Motivation and Contribution

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<th>Figure 1. Citizenship Question in 2019 ACS</th>
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- There has been a sharp increase in nonresponse to the citizenship question over the years.
- This rise in nonresponse degrades survey quality and estimates from those surveys.
- Current point estimates assume non-respondents have the same legal status as respondents.
- Nonsampling error?

Research Question:
What is the size and legal composition of the US Foreign-Born Population taking into account non-sampling error?

Contribution:
- First to measure total uncertainty in population estimates caused by non-sampling error from item nonresponse.

Data

American Community Survey (ACS) 1-Year:
- Main survey used to produce population estimates of the size and legal composition of the US foreign-born population.
- Nationally representative samples of 1% of households.
- Asks individuals whether they are native-born, naturalized citizens, or non-citizens.
- Use Public Files from IPUMS.

Identifying Undocumented Immigrants in the ACS

- Residual Method proposed by Borjas and Cassidy (2019).
- Assign all immigrant women as having authorized status if:
  - that person arrived before 1980.
  - that person is a citizen.
  - that person receives Social Security benefits, SSI, Medicaid, Medicare, or Military Insurance.
  - that person is a veteran, or currently in the Armed Forces.
  - that person works in the government sector.
  - that person was born in Cuba.
  - that person’s occupation requires some form of licensing (such as physicians, registered nurses, and lawyers).
  - that person’s spouse or parent is a legal immigrant or citizen.
- All individuals not identified as a legal immigrant (the residual) are classified as unauthorized.

Manski Bounds

The share of the US population that are foreign-born can be defined as:

\[ P(F) = P(F|R = 1) \cdot P(R = 1) + P(F|R = 0) \cdot P(R = 0) \]  

where:
- \( F = 1 \) if the population unit is foreign-born (native-born).
- \( R = 1 \) if a population unit did (did not) report citizenship status.
- Empirical evidence identifies \( P(R) \) and \( P(F|R) \).
- No empirical information on \( P(F|R = 0) \).
- Without assuming the exact distribution of foreign-born status among non-respondents, \( 0 \leq P(F|R = 0) \leq 1 \).

This yields the following sharp bounds:

\[ P(F|R = 1) \cdot P(R = 1) < P(F) < P(F|R = 1) \cdot P(R = 1) + P(R = 0) \]  

- To estimate the lower bound: suppose \( F = 0 \) for each sample member with missing data in the citizenship question.
- To estimate the upper bound: suppose \( F = 1 \).
- Generates two extreme imputations of each case of missing data.

The point estimate of the share of the foreign-born when using the Census imputations lies between the upper and lower bounds.

Bounds provide maximum degree of uncertainty from item nonresponse.

Estimates within Manski bounds are valid estimates.

Interval Estimates of the US Immigrant Population

Size of Foreign-Born Population (2019)
- Bounds: 40.4 and 59.4 Million
- vs. 44.8M point estimate

Size of Non-citizen Population (2019)
- Bounds: 19.7 and 38.7 Million
- vs. 21.7M point estimate

Interval Estimates of the US Undocumented Population

Manski Bounds for Residual Residual Method

Lower Bound:
- All imputed values are assigned so that they satisfy the conditions.
- Non-respondents assigned as native born.
- Residual method is then performed.

Upper Bound:
- All imputed values are assigned so that they fail to satisfy the conditions.
- Non-respondents assigned as Non-citizens.
- Residual method is then performed.

Bounds: 7.3 and 23.3 Million (vs. 10.15M point estimate)

Conclusion

- Assumptions on the distribution of legal status among non-respondents have to be made to create point estimates.
- MAR assumption typically used is a strong assumption in the context of legal status and assumes away all nonrandom error from nonresponse.
- Considerable uncertainty when taking into account nonsampling error.
- Without strong assumptions, we can say little about the size and legal composition of the US Foreign-born population using survey data alone.

Disclaimer: Any opinions and conclusions expressed herein are those of the authors and do not represent the views of the U.S. Census Bureau.

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