

Changes to be Made for 2021: SPM Thresholds

Thesia I. Garner

(in cooperation with Juan Munoz and Jake Schild)

Division of Price and Index Number Research

Office of Prices and Living Conditions

Bureau of Labor Statistics

AAPAM Annual Conference

November 13, 2020

(Version: November 6, 2020)



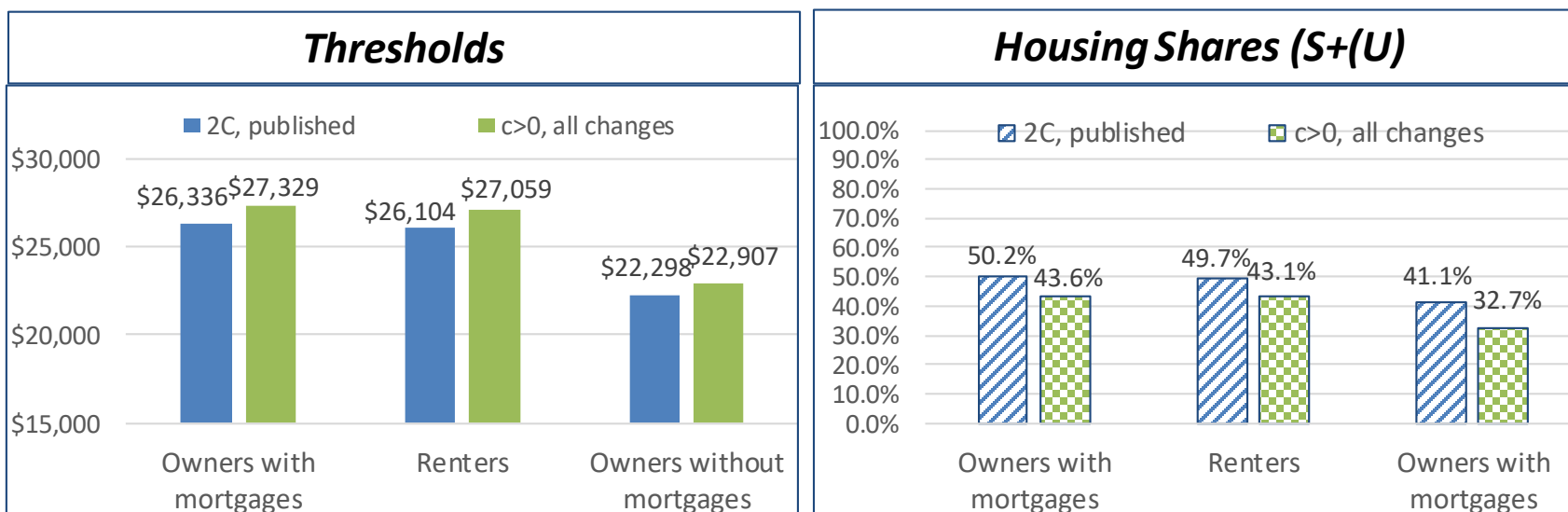
Changes to be Implemented in Production of SPM Thresholds for Reference Unit Composed of 2 Adults with 2 Children (2A+2C)

| Change | Justification |
|---|--|
| Add in-kind benefits to OOP FCSU | Consistency in measurement with resources |
| Expand sample to include CUs with any child (not just those with exactly 2 children) | Represents larger share of the population but with focus on children as a primary beneficiary of poverty programs |
| Percentage of median | Expectation of greater stability around the median and less constrained spending |
| Telephone service separate (not in housing utilities) | Increased cell service expenditures as share of total; impacts (S+U) share of thresholds adjusted for differences in median rents across geographies |
| Add internet | Increased means of communication in addition to telephone |
| Lag by 1 year | CPS ASC data not available in time to produce in-kind benefits for thresholds for most recent year |
| Composite FCSU CPI-U | More reflective of threshold component price changes |

Impact of Combined Changes* on Underlying CE Samples and 2A+2C Thresholds: 2016

| | Estimation Sample | |
|---|------------------------------|-----------------------|
| | CU's with exactly 2 children | CU's with 1+ children |
| Estimation Sample , unweighted observations (percentage of all CU observations for the U.S., weighted and unweighted approx. same) | n = 14,668 (11.3%) | n = 40,623 (31.3%) |

- Of all people living in the US (weighted population): 19.1% in CUs with exactly 2 children; 51.6% in CUs with any children; 48.4% in CUs with no children
- Of CUs with children (weighted CUs): 36.3% have exactly 2 children; 42.7% have exactly 1 child



-Published base on 2C, 5 years of data, data not lagged by 1 year, no in-kind (except for SNAP), telephone in U, no internet;
 *Thresholds with changes based on 33rd percentile rather than a percent of median since percentage selection can be set to obtain the same thresholds (assume relationship between FCSU at "33rd" and "50th" percentiles)

Research to Continue on Changes Not Approved for Thresholds

- Expanding to all consumer units
 - CUs with children spend differently than non-child Cus
 - Concern with equivalence scales
- Restrict to 3 years of CE data (impact of recession vs rapid growth)
- Cost adjust expenditures for (shelter + utilities) at CU-level prior to threshold creation to put FCUS in “national” dollars (current methods: average FCSU expenditures in local area dollars)
- Addition of medical/health care to FCSU
- Replace 20% multiplier with spending on specific categories of goods and services (e.g., personal care and non-work related transportation)
- Use of 12 months of CU data rather than multiple quarterly by 4
- Replace out-of-pocket spending on owner shelter with rental equivalence (consistent with CPI-U and median rent index for geo adjustment)
- Use payments based costs index as opposed to CPI to update 5 years of FCSU quarterly expenditures to threshold year dollars

Contact Information

Thesia I. Garner

Supervisory Research Economist
Division of Price and Index Number Research/
Office of Prices and Living Conditions
<http://stats.bls.gov/pir/spmhome.htm>

202-691-6576

garner.thesia@bls.gov



Supporting Slides



Current Estimation of SPM Thresholds

- At the CU level, convert 5 years of quarterly 2-Child FCSU expenditures to thresholds year dollars using the All Items CPI for all urban consumers (CPI-U), and to 2 adult with 2 children reference unit thresholds using the 3-parameter equivalence scale

$$FCSU_{i,q} = F_{i,q} + C_{i,q} + S_{i,q} + U_{i,q} \qquad FCSU_{i,2016} = \left(\frac{CPI_{2016}}{CPI_{yr}} \right) * FCSU_{i,q} * 4$$

- Rank CUs by equivalized 2A+2C $FCSU_{i,2016}$ expenditures.
- Housing tenure-specific thresholds produced based on means within 30th-36th percentile range (identified as “E”) of $FCSU_{i,2016}$

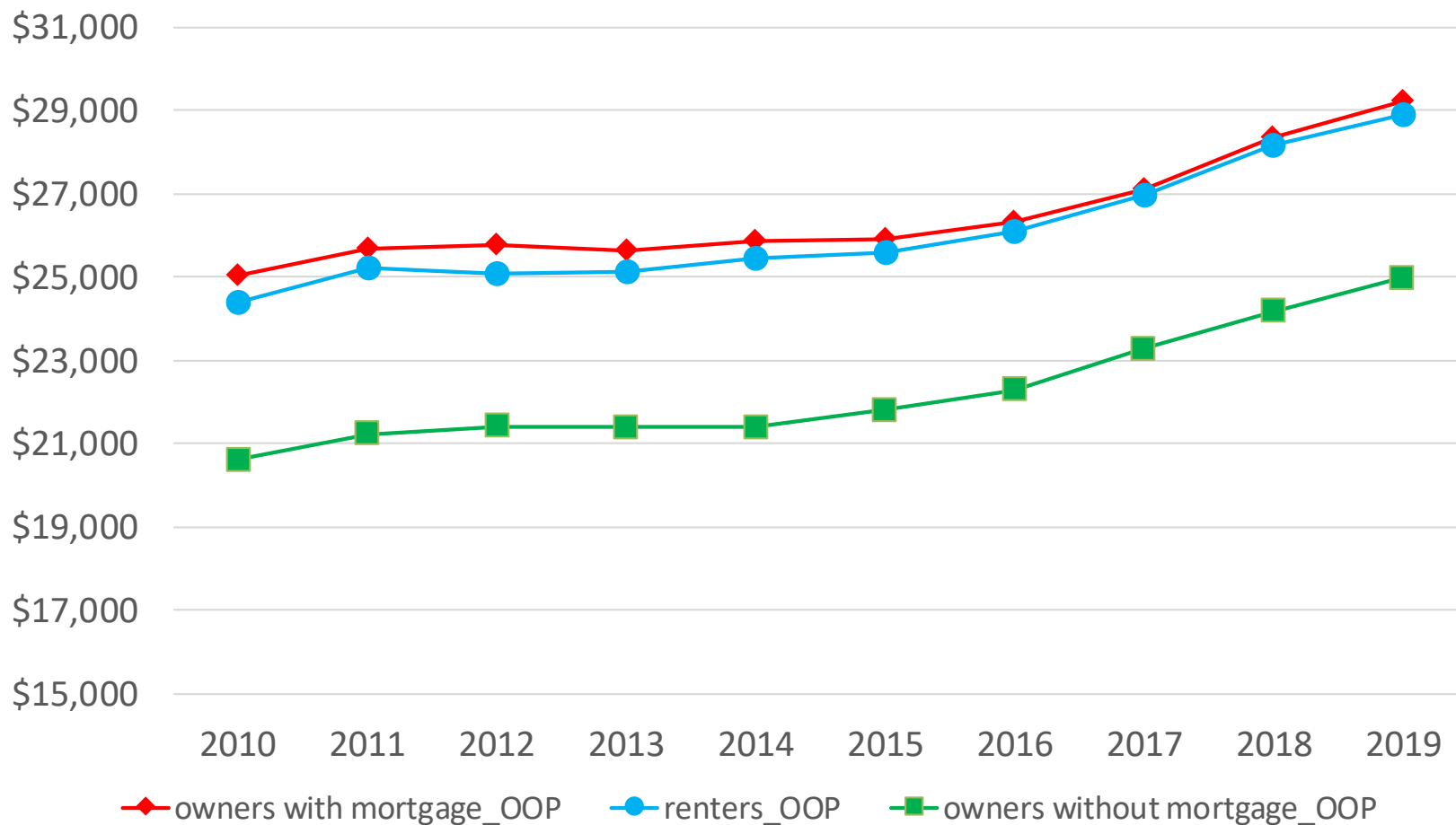
$$SPM_{j,2016} = 1.2 * FCSU_{E,2016} - SUE + SUE_j \qquad \frac{SUE_j}{SPM_{E,j}} = a_j = \text{housing share of 2A+2C } SPM_{E,j} \text{ thresholds}$$

- At threshold level, apply geographical price adjustment (MRI) for sub-national thresholds

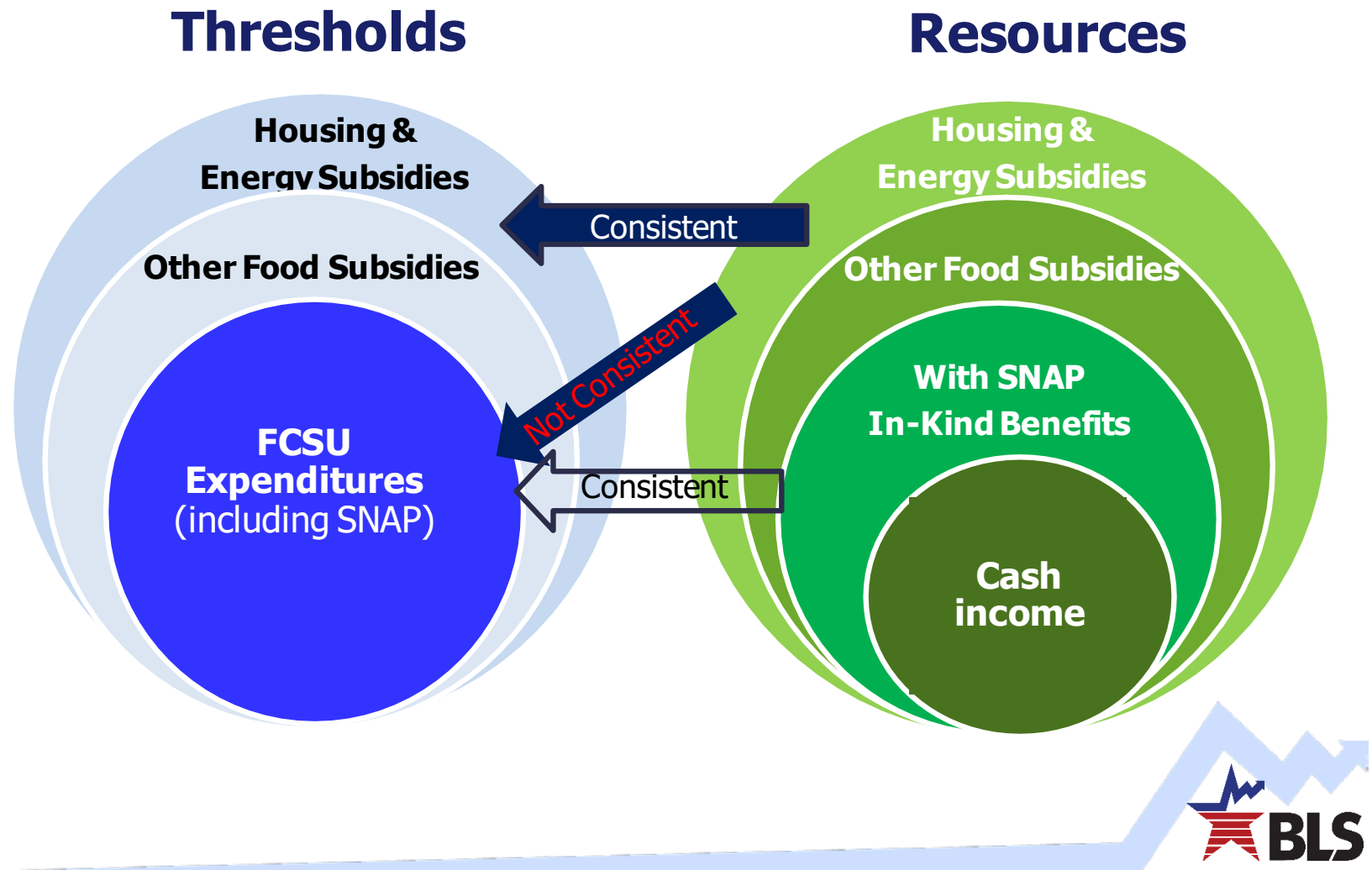
$$SPM_{j,g,2016} = [(a_j * MRI_g) + (1 - a_j)] * SPM_{j,2016}$$



Previously Published SPM Thresholds for 2 Adults with 2 Children by Housing Tenure Based on OOP FCSU Spending (33rd percentile)



In-kind Benefits Included in FCSU



Expanding the Sample to Consumer Units with Any Number of Children from those with Exactly Two Children

| | CU's with exactly 2 children | CU's with 1+ children |
|--|------------------------------|-----------------------|
| Total Estimation Sample (% of U.S. weighted sample of CUs based on 5 years of data) | n = 14,668 (11.4%) | n = 40,623 (31.4%) |

Of *all people* living in the U.S. (person weighted population):

19.1% in CUs with 2 children; 51.6% in CUs with any children; 48.4% in CUs with no children

Of *all CUs* living in the U.S. (CU weighted population):

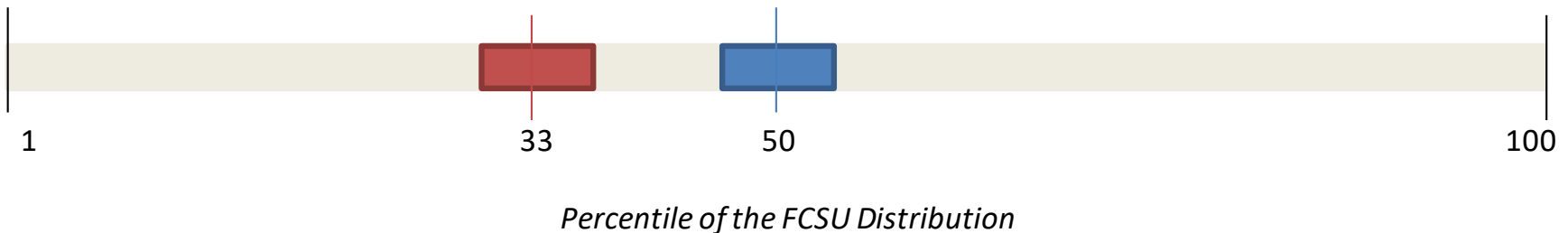
13.4% have exactly 1 child; 11.4% have exactly 2 children; 6.6% have more than 2 children;
68.6% have no children

Of *CUs with children* (CU weighted population):

42.7 % have exactly 1 child; 36.3% have exactly 2 children; 21% have more than 2 children

Source: Bureau of Labor Statistics, Consumer Expenditure Survey Interview Data, 2012Q2-2017Q1; based on analysis from November 2, 2020.

Change Base of Thresholds: Move to the a Percentage of the Median



- Back to NAS Panel (1995) recommendation
 - Question: how to selected the percentage?
- Less likely to reflect constrained spending (until at lower end of FCSU distribution)
- Expected to be more stable (empirical question)
- If in future, decision to include health insurance, out-of-pocket spending likely to be a better proxy of “need” as opposed to position lower in FCSU distribution

Weighted Sample Distributions by Housing Group Assuming “All” Changes but with Varying Estimation Samples and FCSU Percentile Ranges

| | <i>CUs with 2 Children</i> | | <i>CUs with Children>0</i> | | <i>All CUs</i> | |
|---------------------------------|----------------------------|---------------|-------------------------------|---------------|----------------|---------------|
| | <i>"33rd"</i> | <i>"50th"</i> | <i>"33rd"</i> | <i>"50th"</i> | <i>"33rd"</i> | <i>"50th"</i> |
| Owners with mortgages | 39.7% | 55.3% | 33.7% | 48.3% | 24.1% | 34.8% |
| Renters | 48.4% | 37.0% | 52.5% | 42.8% | 42.8% | 39.6% |
| Owners without mortgages | 11.9% | 7.7% | 13.8% | 8.8% | 33.2% | 25.6% |

Source: Bureau of Labor Statistics, Consumer Expenditure Survey Interview Data, 2012Q2-2017Q1; based on analysis from November 6, 2020.

Compared to weighted mean distribution of all Consumer Units in the U.S. in 2016 (one year of data)

owner with mortgages 36%

renters 38%

owners without mortgages 27%

Source: <https://stats.bls.gov/cex/csxmulti.htm>

Additional Changes

Treatment of Telephone and Internet

$$\text{Published: } SPM_{j,2016} = 1.2 * FCSU_{E,2016} - SU_{t,E,2016} + SU_{t,j,2016}$$

$$\text{Alternative: } SPM_{j,2016} = 1.2 * FCTSU_{E,2016} - SU_{E,2016} + SU_{j,2016}$$

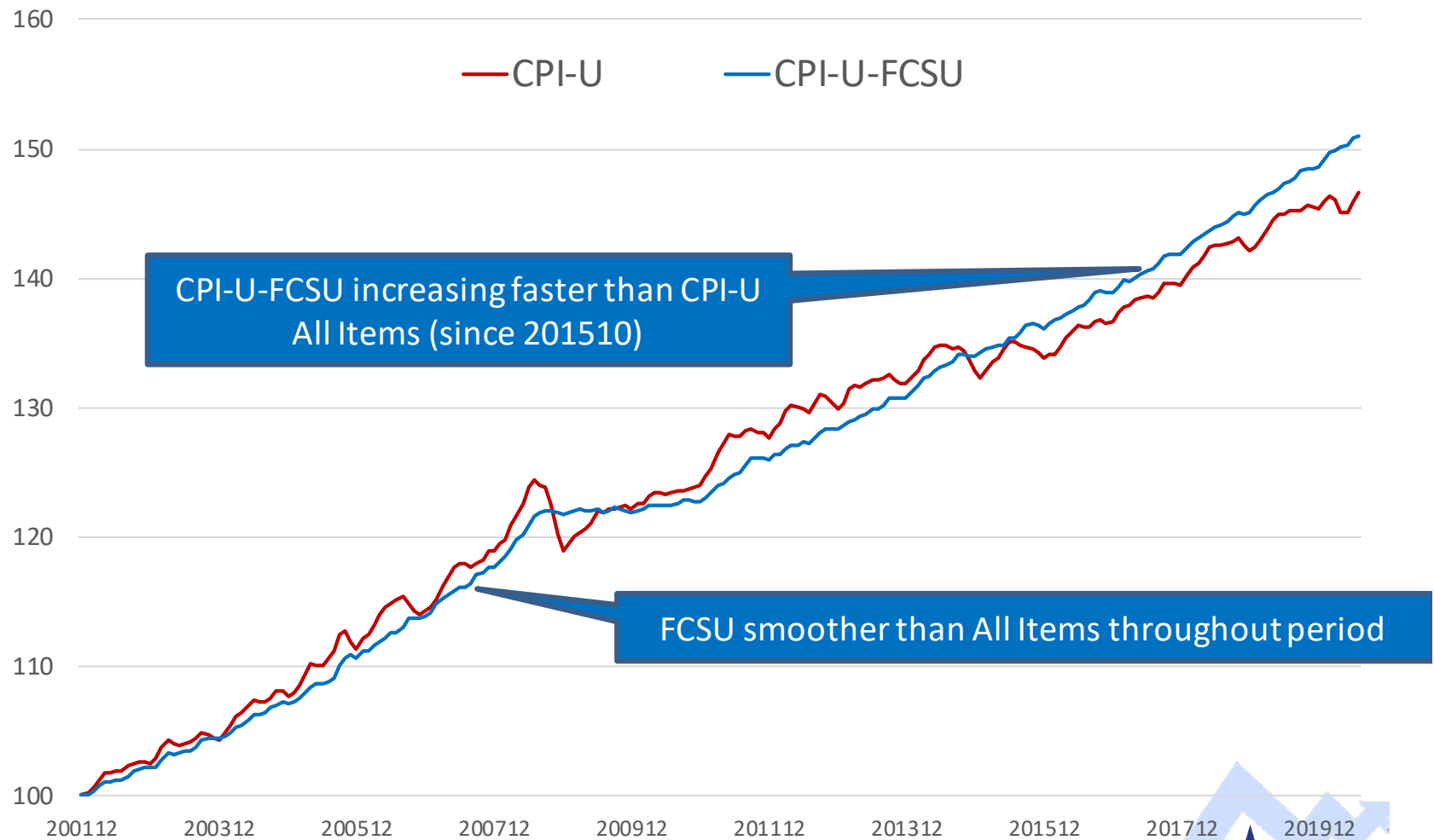
$$\text{Alternative: } SPM_{j,2016} = 1.2 * FCTISU_{E,2016} - SU_{E,2016} + SU_{j,2016}$$

Other Changes Considered

- From 5 to 3 years of CE Interview data (not made)
- Lag by 1 year
- Adjust quarterly FCSU by created “composite FCSU-CPI-U”

$$FCSU_{i,2016} = \left(\frac{FCSU_{CPI_{2016}}}{FCSU_{CPI_{yr}}} \right) * FCSU_{i,yr}$$

Price Indexes to Adjust Quarterly FCSU Expenditures into Threshold Year \$: CPI-U All Items vs CPI-U-FCSU



Source: Monthly indexes produced by Josh Klick, CPI Division, BLS, November 4, 2020.



Impacts (one-by-one) Relative to Published

| Change Planned | Impact on Thresholds | Impact on Housing Shares |
|--|---|--|
| In-kind benefits | own with mortgage: 2.8% higher Renters: 3.4% higher owners w/o mortgages: 4.5% higher | Marginal impact |
| Expand sample | | |
| Child>0 | own with mortgage: 3.1% lower Renters: 2.7% lower owners w/o mortgages: 2.2% lower | Marginal impact |
| All CUs | own with mortgage: 4.3% higher Renters: 4.3% higher owners w/o mortgages: 9.6% higher | own with mortgage: 50.2% to 50.9% renters: 49.7% to 50.5% owners w/o mortgages: 41.1% to 44.8% |
| Percentage of median (80.8%= "33"/"median" FCSU) | Marginal impact | Marginal impact |
| Telephone service separate (not in housing utilities) | Marginal impact but for owners w/o mortgages: 1.7% lower | own with mortgage: 50.2% to 44.2% renters: 49.7% to 44.1% owners w/o mortgages: 41.1% to 33% |

Impacts related to published based on 2 children, 5 years of data, around 33rd percentile; "marginal"= less than 0.3% for thresholds and less than .4 percentage points for shares

All but expanded sample based on estimation sample with 2 children

All results based on thresholds produced for 2016 but for geo adjustment which is based on 2014



Impacts Relative to Published

| Change Planned | Impact on Thresholds | Impact on Housing Shares |
|------------------------------------|---|--|
| Add internet | own with mortgage: 1.7% higher Renters: 2.1% higher owners w/o mortgages: 1.1% higher | own with mortgage: 50.2% to 49% renters: 49.7% to 48.7% owners w/o mortgages: 41.1% to 39.4% |
| 3 years of CE data | own with mortgage: 0.7% higher Renters: 2.4% higher owners w/o mortgages: 3.0% higher | own with mortgage: 50.2% to 49.3% renters: no change owners w/o mortgages: 41.1% to 41.5% |
| Lag by 1 year | own with mortgage: 0.3% lower Renters: 0.8% lower owners w/o mortgages: 0.8% lower | Marginal impact |
| Use created “composite FCSU CPI-U” | own with mortgage: 2.0% higher Renters: 2.3% higher owners w/o mortgages: 1.9% higher | owner with mortgage: 50.2% to 49.8% renters: marginal owners w/o mortgages: 41.1% to 40.7% |

Impacts related to published based on 2 children, 5 years of data, around 33rd percentile; “marginal”= less than 0.4 percentage points
All results based on thresholds produced for 2016



Combined Changes Based on 30-36th Percentile of FCSU: SPM 2016 2A+2C Thresholds

(NOTE: % of median to be set to equal \$value around the 33rd percentile)

Published

- 5 years of CE data
- no lag
- No in-kind benefits (other than SNAP)
- Telephone in housing utilities
- Internet not included
- Use All Items CPI-U to adjust quarterly CU FCSU expenditures to threshold year dollars

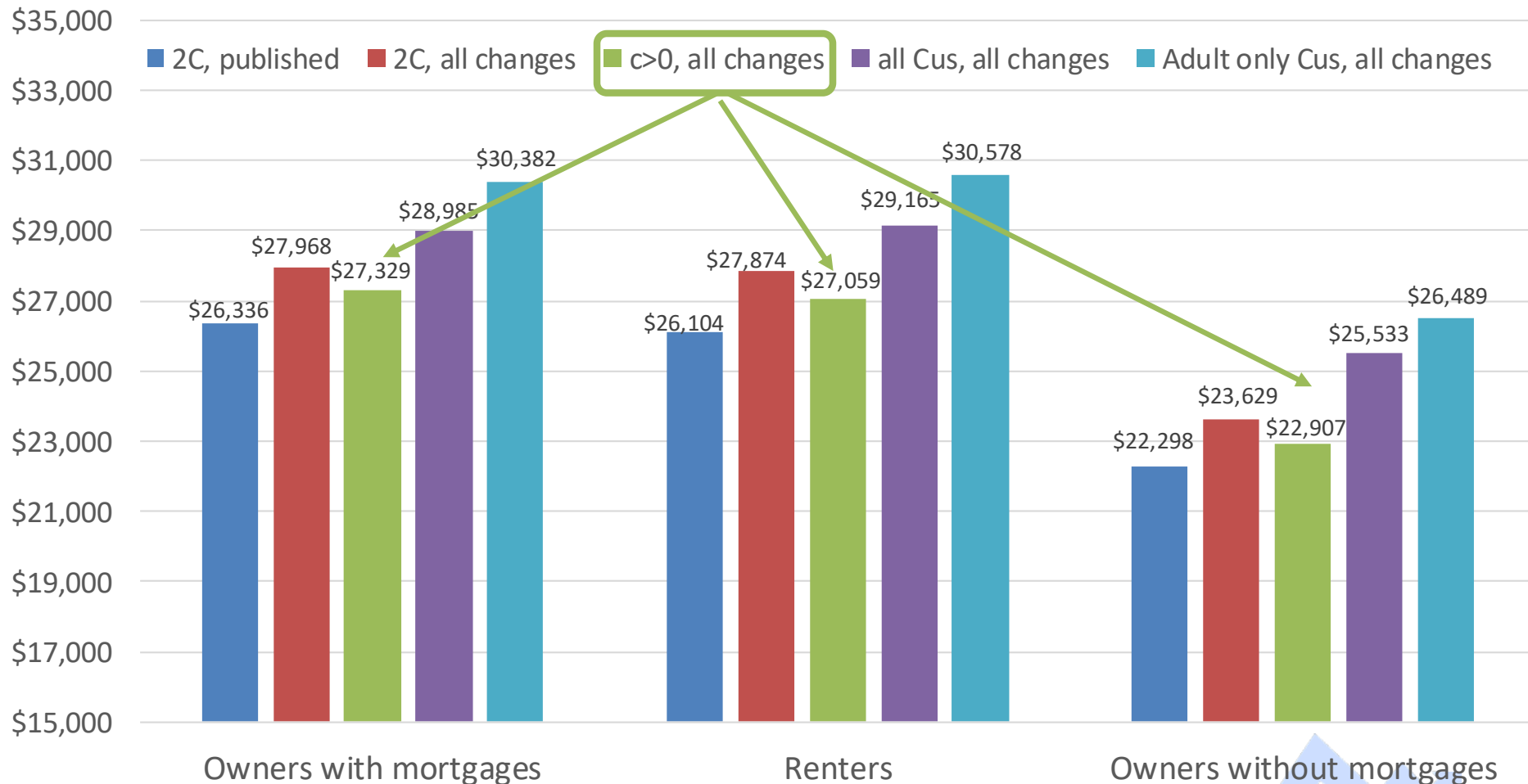
Combined Changes

- 5 years of CE data
- 1-year lag
- In-kind benefits added
- Telephone not in housing utilities
- Internet added
- Use composite FCSU CPI-U to adjust quarterly CU FCSU expenditures to threshold year dollars

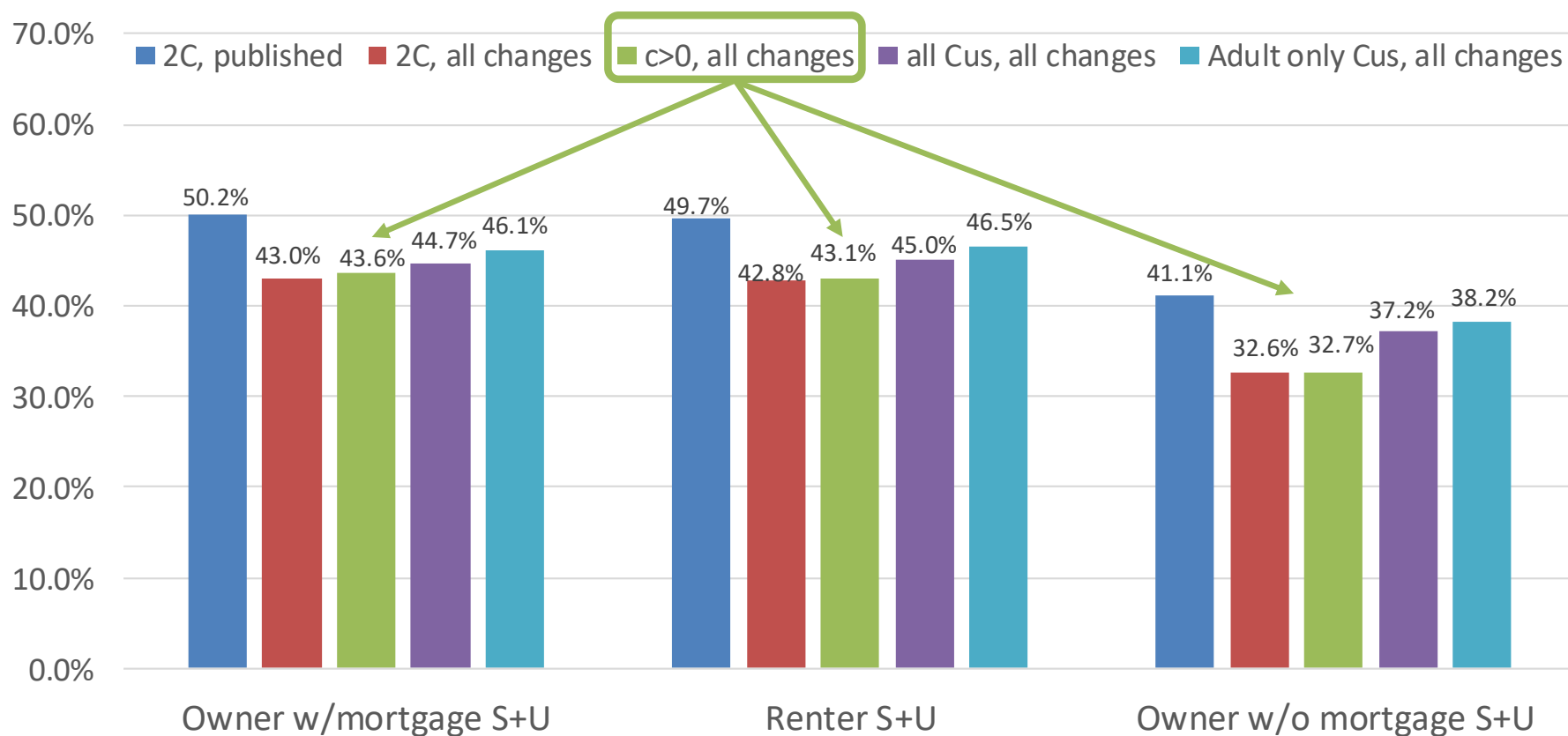
NOTE: Not including geo adjusting FCSU expenditures at CU level before thresholds estimation at this time

Impact of Combined* Changes Based on 30-36th Percentile of FCSU and Different Estimation Samples:

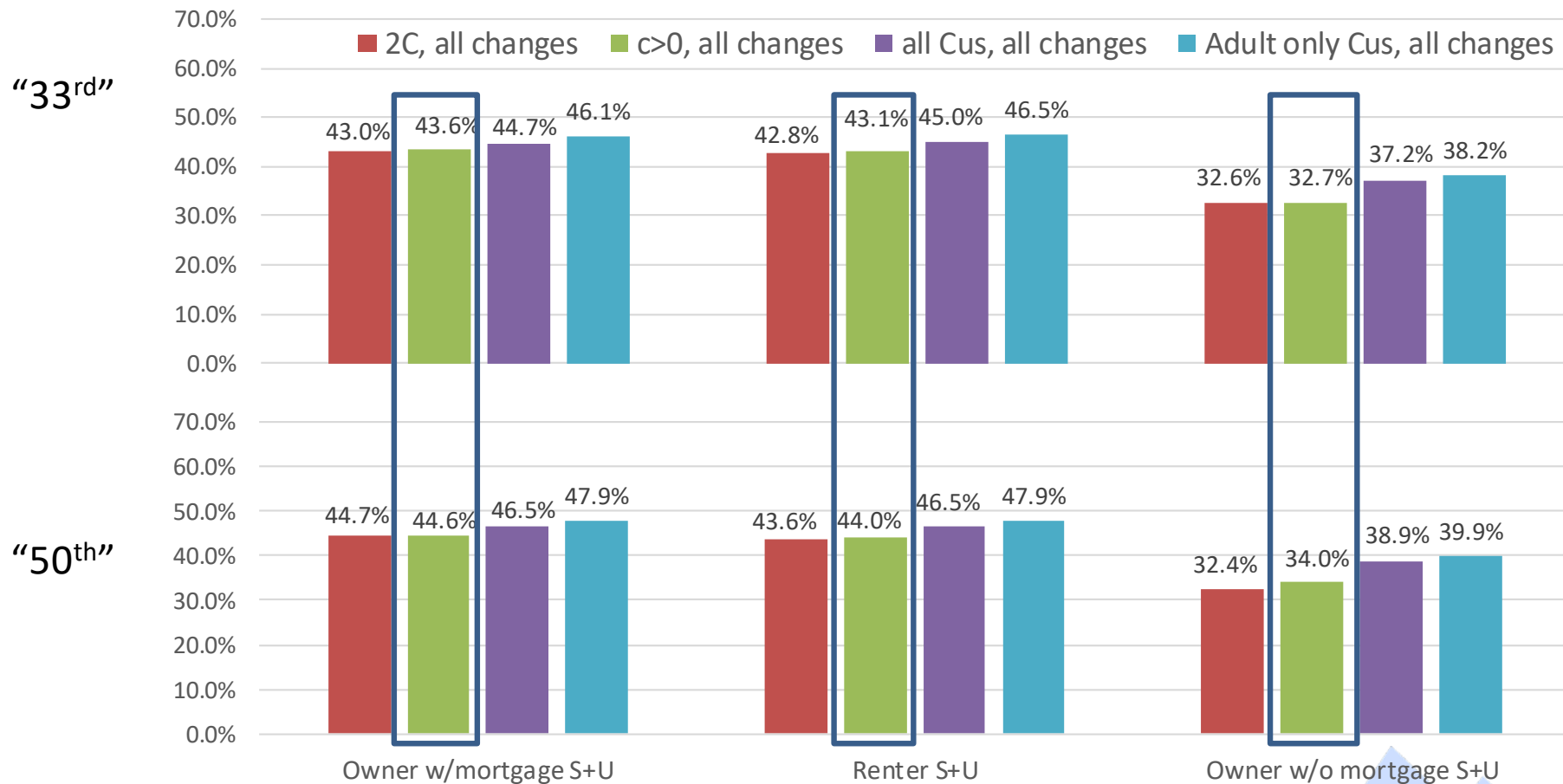
SPM 2016 2A+2C Thresholds (impact of CU composition and equivalence scale)



Impact of Combined* Changes Based on 30-36th Percentile of FCSU and 5 Years of Data: S+U as % of SPM 2016 2A+2C Thresholds



Impact of Combined Changes and 5 Years of Data Around the “33rd” and “50th” Percentiles of FCSU: (S+U) as % of SPM 2016 2A+2C Thresholds



Select % of Median to Offset Impact of Changes to Equate to “33rd” (NAS Panel Approach)

$$SPM_{j,2016} = 1.2 * FCSU_{33E,2016} - SU_{33E} + SU_{33E,j}$$

$$SPM_{j,2016} = 1.2 * 81.9\% * FCSU_{E,2016} - 81.9\% * SU_E + 81.9\% * SU_{E,j}$$

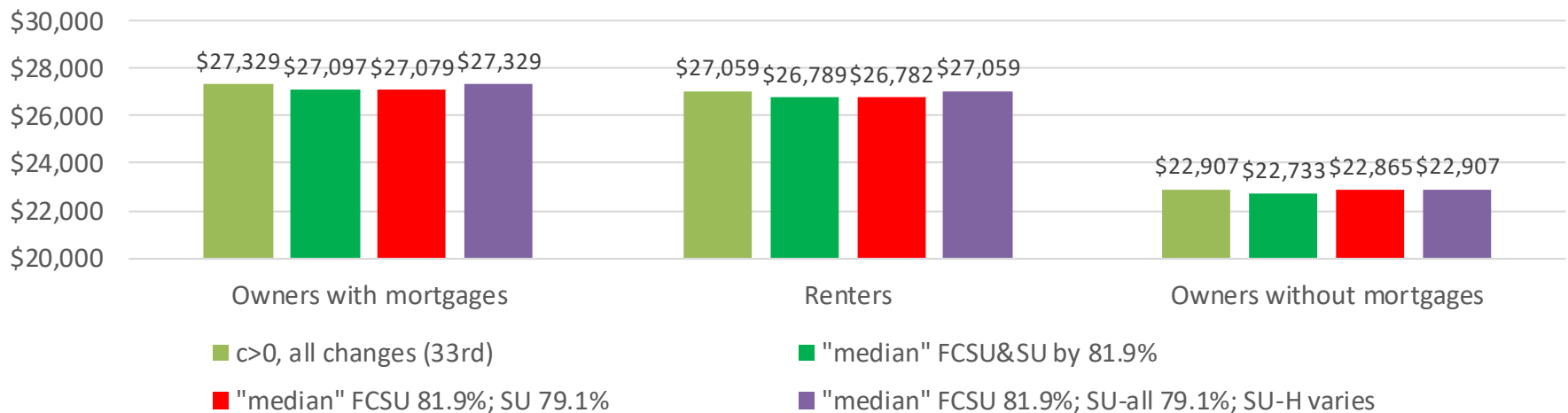
$$SPM_{j,2016} = 1.2 * 81.9\% * FCSU_{E,2016} - 79.1\% * SU_E + 79.1\% * SU_{E,j}$$

$$SPM_{j,2016} = 1.2 * 81.9\% * FCSU_{E,2016} - 79.1\% * SU_E + 80.1\% * SU_{E, \text{own w mort}}$$

$$SPM_{j,2016} = 1.2 * 81.9\% * FCSU_{E,2016} - 79.1\% * SU_E + 79.5\% * SU_{E, \text{own no mort}}$$

$$SPM_{j,2016} = 1.2 * 81.9\% * FCSU_{E,2016} - 79.1\% * SU_E + 81.0\% * SU_{E, \text{renter}}$$

% of
“median”



$$81.9\% = \left(\frac{FCSU_{33rd}}{FCSU_{50th}} \right)$$

$$79.1\% = \left(\frac{SU_{33rd}}{SU_{50th}} \right)$$



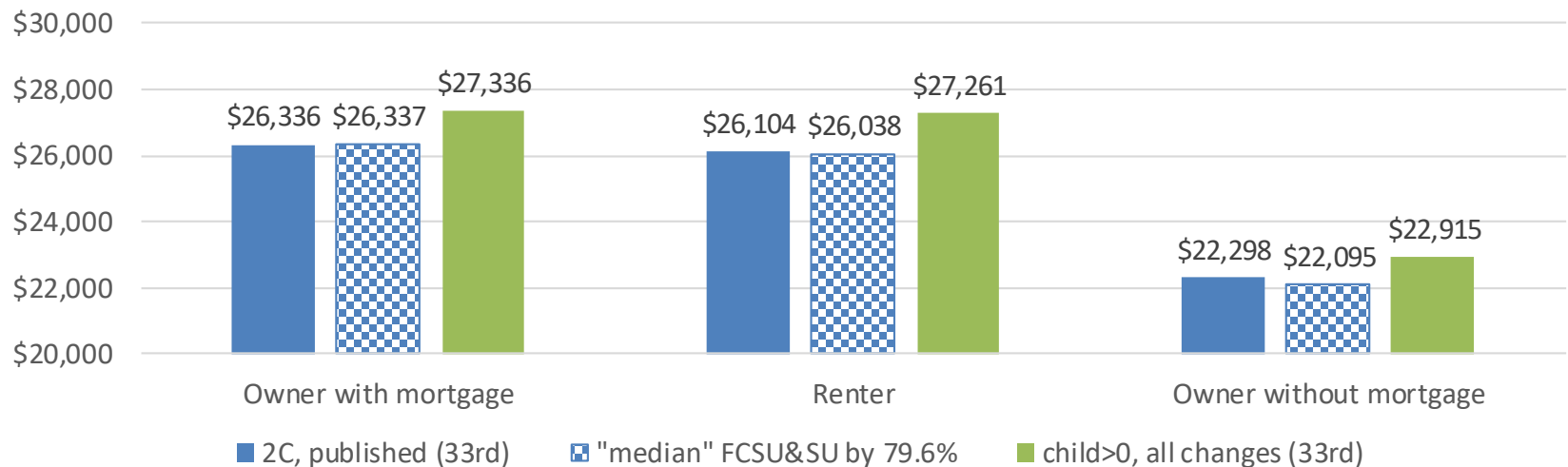
Select % of Median to Offset Impact of Changes to Equate to Published

$$SPM_{j,2016} = 1.2 * FCSU_{33E,2016} - SU_{33E} + SU_{33E,j}$$

% of
"median"

$$SPM_{j,2016} = 1.2 * 79.6\% * FCSU_{E,2016} - 79.6\% * SU_E + 79.6\% * SU_{E,j}$$

To anchor thresholds to *published* for 2016
to reduce impact of changes



79.6% of "median" FCSU and SU within "median" range to result in thresholds that are approximately equal to published thresholds

In Process

| Change Planned | Justification |
|--|---|
| In-kind benefits | For additional years; refining imputed rent model using CE data |
| Expand sample to CU with children>0 | Represents larger share of the population while maintain focus on children |
| Percentage of median | Which percentage and process |
| Telephone service separate (not in housing utilities) | Increased cell service expenditures as share of total; cell not geo specific (impacts housing share for geo adjustment) |
| Add internet | Increased means of communication in addition to telephone (small impact) |
| 5 years of CE data | Reduce impact of recession or economic bubbles (as opposed to 3 years) |
| Lag by 1 year | CPS ASC data not available in time to produce in-kind benefits for thresholds for most recent year |
| Composite FCSU CPI-U | More reflective of threshold component price changes; refining indexes |

Future Research

| Change | Issue |
|--|--|
| Use of price index to reflect spending for owner occupants | “Payments cost” (as opposed to price) index |
| Different equivalence scale | Expanding to all CUs; how well the 3-parameter equivalence scale works |
| Medical/health care | If to include and if so how to value |
| Specific expenditures rather than 20% multiplier | Which goods and services to include |
| Converting CU level expenditures to “national” dollars before estimating thresholds | Development of shelter “cost” index |
| Use of 12 months of CE data | No longitudinal weights |

