsdesign-methodology2014.pdf.

[34] Wrangell City and Borough was created in 2008 from part of the former Wrangell-Petersburg Census Area and part of Prince of Wales-Outer Ketchikan Census Area. Because of geographic vintage issues, the CPS weighted county distribution for Wrangell-Petersburg Census Area was used with the ACS Wrangell City and Borough mover rate.

Nonresponse and Allocation Rates

Because the ACS is mandatory and there is an extended collection period, the total overall nonresponse rates of households in sample are lower than ASEC, as shown in **Table 4**. In addition, a household may participate in the CPS-basic survey and refuse to complete ASEC, meaning there are two opportunities not to respond.

Table 4. ASEC and ACS Nonresponse Rates: 2005 to 2013

Survey Year	ASEC	ACS	
	Total	Housing Units	Group Quarters
2013	20.4	10.1*	4.8
2012	19.2	2.7	4.9
2011	16.2	2.4	3.1
2010	14.1	2.5	2.4
2009	14.2	2.0	2.0
2008	15.6	2.1	2.0
2007	17.1	2.3	2.2
2006	16.7	2.5	2.6
2005	17.4	2.7	N/A

*As a result of the 2013 government shut down, the October 2013 housing unit panel only consisted of a first mailing. There was no second mailing, telephone follow up, or person follow-up operation for that month.
Sources: U.S. Census Bureau, Current Population Survey, Annual Social and Economic Supplement, 2013; American Community Survey, 2013.

Reasons for nonresponse in both surveys include refusal to take the survey, the address cannot be located, no one is home, temporarily absent from home, language problems, and insufficient data. [35] Not all partial responses are classified as insufficient data. If enough questions are answered, the survey is considered complete and processed normally. Any missing data, along with inconsistent data, are allocated after going through the edit process.

Item nonresponse can be due to a respondent refusing to answer a particular question or a survey ending prematurely for any reason. Because of their placement, questions that appear later in the surveys are disproportionately affected by item nonresponse. Respondents must complete all of the CPS basic questions and nearly all of the ASEC questions before answering their first migration question. For ACS, the migration questions are in the middle of questions asked for each individual, 30th out of 48 questions, which follow the household questions.

Like the nonresponse rates, allocation rates for mobility status in ACS are lower than ASEC. In order to improve ACS allocation rates, content Failed-Edit Follow-Up (FEFU) is conducted for mail and Internet cases that have a high number of item nonresponse or that are missing critical information, such as age or housing tenure.[36] Between April and September 2008, FEFU operations were reduced. They were suspended completely due to budget concerns starting in October 2012 and were not conducted in 2013 resulting in increased allocation rates.[37] Even with the increased ACS allocation rates, the ASEC still has higher allocation rates for mobility status (see **Table 5**).

[35] Total nonresponse rates for ASEC are available in Appendix G of the ASEC Supplement Technical Documentation published each year. This documentation is available at: http://www.census.gov/cps/methodology/techdocs.html. The ACS nonresponse rates are available on the ACS website at: http://www.census.gov/acs/www/methodology/sample-size-and-data-quality/response-rates/.
[36] Another type of FEFU, coverage FEFU, is conducted for households with more than five people since the mail questionnaire only asks detailed information for up to five people. All FEFU references in this report pertain to content FEFU.
[37] Coverage FEFU operations were not reduced or suspended at any point.

Table 5. ASEC and ACS Allocation Rates for Mobility Status: 2005 to 2013

Survey Year	ASEC	ACS
2013	16.9	6.5
2012	15.6	4.4
2011	16.1	4.0
2010	13.0	4.0
2009	11.5	3.2
2008	11.3	3.7
2007	12.8	2.3
2006	12.1	2.2
2005	13.4	2.1

Sources: U.S. Census Bureau, Current Population Survey, Annual Social and Economic Supplement, 2005 to 2013; American Community Survey, 2005 to 2013, 1-year estimates.

Editing of Mobility Status

Migration data are edited in both the ACS and the ASEC for missing values and inconsistencies. In the edit hierarchy, mobility status is the first migration item edited, followed by residence 1 year ago. In the case of ASEC, reason for move is edited last.

In the ACS, group quarters data are edited separately from housing units for migration.[38] Two components of the housing unit edits for migration, household relationship and housing questions, are not asked of persons living in group quarters. Therefore, these components cannot be used in the edit imputation process for GQs.

Since the main topic of the paper is differences between the surveys as it relates to the mover rate, this section is limited to the mobility status edit. For both surveys, if a person age 1 year and over reported they lived in the same house 1 year ago, then the reported mobility status is kept, regardless of whether residence 1 year ago is reported or not. If mobility status is reported as different house in the United States or different house outside the United States and it is inconsistent with what is reported for residence 1 year ago, the mobility status is changed to agree with residence 1 year ago.

In the case of missing values, the ACS and ASEC edits sort households in the following order: first by reference person; second by spouse of reference person; third by children of the householder, whether birth, adopted, or step, in descending order; and finally all other persons in the household.

For ASEC, if the reference person's mobility status is missing, then the reported status of the spouse is used, if a spouse is present. If the spouse's status is not reported, then the reported mobility status of any child of the householder under age 15 is used, starting with the youngest. If there is still no donor for the householder, then the value is allocated using an imputation matrix.[39] Missing values for the spouse and children under age 15 are allocated using the householder's mobility status whether reported or assigned. Other household members with missing mobility statuses are allocated using the imputation matrix.

The edits applied to ACS data are slightly different. For householders with a missing mobility status, the edit checks to see if the unedited year and month moved into the house values are within the last 12 months. If so, then the householder is assigned a status of different house in the United States or Puerto Rico 1 year ago.[40] Other

[38] There is no specific group quarters mobility status edit for ASEC.
[39] The donors for the matrices are divided by race (White or not White), household tenure (owner- or renter-occupied unit), and age/Armed Forces status (1-17 years, 18-29 years/in Armed Forces, 18-29 years/not in Armed Forces, 30-64 years/in Armed Forces, 30-64 years/not in Armed Forces, or 65 years and over).
[40] The ASEC does not include information on the year and month moved in.

differences include using other family members as donors for children up to age 18 rather than under 15 and using more dimensions for the imputation matrix because of the ACS's larger sample size.[41]

For the ACS, if the person is missing mobility status but reports a different residence 1 year ago, then the person is assigned a mobility status of different house in the United States or Puerto Rico or outside the United States or Puerto Rico depending upon the response to residence 1 year ago. This only occurs for mailed questionnaire cases since the interview instruments have built in skip patterns.

The ACS mobility status edit for group quarters does not use relationship to the householder or year and month moved in because those questions are not asked of people in group quarters. Missing mobility status values are allocated using an imputation matrix with dimensions containing group quarters type and age group.[42]

General Usage Guidance

One of the most common questions we receive from data users is, "Which should I use, migration estimates from the ACS or ASEC?" The answer is often context specific, meaning it depends on the ultimate objective of the project. There are some circumstances where estimates are only available from one survey. Users typically request the most recent data available, which is often the ASEC. During most years, ASEC data are released mid-September of the survey year and the migration detailed tables are released before the end of the year. For example, the 2013 ASEC data were disseminated in September 2013. The ACS is never released in the same survey year, because it is still collecting data until December 31. The normal release schedule for 1-year ACS data and migration tables in American FactFinder is late September. For example, the 2013 ACS data were released in September 2014 (the 5-year file, 2009-2013, was released in December 2014).

There are other situations where estimates are only available from one survey. As discussed in the survey background section, the ASEC asks respondents for their main reason for moving. Such a question does not exist on the ACS. Therefore, the ASEC is the only choice between the two surveys if the data user is interested in the reason for move. Distance moved is calculated for ASEC respondents who moved from one county, or state, to another. Again, because distance moved is not calculated for the ACS, users should rely on the ASEC detailed migration tables.[43,44]

The ACS is a better data source for examining migration at lower levels of geography. The sample size and coverage ensures that all counties are represented to some extent, a feat not possible in the ASEC. The population size of the area under examination is important because there are preset thresholds that dictate which ACS dataset must be used. For areas with populations smaller than 20,000, 5-year multiyear datasets are the only options available. Areas with populations between 20,000 and 65,000 can use 3-year or 5-year datasets. Areas of 65,000 or more can use 1-year, 3-year, or 5-year datasets.[45] Because the migration questions have a 1-year reference period, for ease of understanding we often recommend using 1-year data unless the situation warrants otherwise.
Before moving forward, it is important to distinguish between 5-year multiyear migration estimates and data from a 5-year migration question. There may be some confusion that the two are equal. A 5-year migration question is just

[41] The ACS matrix for mobility status includes metropolitan area status (living in principal city in a metro, outside principal city in metro, or outside metro). Also, the "not in Armed Forces" categories are subdivided into not a high school graduate, high school graduate only or some college, and Bachelor's degree or higher.
[42] For the group quarters imputation matrix, the group quarter types of correctional institutions, other institutions, and all other group quarter types are divided into the age groups under 18, 18 to 44, 45 and over. Nursing homes are divided into under 45 and 45 and over. College dormitories and military quarters are not divided into age groups.
[43] Distance moved is not available on the ASEC Public Use Files. However, the detailed tables for migration, available at http://www.census.gov/hhes/migration/data/cps.html, contain a collapsed version of distance moved featuring the categories of less than 50 miles, 50 to 199 miles, 200 to 499 miles, and 500 miles or more.
[44] Distance moved could be calculated using the ACS county-to-county migration flow files. However, we are not aware of any attempts to do so.
[45] The Census Bureau ceased production of 3-year estimates in 2015. The last 3-year estimate dataset is 2011-2013.

that, a question asking about a respondent's place of residence 5 years ago.[46] The ACS multiyear estimates are made up of several years of ACS data combined and reprocessed. This pooled approach greatly increases the sample size for smaller areas, reducing the variability of estimates when compared to the 1-year dataset. The migration question itself is unchanged, meaning it is still a 1-year question. As far as interpretation, migration estimates in multiyear datasets are most easily understood as the annual average of movement for the area of interest over the specified 3-year or 5-year period.[47]

There are advantages and disadvantages of using multiyear datasets. Arguably, the biggest advantage is the increased robustness of estimates, especially among smaller geographies. In some cases, even multiyear estimates have large standard errors compared to the estimates themselves, suggesting that the 5-year estimate should be used with caution, and equivalent 1-year estimates, if available, should not be used at all. Without a pooled sample, many smaller counties, towns, or places would not have enough movers to provide a reasonable estimate. The multiyear approach creates opportunities to develop new and interesting products, such as the Census Flows Mapper.[48] The flows mapper tool displays county-to-county migration by selected characteristics over a predetermined period. Establishing any sort of county-to-county flow table or product using 1-year data would prove difficult, but further subdividing the flows by any characteristic would be nearly impossible in most cases. Even with a pooled approach, vast majorities of the county-to-county flows have none to very few movers and many have margins of error greater than the estimate.

There are certain disadvantages that need to be considered when using a pooled approach. As alluded to earlier, the 1-year migration reference period often causes confusion with interpretation. What exactly does it mean that X number of people moved over a 1-year period between 2009 and 2013? In addition, the combined nature of pooled samples results in yearly trends being overshadowed (overwhelmed) by a longer period. Any year-to-year fluctuations may be lost when the years are aggregated and reprocessed. Again, depending on the context, these considerations might not be cause for concern.

An example using ASEC and ACS migration estimates

To demonstrate differences between the various types of data, refer to **Table 6**. The 2007 ASEC mover rate was 13.2 percent, significantly lower than the 2006 estimate of 13.7 percent. The ACS showed a change in the same direction, decreasing from 16.8 percent in 2006 to 16.0 percent in 2007. While the estimates and magnitudes of the change may differ, both record a significant decline in the mover rate between 2006 and 2007. This difference between years may be due in part to movement caused by the housing crisis and displacement resulting from Hurricane Katrina and Rita.

Table 6. Mover Rates by Survey: ASEC and ACS

Survey	2005-2006	MOE	2006-2007	MOE	2007-2008	MOE	2008-2009	MOE	2009-2010	MOE	2006-2010 (5-Year Multiyear)	MOE
ASEC	13.7	0.2	13.2	0.2	11.9	0.2	12.5	0.2	12.5	0.2	N/A	-
ACS	16.8	0.1	16.0	0.1	15.6	0.1	15.4	0.1	15.4	0.1	15.8	0.1

Sources: U.S. Census Bureau, Current Population Survey, Annual Social and Economic Supplement, 2006 through 2010; American Community Survey, 2006 through 2010, 1-year estimates; American Community Survey, 2006-2010 5-year estimates.

[46] For reasons described elsewhere (Ihrke, 2013), it is not advisable to directly compare 1-year and 5-year ASEC migration data.

[47] When the multiyear datasets are created, the 1-year datasets are updated with changes that occurred over the multiyear period. These changes include using the most recent vintage of geographic codes, using the latest population estimate series for population and housing controls, applying inflation factors to monetary variables, and applying any recent methodology changes. In these ways, and others not mentioned, multiyear estimates differ from taking an average of the 1-year estimates.

[48] The Census Flows mapper is available at: http://flowsmapper.geo.census.gov/.

Before moving on to the ACS 5-year multiyear estimate, we can examine the individual 1-year ACS estimates for 2006 through 2010, the years that comprise the 5-year estimate. As **Table 6** indicates, the range varies from 15.4 percent to 16.8 percent, a 1.4 percentage point difference between the highest and lowest mover rate. When the data are pooled and reprocessed in order to create the 2006-2010 5-year multiyear estimates, any trace of the higher 2006 mover rate vanishes. All that remains is a single mover rate across the years. For example, the 2006-2010 ACS 5-year multiyear estimate was 15.8 percent, considerably lower than the 2006 1-year estimate of 16.8 percent. As far as interpretation, the 15.8 percent can be thought of as the percentage of people who moved over a 12 month, or 1 year, period at any point between 2006 and 2010. Stated more simply, the number represents an average of movers over 1 year.

Conclusion and Future Research

This paper built on previous work conducted by Koerber in 2007. Many things have changed in each survey, yet mover rates continue to diverge. Several possible contributing factors were highlighted throughout this paper. They include differences in questionnaire wording, residency rules, population universes, modes of data collection and differences within modes between surveys, reference periods, nonresponse and allocation rates, sample design and county coverage, and sampling frames. The best conclusion we can provide is that there is not a simple, single answer explaining why mover rates do not match. The ACS and ASEC are two surveys with many little differences, all of which likely contribute to any observable difference.

There are several options for future research. Possibilities include: analyzing the coverage of the millennial generation in each survey, which would likely impact mover rates; comparing migration estimates between other Census Bureau surveys such as the American Housing Survey and Survey of Income and Program Participation; comparing survey results to administrative records; survey results compared to population estimates; and how non-Census Bureau migration data, such as moving companies, compares to survey data. None of these topics have been thoroughly documented and discussed in a public forum, a task that is long overdue.

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Appendix A. CPS-ASEC and ACS Comparison Matrix

Table 7. Summary of Differences between CPS-ASEC and ACS Migration Estimates		
	CPS-ASEC	ACS/PRCS
Principal purpose of surveys	Produce specific socioeconomic and demographic estimates for the United States, and estimates for states for selected characteristics and subpopulations.	Replace decennial census long form by providing estimates of selected social, economic, and housing characteristics of the population for many geographic areas and subpopulations.
Migration data availability	1948 to present	2005 to present (household population only in 2005; resident population in 2006 and beyond). Limited data available for development (1996-1999) and demonstration (2000-2004) phases of the survey.
Initial sample size (2013)	99,000 households	3.5 million housing units and 207,000 people living in group quarters.
Estimates available	Mobility status Residence 1 year ago Reason for moved Distance moved	Mobility status Residence 1 year ago
Universe	Civilian non-institionalized population (includes all households and noninstitutionalized group quarters residents).	Resident population (includes all household and group quarters' residents).
Reference period	Residence 1 year ago. Residence 5 years ago question is available for years ending in "0" or "5".	Residence 1 year ago
Mobility status/residence 1 year ago question wording	Asks if the person lived in the same house or apartment 1 year ago. If the respondent indicates that he or she did not live in the same house or apartment 1 year ago, then the city/ town/post office, county, state, and zip code of their residence 1 year ago, is requested. The respondent is also asked if he or she lived inside the city or town limits. If the person lived outside the United States, only the country where they lived 1 year ago is requested. Prior to 2004, the CPS referenced a specific date, March 1st of the prior year.	Asks if the person lived in the same house or apartment 1 year ago. If the respondent indicates that he or she did not live in the same house or apartment 1 year ago, then the street address, city/town/post office, county, state, and zip code of their residence 1 year ago, is requested. If the person lived outside the United States or Puerto Rico, only the country where they lived 1 year ago is requested. Prior to 2008, the respondent was asked if he or she lived inside the city or town limits instead of street address.
Modes of data collection	Computer-Assisted Telephone Interview (CATI) and Computer-Assisted Personal Interview (CAPI).	Internet and mail (1st month of collection)CATI (2nd month of collection)CAPI (3rd month of collection).
Residency rules	Usual residence rule	Two-month rule

Sample design	State-based sample design where the states are divided into primary sampling units.	Housing units are sampled within each county or county equivalent. Group quarters are sampled at the state level.
County coverage (2013)	Households were sampled in 1,347 counties or county equivalents.	Housing units were sampled in all 3,144 counties or county equivalents in the United states and 78 municipios in Puerto Rico.
Nonresponse rates (2013)	20.4 percent	10.1 percent for housing units and 4.8 for group quarters. The rate was higher than normal for housing units due to the government shutdown in October 2013. The rate was 2.7 percent in 2012.
Allocation rates for mobility status (2013)	16.9 percent	6.5 percent
Editing of mobility status	Data are edited for missing mobility status starting with the reference person in the household. If possible, information reported from spouse and children in the housholds are first used as donors for missing data. If a family member's response cannot be used as a donor, then the value is allocated using an imputation matrix.	Data are edited similarly to ASEC, but the ACS also uses the housing question month and year moved in for editing missing mobility status. For paper questionnaires, if a respondent does not answer mobility status but does include residence 1 year ago, they are assumed to have moved.
General usage guidance	Typically the most recent data available and provides information on the reason for move and distance moved.	More robust sample able to provide migration estimates at lower levels of geography.