Predicting the Effect of Adding a Citizenship Question to the 2020 Census

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Citizen Voting Age Population (CVAP) Statistics

• Produced by Census Bureau annually at block group level

• Source: 5-year ACS

• Population and persons age 18 and over who are U.S. citizens, by race/ethnicity

• CVAP used by Dept. of Justice for Voting Rights Act enforcement

• 2011 CVAP used 2005-2009 ACS, released near same time as 2010 Census PL94 redistricting data (April 1, 2011)

• On Dec. 12, 2017 Dept. of Justice requested citizenship question be added to 2020 Census so CVAP could be produced at block level
Why Household Self-Response is Important

• If household doesn’t self-respond
  • Enumerators attempt contact on up to 6 days
  • Seek proxy response from neighbor
  • Whole-household imputation

• Cost increases by estimated $55 million for every percentage point increase in Nonresponse Followup (NRFU)

• Quality declines
  • In 2010, 97.3% correct enumeration rate for self-responses, 93.4% for household interviews, and 70.2% for proxy responses
  • 96.7% linkage rate to administrative records for self-responses, 33.8% for proxy responses
Literature (1 of 2)

- Dillman, Sinclair, and Clark (1993)
  - Randomized Controlled Trial (RCT) shows that asking for SSN decreases decennial response by 3.4 percentage points overall, and by 6.2 percentage points in areas with low mail response rates

- Guarino, Hill, and Woltman (2001)
  - 2000 Census RCT shows 2.1 ppt lower self-response rate in high-response areas, 2.7 ppt lower rate in low-response areas with questionnaires containing SSN request

- Singer, Mathiowetz, and Cooper (1993)
  - Households with confidentiality concerns were less likely to self-respond to the 1990 Census

- Singer, Van Hoewyk, and Neugebauer (2003)
  - Belief that census may be misused for law enforcement purposes was significant negative predictor of self-response in 2000 Census
Literature (2 of 2)

• O’Hare (2018)
  • Citizenship question has higher item allocation rate in ACS than other variables that will be in 2020 Census
  • Increasing over time
  • Higher for racial and ethnic minorities, foreign born, and self-responders

• McGeeney et al. (2019)
  • In 2020 Census Barriers, Attitudes, and Motivators Study (CBAMS), 32.5% of foreign-born respondents “extremely concerned” or “very concerned” that Census Bureau will share answers with other govt. agencies, vs. 24.0% among others
  • 34.0% of foreign-born “extremely concerned” or “very concerned” that answers will be used against them, vs. 22.0% among others

• Escudero & Becerra (2018)
  • In survey in Providence, Rhode Island (site of 2018 End-To-End Census Test), 75% of men and 83% of women agreed with statement “many people in Providence County will be afraid to participate in the 2020 Census because it will ask whether each person in the household is a citizen.”
Measuring Effect of Citizenship Question on Self-Response Rate

- Natural experiment: random sample of 1,418,000 households receiving both ACS (with citizenship question) and Census (without) in 2010
- Households may be less willing to respond to one survey than the other for reasons other than citizenship question
- Divide households into ones likely more vs. less sensitive to citizenship question
  - Less sensitive: everyone in household is citizen in ACS and admin. data
  - More sensitive: all other households
- Difference between self-response rate across surveys for less sensitive group represents general difference in propensity to self-respond across surveys
- Difference-in-differences can isolate citizenship question effect
Measuring Effect of Citizenship Question on Self-Response Rate

- $G \in (S, U)$, $S$ is potentially sensitive to a citizenship question, while $U$ group is not

- $R_{GiACS_t}$ and $R_{GiCensus_t} = 1$ if household $i$ in group $G$ self-responds in year $t$ to the ACS and Census, respectively, and zero otherwise

- Difference between the survey responses is
  \[ \Delta R_{Gi t} = R_{GiACS_t} - R_{GiCensus_t} \]

- Difference-in-differences in expected self-response rates across the two surveys for the two groups $S$ and $U$ in year $t$ is
  \[ \Delta \Delta R_{S U_t} = E(\Delta R_{S t}) - E(\Delta R_{U t}) \]
Data Sources

• American Community Survey (ACS) in 2010, 2017

• 2010 Census

• 2010, 2017 Social Security Administration (SSA) Numident
  • Misses persons without Social Security Numbers (SSNs)
  • Not all naturalized persons report their status change to SSA, or they do so with delay

• Individual Tax Identification Numbers (ITINs)
  • Persons who need to pay taxes, but do not have work authorization
Comparison of 2010 ACS to 2010 Census Self-Response Rates

|                      | Self-Response Rate (%) | Difference |
|----------------------|------------------------|------------|
|                      | 2010 ACS   | 2010 Census |               |
| All other households | 42.0       | 62.7        | -20.7        |
| AR & ACS all-citizen | 65.6       | 74.4        | -8.9         |
| Difference-in-differences |            |             | -11.9        |
Blinder-Oaxaca Decomposition

• Households potentially containing noncitizens could have a greater difference between their Census and ACS self-response propensity for reasons other than citizenship question

  • Those containing noncitizens may be more likely to be linguistically isolated
  • Linguistically isolated households may find a longer questionnaire particularly burdensome

• Blinder-Oaxaca decomposition can control for systematic observable differences between groups like linguistic isolation
Blinder-Oaxaca Decomposition

• We estimate OLS models for each household group:

• $\Delta R_{St} = X'_{St} \beta_{St} + \varepsilon_{St}$

• $\Delta R_{Ut} = X'_{Ut} \beta_{Ut} + \varepsilon_{Ut}$

• $\Delta \Delta R_{SU} = E(\Delta R_{St}) - E(\Delta R_{Ut})$

• $\Delta \Delta R_{SU} = [E(X_{St}) - E(X_{Ut})]' \beta_{Ut} + [E(X_{St})'(\beta_{St} - \beta_{Ut})]$
Blinder-Oaxaca Decomposition

• Explanatory variables (X’s) include
  • log household size and its square
  • owned vs. rented
  • housing structure type
  • household income
  • presence of related and unrelated children, unrelated adults, only working adults
  • householder sex crossed with marital status
  • householder age, race/ethnicity, education, recently moved here
  • linguistic isolation
  • shares of housing units in block group with at least one noncitizen, under poverty line, vacant
  • tract population density
Blinder-Oaxaca Decomposition of Comparison of Predicted 2010 ACS to 2010 Census to Self-Response Rates by All-Citizen vs. All Other Households

|                                | 2010 ACS – 2010 Census |
|--------------------------------|------------------------|
| All other households           | -20.7                  |
| AR & ACS all-citizen households| -8.9                   |
| Difference-in-differences      | -11.9                  |
| Explained                      | -3.1                   |
| Unexplained                    | -8.8                   |
Blinder-Oaxaca Unexplained Component Using 2017 ACS Characteristics

\[ UV_{2017} = E(X_{S_{2017}})' \beta_{S_{2010}} - E(X_{S_{2017}})' \beta_{U_{2010}} \]

| 2017 ACS – 2010 Census                   |
|-----------------------------------------|
| All other household model (\( \beta_{U_{2010}} \)) | -19.9 |
| AR & ACS all-citizen household model (\( \beta_{S_{2010}} \)) | -11.9 |
| Difference-in-differences                | -8.0  |

N=755,000 households
Blinder-Oaxaca Decomposition: Robustness

• Try 227 variables from entire ACS, in addition to 39 in base specification, to estimate the all-citizen household model
• 3 versions of Least Absolute Shrinkage and Selection Operator (lasso) procedure
  • EBIC information criterion (149 variables selected)
  • cross-validation method (157 variables selected)
  • AIC information criterion (157 variables selected)
• Principal Components Analysis (PCA) using top 20, 50, and 100 factors
• Run Blinder-Oaxaca Decomposition with the selected variables in 2010
  • 6.3-6.4 ppts unexplained with lasso, 7.0-7.2 unexplained with PCA
Effect on Overall Self-Response Rate

- Apply 8.0 ppt drop to 28.1% of housing units potentially having at least one noncitizen (estimated in 2017 ACS)
- Results in 2.2 ppt drop in housing unit self-response
- At a cost of $55 million per ppt, this would mean an increase in NRFU fieldwork costs of $121 million
Caveats

• Assumes self-response rate of all-citizen households will be unaffected by citizenship question

• Some households in group potentially containing at least one noncitizen likely contain only citizens, which may understate the citizenship question effect on households actually containing at least one noncitizen

• Does not capture change in degree of sensitivity to citizenship question since 2010
Conclusions

• Households potentially containing at least one noncitizen have a 11.9 ppt larger drop-off in self-response to the 2010 ACS vs. the 2010 Census compared to all-citizen households.

• 6.3-8.8 ppt of the difference-in-differences is unexplained, which we attribute to sensitivity to the ACS citizenship question.

• We estimate a 2.2 ppt overall drop in self-response, increasing NRFU cost by $121 million and lowering quality.
Ideas for Future Research

• Randomized Control Trials
  • Measure effect of citizenship question on all-citizen household unit self-response rate
  • Effect of citizenship question on net undercount

• Comparisons of citizenship information across multiple administrative sources

• How to combine data sources to produce “best” citizenship variable
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2017 ACS Item Nonresponse: Administrative Record Citizens and Noncitizens

![Bar chart showing the percent nonresponse for Administrative Citizens and Administrative Noncitizens by age and citizenship status.](chart.png)
2017 ACS-Administrative Record Disagreement: Administrative Record Citizens and Noncitizens
Explaining Administrative Record Noncitizen Item Nonresponse and Discrepant Response

- Respondent misunderstands the question
  - more discrepancies when linguistically isolated, in self-response

- Respondent doesn’t know person’s status
  - more nonresponse and discrepancies with nonrelatives, little difference between noncitizens and citizens

- Respondent has privacy concerns
  - more nonresponse and discrepancies among noncitizens relative to citizens

- Incorrect linkage to administrative records
  - more discrepancies with lower-quality linkage, little difference between noncitizens and citizens

- Administrative data are incorrect (missing naturalizations)
  - more discrepancies when reporting about self, mode shouldn’t matter
Item Nonresponse Regressions

- $Item_{Cj} = X_{Cj}' \beta_{Cj} + \epsilon_{Cj}$
- $Item_{NCj} = X_{NCj}' \beta_{NCj} + \epsilon_{NCj}$

- $Item \ j = age, \ and \ citizenship \ in \ 2017 \ ACS$

- $X$ includes relationship to householder, race/ethnicity, working or search for a job, linguistic isolation, linkage quality, self-response vs. fieldwork, education, household income, share of households in block group with at least one noncitizen, share of households in block group below poverty line

- Sample size:
  - 4,108,000 for administrative record Citizens
  - 253,000 for administrative record noncitizens
Age and Citizenship Status Disagreement Regressions

- $\text{Disagree}_k = X_k' \beta_k + \epsilon_k$

- $k = \text{admin. citizen-ACS noncitizen, admin. noncitizen-ACS citizen}$

- $X$ includes relationship to householder, race/ethnicity, working or search for a job, linguistic isolation, linkage quality, self-response vs. fieldwork, education, household income, share of households in block group with at least one noncitizen, share of households in block group below poverty line

- Sample size:
  - 4,060,000 for administrative record citizen age disagreement regression
  - 249,000 for administrative record noncitizen age disagreement regression
  - 3,872,000 for administrative record citizen – ACS noncitizen regression
  - 229,000 for administrative record noncitizen – ACS citizen regression
Relatives and Nonrelatives vs. Respondent

- Age nonresponse
- Citizenship nonresponse
- Age disagreement
- Citizenship disagreement

Percentage Points

Citizen | Noncitizen | Citizen | Noncitizen | Citizen | Noncitizen | Citizen | Noncitizen

Relative | Nonrelative
Better Linkage, Mail/Internet Response

-3 -2 -1 0 1 2 3 4 5 6

Percentage Points

age nonresponse  citizenship nonresponse  age disagreement  citizenship disagreement

Citizen  Noncitizen  Citizen  Noncitizen  Citizen  Noncitizen  Citizen  Noncitizen

Better Linkage  Mail/Internet Response
### Blinder-Oaxaca Decomposition of Differences in Problematic Response to Citizenship and Age Questions by Administrative Record Citizenship Status

| Problematic Response Rate (%) | Difference |
|------------------------------|------------|
| Citizenship                  | Age        |
| AR Noncitizens               | 44.6       | 8.0 |
|                              | (0.15)     | (0.07) |
| AR Citizens                  | 5.9        | 5.8 |
|                              | (0.03)     | (0.02) |
| Difference-in-differences    |            | 36.5 |
| Explained                    | -1.0       |     |
| Unexplained                  | 37.4       | (0.09) |
Estimated Annual Naturalizations in 2017 Numident vs. USOIS Statistics

Number of Naturalizations

- USOIS
- Census Numident

Years: 2005 to 2016
Difference between 2016 ACS Naturalization and Numident Citizenship Change Years
Distribution of 2016 ACS Citizenship Receipt Timing for Administrative Record Noncitizen-ACS Citizens by Linkage Quality and Ethnicity
Enumeration Quality in Mailout/Mailback and Nonresponse Follow-up (NRFU) Proxy Responses

|                                      | Mailout/Mailback Response | NRFU Proxy |
|--------------------------------------|---------------------------|------------|
| Correct Enumerations                 | 97.3                      | 70.2       |
| Erroneous Enumerations               | 2.5                       | 6.7        |
| Whole-Person Census Imputations       | 0.3                       | 23.1       |
| Person Linkage Rate                  | 96.7                      | 33.8       |

$55 million estimated fieldwork cost for each percentage point drop in self-response rate