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MEMORANDUM FOR ACS Research and Evaluation Advisory Group

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Subject: Assessment of Multiple Responses and Internet Returns that
Identify as Vacant Units

Attached is the final American Community Survey (ACS) Research and Evaluation report, "Assessment of Multiple Responses and Internet Returns that Identify as Vacant Units". We conducted this evaluation for two reasons: (1) to identify how often respondents provide multiple responses, a measure of respondent burden, and (2) to provide information that the ACS managers needed to consider any changes related to follow-up data collection for Internet-identified vacant units. If you have any questions about this report, please contact Samantha Fish at 301-763-7542.

Attachment

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APRIL 4, 2014

Assessment of Multiple Responses and Internet Returns that Identify as Vacant Units

FINAL REPORT

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INTRODUCTION

Beginning in January 2013, the American Community Survey (ACS) introduced an Internet response option. The ACS added this option alongside its traditional data collection operations: mail, computer-assisted telephone interviewing (CATI) and computer-assisted personal interviewing (CAPI). This evaluation focuses on two issues related to the addition of the Internet operation.

The first issue involves multiple responses in the ACS. There has always been the possibility that a sample address may respond more than once; for example, a household may complete a telephone interview while also returning a mail questionnaire. The Internet and mail modes are the focus of the first month of data collection, with CATI in the second month, and CAPI in the third month. However, the ACS still accepts Internet and mail responses throughout the three-month data collection period. With the addition of the Internet option, there are now more ways sampled households can submit multiple responses. The ACS needs to be aware of how often we receive multiple responses and if the addition of the Internet option increased the incidence of multiple responses because they are indications of burden on respondents and may be the result of respondents' confusion.

The second issue involves vacant housing units. The mail questionnaire does not give respondents the option to report the unit as vacant. Therefore, the ACS always followed up with mail returns for potentially vacant units to confirm the status of the unit. However, the Internet instrument asks the same questions regarding household members and residency as the CATI and CAPI instruments. This means that Internet respondents may identify the sample address as a vacant unit. The ACS currently requires follow-up with vacant units identified via the Internet in order to verify their unit status. This report provides the information ACS managers need to consider any change(s) related to follow-up data collection for vacant units identified in the Internet instrument.

BACKGROUND

About the ACS

The ACS is a continuous survey that measures population and housing characteristics of large and small areas across the U.S. The ACS eliminates the need for the Census long form and provides sample estimates on detailed topics each year instead of once every ten years. The Census Bureau has collected ACS data continuously since 2000 and expanded its annual sample to 3 million addresses in 2005. In 2011, the ACS incrementally increased its sample and now selects roughly 3.5 million addresses annually.

The most recent census consisted of a short form only, which asked basic questions about age, sex, race, Hispanic origin, household relationship, owner/renter status, and occupancy status (occupied vs. vacant). In contrast, the ACS asks about detailed housing and population

characteristics including income and benefits, education, poverty, housing costs, veteran status, and disabilities.

For a copy of the American Community Survey information guide, please visit: http://www.census.gov/acs/www/about_the_survey/acs_information_guide/. Topics from this guide include a short history of the ACS, who uses the ACS and why, ACS data products, and FAQs about the survey.

Basic Methodology of the ACS

The ACS divides its annual sample into 12 monthly panels for data collection. The panels consist of three sequential phases of data collection, each lasting about one month, and occur in the following order: Self-Response, Telephone, and Personal Visit.¹ In the January 2013 panel, for example, the ACS collected self-responses in January 2013 with telephone responses in February 2013 and personal visit interviews in March 2013, as shown in Table 1. A new panel begins each calendar month so that in any month of the year all three phases run simultaneously.

Table 1. Phases of Data Collection by Panel

CALENDAR MONTH	PANEL			
	January 2013	February 2013	March 2013	April 2013
January 2013	Self-Response			
February 2013	Telephone Self-Response (cont'd)	Self-Response		
March 2013	Personal Visit Self-Response (cont'd)	Telephone Self-Response (cont'd)	Self-Response	
April 2013		Personal Visit Self-Response (cont'd)	Telephone Self-Response (cont'd)	Self-Response
May 2013			Personal Visit Self-Response (cont'd)	Telephone Self-Response (cont'd)

Beginning in 2013, the ACS added an Internet response option to its self-response materials. The self-response phase now collects data via the Internet, mail, and telephone questionnaire assistance (TQA). Instead of mailing a paper questionnaire in the first mailout, the ACS now mails instructions for completing the survey online. After about two weeks, if a sample address does not respond online then the Census Bureau mails the address a paper questionnaire.

For information on data collection topics not covered in this report, please consult the ACS Design and Methodology Handbook. The following web address houses the current version: www.census.gov/acs/www/methodology/methodology_main.²

¹ Late self-response returns are accepted throughout all data collection modes.

² As of this report's publication date, the handbook did not reflect the addition of the Internet response option.

Operations throughout a Panel

This section describes the operations involved in each phase of a panel. Although each data collection phase is named after the operation that is most prominent during that period, several operations run during each phase. The phases are rough divisions for each of the three months that make up a panel. This report tabulates data that the ACS collected according to the following mailing/interviewing strategy:

- First Phase: Self-Response (Internet, Mail, and TQA)

The first phase of data collection is conducted in the first month of each panel and now includes four data collection operations: Internet, mail, and two telephone operations (one for survey assistance and one for follow-up). Below we explain how these operations work together.

All sample addresses with a complete mailing address receive a pre-notice letter informing them that the ACS selected them for its sample. A few days later, the ACS sends these addresses information on how to access the Internet instrument to respond to the survey. These materials also include telephone numbers for help (there are different numbers for assistance in multiple languages), which respondents may call to complete an interview over the phone. We refer to this mailing package as the “first mailing”. Respondents can self-respond by Internet or TQA. The ACS then mails each address a reminder postcard, regardless of whether the Census Bureau received an Internet or TQA response. We refer to this mailing as the “first reminder postcard”.

Several days after mailing the first reminder, if the Census Bureau has no record of a telephone or sufficiently completed Internet response, then the ACS sends a “second mailing” containing the paper questionnaire. At this point, respondents have the option to respond by Internet, TQA, or mail (return the paper questionnaire). About a week following the second mailing, the ACS sends a “second reminder” postcard to only those addresses that have yet to respond.

In the event that a self-response is missing critical information or identified as a vacant unit via Internet or mail, the ACS sends these sample addresses to a small telephone follow-up operation called Failed Edit Follow-Up (FEFU).³ FEFU also tries to call all vacant units identified through the Internet instrument to confirm their unit status. If FEFU cannot reach these respondents by phone, the survey will not accept these responses as vacant units and the sample addresses become eligible for the personal visit interviewing operation (namely CAPI).

The ACS gives respondents about one month total to provide a self-response (Internet, mail, or TQA response) before starting the telephone follow-up operation. Respondents may continue to complete the survey on the Internet, use the paper questionnaire, or call into the

³ Originally, the operation followed up on paper returns that were missing critical information, but it has since expanded to accommodate the follow-up of Internet returns.

TQA line throughout the remainder of the panel. The ACS removes late self-responses from any outstanding ACS data collection workloads upon receipt.

- **Second Phase: Telephone**

Nonrespondents from the self-response modes are eligible for the CATI operation if the ACS can match their address with a telephone number. Meanwhile, we mail a third reminder postcard to addresses that the ACS is unable to match with a telephone number. Sample addresses, whether eligible or ineligible for CATI, may self-respond any time during this phase. If a sample address in the CATI workload submits a self-response, the ACS simply removes them from the CATI workload.

The CATI operation lasts about one month in total. Interviewers share the call workload among three call centers, and CATI call centers can assist respondents in a variety of languages if needed. As mentioned earlier, the ACS removes late self-responses from the CATI workload upon receipt. Sample addresses for which the ACS has a “bad” telephone number or that do not respond become eligible for CAPI.

- **Third Phase: Personal Visit**

Sample addresses with an incomplete mailing address or those that did not respond to any of the previous data collection operations are eligible for CAPI. Due to the high cost of personal visit interviewing, the ACS does not send all eligible addresses to CAPI. The ACS subsamples eligible CAPI addresses at a rate of approximately one in three. CAPI takes about one month to complete before we close out the panel.

We accept Internet, mail, and TQA responses during the third month of data collection regardless of whether we selected the address for CAPI subsampling. Sometimes interviewer’s contact attempts prompt self-responses in the other operations. Upon receipt of late self-responses, ACS data processing removes these cases from the CAPI workload.

[Appendix A](#) contains the mailing schedule and the computer-assisted interviewing start/end dates for the first six panels in 2013.

Multiple Responses

An instance of “multiple response” refers to the situation in which a sample address provides two or more ACS responses. In the event of a multiple response, the ACS selects the best response using its Primary Selection Algorithm. The selection algorithm considers several factors when determining which response to accept for the official estimates. The algorithm does not combine information from both responses into one response.

The ACS runs this algorithm at the end of the data collection year, meaning that selected responses are unknown immediately after panel closeout. For example, the ACS will not know

which interviews or returns from the January 2013 panel were selected until early 2014, even though the panel closed in April 2013.⁴

Follow-Up of Vacant Units from the Internet Operation

With the addition of the Internet mode came the question of how to process submissions that are identified as vacant units. The ACS considers a response from the Internet mode as a “vacant” sample address if the respondent (1) indicates no one is currently living or staying at the sample address and (2) reaches at least the first screen of the housing items in the Internet instrument.

This definition encompasses situations where respondents immediately indicated that no one lived or stayed at the address *and* where respondents indicated that at least one person lived or stayed at the address but then determined that they did not meet the ACS residency rules. For example, a respondent may report that he and his wife live or stay at the sample address, but also live or stay elsewhere and plan to stay at the sample address for less than two months. In this case, the Internet instrument will classify the sampled address a vacant unit. The instrument outcome code, however, makes no distinction between this type of situation and a truly empty housing unit.

The ACS self-response follow-up operation, FEFU, tries to confirm the unit status of vacant Internet responses.⁵ It does this regardless of when the ACS receives the responses within the panel. Interviewers call the contact telephone numbers usually provided by respondents to verify their data. If the follow-up interview results in a unit status other than “vacant”, this response is recorded along with the original Internet submission in the Data Capture File and the decision about which interview to keep is made later. At the end of the data collection year, the ACS determines which responses are acceptable and selects the best one in instances of multiple responses.

Sample addresses with a vacant Internet response that could not be confirmed in FEFU become eligible for CAPI. The ACS conducts CAPI in the third month of the panel for only a subsample of the eligible vacant units identified through the Internet operation and subsamples approximately one in three eligible addresses for interviewing. However, if a vacant Internet response comes in after the start of CAPI, then the only follow-up that it can be eligible for is FEFU.

As mentioned earlier, the ACS documents the results of the follow-up interviews and later determines whether the original Internet response or the CAPI response will be used for final tabulations. At the end of the data collection year, the ACS evaluates which responses meet acceptable completeness standards. After determining which responses are acceptable, the ACS runs the Primary Selection Algorithm (PSA) to determine which acceptable response it will accept from each address that provided a multiple response.

⁴ For those familiar with ACS processing, final results become available when the ACS produces its “Edit Input” file.

⁵ “Unit status” is a term referring to the ACS’ classification of a housing unit as occupied, temporarily occupied, vacant, or not a housing unit.

METHODOLOGY

This report specifically answers each of the following questions:

1. How often do ACS respondents provide more than one survey response?
2. What are the most common mode combinations of multiple response instances?
3. Do respondents provide multiple responses more often since adding the Internet mode?
4. What proportion of Internet responses identify as vacant?
5. How often do respondents identify as vacant via the Internet in the second or third month of a panel?
6. What are the follow-up workloads for vacant Internet responses received before the start of CAPI?
7. What proportion of follow-up interviews with vacant Internet responses did the ACS confirm vacant?

Data Analyzed for this Report

We evaluate responses from the first six ACS panels in 2013 for U.S. housing units only (this excludes Puerto Rico). The ACS collected data for the January through June panels from December 17, 2012 to September 10, 2013. One research question compares the 2013 data with data from the previous year. For that research question, the January through June panels of 2012 correspond with data collected from December 22, 2011 to September 11, 2012.

Definition of Response Used in this Report

This report defines a “response” as the data collection operations do, which depends upon mode of collection and a measure of a respondent’s progress through the data collection instrument, not necessarily the completeness of the data provided. The following describes the minimum levels of progress that constitute a “response” by mode of collection in the 2013 ACS:

- **Internet Mode**

Internet “responses” are defined by the furthest screen that the respondent reached in the Internet instrument. There are a few key screens to know about in order to understand what makes up an Internet response.

The “Place of Birth” and “Pick Next Person” screens are transitions that bridge the housing section to the detailed section for single- and multi-person households, respectively. For example, if the respondent indicates someone is living or staying at the sample address and he/she meets the survey’s residency rules, the instrument will ask about basic demographic

characteristics, housing data, and then detailed social and economic characteristics. The Place of Birth and Pick Next Person screens appear just before the respondent starts the last section of the survey (i.e. the social and economic items).

The “Type of Unit” screen is a transition from the start of the survey into the housing section of a vacant interview. For example, if the respondent indicates that no one is living or staying at the housing unit or no one temporarily staying at the unit meets the survey residency rules, the instrument asks for the respondent’s contact information in case we have a question and then precedes to ask select housing items only. The Type of Unit screen begins the survey’s request for respondents of vacant units to provide select housing information for the sample address.

Now knowing the key screens of the Internet instrument, we explain the outcomes that constitute an Internet response. An Internet “response” includes any case specified by one of the following outcomes:

- The respondent indicated there are two or more individuals living in the housing unit and reached, at least, the “Pick Next Person” screen (the start of the social and economic section for multi-person households); or
- The respondent indicated there is one person living in the housing unit and reached, at least, the “Place of Birth” screen (the start of the social and economic section for single person households); or
- The respondent indicated that no one is living or staying at the sample address or that no one temporarily staying at the address met the survey residency rules. In addition, the respondent reached, at least, the “Type of Unit” screen (the start of the housing section for vacant interviews).

There is one other outcome that the 2013 ACS methodology considers an Internet response, but we do not consider it so for this evaluation. The 2013 ACS accepts a number of Internet responses that fail to meet the above-noted minimum requirements if the Census Bureau never receives a more complete response for the sample addresses in another mode. In the first six panels of 2013, there were 4,175 sample addresses that provided an insufficient Internet response and did not respond in another data collection operation. At the end of the data collection year, the ACS determines which of these responses meet acceptable completeness standards and uses the acceptable responses in the official estimates.

Insufficient Internet cases may have provided some basic demographic characteristics and/or housing data, but did not start the final detailed social and economic section. Specifically, these cases are defined as instances where the respondent reached at least the “Roster” screen (proceeds the start of the demographic section) and listed at least one person, but never reached the “Pick Next Person” or “Place of Birth” screen (the start of the detailed social and economic section).

Please keep in mind that reaching a particular screen in the Internet instrument does not necessarily mean that the respondent answered all of the questions presented. The instrument

allows respondents to skip over any questions, often after bypassing a warning message. The ACS checks the completeness of responses at the end of the data collection year.

- Mail Mode

For the mail mode, a “response” is any return, regardless of unit status, that provided a contact telephone number or at least one “data-defined” person. A data-defined person is a person record with a first and last name whose combined length exceeds two characters, answers for at least two basic demographic items, or answers for at least three detailed social and economic items.

The mail questionnaire starts by asking respondents for contact information in case we have a question and how many people live or stay at the sample address. For each person counted at the sample address, the questionnaire asks about basic demographics items and detailed social and economic items. These two sections sandwich the housing items sections and may be completed by anyone counted at the address. The definition of a mail response, therefore, means that the respondent either put their contact telephone number on the front page, put a name on the inside roster, answered two basic questions (like sex and age) for one person, *or* answered three detailed items for at least one person on the roster.

Notice that the requirements for a response in the mail mode differ from those for the Internet mode. For example, in the Internet mode, a respondent that provided just basic demographic items for an occupied household would fail the standards of a response. However, in the mail mode, a returned questionnaire with just the demographic items filled out for at least one person would count as a response. The mail mode requirements for a response can be, in some ways, considerably less than the requirements for responses from the Internet and interviewer-assisted modes.

- Modes with an Interviewer

The computer-assisted modes (CATI and CAPI) and TQA ask questions in an order similar to the Internet instrument. They ask basic demographics for all persons first, then housing items, and then detailed items for each individual. If the respondent indicates or the interviewer determines that the sample address is a vacant unit, interviewers collect only select housing items.

For the modes with interviewer assistance, an interview is considered a “response” if the respondent goes through the entire housing unit section of the interview, regardless of unit status. These standards of response are comparable those for the Internet mode in that respondents must reach the start of the detailed social and economic section to be counted as occupied unit response or the start of the housing section to be counted as temporarily occupied unit.

Note that reaching a particular section of an interview does not necessarily mean that the respondent completed all of the questions leading up to that point. Respondents may tell interviewers they would like to skip, refuse, or do not know the answers to some items.

Internet Response Date

One research question identifies the day within each panel that the ACS received a vacant Internet response. To do this, we use the timestamp of the official Internet response that ACS received from the Application Services Division (i.e. the division that processes ACS Internet data). We measure this date in relation to events listed on the 2013 mail out schedule and CATI/CAPI start/end dates (see [Appendix A](#)).

For example, we say that the ACS collected an Internet response that it received on February 5, 2013 during the second month of the January 2013 panel. More specifically, the ACS would have received this case after the start of CATI but before the start of CAPI. Note that although the ACS collects Internet responses in the second or third month of a panel, it does not necessarily mean that those addresses were eligible for CATI or CAPI, respectively.

Rate of Multiple Response

We determine how often ACS sample addresses provide multiple responses by calculating the following rate:

$$\text{Rate of Multiple Response} = \frac{\text{Total sample addresses providing two or more responses}}{\text{Total sample addresses providing at least one response}} \times 100$$

We report the statistic unweighted or weighted depending upon the purpose of the research question. The unweighted rate represents that actual proportion of sample addresses with two or more responses. The weighted rate accounts for the probability of sample selection for each responding address, although the rate is not adjusted for the survey's final nonresponse and coverage adjustments. Therefore, weighted rates estimate the proportion of U.S. addresses that responded to the ACS more than once out of the total responding U.S. addresses.

There is a margin of error associated with each weighted rate since they are estimates. We calculate standard errors, which are used to create the margin of error, according to the successive difference replication method referenced in the ACS Design and Methodology handbook.⁶ We use a 90 percent confidence level to calculate the margin of error. This means that if we repeatedly recalculated any estimate in this report, the reported interval (i.e. the statistics +/- its margin of error) would contain the average of all the sample estimates 90 percent of the time.

Other Reported Statistics

There are several instances where we look further into the data to glean knowledge about collection workloads or patterns in respondent behavior. As with the multiple response rates, we report these percentages unweighted or weighted depending upon the purpose of the research.

⁶ www.census.gov/acs/www/methodology/methodology_main

We use unweighted figures to assess actual frequency of events in the data collection operations, and we use the weighted rates to estimate frequency among the U.S. population. When weighted, percentages account for all stages of sampling in the ACS, including CAPI subsampling (where applicable), but do not account for the survey's final nonresponse and coverage adjustments.

In addition, for the last research question regarding follow-up interview outcomes of vacant Internet responses, we look at the percent of interviews that resulted in an inconsistent status. This refers to sample addresses sent to FEFU or CAPI where the interviewer determined that the sample address was occupied or not a housing unit. We exclude noninterviews and cases that provided a late return from our definition of interview for this research because the ACS did not resolve these cases in FEFU or CAPI. Research question #6, however, addresses the proportion of the vacant Internet responses that resulted in an interview, noninterview, or late return during follow-up.

RESULTS

1. How often do ACS respondents provide more than one survey response?

Among the sample addresses that responded in the January through June 2013 panels, the ACS collected multiple responses from 17,291 addresses (1.45 percent of sample addresses). That amounts to approximately 2,900 instances per panel. The left side of Table 2 displays this unweighted rate by panel.

In contrast, the weighted rates on the right side of Table 2 estimate the proportion of total U.S. addresses that provided multiple responses in the ACS. We estimate that 1.52 percent (+/- 0.02 percentage points) of U.S. addresses provided more than one survey response in the ACS.

Table 2. Instances of Multiple Response in the ACS

Panel	Total Responding Sample Addresses	Instances of Multiple Response	Unweighted Rate (%)	Weighted Rate (%)	Margin of Error for Weighted Rate (+/-)
TOTAL	1,191,763	17,291	1.45	1.52	0.02
Jan 2013	202,911	2,860	1.41	1.48	0.05
Feb 2013	200,418	3,173	1.59	1.65	0.05
Mar 2013	198,145	2,792	1.41	1.50	0.05
Apr 2013	197,694	2,726	1.38	1.44	0.05
May 2013	196,377	2,854	1.46	1.52	0.05
Jun 2013	196,218	2,886	1.48	1.54	0.06

Source: January through June 2013 American Community Survey panels

Results from the first Internet test in April 2011 also showed a low rate of multiple responses (less than one percent of responding addresses), but that test included the Internet and mail modes only (Tancreto, Zelenak, Davis, Ruiter, and Matthews, 2012). This test excluded the CATI and CAPI follow-up components that the ACS conducts and the test's data collection for the self-response modes lasted only two months instead of the full three months allotted in production.

If you wish to compare the production rate of self-response mode multiples to this test rate, please see the commentary in research question #3 after Table 5.

2. What are the most common mode combinations of multiple response instances?

Table 3 shows the distribution of mode combinations for multiple responses. Of the sample addresses that provided multiple responses in the January through June 2013 panels, 69.6 percent provided an Internet and mail response. When weighted, this means that 70.9 percent (+/- 0.6 percentage points) of U.S. addresses provided an Internet and mail response combination during the six panels.

A smaller number of sample addresses provided mail and CATI responses. This multiple response combination accounted for about 11.1 percent (+/- 0.4 percentage points) of U.S. addresses that responded two or more times. For both combinations mentioned, (1) Internet and mail and (2) mail and CATI, these are responses from operations that run back-to-back during a panel. For instance, Internet data collection operation starts first, then the mail operation begins a couple weeks later, and follows with CATI during the second month of the panel.

Table 3. Mode Combinations of Multiple Responses in the ACS

Mode Combination	Unweighted Instances	Unweighted Distribution (%)	Weighted Distribution (%)	Margin of Error for Weighted Distribution (+/-)
TOTAL Instances of Multiple Response	17,291	100.0	100.0	N/A
Internet & Mail	12,043	69.6	70.9	0.6
Mail & CATI	2,041	11.8	11.1	0.4
Mail & CAPI	1,138	6.6	6.2	0.3
Internet & CAPI	923	5.3	5.1	0.3
Internet & TQA	656	3.8	3.9	0.2
Internet & CATI	225	1.3	1.3	0.1
Other	265	1.5	1.4	0.2

Source: January through June 2013 American Community Survey panels

Because the Internet and mail combination was the most common multiple response combination, we looked further into the timing of responses with this combination. The data confirmed our guess that nearly all of these cases replied on the Internet first and then returned a paper questionnaire (more than 99.9 percent of multiple responses, unweighted and weighted). This makes sense given that we first mail an invitation to access the Internet instrument and later provide a mail questionnaire if necessary.

We also looked at the respondents' progress through the Internet instrument in instances of an Internet response. Unfortunately, the mail outcome codes do not indicate the furthest a respondent reached in the paper questionnaire, so we did not have a similar, quick measure for the mail response progress. We found that Internet and mail combinations predominately included a sufficient but partial Internet response 84.0 percent of the time (unweighted and weighted).⁷ Only about 14.6 percent of the time (unweighted and weighted) did the Internet and mail combinations involve a finished Internet response.

This tells us that, of the U.S. addresses that provided multiple responses, most started the online survey but ultimately completed the ACS by returning a paper questionnaire. We cannot say for sure why respondents chose to complete the mail questionnaire, although there are a few possible reasons. For instance, respondents may have logged out of the survey and lost their PIN so they could not return. Others may have felt compelled to complete the survey again because the second mailing envelope states, "your response is required by law". Another group may not have even realized their Internet data were captured, so they provided a response by mail.

Although previous tests of the Internet instrument did not study mode combinations of multiple responses, they did interview respondents about their choice to respond by Internet or paper and whether anything specific in the mailing materials pushed respondents toward one mode over the other. The telephone follow-up study to the April 2011 Internet test, called the Attitudes and Behavior Study, revealed that not all ACS respondents understood that there was a mode choice and that more mail respondents than Internet respondents were likely not to know about the mode option (Nichols, 2012). It is unclear whether Internet and mail multiple respondents knew there was a mode choice in the ACS, and how that may have factored into their decision to respond to both operations.

Furthermore, the same April 2011 test found that there did not seem to be any messages specific to the mailing materials or motivation strategies that motivated respondents to choose one mode over the other. Nearly one third of respondents in the Push Accelerated treatment who chose the paper form said they did so because they did not have Internet access or because they had computer problems (Tancreto et al., 2012). The ACS bases its current self-response data

⁷ The distinction between what we call a sufficient but partial Internet response and a finished Internet response deals with the respondent's progress through the detailed social and economic section. At minimum, as described in the methodology section, all occupied responses must reach the "Place of Birth" or "Pick Next Person" screens. The ACS considers all responses that reach this point as sufficient but partial until the respondent clicks the "Submit" button at the end of the interview. Sufficient but partial Internet responses have progressed through the basic demographic and housing section, but did not finish the detailed demographic section for all person(s). We term Internet responses that went through the whole Internet survey and submitted data using the "Submit" button as finished responses.

collection on this Push Accelerated mailing strategy treatment from the test. It is possible that Internet and mail multiple respondents experienced these same issues.

3. Do respondents provide multiple responses more often since adding the Internet mode?

We want to know if there is a change in respondent behavior, not necessarily an increase or decrease in workload, so we compared weighted rates of multiple responses before and after the addition of the Internet mode. The weighted multiple response rate for the January through June panels in 2013 was 1.52 percent (+/- 0.02 percentage points), which is an increase of 0.57 percentage points from the same period in 2012. This increase is statistically significant. See Table 4 for more detail.

Table 4. Historical Rates of Multiple Responses in the ACS

Panel Period	Total Responding Sample Addresses	Instances of Multiple Response	Unweighted Rate (%)	Weighted Rate (%)	Margin of Error for Weighted Rate (+/-)
2013 Jan-Jun	1,191,763	17,291	1.45	1.52	0.02
2012 Jan-Jun	1,197,673	11,287	0.94	0.95	0.02

Source: January through June 2012 American Community Survey panels and January through June 2013 American Community Survey panels

The increase of multiple responses among U.S. addresses in 2013 relates to a higher proportion of addresses providing multiple self-responses in the ACS. You will see this in Table 5, which compares the mode combinations of multiple responses from 2012 to those in 2013.

As a reminder, a self-response is an Internet, mail, or TQA response. Prior to 2013, a multiple self-response meant that the respondent either returned two mail questionnaires or provided a mail return and completed a TQA interview. However, a multiple self-response now includes combinations with an Internet response. Most of the self-response combinations returned during the January through June 2013 panels involved an Internet and a mail response, although a small number included an Internet or mail response with a TQA interview.⁸

Table 5 shows the multiple response rates among U.S. addresses in 2012 and 2013 for the first six panels broken up by mode combinations. Unlike Table 4, we show percent of mode combinations relative to the number of responding U.S. addresses. This helps to see which combination(s) attributed most to the overall level of multiple responses.

⁸ Two paper questionnaire responses were possible in the 2013 panels only if someone requested a Spanish questionnaire in addition to receiving the English questionnaire, but this multiple response combination did not happen in 2013.

Table 5. Comparison of Multiple Response Mode Combinations in the ACS

	Weighted Percent of Total Responding U.S. Addresses (%)			
	2012	Margin of Error (+/-)	2013	Margin of Error (+/-)
TOTAL Instances of Multiple Response	0.95	0.02	1.52	0.02
Self-Response Modes Only	0.30	0.01	1.15	0.02
Self-Response + CATI	0.46	0.01	0.19	0.01
Self-Response + CAPI	0.20	0.01	0.18	0.01

Source: January through June 2012 American Community Survey panels and
January through June 2013 American Community Survey panels

Multiple responses from the “self-response modes only” grew from 0.30 percent of total responding U.S. addresses in the first half of 2012 to 1.15 percent of total responding addresses in the first half of 2013. This is a notable increase in multiple responses from the self-response only modes that we can likely attribute to the addition of Internet data collection and the new accelerated mailing schedule. In addition, the percent of responding U.S. addresses that provided multiple responses of the self-response and CATI combination decreased from 0.46 percent in 2012 to 0.19 percent in 2013. This decrease may also be due to the accelerated mailing schedule, which has increased the amount of time between the second mailing and the start of CATI.

The 2013 production rates of multiple responses from the “self-response modes only” are similar to the multiple response rates from the April 2011 test, considering their differences in methodology. The test found that less than one percent of self-respondents provided a multiple response. However, the test did not mail paper questionnaires to addresses that provided sufficient but partial Internet responses, it excluded the CATI and CAPI follow-up operations, and it lasted only two months instead of the full three months of a panel. In ACS production, the opposite occurs. We assume that mailing sufficient but partial Internet respondents a paper questionnaire and allowing responses in additional modes for a longer period of time prompts additional multiple responses. Therefore, considering these method differences, we say that the production and test outcomes showed similar rates of multiple self-responses and that adding the Internet mode, as it is currently specified, resulted in an increase of multiple responses in the self-response modes from 2012 to 2013.

We know from the previous research question that most of the multiple responses from the “self-response only” modes involved a sufficient but partial Internet response (received first) along with a returned questionnaire (84.0 percent). With this information and the results from Table 5, we can conclude that multiple response combinations of sufficient but partial Internet responses with a mail return accounted for the majority of the increase in multiple response rates. Had all the addresses that provided multiple self-responses finished the online survey instead of

“breaking off”, the overall multiple response rate in the ACS would be greatly reduced and comparable to the 2012 rate.

Furthermore, addresses that provide sufficient but partial Internet responses with a mail return likely do so because the ACS sends a mail questionnaire to all sample addresses that provide a sufficient but partial Internet response. Since the second ACS mailing clearly states that, “your response is required by law”, this probably compels these respondents to provide a second survey response by mail. Such a mailing strategy may confuse or frustrate respondents that tried to respond by the Internet first. The ACS could reduce respondent burden and its multiple response rate if it simply followed up with Internet responses that provided sufficient but not complete data instead of asking them to complete the survey all over again from the beginning.

However, the ACS chose to mail paper questionnaires to addresses that provided sufficient but partial Internet responses because the results from the second Internet test in November 2011 showed that doing so lowered item nonresponse rates for some detailed social and economic survey items ([Matthews, Davis, Tancreto, Zelenak, Ruiters, 2012](#)). Originally, researchers had not planned to study the effects of mailing a paper questionnaire to sufficient but partial Internet responses, but a glitch in the first Internet test of April 2011 provided the opportunity to compare the treatments of no mailing to one with mailing. Please see the full report for more detail on the benefit of mailing questionnaires to addresses that provide sufficient but partial Internet responses.

4. What proportion of Internet responses identify as vacant?

We consider Internet responses as “vacant” if the respondent indicated in the Internet instrument that no one was living or staying at the sample address. This also involves situations where the respondent indicated that someone was living or staying at the address for less than two months (please see the [Follow-Up of Vacant Units from the Internet Operation](#) sub-section). Note that the official tabulated occupancy status for some sample addresses initially identified as vacant via the Internet instrument could change because the ACS tries to follow up with all vacant Internet responses (see research question #6 for detail).

Out of the 445,352 Internet responses that the ACS received in the first six panels, 7,510 Internet responses identified as a vacant housing unit. These results, when weighted, estimate that 1.53 percent (+/- 0.04 percentage points) of U.S. addresses that provided an Internet response identified as a vacant housing unit.

5. How often do respondents identify as vacant via the Internet in the second or third month of a panel?

Table 6 shows that the ACS received most Internet responses from addresses that identified as vacant during the first month of data collection (83.8 percent). However, 12.3 percent of all addresses that identified as vacant on the Internet originated in the second month of data collection, and 3.9 percent originated in the last month.

Table 6. Timing of Vacant Internet Responses Received in the ACS

		Unweighted Responding Addresses	Unweighted Percent (%)	Weighted Percent (%)	Margin of Error for Weighted Percent (+/-)
TOTAL Internet Responses Identifying as Vacant		7,510	100.0	100.0	N/A
<i>On or After...</i>	<i>And Before...</i>				
Start of Panel	Start of CATI	6,292	83.8	84.0	0.8
Start of CATI	Start of CAPI	927	12.3	12.1	0.7
Start of CAPI	Panel Closeout	291	3.9	3.9	0.4

Source: January through June 2013 American Community Survey panels

We exclude the 3.9 percent of vacant Internet responses that responded in the third month from our analysis in the next two research questions because the ACS bases its CAPI follow-up of vacant Internet responses on the FEFU outcomes resulting in the second month of a panel. Therefore, the 3.9 percent of vacant Internet responses that the ACS collects in the third month, while still eligible for FEFU, do not become part of the CAPI workload.

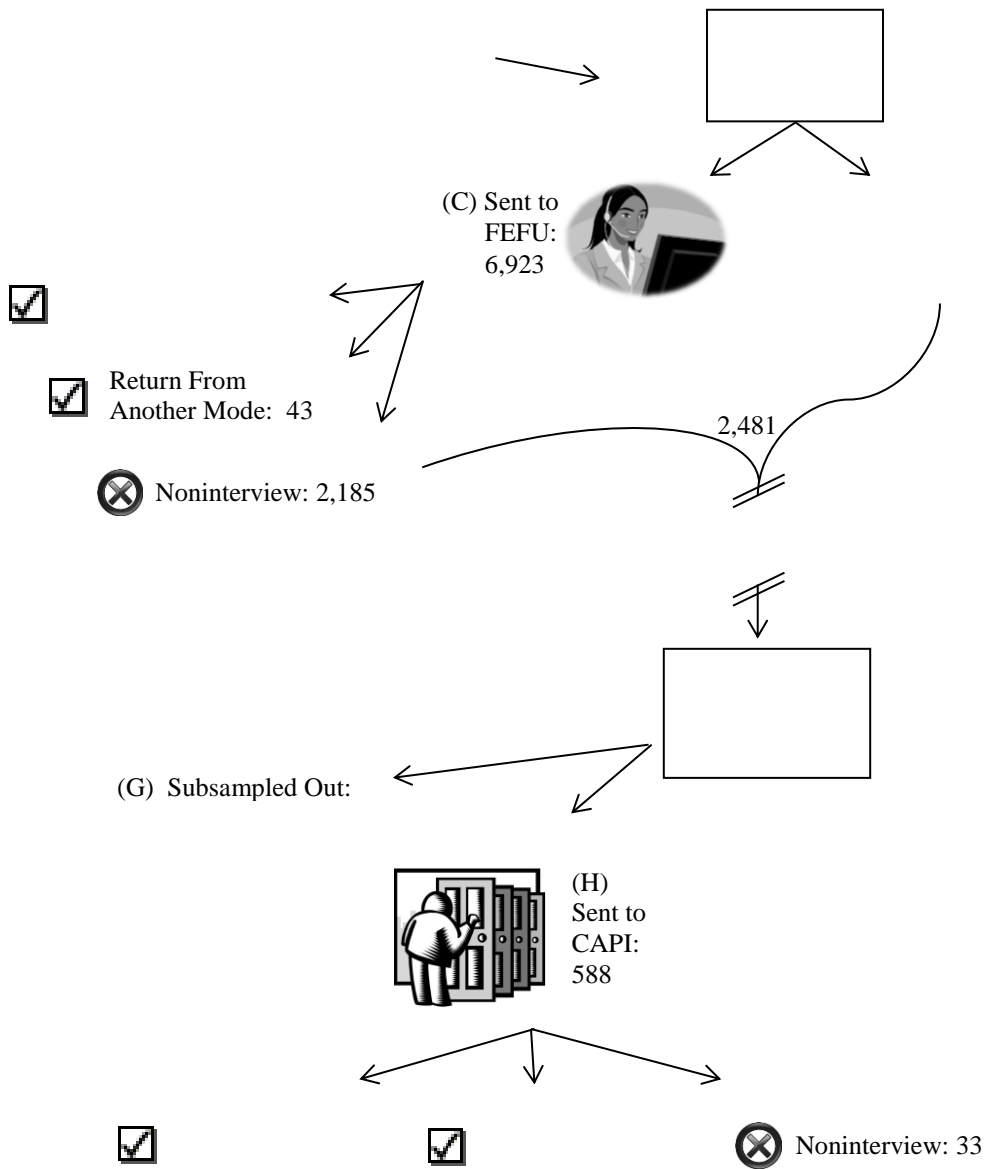
6. What are the follow-up workloads for vacant Internet responses received before the start of CAPI?

ACS managers want to know how many cases the ACS sent to FEFU and CAPI by following up with addresses that respond as vacant housing units via the Internet mode. This information is necessary in considering the cost of follow-up operations. Managers will compile follow-up costs and compare them to the benefits derived from following up.

As explained in the background section, the ACS tries to send all addresses that identify as vacant housing units to FEFU. Cases that we do not have or cannot match a contact telephone number for and cases that result in a FEFU noninterview are eligible for CAPI. Generally, the cost of CAPI interviews are much more expensive than FEFU interviews, but both are more costly than collecting data via the Internet instrument.

Figure 7 depicts the number of sample addresses that reached certain stages of the vacant Internet follow-up procedures. Please note that this figure summarizes just the vacant Internet responses received in the first and second months of each panel. The full FEFU workload included about 291 additional cases that responded in the third month (please refer back to Table 6). We exclude these few cases from the figure because their FEFU results have no impact on the follow-up CAPI workload.

Figure 7. Follow-Up of Vacant Internet Responses Collected Before the Start of CAPI



Source: January through June 2013 American Community Survey panel data collected during the first and second months only of each panel, unweighted.



During the first six panels, the ACS sent 6,923 vacant Internet cases received before month three to FEFU and was able to obtain information from 4,738 cases in the form of an interview or a late return from another mode (68.5 percent). This means that 2,185 cases (31.5 percent) of the vacant Internet responses sent to FEFU in the first two months of each panel resulted in a noninterview.

The ACS subsampled roughly one-fourth of FEFU noninterviews and vacant Internet cases that responded in the first or second month of panel but were ineligible for FEFU. Due to data processing issues, the ACS unfortunately made 770 addresses ineligible for CAPI when they should have been eligible. This reduced the number of cases that the ACS sent to CAPI by about 257 addresses.⁹ The actual CAPI follow-up workload consisted of 588 sample addresses, but may have otherwise been about 845 sample addresses.

CAPI interviewers obtained information from 555 of the 588 sampled addresses (94.4 percent) in the form of an interview or late return from another mode. Only 33 addresses (5.6 percent) from the vacant Internet CAPI follow-up workload resulted in a noninterview.

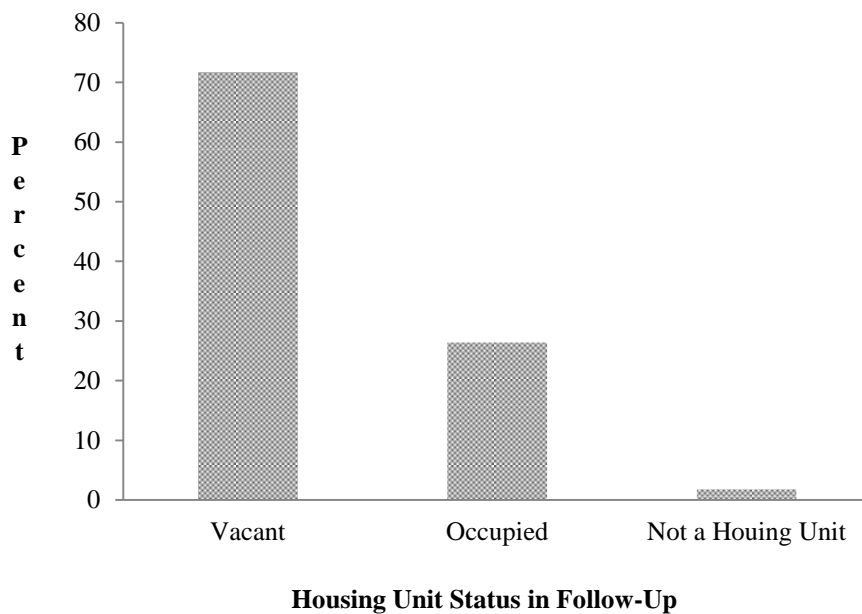
7. What proportion of follow-up interviews with vacant Internet responses did the ACS confirm vacant?

The ACS needs to know how often vacant Internet responses result in a unit status other than “vacant” to measure the benefit of following up with vacant Internet responses. If follow-up activity confirms the status of the vast majority of sample addresses that self-identified as vacant in the Internet mode, then following up may be unnecessary. On the other hand, if follow-up activity often results in housing unit statuses changing to occupied or not a housing unit then follow-up is beneficial, but we should investigate why respondents provide information that leads to a vacant unit status initially.

We look at combined results of the FEFU and CAPI follow-up to answer this research question. Figure 8 shows the percent of follow-up interviews among U.S. addresses that provided a vacant Internet response before the third month of the panel that were confirmed vacant. We also show the opposing statistics of how often the weighted, follow-up interviews resulted in an occupied or not a housing unit response. Figure 8 accounts for the initial ACS sample selection along with CAPI subsampling rates, but makes no adjustments for survey nonresponse or housing unit coverage. Please see Appendix [Table B1](#) for respective margins of error.

⁹ We estimate that an additional 257 addresses should have been sent to CAPI by applying the average one-third subsampling rate to the 770 addresses that should have been eligible for CAPI (i.e. $770 * \frac{1}{3} \approx 257$).

Figure 8. Housing Unit Status of Follow-Up Interviews with Vacant Internet Responses Received Before the Start of CAPI



Source: January through June 2013 American Community Survey panel data collected during the first and second months only of each panel

Figure 8 shows that 71.8 percent (+/- 1.1 percentage points) of vacant Internet responding U.S. addresses before month three were confirmed vacant in follow-up, and 26.4 percent (+/- 1.1 percentage points) were determined to be occupied. Interviewers determined that only a small proportion of the U.S. sample addresses that identified as vacant on the Internet before the third month of each panel were not a housing unit.

These results are not surprising considering that recent and historical Census Bureau research repeatedly prove that measuring housing unit status is difficult and that the vacant unit inventory is volatile ([Fish, 2013](#)). Also, we know that some vacant Internet responding U.S. addresses are temporarily occupied units (by definition- see [methodology section](#) for more detail) and are likely transient. However, there are numerous factors that may attribute to an inconsistent follow-up outcome. We encourage you to look at the cited report, which compares the occupancy status of addresses that were in both the 2010 Census and the 2010 ACS. You may find the background information helpful in understanding why vacant units are so hard to accurately count.

Looking more closely at the results by operation, we see that the follow-up of vacant Internet responding U.S. addresses resulted in a higher percentage of housing units that were determined occupied in CAPI than in FEFU. Of the vacant Internet responding U.S. addresses interviewed in FEFU before the start of CAPI, interviewers determined 20.1 percent to be occupied (+/- 1.2 percentage points). Comparatively, of the vacant Internet responding U.S. addresses followed up

in CAPI, interviewers classified 42.9 percent as occupied (+/- 3.7 percentage points). See [Tables B2 and B3](#) in the Appendix for more detail.

We questioned whether these follow-up classifications reflected actual changes in unit status or if the respondents initially reported information that led the ACS to incorrectly classify the address. For example, it seems reasonable to assume that the ACS should collect data in FEFU that are consistent with vacant Internet responses because FEFU interviewers follow up with cases within days of their Internet submission and call using a telephone number that respondents usually provide. However, because 20.1 percent of vacant Internet responding U.S. addresses from before the start of CAPI were determined in FEFU to be occupied, this indicates that some respondents may have experienced difficulty or confusion in answering the ACS initially.

Moreover, 42.9 percent of the CAPI follow-up workload resulted in an occupied status. Despite the fact that CAPI often begins several weeks after the ACS receives a vacant Internet response, this seems like a high proportion of responses that changed status. We compared this to past research, which studied how often vacant units changed status within a short period. Using data from the Current Population Survey (CPS) and Consumer Expenditure survey (CE), Fronczek and Savage estimated that the shift from vacant to occupied within the total U.S. housing inventory during any two to three month time frame is about 20 percent (Love, 2001). If this trend still holds true, it would only explain, at most, about half of the change we saw in CAPI follow-up for vacant units.

Reviewing just the occupied CAPI follow-up responses from sample addresses that initially provided a vacant Internet response, we saw that the majority of them indicated that the first person listed on the roster (usually the householder) moved to the address two or more years ago. This indicates that these addresses likely did not suddenly change unit status. Only 11 percent of these occupied CAPI cases said they moved during 2013. This, along with findings reported in Love (2001), leads us to conclude that vacant Internet responses likely contain a notable amount of response error in regards to their housing unit status.

Vacant Internet respondents may have had difficulty answering the Internet survey questions related to the sample addresses' unit status, which could lead the ACS to incorrectly classify those addresses. Hosting a debriefing session with FEFU and CAPI interviewers to hear about their experiences with respondents that initially replied as vacant on the Internet may prove useful. If the ACS understands the problem(s) and challenges that vacant Internet respondents encounter, then it can identify what the survey needs to clarify in order to prevent respondents from initially misinterpreting ACS survey questions.

CONCLUSIONS

Multiple Responses

We estimate that about 1.5 percent of U.S. addresses in the first six panels of the 2013 ACS provided more than one survey response. The ACS received multiple responses from about

2,900 sample addresses in each panel. The majority of multiple response instances submit both a mail and Internet return. This combination accounted for close to 70 percent of all mode combinations of multiple response instances.

When comparing the rate of multiple response in the first half of 2013 with the rates from the first half of 2012, we see that instances of multiple response increased 50 percent over the previous year, but the new rate is still very low. The weighted rate of multiple response for the January through June panels in 2012 was about 1.0 percent while the rate for the same period in 2013 was about 1.5 percent.

The increase is largely attributable to new methods that stipulate the ACS send a paper questionnaire to all sample addresses that provide a sufficient but partial Internet response. If we can find a way to encourage more respondents to complete the entire survey online instead of “breaking off” or if the ACS stops mailing these partially complete Internet responses a paper questionnaire, we can significantly reduce the overall multiple response rate and lessen respondent burden. One method being tested in 2014 is to send email reminders to respondents that provide partial Internet responses.

Current research is also underway to determine common points in the online instrument where respondents exit the survey before it is complete. Preliminary results indicate that such exits are not entirely random events. Once we identify these locations, the ACS will have a better understanding of what issues it needs to address so that respondents will choose to completely fill out the survey online.

Follow-Up for Internet Responses that Identify as Vacant Units

We estimate that about 1.5 percent of U.S. addresses in the first six 2013 ACS panels that provided a response on the Internet identified themselves as vacant housing units. This amounted to about 1,250 vacant Internet responses in each panel. The ACS received most vacant Internet responses during the first month of data collection. However, approximately 12 percent of the total vacant Internet cases originated in the second month of data collection and about 4 percent originated in the last month.

FEFU and CAPI follow-up confirmed as vacant approximately 72 percent of US addresses that identified as vacant on the Internet during the first two months of each panel. This percentage accounts for CAPI subsampling, but does not include adjustments for nonresponse or housing coverage. Another 28 percent of vacant Internet responding U.S. addresses resulted in an occupied status after follow-up. This indicates that the respondents and the follow-up interviewers inconsistently classified roughly one in every four vacant Internet responses.

The proportion of vacant Internet responses that FEFU and CAPI concluded were occupied seems unusually high given past research and our own observations. For example, respondents typically provide the contact telephone number that FEFU interviewers call, but about 20 percent of the vacant follow-up interviews resulted in an occupied status. Additionally, the follow-up CAPI interviews resulted in about 40 percent being classified as occupied. However, past

research tells us that the transition from vacant to occupied within the U.S. housing inventory over a two to three month period was around 20 percent (Love, 2001). Moreover, we found that most vacant Internet responses that were classified as occupied in CAPI reported during CAPI that the householder moved two or more years ago.

We believe this suggests that vacant Internet responses contain a notable level of respondent error. Respondents that have difficulty or confusion when completing the ACS online may provide us information that leads the ACS to incorrectly assess their unit status. There could be specific circumstances surrounding an address' Internet access or housing unit status that make completing the ACS online challenging for respondents. Many possible explanations exist for response error and we encourage the ACS to ask interviewers about any insight they might have.

NEXT STEPS

ACS managers need to conduct a cost/benefit analysis of vacant Internet response follow-up using some of the data we provide herein. Further, we recommend that the ACS consider a debriefing session with interviewers to determine how the ACS could improve the Internet instrument to reduce the response error in unit status (i.e. confusion or difficulty in answering questions that leads to an incorrect assessment). To resolve this issue for the long term, the ACS needs to consider how it can better collect information in the Internet instrument that the survey uses to classify housing unit status.

In addition, the ACS should reconsider its follow-up strategy for sufficient but partial Internet responses. Multiple self-responses with a sufficient but partial Internet response attributed most to the increase in multiple responses between the first six panels in 2012 and 2013. This likely burdened a larger number of respondents who initially started the survey online. We recommend that managers monitor the results of the upcoming tests to see if sending reminder emails to Internet respondents prompts them to finish online. Other options to consider involve sending a reminder postcard or sending cases to FEFU instead of mailing them a paper questionnaire.

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APPENDIX A

Schedule of ACS Operations:

Table A1. Mailing Schedule for January through June 2013 ACS panels

Panel	Pre-notice	Initial Package	1st Reminder Card	Replacement Package	2nd Reminder Postcard	Additional Postcard (if ineligible for CATI)	Cut Off Date
January 2013	12/17/12	12/20/12	12/27/12	1/10/13	1/14/13	1/31/13	4/3/13
February 2013	1/24/13	1/28/13	1/31/13	2/14/13	2/19/13	3/7/13	5/3/13
March 2013	2/21/13	2/25/13	2/28/13	3/14/13	3/18/13	4/4/13	6/3/13
April 2013	3/21/13	3/25/13	3/28/13	4/11/13	4/15/13	5/2/13	7/3/13
May 2013	4/18/13	4/22/13	4/25/13	5/9/13	5/13/13	5/31/13	8/5/13
June 2013	5/23/13	5/28/13	5/31/13	6/13/13	6/17/13	7/5/13	9/3/13

Table A2. CATI and CAPI Start/End Dates for January through June 2013 ACS panels

Panel	CATI		CAPI	
	Start	Stop (Last Day of Interviewing)	Start	Stop (Regional Office Closeout)
January 2013	2/1/13	2/25/13	3/1/13	4/1/13
February 2013	3/1/13	3/26/13	4/1/13	5/1/13
March 2013	4/1/13	4/25/13	5/1/13	6/3/13
April 2013	5/1/13	5/28/13	6/1/13	7/1/13
May 2013	6/1/13	6/25/13	7/1/13	8/1/13
June 2013	7/1/13	7/28/13	8/1/13	9/3/13

APPENDIX B

Results of Follow-up:

Table B1. Housing Unit Status of Follow-Up Interviews with Vacant Internet Response Collected Before the Start of CAPI

	Unweighted Responding Addresses	Unweighted Distribution (%)	Weighted Distribution (%)	Margin of Error (+/-)
TOTAL Vacant Internet Responses Received Before CAPI and Interviewed in Follow-Up	5,293	100.0	100.0	N/A
Confirmed Vacant	4,067	77.7	71.8	1.1
In FEFU	3,766	71.9	58.8	1.4
In CAPI	301	5.8	12.9	1.2
Determined Occupied	1,105	21.1	26.4	1.1
In FEFU	895	17.0	15.8	1.0
In CAPI	210	4.0	10.6	1.1
Determined Not a Housing Unit	65	1.2	1.8	0.4
In FEFU	34	0.7	0.6	0.2
In CAPI	31	0.6	1.2	0.4

Source: January through June 2013 American Community Survey panels

Table B2. FEFU Interview Outcomes of Sample Addresses that Provided a Vacant Internet Response Before the Start of CAPI

	Unweighted Responding Addresses	Unweighted Percent of FEFU Interviews (%)	Weighted Percent of FEFU Interviews (%)	Margin of Error for Weighted Percent (+/-)
TOTAL Vacant Internet Responses Sent to FEFU	6,923	100.0	100.0	N/A
Confirmed Vacant	3,766	80.2	78.3	1.2
Determined Occupied	895	19.1	20.1	1.2
Determined Not a Housing Unit	34	0.7	0.7	0.2
Late Return from Another Mode	43	-	-	-
Noninterview (No answer, refusal, etc.)	2,185	-	-	-

Source: January through June 2013 American Community Survey panels

Table B3. CAPI Interview Outcomes of Sample Addresses that Provided a Vacant Internet Response Before the Start of CAPI

	Unweighted Responding Addresses	Unweighted Percent of CAPI Interviews (%)	Weighted Percent of CAPI Interviews (%)	Margin of Error for Weighted Percent (+/-)
TOTAL Vacant Internet Responses Resulting as FEFU Noninterviews and Addresses Ineligible for FEFU That Were SubSampled for CAPI	588	100.0	100.0	N/A
Vacant	301	55.5	52.0	3.6
Occupied	210	38.7	42.9	3.7
Not a Housing Unit	31	5.7	5.1	1.6
Late Return from Another Mode	13	-	-	-
Noninterview	33	-	-	-

Source: January through June 2013 American Community Survey panels