DISCUSSION PAPER SERIES

Estimating the Potential Effects of Adding a Citizenship Question to the 2020 Census

J. David Brown
Misty L. Heggeness
Suzanne M. Dorinski
Lawrence Warren
Moises Yi

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J. David Brown
U.S. Census Bureau and IZA

Misty L. Heggeness
U.S. Census Bureau

Suzanne M. Dorinski
U.S. Census Bureau

Lawrence Warren
U.S. Census Bureau

Moises Yi
U.S. Census Bureau

ABSTRACT

Estimating the Potential Effects of Adding a Citizenship Question to the 2020 Census[1]

The self-response rate is a key driver of the cost and quality of a census. The addition of a citizenship question to the 2020 Census could affect the self-response rate. We predict the effect of the addition of a citizenship question on self-response by comparing mail response rates in the 2010 Census, which did not have a citizenship question, and the 2010 American Community Survey (ACS), which included a citizenship question for the same housing units. To distinguish a citizenship question effect from other factors, we compare the actual ACS-Census difference in response rates for households that may contain noncitizens to the ACS-Census difference for all-U.S. citizen households. We estimate the addition of a citizenship question will have a 5.8 percentage point (ppt) larger effect on self-response rates in households that may have noncitizens relative to all-U.S. citizen households. Noncitizens are also 36.2 ppts less likely to report citizenship status that is consistent with administrative records compared to citizens. Only 6.2 ppts of this difference is explained by observed characteristics.

Corresponding author:
J. David Brown
Center for Economic Studies
U.S. Census Bureau
4600 Silver Hill Road
Washington, DC 20233
USA

E-mail: j.david.brown@census.gov

INTRODUCTION

The self-response rate is a key driver of the cost and quality of a census. Households that do not self-respond to the census are placed in Nonresponse Followup (NRFU), the most expensive component of census operations. In the 2010 Census, enumerators visited a household up to six times trying to obtain an in-person interview. If enumerators were unsuccessful, they sought a proxy response from a neighbor, landlord, property manager, or other knowledgeable individual. If no proxy response was received, the household count was imputed. Mule (2012) reports that the quality of proxy enumerations is significantly lower on average than that of self-response or in-person interviews, and imputations are likely to be of even lower quality.[2]

The addition of a citizenship question to the 2020 Census could depress self-response rates. While the Census Act, Title 13 of the U.S. code requires that responses to Census Bureau surveys and censuses be kept confidential and used only for statistical purposes,[3] new survey evidence reported by Bower et al. (forthcoming) suggests that some people fear that the U.S. Census Bureau will share their answers to the 2020 Census with other government agencies and that the answers may be used against them.[4] Such households could have confidentiality concerns regarding the presence of a citizenship question on the 2020 Census questionnaire,[5] and they may react by either

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[2] Using the 2010 Census Coverage Measurement Survey, Mule (2012) finds a 97.3% correct enumeration rate for mailback responses and 70.2% for proxy responses. Rastogi and O'Hara (2012) report a 96.7% person linkage rate between the 2010 Census and administrative records for mailback responses and 33.8% for proxy responses, indicating that the completeness and accuracy of personally identifiable information (PII) provided in proxy responses is poor.

[3] See Jarmin (2018).

[4] In the 2020 Census Barriers, Attitudes, and Motivators Study (CBAMS), 32.5% of the foreign born survey respondents report being "extremely concerned" or "very concerned" that the Census Bureau will share their answers with other government agencies, and 34.0% are "extremely concerned" or "very concerned" that their answers will be used against them. This compares to overall rates of 24.0 and 22.0 respectively. See McGeeney et al. (forthcoming). One CBAMS focus group participant said "Every single scrap of information that the government gets goes to every single intelligence agency, that's how it works…individual-level data. Like, the city government gets information and then the FBI and then the CIA and then ICE and military." See Bower et al. (forthcoming, p. 53).

[5] Bower et al. (forthcoming) report that some CBAMS focus group participants expressed the view that the purpose of the citizenship question is to find undocumented immigrants. One said about the citizenship question: "[The question is used] to make people panic. Some people will panic because they are afraid that they might be deported. (p. 72)"

providing incorrect citizenship answers, skipping the question, or not self-responding. The self-response effect could be particularly damaging to the quality of the census, affecting not only citizenship statistics, but also other demographic statistics and, potentially, the population count itself. It could also significantly increase the cost of the 2020 Census by requiring more nonresponse follow-up.

Respondent reports about what they plan to do in a future survey are not necessarily reliable. Some people expressing concern about a question in a focus group or attitude survey may end up answering it in the actual census and others who do not express concern in the focus group may not answer the question. Rather than asking respondents about future behavior, this paper investigates whether respondents in a survey already containing the 2020 Census citizenship question (the American Community Survey (ACS)) exhibited behavior consistent with having sensitivity about the citizenship question when asked to report about people who are noncitizens. By comparing mail response rates in the 2010 ACS (which contained a citizenship question) and the 2010 Census (which did not have a citizenship question) for the same housing units, we predict how adding the American Community Survey's (ACS) citizenship question to the 2020 Census questionnaire could affect self-response rates. We focus on the differential effect on households that may contain noncitizens, since they are more likely to have concerns about revealing citizenship status.

We would have preferred to test the citizenship question effect by conducting a randomized controlled trial (RCT) using two otherwise identical questionnaires – one containing a citizenship question and the other not. Unfortunately, it was not possible to conduct an RCT in the timeframe allowed. We faced a number of challenges when attempting to estimate the citizenship question effect on self-response in the absence of an RCT. For example, other factors may have contributed

to the difference in housing unit self-response between the 2010 Census and the ACS other than the citizenship question.

Our strategy for identifying a citizenship question effect is to perform difference-in-differences analysis comparing households likely to have concerns about the citizenship question to other households. We investigate the validity of this strategy by examining whether respondents displayed behavior consistent with the ACS citizenship question being particularly sensitive when asked about a noncitizen in their household. Besides not self-responding, respondents could protect the noncitizen household member by skipping the citizenship question or providing an answer inconsistent with the household member's administrative records.[6] To isolate the noncitizen effect from other factors, the difference-in-differences analysis compares item nonresponse or inconsistent response patterns in the citizenship question to the age question for noncitizens and citizens.

This paper is structured as follows. Section 2 discusses related literature. Section 3 describes the data and methodology. Section 4 investigates whether respondent behavior is consistent with having concerns about the citizenship question when the person being asked about is a noncitizen, and it predicts the effect of adding the citizenship question on housing unit self-response in housing units potentially containing at least one noncitizen. Section 5 concludes.

BACKGROUND

As discussed by Tourangeau and Yan (2007), the presence of a sensitive question on a questionnaire can lead to misreporting about the question, skipping the question (item

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[6] The administrative data could be incorrect, and we cannot determine with certainty whether the administrative data or the ACS answer is correct. But the evidence provided in Brown, Heggeness, Dorinski, Warren, and Yi (2018) suggests that the administrative data are correct most of the time when the two sources disagree.

nonresponse), or not taking part in the survey (unit nonresponse). Tourangeau and Yan argue that a question can be sensitive for multiple reasons. One reason is that the question may be intrusive, an invasion of privacy, or none of the survey collector's business. Questions in this category risk offending all types of respondents, regardless of their status on the question. The second is threat of disclosure (which we will refer to as confidentiality concerns), raising fears that the information will be shared with others. Respondents may vary in how much they worry about confidentiality depending on whether exposing their information will put them at risk. A special type of threat of disclosure is when the question prompts socially undesirable or unacceptable answers. Tourangeau and Yan note that the literature has found respondents are more willing to report sensitive information in self-administered surveys than interviewer-administered ones. They point out that self-administered surveys can alleviate biases due to social desirability concerns.

A small number of studies have estimated the effect of a sensitive question on unit response using RCTs. Dillman, Sinclair, and Clark (1993) analyzed data from an RCT where one set of questionnaires included a question requesting the person's Social Security Number (SSN), and an alternative set of questionnaires excluded the SSN question. They found a 3.4 percentage point (ppt) lower mail response rate for the questionnaires containing the SSN request. In areas with low mail response rates in the 1990 Census, the difference was 6.2 ppts. Similarly, Guarino, Hill, and Woltman (2001) found a 2.1 ppt lower self-response rate in high-response areas and a 2.7 ppt lower rate in low-response areas in a 2000 Census RCT with questionnaires including or excluding an SSN request.

Focus group evidence suggests foreign-born participants in a survey including a citizenship question engage in avoidance behavior. Camarota and Capizzano (2004) conducted focus groups with over 50 field representatives (FRs) for the Census 2000 Supplemental Survey (a pilot for the

ACS). FRs reported that foreign-born respondents living in the country illegally or from countries where there is distrust in government were less likely to participate. Some foreign-born respondents failed to list all household members. FRs suspected that some foreign-born respondents misreported citizenship status, and they believed this was due to "recall bias, a fear of the implications of certain responses or a desire to answer questions in a socially desirable way."

Some post-census surveys asking about reasons for participation or non-participation in the census provide evidence about confidentiality concerns. Singer, Mathiowetz, and Couper (1993) reported that households with confidentiality concerns were less likely to self-respond to the 1990 Census, and Singer, Van Hoewyk, and Neugebauer (2003) found that the belief that the census may be misused for law enforcement purposes was a significant negative predictor of self-response in the 2000 Census. Singer, Mathiowetz, and Couper hypothesized that foreign-born persons would have stronger confidentiality concerns due to concerns about immigration laws, but their results showed no significant difference in concerns across foreign-born and native-born respondents.

O'Hare (2018) examined item response behavior to try to predict the effects of adding a citizenship question to the 2020 Census. He found that the citizenship question has a higher item allocation rate (the sum of the item nonresponse and edit rates) in the ACS than other variables that will be in the 2020 Census, that the citizenship item allocation rate is increasing over time, and it is higher for racial and ethnic minority groups, the foreign born, and those self-responding. He concluded that these patterns support the idea that the citizenship question will affect self-response rates in the 2020 Census, but he did not directly test that proposition.

Our study is the first to estimate the effect of a citizenship question on self-response rates. It is also the first to examine item nonresponse and micro-level survey-administrative record

reporting consistency patterns for citizenship status. We develop an alternative method for distinguishing self-response effects of sensitive questions when an RCT is unavailable.

DATA

We use multiple data sources for this study: the American Community Survey (ACS), the 2010 Census, and administrative records from the Social Security Administration (SSA) and the Internal Revenue Service (IRS). Our household survey sources come from the 2010 and 2016 ACS one-year files and the 2010 Census. After the 2000 Census, the Census Bureau's principal citizenship data collection moved from the decennial long form to its replacement, the ACS. The ACS collects responses from approximately 1.6% of households annually (American Community Survey 2016a; American Community Survey 2016b).[7] The citizenship question distinguishes citizens born in the United States, those born in U.S. territories, those born abroad to U.S. citizen parents, those of foreign nativity but naturalized, and noncitizens.

Our main administrative record source is the Census Numident, which is the most complete and reliable administrative record source of citizenship data currently available to the Census Bureau. The Numident file is a record of individual applications for Social Security cards and certain subsequent transactions for those individuals. Unique, life-long Social Security Numbers (SSNs) are assigned to individuals based on these applications. In addition, a full record of all changes to the account information (such as change of name) is maintained. To obtain an SSN, the applicant must provide documented identifying information to SSA. Through the "enumeration at

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[7] We calculate this number using American Fact Finder (AFF) Tables B98001 and B25001.

birth" program, children can be issued an SSN when they are born.[8] Data elements on a Numident record include name, date and place of birth, parents' names, and date of death.

SSA began requiring evidence of citizenship in 1972. Hence, citizenship data for more recently issued SSNs should be reliable as of the time of application.[9] SSA is not automatically notified when previously noncitizen SSN holders become naturalized citizens, so some naturalizations may be captured with a delay or not at all. To change citizenship status on an individual's SSN card, naturalized citizens must apply for a new card, showing proof of the naturalization (U.S. passport or certificate of naturalization).[10] Naturalized citizens wishing to work have an incentive to apply for a new card showing their U.S. citizenship, because noncitizen work permits expire, and the Numident is used in combination with U.S. Citizenship and Immigration Services (USCIS) data in the E-Verify program that confirms that job applicants are eligible to work. Those with the most incentive to update their SSN card are those who are switching jobs or looking for new employment, since those employed in stable jobs may not be asked to re-verify or update their status with a new valid SSN card immediately following their naturalization.

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[8] A parent can apply for the infant's SSN at the hospital where the infant is born. Otherwise, applications for U.S.-born persons require an original or certified copy of a birth record (birth certificate, U.S. hospital record, or religious record before the age of five including the age), which SSA verifies with the issuing agency, or a U.S. passport. Foreign-born U.S. citizen applications require certified report of birth, consular report of birth abroad, a U.S. passport, a certificate of citizenship, or a certificate of naturalization. Noncitizen applications require a lawful permanent resident card, machine readable immigrant visa, arrival/departure record or admission stamp in an unexpired foreign passport, or an employment authorization document. See https://www.ssa.gov/ssnumber/ss5doc.htm. The enumeration at birth program was rolled out starting in 1987, and 45 states, Puerto Rico, the District of Columbia, and New York City had signed agreements to offer it by 1991. Today over 90% of parents use this process in all 50 states plus Puerto Rico and the District of Columbia. See https://www.ssa.gov/policy/docs/ssb/v69n2/v69n2p55.html.
[9] A detailed history of the SSN is available at https://www.ssa.gov/policy/docs/ssb/v69n2/v69n2p55.html (Exhibit 1). For some categories of persons, the citizenship verification requirements started a few years later, but all were in place by 1978.
[10] For more information, see https://www.ssa.gov/ssnumber/ss5doc.htm.

The second administrative record source used in this paper comes from Individual Taxpayer Identification Numbers (ITINs), issued by the Internal Revenue Service (IRS) to persons who do not have and are not eligible to obtain SSNs, but who are required to file a federal individual income tax return. Persons with ITINs should be noncitizens at the time of receipt of the ITIN by definition, since all citizens are eligible to obtain SSNs.

We link SSN and ITIN records to the 2010 Census and ACS datasets using a Protected Identification Key (PIK) developed by the Census Bureau. Around 90.7% of individuals in the 2010 Census link to administrative records. Most failures occur because a PIK cannot be identified (9.0% of the 2010 Census) or a PIK is found, but the individual is not in the Numident or ITIN database (0.3%).[11] Of those who matched, 57.6 million (20.6% of linked persons) have missing citizenship data in the Numident, but the vast majority of these are U.S.-born.[12] The linkage rate is higher for persons in the ACS; Luque and Bhaskar (2014) report that 94.2% of persons in the 2010 ACS have PIKs.

METHODS

There are several elements to our method for predicting the effect of adding a citizenship question to the 2020 Census on self-response rates. We identify a natural experiment. The natural randomization occurs because households receiving the ACS questionnaire in 2010 were selected

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[11] The individual record linkage system used for this research can also associate persons with PIKs that do not relate to a legal SSN or ITIN.

[12] We classify U.S.-born persons with missing Numident citizenship as administrative record citizens in this analysis. When considering administrative record coverage for the 2020 Census, the only Numident group of concern is the 2.5 million foreign-born persons in the 2010 Census with missing citizenship, alive in 2017 according to the Numident, and born after 1919 (and thus persons who would be age 100 or less in 2020). In this paper we treat foreign-born persons with no ITIN or Numident citizenship as having missing administrative record citizenship, just as we do for persons who cannot be linked to administrative records.

using a probability sampling scheme that did not depend upon the citizenship status of individuals in the selected households. The questionnaire contained 75 questions, including a battery of three questions that asked about nativity, citizenship status, and year of immigration. These same households also received the full-count Census questionnaire in the same year, a list of 10 questions that did not include citizenship. We focus on Census housing units, addresses in the Master Address File, that received both questionnaires by mail. In the 2010 Census, these are the housing units from the initial mailing that did not have the questionnaire returned by the U.S. Postal Service as Undeliverable as Addressed (UAA) and which were not classified as a vacant or delete (meaning uninhabitable or cannot be found). We define a 2010 Census self-response as a returned questionnaire from the first mailing that is not blank. For the 2010 ACS, a self-response is a mail response, also from the first contact mailing.

The simple difference in self-response rates (mail response) between the two surveys does not control for the possibility that there may be other reasons a household might respond to one survey and not the other besides the presence/absence of a citizenship question. Census self-response is bolstered by a media campaign and intensive community advocacy group support, and the ACS questionnaire involves much greater respondent burden (Office of Management and Budget 2008; Office of Management and Budget 2009).[13]

A way to control for the effects of other factors on the difference between ACS and Census self-response rates is to compare the difference in households likely to have concerns about the citizenship question to the difference in households unlikely to have such concerns. Administrative record (AR) noncitizens may have something to hide, and they could be put at risk if their personal

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[13] Not only is the ACS questionnaire much longer than the 2010 Census questionnaire, but it contains several potentially sensitive questions, such as income and public assistance receipt.

information regarding citizenship status and location were shared with immigration enforcement agencies, while AR citizens have nothing to hide and would not be put at risk.[14] Households containing at least one noncitizen may thus have concerns about participating in a survey specifically containing a citizenship question, but all-citizen households presumably do not have concerns about a citizenship question, at least in 2010 before the question's presence on the questionnaire became a political issue. Our analysis assumes that any reduction in self-response to the ACS vs. the Census for all-citizen households is due to factors other than the presence of a citizenship question.

Before doing the unit self-response analysis, we investigate whether households with noncitizens in particular exhibit behavior consistent with citizenship question sensitivity by examining citizenship question item nonresponse and the consistency of answers with administrative records[15] when the person being reported about (hereafter the person of interest) is an AR citizen vs. an AR noncitizen. If only households containing noncitizens have concerns about the citizenship question, then we should see a higher incidence of problematic responses (skipping the question or providing an answer inconsistent with administrative records) when respondents are asked about AR noncitizens, when controlling for other relevant factors.

There are other reasons a respondent could skip a question or provide an inconsistent response, such as lack of knowledge regarding the person of interest's characteristics or record

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[14] In this paper, we define AR noncitizens as individuals who are identified as noncitizens in administrative records (Census Numident or ITINs). An AR citizen is identified as a citizen in administrative records. We use the AR citizenship as a base because AR records are verified with additional documentation and, therefore, considered an accurate reflection of status.

[15] We cannot determine with certainty whether the administrative data or the ACS answer is correct. Unlike survey responses, the administrative data are verified at the time of application. The administrative data may not be fully updated, however. The evidence provided in Brown, Heggeness, Dorinski, Warren, and Yi (2018) suggests that the administrative data are correct most of the time when the two sources disagree. We thus treat an inconsistent response as a problematic response.

linkage errors (the administrative record is for a different person than the person of interest).[16] We control for other reasons for problematic response in several ways. First, we do the difference-in-differences analysis comparing problematic response for the citizenship question to that of the age question for the same person of interest, separately for AR citizens and AR noncitizens. Problematic responses could occur for the same reasons for age and citizenship, with the exception that age responses are less likely to be related to citizenship question sensitivity. We classify age as being inconsistent in the survey and administrative records if the values differ by more than one year.

Second, we control for other relevant factors by estimating multivariate regressions with controls that proxy for such factors. Then we do a Blinder-Oaxaca decomposition (Blinder 1973; Oaxaca 1973)[17] of the differences between AR citizens and AR noncitizens into differences between the groups' characteristics (explained portion) and differences in the coefficients (unexplained portion). The explained portion could include differences in the incidence across AR citizens and noncitizens of factors like English language ability, which may be associated with both citizenship status and problematic response (via ability to understand the question). We attribute the unexplained portion to citizenship question sensitivity.

Before conducting the Blinder-Oaxaca decomposition, we estimate regressions for age and citizenship 2016 ACS item nonresponse and age and citizenship status disagreement between the 2016 ACS and contemporaneous administrative records. The regressions are of the form:

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[16] See Tourangeau and Yan (2007).
[17] This method was initially developed to study the extent to which the gender wage gap or racial wage gaps are due to different distributions of characteristics associated with wages by gender or race (explained variation) vs. differing behavior across gender or race for a given set of characteristics (unexplained variation). The unexplained variation is usually attributed to discrimination, but it also captures any effects of differences in unobserved variables.

$$Y_{G_jAGE} = X'_{G_j}\beta_{G_jAGE} + \varepsilon_{G_jAGE} \tag{1}$$

$$Y_{G_jCITIZENSHIP} = X'_{G_j}\beta_{G_jCITIZENSHIP} + \varepsilon_{G_jCITIZENSHIP} \tag{2}$$

Person of interest j belongs to one of two groups $G \in (N, C)$, where the N group (AR noncitizens) could be harmed by confidentiality breaches regarding a citizenship question or are otherwise sensitive to the question, while the C group (AR citizens) would not be. Eqs. 1 and 2 are estimated separately for the N and C groups. Y is the dependent variable for person j in group G, X is a vector of characteristics, β contains the slope parameters and intercept, and ε is a regression error term with zero conditional mean, given X.

In the item nonresponse regressions, Y is equal to one if there is no response for the question for person of interest j in group G, and zero otherwise (even if the response was later edited or allocated). In the ACS-AR age question disagreement regressions, Y is equal to one if the difference in age across sources is more than one year, and it is otherwise zero. Persons who have age in AR data and unedited age in the 2016 ACS are included in these regressions. For the ACS-AR citizenship question disagreement regressions, Y is equal to one if the two sources indicate different citizenship statuses, and it is zero if both sources agree. Persons who are AR citizens and unedited citizenship in the 2016 ACS are included in the citizenship disagreement regressions.

The X variables include person of interest j's relationship to the reference person,[18] the reference person's English language ability (speaking only English at home is the base category), an indicator for better or worse quality person linkage for person of interest j,[19] an indicator for self-response (equal to one if a mail or internet response and zero if by in-person or telephone

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[18] The reference person (also called the householder or person 1) is the first person listed in the household roster.
[19] High-quality linkage is defined as having an above-median linkage confidence score on the first linking attempt (pass), and lower-quality is all others.

interview), reference person sex, reference person race/ethnicity, reference person log one plus age and its square, reference person educational attainment (less than high school, high school but less than bachelor's degree, bachelor's degree, and graduate degree), reference person working in the last week, reference person searching for a job in the last four weeks, and reference person log of one plus the number of years since entering the U.S. (or since birth if born in the U.S.) and its square.[20] Most of these characteristics are about the reference person, because we are studying the respondent's behavior here, and the reference person is often the respondent.

Relationship may proxy for the amount of knowledge the reference person has about the person of interest. If so, one would expect less item nonresponse and disagreement when reporting about oneself than about others, especially nonrelatives.[21] The reference person's English language ability (speaking only English at home is the base category) could be associated with trouble understanding the question, potentially leading to item nonresponse and inconsistent reporting. Record linkage errors could cause inconsistent reporting. As mentioned above, Tourangeau and Yan's (2007) literature review reported that studies have found less item nonresponse and inconsistent reporting about sensitive questions in self-responses, consistent with social desirability being a factor in interviews.

For the Blinder-Oaxaca decomposition, we create summary measures of problematic response to the age and citizenship questions. Each variable is set to one if the respondent does not provide a response to the question, the respondent's answer is edited,[22] or the answer is

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[20] In cases where the person came to live in the U.S. more than once, respondents are instructed to give the latest year.
[21] Singer, Bates, and Miller (1992) reported that item nonresponse for the SSN question in the Simplified Questionnaire Test increased by person number in the household roster. In the 2000 Census Social Security Number, Privacy Attitudes, and Notification Experiment, Guarino, Hill, and Woltman (2001) found that SSN item nonresponse was higher for person 2 than person 1, and for persons 3-6 than for person 2, and Brudvig (2003) found that SSN validation rates decreased with person number.
[22] An answer may be edited when it conflicts with other information provided about the person of interest.

inconsistent with administrative records, and it is zero if an answer is provided that is consistent with administrative records. Cases where administrative records are missing are excluded. We set the problematic-response dependent variables Y_{G_jAGE} and $Y_{G_iCITIZENSHIP}$ equal to one if the response regarding person of interest j in group G is problematic for the age and citizenship questions, respectively, and zero otherwise.[23] The difference between the responses is

$$\Delta Y_{G_j} = Y_{G_jCITIZENSHIP} - Y_{G_jAGE} \tag{3}$$

We estimate regression models for each group

$$\Delta Y_{N_j} = X'_{N_j}\beta_N + \varepsilon_{N_j} \tag{4}$$

$$\Delta Y_{C_j} = X'_{C_j}\beta_C + \varepsilon_{C_j} \tag{5}$$

The difference-in-differences in expected problematic response rates across the two questions for the two groups NC and C is

$$\Delta\Delta Y_{NC} = E(\Delta Y_N) - E(\Delta Y_C) \tag{6}$$

We decompose this as follows:

$$\Delta\Delta Y_{NC} = [E(X_N) - E(X_C)]'\beta_C + [E(X_{NC})'(\beta_{NC} - \beta_C)] \tag{7}$$

The first term (explained variation) applies the coefficients for the AR citizen group to the difference between the expected value of the AR noncitizen group's predictors and those of the AR citizen group. The second (unexplained variation) is the difference between the expected value of the AR noncitizen group's predictors applied to the AR noncitizen group's coefficients and the same predictors applied to the AR citizen group's coefficients. The interpretation that the

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[23] We multiply the coefficients by 100 so that the results are expressed in percentages.

unexplained variation represents the variation due to the AR citizenship status of the person of interest is dependent on the assumption that there are no unobserved variables relevant to the difference-in-differences in problematic response across the two questions and AR citizenship groups.

Once evidence of sensitivity to being asked about the citizenship status of AR noncitizens has been established, we estimate the citizenship question self-response effect on households potentially containing noncitizens via comparing household self-response to the 2010 ACS vs. the 2010 Census, separately for households likely to be sensitive to the citizenship question and others. In our dichotomy the less sensitive group is "all-citizen households", those households where all persons reported in the ACS to be living in the household at the time of the survey are AR citizens, and all are self-reported as being citizens in the ACS as well. The more sensitive group is "other households", including those households where some residents are both AR citizens and self-reported citizens but at least one is not; there is a mismatch between the survey report and administrative record response; or citizenship status is not reported in one or both sources.[24] We use the ACS household roster to define which people are living in the household.

We assume all-citizen households are less sensitive to a citizenship question than other households, since as we show, respondents have demonstrated a willingness to provide citizenship status answers for AR citizens, and those answers are quite consistent with administrative records and thus likely truthful responses. Citizens presumably also have less to fear about revealing their

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[24] Note that this expands the group of people potentially having citizenship question confidentiality concerns compared to those we are using in the problematic response analysis. AR noncitizens are probably not the people most sensitive to a citizenship question, since most of them are legal residents. Camarota and Capizzano (2004), for example, said field representatives reported that illegal immigrants were less likely to respond than other foreign-born persons. Immigrants who have never been legal residents cannot have SSNs, and if they don't have an ITIN either, they will have missing AR citizenship in our data. Since we are unable to distinguish persons without SSNs or ITINs from those who have SSNs or ITINs but have PII discrepancies that prevent a link to administrative records, we include all persons with missing AR citizenship in the sensitive group here.

status than noncitizens. In comparison to others, more of the all-citizen household group's reluctance to self-respond to the ACS should be due to reasons other than the citizenship question, such as unwillingness to answer a longer questionnaire. Note that if some of the reluctance by all-citizen households to self-respond is due to the citizenship question in the ACS, that will downwardly bias our estimate of the citizenship question unit self-response effect.[25]

A different magnitude for the decline in self-response rates for the other household group relative to all-citizen households may not actually be due to greater sensitivity. Other characteristics besides citizenship status could be associated with different ACS self-response, and the other household group could have a higher propensity to have such characteristics. To control for this possibility, we perform Blinder-Oaxaca decompositions to isolate citizenship question concerns.

Households may belong to one of two groups $G \in (S, U)$, where the S group is thought to be potentially sensitive to a citizenship question (other households), while the U group is not (all-citizen households). We set the self-responses $R_{G_i ACS_t}$ and $R_{G_i Census_t}$ equal to one if household i in group G self-responds in year t to the ACS and Census, respectively, and zero otherwise.[26] The difference between the survey responses is

$$\Delta R_{G_i t} = R_{G_i ACS_t} - R_{G_i Census_t} \tag{8}$$

The vector of predictors X includes household size and reference person characteristics (sex, race/ethnicity, age, educational attainment, household income, working in the last week, job search

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[25] If all-citizen households are more likely to self-respond due to the presence of the citizenship question in the ACS, that will upwardly bias our estimate the citizenship question unit self-response effect.
[26] We multiply the coefficients by 100 so that the results are expressed in percentages.

in the last four weeks, and English language ability among those speaking a language other than English at home).[27] β contains the slope parameters and intercept, and ε is a regression error term with conditional mean zero, given X.

We estimate regression models for each household group

$$\Delta R_{S_{it}} = X'_{S_{it}} \beta_{S_t} + \varepsilon_{S_{it}} \tag{9}$$

$$\Delta R_{U_{it}} = X'_{U_{it}} \beta_{U_t} + \varepsilon_{U_{it}} \tag{10}$$

The difference-in-differences in expected self-response rates across the two surveys for the two groups S and U in year t is

$$\Delta\Delta R_{SU_t} = E\big(\Delta R_{S_t}\big) - E\big(\Delta R_{U_t}\big) \tag{11}$$

We decompose this as follows:

$$\Delta\Delta R_{SU_t} = \big[E\big(X_{S_t}\big) - E\big(X_{U_t}\big)\big]' \beta_{U_t} + \Big[E\big(X_{S_t}\big)' \big(\beta_{S_t} - \beta_{U_t}\big)\Big] \tag{12}$$

The first term (explained variation) applies the coefficients for the unsensitive group to the difference between the expected value of the sensitive group's predictors and those of the less sensitive group. The second (unexplained variation) is the difference between the expected value of the sensitive group's predictors applied to the sensitive group's coefficients and the same predictors applied to the unsensitive group's coefficients. The interpretation that the unexplained variation represents the citizenship question effect is dependent on the assumption that there are

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[27] See Couper, Singer, and Kulka (1998) for a review of the literature about factors that may affect self-response, such as household size, age, English language ability, and education.

no unmeasured confounding variables relevant to the difference-in-differences in self-response across the two surveys.

To study how changes in predictors over time might affect the magnitude of the unexplained variation (*UV*) in the decomposition, we apply the coefficients from the 2010 models to the predictors as measured in the 2016 ACS:

$$UV_{2016} = E\left(X_{S_{2016}}\right)' \beta_{S_{2010}} - E\left(X_{S_{2016}}\right)' \beta_{U_{2010}} \tag{13}$$

ANALYSIS

PROBLEMATIC RESPONSE

Table 1 reports item response rates for age and citizenship in the 2016 ACS and age and citizenship status disagreement rates between the 2016 ACS and 2016 administrative records, separately for AR citizens and noncitizens. Item response is very high for age, and it varies little among AR citizens and noncitizens. The item response rate for citizenship is actually slightly higher than the rate for age among AR citizens, but it is 3-4 percentage points (ppts) lower for AR noncitizens. The disagreement rates for both questions are higher among AR noncitizens than AR citizens, which could partly reflect less knowledge about noncitizens. The gap between AR noncitizens and citizens is much larger for the citizenship question, though. AR citizens have age discrepancies ten times more often than citizenship discrepancies, whereas AR noncitizens have citizenship discrepancies three times more often than age discrepancies. The citizenship disagreement rate is 88 times larger for AR noncitizens than AR citizens (37.9% vs. 0.4%).

Next we attempt to distinguish the extent to which the differences in Table 1 can be attributed to citizenship question concerns by AR noncitizens vs. other factors correlated with both citizenship status and response behavior. Table 2 shows results from multivariate regressions predicting age and citizenship item response and ACS-AR disagreement, separately for persons who are AR citizens and noncitizens. We assume that a respondent's knowledge about a question will be greater when the person of interest is the respondent than a relative, followed by a nonrelative. In contrast, presumably respondents will feel the greatest sensitivity about answering questions regarding themselves, followed by relatives, then nonrelatives. In Table 2 respondents have a higher propensity to provide age and citizenship answers about themselves and a lower one to provide answers about nonrelatives, consistent with having less knowledge about others. Respondents also provide more consistent answers about themselves than others for both questions when the person of interest is an AR citizen. The point estimate patterns for the age question disagreement rate are similar for AR citizen and AR noncitizen persons of interest (though the latter are statistically insignificant), but they are very different for citizenship. When the person of interest is an AR noncitizen, respondents have a much higher propensity to provide an inconsistent citizenship answer about themselves than about others, which is consistent with citizenship question sensitivity and inconsistent with lack of knowledge.

Respondents may be more likely to misunderstand a question if they have poor English language skills. When a respondent misunderstands a question, (s)he may be more likely to skip the question or answer it inconsistently. English language skills may also be negatively correlated with legal vulnerability to deportation and thus citizenship question confidentiality concerns. Table 2 shows little association between English language skills and age item nonresponse or inconsistent response, regardless of the person of interest's AR citizenship status. Speaking a

foreign language at home is negatively associated with citizenship item nonresponse for AR citizens, but it is positively associated with it for AR noncitizens.[28] Respondents who don't speak English at all are not statistically significantly more likely to skip the citizenship question than those speaking English very well, which is inconsistent with misunderstanding the question. The respondent's English language ability is positively associated with providing an inconsistent citizenship question answer for AR noncitizens, which is again inconsistent with misunderstanding the question.

Record linkage errors should lead to ACS-AR disagreement for both questions, since the ACS and AR persons are different in those cases. Those with better linkage should have better quality personally identifiable information (PII), which we expect to be negatively associated with having confidentiality concerns about the person of interest. In Table 2 we find that persons of interest with higher quality linkage have a lower propensity to have age disagreement, especially among AR noncitizens, whereas citizenship status disagreement is positively associated with linkage quality, particularly for AR noncitizens. This result is inconsistent with linkage quality being an important factor for citizenship status disagreement.

Social desirability may lead respondents in an interview to skip a sensitive question or give an untruthful, but less embarrassing response. In contrast, interviewers could allay respondent confidentiality concerns, leading to higher item response and agreement rates than in self-responses (mail or internet response). With the exception of the age question for AR noncitizen persons of interest, Table 2 suggests a higher propensity for item nonresponse in self-reponses than in interviews, particularly for the citizenship question for AR noncitizens. Disagreement

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[28] Speaking a foreign language at home is defined as any English language ability response except the base category of speaking only English.

propensity is lower in self-reponse except for the citizenship question for AR noncitizens, where disagreement propensity is much higher. These patterns are inconsistent with social desirability being an important factor explaining citizenship question item nonresponse and disagreement for AR noncitizens. Rather, they are consistent with interviewers being able to build trust and rapport with the interviewee, which can help alleviate citizenship question confidentiality concerns.

In sum, these results suggest that the very different citizenship question response behavior regarding AR noncitizen persons of interest is associated with citizenship question sensitivity, not lack of knowledge, misunderstandings, or record linkage errors. Among the reasons for sensitivity, the results are most consistent with confidentiality concerns, which are particularly relevant for unit nonresponse. As suggested by focus group evidence in Bower et al. (forthcoming), the presence of a citizenship question may cause legally vulnerable persons to worry that their data could be shared with law enforcement agencies; in such a case they may have confidentiality concerns about all their data and thus not participate at all.

To more rigorously distinguish how much of the response difference for the citizenship question regarding AR noncitizen persons of interest is due to the AR noncitizen status itself vs. other factors correlated with response behavior and AR citizenship status, we perform a Blinder-Oaxaca decomposition of differences in problematic response to the citizenship and age questions (equation 7) in Table 3. AR citizens have virtually no difference in the problematic response rate across the two questions, while that rate is 36.2 ppts higher for citizenship when the person of interest is an AR noncitizen. Only 6.2 ppts are explained by differences in observable characteristics between AR citizens and noncitizens, leaving 30.0 ppts unexplained (i.e., differences in the coefficients across AR citizens and noncitizens). We attribute the unexplained portion to higher sensitivity about providing citizenship status for AR noncitizens. This motivates

our use of household members' citizenship status to divide households into ones more likely to be sensitive to the citizenship question vs. those less likely to be sensitive in the unit self-response analysis below.

As a robustness check, we have performed the Blinder-Oaxaca decomposition with a different definition of problematic response, where edited responses are considered problematic only if they disagree with the person's administrative record. The results (not shown) are qualitatively similar to our baseline results.

EFFECT OF THE CITIZENSHIP QUESTION ON UNIT SELF-RESPONSE RATES

We now forecast the effect of adding a citizenship question to the 2020 Census on unit self-response rates by comparing mail response rates in the 2010 Census and the 2010 American Community Survey (ACS) for the same housing units, separately for all-citizen households according to both the ACS and AR vs. households potentially containing at least one noncitizen (other households), which is Eq. 12. Table 4 displays the Blinder-Oaxaca decomposition. The self-response rate is higher in the 2010 Census than the ACS for both household categories, presumably reflecting the higher burden of the ACS. The all-citizen self-response rate is greater than the other household rate in each survey, suggesting that other households have a lower self-response rate in general. Most important for this study is understanding how the difference in self-response rate across groups varies between the 2010 Census and ACS. While the self-response rate for all-citizen households is 8.9 ppts lower in the ACS than in the 2010 Census, the self-response rate for households potentially containing at least one noncitizen is 20.7 ppts lower for the ACS than the

self-response rate to the 2010 Census, which is a 11.9 ppt difference between the two categories. Of this difference, 6.1 ppts are unexplained.

Since the characteristics of households in the two categories change over time, and we want to have the most up-to-date prediction possible, we apply the 2010 model coefficients to 2016 ACS characteristics in Table 5 (Eq. 12). The unexplained portion declines slightly to 5.8 ppts. We consider this to be our best estimate of the effect of the citizenship question on unit self-response in households potentially containing at least one noncitizen.

The Blinder-Oaxaca decomposition results could potentially be sensitive to the choice of X characteristics used in the models. Some variables in our base specification are closely tied to citizenship status, including English language ability and number of years the person has been in the U.S. As shown in Table 6, we have done decompositions without English language ability, without number of years the person has been in the U.S., and without either of them. In another specification we have tried adding other variables that could be associated with both citizenship status and response behavior, including an indicator for living in the same county as a year ago, living in the same tract as their workplace, log of hourly wage, a health insurance coverage indicator, and an indicator for paying real estate taxes (a proxy for home ownership). A specification adds those variables plus one-digit occupation codes, and another adds those variables plus class of worker indicators. The number of ppts that are unexplained range from 5.8 when adding the extra variables except occupation and class of worker to 8.6 when excluding English language ability, without number of years the person has been in the U.S. The only change that affects the estimate materially is the exclusion of number of years the reference person has lived in the U.S. and its square.

There are several caveats to this analysis. It assumes that the self-response rate of all-citizen households will be unaffected by the addition of a citizenship question. Some all-citizen households could boycott the census in solidarity with noncitizens, while others may become more excited to participate, and it is unclear which effect will be larger. The group of households potentially containing at least one noncitizen includes some all-citizen households, but we are unable to distinguish them due to incomplete citizenship coverage in the ACS and administrative data as well as disagreement across sources. Including some all-citizen households in this group may understate the citizenship question effect on households actually containing at least one noncitizen. This analysis also does not capture changes over time in the degree of sensitivity to a citizenship question for a housing unit with a fixed set of characteristics. That would require estimating models on fresher surveys with and without a citizenship question for the same households.

CONCLUSION

This paper finds that respondents often provide answers to the citizenship question that conflict with administrative records or skip the question altogether when asked about an AR noncitizen, raising concerns about the quality of survey-sourced citizenship data for the noncitizen subpopulation. This happens much less frequently when asked about an AR citizen's citizenship status, or when asked about either an AR citizen's or noncitizen's age. Lack of knowledge about the person of interest's citizenship status, misunderstanding the question, record linkage errors, and social desirability concerns do a poor job of explaining these patterns. After controlling for alternative explanations for such behavior, we still find that problematic reactions are much more frequent when respondents are asked about the citizenship status of AR noncitizens. We interpret

this as evidence that respondents have citizenship question sensitivity that may be due to confidentiality concerns or concerns about inappropriate statistical use of the data regarding AR noncitizens, as such persons are more legally vulnerable to these misuses.

We take advantage of a natural experiment where a scientific probability sample of housing unit addresses were in both the 2010 ACS, which contained a citizenship question, and the 2010 Census, which did not include the question. We compare the difference in ACS and Census self-response in households likely to be sensitive to the citizenship question (those potentially containing at least one noncitizen) vs. those unlikely to be sensitive to it (all-citizen households) and find a 6.1 ppt larger drop in self-response rates in the ACS vs. the Census in households potentially containing at least one noncitizen. When applying the models to 2016 ACS characteristics, the estimate declines slightly to 5.8 ppts. If we assume that the citizenship question does not affect unit self-response in all-citizen households and we apply the 5.8 ppt drop to the 28.6% of housing units potentially having at least one noncitizen, it would predict an overall 1.7 ppt drop in self-response in the 2020 Census. This would result in more nonresponse follow-up (NRFU) fieldwork, more proxy responses, and a lower-quality population count.

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Table 1. Summary Statistics for ACS Item Response and AR-ACS Disagreement Regressions

Variable	Mean	Standard Error	Sample Size
		AR Citizens	
Age Item Response	99.22	0.09	4,418,000
Citizenship Item Response	99.59	0.02	4,418,000
ACS-AR Age Disagreement	4.64	0.02	4,388,000
ACS-AR Citizenship Disagreement	0.43	0.02	4,165,000
		AR Noncitizens	
Age Item Response	98.75	0.17	280,000
Citizenship Item Response	95.77	0.27	280,000
ACS-AR Age Disagreement	13.16	0.09	276,800
ACS-AR Citizenship Disagreement	37.89	0.55	254,000

Source: American Community Survey (ACS), Census Numident, and ITINs, 2016.

Notes: The sample sizes are unweighted, while the means and standard errors are survey-weighted. The standard errors are calculated using Fay's balanced repeated replication variance estimation method, with 80 replicate weights, adjusting the original weights by a coefficient of 0.5.

Table 2. Item Nonresponse and ACS-AR Disagreement Regressions

	Age Item Nonresponse		Citizenship Item Nonresponse		ACS-AR Age Disagreement		ACS-AR Citizenship Disagreement	
	AR Citizen	AR Noncitizen	AR Citizen	AR Noncitizen	AR Citizen	AR Noncitizen	AR Citizen	AR Noncitizen
Relative	0.234	0.224	0.057	0.480	0.007	-0.002	0.028	-0.753
	(0.013)	(0.060)	(0.010)	(0.082)	(0.0003)	(0.0017)	(0.011)	(0.215)
Nonrelative	2.353	3.509	1.141	7.395	0.038	0.055	0.571	-5.461
	(0.080)	(0.307)	(0.047)	(0.390)	(0.0014)	(0.0058)	(0.045)	(0.613)
English Very Well	-0.084	-0.068	-0.087	1.036	-0.011	-0.080	-0.452	1.983
	(0.035)	(0.088)	(0.028)	(0.133)	(0.0009)	(0.0026)	(0.031)	(0.373)
English Well	-0.306	-0.074	-0.390	1.688	-0.015	-0.060	0.114	1.063
	(0.052)	(0.102)	(0.056)	(0.159)	(0.0014)	(0.003)	(0.081)	(0.426)
English Not Well	-0.056	0.148	-0.475	2.115	-0.016	-0.043	1.461	-4.927
	(0.073)	(0.128)	(0.070)	(0.191)	(0.0018)	(0.0037)	(0.113)	(0.480)
English Not At All	0.179	0.155	-0.571	1.241	-0.017	-0.055	3.391	-8.282
	(0.143)	(0.189)	(0.122)	(0.236)	(0.0031)	(0.0055)	(0.260)	(0.592)
Better Linkage	-1.384	-1.193	-0.127	-1.766	-0.013	-0.080	0.060	4.586
	(0.015)	(0.040)	(0.008)	(0.115)	(0.0004)	(0.0016)	(0.009)	(0.308)
Mail/Internet Response	0.083	-0.708	0.397	5.923	-0.004	-0.036	-0.262	3.810
	(0.019)	(0.073)	(0.011)	(0.122)	(0.002)	(0.002)	(0.012)	(0.285)
Weighted Obs.	264,700,000	21,910,000	264,700,000	21,910,000	262,500,000	21,620,000	250,300,000	20,220,000
Unweighted Obs.	4,418,000	280,000	4,418,000	280,000	4,388,000	276,800	4,165,000	254,000

Source: American Community Survey (ACS), Census Numident, and ITINs, 2016. Notes: These regressions are estimated by OLS, weighted by ACS person weights. Standard errors are clustered by household. We also include sex, race/ethnicity, worked in the last week, searched for a job within the last four weeks, educational attainment (less than high school, high school but less than bachelor's degree, bachelor's degree, and graduate degree), log of one plus age and its square, and log of one plus the number of years in the U.S. and its square, but we do not report them here.

Table 3. Blinder-Oaxaca Decomposition of the Differences in Problematic Response to the Citizenship and Age Questions by AR Citizenship Status

| | Problematic Response Rate (%) | | Difference |
	Citizenship	Age	
AR Noncitizens	44.5	8.1	36.4
	(0.15)	(0.09)	(0.14)
AR Citizens	5.8	5.7	0.2
	(0.03)	(0.02)	(0.04)
Difference-in-differences			36.2
			(0.07)
Explained			6.2
			(0.08)
Unexplained			30.0
			(0.10)

Source: ACS 1-year file, Census Numident, and ITINs, 2016.

Notes: The results use ACS person weights. The sample excludes observations where age or citizenship is missing from AR. The response is problematic if no answer is provided about the item, the answer is changed in the edit process, or the answer is inconsistent with the AR record for the person. The response is not problematic if the answer is consistent with the person's AR record. Standard errors are in parentheses. The standard errors for the differences are bootstrapped using 80 ACS replicate weights. The number of observations is 4,681,000.

Table 4. Blinder-Oaxaca Decomposition of the Differences in 2010 ACS to 2010 Census Self-Response Rates by Household Citizenship Type

	Self-Response Rate (%)		Difference
	2010 ACS	2010 Census	
All other households	42.0	62.7	-20.7
	(0.32)	(0.14)	(0.12)
AR & ACS all-citizen	65.6	74.4	-8.9
households	(0.33)	(0.11)	(0.12)
Difference-in-differences			-11.9
			(0.07)
Explained			-5.8
			(0.14)
Unexplained			-6.1
			(0.16)

Source: ACS 1-year file, Census Unedited File (CUF), Census Numident, and ITINs, 2010.

Notes: Only NRFU-eligible housing units are included. 2010 CUF self-response is non-blank response to the first mailing, and ACS self-response is mail response. The standard errors are in parentheses, and they are bootstrapped using 80 ACS replicate weights. The number of observations is 1,418,000.

Table 5. Predicted 2016 ACS to 2010 Census Response Rate Differences for Other Households Using Other Household vs. All-Citizen Models

Model	2016 ACS – 2010 Census
All other household model	-21.7
	(0.33)
AR & ACS all-citizen household	-15.9
model	(0.39)
Difference-in-differences	-5.8
	(0.51)

Source: ACS 1-year file, Census Numident, and ITINs, 2016.

Notes: Only NRFU-eligible housing units are included. 2010 Census self-response is non-blank response to the first mailing, and ACS self-response is mail response. The standard errors are in parentheses. The standard errors for the 2016 ACS – 2010 Census response differences are calculated using Fay's balanced repeated replication variance estimation method, with 80 replicate weights, adjusting the original weights by a coefficient of 0.5. The difference-in-differences (*DiD*) standard errors (*SE*) are calculated as $DiD\ SE = \sqrt{SE(Est_1)^2 + SE(Est_2)^2}$, where the two estimates (*Est*) are the 2010 Census – 2016 ACS differences for the two groups. They are the standard errors of the model predictions, based on the bootstrapped regressions in equations 9 and 10 that use 80 ACS replicate weights. The estimates use ACS housing unit weights. The all other households group makes up 28.6% of housing units in 2016. The number of observations is 477,000.

Table 6. Blinder-Oaxaca Decomposition of the Differences in 2010 ACS to 2010 Census Self-Response Rates by Household Citizenship Type – Robustness Tests

	(1)	(2)	(3)	(4)	(5)	(6)	(7)
Difference-in-differences	-11.86	-11.86	-11.86	-11.86	-11.86	-11.86	-11.86
	(0.0684)	(0.0684)	(0.0684)	(0.0684)	(0.0684)	(0.0684)	(0.0684)
Explained	-5.772	-5.741	-4.221	-3.218	-6.04	-6.009	-5.941
	(0.139)	(0.138)	(0.0887)	(0.0582)	(0.138)	(0.138)	(0.137)
Unexplained	-6.083	-6.114	-7.634	-8.637	-5.816	-5.847	-5.915
	(0.161)	(0.161)	(0.12)	(0.0983)	(0.16)	(0.16)	(0.159)

Source: ACS 1-year file, Census Unedited File (CUF), Census Numident, and ITINs, 2010.

Notes: Only NRFU-eligible housing units are included. 2010 CUF self-response is non-blank response to the first mailing, and ACS self-response is mail response. The standard errors are in parentheses, and they are bootstrapped using 80 ACS replicate weights. The number of observations is 1,418,000. Specification 1 is the base specification in Table 4. Specification 2 excludes the reference person's English language ability. Specification 3 excludes number of years the reference person has lived in the U.S. and its square. Specification 4 excludes English language ability and number of years the person has lived in the U.S. and its square. Specification 5 adds an indicator for living in the same county as a year ago, living in the same tract as their workplace, log of hourly wage, a health insurance coverage indicator, and an indicator for paying real estate taxes (a proxy for home ownership). Specification 6 is like Specification 5, except it also adds one-digit occupation indicators. Specification 7 is like Specification 5, except it also adds class of worker indicators.