Testing an Additional Mailing Piece in the American Community Survey

FINAL REPORT

U S C E N S U S B U R E A U

Helping You Make Informed Decisions

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Studies Division

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EXECUTIVE SUMMARY

Test Objective

The American Community Survey (ACS) is an annual survey that samples approximately 250,000 housing unit addresses each month collecting data on population and housing characteristics using three modes of data collection. The current mailing strategy for the production ACS consists of a pre-notice letter, initial questionnaire package, reminder postcard, and a replacement questionnaire if the initial questionnaire was not returned in a timely manner.

Sample cases that do not respond via mail or the Telephone Questionnaire Assistance (TQA) 1-800 number become eligible for our Computer Assisted Telephone Interviewing (CATI) follow-up operation given that we were able to successfully find a corresponding phone number through our vendor telephone number look-up operation. Otherwise, those nonresponse cases for which we do not have a known phone number become eligible to be subsampled for the more expensive Computer Assisted Personal Interviewing (CAPI) follow-up along with the nonresponse cases from the CATI follow-up. Based on ACS operational data from 2009, two weeks after the Census Bureau has identified the universe of addresses to be mailed a replacement questionnaire, approximately 42 percent of the cases that have failed to respond by mail by this time lack a known phone number. These cases are the universe for this research. Before the personal visit follow-up workload is identified, the mail nonresponse cases without known phone numbers are not contacted in any way for the month that the telephone follow-up operation takes place.

Due to the increased cost of CAPI and the decrease in mail response over the years, we designed a test to identify possible changes to the ACS mailing strategy that might help reduce the cost of CAPI for the ACS by increasing the ACS mail response rate. The 2009 ACS additional mailing test determined the effectiveness of incorporating an additional reminder postcard or additional replacement questionnaire to boost the mail return rate for nonrespondents to the initial mail attempts for whom the Census Bureau lacks known phone numbers.

Methodology

The additional mailing test included all mail nonresponse cases without telephone numbers from the March 2009 ACS production panel (60,755 cases out of 227,435 mailable ACS sample addresses). The sample was randomly and approximately equally allocated among two "additional mailing" treatment groups (postcard only and questionnaire) and a control group. The impact on mail response and cost savings is compared among the groups to assess the effectiveness of the additional mailing treatments.

Research Questions and Results

Does changing the ACS mailing strategy to include an additional reminder postcard or a replacement questionnaire increase the mail return rate among nonrespondents without telephone numbers?

Yes. Both the additional mailing postcard and replacement questionnaire resulted in statistically significant increases in the mail return rates by about 6 to 7 percentage points. However, the additional mailing test data provide no evidence of a difference in the increase in the mail return rates between the additional postcard and replacement questionnaire.

Does changing the ACS mailing strategy to include an additional reminder postcard or replacement questionnaire increase the overall ACS mail response rate?

Yes. We find that the postcard leads to a 1.6 percentage point increase and the questionnaire leads to a 1.8 percentage point increase in the overall ACS mail response rate when compared to the control group, however the data provide no evidence that the increases due to the postcard and questionnaire are different.

Does changing the ACS mailing strategy to include an additional reminder postcard or replacement questionnaire reduce the CAPI follow-up workload?

Yes. Both methods lead to a statistically significant decrease in the CAPI workload by about 1,000 cases a month when compared with the control group. The data provide no evidence of a difference in the CAPI workload reductions between the two additional mailing treatments.

Does either additional mailing strategy produce a cost savings that, at a minimum, offsets the cost of the additional mailing operation? What are the additional cost savings, if any?

Only the additional mailing of the postcard produced a large enough cost savings to offset the material and operational cost of mailing the postcards. Based on the test results, we estimate that the additional mailing of the postcard could lower the overall cost of the ACS by approximately $875,000 annually. The additional replacement questionnaire did not reduce the CAPI workload enough to cover the cost associated with conducting this additional mailing strategy. In fact, we estimate that this method would add about $1 million annually to the overall ACS budget.

Given that both additional mailings produce a similar effect on the overall ACS mail response rate and on the mail return rates among ACS mail nonresponse households without known telephone numbers, we have to take into account the cost implications of each method. Based on our cost analysis, we demonstrated a cost savings due to the postcard and cost expenditure due to the questionnaire – as a result our recommendation is to implement the postcard as part of the ACS mailing strategy.

1. BACKGROUND

1.1 ACS Data Collection Methodology

The ACS is an annual survey that samples approximately 250,000 housing unit addresses each month collecting data on population and housing characteristics using three modes of data collection. Sampled addresses are initially mailed a self-administered questionnaire. The current mailing strategy for the production ACS consists of a pre-notice letter, initial questionnaire package, reminder postcard, and a replacement questionnaire if the initial questionnaire was not returned in a timely manner.

Sample cases that do not respond via mail or TQA become eligible for our Telephone Follow-up operation given that we were able to successfully find a corresponding phone number through our vendor telephone number look-up operation. Otherwise, those nonresponse cases for which we do not have a known phone number become eligible to be subsampled for the more expensive personal visit follow-up along with the nonresponse cases from the telephone follow-up. Before the personal visit follow-up workload is identified, the mail nonresponse cases without known phone numbers are not contacted in any way for the month that the CATI follow-up operation takes place.

The cost per case increases as we progress through the different modes of data collection in the ACS. In other words, the more people who return their questionnaires by mail, the cheaper the ACS will be. Based on ACS operational data collected from 2009, two weeks after the Census Bureau has identified the universe of addresses to be mailed a replacement questionnaire, approximately 42 percent of those cases that failed to respond by mail or TQA by this time lack a known phone number and later become eligible to be subsampled for the more expensive personal visit. As a result, this universe contributes to a higher per case cost, larger variances in the estimates, and sample loss (due to subsampling for the CAPI follow-up).

1.2 Motivation for the 2009 ACS Additional Mail Test

Decreases in response to mail surveys over the years (de Leeuw 2002, National Academy of Sciences 1995) coupled with the costliness of conducting personal visit nonresponse follow-up has created a need for rethinking the way we have traditionally conducted mail surveys. Decreases in mail response rates lead to increases in the nonresponse followup workloads and have the potential to reduce the reliability of survey estimates. Despite being a mandatory survey, the ACS has not been immune to the recent downturn in response to mail surveys. Reviewing the ACS mail response rates, starting in 2002 we observe significant drops in the mail response rate each subsequent year ending in 2007 (Castro, 2008).

In addition to the decreasing trend in mail response to the ACS, the cost of conducting personal interviews with mail nonrespondents has been moving upward. According to the Census Bureau's financial management reports, the average cost of an ACS CAPI follow-up interview in fiscal year 2005 was $126 per case. Three years later, in fiscal year 2008, the average cost of a CAPI interview rose to $147 per case.

Based on the evidence of the rising cost of CAPI interviews and the decreasing trend in mail response rates over the years, we designed a test to identify possible changes to the ACS mailing strategy that would help reduce the cost of CAPI for the ACS by increasing the ACS mail response rate. The 2009 ACS additional mailing test determined the feasibility of incorporating an additional reminder postcard or an additional mailed questionnaire to boost the mail response rate for nonrespondents without known telephone numbers.

1.3 Cognitive Testing of Materials

Prior to conducting the additional mailing test, we developed three additional mailings for our target population: two postcards and a revised cover letter. One postcard used a "carrot" approach, the other used a "stick" approach, and the new letter used both approaches. The "carrot" approach provided the respondent with a friendly message that attempted to appeal to their sense of civic duty by highlighting community resources and services that may benefit from their participation in the ACS. The "stick" approach provided a more formal and stern message appealing to the respondents' sense of authority, by emphasizing that participation in the ACS is required by law. Cognitive testing was then conducted to test the wording of the messages and respondents' reactions to them and to determine which of the two postcards would go forward into the split panel test with the revised replacement questionnaire package cover letter. The two new reminder postcards were printed on 5.5" x 8.5" cardstock. The cardstock chosen was larger in size than the 4.25" x 6" cardstock currently used for the ACS reminder postcard to help the postcard stand out in a pile of mail. We compared cognitive testing participants' reactions to the three materials and their rankings in terms of personal likeliness to respond. Results showed that the stick approach elicited very strong reactions - most said they would complete and send immediately, but others would refuse to participate at all (Schwede, 2008).

In addition to testing the proposed content of the additional mail materials, cognitive testing also elicited feedback on different color schemes for the postcard – salmon color, green, and white. Respondents tended to prefer the green colored postcard due to its brightness, readability, and noticeability (Schwede, 2008). Based on the cognitive testing results, the large green postcard format was chosen in conjunction with a combined approach of using "carrot" and "stick" language for the content of the final postcard and revised cover letter. Both the postcard and the letter included the Telephone Questionnaire Assistance (TQA) 1-800 telephone number to allow respondents to seek assistance or provide their information over the phone. See Figures 1 and 2 in the appendix for a facsimile of the final postcard and revised cover letter.

2. SELECTION CRITERIA

As a minimum criterion for considering whether to change the ACS mailing strategy, the cost savings produced from the additional mailing needed to be large enough to cover the operational and material cost for the selected additional mailing method. If both additional mailing methods met this criterion, then the method that resulted in the greater cost savings after operational and material expenses would be selected for inclusion in the production mailing strategy.

3. METHODOLOGY

3.1 Data Collection Methods

To support the CATI operation, all mailable addresses in the ACS sample for a given data collection month are subject to a telephone number look-up operation conducted by two independent vendors prior to the initial mailing. Note that the vendors do not attempt to match to cell phone numbers. Under the production data collection process, those addresses that result in a mail nonresponse and no phone number match are ineligible for the CATI follow-up operation. These cases would then become eligible to be sampled into the CAPI follow-up operation (U.S. Census Bureau, 2009). The mail nonresponse cases without a known phone number are the universe for our research.

To determine the feasibility of changing the ACS mailing strategy to include an additional mailing, the additional mailing test required the use of all mail nonresponse cases lacking known telephone numbers from a single ACS production panel. The sample was allocated prior to the mail phase among two "additional mailing" treatment groups (postcard only and questionnaire) and a control group. The current mailing strategy for the production ACS consists of a pre-notice letter, initial questionnaire package, reminder postcard, and a replacement questionnaire if the initial questionnaire was not returned in a timely manner. The additional mailing test changes the production mailing strategy by mailing an additional mailing piece to the universe of mail nonrespondents lacking known telephone numbers approximately two weeks after the mail out date of the replacement questionnaires. Note that, in general, the mail date of the additional mailing piece will not always exactly coincide, but approximates the start of the CATI followup due to fluctuations in the scheduled mail date of the replacement questionnaires relative to the start date of the CATI followup.

3.2 Sample Design

All cases in the ACS March 2009 production sample were randomly assigned to one of the three "additional mailing" treatment groups (control, postcard only, and replacement questionnaire), prior to identifying the additional mailing test universe. The additional mailing test universe included 60,755 cases (out of 227,435 mailable ACS sample addresses). These cases had no known telephone numbers and were identified as mail nonresponse cases as of approximately two weeks after the mailout of the first replacement questionnaire on March 30 (coinciding with the start of CATI follow-up for the March panel). We excluded from the additional mailing test universe any cases where both the first and second questionnaire mail packages were returned as Undeliverable as Addressed (UAA) by the United States Postal Service (USPS) on or before March 30. Cases where only the first or second mail package was returned as UAA were included in the universe since the production ACS data show that some of these cases result in a mail return. Note that group quarters, Puerto Rico, and remote Alaska were excluded from the test universe.

The "pre-assigning" of all the production cases into the two treatment groups and control group resulted in an approximately equal number of additional mailing test cases among the three groups once the nonrespondents without telephone numbers were identified ($n_{control}$ = 20,273, $n_{postcard}$ = 20,417, and $n_{questionnaire}$ = 20,065).

4. LIMITATIONS

This evaluation does not address the impact on the reliability of the ACS estimates as a result of increases in the number of mail returns due to the introduction of the additional mailing pieces. The decreases in sampling variance that would result from these additional mailings are due to two factors: (1) The increase in the total number of interviews; and (2) A decrease in the proportion of sample interviews coming from CAPI with the largest sampling weights. In other words, any reduction in the CAPI workload resulting from the receipt of additional mail responses increases the effective sample size of the ACS and the precision of the estimates.

5. RESEARCH QUESTIONS AND RESULTS

5.1 Does changing the ACS mailing strategy to include an additional reminder postcard or replacement questionnaire increase the mail return rate among nonrespondents without known telephone numbers?

The mail return rate for each treatment is essentially the percent of addresses determined to be deliverable by the USPS in the additional mailing test universe within a given treatment that returned a nonblank questionnaire by mail or responded via the TQA program. To calculate the mail return rate for each treatment, we define the numerator as all test cases that responded by calling the ACS TQA telephone number or by returning a nonblank first or second mailed questionnaire (or third questionnaire, if part of the third questionnaire treatment group) on the date of, or prior to, when the nonresponse cases are identified for CAPI. Note that both the postcard and letter included the 1-800 TQA telephone number to allow respondents to call in and provide their data. The denominators for each mail return rate are all test cases belonging to their respective treatment excluding unmailable cases and cases where both the first and second questionnaire mailing were returned as UAA by the USPS prior to June 1, 2009 (the date when data collection ends for the March 2009 production panel). Note that the denominator includes addresses that could later have been determined to be vacant or ineligible during the CAPI follow-up operation.

Table 1 shows the mail return rates for each additional mail treatment weighted up to the national level. The control group, which received no additional mail materials, had a mail return rate of 15.2 percent. This means that about 15 percent of the mail nonresponse cases with no additional contacts responded by mail anyway. Members of the control group that respond by mail or by calling in to the TQA toll-free number are essentially late responders. That is, they fail to respond prior to the date at which we create the address file for the additional mailing universe but decide to respond thereafter. For the group that received the additional mail postcard, we observed a mail return rate of 21.3 percent and a mail return rate of 22.1 percent for those that received an additional questionnaire replacement package with our modified cover letter.

Table 1. Test Universe Mail Return Rates for the Control, Postcard, and Questionnaire Treatment Groups

Treatment	Estimate (%)	Standard Error (%)
Control	15.2	0.3
Postcard	21.3	0.4
Questionnaire	22.1	0.3

Source: American Community Survey, March 2009, http://www.census.gov/acs/www/SBasics/desgn_meth.htm (these data are subject to error arising from both sampling and nonsampling error)

Comparing the treatments among each other, Table 2 shows that sending an additional reminder postcard or an additional replacement questionnaire boosts the mail return rate for this universe in comparison to the case where we do nothing. Specifically, the additional reminder postcard resulted in a 6.1 percentage point increase over the control group and the additional replacement questionnaire resulted in an increase of 7.0 percentage points over the control group in the study universe.

While the replacement questionnaire appears to have produced a higher mail return rate than the reminder postcard, the data do not provide any evidence of a difference that is statistically significant between the postcard and questionnaire. Note that when we include the UAA cases in our difference calculations, we observed a similar pattern in the magnitude and direction of the differences.

Table 2. Differences in the Test Universe Mail Return Rates Among the Control, Postcard, and Questionnaire Treatment Groups

Treatment Comparison	Estimate (%)	Standard Error (%)	Significant*
Postcard – Control	6.1	0.5	Yes
Questionnaire – Control	7.0	0.4	Yes
Questionnaire – Postcard	0.9	0.5	No

Source: American Community Survey, March 2009, http://www.census.gov/acs/www/SBasics/desgn_meth.htm (these data are subject to error arising from both sampling and nonsampling error)
*Note that for this family of one-sided hypothesis tests the familywise error rate has been controlled using the Bonferroni multiple comparison method at the $\alpha = 0.10$ level

5.2 Does changing the ACS mailing strategy to include an additional reminder postcard or replacement questionnaire increase the overall ACS mail response rate?

In addition to looking at the impact of the additional mailings among households without known phone numbers, we were also interested in the impact of the additional mailings on the overall ACS mail response rate for the entire March 2009 production sample. Following the specifications for calculating the official ACS mail response rate as described by Cepietz (2009), we calculated the overall ACS mail response rates for each treatment group prior to and after the additional mailing. The mail response rate differs from the mail return rate, as it is the ratio of mail and TQA responses to the mailable sample addresses that the Census Bureau ultimately determined to be occupied. UAAs are not taken into account, but units determined to be vacant or nonexistent are removed from the denominator, resulting in a more precise measure of the

effect on mail response from addresses that were eligible to respond by mail. Table 3 shows the changes in the ACS mail response rates for the control and additional mail treatment groups between March 30 (the date when we identified the additional mailing test universe) and the end date for the data collection period for the March panel (June 1). For the control group, we observe a 14.2 percentage point increase in the response rate as measured before and after the additional mailings. For the additional mailing treatment groups we observe a 15.9 percentage point increase for the postcard and a 16.1 percentage point increase for the questionnaire.

Table 3. Change in the Overall ACS Mail Response Rate for the Control, Postcard, and Questionnaire Treatment Groups (Pre- and Post-Additional Mailing)

Treatment	Estimate (%)	Standard Error (%)
Control	14.2	0.2
Postcard	15.9	0.2
Questionnaire	16.1	0.2

Source: American Community Survey, March 2009, http://www.census.gov/acs/www/SBasics/desgn_meth.htm (these data are subject to error arising from both sampling and nonsampling error)

Based on our statistical testing, Table 4 shows that in comparison to the control group the additional reminder postcard leads to a significant 1.6 percentage point increase in the overall ACS mail response rate and the additional replacement questionnaire leads to significant 1.8 percentage point increase in the overall ACS mail response rate. However the data provide no evidence that the increases due to the postcard and questionnaire are significantly different from each other.

Table 4. Differences in the Change in the Overall ACS Mail Response Rate Among the Control, Postcard, and Questionnaire Treatment Groups

Treatment Comparison	Estimate (%)	Standard Error (%)	Significant*
Postcard - Control	1.6	0.2	Yes
Questionnaire - Control	1.8	0.2	Yes
Questionnaire - Postcard	0.2	0.2	No

Source: American Community Survey, March 2009, http://www.census.gov/acs/www/SBasics/desgn_meth.htm (these data are subject to error arising from both sampling and nonsampling error)
*Note that for this family of one-sided hypothesis tests the familywise error rate has been controlled using the Bonferroni multiple comparison method at the $\alpha = 0.10$ level

5.3 Does changing the ACS mailing strategy to include an additional reminder postcard or replacement questionnaire reduce the CAPI follow-up workload?

From our previous comparative analysis of the mail response among treatments, with the increase in response due to the additional mailing, we would expect the number of cases sampled to be included in the CAPI follow-up workload to decrease for the additional mailing treatment groups. The only workload changes should be in the study universe – mail nonrespondents without known telephone numbers. To investigate whether this is the case, we calculate three estimates based on the different additional mailing scenarios (no additional mailing, an additional reminder postcard, or an additional replacement questionnaire) of the expected portion

of the total CAPI workload for the March 2009 production ACS sample attributed to the universe of mail nonrespondents without known telephone numbers. We calculate this estimate for a given treatment by taking the actual CAPI workload for the treatment and adjusting it upward to account for the fact that each treatment is only about one-third of the total CAPI workload. This adjustment factor is the simple ratio of the total number of mail nonresponse cases without a known phone number (60,755) to the total number of mail nonresponse cases without a known phone number assigned to a given treatment group ($n_{control} = 20,273$, $n_{postcard} = 20,417$, and $n_{questionnaire} = 20,065$). The calculation for the expected CAPI workload for each treatment is also described by the following formula.

$$Expected\,CAPI\,Workload_t = (Actual\,CAPI\,Workload)_t \times \left(\frac{60,755}{n_t} \right), where\ t\ is\ the\ treatment$$

Table 5 shows that for the control panel of the March 2009 ACS sample, approximately 19,000 cases are in the CAPI workload because they are mail nonresponse cases without a known phone number. Under both scenarios with an additional mailing, the estimated CAPI workload contribution is reduced to approximately 18,000 cases.

Table 5. Estimated CAPI Workloads for the Control, Postcard, and Questionnaire Treatment Groups

Treatment	Estimate	Standard Error
Control	19,264	162
Postcard	18,235	159
Questionnaire	18,110	161

Source: American Community Survey, March 2009, http://www.census.gov/acs/www/SBasics/desgn_meth.htm (these data are subject to error arising from both sampling and nonsampling error)

Given that no other changes in mail response are expected, the differences among the workloads are estimates of the impact on the overall CAPI workload from changing the mail implementation strategy. When we perform the multiple comparison tests using the Bonferroni method (Table 6), we find that both the additional mailing of a reminder postcard and the additional replacement questionnaire significantly decrease the CAPI workload compared to that of the control group by approximately 1,000 cases. However, the data provide no statistical evidence of a superior additional mailing method for reducing the CAPI workload when we compare both additional mail methods to each other.

Table 6. Differences in the CAPI Workloads Among the Control, Postcard, and Questionnaire Treatment Groups

Treatment Comparison	Estimate	Standard Error	Significant*
Control – Postcard	1,029	227	Yes
Control – Questionnaire	1,154	228	Yes
Postcard – Questionnaire	125	226	No

Source: American Community Survey, March 2009, http://www.census.gov/acs/www/SBasics/desgn_meth.htm (these data are subject to error arising from both sampling and nonsampling error)
*Note that for this family of one-sided hypothesis tests the familywise error rate has been controlled using the Bonferroni multiple comparison method at the $\alpha = 0.10$ level

5.4 Does either additional mailing strategy produce a cost savings that, at a minimum, offsets the cost of the additional mailing operation? What are the additional cost savings if any?

The next step in our analysis is to determine the total cost for each additional mailing method. Based on budget data provided by the ACS Content and Mail Branch of the American Community Survey Office (ACSO) and the National Processing Center (NPC), we have identified the following estimated itemized costs associated with the various operational activities in addition to material costs for producing the additional mail pieces in Table 7. Clearly, the postcard costs significantly less to implement than the questionnaire given that the questionnaire is much more expensive to print, assemble, and mail.

Table 7. Itemized ACS Monthly Production Costs for each Additional Mailing Treatment*

Cost	Postcard ($)	Questionnaire ($)
Pre-sorted First Class postage	0.334	1.16
Total Postage	20,292	70,719
Return Packages	--	15,884
Quality Assurance of Mailout	2,407	4,754
Production Control	926	3,704
Printing/Duplicating Questionnaire Packages	--	31,645
Material Assembly	--	15,625
Mail Processing	423	1,691
Management	623	2,494
Docuprinting Postcards	2,734	--
Total Cost	27,406	199,052

Source: National Processing Center Fiscal Year 2008 Budget Estimates, July 2007 (these data are subject to error arising from modelling error)
*Itemized cost calculations are based on an additional mailing workload of 60,755 cases

Given the itemized costs under each additional mailing method in Table 7, the estimated total cost for implementing the postcard additional mailing method for one month of ACS production is $27,406 and the cost for implementing the additional replacement questionnaire is $199,052.

Taking into account the total cost of implementing each additional mailing method, we can now estimate the cost savings we would expect to achieve for the March 2009 sample under the different additional mailing scenarios. Our method for estimating the expected cost savings for each additional mailing treatment is to determine the accrued cost savings due to the CAPI workload reduction offset by both the additional mail data capture cost due to the increased number of mail returns and the implementation cost from Table 7. Our calculation for the expected cost savings for a given additional mailing treatment is illustrated by the following formula.

$Expected\ Cost\ Savings_t = Reduction\ in\ CAPI\ Cost_t$

$\qquad\qquad - Increase\ in\ Mail\ Data\ Capture\ Cost_t$

$\qquad\qquad - Additional\ Mailing\ Implementation\ Cost_t$

$\qquad\quad = (CAPI\ Cost\ per\ Interview) \times (Expected\ Reduction\ in\ CAPI\ Workload)_t$

$\qquad\qquad - (Data\ Capture\ Cost\ per\ Mail\ Return) \times (Expected\ Increase\ in\ Additional\ Mail\ Returns)_t$

$\qquad\qquad - (Additional\ Mailing\ Implementation\ Cost)_t$

$$= \$129.52 \cdot \sum_{i \in CAPI\ Strata} \left(\sum_{j \in n_{t(i)}} \delta_{ij} f_i w_t - \sum_{j \in n_{control(i)}} \delta_{ij} f_i w_{control} \right)$$

$$- \$6.87 \cdot \sum_{i \in CAPI\ Strata} \left(\sum_{j \in n_{t(i)}} \delta_{ij} w_t - \sum_{j \in n_{control(i)}} \delta_{ij} w_{control} \right)$$

$$- (Additional\ Mailing\ Implementation\ Cost)$$

where for additional mailing treatment t, the jth mail nonresponse case (prior to the additional mailing)
without a known phone number in the ith CAPI subsampling stratum,

$\delta_{ij} = mail\ return\ indicator, \quad f_i = CAPI\ stratum\ subsampling\ rate, \quad w_t = \dfrac{60,755}{n_t}, \quad and\ w_{control} = \dfrac{60,755}{n_{control}}$

To determine the expected cost savings attributed to the decrease in the CAPI workload for each additional mailing treatment, within each CAPI subsampling stratum, we sum separately the number of mail returns received for the additional mailing treatment group and the control group and apply the CAPI subsampling rate. The resulting sums are adjusted by a weighting factor to weight the experimental sample up to the full universe of mail nonresponse cases without known phone numbers. By subtracting the control group summation from the additional mailing treatment group summation, we have an estimate of the CAPI workload reduction attributed to the additional mailing. We then multiply the CAPI workload reduction by the average cost per CAPI case ($129.52 per case[1]) to estimate the initial cost savings due to the additional mailing.

Next, we subtract the cost for capturing the additional mail returns. For each CAPI subsampling stratum, we separately sum the number of mail returns received for the additional mailing treatment group and the control group. We then adjust the resulting sums by a weighting factor to weight the experimental sample up to the full universe. We then multiply the increase in mail returns by the average cost to data capture each mail return ($6.87) to estimate the cost of the additional mail returns. This amount is then subtracted from the CAPI cost savings (along with the implementation cost from Table 7).

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[1] Note that this estimate only includes the cost to perform a CAPI interview and does not include the costs of any of the ACS mailings

Given that we sent an additional reminder postcard, we produced a large enough cost savings in this experiment to offset the operational and material cost associated with this method as well as save an estimated $72,907 (standard error = $6,332) per ACS production month and $875,000 annually.

If we opt to send an additional replacement questionnaire, we are unable to offset the operational and material cost associated with the replacement questionnaire through reducing the CAPI workload despite the boost in mail return using this method. As a result, we end up spending an estimated $85,184 (standard error = $6,349) per ACS production month or approximately $1 million annually to implement the additional replacement questionnaire.

SUMMARY

The 2008 ACS additional mailing test tested the effectiveness of incorporating an additional reminder postcard or an additional replacement questionnaire to boost the mail response for nonrespondents without known telephone numbers and to assess the cost implications. Through the additional mailing test, we demonstrated that by adding either an additional replacement questionnaire or an additional reminder postcard we can increase the ACS mail return rate for the universe of nonrespondents without telephone numbers by about 6 to 7 percentage points. Furthermore, we demonstrated that the additional mailings boost the overall ACS mail response rate by about 1.6 to 1.8 percentage points.

While the data from our study showed no evidence of a superior additional mailing method for boosting response between the additional replacement questionnaire and the additional reminder postcard, we did observe a difference in the operational and material costs of implementing the two additional mail strategies.

The additional reminder postcard was the clear winner in terms of covering the cost of implementing the additional mail strategy as well as saving money. The net cost savings for the additional reminder postcard was estimated to be approximately $73,000 for the data collection month of March and cautiously extrapolating this result to a per annum basis, we estimate a potential yearly savings of approximately $875,000.

This research demonstrates that this new method of targeting a subgroup of nonrespondents can work in the ACS environment. Given that both additional mailings produce a similar effect on mail response in the ACS, we have to take into account the cost implications of each method. As a result of the cost savings due to the postcard and the cost expenditure due to the questionnaire, we recommend implementing the additional reminder postcard into the production ACS mailing strategy.

In addition to identifying the costs and benefits of mailing an additional reminder postcard, further evaluation is needed to quantify the benefits in reliability due to the increase in response. Given the positive results of the additional mailing test, we hope that through continued innovations in mail data collection methods, such as providing an additional mailing, we can continue to combat the recent trends in declining response to mail surveys as well as reduce the cost of expensive nonresponse followup operations used to supplement mail surveys.

References

Castro E. (2008). "American Community Survey and Puerto Rico Community Survey: Margins of Error for the 2000-2007 Housing Unit Response Rate by Mode" 2008 American Community Survey Sampling Memorandum Series #ACS08-S-20.

Ciepetz, E. (2009). "Specifications for Calculation of American Community Survey and Puerto Rico Community Survey Housing Unit Mode Level Response Rates" 2009 American Community Survey Sampling Memorandum Series #ACS09-S-25. (Draft)

de Leeuw, E. (2002). "Trends in Household Survey Nonresponse: A Longitudinal and International Perspective." In *Survey Nonresponse,* ed. Robert M. Groves, Don A. Dillman, John L. Eltinge, and Roderick J. A. Little, pp. 41-54. New York: Wiley.

National Academy of Sciences (1995). Modernizing the U.S. Census. Edmonston, B. and Schultze, C. eds. National Academy Press, Washington, D.C.

Schwede L. (2008). "'Carrot' or 'Stick' Approach to Reminder Cards: What Do Cognitive Respondents Think?" 2008 JSM Proceedings of the Section on Survey Research Methods – AAPOR paper, pp 4352-4359.

U.S. Census Bureau (2009). Design and Methodology American Community Survey, U.S. Government Printing Office, Washington, DC.

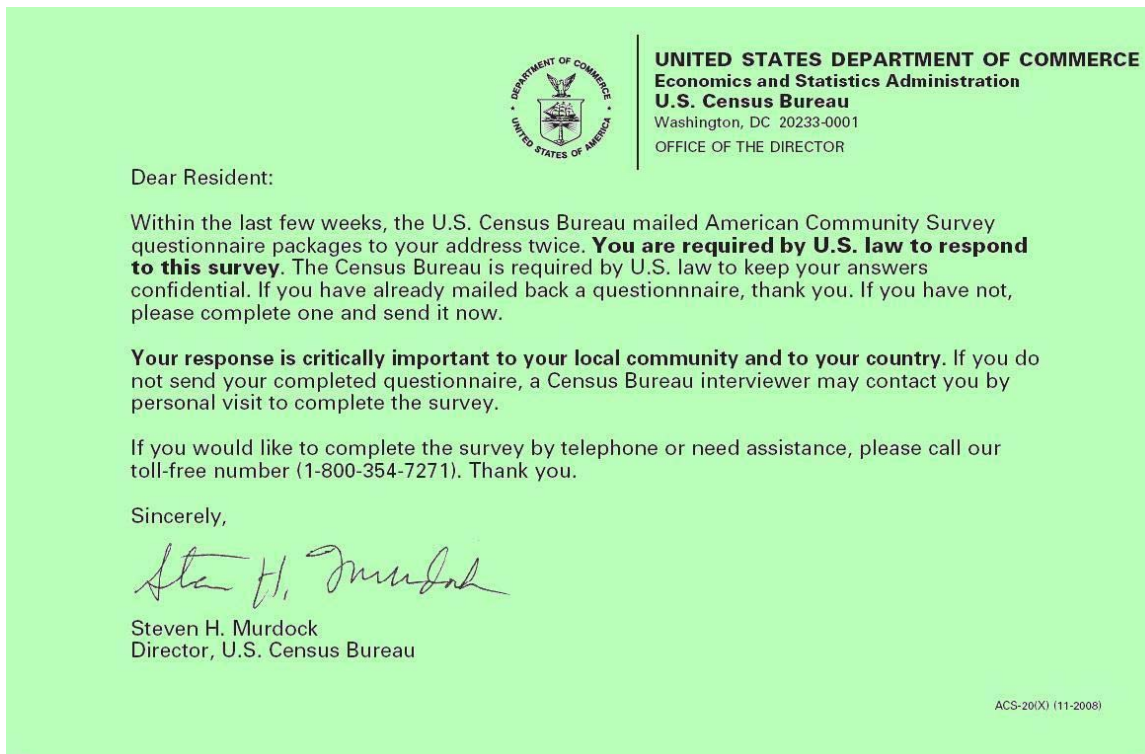# Appendix: Additional Mailing Materials Images

Figure 1. Postcard

U.S. DEPARTMENT OF COMMERCE
Economics and Statistics Administration
U.S. Census Bureau
1201 East 10th Street
Jeffersonville IN 47132-0001

OFFICIAL BUSINESS
Penalty for Private Use $300

ACS-20(X) (11-2008)

PRESORTED
FIRST-CLASS MAIL
POSTAGE & FEES PAID
U.S. Census Bureau
Permit No. G-58

U S C E N S U S B U R E A U

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

Dear Resident:

Within the last few weeks, the U.S. Census Bureau mailed American Community Survey questionnaire packages to your address twice. **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. If you have already mailed back a questionnaire, thank you. If you have not, please complete one and send it now.

Your response is critically important to your local community and to your country. If you do not send your completed questionnaire, a Census Bureau interviewer may contact you by personal visit to complete the survey.

If you would like to complete the survey by telephone or need assistance, please call our toll-free number (1-800-354-7271). Thank you.

Sincerely,

Steven H. Murdock
Director, U.S. Census Bureau

ACS-20(X) (11-2008)

Figure 2. Modified Cover Letter for the Additional Replacement Questionnaire

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

Dear Resident:

Within the last few weeks, the U.S. Census Bureau mailed American Community Survey questionnaire packages to your address twice. We asked you to help us with this very important survey by completing a questionnaire and mailing it back, but we have not received one yet. If you have already mailed a questionnaire back, thank you very much. If you have not, please complete one and send it now.

We have enclosed another copy of the questionnaire with this letter. This survey is so important that a Census Bureau interviewer may contact you by personal visit if we do not receive your completed questionnaire.

Your response is critically important to your local community and to your country. By answering these questions, you help provide local and national leaders with the information they need for planning schools, hospitals, and other community services. The information is also used to develop programs to reduce traffic congestion, provide job training, and plan for the healthcare needs of the elderly.

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 would like to complete the survey by telephone or need assistance, please call our toll-free number (1–800–354–7271). You can also use the enclosed guide if you need help filling out the questionnaire. Thank you.

Sincerely,

Steve H. Murdock
Director

Enclosures

ACS-14(L)(X)M3 (1-2009)

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