Household Estimates Conundrum

Effort to Develop More Consistent Household Estimates Across Surveys

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The views expressed in this paper are solely attributable to the authors and do not necessarily reflect the position of the United States Census Bureau.

Outline of Presentation

- Importance of household concept to both population and housing statistics
- Conundrum posed by inconsistent household estimates
- Possible sources of inconsistency
- Research to address main source of differences – estimation
- Additional research that must be done

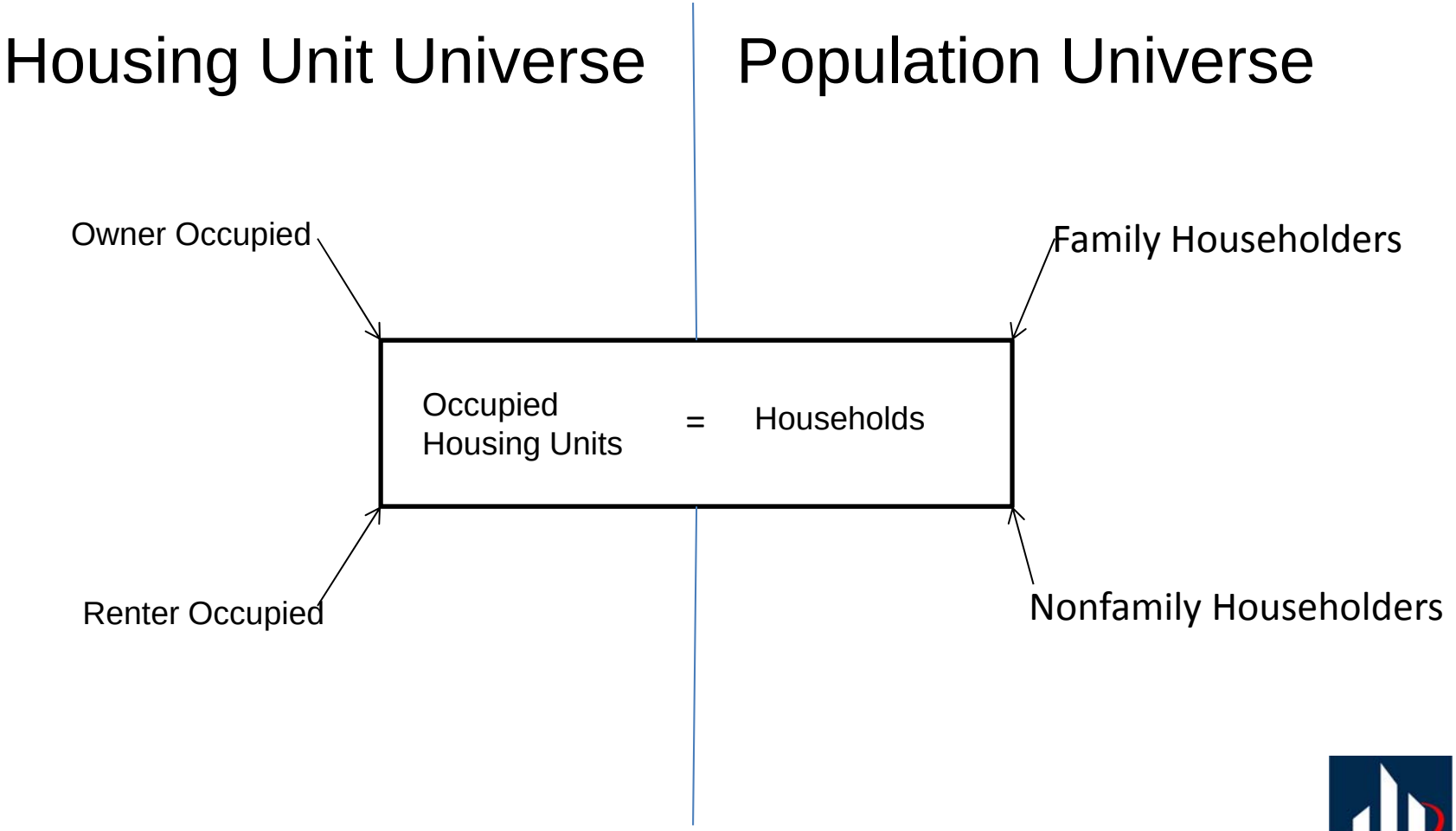
What Is a Household?

Defined consistently across surveys:

"A household includes all of the people who occupy a housing unit."

Households can contain families, one person, only unrelated individuals, or combinations of families and unrelated individuals

Important First Concept



The Conundrum

- Definition of a household same across household surveys and the decennial census

BUT

- Household estimates differ, sometimes substantially, across surveys

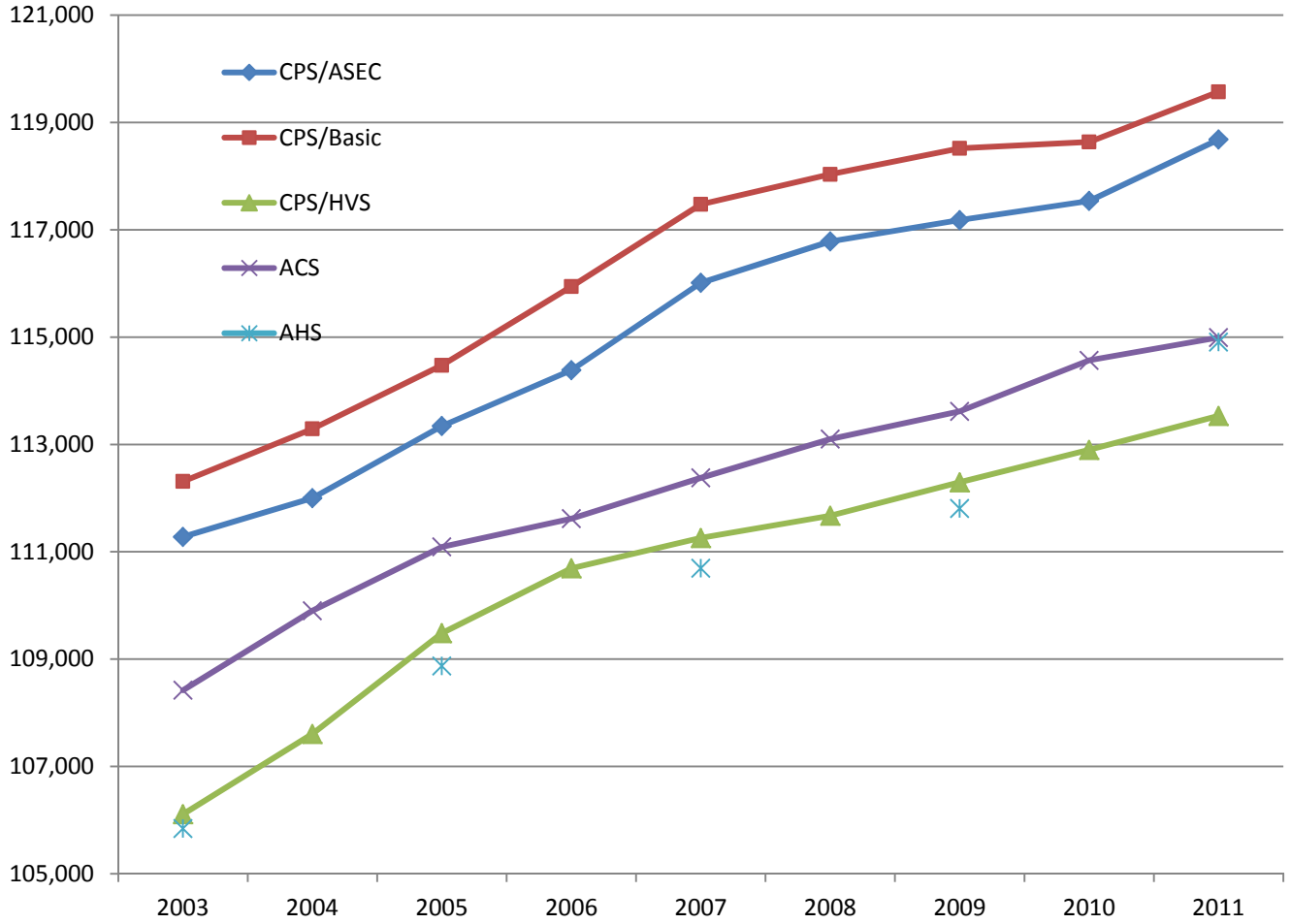
AND

- Sometimes estimates are not always consistent within same survey

Brief Description of Household Surveys Used in this Paper

- **Basic CPS –** Monthly labor force survey with occasional supplements (e.g., fertility, school enrollment)
- **CPS/ASEC** – Current Population Survey Annual Social and Economic Supplement – conducted over a 3-month period – produces key income and poverty data as well as household and family estimates
- **CPS/HVS** – Current Population Survey Housing Vacancy Survey – conducted each month with results based on quarterly averages – produces economic indicator data on housing vacancy
- **ACS** – American Community Survey – conducted continuously with results presented on an annual basis
- **AHS** – American Housing Survey – conducted in odd-numbered years

Data Shown Graphically from Table 1 of Paper



What Is the Source of These Differences?

- Estimation
- Sample Frame
- Operational

Estimation

- Interdivisional working group (early 2000's) – looked at use of housing unit controls instead of population controls for CPS Housing Vacancy Survey
- Key finding – weight adjustment using population controls (by age, sex, race, and Hispanic origin) tend to produce higher estimates of households (occupied housing units) than weight adjustment using housing unit controls

Example of Impact of Using Housing Unit Controls vs Population Controls

Comparison of CPS Housing Vacancy Survey Estimates Based on Population-Based vs Housing-Based Weights

(Numbers in thousands)

	2002 - Housing Based	2002 – Pop Based
Total Housing	**119,297**	**123,318**
Occupied	**104,965**	**108,539**
Vacant	**14,332**	**14,779**

Problem Posed by Use of Housing Unit Controls for CPS/HVS

- Provides differing estimates of households for the same survey (CPS/HVS (housing unit based) vs CPS/ASEC (population based))
- Two other household surveys have dealt with this problem
  - New York City Housing and Vacancy Survey
  - American Community Survey

Sample Frame Differences

- Know from research on differences between 2010 ACS 1-year estimates and 2010 Census – both based on Master Address File (MAF) but different versions
- CPS – current sample based on 2000 census results and updates from new construction
- American Housing Survey – longitudinal survey 1985 sample based originally on 1980 census and updated for new construction
- All of these surveys will be based on the MAF within the next two years

Operational Differences

- Different methods of identifying occupancy status
  - ACS method vs CPS/HVS and AHS

- Possible different application of rules by field representatives for identifying occupancy status

Addressing Estimation Issues: Focus on Basic CPS Weighting Procedure

- Current stages of CPS weighting
  1. Non-interview Adjustment
  2. First Stage Ratio Adjustment (Adjustment to Persons in Non-Self Representing PSU's)
  3. National Coverage Adjustment (Ratio Adjustment to Population Controls for Race/Age/Sex Classifications)
  4. State Coverage Adjustment (Ratio Adjustment to Population Controls for State/ Black, Non-Black/ Age Classifications)
  5. Second Stage Raking Ratio Adjustment (3-Way Raking to Pop Controls for State/Ethnicity/Race)
  6. Composite Weighting (Rakes weights to sum to composite estimates)
- Note that there is no use of housing unit controls in current CPS weighting

Current Research on Basic CPS Estimation: Assumptions and Initial Determinations

- Total housing unit controls are created by the U.S. Census Bureau's Population Division
- The number of occupied housing units is unknown and must be estimated
- By definition, there can only be one householder per household i.e., Households = Householders
- Current research indicates:
  - If we benchmark to housing controls in an early stage of weighting, the adjustment gets washed out by population controls in later stages.
  - If we benchmark to housing controls after population controls, we obtain HU estimates more consistent with HVS, but causes benchmarks to population control constraints to fall out of kilter.
- It is important that we constrain to pop controls and housing controls at the same time.

Current Research on Basic CPS Estimation: Initial Approach

- New Idea: Include New Weighting Step and Revised Second Stage
  - Keep steps 1-4 of basic CPS estimation procedure
  - Create estimate of occupied housing units (householders) using survey results applied to housing unit controls
  - Create estimate of "non-householders" by subtracting the new estimate of householders from population controls
  - New Second Stage Ratio Adjustment (Revised Step 5)
    - Rake householders to a margin containing the estimate of the number of householders from previous step
    - Rake residual of the population to the estimate of non-householders from previous stage.
    - Other margins from current weighting procedure remain intact.
- This procedure will give estimates of number of households more consistent for HVS and ASEC, but research must be done on the impact on statistics produced from these surveys

Next Stage of Research

- Include family equalization into estimation procedure
- Investigate impact of adjusting the householder's and non-householder's weights to achieve goal
  - "Basic" CPS – labor force estimates
  - CPS/ASEC:
    - Number of households
    - Household income
    - Poverty rate
  - CPS/HVS:
    - Rental Vacancy Rate
    - Homeowner Vacancy Rate
    - Homeownership Rate

- Work with sponsors, especially BLS, and other stakeholders to assess these impacts

Additional Research

- Compare methodology chosen with those used for the ACS and NYCHVS and develop feasibility of developing a common methodology
- Apply this same methodology to the Survey of Income and Program Participation (SIPP) and assess impact of methodology on key statistics produced by SIPP
- Ensure field procedures to identify occupancy status are consistently applied across surveys

Conclusion

- Successful implementation of new estimation methodology for CPS will address core issue of the conundrum
- Much more work to be done

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