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MEMORANDUM FOR ACS Research and Evaluation Advisory Group

From: Patrick J. Cantwell ***signed 12/28/15***
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Subject: 2014 Pre-Notice Test Final Report

Attached is the final American Community Survey Research and Evaluation report for the 2014 Pre-Notice Test. This test evaluated the effect of not sending a pre-notice letter on response rates and survey costs.

If you have any questions about this report, please contact Elizabeth Poehler (301-763-9305) or Padraic Murphy (301-763-2192).

Attachment

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American Community Survey Research and Evaluation Program

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2014 Pre-Notice Test

FINAL REPORT

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Table of Contents

LIST OF TABLES

Executive Summary

The American Community Survey (ACS) currently employs an Internet push strategy for soliciting self-response from sampled households. The first contact with most sample households is a pre-notice letter notifying them to be on the lookout in their mail for instructions to complete the ACS. The initial mailing (after the pre-notice) is a letter requesting a response via Internet. Only after two weeks of no response via Internet is a paper questionnaire sent to sample households with a second request to respond, this time either via mail-back or Internet.

It is well-established for surveys employing only mail-back self-response that a pre-notice letter significantly improves the response rate.[1] However, the 2012 National Census Test included research on the effect of a pre-notice letter on total self-response in the context of an Internet push strategy like that currently used in the ACS.[2] This research found no significant improvement in total self-response with an advance (pre-notice) letter.[3] We conducted the 2014 ACS Pre-notice Test to evaluate the effect of eliminating the pre-notice letter on ACS Internet response rates and total self-response rates.

Methodology

We used the September 2014 ACS production sample panel for this test. The experimental treatment consisted of one Methods Panel Group, which is a nationally representative sub-sample of about 12,000 addresses. We did not send a pre-notice letter to addresses in the experimental treatment. We refer to the experimental treatment as the Test group from this point forward. The remainder of the production sample (about 274,800 households) was the control treatment, which we refer to subsequently as the Production group. We normally send a multi-lingual brochure with the pre-notice letter; for the Test group addresses we sent this brochure in the initial mailing package.[4] In addition, we slightly modified the letter in the initial mailing package to reflect that this was the first contact with these households. Aside from these three changes, the contact strategy for the Test group was the same as for the Production group.

It is important to note that since the initial mailing package was sent four days after the pre-notice, the Test group was informed of their selection into the ACS four days later than the Production group. We have data that indicates a small number of ACS respondents actually respond before receiving the initial mailing package, using information available in the pre-notice mailing. More importantly, the Production group has additional time to learn about the ACS. This makes the comparison between the two groups not quite fair, which is a limitation of this study. We might have achieved a more fair comparison by sending the initial mailing package to the Test group at the same time the pre-notice letter was sent to the Production group. This will be tested in April of 2015.

[1] Groves (2010)
[2] Reiser, et al. (2013)
[3] The estimated response rates for the panel with an advance letter in the 2012 National Census Test were higher than the rates for the panel without an advance letter, but the differences were not significant.
[4] We assume the placement of the multi-lingual brochure with a different mailing does not affect response rates, based on previous research (Joshipura, 2010).

Research Questions and Results

- *Does eliminating the pre-notice decrease self-response by Internet prior to mailing the first reminder postcard?*

  Yes, the Internet response rate for the Test group at this point was 3.5 percent, 0.8 percentage points less than the Production group rate of 4.3 percent.[5]

- *Does eliminating the pre-notice decrease self-response by Internet prior to mailing the second mail package?*

  Yes, the Internet response rate for the Test group at this point was 18.6 percent, 2.6 percentage points less than the Production group rate of 21.2 percent.[5]

- *Does eliminating the pre-notice decrease self-response by Internet prior to beginning Computer-Assisted Telephone Interviewing?*

  Yes, the Internet response rate for the Test group at this point was 26.5 percent, 2.0 percentage points less than the Production group rate of 28.5 percent.[5]

- *Does eliminating the pre-notice decrease self-response by Mail prior to beginning Computer-Assisted Telephone Interviewing?*

  No, the Mail response rate for the Test group at this point was 15.7 percent, 1.0 percentage point greater than the Production group rate of 14.7 percent, which was not statistically significant. Even adjusting for the higher percentage of Test households that received a paper questionnaire, the adjusted rate for the Test group was 16.6, 0.7 percentage points greater than the adjusted Production rate of 15.9 percent.[6]

- *Does eliminating the pre-notice decrease total self-response (Internet and Mail combined) prior to beginning Computer-Assisted Telephone Interviewing?*

  Yes, the total self-response rate for the Test group at this point was 42.2 percent, 1.0 percentage point less than the Production group rate of 43.2 percent.[7]

[5] This difference is statistically significant, with probability 0.05 of incorrectly detecting a decrease from production to test.
[6] See the main body of the report for more detailed discussion of the adjusted Mail response rates.

- *Does eliminating the pre-notice decrease self-response by Internet prior to beginning Computer-Assisted Personal Interviewing?*

  Yes, the Internet response rate for the Test group at this point was 29.3 percent, 2.0 percentage points less than the Production group rate of 31.3 percent.[7]

- *Does eliminating the pre-notice decrease self-response by Mail prior to beginning Computer-Assisted Personal Interviewing?*

  No, the Mail response rate for the Test group at this point was 22.9 percent, 0.6 percentage points greater than the Production group rate of 22.3 percent, which was not statistically significant. Adjusting for the higher percentage of Test households that received a paper questionnaire, the adjusted Test rate of 24.02 percent is 0.15 percentage points greater than the Production rate of 23.87 percent.

- *Does eliminating the pre-notice decrease total self-response (Internet and Mail combined) prior to beginning Computer-Assisted Personal Interviewing?*

  Yes, the total self-response rate for the Test group at this point was 52.2 percent, 1.4 percentage points less than the Production group rate of 53.6 percent.[7]

- *Does eliminating the pre-notice decrease overall response at the end of data collection?*

  No, the overall response rate for the Test group at the end of data collection was 96.6 percent, 0.6 percentage points greater than the Production group rate of 96.0 percent, which was not statistically significant.

- *Does eliminating the pre-notice decrease total self-response at the end of data collection?*

  Yes, the total self-response rate for the Test group at the end of data collection was 55.1 percent, 1.1 percentage points less than the Production group rate of 56.2 percent.

Cost Estimates

While eliminating the pre-notice mailing would yield cost savings from printing, assembly, and postage, the additional costs—resulting from both shifts in self-response from Internet to paper and the additional workload in the more costly interviewer-administered modes—substantially outweigh any potential savings. From an operational perspective, eliminating the pre-notice mailing would result in higher costs for ACS data collection.

[7] This difference is statistically significant, with probability 0.05 of incorrectly detecting a decrease from production to test.

Conclusion

The results of this test support the continued use of a pre-notice letter, as both Internet and total self-response rates before Computer-Assisted Personal Interviewing were lower in the absence of a pre-notice letter. Furthermore, we estimate that overall mailing costs would be significantly higher if the pre-notice were eliminated. Finally, the lower total self-response rate in the Test group means that the Computer-Assisted Telephone Interviewing and Computer-Assisted Personal Interviewing workloads were higher, increasing costs even more relative to Production.

1. Introduction

The American Community Survey (ACS) employs an Internet push strategy for self-response. Initially, we mail a request and instructions to complete the survey online. About two weeks later, we follow up with a second request, which includes a paper questionnaire. A few days before the initial mailing, we send a pre-notice letter from the Director to notify the recipient to be on the lookout for instructions coming in the mail to complete the ACS, an important national survey being conducted by the U.S. Census Bureau. The pre-notice letter helps establish the legitimacy of the survey and briefly explains the usefulness of the ACS (see Attachment A). Use of a pre-notice letter for such purposes is standard practice in many household surveys. Research has consistently shown its benefits for increasing self-response. Speaking of the 2010 Census, former Census Director Robert Groves blogged: "Years of research have shown that higher percentages of people receiving the mail questionnaire return a completed form after they receive the advance letter compared to those who receive merely the census form with a simultaneous request to return it" (http://directorsblog.blogs.census.gov/2010/02/18/why-use-advance-letters/). Dillman et al. (2009) state, "Research has consistently shown that a pre-notice will improve response rates to mail surveys by 3 to 6 percentage points." Much of the research, however, has been focused on mail surveys.

Pre-notification was first implemented in the ACS before we added the Internet mode. Can we still expect a pre-notice letter to increase self-response under the Internet push strategy? In addition to the pre-notice, the ACS includes several attempts at a mail contact (the initial request, a reminder postcard, a second request, and a second reminder postcard) before moving on to personal interviews. Dillman et al. (2009) state, "Perhaps more important than whether three, four, or five contacts are used is that each communication differs from the previous one and conveys a sense of appropriate renewal of an effort to communicate." From a cost-benefit perspective, should we continue to mail the pre-notice letter, given that we are in an Internet push environment?

Recent research conducted as part of the 2012 National Census Test (NCT) examined different contact strategies in an Internet push environment. The results did not find a significant difference in self-response due to the inclusion of an advance (pre-notice) letter. This was true for Internet self-response and total self-response. The Internet self-response rate for the "Absence of advance letter" panel (analogous to our Test group) was 37.2 (0.6) percent, while the "Advance letter" panel (analogous to our Production panel) was 38.1 (0.7) percent.[8] Based on this research, it was recommended that future Census Tests focus on strategies that do not include an advance letter (Reiser, 2013).

Statistics Canada has already implemented an Internet Push methodology in their 2011 Census and did not use a pre-notice letter. Of course, a pre-notice letter may be more important in the ACS than in a national Census where considerable resources are spent on advance activities to

[8] Throughout this report, numbers in parentheses following estimates are standard errors. Note that response for the NCT panel with no advance letter is lower, but the difference is not statistically significant.

promote participation. In this paper, we examine the effect of eliminating the pre-notice mailing on ACS response rates.

2. Methodology

2.1. Experimental Design

There was one experimental treatment for this test. This consisted of one Methods Panel group in the production ACS sample, randomly selected from the ACS September 2014 sample panel (201409). We will refer to the experimental treatment as the Test group. We refer to the remaining households in sample panel 201409 as the Production group, which serves as the control for this experiment. The Test group did not receive a pre-notice letter, and we slightly modified the letter in the initial mailing package from the production version to reflect that this was the first contact with these households (see Attachments B and C). In addition, the multi-lingual brochure that is normally included in the pre-notice mailing was instead sent with the initial mailing package for the Test group.[9] Aside from these three modifications, the contact strategy and all other aspects of data collection were identical between the Test group and the Production group.

It is important to note that since the initial mailing package was sent four days after the pre-notice, the Test group was informed of their selection into the ACS four days later than the Production group. We have data that indicates a small number of ACS respondents actually respond before receiving the initial mailing package, using information available in the pre-notice mailing. More importantly, the Production group has additional time to learn about the ACS. This makes the comparison between the two groups not quite fair, which is a limitation of this study. We might have achieved a more fair comparison by sending the initial mailing package to the Test group at the same time the pre-notice letter was sent to the Production group. (We are considering doing just that in a future test.)

We evaluated overall response across all modes, Mail response, and total self-response, as well as Internet self-response, at various points during the 3-month ACS data collection cycle, with a primary focus on the Internet self-response prior to sending the paper questionnaire mail package. Failure to respond by Internet leads to more costly attempts to solicit response, i.e., mailing the paper questionnaire and conducting Computer-Assisted Telephone Interviewing (CATI) and Computer-Assisted Personal Interviewing (CAPI), as necessary. We use the results of this test to evaluate the effect of eliminating the pre-notice mailing on overall costs.

2.2. Sample Design

The sample design for the 2014 Pre-notice Test takes advantage of the 24 Methods Panel groups designated by the ACS Sample Design area, each one of which is a representative sub-sample of the entire annual sample. Furthermore, each intersection of a monthly sample panel with a

[9] We assume the placement of the multi-lingual brochure with a different mailing does not affect response rates, based on previous research (Joshipura, 2010).

Methods Panel group is representative of the entire monthly sample panel. Therefore, Test group estimates are comparable to Production group estimates. There are approximately 12,000 addresses in the Test group and approximately 274,800 addresses in the Production group.

2.3. ACS Mailout Schedule for the September 2014 Panel

The ACS has six mailouts associated with each sample panel. For the September 2014 panel, Table 1 shows the date of each mailout and briefly describes its contents and purpose.

Table 1: ACS Mailouts for the September 2014 Panel (201409)

Mailout	Description	Date
Pre-notice	Informs households they are in ACS, and tells them to expect a request to participate in a few days. (Also includes the multi-lingual brochure for the Production group.)	August 21, 2014
Initial Mailing Package	Contains a letter requesting the household respond via Internet. (Also includes the multi-lingual brochure for the Test group.)	August 25, 2014
Reminder Card	A reminder sent to all addresses that received the previous two mailings.	August 28, 2014
Replacement Mailing Package	Sent to addresses that have not responded via the Internet. Includes a paper questionnaire.	September 11, 2014
Second Reminder Postcard	A reminder sent to all households who received the replacement mailing package	September 15, 2014
Additional Mailing Postcard	Sent to addresses that have not yet responded and are not in the CATI universe.	October 2, 2014

2.4. Research Questions

In advance of the test, we identified a series of research questions to help assess the impact of removing the pre-notice letter. We list the research questions here, and provide answers to these questions in Section 4 of this report.

- Does eliminating the pre-notice decrease self-response by Internet
  - prior to mailing the first reminder postcard?
  - prior to mailing the replacement mail package?

- Does eliminating the pre-notice decrease self-response by Internet or Mail
  - prior to beginning CATI?
  - prior to beginning CAPI?

- Does eliminating the pre-notice decrease total self-response (Internet and Mail combined)
  - prior to beginning CATI?
  - prior to beginning CAPI?
  - At the end of data collection?[10]

- Does eliminating the pre-notice decrease overall response at the end of data collection?

Our primary focus in this study is the effect of the ACS pre-notice letter on Internet response rates. Therefore, we are most interested in the answers to the first two questions, about rates prior to (1) the first reminder postcard, and (2) the second mail package. Because data collection using CATI and CAPI takes place many weeks after the pre-notice and initial mailings, we did not expect to see a difference in overall response between the Test and Production groups. However, we included the final research question to check our expectations in this regard. One unlikely but possible scenario is that increased CATI and CAPI workloads, due to increased nonresponse in the Test group, might result in operational difficulties that could lead to lower overall response in the Test group.

2.5. Analysis

For each of the nine response rates calculated, the general formula is:

$$\text{Response Rate} = \frac{\text{Weighted count of responses via mode(s) of interest}}{\text{Weighted count of addresses eligible to respond via mode(s) of interest}}$$

In each case, we first determined which addresses were eligible to respond, based on information in a "snapshot," or "cut," of the ACS control file as of the date in question. Table 2 below describes the nine response rates and the corresponding dates of the control file cuts.

Table 2: Control File Cut Dates Used for the Various Response Rates

Response Rate Description	Control File Cut Date
1. Internet self-response prior to 1st reminder postcard	August 29, 2014
2. Internet self-response prior to 2nd mail package	September 12, 2014

[10] This third bullet under total self-response was not one of the original research questions from the analysis plan, but we think it is informative and worth adding; and the additional work required was minimal.

Response Rate Description	Control File Cut Date
3. Internet self-response prior to beginning CATI	
4. Mail self-response prior to beginning CATI	October 1, 2014
5. Total (Internet + Mail) self-response prior to beginning CATI	
6. Internet self-response prior to beginning CAPI	
7. Mail self-response prior to beginning CAPI	November 1, 2014
8. Total (Internet + Mail) self-response prior to beginning CAPI	
9. Overall response in all modes at panel closeout	December 12, 2014

2.5.1. Eligibility and Response Criteria for the Self-Response Modes (Internet and Mail)

The criteria discussed in this section apply to response rates 1-8 listed in Table 2.

Self-Response Eligibility (Internet and Mail Universe)

For the self-response modes (Internet and Mail), we only wanted to include in the universe those addresses that could receive mail; because only households that could receive mail had the chance to respond in the Internet or Mail modes. For this reason, we excluded addresses designated as "unmailable." We also excluded addresses in remote Alaska and Puerto Rico, and any that were determined to be "undeliverable as addressed" (UAA).[11] Finally, we excluded cases where a telephone contact via failed-edit-follow-up (FEFU) or telephone questionnaire assistance (TQA) determined that an address was out of scope for ACS (often a business). All addresses not excluded by one of these criteria we counted as eligible for both the Internet and Mail modes.

Response Criteria for Internet

We counted a case as an Internet mode response if the address was in the self-response universe and one of the following conditions was satisfied:

- There was a completed Internet response.
- There was a sufficient partial Internet response. That is, not all items were answered, but the respondent got far enough through the questionnaire that the completed items provide a useful amount of data for the household.

[11] Note that there are situations where the first or second mailing is designated UAA, yet there is a valid Internet or Mail response. In these cases, we do NOT consider the case UAA, and count it in both the self-response denominator and the appropriate numerator.

- The unit is suspected to be vacant, based on the Internet response received. Vacancy is not confirmed, but at the point in time for which we are calculating the Internet response rate, this is considered a valid and complete Internet response.
- The unit is suspected to be a business – which would make it out of scope for the survey – but this has not been confirmed. The unit could still be found to be in scope via follow-up, and someone did submit a response; so for the point in time at which we are calculating the rate we consider this a valid Internet response.

Response Criteria for Mail

If there was a valid Internet response (as determined by the criteria in the previous section) then we did not count a case as a Mail response even if the following criteria for a valid Mail response were satisfied. This is because we are primarily interested in the effect of the pre-notice letter on Internet response and total self-response.

If an address was in the self-response universe, but there was no valid Internet response, then we counted a case as a Mail mode response if one of the following conditions was satisfied:

- There was a completed Mail response.
- There was a completed response via TQA.

Responses received via TQA were treated as Mail mode responses for the purposes of this study.[12]

2.5.2. Eligibility and Response Criteria for All Modes Together (Overall)

The criteria discussed in this section apply only to response rate 9 in Table 2, the overall response rate including all modes after panel closeout.

Overall Eligibility (All Modes)

The universe for the overall response rate is a subset of the self-response universe. We are still excluding cases that could not have received mail, even if they were eligible for CATI or CAPI. In addition to the exclusions described for the self-response universe, the overall response rate universe also excludes cases that are determined to be vacant or otherwise out-of-scope during the CAPI phase. These are excluded because it is presumed that there were no persons in residence to receive mail.

[12] Responses via TQA are collected using the CATI instrument, so arguably should be counted as CATI responses. However, there are very few TQA cases (about 1 percent of the original sample size in both Test and Production) and TQA interviews are prompted by information provided in one of the mailings or on the ACS web page, and initiated by respondents. For the purposes of this study, we chose to treat TQA responses as self-response.

Overall Response Criteria (All Modes)

We count a case as a response for the overall rate if it is in the overall universe and there is a complete response via Internet, Mail, TQA, CATI, or CAPI.

2.5.3. Calculation of Weighted Response Rates and Differences Between Treatments

Internet, Mail, and Total Self-Response

For each of the first eight response rates listed in Table 2, we calculated a weighted numerator and denominator. The numerator is the sum of the base weights[13] of the cases determined to have a valid response in the Internet or Mail modes, or both, as appropriate. The denominator is the sum of the base weights of the cases determined to be in the self-response universe.

The response rate is the numerator divided by the denominator. The numerators, denominators, and response rates were calculated separately for the Test and Production groups. The difference between treatments was calculated as the Production rate minus the Test rate.

Overall Response Rate After Panel Closeout

For the final response rate, we must adjust the weights of cases eligible for CAPI by applying the appropriate CAPI subsampling factors. Due to the high cost of CAPI, ACS sends only a subsample of the cases that have not responded in previous modes for this final mode of data collection. We assign a subsampling factor to account for those that were not included. Details of this process may be found in the ACS Design and Methodology document (US Census Bureau, 2014).

We used the CAPI subsampling factor to adjust the base weight of each case in the overall response universe that did not respond in Internet, Mail, or CATI, and were selected in the CAPI subsample. We applied the adjustment to both interviews and non-interviews in CAPI. We used the adjusted weights to calculate the final response rate in the same way we used the unadjusted weights to calculate the earlier self-response rates. Again, the difference between treatments was calculated as the Production rate minus the Test rate.

2.5.4. Calculation of Standard Errors

We estimated variances using the Successive Differences Replication (SDR) method with replicate weights.[14] Since we are calculating response rates, we use the replicate base weights that account only for sampling probabilities. For each type of rate and treatment, we calculated the response rate for the 80 half-sample replicates. Then, for each replicate, we calculated the

[13] The base weight for a sample unit is the inverse of the probability of selection for that unit.
[14] Chapter 12 of the ACS Design and Methodology document (US Census Bureau, 2014) has details and references regarding the SDR method for variance estimation.

difference between the Production rate and Test rate. The variance for each rate and treatment, and each difference, was calculated using the formula

$$Var(RR_0) = \frac{4}{80}\sum_{r=1}^{80}(RR_0 - RR_r)^2$$

where

RR_0 = the response rate or difference estimate calculated using the full sample base weights,

RR_r = the response rate or difference estimate calculated for replicate r.

Finally, the standard error for an estimate is the square root of the variance.

2.5.5. Hypothesis Testing

For each of the nine response rates listed in Table 2, we are interested in the difference between the Production rate (for households that received a pre-notice letter) and the Test rate (for households that did not). The null hypothesis is that the Test rate is at least as high as the Production rate. We reject the null in favor of the alternative if the Production rate is significantly larger than the Test rate; that is, this is a one-tailed test. The significance level is $\alpha = 0.05$.

We defined the test statistic $\bar{\bar{D}}$ as the normalized difference estimate:

$$\bar{\bar{D}} = \frac{\hat{P} - \hat{T}}{\sqrt{Var(\hat{P} - \hat{T})}}$$

Here, $\hat{P}$ is an estimate of the population Production response rate *P*, and $\hat{T}$ is an estimate of the population Test response rate *T*. Let $D = P - T$ be the true population difference in response rates. Thus, an estimate of *D* is

$$\hat{D} = \bar{\bar{D}}\sqrt{Var(\hat{P} - \hat{T})}$$

Then we may state the null and alternative hypotheses as:

$$H_0: D \leq 0$$
$$H_1: D > 0$$

Assuming $\bar{\bar{D}}$ has an approximately standard normal distribution, we reject the null in favor of the alternative if

$$\bar{\bar{D}} > \Phi^{-1}(0.95) \cong 1.645$$

If the pre-notice letter does improve response, as suggested by the literature, then the test should result in rejecting the null hypothesis. If instead the pre-notice letter does not improve response,

then we would fail to reject the null hypothesis. In practice, we calculate a p-value for $\overline{\overline{D}}$, which for this one-tailed test is the area under the standard normal curve to the right of $\overline{\overline{D}}$ This area is the probability of seeing a value larger than $\overline{\overline{D}}$ under the null hypothesis. If the p-value is smaller than our significance level (0.05 for this study) we consider the difference between the Production rate and the Test rate to be significant.

3. Assumptions and Limitations

3.1. Assumptions

1) A single ACS sample panel is representative of an entire year (12 panels) with respect to both response rates and costs.

2) A single Methods Panel Group (1/24 of the full sample) is representative of the full sample.

3) The same denominator is used for all three self-response rate calculations: Internet, Mail, and total self-response (Internet and Mail combined).

4) Cost differences were ignored for coding, FEFU, and TQA, as the costs for these operations should be nearly identical for the control and Test groups.

5) We included the multilingual brochure with the pre-notice letter for households in the Production group households, but with the initial mailing package for the Test group households. We assume this did not have any appreciable effect on the difference in response rates between treatments, based on previous research results (Joshipura, 2010) that found no difference in ACS Mail response rates with or without the brochure included in mailings, and no difference depending on the placement of the brochure with the pre-notice letter or with the initial mailing.

3.2. Limitations

1) We missed the creation of the first control file cut on August 29, so the file we used for that analysis was an approximate recreation based on the second cut on September 12. We created our August 29 file by changing the values of date, status, and outcome variables for any record where one of the relevant Internet or Mail status change dates was August 29 or later, under the assumption that before August 29, the status of such a case was generally “not started.” We set the values of the relevant status and outcome code variables to indicate “not started”; and we set the values of the relevant date variables to missing. While we believe that for most records this reflected the actual state of the record as of August 29, some cases that were responses may have been misclassified as nonresponses. Therefore, the response rate estimates for the August 29 cut may be underestimates for both Test and Production.

2) Because the initial mailing package was sent four days after the pre-notice, the Test group was informed of their selection into the ACS four days later than the Production group. We have data that indicates a small number of ACS respondents actually respond before receiving the initial mailing package, using information available in the pre-notice mailing. Further, the Production group has additional time to learn about the ACS. This makes the comparison of response rates between the two groups not quite fair. We might have achieved a more fair comparison by sending the initial mailing package to the Test group at the same time the pre-notice letter was sent to the Production group. (We are considering doing just that in a future test.)

   When the National Processing Center (NPC) sends out ACS mailings to respondents the mail is sorted, based on address, into geographic groups. In a large batch, there are generally enough mailings going to a given area that they will be sent directly to the local USPS facility. However, in smaller batches, there will not be enough mail to send directly to an area, so that mail is sent through more mail facilities thus taking longer to be delivered.

   In the case of this test, since the Test group initial mailing package was different from the rest of ACS production, NPC processed the Test group in a small batch separate from the rest of the 201409 sample panel. All of the subsequent mailings were identical between Test and Control, so those were processed as one batch together. This means that, potentially, Test group initial mailing packages going to a given area might have been delivered later than Control group initial mailing packages going to the same area.

   However, analysis of delivery tracking files provided by NPC indicated that on average nationwide, Test group initial mailing letters actually arrived earlier than Control group letters. It is not clear why this happened, but it does not support the hypothesis that Test group initial mailing letters were delivered later than Control group letters. However, it does raise the question of whether the Test group response rates were higher than they would have been if the mail had been delivered the same as the Control group. One might adjust for this unexplained Test group advantage, but such an adjustment could only decrease the Test group response rates. This would not alter our overall conclusion that a pre-notice letter improves response, since it would actually increase differences in response rates between the Control and Test groups.

4. Results

Table 3 shows response rate results for all five cut dates, and for the modes appropriate to each date. We discuss the answers to our research questions in the remainder of this section.

Table 3: Response Rate Results by Mode and Cut Date

Internet

Point in Data Collection Cycle	Production	Test	Difference	Significant? *
Before 1st reminder postcard	4.3 (0.0)	3.5 (0.2)	0.8 (0.2)	Yes
Before 2nd mailing package	21.2 (0.1)	18.6 (0.5)	2.6 (0.5)	Yes
Before CATI	28.5 (0.1)	26.5 (0.5)	2.0 (0.5)	Yes
Before CAPI	31.3 (0.1)	29.3 (0.5)	2.0 (0.5)	Yes
After closeout	33.2 (0.1)	31.5 (0.5)	1.7 (0.6)	Yes

Mail

Point in Data Collection Cycle	Production	Test	Difference	Significant? *
Before CATI	14.7 (0.1)	15.7 (0.4)	-1.0 (0.4)	No
adjusted	*15.9 (0.1)*	*16.6 (0.4)*	*-0.7 (0.4)*	*No*
Before CAPI	22.3 (0.1)	22.9 (0.5)	-0.6 (0.5)	No
adjusted	*23.9 (0.1)*	*24.0 (0.5)*	*-0.2 (0.5)*	*No*
After closeout	23.0 (0.1)	23.6 (0.5)	-0.6 (0.5)	No
adjusted	*24.6 (0.1)*	*24.7 (0.5)*	*-0.1 (0.5)*	*No*

Total Self-Response (Internet & Mail combined)

Point in Data Collection Cycle	Production	Test	Difference	Significant? *
Before CATI	43.2 (0.1)	42.2 (0.5)	1.0 (0.5)	Yes
Before CAPI	53.6 (0.1)	52.2 (0.5)	1.4 (0.6)	Yes
After closeout	56.2 (0.1)	55.1 (0.5)	1.1 (0.5)	Yes

Overall Response after closeout of 201409 (Internet, Mail, CATI, & CAPI combined)

Point in Data Collection Cycle	Production	Test	Difference	Significant? *
After closeout	96.0 (0.1)	96.6 (0.3)	-0.7 (0.3)	No

Source: U.S. Census Bureau, American Community Survey, 2014

* *Here, "Significant?" should be read "Is the Production response rate significantly higher than the Test response rate?", since these are one-tailed tests.*

4.1. Does eliminating the pre-notice decrease self-response by Internet prior to mailing the first reminder postcard?

As of August 29, 2014 (the day after the reminder postcard was mailed), the two treatment self-response rate estimates[15] and the difference estimate for the Internet mode were:

Production:	4.3 (0.0)
Test:	3.5 (0.2)
Difference:	**0.8 (0.2)**

The value of the normalized test statistic D is 3.61, which is significant at the 0.05 level. (The p-value is 0.0002.) This is strong evidence that eliminating the pre-notice does decrease the Internet response rate prior to mailing the first reminder postcard.

The difference in response rates has no cost implication at this stage, since the reminder postcard is mailed to all addresses that got the initial mailing.

4.2. Does eliminating the pre-notice decrease self-response by Internet prior to mailing the replacement mail package?

As of September 12, 2014 (the day after the replacement mail package was sent), the two treatment self-response rate estimates and the difference estimate for the Internet mode were:

Production:	21.2 (0.1)
Test:	18.6 (0.5)
Difference:	**2.6 (0.5)**

The value of the normalized test statistic D is 5.64, which is significant at the 0.05 level. (The p-value is 8.5×10^{-9}.) This is strong evidence that eliminating the pre-notice does decrease the Internet response rate prior to mailing the second mail package.

At this stage, the difference in response rates has cost implications, since lower Internet response means that a larger proportion of replacement mail packages must be sent.

[15] Throughout this report, numbers in parentheses following estimates are standard errors. Note that standard errors shown as 0.0 are not actually zero, just less than 0.05, and therefore rounded to 0.0.

4.3. Does eliminating the pre-notice decrease self-response by Internet prior to beginning CATI?

As of October 1, 2014 (the day CATI interviewing began), the two treatment self-response rate estimates and the difference estimate for the Internet mode were:

Production:	28.5 (0.1)
Test:	26.5 (0.5)
Difference:	**2.0 (0.5)**

The value of the normalized test statistic D is 4.02, which is significant at the 0.05 level. (The p-value is 2.9×10^{-5}.) This is strong evidence that eliminating the pre-notice does decrease the Internet response rate prior to beginning CATI.

At this stage, the difference in Internet response rates has cost implications, since lower Internet response contributes to lower total self-response; and lower total self-response means that a larger proportion of cases are sent to CATI.

4.4. Does eliminating the pre-notice decrease self-response by Mail prior to beginning CATI?

As of October 1, 2014 (the day CATI interviewing began), the two treatment self-response rate estimates and the difference estimate for the Mail mode were:

Production:	14.7 (0.1)
Test:	15.7 (0.4)
Difference:	-1.0 (0.4)

The value of the normalized test statistic D is -2.43, which is not significant for this one-tailed test. (The p-value is 0.99.) These results are somewhat unexpected, as they suggest the Mail response rate is actually better for households that did not receive the pre-notice letter. On the other hand, because our calculations assume the universe for Mail response is the same as for Internet response, the lower Internet response rate in Test means that a higher percentage of Test households received a paper questionnaire, as compared with Production households. To account for this, we also calculated adjusted Mail mode response rates with the universe reduced by removing households that had responded via Internet prior to the second mailing.[16] The pre-CATI *adjusted* Mail mode response rates were:

Production:	15.9 (0.1)
Test:	16.6 (0.4)
Difference:	-0.7 (0.4)

[16] More precisely, we excluded households that were not mailed a paper questionnaire AND did not respond via TQA, since TQA responses are considered Mail mode responses for this study.

The adjusted rates still do not support our pre-test hypothesis that a pre-notice letter improves response. We speculate that the presence of the Internet mode may be confounding results for the Mail mode. It could be that some of those who have a higher propensity to respond via Mail than via Internet are confused or put off by the Internet option; furthermore, this effect is strengthened in the Production group by having two contacts before receiving a paper questionnaire. We suspect that in the absence of the Internet mode, the results for Mail would satisfy our expectation that eliminating the pre-notice letter decreases response.[17]

At this stage, the difference in Internet response rates has cost implications, since lower Mail response contributes to lower total self-response; and lower total self-response means that a larger proportion of cases are sent to CATI.

4.5. Does eliminating the pre-notice decrease total self-response (Internet and Mail combined) prior to beginning CATI?

As of October 1, 2014 (the day CATI interviewing began), the two treatment response rate estimates and the difference estimate for total self-response were:

Production:	43.2 (0.1)
Test:	42.2 (0.5)
Difference:	**1.0 (0.5)**

The value of the normalized test statistic D is 2.02, which is significant at the 0.05 level. (The p-value is 0.02.) This is strong evidence that eliminating the pre-notice does decrease the total self-response rate prior to beginning CATI.

4.6. Does eliminating the pre-notice decrease self-response by Internet prior to beginning CAPI?

As of November 1, 2014 (the day CAPI interviewing began), the two treatment self-response rate estimates and the difference estimate for the Internet mode were:

Production:	31.3 (0.1)
Test:	29.3 (0.5)
Difference:	**2.0 (0.5)**

The value of the normalized test statistic D is 3.62, which is significant at the 0.05 level. (The p-value is 0.0001.) This is strong evidence that eliminating the pre-notice does decrease the Internet response rate prior to beginning CAPI.

[17] Research on response mode choice for certain hard-to-interview subpopulations has shown depressed self-response for some of those subpopulations in an Internet push environment (Nichols et al., 2013). Subpopulation analysis is not in the scope of this study, but future research might look at the effect of the ACS pre-notice letter on response in some hard-to-interview subpopulations.

4.7. Does eliminating the pre-notice decrease self-response by Mail prior to beginning CAPI?

As of November 1, 2014 (the day CAPI interviewing began), the two treatment response rate estimates and the difference estimate for the Mail mode were:

Production:	22.3 (0.1)
Test:	22.9 (0.5)
Difference:	-0.6 (0.5)

The value of the normalized test statistic D is -1.23, which is not significant for this one-tailed test. (The p-value is 0.89.) As we did for the pre-CATI Mail mode response rates, we adjusted these pre-CAPI rates by removing households that did not receive a paper questionnaire (and did not respond via TQA) from the Mail mode universe. The adjusted pre-CAPI Mail mode rates were:

Production:	23.9 (0.1)
Test:	24.0 (0.5)
Difference:	-0.2 (0.5)

While the adjustment does make the Production rate roughly equal to the Test rate, we still fail to reject the null hypothesis that eliminating the pre-notice letter does not affect pre-CAPI Mail mode response rates. See the discussion of the pre-CATI Mail mode response rates (above) for a possible explanation of this somewhat unexpected result.

4.8. Does eliminating the pre-notice decrease total self-response (Internet and Mail combined) prior to beginning CAPI?

As of November 1, 2014 (the day CAPI interviewing began), the two treatment response rate estimates and the difference estimate for total self-response were:

Production:	53.6 (0.1)
Test:	52.2 (0.5)
Difference:	**1.4 (0.6)**

The value of the normalized test statistic D is 2.47, which is significant at the 0.05 level. (The p-value is 0.007.) This is strong evidence that eliminating the pre-notice does decrease the total self-response rate prior to beginning CAPI.

4.9. Does eliminating the pre-notice decrease overall response at the end of data collection?

As of December 12, 2014 (the day after closeout for the September 2014 sample panel), the two treatment response rate estimates and the difference estimate for overall response at the end of data collection for the 201409 sample panel were:

Production:	96.0 (0.1)
Test:	96.6 (0.3)
Difference:	-0.7 (0.3)

The value of the normalized test statistic D is -2.00, which is not significant at the 0.05 level for this one-tailed test. (The p-value is 0.9772.) This is strong evidence that eliminating the pre-notice does not decrease the overall response rate at the end of data collection.[18] Because CATI and CAPI tend to make up for any shortfall in the self-response modes, it is not surprising that the final overall response rate for Production is not higher than for Test. It is somewhat unexpected that it is actually lower, but we believe the difference in the Mail mode rates accounts for the difference in the total rates. See the discussion of the pre-CATI Mail mode response rates, above.

5. Cost Estimates

Response rates alone are not enough to determine if the Test strategy should be considered for implementation into the standard ACS data collection procedure. While lower self-response (or even shifting self-response from Internet to Mail) does mean that data collection costs will increase, it is necessary also to examine the cost savings that would be realized from the removal of the pre-notice package from the mail strategy. Lower self-response might be considered acceptable for the ACS program if the ensuing costs were offset or surpassed by saving the printing, assembly, and postage costs associated with mailing a pre-notice package.
For this test, cost differences between the Production and Test groups were considered for postage, printing, mail package assembly, questionnaire data capture, and data collection costs for both CATI and CAPI modes. Cost differences were ignored for coding, FEFU, and TQA, as the costs for these operations should be nearly identical for the Production and Test groups.

5.1. Printing, assembly, and postage costs

The costs (printing, assembly, and postage) of mailing the various pieces of the ACS are quite high, and eliminating any piece of the current mailout strategy would result in cost savings to the program. While the pre-notice mail package is smaller than the mail package containing the questionnaire, and thus less costly to mail, the savings would still be substantial.

[18] In fact, the overall response rate for the Test group is somewhat higher than for Production; and the difference would be significant for a two-tailed test at the 0.05 level, since the left-tail cutoff for D at that level is -1.96. Equivalently, the two-sided p-value corresponding to D = -2.00 is 0.0455, which is less than 0.05.

The results of this test show that removing the pre-notice package yielded a lower response in the Internet mode. Thus, in the Test group, more respondents received a questionnaire package (and consequently, more mailed one back), which lead to higher printing, assembly, and postage costs for the questionnaire mailing package. These extra costs offset the savings that would be achieved by eliminating the pre-notice package by about 20 percent.

5.2. Data capture costs

Data capture costs are the costs associated with transcribing data written onto the paper questionnaire into an electronic format. The ACS uses a combination of optical mark recognition (for checkboxes), optical character recognition (for written numeric fields), and human keyers (for written non-numeric fields) for data capture. Data capture costs include scanning/imaging, keying, ambiguity checks, and quality assurance techniques.

Because more paper questionnaires were returned in the Test group compared to the control, the costs for data capture are expected to increase if the pre-notice package were to be eliminated. However, the increase is modest and would only offset the savings from not mailing the pre-notice package by about 4 percent.

5.3. CATI and CAPI data collection costs

Because of the high cost of data collection in the CATI and CAPI modes, it is imperative that the ACS program keep self-response rates as high as possible. The cost per case for the ACS CATI operation is approximately three times that of self-response, and the cost per case for the CAPI operation is over 25 times that of self-response. Therefore, even a small reduction in the self-response rate can have a huge effect from a cost perspective.

Because the total self-response rate for the Test group at the CATI and CAPI cuts dropped compared to control, there is a significant cost increase due to the increased volume of CATI and CAPI workloads. The additional cost is approximately three times higher than the entirety of the cost savings that would result from printing, postage, and assembly if the pre-notice package were eliminated.

5.4. Cost Estimates Conclusions

From an operational perspective, eliminating the pre-notice package would result in significant cost increases resulting mostly from an increase in the CATI and CAPI workloads. While some cost savings would be realized in postage, printing, and assembly, the increase in cost for CATI and CAPI data collection would be over three times higher than the initial savings. We do not recommend that the ACS implement the Test strategy.

6. Conclusions

The results of this test support the continued use of a pre-notice letter, as both Internet and total self-response rates were lower in the absence of a pre-notice letter.[19] Furthermore, we estimate that an increase in the cost of mailing more questionnaire packages and processing more mail returns would somewhat offset any savings in printing, assembly and postage achieved by not having a pre-notice package; and the savings would be completely eclipsed by an increase in CATI and CAPI workloads. The additional CATI/CAPI costs would be more than three times the initial pre-notice savings.

Results for Mail mode response rates (and consequently overall response rates) were somewhat unexpected. The Mail rate was higher for Test than for Production by 1.0 percentage point prior to CATI. (This result would have been significant for a two-tailed test.) This is surprising particularly because we believed before this test that if we were to see any deviation from previous studies on this topic, it would be in the Internet mode.

One likely cause of the higher Mail response rates in the Test group is its lower Internet response rate, resulting in a higher percentage of Test households getting the second mailing package with the paper questionnaire. To account for this, we calculated an adjusted Mail response rate by removing households that had already responded by Internet from the Mail mode universe. Even this adjustment, however, did not result in the Production Mail response rate being higher than the Test rate. We speculate that a secondary cause of lower Mail response in Production stems from Mail and Internet response options being offered together. If we had conducted this test with only the Mail response option, we suspect that results would have been more in line with findings from previous research. It may be that respondents with a higher propensity to respond via Mail than via Internet are confused or put off by the presence of the Internet option, and that this effect is increased by the additional contact in the Production group (households that did receive a pre-notice letter).

An ACS test to be conducted in April 2015 will look at removing the pre-notice while (1) sending the initial mailing when we would have sent the pre-notice, and (2) replacing the reminder postcard with a reminder letter that directs people to their user ID to help them respond online.

[19] This is not the same conclusion drawn from the results of the 2012 National Census Test. However, the panel with no advance letter in that test – comparable to the Test group in our study – did have a lower response rate than the panel with an advance letter, but the difference was not statistically significant. While the sample size for the NCT panel that is comparable to the Test group in this study was actually slightly larger than the Test group sample size, the sample size for the control panel in the NCT was far smaller than that of the Production group in this study.

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Attachment A – Pre-notice Letter Used in ACS Production

Below is the pre-notice letter currently in use for ACS production.

ACS-12(L)S (2013)
(6-2012)

UNITED STATES DEPARTMENT OF COMMERCE
Economics and Statistics Administration
U.S. Census Bureau
Washington, DC 20233-0001
OFFICE OF THE DIRECTOR

A message from the Director, U.S. Census Bureau ...

In a few days your household will receive instructions in the mail on how to complete a very important national survey, the American Community Survey. Please follow the instructions to complete the survey promptly. The U.S. Census Bureau is conducting this survey and chose your address, not you personally, as part of a randomly selected sample.

The American Community Survey collects information about various topics like education, housing, and jobs. Information from this survey is used by federal, state, local, and tribal governments to meet the needs of communities across America. For example, community leaders use this information to decide where schools, highways, hospitals, and other services are needed. The survey also is used to develop programs to reduce traffic congestion, provide job training, and plan for the health care needs of the elderly.

If you have access to the Internet and want to learn more about the American Community Survey, please visit the Census Bureau's Web site: www.census.gov/acs/www.

Thank you in advance for your help.

Enclosure

census.gov

Attachment B – Initial Mailing Letter Used in ACS Production

Below is the letter from the initial mailing package currently in use for ACS production. This letter was included in the initial mailing package for addresses in the Control Group.

ACS-13(L)SM (2013)
(6-2012)

UNITED STATES DEPARTMENT OF COMMERCE
Economics and Statistics Administration
U.S. Census Bureau
Washington, DC 20233-0001
OFFICE OF THE DIRECTOR

A message from the Director, U.S. Census Bureau ...

The U.S. Census Bureau recently sent a letter to your household about the American Community Survey. Using the enclosed instructions, please complete the survey online as soon as possible at:

https://respond.census.gov/acs

The Census Bureau is using the Internet to collect this information in an effort to conserve natural resources, save taxpayers' money, and process your data more efficiently. If you are unable to complete the survey online, there is no need to contact us. We will send you a paper questionnaire in a few weeks.

This survey collects critical up-to-date information used to meet the needs of communities across the United States. For example, results from this survey are used to decide where new schools, hospitals, and fire stations are needed. This information also helps communities plan for the kinds of emergency situations that might affect you and your neighbors, such as floods and other natural disasters.

The Census Bureau chose your address, not you personally, as part of a randomly selected sample. You are required by U.S. law to respond to this survey. The Census Bureau is required by U.S. law to keep your answers confidential. The enclosed brochure answers frequently asked questions about the survey.

If you need help completing the survey, please call our toll-free number (1–800–354–7271).

Thank you.

Enclosures

census.gov

Attachment C – Initial Mailing Letter Used for Test Group

Below is the letter we included in the initial mailing package sent to addresses in the Test group. For these cases, this letter will replace that which is currently in use for ACS production.

ACS-13(LX)PT (2014)
(6-2014)

UNITED STATES DEPARTMENT OF COMMERCE
Economics and Statistics Administration
U.S. Census Bureau
Washington, DC 20233-0001
OFFICE OF THE DIRECTOR

A message from the Director, U.S. Census Bureau ...

Your household has been randomly selected to complete a very important national survey, the American Community Survey. The U.S. Census Bureau conducts this survey to give our country an up-to-date picture of how we live—our education, employment, housing, and more. Using the enclosed instructions, please complete the survey online as soon as possible at:

https://respond.census.gov/acs

The Census Bureau is using the Internet to collect this information in an effort to conserve natural resources, save taxpayers' money, and process your data more efficiently. If you are unable to complete the survey online, there is no need to contact us. We will send you a paper questionnaire in a few weeks.

This survey collects critical information used to meet the needs of communities across the United States. For example, results from this survey are used to decide where new schools, hospitals, and fire stations are needed. This information also helps communities plan for the kinds of emergency situations that might affect you and your neighbors, such as floods and other natural disasters.

The Census Bureau chose your address, not you personally, as part of a randomly selected sample. You are required by U.S. law to respond to this survey. The Census Bureau is required by U.S. law to keep your answers confidential. The enclosed brochures answer frequently asked questions about the survey.

If you need help completing the survey, please call our toll-free number (1–800–354–7271).

Thank you.

Enclosures

census.gov