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LEVERAGING THE STRENGTHS OF THE PRCS

LESSONS FROM PPH AND OTHER HOUSEHOLD CHARACTERISTICS ESTIMATED USING THE PRCS

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ISSUE

- Budget cuts consistently affect the Census Bureau's efforts to produce accurate and timely estimates.
 - Risk of inaccurate control estimates for the ACS/PRCS
 - Risk of decreased quality of Household and Person characteristics determined by the ACS/PRCS

WHY PUERTO RICO?

- Let's assume that budget cuts will affect the quality of:
 - Methodology development (e.g. for migration estimates)
 - Supplemental resources (e.g. MAF updates)
 - Base estimates (e.g. housing units)
- ...in this case, the PRCS can be used to explore the quality that the ACS could have under a “worst-case scenario”

OBJECTIVE

- Use the Puerto Rico Community Survey (PRCS) as a case study to explore the quality and uses of the ACS if it were to have poor household and persons' controls, highlighting:
 - **Potential:**
 - Persons Per Household are usable using an alternate method ...which can be used to estimate Households
 - Estimates of household distributions are relatively accurate
 - **Cautions:**
 - Biases are produced by the data-collection structure

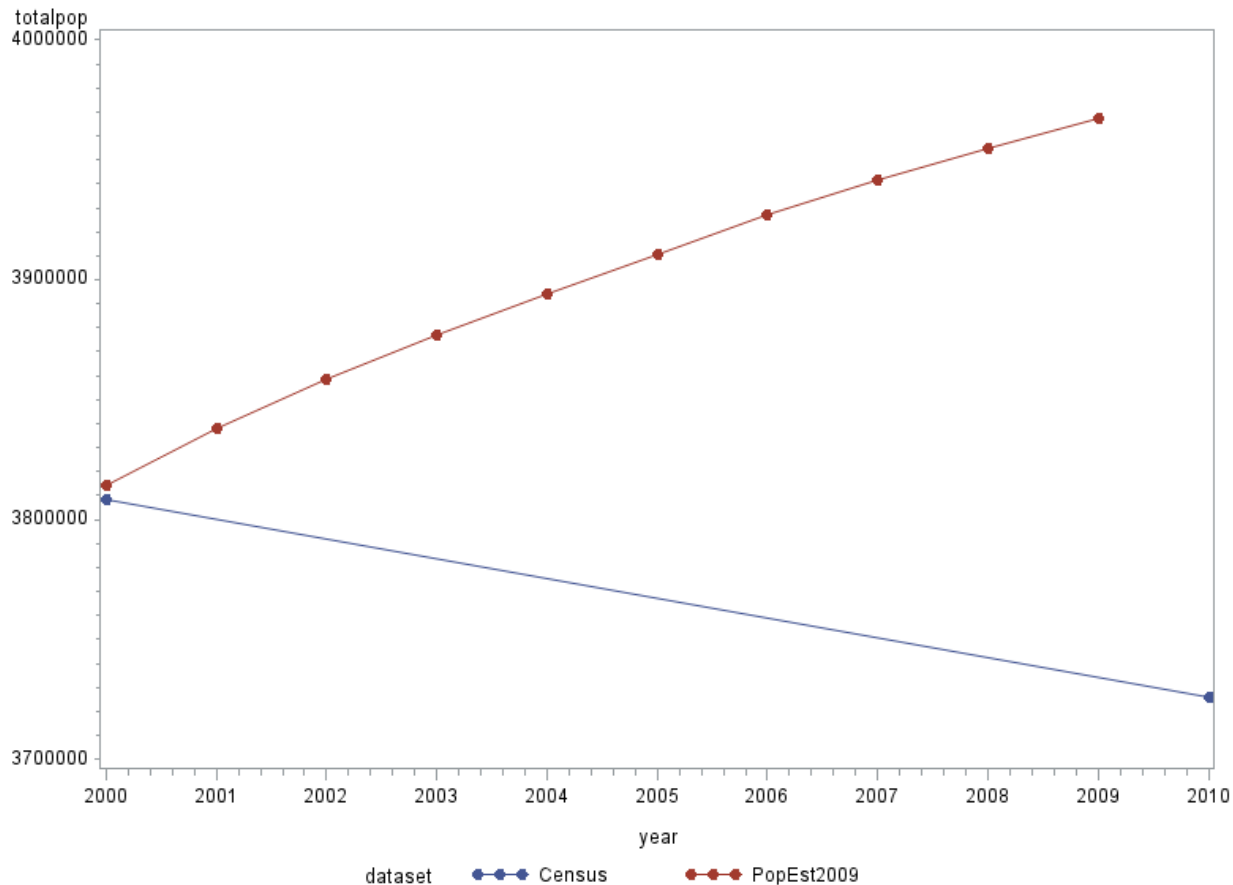
POPULATION ESTIMATE METHOD: 2000 – 2009

- Births: Puerto Rico Planning Board
- Deaths: Puerto Rico Planning Board
- Net Migration rates (residual method):
[2000 enumerated] – [1990-based 2000 projection]
- Assumptions:
 - Migration rates of the 1990s = migration rates of 2000s
 - Differential coverage across the two censuses is equal

POPULATION ESTIMATE QUALITY: 2000 – 2009

The application of 1990s-based net migration rates to the 2000s produced poor population estimates

Total Population Estimates for Puerto Rico: Census Interpolated vs. Population Estimates

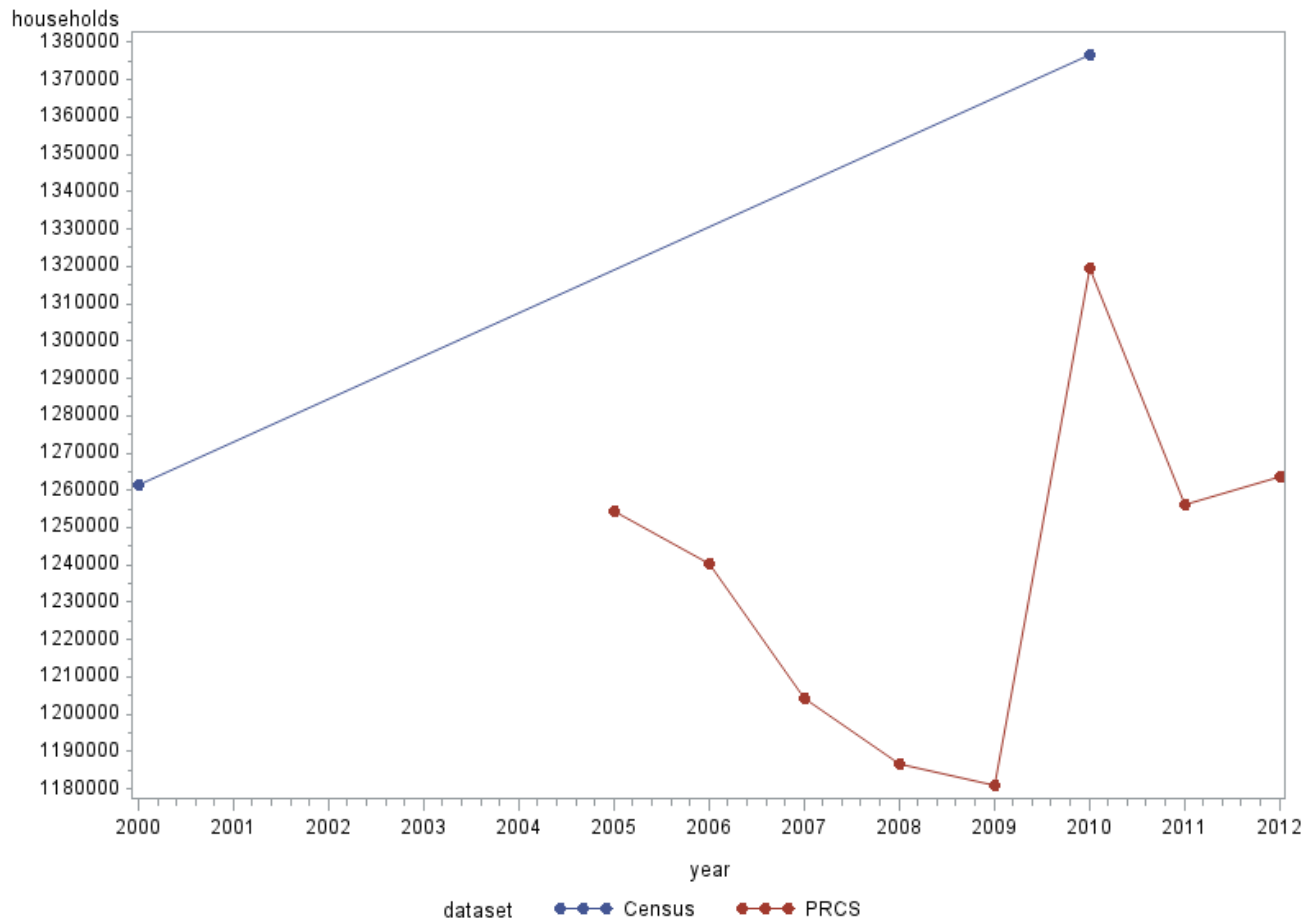


HOUSEHOLD ESTIMATE QUALITY: 2000 – 2009

Stable Household estimates were unstable (no MAF updates)

*Note: it looks like the problem returns after the 2010 Census

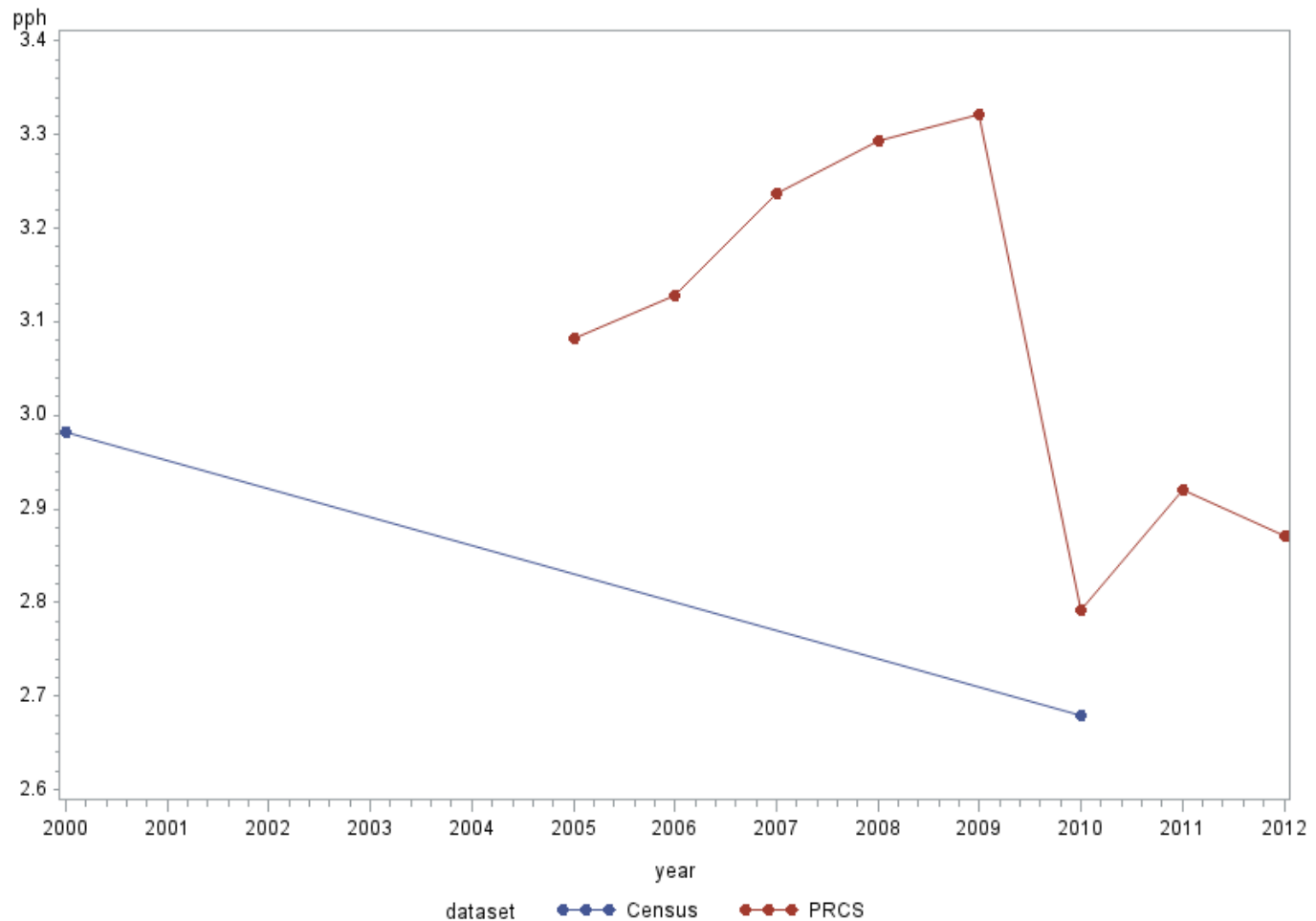
Household Estimates for Puerto Rico: Census Interpolated vs. PRCS



PUT THE TWO TOGETHER: PPH

Inflated persons + deflated households = really inflated PPH

Persons Per Household Estimates for Puerto Rico: Census Interpolated vs. PRCS



SOME CONTEXT: ACS' PPH DIFFICULTIES

The “statistical perspective” of ACS weighting (Swanson and Hough, 2010)

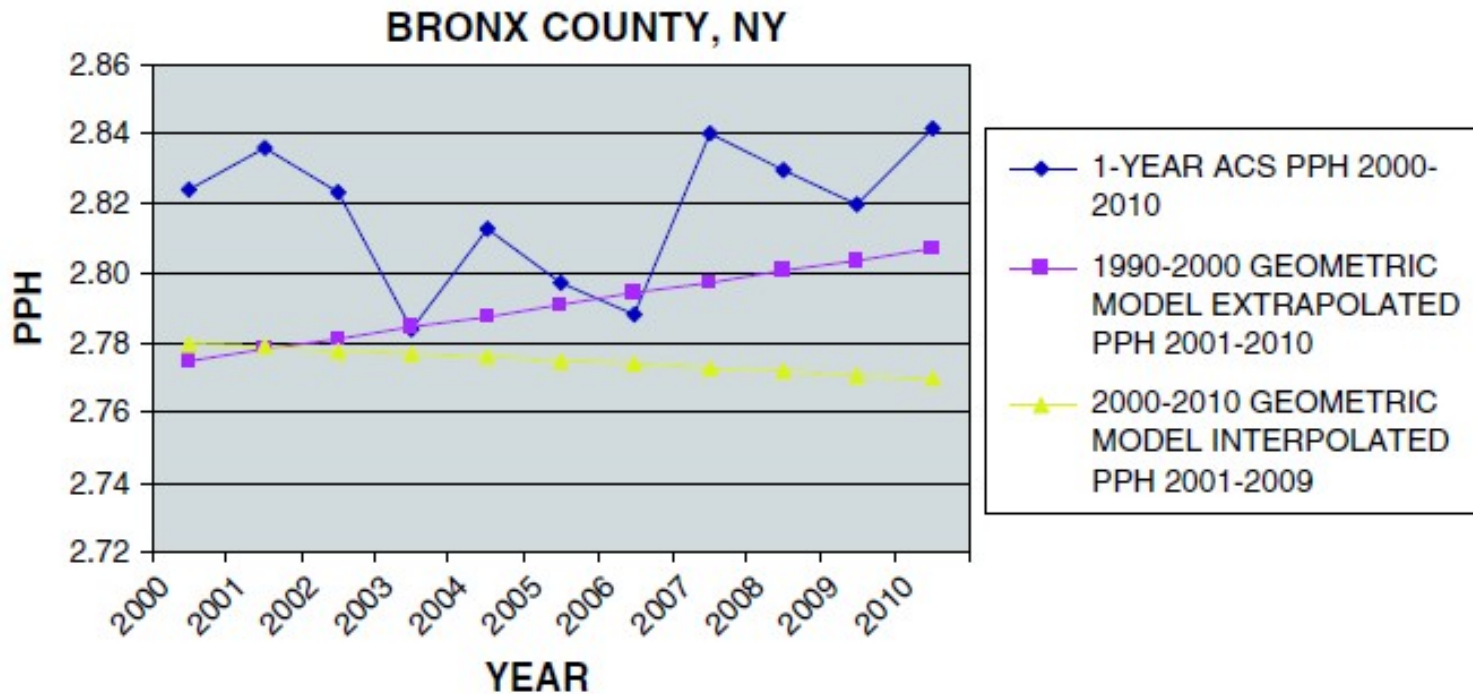


Exhibit 12 Bronx County, NY: 2000–2010 PPH estimates and census PPH values for 2000 and 2010

ARE WE DOOMED TO POOR HOUSEHOLD ESTIMATES FOR PUERTO RICO?

Not so fast...

- What is the PRCS?
 - A household survey with sampling rates stratified by block size
 - Household weights are determined by sampling and non-response rates
- Can we determine PPH if we simply treated the PRCS as a weighted household survey?

PERSONS-PER-HOUSEHOLD

An alternative method

- PPH as a weighted average of Household Size

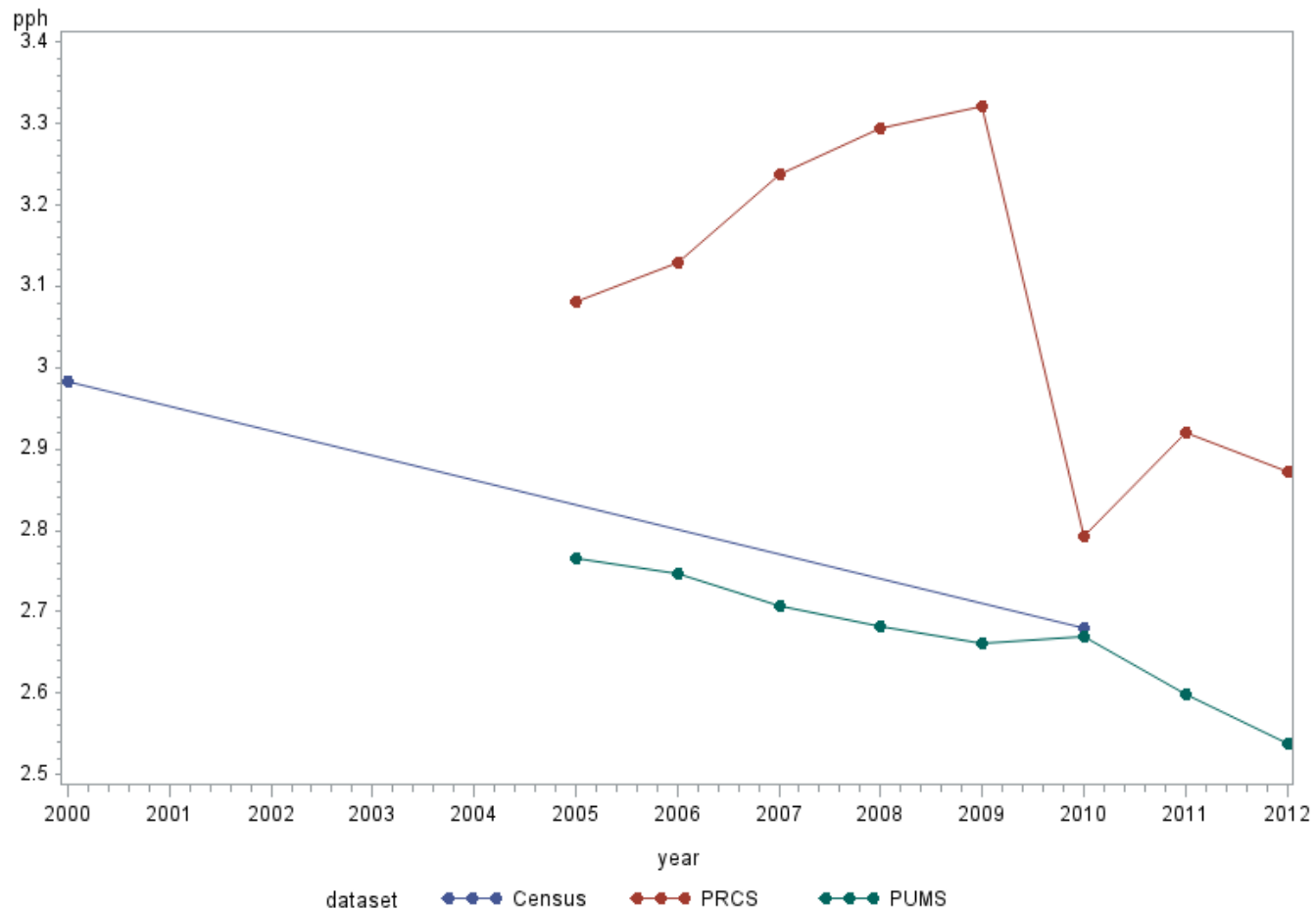
$$PPH = \frac{\sum HHSize_i \times HHWeight_i}{\sum HHWeight_i}$$

...where i = a PRCS-sampled household

RESULTS

“PUMS” method for Puerto Rico: average annual sample size = 12732

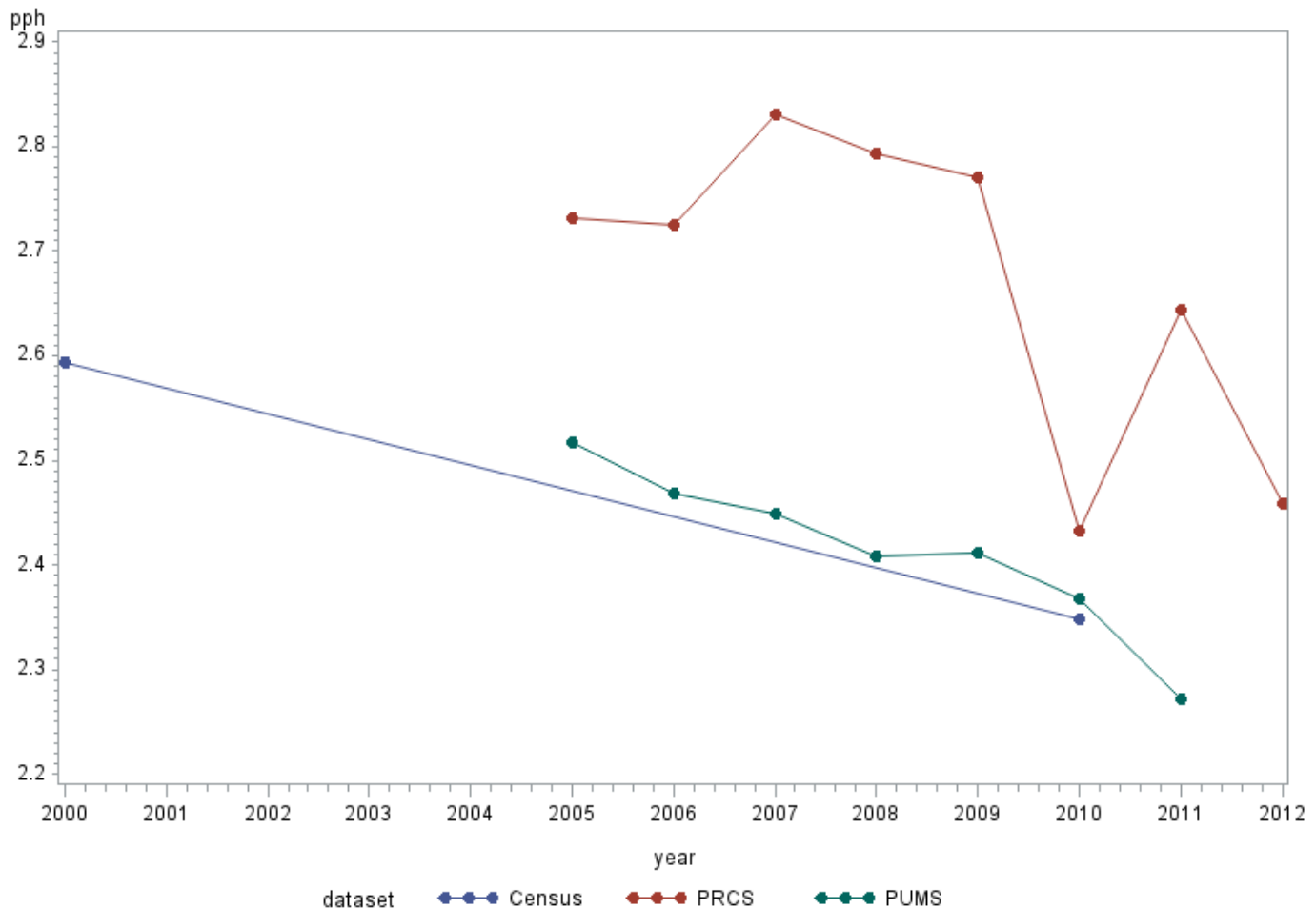
Persons Per Household Estimates for Puerto Rico
PRCS, Census, and Modified PUMS Estimates



WHICH STILL WORKS FOR SMALLER GEOGRAPHIES

San Juan Municipio: average sample size = 1637

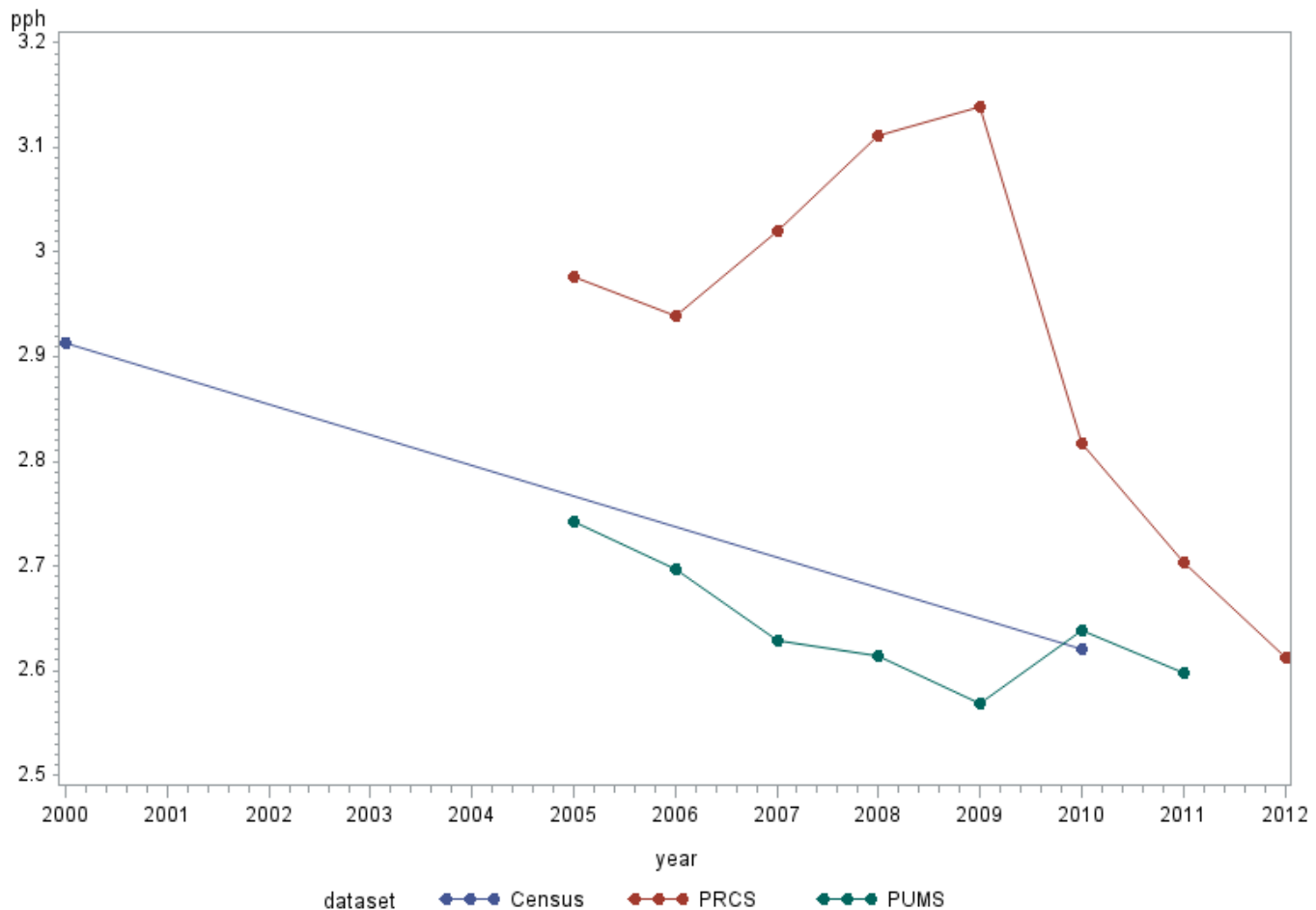
Persons Per Household Estimates for San Juan Municipio
PRCS, Census, and Modified PUMS Estimates



WHICH STILL WORKS FOR SMALLER GEOGRAPHIES

Carolina Municipio: average sample size = 644

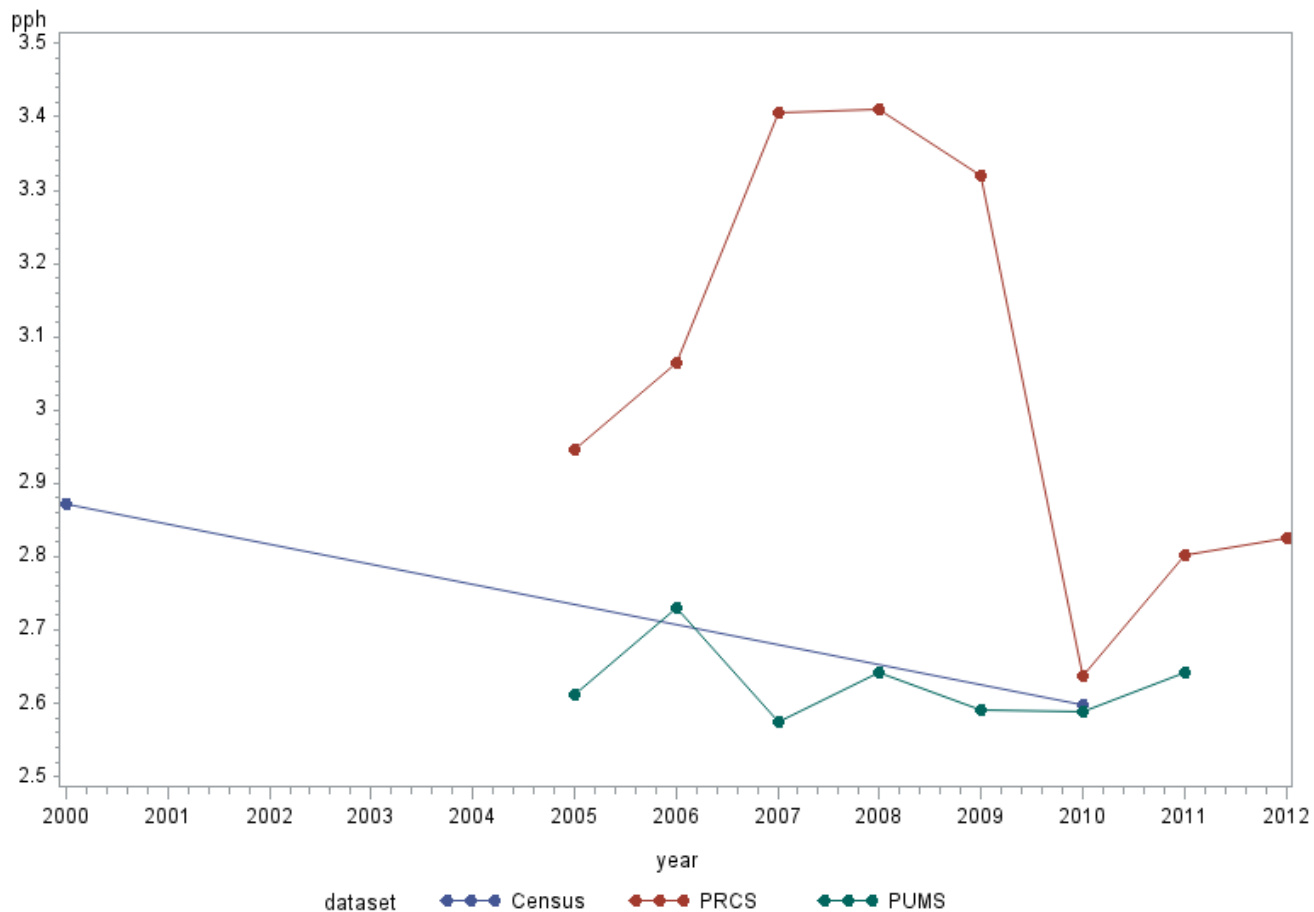
Persons Per Household Estimates for Carolina Municipio
PRCS, Census, and Modified PUMS Estimates



WHICH STILL WORKS FOR SMALLER GEOGRAPHIES

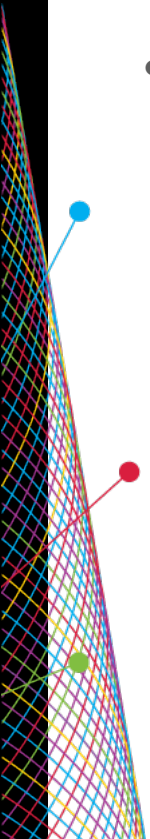
Arecibo Municipio: average sample size = 314

Persons Per Household Estimates for Arecibo Municipio
PRCS, Census, and Modified PUMS Estimates



VIEWING THE PRCS AS A HOUSEHOLD SURVEY

- The alternate PPH method suggests that, controls and weighted counts notwithstanding, the PRCS may still produce good household % distributions.
- ...which begs the question: How does the PRCS perform in estimating other household distributions?



ALLOW ME TO OPEN UP A CAN OF WORMS

Let us consider highly mobile populations

- A Decennial Census captures household members that “live or sleep [here] most of the time”, whereas the ACS captures “everyone who is living or staying [here] for more than 2 months”
- The ACS is closer to a snapshot-in-time
- Thus... the ACS may be more sensitive to mobile populations

Census

The Census must count every person living in the United States on April 1, 2010.

Before you answer Question 1, count the people living in this house, apartment, or mobile home using our guidelines.

- Count all people, including babies, who live and sleep here most of the time.

ACS

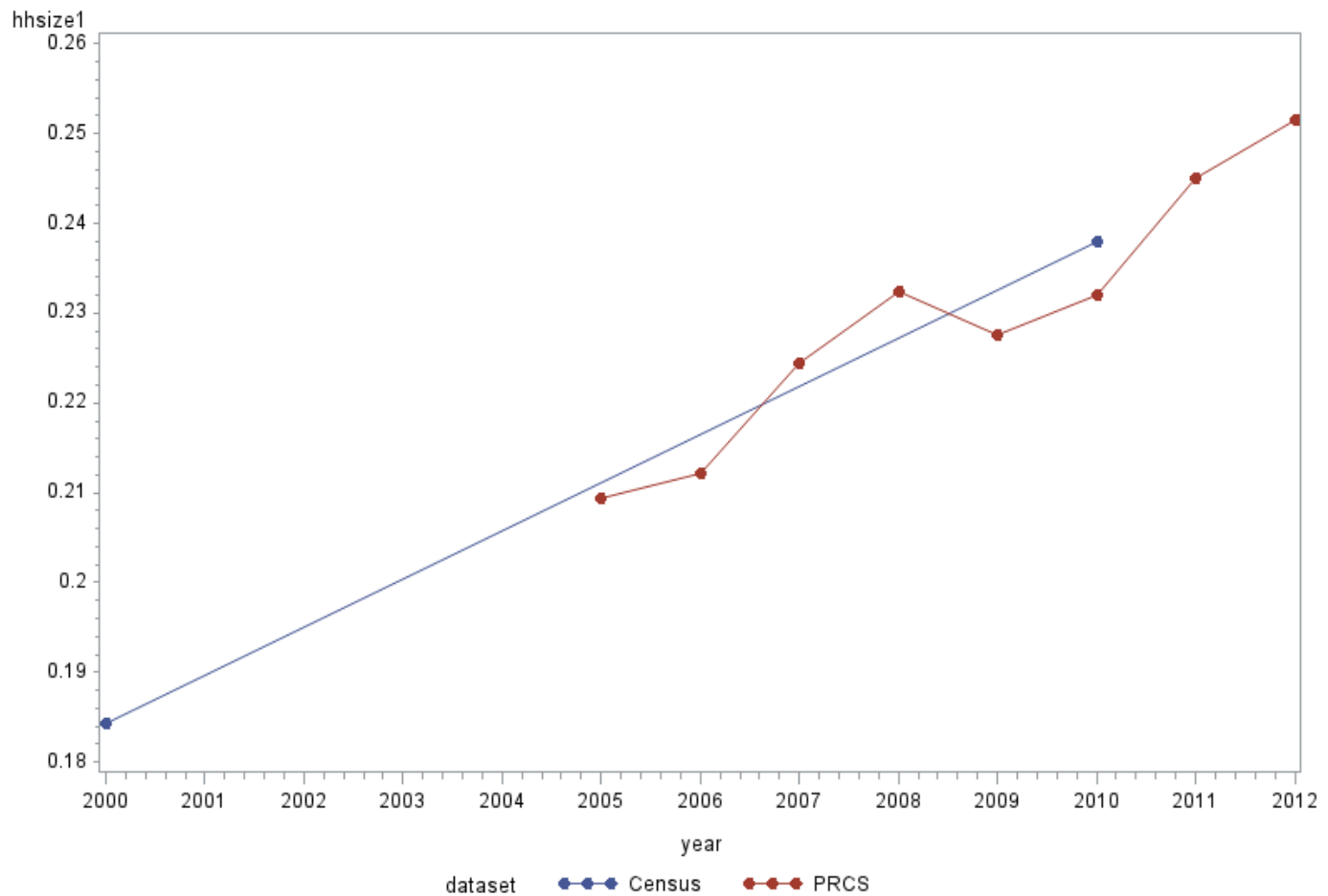
How many people are living or staying at this address?

- **INCLUDE** everyone who is living or staying here for more than 2 months.
- **INCLUDE** yourself if you are living here for more than 2 months.
- **INCLUDE** anyone else staying here who does not have another place to stay, even if they are here for 2 months or less.
- **DO NOT INCLUDE** anyone who is living somewhere else for more than 2 months, such as a college student living away or someone in the Armed Forces on deployment.

HOUSEHOLD SIZE 1: BINGO

...which is presumably a more stable household size

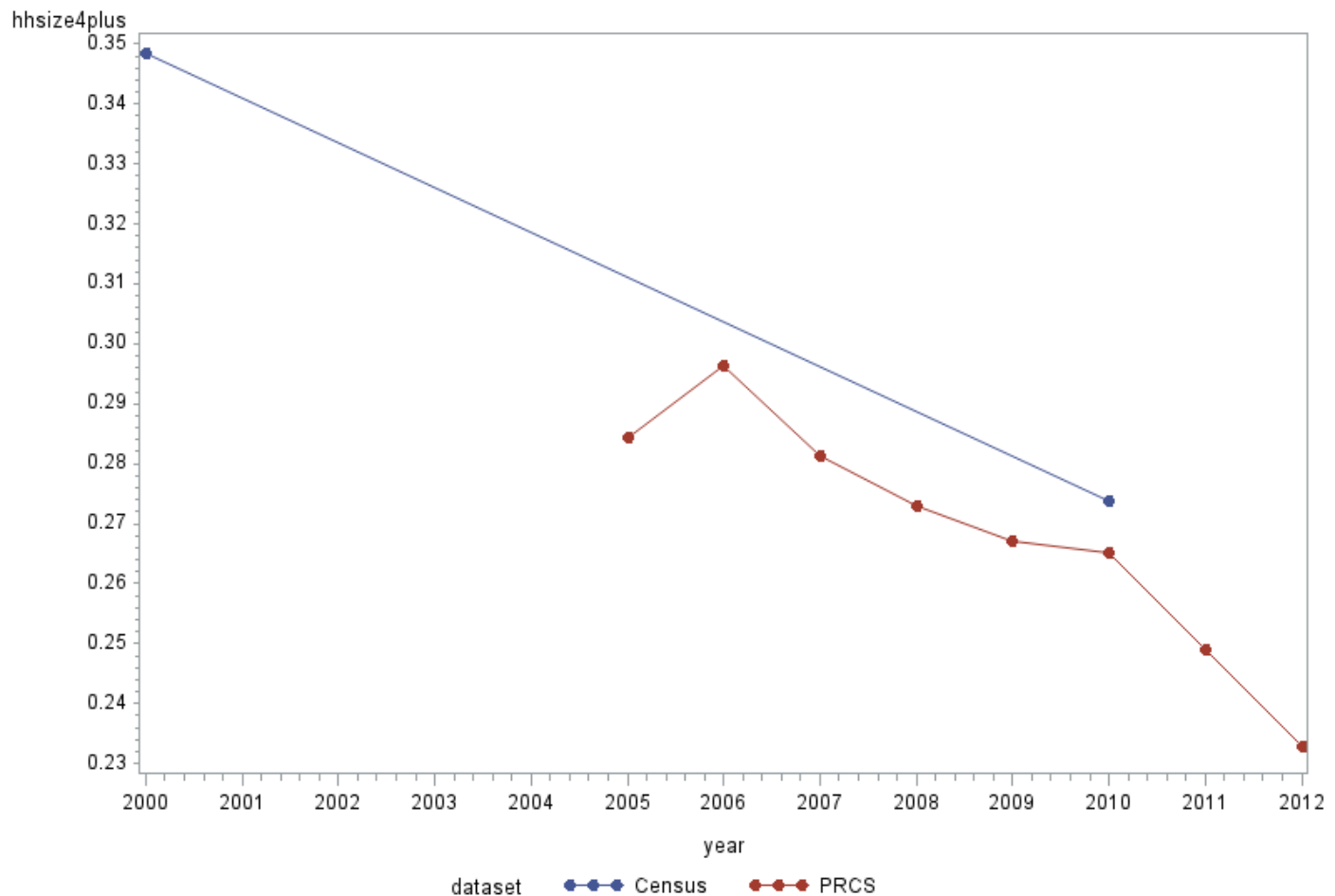
HHSize 1 Estimates for Puerto Rico
PRCS, Census, and Modified PUMS Estimates



HOUSEHOLD SIZE 4+: UNDERESTIMATE

...presumably has more workers “abroad”

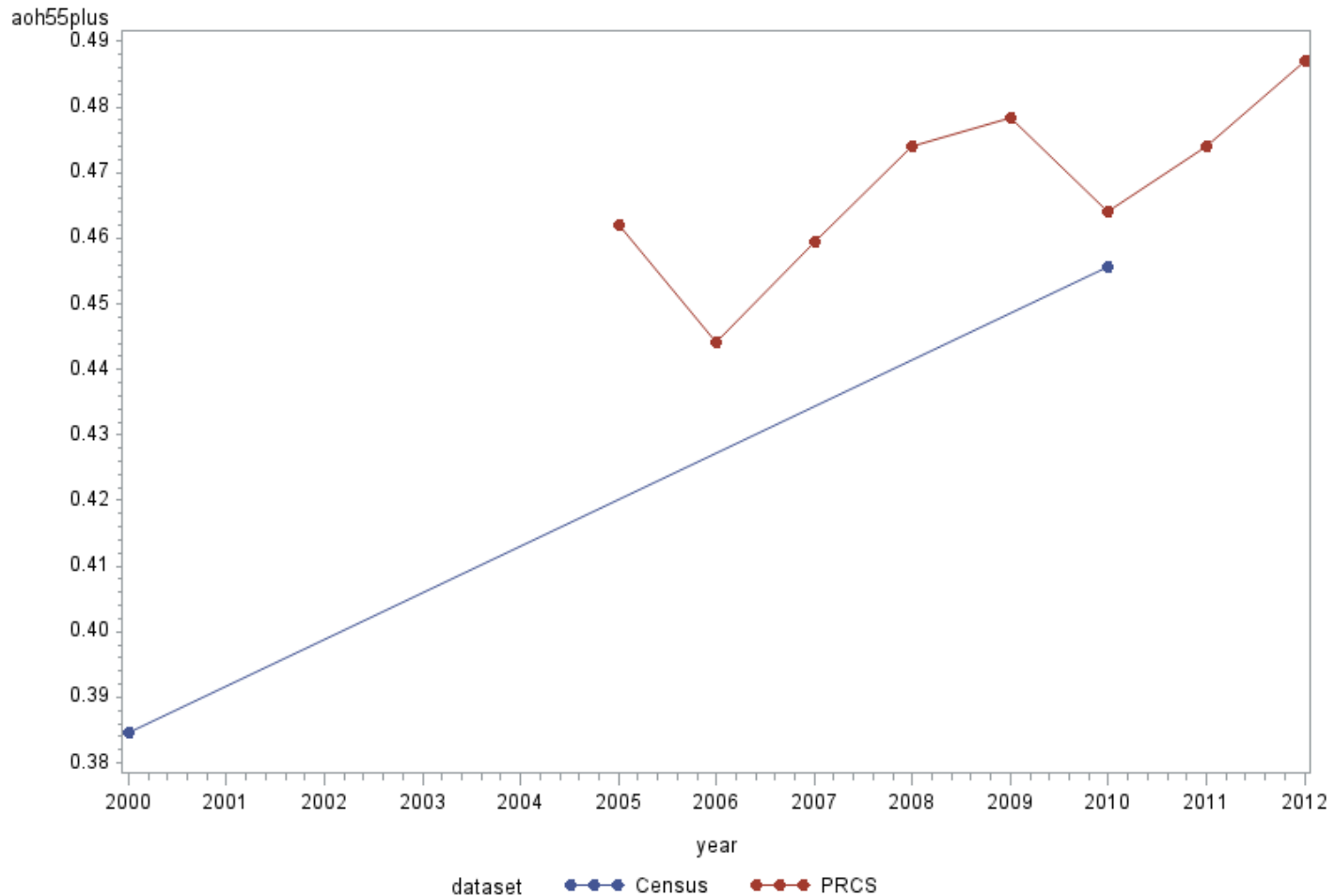
HHSize 4 Plus for Puerto Rico
PRCS, Census, and Modified PUMS Estimates



AGE OF HOUSEHOLDER 55+: OVERESTIMATE

...presumably has fewer workers “abroad”

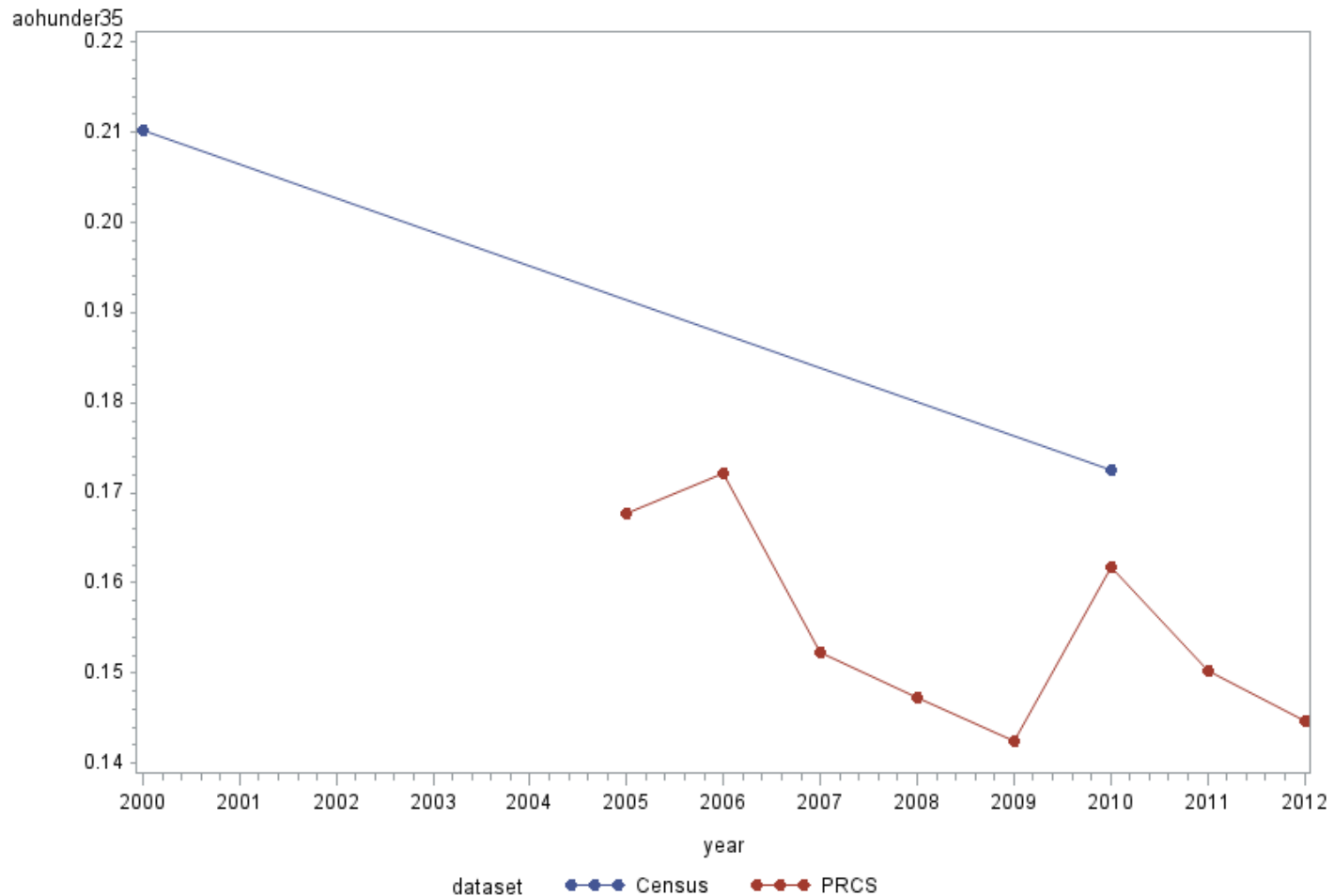
Age of Household 55 Plus Estimates for Puerto Rico
PRCS, Census, and Modified PUMS Estimates



AGE OF HOUSEHOLDER < 35: UNDERESTIMATE

...presumably has more workers “abroad”

Age of Household <35 Estimates for Puerto Rico
PRCS, Census, and Modified PUMS Estimates



CONCLUSIONS

- Persons-Per-Household estimates can be computed by using a weighted average of household size using the PRCS
- The PRCS can still produce relatively accurate household characteristic distributions.
- **HOWEVER**, differences exist between the PRCS and the Decennial Census (i.e. The PRCS is sensitive to mobile populations).

TAKING IT A STEP FURTHER

- The PRCS (ACS?) may be leveraged to assist with Household estimates
 - In a world of dramatically-limited budgets, are there other uses of the PRCS/ACS for assisting the Census Bureau?
- The Master Address File remains to be of high importance
- The utility of the “statistical perspective” of household weighting continues to be open to debate (Swanson and Hough 2010)
- The ACS as a surrogate for the “long form” may require greater consideration to the differences between the ACS and Decennial Census
- Side note: the weighted household size method of estimating PPH does not perform as well for the continental U.S.
 - More research is needed to determine why
 - My guess: overweighting of the ACS

THANKS!

