Impact of Methodological Changes on Estimates of Childlessness from the 2012 and 2014 Current Population Survey (CPS) Fertility Supplements

Lindsay M. Monte
U.S. Census Bureau

April 7, 2015

SEHSD Working Paper 2015-04

CORRESPONDENCE TO:
Lindsay M. Monte
Fertility and Family Statistics Branch
U.S. Census Bureau
4600 Silver Hill Road
Washington D.C.
(301) 763-2416
lindsay.m.monte@census.gov

ABSTRACT: The June 2012 Current Population Survey (CPS) Fertility Supplement data showed a significant decrease from 2010 in the percent of childless women aged 35 to 44. However, due to numerous changes in data and data processing, it is reasonable to think that some of the apparent changes shown in the data may be artifacts of changes in measurement, not an indication of an actual demographic shift. In this paper, I explore the changes in childlessness seen in CPS fertility supplement data, focusing particularly on changes between 2008 and 2014, in order to discern to what extent recent methodological changes affected our reported rates of childlessness.

INTRODUCTION

Every two years, the Current Population Survey's June interview includes a Fertility Supplement, administered to adult women of childbearing age.[1] The June 2012 Current Population Survey (CPS) Fertility Supplement data showed a significant decrease from 2010 in the percent of women aged 35 to 44 who are childless (see Figure 1).[2,3] However, due to numerous changes in data and data processing, it is reasonable to think that some of the apparent changes shown in the data may be artifacts of changes in measurement, not an indication of an actual demographic shift. In this paper, I explore the changes in childlessness seen in CPS fertility supplement data from 2000 to 2014, focusing particularly on changes between 2008 and 2014, in an effort to discern to what extent recent methodological changes affected our reported rates of childlessness.

ABOUT THE DATA

The CPS Fertility Supplement includes between one and four questions, depending on whether a woman has had children, and in what year she was interviewed.[4] The question used to assess childlessness ("Altogether, how many children have you ever given birth to?") has been unchanged in the CPS since 1976. However, the remaining questions were revised in 2012 to focus on women's first birth, instead of last birth, in an effort to reduce redundancy with the data collected in the American Community Survey (ACS).[5] Additionally, the universe was expanded to include women aged 15 to 50 as the ACS does, instead of women 15 to 44, as the CPS had done previously.

[1] Prior to 2012, this included women aged 15 to 44. However, in 2012, the CPS universe was expanded to include women aged 15 to 50.
[2] All comparative statements in this paper have undergone statistical testing, and, unless otherwise noted, all comparisons are statistically significant at the 5 percent significance level.
[3] Readers should note that the y-axes of Figures 1, 2, and 3 range from 14 to 32 percent. The differences from year to year, while often statistically significant, are often no more than a percentage point and would be difficult to distinguish if the y-axis were to cross at zero.
[4] Questions have been added and dropped across the life of the CPS.
[5] The ACS asks women if they have had birth in the past year.

Along with the new questions and expanded sample, the edit process was overhauled in 2012. In the process of updating the edits, additional steps were added to the edit process used in 2012 and 2014 in order to incorporate available information from the household roster. That is, although information about coresident biological children had been available in the CPS in both the 2008 and 2010 supplements, previous edits did not check the fertility data against information about biological children listed on the household roster.[6]

The 2012 data also utilized updated weights. Weights for the CPS Fertility Supplement data from 2002 to 2010 were based on population estimates that used Census 2000 as a base. However, in 2012 and 2014, the weighting scheme was updated to use the 2010 Census as a base. The 2010 Census revealed a larger Hispanic population than had been seen in the population estimates based on Census 2000. As Hispanic women are less likely to be childless (Monte and Ellis, 2014), it may be that the new 2010-based weights contributed to the apparent drop in childlessness.

Another factor which may have contributed to the observed change in childlessness is non-response and resulting allocation.[7] In this analysis, I explore the extent to which all of these factors - disparities in allocation rates, changes to the weights, and changes to the edit (including accounting for coresident biological children) - account for the observed drop in childlessness between 2010 and 2012.

EDIT CHANGES

The primary change to the edit that might have affected childlessness estimates is the utilization of information from the household rosters both to allocate data in cases of non-response, and to validate responses. Figure 2 shows how the inclusion of information about coresident children in 2008 and 2010 might have reduced overall estimates of childlessness (see dotted lines); although this information was available in 2008 and 2010, the edit used on those data did not take advantage of it. When these data are utilized, the differences are minimal, but occasionally important. Although each estimate accounting for coresident children is lower than the published estimates, only the difference for 40 to 44 year olds in 2008 is statistically significant; all other age and year estimates are statistically unchanged

[6] Prior to 2008, the CPS did not collect information on biological relatedness in the household roster portion of the survey. However, in the 2007 CPS core or "Basic" questions (which are asked in each interview), the household relationship questions were expanded to include information on the type of relationship between coresident parents and children. However, the editing procedures used in 2008 and 2010 did not utilize this information.

[7] In CPS data files published by the Census Bureau, missing data are allocated during the editing process. For more information about the imputation process, see http://www.census.gov/cps/methodology/unreported.html.

by the inclusion of information about coresident children. However, the difference between 2010 and 2012 is no longer significant for 35 to 39 year olds when the 2010 estimate accounts for coresident children. This suggests that the perceived "drop" in childlessness for women aged 35 to 39 is actually due to the change in editing procedure.

Similarly, Figure 2 shows how, if the edit had not been updated to account for coresident children in 2012 – that is, if the 2010 edit had been applied to 2012 and 2014 data – the estimates of childlessness would have remained relatively stable (see lighter colored lines). When the 2010 edit is applied to the 2012 data, the difference between estimates of childlessness in 2010 and 2012 is not significant for any age group.[8] In conjunction with the alternate estimates accounting for coresident children in 2008 and 2010, these data together suggest that estimates of childlessness prior to 2012 may have overstated the size of the childless population, due to the fact that the editing process did not reconcile information about coresident biological children with respondent reports within the fertility supplement.

WEIGHTING

In contrast, the change in the weighting scheme does not significantly impact the estimates of childlessness (see Figure 3). The published estimates for 2010 use a weighting scheme based on Census 2000 (and adjusted throughout the decade); in contrast, the estimates in 2012 and 2014 use weights based on Census 2010. However, when weights derived based on Census 2010 are retroactively applied to the CPS 2010 data, the estimates of childlessness do not change for any age group.

Therefore, despite the fact that Census 2010 revealed a much larger Hispanic population in the United States than had previously been estimated, this population adjustment does not appear to impact estimates of childlessness. Although Hispanic women are more likely to be mothers than are women of other racial or ethnic backgrounds (Monte and Ellis, 2014), the growth in the Hispanic population appears to be concentrated among younger women.[9] It is perhaps due to this that the estimates of

[8] The published estimates for women aged 40 to 44 are significantly different in both 2012 and 2014 from the estimates that would have been produced if the 2010 edit had continued to be used. However, for women aged 30 to 34 and 35 to 39, the differences between estimates using the 2010 edit and those using the 2012/2014 edit are not significant.

[9] The Census Bureau's on-line Fertility Tables for 2010 and 2012 demonstrate this difference (see http://www.census.gov/hhes/fertility/data/cps/). Women aged 15 to 24 comprise 17 percent of the sample of Hispanic women in 2010 and 18 percent in 2012. In comparison, women aged 30 to 44 represent 17 percent of the Hispanic population used for fertility estimates in 2010, and 16 percent in 2012.

childlessness among women aged 30 to 44 are unaffected by population changes reflected in the revised weights.

ALLOCATION RATES

Allocation rates for women in each age group examined rose significantly between 2010 and 2012, and then again between 2012 and 2014 (see Figure 4).[10] Despite the increased allocation, however, published estimates and unallocated estimates generally do not differ significantly in 2010, 2012, or 2014.[11]

Moreover, based on the inclusion of information from the household roster about coresident biological children, the increased allocation seems likely to be improving the quality of the data. Figures 5, 6, and 7 show the breakout of the source of responses from 2000 to 2014. These figures show the reduction since 2010 in the percent of data that are unallocated (meaning that the response comes directly from the respondent). The figures additionally show a concomitant increase in the percent of data that are allocated, with distinctions made between allocations based on "hot-decking" (or allocation from a demographically similar woman) and those using logical imputation based on data from the household roster.

However, in 2012 and 2014, the figures also show how allocation of childlessness based on hot-decking was reduced by allocation using data from the household rosters. That is, despite increasing non-response in the Fertility Supplement data after 2010 (as seen in the shrinking 'unallocated' portions), the amount of data that are being allocated from another respondent dropped for all age groups with the introduction of the new edit procedure in 2012.[12] Instead, the use of roster data allows for logical imputation of missing data on children ever born. Given that roster data on the relationships between mothers and children has very low allocation, this means that such imputations are based on respondent-provided data, likely improving the accuracy of estimates of childlessness in the CPS.[13]

[10] Readers should note that the y-axis in Figure 4 ranges from zero to twenty.

[11] The exception here is women aged 40 to 44 in 2014, for whom estimates of childlessness using only unallocated data are significantly higher than the published estimates.

[12] For more information about the imputation and allocation, see http://www.census.gov/cps/methodology/unreported.html.

[13] Less than one percent of eligible respondents have allocated data on a mother/child relationship in either 2008, 2010, or 2012. These relationships are identified by the respondent from the child's perspective, and the data are determined based on responses to multiple questions (i.e., "Who is X's mother?" and "Is X her biological, step, or adopted child?"). The low level of allocation (for each of these questions, and for the combination of these two

CONCLUSION

Taken together, these findings suggest that the drop in childlessness observed in the CPS between 2010 and 2012 is largely due to changes to the editing process, rather than evidence of demographic change. However, these results additionally suggest that the changes to the edits likely improved the accuracy of our estimates by making the editing process more reliant on respondent-provided information, rather than statistical imputation.[14] It appears, therefore, that the "drop" in childlessness may be more due to overestimation of childlessness prior to 2012, rather than failure to capture childless women in 2012 and beyond.

questions) suggests that the vast majority of mother/child relationships identified in the household roster are respondent-reported.

[14] The implied assumption here is that respondents are reliable sources of their own data. Although mis-reporting and data entry errors are known problems in social surveys, research suggests that the majority of respondents do accurately report basic demographic information about themselves (see, for example, Coombs, 1977, or Brackbill, 1974). Although we have no way to benchmark the accuracy of respondent reports in CPS data, it is telling that very little of respondent reported fertility information was changed based on contradictory information reported elsewhere (the amount was around 1 percent for all groups in both 2012 and 2014). Therefore, within the limitations imposed by this analysis, it seems reasonable to suppose that respondent reported information is more likely to accurately reflect individual respondents' circumstances than imputed data.

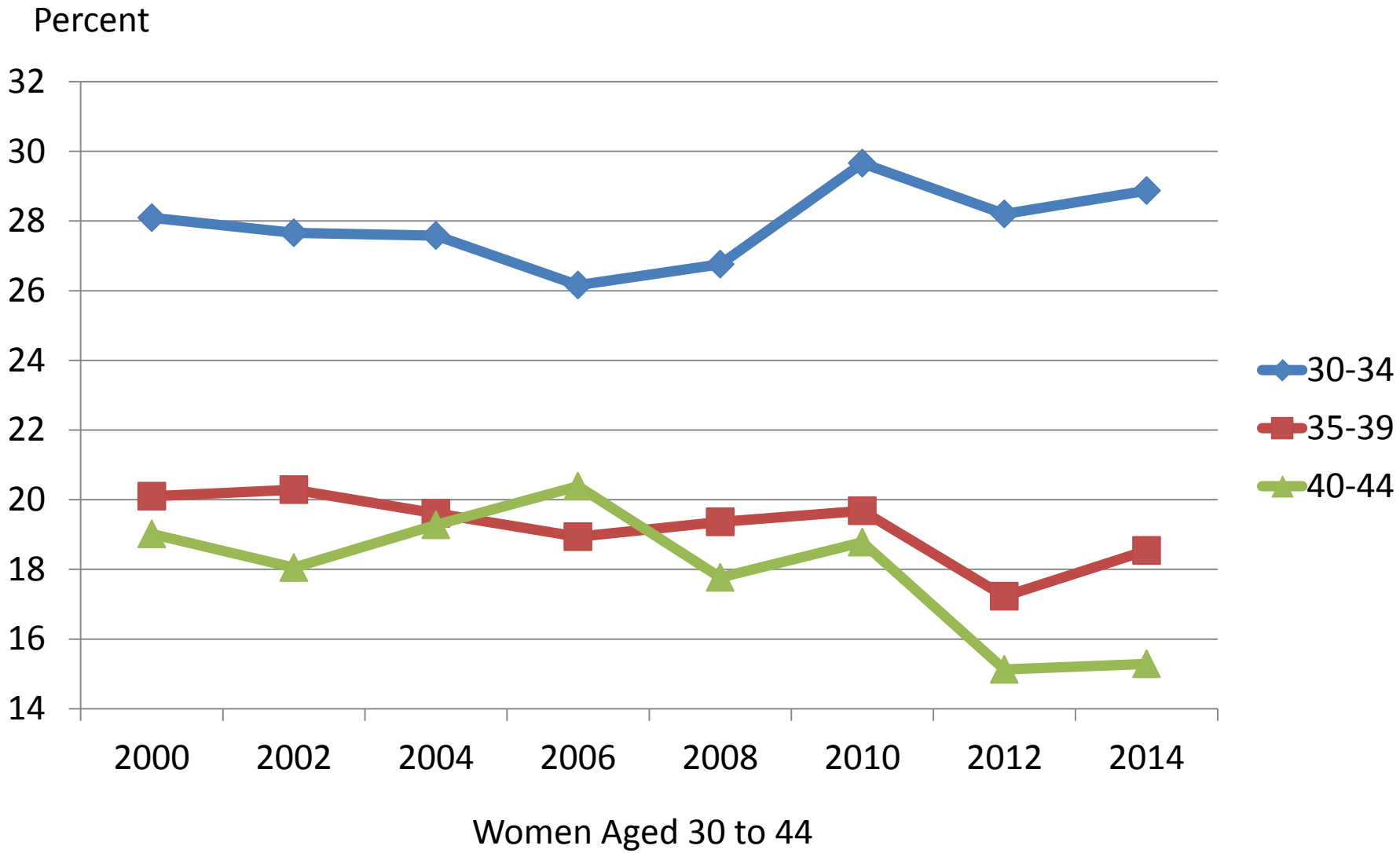
Works Cited

Brackbill, Y. (1974). "Test-Retest Reliability in Population Research." *Studies in Family Planning,* Vol. 5(8), pp. 261-266.

Coombs, L.C. (1977). "Levels of Reliability in Fertility Survey Data." *Studies in Family Planning*, Vol. 8(9), pp. 218-232.

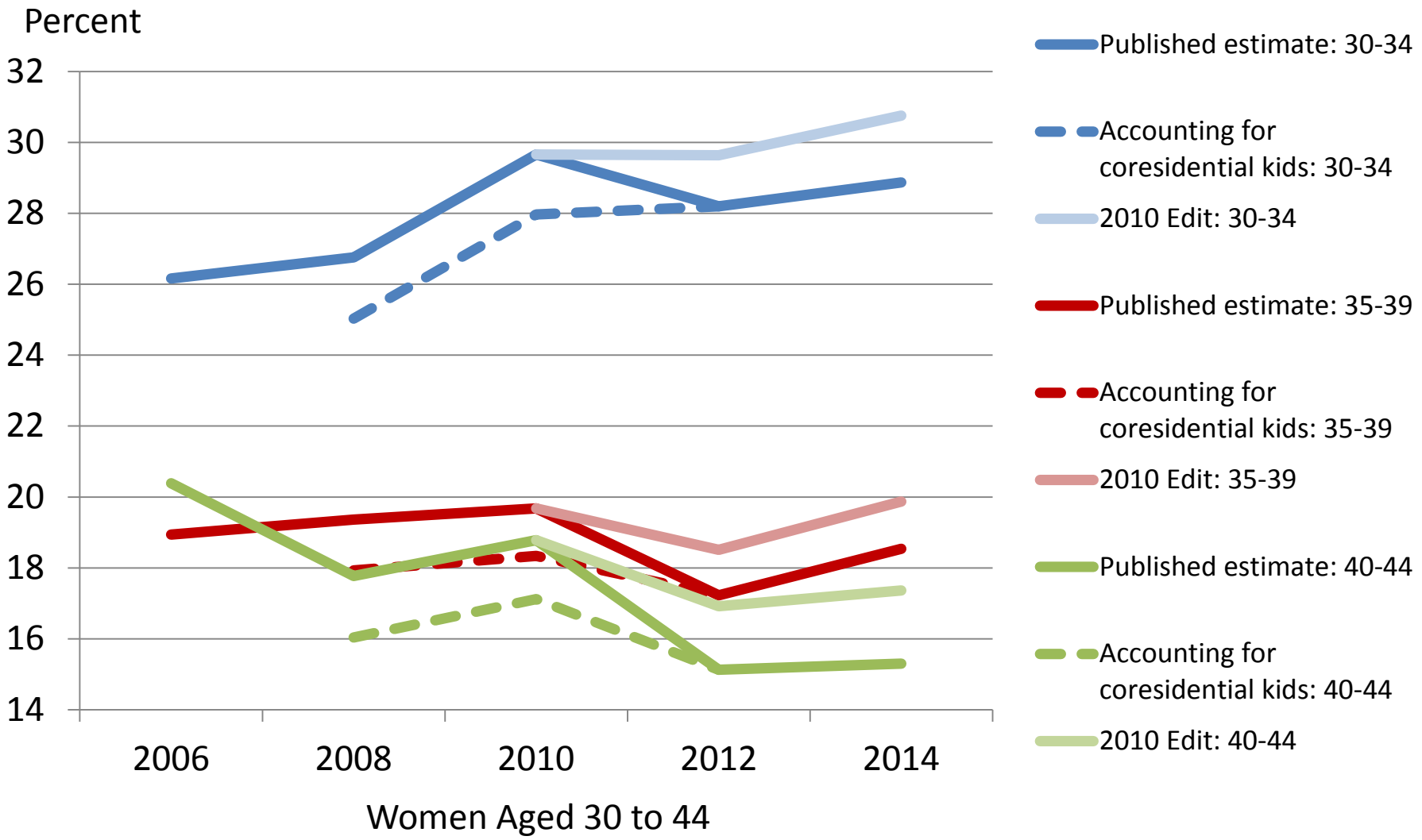
Monte, L.M. and Ellis, R.R. (2014). Fertility of Women in the United States: June 2012. *Current Population Reports*, P20-575, U.S. Census Bureau: Washington, D.C..

FIGURE 1:
Published Estimates of the Percent of Women who are Childless



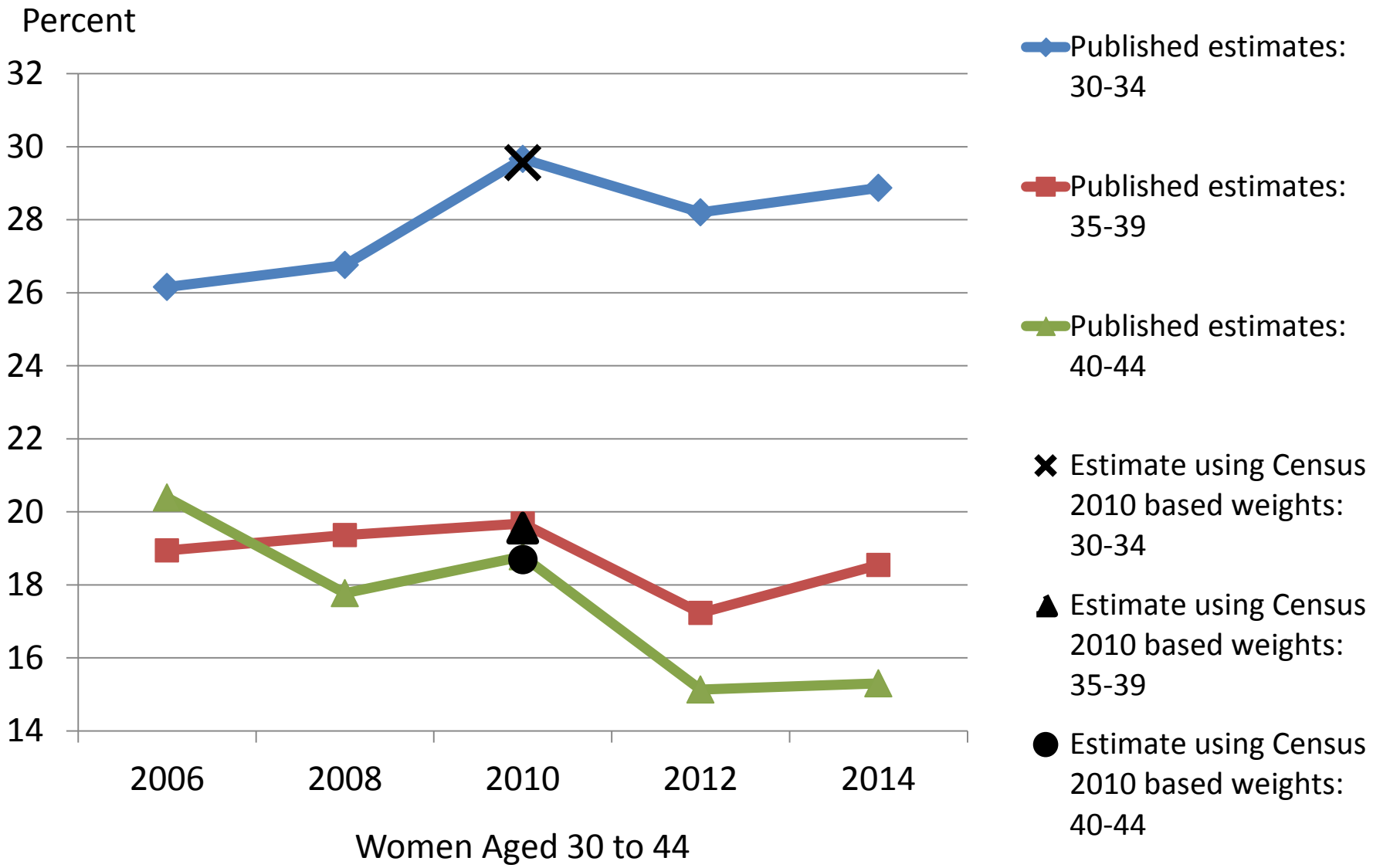
SOURCE: Current Population Survey, 2000-2014

FIGURE 2:
Differences in Estimates of Childlessness Depending on the Edit Process Used



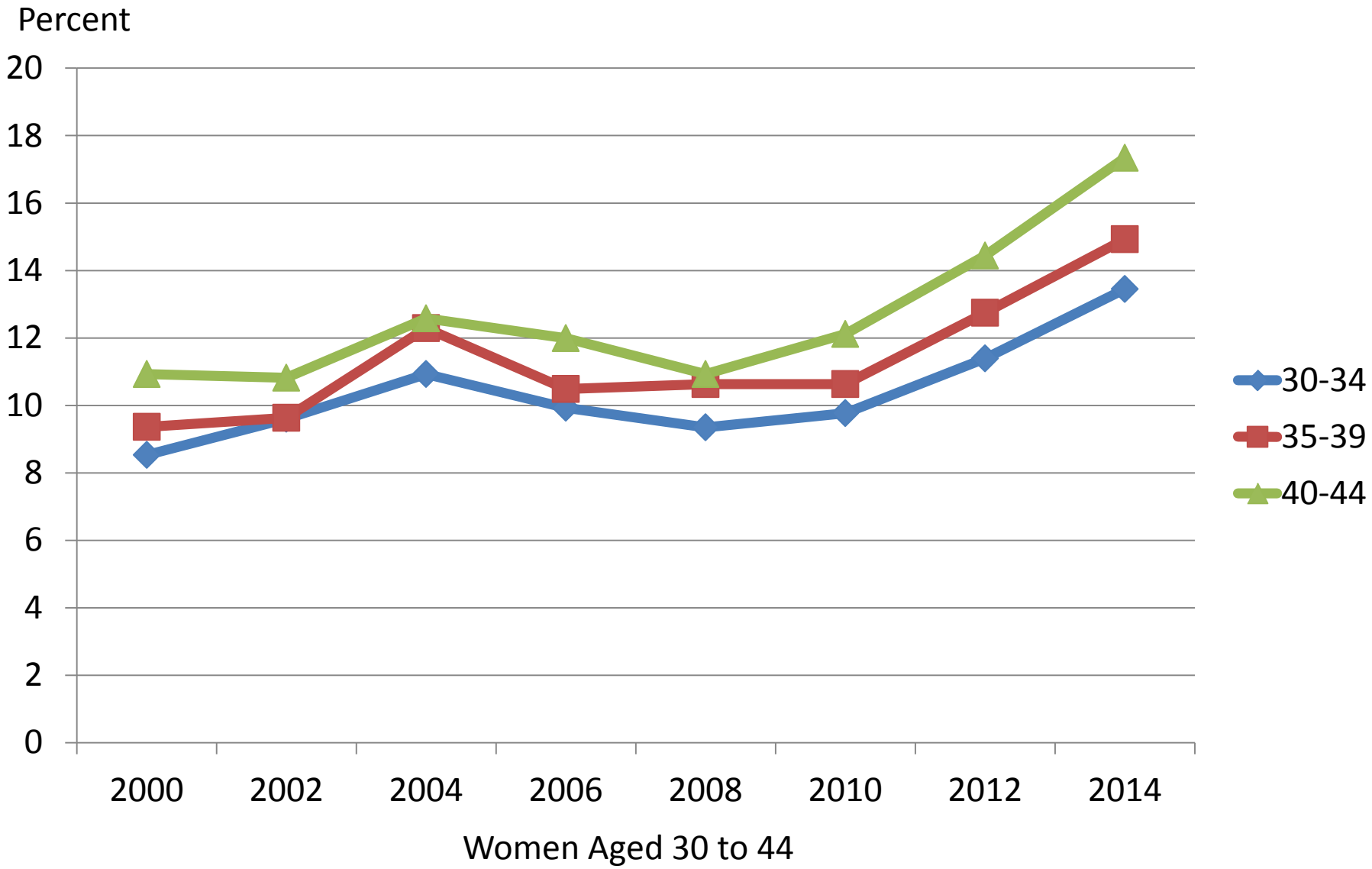
SOURCE: Current Population Survey, 2006-2014

FIGURE 3:
Differences in Estimates of Childlessness by Weighting Scheme



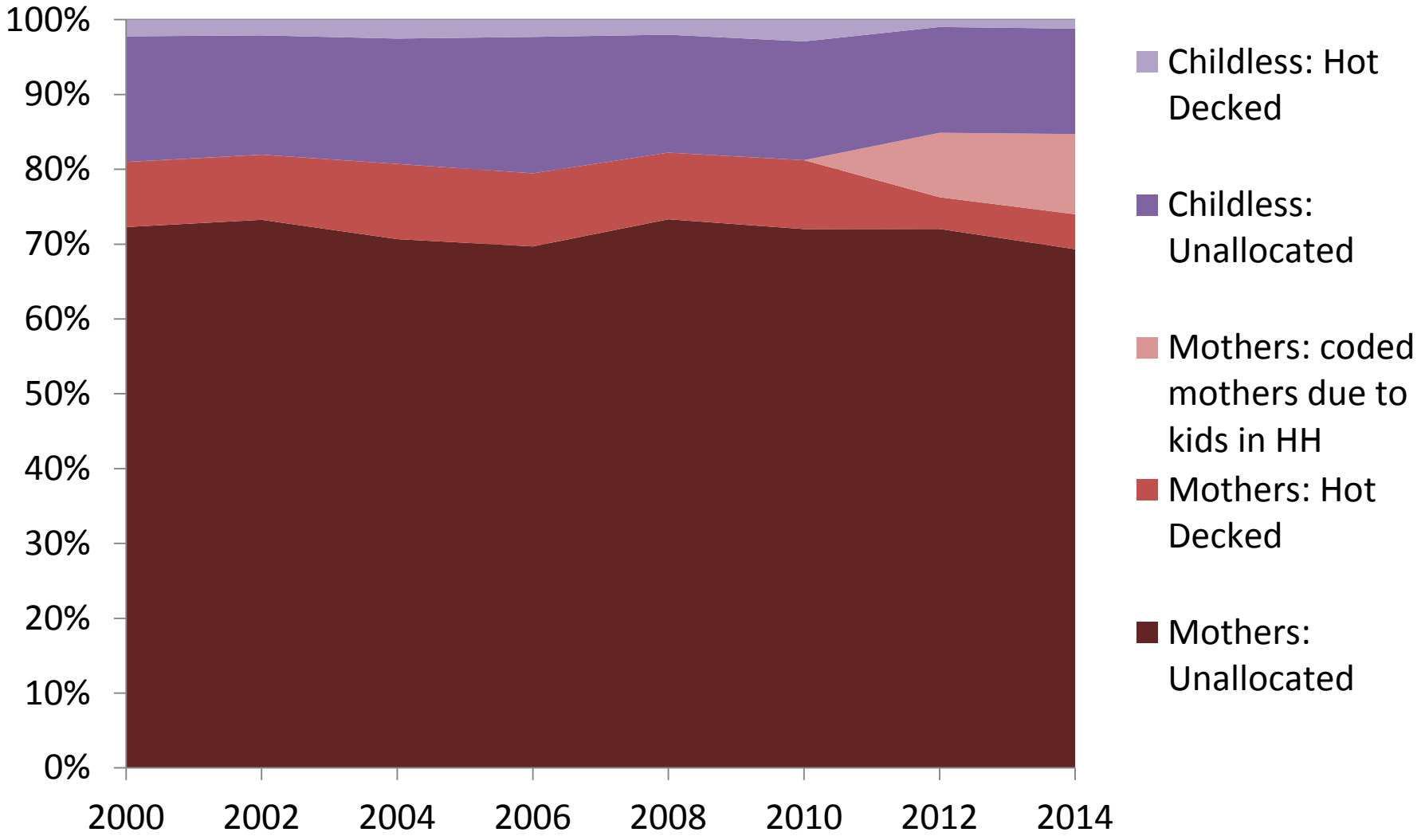
SOURCE: Current Population Survey, 2006-2014

FIGURE 4:
Allocation of Children Ever Born



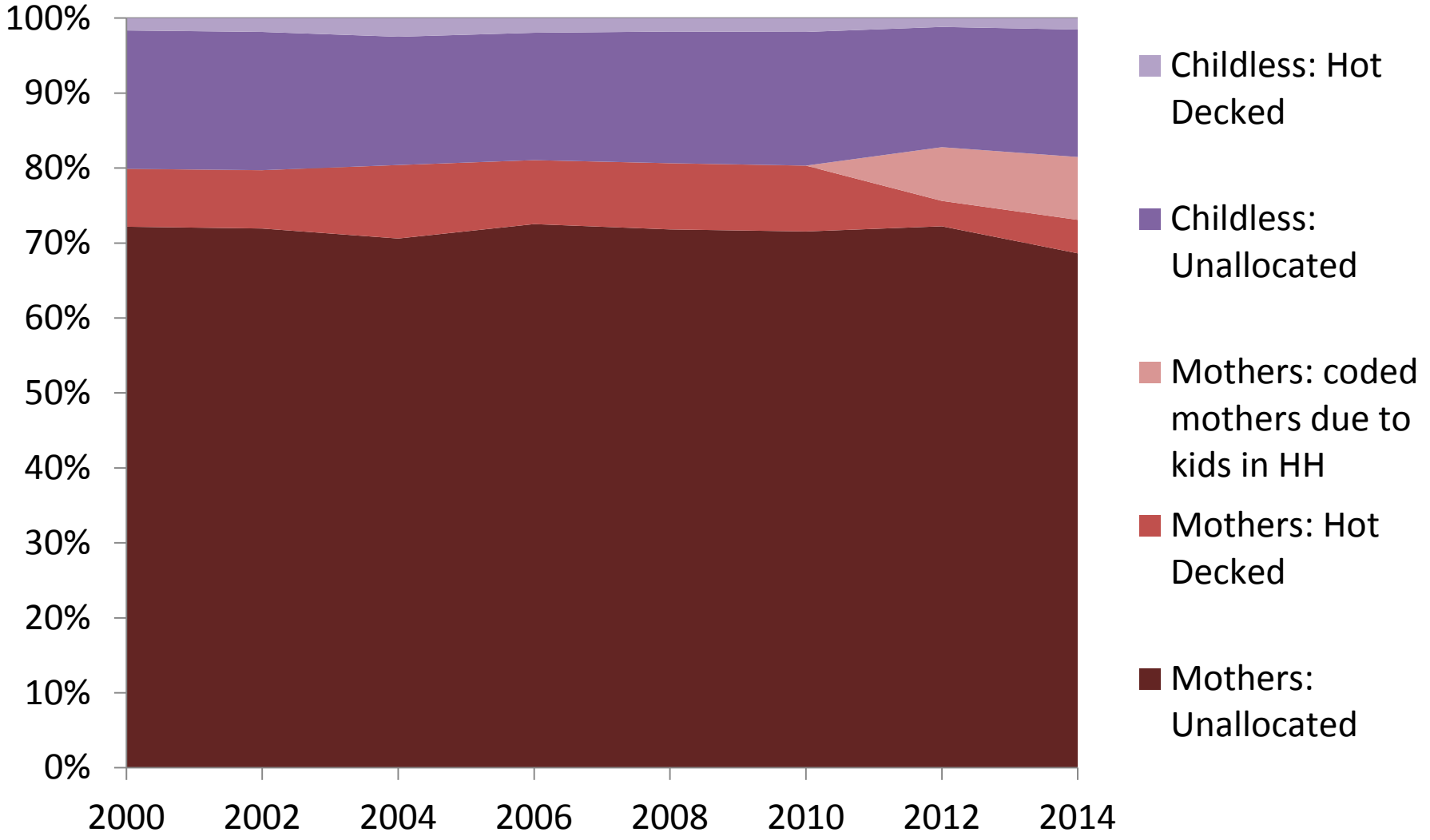
SOURCE: Current Population Survey, 2000-2014

FIGURE 5:
Origin of CPS Fertility Data Over Time, Women aged 40-44



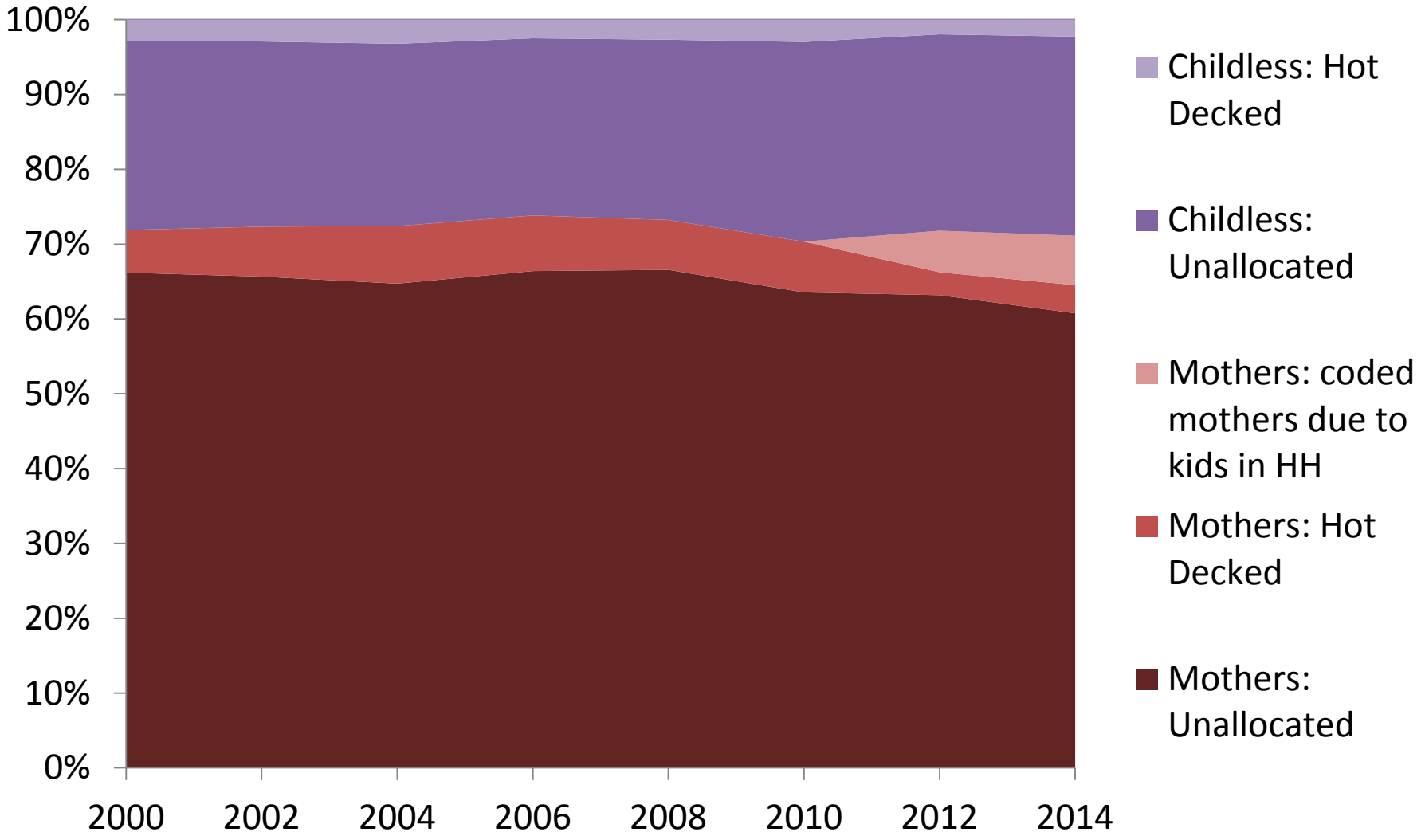
SOURCE: Current Population Survey, 2000-2014

FIGURE 6:
Origin of CPS Fertility Data Over Time, Women aged 35-39



SOURCE: Current Population Survey, 2000-2014

FIGURE 7:
Origin of CPS Fertility Data Over Time, Women aged 30-34



SOURCE: Current Population Survey, 2000-2014