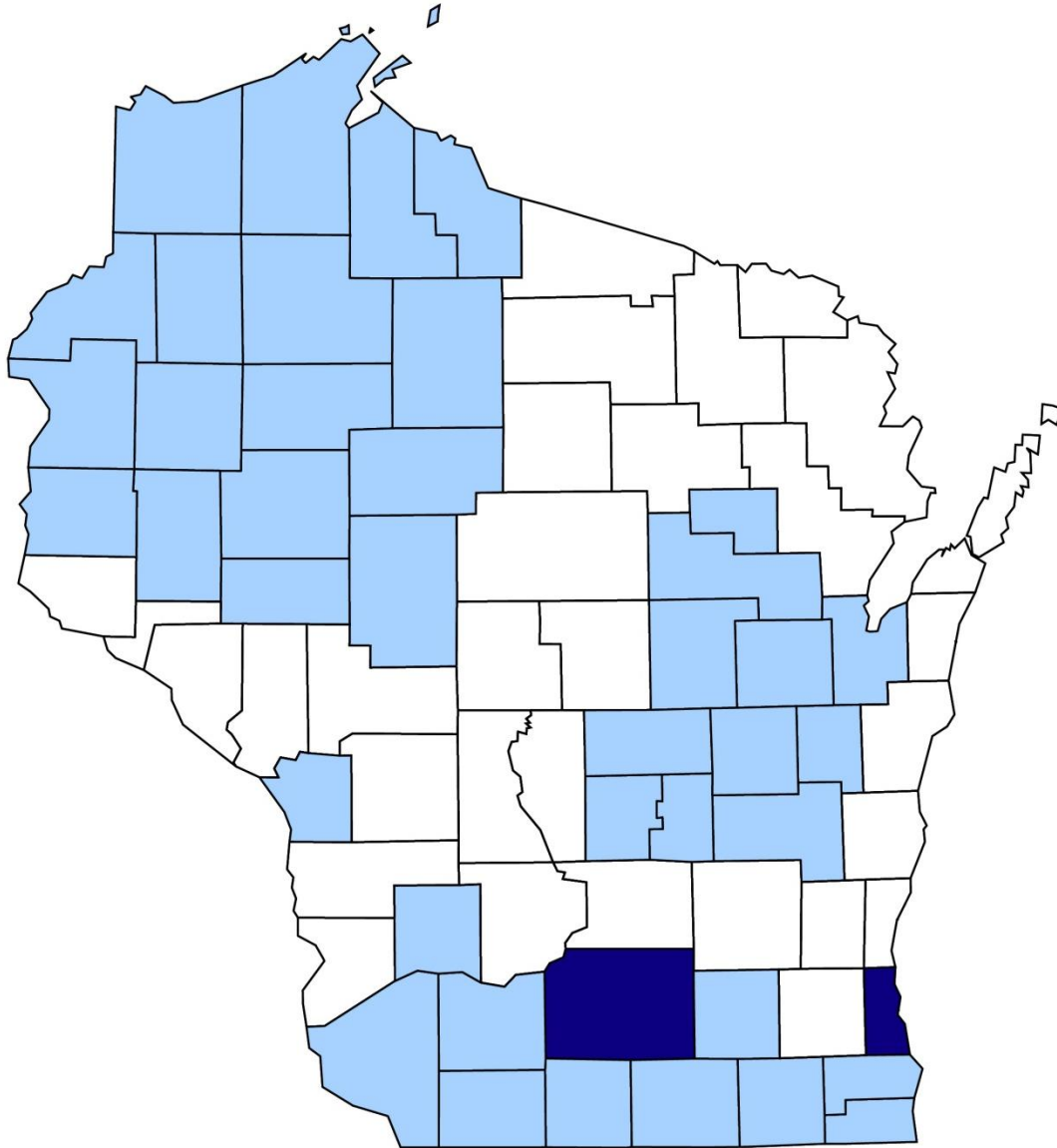


# *Wisconsin Poverty Report: Technical Appendix for 2009*



*Joanna Y. Marks, Julia B. Isaacs, Timothy M. Smeeding, and Katherine A. Thornton*

*Institute for Research on Poverty  
University of Wisconsin–Madison*

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## ABOUT THE AUTHORS

Julia Isaacs is the Child and Family Policy Fellow at the Brookings Institution, supported by funding from First Focus, and a Visiting Scholar at the Institute for Research on Poverty. Joanna Marks is an Assistant Researcher at the Institute for Research on Poverty. Timothy Smeeding is the Director of the Institute for Research on Poverty and the Arts and Sciences Distinguished Professor of Public Affairs at the La Follette School of Public Affairs [smeeding@lafollette.wisc.edu]. Katherine Thornton is a programmer analyst at the Institute for Research on Poverty.

## ABOUT THIS REPORT

This report is available in a printable format on IRP's Web site at [www.irp.wisc.edu](http://www.irp.wisc.edu). Two companion reports—*Wisconsin Poverty Report: Were Antipoverty Policies Effective in 2009?* and *Wisconsin Poverty Report: Methodology and Results for 2009*—are also available at [www.irp.wisc.edu](http://www.irp.wisc.edu).

## ABOUT IRP



The Institute for Research on Poverty (IRP) is a unit within the College of Letters and Science at the University of Wisconsin–Madison. It was established in 1966 as the nation's original poverty research center to study the causes, consequences, and cures of poverty and social inequality in the United States. Major funding is provided by the Assistant Secretary for Planning and Evaluation in the U.S. Department of Health and Human Services.





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## APPENDIX A. PUBLIC USE MICRODATA AREAS IN WISCONSIN

The U.S. Census Bureau has divided Wisconsin into 31 Wisconsin Public Use Microdata Areas (PUMAs), with boundaries set to follow county boundaries and ensure at least 100,000 residents in each unit. For our imputations and poverty results, we have grouped these 31 PUMAs into 22 areas, consisting of 10 large Wisconsin counties contained within one PUMA (or for the 4 largest counties, multiple PUMAs), and the remaining 12 PUMAs that group between 2 and 10 counties into one area (see Table A 1).

**Table A 1. Guide to Counties, Multi-County Areas, and PUMAs**

County or Multi-County Area	Public Use Microdata	
	Area (PUMA)	Counties
Milwaukee	02001, 02002, 02003, 02004, 02101, 02102	Milwaukee
Dane (Madison)	01100, 01200	Dane
Waukesha	02201, 02202, 02203	Waukesha
Brown (Green Bay)	00200, 00300	Brown
Racine	01900	Racine
Kenosha	01800	Kenosha
Rock (Janesville)	02400	Rock
Marathon	01600	Marathon
Sheboygan	02500	Sheboygan
La Crosse	00900	La Crosse
10-county area (Superior)	00100	Ashland / Bayfield / Burnett / Douglas / Iron / Price / Rusk / Sawyer / Taylor / Washburn
Calumet/Outagamie/ Winnebago (Appleton)	01500	Calumet/ Outagamie / Winnebago
9-county area (Stevens Point, Crandon)	00600	Adams / Forest / Juneau / Langlade / Lincoln / Oneida / Portage / Vilas / Wood
7-county area (Fond du Lac)	01400	Fond du Lac / Green Lake / Marquette / Menominee / Shawano / Waupaca / Waushara
5-county area (Menomonie)	00400	Barron / Clark / Dunn / Polk / St. Croix
Ozaukee/ Washington	02300	Ozaukee / Washington
6-county area (Manitowoc)	01300	Door / Florence / Kewaunee / Manitowoc / Marinette / Oconto
Columbia/Dodge/ Sauk (Baraboo)	01000	Columbia / Dodge / Sauk
8-county area (Sparta)	00700	Buffalo / Crawford / Jackson / Monroe / Pepin / Pierce / Trempealeau / Vernon
Jefferson/Walworth	01700	Jefferson / Walworth
Chippewa/Eau Claire	00500	Chippewa / Eau Claire
5-county area (Dodgeville)	00800	Grant / Green / Iowa / Lafayette / Richland

## APPENDIX B. POVERTY UNITS AND POVERTY UNIVERSE

We chose poverty units that reflect patterns of income and consumption sharing across families and individuals living within households. We also chose to expand the poverty universe to include foster children.<sup>1</sup> Our poverty unit is expanded beyond the Census Bureau family unit to include unmarried partners who cohabit, minor and adult children of the cohabiting partner,<sup>2</sup> foster children, and unrelated minor children. Yet our units are smaller than household units because we split unrelated subfamilies and unrelated adults into separate small poverty units within the household.

First, we created a primary poverty unit (expanded family unit) in each household, consisting of:

- a. The head of household and any individual related to the head of household (using the IPUMS variable RELATED)
- b. Unmarried partner of the head of household
- c. Unmarried partner's children
- d. Foster children
- e. Unrelated minor children

Second, we allowed for additional poverty units with the household, created out of individuals who are unrelated to the household head. If the individuals are related to each other, they are grouped together into a unit, forming what might be thought of as an unrelated subfamily. Otherwise, any remaining unrelated individuals 18 years of age and older are each their own single-person poverty unit. Table B 1 shows the sample and weighted sample counts for each unit of analysis within our study.

Our poverty units, while more inclusive than the usual Census practice of distinguishing between families and unrelated individuals, are less inclusive than households, where all members sharing the same basic unit (common areas like living room, kitchen, heating, lights, etc.) are treated as fully sharing income. The overall poverty rate would fall from 11.5 to 10.6 percent using households as the poverty unit. Poverty rates would fall for all counties and multi-county areas using households as the unit of analysis, with the largest differences in Dane and La Crosse Counties and the 2-county area of Chippewa and Eau Claire Counties. Table B 2 presents poverty rates using households as the unit of analysis rather than our poverty units.

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<sup>1</sup>Foster children are not included in the poverty universe under the official measure, though they are proposed to be included in the Supplemental Poverty Measure (SPM).

<sup>2</sup>We analyzed the ACS using a data extract from the Integrated Public Use Microdata Series (IPUMS). The 2009 ACS subsample for Wisconsin in IPUMS contained 59,049 individuals, including individuals living in group quarters (Ruggles et al., 2010). We identified family members of the unmarried partner using the IPUMS variable FAMUNIT.



**Table B 1. Unweighted and Weighted Sample Counts by Units of Analysis, 2009**

Dataset	Number of People		Number of Family Units		Number of Households		Number of Poverty Units	
	Sample	Weighted Sample	Sample	Weighted Sample	Sample	Weighted Sample	Sample	Weighted Sample
2009 ACS sub-sample from IPUMS	59,049	5,654,774	27,570	2,740,603	25,305	2,438,157	N/A	N/A
Modified dataset excluding people living in group quarters and using IRP-defined poverty units	57,390	5,488,887	25,911	2,574,716	23,646	2,272,270	24,536	2,411,713
Final dataset excluding group quarters and certain college students, using IRP-defined poverty units.	57,356	5,482,124	25,877	2,568,097	23,630	2,268,485	24,504	2,405,358

**Source:** IRP tabulations of 2009 American Community Survey data.

**Table B 2. Poverty Rates Under the Wisconsin Measure, Using Poverty Units and Household Units, 2009**

	Wisconsin Measure	Wisconsin Measure with Household as Unit	Difference (percentage points)*
<b>County</b>			
Milwaukee	19.6	18.1	-1.5
Dane (Madison)	13.9	11.8	-2.1
Waukesha	5.6	5.2	-0.4
Brown (Green Bay)	13.3	12.5	-0.8
Racine	11.3	10.6	-0.7
Kenosha	12.0	10.5	-1.5
Rock (Janesville)	10.7	10.0	-0.7
Marathon (Wausau)	5.7	5.5	-0.2
Sheboygan	7.1	6.6	-0.6
La Crosse	14.2	12.0	-2.2
<b>Multi-County Area</b>			
Ozaukee/Washington	5.6	5.0	-0.6
Jefferson/Walworth	11.7	11.1	-0.6
Chippewa/Eau Claire	12.6	10.6	-2.0
Calumet/Outagamie/ Winnebago (Appleton)	11.2	10.6	-0.6
Columbia/Dodge/Sauk (Baraboo)	5.4	5.1	-0.4
5-county area (Menomonie)	9.6	9.4	-0.3
5-county area (Dodgeville)	11.4	10.2	-1.1
6-county area (Manitowoc)	7.5	7.2	-0.3
7-county area (Fond du Lac)	9.9	9.7	-0.3
8-county area (Sparta)	8.2	8.0	-0.2
9-county area (Stevens Point, Crandon)	7.7	7.0	-0.7
10-county area (Superior)	11.6	11.1	-0.5
<b>State Total</b>	<b>11.5</b>	<b>10.6</b>	<b>-0.9</b>

**Source:** IRP tabulations of 2009 American Community Survey data.

\*Differences may not sum due to rounding.

**Note:** In this tabulation, households containing select college students (and not just poverty units containing select students) were excluded from the analysis, resulting in a sample containing 57,304 people, 23,616 households, and 24,466 poverty units.

## APPENDIX C. POVERTY UNIVERSE AND TREATMENT OF COLLEGE STUDENTS

Our poverty universe excludes individuals in group quarters from our analysis. The Census Bureau includes individuals in certain types of non-institutional group quarters in the poverty universe for the official measure. We have not done so, partly because the detailed coding for types of group quarters is not available on the IPUMS version of the American Community Survey (ACS), but also because it would be difficult to impute non-cash resources for such individuals. Our exclusion of all individuals in group quarters is consistent with research on alternative poverty measures for New York City, Minnesota and Connecticut (New York City Center for Economic Opportunity, 2011; Zedlewski et al., 2010a; Zedlewski et al., 2010b).

This is our second year of exploring the treatment of college students in the poverty universe, namely undergraduate students living in off-campus housing. The ACS asks respondents if they are attending school, with a distinction for undergraduate education, but makes no distinction as to full- versus part-time enrollment. Under the official poverty measure, ACS poverty rates in areas with large numbers of college students are higher than Current Population Survey (CPS) poverty rates due to the survey design. Unlike the CPS, the ACS is conducted throughout the year, meaning college students may be surveyed when they are away from their parents' homes and therefore treated as independent consumer units.<sup>3</sup> Students may report that they are living alone or with roommates, and that they have little or no income; however, in many cases they are relying on the income of family elsewhere or financial aid to meet their food, clothing, shelter, and utility needs. In these cases, it might not be appropriate to consider these individuals as living in poverty.

Our initial exploration in 2008 eliminated those individuals from our sample who were attending college, 18 through 23 years of age, and not living with parents or other family members (see Isaacs et al., 2010, Appendix C). These individuals accounted for approximately 460 people in our data set in 2008. Excluding them from the universe reduced poverty rates by one percentage point overall and by more in La Crosse, Dane and several other counties.<sup>4</sup> For instance, in 2008, the poverty rate for Dane County (Madison) under the Wisconsin measure decreased from 13.1 to 10.2 percent when college students were removed from the sample.

This year, we have attempted to determine how many of those who report attending college on the ACS are indeed traditional, full-time students, and how many may be part-time students, combining classes at community college with part- or full-time work. While the ACS does not have a variable on full-time versus part-time status, it does contain information on employment, income, and relationships to others in the households. We have attempted to use this data to distinguish students who are supporting themselves from students receiving support from family members living elsewhere.

Our final model for 2009 excludes certain individuals enrolled in undergraduate education from the poverty universe. We now exclude those who meet all of the following criteria:<sup>5</sup>

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<sup>3</sup>Individuals in group quarters, including college dormitories, are already excluded from our poverty universe. This discussion on treatment of college students pertains strictly to those individuals living in off-campus, privately owned housing.

<sup>4</sup>In general, counties that saw reductions in poverty rates under these measures had large student populations.

<sup>5</sup>As the specification for our final model, all poverty rates within this report are based on this definition of the poverty universe, with the exception of those in Tables C 1 and C 2.

- ages 18–23;
- attending college;
- not living with parents or family members, including unmarried partners. To be consistent with our poverty unit definition, this means treating unmarried partners as family and only defining our student population as those living with all other unrelated individuals;
- earned less than \$5,000 in the past 12 months. In 2008, 93 percent of Wisconsin college students had earnings greater than zero and 37 percent had earnings from \$1 to \$4,999; and,
- worked 0–13 weeks during the past year, and typically worked 0–20 hours per week.

We believe these criteria identify students who are not supporting themselves through earnings and who are receiving support from elsewhere.

Table C1 compares poverty rates under our final model for 2009 with poverty rates under our alternative model for 2008, which included a less restrictive definition of students. The statewide poverty rate in 2009 was 11.5 percent, 1.3 percentage points higher under our final model (using a restricted definition of students) than the poverty rate in 2008 with a broader definition of students excluded.

Table C2 compares poverty rates under our final model for 2009 with poverty rates for 2009 if we had kept all college students in our poverty universe. The poverty rate would have been slightly higher (0.1 percentage point) in 2009 if we had kept all students in our poverty universe, and would have had no impact on poverty rates for 14 of our 22 multi-county areas. However, in areas with large student populations, such as Dane County, the poverty rate would have been several tenths of a percentage point higher if we had kept all students in our universe.

**Table C 1. Poverty Rates Under the Wisconsin Measure, Using Varying Treatment of College Students, 2008 and 2009**

<b>County</b>	<b>Wisconsin Measure (final model for 2009, which excludes select students)</b>	<b>Wisconsin Measure (2008 alternate model excluding all college students except those living with their parents)</b>	<b>Difference (percentage points)*</b>
Milwaukee	19.6	17.8	-1.8
Dane (Madison)	13.9	10.2	-3.7
Waukesha	5.6	5.6	0.0
Brown (Green Bay)	13.3	8.4	-4.9
Racine	11.3	9.2	-2.1
Kenosha	12.0	9.1	-3.0
Rock (Janesville)	10.7	9.1	-1.6
Marathon (Wausau)	5.7	6.2	0.5
Sheboygan	7.1	8.5	1.4
La Crosse	14.2	9.4	-4.8
<b>Multi-County Area</b>			
Ozaukee/Washington (West Bend)	5.6	4.5	-1.2
Jefferson/Walworth	11.7	10.0	-1.7
Chippewa/Eau Claire	12.6	8.7	-3.9
Cal. /Out. / Winnebago (Appleton)	11.2	8.8	-2.4
Columbia/Dodge/Sauk (Baraboo)	5.4	8.9	3.5
5-county area (Menomonie)	9.6	11.0	1.3
5-county area (Dodgeville)	11.4	10.3	-1.0
6-county area (Manitowoc)	7.5	9.5	1.9
7-county area (Fond du Lac)	9.9	7.8	-2.2
8-county area (Sparta)	8.2	7.6	-0.6
9-county area (Stevens Point, Crandon)	7.7	9.3	1.7
10-county area (Superior)	11.6	11.3	-0.3
<b>State Total</b>	<b>11.5</b>	<b>10.2</b>	<b>-1.3</b>

**Source:** IRP tabulations of 2008 and 2009 American Community Survey data.

\*Differences may not sum due to rounding.

**Table C 2. Poverty Rates Under the Wisconsin Measure, Using Varying Treatment of College Students, 2009**

	Wisconsin Measure (final model)	Wisconsin Measure (including college students)	Difference (percentage points)*
<b>County</b>			
Milwaukee	19.6	19.8	0.2
Dane (Madison)	13.9	14.4	0.5
Waukesha	5.6	5.6	0.0
Brown (Green Bay)	13.3	13.3	0.0
Racine	11.3	11.3	0.0
Kenosha	12.0	12.0	0.0
Rock (Janesville)	10.7	10.8	0.2
Marathon (Wausau)	5.7	5.9	0.3
Sheboygan	7.1	7.1	0.0
La Crosse	14.2	14.3	0.2
<b>Multi-County Area</b>			
Ozaukee/Washington (West Bend)	5.6	5.6	0.0
Jefferson/Walworth	11.7	11.8	0.1
Chippewa/Eau Claire	12.6	12.6	0.0
Cal. /Out. / Winnebago (Appleton)	11.2	11.2	0.0
Columbia/Dodge/Sauk (Baraboo)	5.4	5.4	0.0
5-county area (Menomonie)	9.6	9.6	0.0
5-county area (Dodgeville)	11.4	11.5	0.1
6-county area (Manitowoc)	7.5	7.5	0.0
7-county area (Fond du Lac)	9.9	9.9	0.0
8-county area (Sparta)	8.2	8.2	0.0
9-county area (Stevens Point, Crandon)	7.7	7.7	0.1
10-county area (Superior)	11.6	11.6	0.0
<b>State Total</b>	<b>11.5</b>	<b>11.6</b>	<b>0.1</b>

**Source:** IRP tabulations of 2009 American Community Survey data

\*Differences may not sum due to rounding.

## APPENDIX D. SIMULATING INCOME AND PAYROLL TAXES

Neither the March Current Population Survey (CPS) nor the American Community Survey (ACS), both current sources used for measuring poverty based on the official definition, collect information on taxes paid. It is therefore necessary to simulate the taxes paid based on the before-tax income amounts reported in these surveys. This appendix briefly outlines the tax simulation model constructed for the Institute for Research on Poverty (IRP) for the State of Wisconsin using data from the ACS for both 2008 and 2009.

### Background for the Model

The tax simulation model developed for the IRP is based largely on a model developed by Sentier Research LLC for the U.S. Census Bureau in 2003. That model was intended to estimate taxes paid for sample households in the Annual Social and Economic Supplement (ASEC) of the CPS. While the CPS and ACS share much common ground in terms of content, there are significant differences. The model constructed in 2003 had to be adapted to reflect ACS content and updated to reflect changes in the income tax regulations at the federal and state levels. Adaptation of the early CPS model centered on 1) creation of an input data set from the ACS that resembled the one used by the CPS model; 2) updating for changes in tax regulations; and, 3) adapting the program code to account for differences between the ACS and CPS that could not be directly resolved.

### Basic Elements of the Model

The model is logically divided into five elements: calculation of payroll taxes, provisional assignment of tax units, provisional calculation of federal income taxes, calculation of state income taxes, and final computation of federal income taxes, with state taxes as potential itemized deduction.

Payroll Taxes- The computation of payroll taxes assumes that, with a few minor exceptions, all persons reporting wage and salary income pay FICA taxes. The computation is straightforward following the tax rates for each component of the tax. The simulation also attempts to estimate the proportion of workers reporting their class of worker as “Federal Government” under the Civil Service Retirement System (CSRS) and to assign payroll taxes corresponding to that system. Taxes paid on income from self-employment are estimated as part of the federal income tax portion of the model.

Provisional Tax Units- Sample persons are organized into provisional tax units based on household/family relationship. Persons who are members of a primary family excluding related subfamily members are placed in a tax unit and assigned either as “married, filing jointly” or “head of household” for type of return. Primary unrelated individuals are assigned “single” for type of return. Members of subfamilies, both related and unrelated, are placed in tax units with the same possibilities for type of return. Finally, a provisional tax unit is generated for each person age 15 years old and over who is not the household reference person or spouse of the household reference person. All persons unrelated to the householder, under age 15, and not in an unrelated subfamily were assigned to the tax return of the householder. A routine was added to identify primary families where the householder appeared to be dependent on other family members. In these situations, another family member was chosen as the head of the tax unit and the householder was relegated to an exemption on that return.

Provisional Calculation of Federal Income Tax- A provisional tax return is generated for each of the tax units in order to establish details needed to simulate a state income tax return.

Calculation of State Income Tax- Wisconsin state income taxes were simulated using the provisional federal return. The simulation of state taxes originally developed for the Census Bureau model was

updated to current provisions and revised to include the Wisconsin-specific taxes and credits: the Homestead Credit, the School Property Tax Credit, and the Working Family Credit.

Final Calculation of Federal Income Tax- Once the state income tax computation is completed, the state tax liability is appended to the provisional federal return and the final computation of federal taxes is made, first for tax units derived from subfamilies. At this point, a determination is made as to whether or not a tax unit is likely or legally required to file. If it is determined that the unit is a “nonfiler,” the provisional unit is dissolved. This releases the children into the pool of likely exemptions on the tax unit formed around the householder and the adults as single returns.

## **Differences in Survey Content on Income in the ACS and CPS**

For purposes of the tax simulation model, the main difference between the ACS and CPS is the level of detail available for sources and amounts of income. The CPS includes significantly more detail. Of particular note are the following:

- The CPS provides details on specific sources and amounts of retirement income while the ACS collects no detail on specific sources and allows only the total amount of all retirement income to be recorded (income from Social Security is collected specifically).
- The CPS provides details on unemployment compensation, workers’ compensation, and veterans’ payments, while all of these sources are combined into a single amount on the ACS, along with all other sources of income not elsewhere classified. No detail is collected regarding the component sources included.
- The CPS provides separation of interest income, dividend income, and net rental income while the ACS collects the sum of income from these sources without any identification of which source(s) was (were) received.
- The CPS provides separation of self-employment income into farm and non-farm amounts while the ACS combines income from these two sources without identifying the underlying source(s).
- The CPS provides a direct estimate of alimony received while the ACS does not identify this income source and it is therefore not counted as income.

As both the CPS and ACS lack much additional detail regarding sources of income that are more important to an accurate simulation, the effects of differing content on the tax simulations described above should be small in comparison to other missing details. Of most concern is income from unemployment compensation (UI). UI is taxable under federal tax law but it is not taxable under Wisconsin tax regulations.

## **ACS-CPS Model Differences**

There are many aspects of federal and state income taxes that cannot be simulated because the data are not available from the 2009 ACS. The March CPS tax simulation has similar limitations. In the case of the March CPS tax simulation, however, some of this missing information is obtained by statistically matching the survey based tax returns to the public use sample of tax returns known as the Statistics of Income, or SOI. Currently the SOI is used to obtain the following:

- Individual Retirement Accounts (IRA) and Self-employed SEP, SIMPLE, and other qualified retirement plans



- Itemized deductions (integrated with simulated state income taxes paid)
- Self-employed health insurance deduction
- Capital gains and losses (not included as of March 2008 CPS ASEC)

As we do not have access to the SOI data file we were unable to include any of these items as part of the ACS simulation.

- The CPS model does not obtain estimates for property taxes and mortgage interest paid directly from any source. These components of itemized deductions are imbedded in the overall amount of itemized deductions assigned during the statistical match to the SOI. The ACS provides property taxes directly. It also supplies a direct estimate of monthly mortgage payments made by homeowners. In the ACS model we crudely estimate annual mortgage interest paid by applying an assumed interest rate to the monthly mortgage amount collected directly in the survey. These components along with the state income tax liability provide the model's estimate of total itemized deductions.
- The CPS model obtains child care expense estimates from the SOI match. It then computes the credit based on the number of qualified children and other information outlined in Form 2441. The ACS model obtains estimates of child care expenses from a statistical match with the March 2010 CPS<sup>6</sup> and then applies that information to the computation of the credit using procedures outlined in Form 2441.
- Both models simulate the filing of a Form 1040.
- Neither model contains provisions to simulate the Alternative Minimum Tax.

### **Specific Federal Tax Items Simulated (by line number for Form 1040 for 2009)**

Items simulated in the ACS tax model are as follows:

- Line 7 (variable incwage)
- Line 8a (all from the ACS income variable incinvst)
- Line 12 (includes farm income contained in variable incbus00)
- Line 16a (variable incretir)
- Line 20a (computed using variable incss and other simulated relevant items)
- Line 27 (computed from simulated self-employment tax)
- Line 37 (computed from lines noted above)
- Line 39a (computed based on age)

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<sup>6</sup>The Census Bureau began collecting child care expense data for the first time in March 2010.

- Line 40a (itemized deduction computed by adding state income taxes, property taxes, and simulate mortgage interest payments or standard deduction)
- Line 41 (by subtraction)
- Line 42 (by computation of simulated line 38 and exemptions derived from household relationship, etc.)
- Line 43 (by subtraction)
- Line 44 (by applying tax rates)
- Line 46 (same as line 44 as we do not simulate the Alternative Minimum Tax)
- Line 48 (simulated based on child care expenses assigned in a statistical match to the March 2010 CPS public use file where child care expense amount is collected directly. No attempt at expenses for caring for disabled)
- Line 51 (simulated based on income and presence of qualified children, etc.)
- Line 56 (simulated based on incbus00 and self-employment tax rates)
- Line 63 (simulated making work pay credit based on Schedule M)
- Line 64a (simulated based on income, qualified children, and the payment rates)
- Line 65 (simulated based on income, qualified children, and benefit rates)

## **Simulated Items for the Wisconsin State Income Tax Model (Form 1 for 2009)**

The tax simulation model for estimating taxes for Wisconsin households assumes all households file Form 1. It begins with the Federal AGI amount. This amount is adjusted by removing the taxable amount of social security that is included in Federal AGI to arrive at Wisconsin AGI. The computation of taxes before credits is then made in a straightforward way. Credits simulated that reduce Wisconsin taxes are as follows:

- State Earned Income Credit (line 45)
- Homestead credit (line 48)
- Married couple credit (line 30)
- Working family credit (line 24)
- Itemized deduction credit (line 20)
- Farm tax relief credit (line 49)
- School property tax credit (line 22)

## **Changes in the Tax Model for 2009**

The biggest change is that the tax model was adjusted to take into account the changes in tax laws, including those under the American Recovery and Reinvestment Act. These include the new Making Work Pay tax credit, the expansion of the additional Child Tax Credit, and the expansion of the Earned Income Tax Credit. However, the model did not capture all expansions in taxes in 2009. For example, it ignored changes in the taxability of unemployment compensation, increases in the allowable level of IRA deductions, increases to the amount allowable for first-time home buyer credits, and cash for clunkers, because the data to model such provisions are not available in the ACS.

One methodological improvement is that the 2009 model obtained estimates of child care expenses from a statistical match with the March 2010 CPS, which has newly added questions about child care amounts. This match was used to improve estimates of the Dependent and Child Tax Credits.

Note that the tax models for both 2008 and 2009 do not include capital gains (losses) or provisions for the AMT.

Evaluation- Table D1 on the following page provides detailed comparisons of tax simulation results with administrative counts derived from publications from the Wisconsin Department of Revenue (DOR) for 2009.

**Table D 1. Comparison of 2009 Simulated Tax Model Results with 2009 Wisconsin Department of Revenue Statistics and IRS Statistics**

Selected Items	Model Based on 2009 ACS	Wisconsin Department of Revenue (DOR) 2009	Ratio Model to DOR
Total Number of Filers*	2,541,924	2,618,156	0.97
Number of Single Filers	1,232,079	1,195,734	1.03
Number of Married Couple Joint Filers	1,054,995	1,160,896	0.91
Number of Head of Household Filers	254,850	261,526	0.97
Number of Dependent Filers	158,189	194,283	0.81
Aggregate Amount of Adjusted Gross Income	\$131,021,569,753	\$128,591,983,351	1.02
Number of Filers with Taxable Income	2,123,161	2,045,669	1.04
Aggregate Amount of Taxable Income	\$112,196,753,235	\$109,657,024,219	1.02
Number of Filers with Exemptions	2,442,173	2,026,628	1.21
Aggregate Exemption Amount	\$3,564,489,900	\$3,114,032,445	1.14
Number of Filers with Nonzero Standard Deduction	2,214,787	2,364,607	0.94
Aggregate Standard Deduction Amount	\$16,908,051,970	\$17,554,281,359	0.96
Aggregate Tax Liability Before All Credits (DOR'S GROSS TAX)	\$6,837,866,259	\$6,807,777,207	1.00
Aggregate Tax Liability After Refundable Credits (DOR's NET TAX)	\$5,607,424,998	\$5,727,834,991	0.98
Number of Filers with Homestead Credit	238,276	235,094	1.01
Aggregate Amount of Homestead Credit	\$97,398,621	\$121,087,750	0.80
Number of Filers with School Property Tax/Rent Credit	1,894,082	1,969,183	0.96
Aggregate Amount of School Property Tax/Rent Credit	\$466,263,349	\$456,995,606	1.02
Number of Filers with Married Couple Credit	743,873	704,332	1.06
Aggregate Amount of Married Couple Credit	\$296,257,923	\$266,635,934	1.11
Number of Filers with Working Family Credit	2,618	844	3.10
Aggregate Amount of Working Family Credit	\$9,560	\$196,432	0.05
Number of Filers with WI EIC Credit	273,740	273,936	1.00
Aggregate Amount of WI EIC Credit	\$149,670,588	\$127,868,062	1.17
Number of Filers with FED EIC Credit	421,010	(na)	(na)
Aggregate Amount of FED EIC Credit	\$754,445,488	\$708,641,968	1.06

(table continues)

**Table D 1, continued**

<b>Selected Items</b>	<b>Model Based on 2009 ACS</b>	<b>Wisconsin Department of Revenue (DOR) 2009</b>	<b>Ratio Model to DOR</b>
Number of Filers with Farm Property Tax Relief Credit**	38,531	49,255	0.78
Aggregate Amount of Farm Property Tax Relief Credit	\$28,578,315	\$13,672,882	2.09
Number of Filers with Itemized Deduction Credit	663,225	671,756	0.99
Aggregate Amount of Itemized Deduction Credit	\$259,403,622	\$298,804,506	0.87

**Notes:** Model count based on simulated filers having income above the minimum income filing requirement or wage and salary income of \$1,000 or more. DOR total excludes married, filing separate not simulated in the model. Count of DOR filers excludes married filing separate returns. Computations by Sentier Research LLC.

## APPENDIX E. SIMULATION OF SNAP BENEFITS

While the American Community Survey contains information on *receipt* of benefits under the Supplemental Nutrition Assistance Program (SNAP, formerly known as food stamps, and called FoodShare in Wisconsin), the 2008 and 2009 ACS do not include information on benefit *amounts*. Moreover, there is under-reporting of SNAP benefits; the number of ACS-reported SNAP recipients in Wisconsin (counting recipients in SNAP units as defined below) was 71 percent of SNAP recipients in the administrative data from the Wisconsin Cares system. To address this under-reporting of receipt and to model SNAP benefits, we therefore created a model with five key steps. As outlined below, the steps are: 1) Define SNAP unit; 2) Identify households receiving SNAP benefits; 3) Simulate eligibility pool; 4) Select additional recipients among non-recipient eligibles; and 5) Simulate benefit amounts.

1. Define SNAP unit. SNAP benefits are provided to households, where households are defined as units who purchase and prepare food together. We did not just use the ACS household as the SNAP unit, because New York City’s Center for Economic Opportunity (CEO) found this approach resulted in larger unit size than in the administrative data in their poverty modeling work. Instead, we followed CEO’s approach of keeping spouse/parents/children together in units, but otherwise split household up into “maximal SNAP units,” assuming that unrelated subfamilies and unrelated individuals will apply as separate units to maximize the amount of SNAP benefits received. This approach resulted in a lot of single-person units and may overestimate the population of eligible one-person units. However, as discussed below, we had a low participation rate for units without children, (and thus for single-person units), and so we did not end up with a disproportionate number of one-person units with simulated receipt. In fact, our simulated receipt by SNAP unit size approaches that of the administrative data, with 42 percent of our simulated SNAP units being 1-person households, compared to 45 percent in the administrative data (see Table E 1).

**Table E 1. Summary of SNAP Units, Eligibles, and Receipt**

SNAP Unit Size	ACS Data			Administrative Data
	SNAP Eligibles	Reported SNAP Receipt	Simulated SNAP Receipt	
1	62%	39%	42%	45%
2	16%	19%	19%	21%
3	8%	15%	14%	15%
4	6%	13%	12%	10%
5	4%	9%	8%	5%
6	1%	3%	2%	2%
7	1%	2%	2%	1%
8+	1%	1%	1%	1%
Total	100%	100%	100%	100%

**Source:** Authors’ calculations of ACS data and state administrative (CARES) data.

**Note:** Figures may not sum due to rounding.

2. Identify households receiving SNAP benefits in ACS data. We included all ACS households reporting receipt. Where we divided an ACS household into two or more SNAP units, we assumed each SNAP unit received SNAP benefits. This approach maximizes the number of units with reported SNAP receipt. Even so, we had only 220,278 SNAP recipients on the ACS or 71 percent of the 308,155 from the

administrative data.<sup>7</sup> (Under-reporting was even more of a problem prior to the recession; in 2008 only 60 percent of recipients identified in the administrative data were captured in the ACS data). Our next step was to estimate eligibles from which to draw the additional 100,000 units needed.

3. Simulate eligible units. Households are generally eligible for SNAP benefits if they have *monthly* incomes below 130 percent of poverty. Household incomes can fluctuate from month to month, and so many households with *annual* incomes below 130 percent of poverty may qualify for part of the year, and thus receive SNAP benefits in the past year. As a rough proxy for income eligibility, we looked at households with annual incomes below 150 percent of poverty. Using 150 rather than 130 percent of poverty improved our eligibility simulation because it made a higher proportion of those with ACS-reported receipt fall into our simulated eligibility pool.

We did not adjust for whether or not the household head was a citizen, because we found similar proportions (5 percent) of non-citizen heads among the simulated eligible population and the administrative data. High participation among non-citizen refugees (who are eligible for SNAP benefits) offsets lack of participation from those non-documented non-citizens who are ineligible, allowing us to ignore citizenship status when simulating eligibility.

4. Select additional participants among eligibles. We defined our pool of eligible units as all eligible units who did not already report SNAP receipt. We divided all eligibles into four categories:

1. Households with Public Assistance (i.e., Temporary Assistance for Needy Families [TANF], other cash assistance, or Supplemental Security Income [SSI]) and children
2. Households with Public Assistance (PA) and no children
3. Units with children (and no PA)
4. All others (without children or PA)

We assumed 100 percent participation for the first category and near 100 percent participation for the second category; almost all households with reported PA or SSI income and income below 150 percent of poverty were simulated as receiving SNAP benefits.<sup>8</sup> Even so, we had fewer such households in our simulation than in the administrative data, particularly in Milwaukee. Where we did not have enough units with public assistance income, we compensated by adding more of the other two types of units (e.g., non-PA units with children and non-PA units without children). We assumed county/PUMA-specific participation rates among the third, non-PA units with children, so as to hit county/PUMA administrative targets for non-PA SNAP units with children. These participation rates ranged from 0 to 100 percent, with a median of 36 percent. We assumed much lower participation rates for other units (units without PA Income or children), ranging from 0 to 39 percent and a median of 1 percent. Once we had calculated target participation rates for each county or multi-county PUMA, we used a random number generator to assign random numbers within these cells, and selected households with random numbers below the target participation rate.

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<sup>7</sup>Our administrative data totals are based on any households receiving benefits over a 12-month period (July 2008–June 2009) to mimic the report of any SNAP receipt in the past twelve months.

<sup>8</sup>We did assume that less than 100 percent of nonrecipient PA units without children received SNAP benefits in 4 of the 22 county or multi-county areas, because otherwise we would have been simulating significantly more total SNAP recipients in those PUMA than were identified in the administrative data.

5. Simulate Amount of Annual Benefits Received. We developed an ordinary least squares (OLS) regression that estimated annual benefits in the administrative data. The dependent variable was the sum of SNAP benefits received over a 12-month period (an amount that might be based upon 1 to 12 months of benefits). Our main model is shown in Table E 2:

**Table E 2. Summary of Model Used for SNAP Imputation**

<b>Variable</b>	<b>Parameter Estimate</b>	<b>Standard Error</b>	<b>t Value</b>	<b>Pr &gt;  t </b>
Intercept	744	10.7	69.3	<.0001
Count of all individuals in household receiving SNAP	220	5.5	39.8	<.0001
Count of children in household receiving SNAP	600	5.9	102.1	<.0001
Anyone 60 or older in household (0,1)	-174	9.0	-19.4	<.0001
Dummy if single-person household (0,1)	-149	7.8	-19.1	<.0001
Any Social Security received by any household member (0,1)	-167	7.5	-22.4	<.0001
Any SSI received by any household member (0,1)	-17	6.1	-2.8	0.0046
Any W-2 or cash assistance received by any household member (0,1)	1,139	12.7	89.6	<.0001
Milwaukee County	343	5.9	58.1	<.0001
Dane County	129	10.8	11.9	<.0001
Racine or Rock County	193	9.7	19.9	<.0001

N=307,946. Adjusted R-Squared=.4366. (The sample for the regression excludes a few cases that had missing data on county).

SNAP benefits increase with the size of the household, with particularly large increases for each additional child. (Both children and adults increase benefit size equally, except adults are likely to bring in income, which will have an offsetting decrease in benefits). Single-person households have particularly low benefits. Households with TANF income are very poor and have very high benefits. Households with Social Security or Disability Income are relatively well-off (among low-income households) and so have lower benefits. Benefits are significantly higher in Milwaukee, as well as in Dane County (site of Madison, the state's second largest city) and Racine and Rock, two counties with particularly high unemployment. These larger urban areas and cities with high unemployment are more likely to have recipients with long-term (12-month) receipt and/or low incomes, and thus higher annual benefits. Our list of explanatory variables is limited to those that are defined in similar ways in the ACS and the administrative data. For this reason, we did not include income, because the annual incomes reported in the ACS cover a 12-month period, while any estimate of 12-month incomes from administrative data must be extrapolated from the months (1–12) in which the unit participates in SNAP.

Finally, we used the coefficients from OLS equation from the administrative data to estimate annual SNAP benefits in ACS. Because our initial simulation resulted in higher mean and aggregate benefits than in the administrative data, we adjusted our simulation of SNAP benefits downward by a global .94 multiplier. We set the .94 multiplier with the goal of coming close to aggregate benefits, but not



overestimating them, because we did not want to overstate the amount of SNAP resources going to families. Our final simulation finds 99.4 percent of the recipients in the administrative data, and 99.5 percent of aggregate benefits (see Table E 3). Moreover, we were close to on-target for estimating benefits going to families with and without children, and in Milwaukee and outside Milwaukee (see Table E 3). We were not able to hit the target for public assistance households, because the number of ACS households reporting W-2 and SSI is less than that reported in the SNAP administrative data, particularly in Milwaukee. Finally, we were within 10 percent of our aggregate benefit target for each county/PUMA, except for three areas.<sup>9</sup>

**Table E 3. Results of SNAP Simulation and Comparison to Administrative Data**

<b>Recipients and Benefits Simulated in Wisconsin Poverty Model</b>			
	<b>Recipient Participants (Ever On in A Year)</b>	<b>Mean Annual Benefit</b>	<b>Aggregate Benefit (In millions)</b>
Total	306,204	\$1,927	\$590.0
Milwaukee	99,146	\$2,156	\$213.8
Rest of State	207,058	\$1,817	\$376.2
With Children	155,702	\$2,873	\$447.3
Without Children	150,502	\$948	\$142.6
<b>Targets from Administrative Data</b>			
Total	307,946	\$1,925	\$592.7
Milwaukee	100,106	\$2,143	\$214.5
Rest of State	207,840	\$1,820	\$378.2
With Children	156,246	\$2,866	\$447.9
Without Children	151,700	\$955	\$144.9
<b>Simulated as a Percentage of Target</b>			
Total	99.4%	100.1%	99.5%
Milwaukee	99.0%	100.6%	99.7%
Rest of State	99.6%	99.8%	99.5%
With Children	99.7%	100.2%	99.9%
Without Children	99.2%	99.2%	98.5%

<sup>9</sup>The three exceptions were Dodgeville, Ozaukee/Washington and Racine; the first two had simulated benefits more than 110 percent in excess of the administrative target, due to the high number of ACS cases reporting SNAP receipt in those counties, and Racine had simulated aggregate benefits of less than 90 percent of the administrative target

## APPENDIX F. SIMULATION OF LIHEAP BENEFITS

The American Community Survey does not contain any questions related to home energy assistance; therefore, in accordance with most other state and municipal poverty measures, we imputed the value of this benefit. We determined household eligibility using program rules and then randomly assigned eligible households to simulate a caseload approximating the state administrative data. We then applied the average benefit amount by PUMA to the selected subset of eligible households.

States have flexibility in determining the eligibility and benefits for the Low Income Home Energy Assistance Program (LIHEAP). In Wisconsin, federal LIHEAP is called the Wisconsin Home Energy Assistance Program (WHEAP). WHEAP provides one-time electric (non-heating) assistance during the heating season and one-time payment for heating assistance, with payment typically made directly to the utility provider, to assist with a portion (not all) of costs. The payment amount is primarily based on household income and annual energy costs,<sup>10</sup> but may also be based on number of rooms in the home, number of people in the household, type of fuel used and annual fuel usage.

Among eligible households, those with the lowest incomes receive benefits that are a larger percentage of annual energy costs compared to those with higher incomes. In FFY 2009, Wisconsin's LIHEAP program paid 178,344 households and 455,383 persons. The program made a total of \$122,731,818 in payments that year.<sup>11</sup> In FFY 2009, the maximum heating assistance benefit paid was \$1,200 and the maximum non-heating electric (Public Benefits) benefit was \$706, for a total WHEAP maximum benefit of \$1,906.<sup>12</sup>

WHEAP reports data on a fiscal year basis. To be as close to the timing of data on other transfers, we used administrative data from FFY 2009 in conjunction with the 2009 ACS.<sup>13</sup> The data was available by county, for eight tribes (in addition to Menominee, where tribal land is contiguous with county), and statewide. For the purposes of our analysis, counties were combined into their respective PUMAs, and tribes were assigned to PUMAs based on location of the tribal office for WHEAP.<sup>14</sup>

We determined eligibility for WHEAP/LIHEAP by household, using household size, household income, and the above guidelines.<sup>15</sup> We divided the number of households actually paid by the total number of eligible households within each PUMA to determine the percent actually paid among those eligible. Then we randomly selected the given percentage of households among those eligible to assign benefit receipt. For the selected subset of eligible households, we converted average benefit amounts by county to average benefit amounts by PUMA, then applied the average annual benefit for the given PUMA to all cases.

Table F 1 shows the administrative data and the results of our LIHEAP simulation for 2009. Selecting this “subset of eligibles” simulated a caseload size approximating the state administrative data; however, the

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<sup>10</sup>March 3, 2010, email from Jane Blank (Wisconsin Department of Administration) to Joanna Marks.

<sup>11</sup>These are substantial increases from FFY 2008. Average payments per household (by county) increased by about \$100 from the previous year.

<sup>12</sup>March 3, 2010, and August 3, 2010, emails from Jane Blank (WI Dept. of Administration) to Joanna Marks. Maximum benefit amounts are not published in the Home Energy Reports.

<sup>13</sup>See [https://wheap.doa.state.wi.us/reports/FFY\\_Heat\\_view.asp?ispublic=true](https://wheap.doa.state.wi.us/reports/FFY_Heat_view.asp?ispublic=true).

<sup>14</sup>This method is consistent with our treatment of SNAP benefits to tribal offices.

<sup>15</sup>As with other components of our model, we applied an adjustment factor from the Census Bureau to the dollar values of household income in IPUMS to convert responses to calendar year dollars.

simulated caseload likely differs from the administrative data in terms of certain demographic characteristics, as has been found in similar work of the Urban Institute (Zedlewski, Giannarelli, Wheaton, and Morton, 2010). We may explore this in future work.

**Table F 1. Results of LIHEAP Simulation and Comparison to Administrative Data, 2009**

County / PUMA	Administrative Data		Simulation	
	Number of Households Receiving	Payment Total	Number of Households Receiving	Payment Total
Milwaukee	48,232	\$38,500,338	48,155	\$38,427,690
Dane (Madison)	7,403	4,174,586	7,235	4,080,540
Waukesha	4,216	2,461,964	4,276	2,497,184
Brown (Green Bay)	5,421	3,344,090	5,328	3,281,046
Racine	7,145	5,163,549	7,129	5,154,267
Kenosha	5,595	3,951,124	5,798	4,093,388
Rock (Janesville)	5,470	3,717,529	5,365	3,648,200
Marathon (Wausau)	4,425	2,957,841	4,355	2,909,140
Sheboygan	3,048	1,851,429	3,018	1,831,926
La Crosse	3,460	2,048,945	3,470	2,054,240
Ozaukee/Washington	2,466	1,426,281	2,540	1,468,120
Jefferson/Walworth	3,603	2,235,465	3,607	2,236,340
Chippewa/Eau Claire	5,462	3,132,465	5,439	3,121,986
Calumet/Outagamie/ Winnebago (Appleton)	8,542	5,155,161	8,565	5,173,260
Columbia/Dodge/ Sauk (Baraboo)	5,216	3,090,830	5,144	3,050,392
5-county area (Menomonie)	7,288	4,790,280	7,300	4,796,100
5-county area (Dodgeville)	4,485	2,926,599	4,441	2,899,973
6-county area (Manitowoc)	7,655	4,727,818	7,663	4,735,734
7-county area (Fond du Lac)	8,676	5,907,463	8,644	5,886,564
8-county area (Sparta)	6,899	4,436,337	6,917	4,447,631
9-county area (Stevens Point, Crandon)	12,983	9,127,881	12,962	9,112,286
10-county area (Superior)	10,661	7,075,477	10,494	6,968,016
<b>Wisconsin</b>	<b>178,351</b>	<b>\$122,203,452</b>	<b>177,845</b>	<b>\$121,874,023</b>

After we simulated recipients and benefit amounts, we compared results to actual administrative caseload and amount paid (statewide and by county or PUMA). Using the above method, we were able to simulate a caseload within 99.7 percent of households paid and within 99.7 percent of dollars paid.

As a final note, we estimated LIHEAP benefits for a household, which in some cases is different from a poverty unit. Thus when we calculated family resources per poverty unit, we had to estimate the share of

LIHEAP household benefits that went to each poverty unit. If there was one poverty unit per household, the share was simply 1.00. In cases where there are 2 or more poverty units in the household, we allocated the benefit across the poverty units based on the number of people in each poverty unit. For example, if a 5-person household consisting of a 2-person and a 3-person poverty unit receives \$2,000 in LIHEAP benefits, 40% ( $2/5$ ) goes to the 2-person unit and 60% ( $3/5$ ) to the poverty unit. If an 8-person household has a 4-person, 3-person and 1-person units, we divided benefits as  $4/8$ ,  $3/8$  and  $1/8$ .

## APPENDIX G. SIMULATION OF PUBLIC HOUSING BENEFITS

Public housing benefits help people living in poverty to obtain shelter. The American Community Survey does not ask whether respondents receive public housing benefits. Therefore, we imputed the value of this benefit for the Wisconsin poverty measure using administrative data from the federal report *A Picture of Subsidized Housing – 2008*.<sup>16</sup>

### Income Limits

Individuals and families qualify for public housing assistance based on annual gross income; status as elderly, as a person with a disability, or as a family; and status as a U.S. citizen or eligible immigrant. The U.S. Department of Housing and Urban Development (HUD) has three sets of income limits:

- a) below 80 percent of median income for the given county/metropolitan area, referred to as “low income”;
- b) below 50 percent of median income, referred to as “very low income”; and,
- c) below 30 percent of median income, referred to as “extremely low income”.<sup>17</sup>

In 2008 and 2009, we used the broadest definition (below 80% of median income).

Annual income is defined as *expected* total income for the year “from all sources received from the family head and spouse, and each additional member of the family 18 years of age or older”.<sup>18</sup> Since we did not have expected income we used actual income in our simulations. In general, the rent payment is 30 percent of monthly adjusted income. However, Housing Authorities may exclude the following allowances from gross annual income to determine adjusted annual income:

- \$480 for each dependent;
- \$400 for any elderly family;
- \$400 for any person with a disability; and,
- some medical deductions for families headed by an elderly person or a person with disabilities.<sup>19,20</sup>

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<sup>16</sup>Report and database available at <http://www.huduser.org/portal/picture2008/index.html>. This is the same data source we used for 2008 as the report is not issued on an annual basis, however, our analysis for 2009 includes an adjustment for the Housing Voucher Choice Program.

<sup>17</sup>See <http://www.huduser.org/datasets/il.html> for further detail on income limits.

<sup>18</sup>See [http://portal.hud.gov/portal/page/portal/HUD/topics/rental\\_assistance/phprog](http://portal.hud.gov/portal/page/portal/HUD/topics/rental_assistance/phprog) for further details.

<sup>19</sup>Johnson, Renwick, and Short (2010) identify additional factors HUD uses in adjusting families’ income; these figures are available through the CPS ASEC but not collected in the ACS.

<sup>20</sup>We are unable to assign additional medical deductions as Housing Authorities sometimes do, given the limitations of our data.

## Determining Eligibility

Given the limited data on public housing in both the ACS and the administrative data from HUD—we defined adjusted income and determined eligibility as follows:

1. Adjusted annual household income using the ACS adjustment factor, as for other measure components;
2. Selected only those households in the dataset which were renters;
3. Compared adjusted income to public housing eligibility guidelines (updated for 2009) as described above, including allowances based on certain demographic and health characteristics, income limits, household size, and PUMA;

As with LIHEAP receipt, many more households were eligible for public housing assistance than the number who actually received it in the administrative data.

## Assigning Public Housing Receipt

This approach relied on the same logic and methodology as used in the LIHEAP simulation in order to select recipients from the pool of eligibles. We assigned a random number to each eligible household, by PUMA and by presence of elderly members.<sup>21</sup> We then ranked these household records by their random numbers, by PUMA and by elderly member presence, and selected the appropriate number of households needed to achieve the number of household recipients (weighted) comparable to the administrative data.

## Assigning Public Housing Benefits

We assigned annual out of pocket rent to households receiving public housing benefits by multiplying adjusted income by 0.30. We calculated the annual value of the subsidy as the annualized fair market rent (FMR) for the PUMA (updated for 2009), minus 30 percent of annual adjusted income.<sup>22</sup> The annual subsidy value was prorated among individuals in the household, and then summed for poverty units and household units for the respective poverty calculations.

## Comparison of Simulation Results to Administrative Data

Unlike the administrative data for LIHEAP, where dollar amounts were available for total payouts and average payments by county, our data source for public housing receipt does not contain any fiscal data. Therefore, we are only able to compare the numbers of people and households served in administrative data to our simulated data, and not do a comparison of payments within PUMA; we do, however, estimate the subsidy value by county or PUMA and for the state as a whole (see Table G 1). Our simulation came within one percentage point of the demographic target for households with one or more elderly members (32 percent).

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<sup>21</sup>HUD defines elderly as 62 or older.

<sup>22</sup>Note that FMRs were based on the numbers of bedrooms as reported in the ACS, with all responses for four or more bedrooms collapsed into a single category and assigned the 4-bedroom FMR. The Census method is slightly different, assigning the number of bedrooms based on people in the household and HUD rules; however, the ACS allows us to know precisely how many bedrooms were in the actual unit.

As in the case of LIHEAP benefits, public housing benefits are estimated for a household unit, which in some cases differs from the poverty unit. As explained above for LIHEAP benefits, in cases where there are 2 or more poverty units in the household, we allocated the benefit across the poverty units based on the number of people in each poverty unit.

**Table G 1. Results of Public Housing Simulation and Comparison to Administrative Data, 2009**

County / PUMA	Administrative	Simulation	
	Data	Number of Households Receiving	Number of Households Receiving
			Payment Total
Milwaukee	19,850	19,695	\$102,984,803
Dane (Madison)	5,777	5,770	\$26,948,259
Waukesha	2,881	2,298	\$13,349,228
Brown (Green Bay)	4,098	4,079	\$18,437,107
Racine	2,804	2,741	\$7,186,695
Kenosha	2,145	2,060	\$10,163,841
Rock (Janesville)	2,194	2,232	\$11,126,089
Marathon (Wausau)	914	899	\$2,786,987
Sheboygan	984	970	\$2,738,066
La Crosse	1,330	1,380	\$2,621,013
Ozaukee/Washington	1,420	1,391	\$3,724,374
Jefferson/Walworth	1,526	1,472	\$5,082,737
Chippewa/Eau Claire	2,105	2,071	\$7,218,526
Calumet/Outagamie/ Winnebago (Appleton)	3,327	3,228	\$14,402,211
Columbia/Dodge/Sauk (Baraboo)	2,148	1,938	\$6,043,818
5-county area (Menomonie)	1,333	1,345	\$4,198,320
5-county area (Dodgeville)	1,259	1,226	\$3,259,878
6-county area (Manitowoc)	2,157	2,023	\$5,992,419
7-county area (Fond du Lac)	2,483	2,501	\$7,591,134
8-county area (Sparta)	1,575	1,634	\$5,019,183
9-county area (Stevens Point, Crandon)	2,992	2,877	\$5,891,206
10-county area (Superior)	2,974	3,006	\$8,798,421
<b>Wisconsin</b>	<b>68,276</b>	<b>67,419</b>	<b>\$275,564,315</b>

### Changes in Methodology for 2009

This year, we refined our method to better approximate the proportion of households containing one or more elderly members. (In 2008, we did not look at demographic characteristics when selecting households.) This change resulted in more housing payments to households with an elderly member and

fewer housing payments to other households. In addition to working on this demographic target, we also refined our method to include administrative data on the Housing Voucher Choice program, which was omitted from our 2008 estimate. The subsidy value was capped at 44 percent of the poverty unit's poverty threshold, to reflect the housing portion of the threshold.<sup>23</sup> Finally, we made two corrections: one to the process for adjusting income per HUD guidelines and the other to restrict the eligibility pool to households that would receive subsidies greater than zero. The latter correction, combined with the inclusion of Voucher Choice recipients, increased the estimated value of simulated payments substantially from 2008 to 2009.

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<sup>23</sup>To avoid negative subsidy values, the subsidy value was set to zero if 30 percent of household income exceeded the FMR for the given household.



## APPENDIX H. ESTIMATION OF WORK-RELATED EXPENSES

The WPM subtracts from family resources the expenses that families face when going to work—primarily work-related child care and transportation expenses. Yet the ACS contains no questions about child care expenses and limited ones about getting to work.

**Work-Related Child Care Expenses.** For estimating work-related child care expenses, we debated the two main approaches that the Census Bureau has used in experimental poverty measures:

- 1) Modeling actual expenses, which range considerably across families. Under this approach, large numbers of families would have 0 in child care expenses, while a few would have very high expenses.
- 2) Modeling expected expenses, which are set as modest weekly amounts for all families, varying only by number and age of children. Under this approach, no family with children under age 12 would be expected to rely on unpaid care during weeks when all parents are working.

We chose to use the expected costs approach in 2008 and ended up maintaining that approach in 2009, partly for consistency across the two years. However, the SPM proposes using actual expenses, and so we have begun exploring the possibility of imputing actual expenses, drawing on the new questions about out-of-pocket expenses that added to the CPS in 2010. Preliminary findings for the new method, based on an initial match of the CPS and the ACS, are shared below.

Under the expected cost approach, work-related child care expenses were calculated by multiplying an “expected weekly amount” by the weeks worked by the worker with the fewest weeks, but subject to a cap of the annual earnings of the worker with the lowest earnings.<sup>24</sup> The expected weekly amount is 85 percent of median weekly family expenses on child care, varying by the number of children less than age 5 and the number of children less than age 12, and based on unpublished tabulations of the spring 2005 Survey on Income and Program Participation (personal communication with K. Short, March 26, 2010). Table H 1 shows the base weekly amount for child care expenses for families by numbers of children less than age 5 years and less than age 12 years, adjusted for inflation to 2009.

**Table H 1. Estimated Child Care Expenses by Family Composition, 2009**

<b>Number of Children, by Age</b>	<b>Base Weekly Amount for Child Care</b>
1 child under 12 years	
and none under 5 years	52.30
with 1 under 5 years	100.58
2 or more children under 12 years	
None under 5	80.46
1 under 5	94.29
2 or more under 5	150.87

<sup>24</sup>For this calculation, we defined a working adult as a person who is head, spouse, or other adult 18 years of age or older. If any of these adults were not working, child care expenses were set to zero.

The March 2010 CPS supplemental questionnaire collected data on child care expenses for the first time. John Coder of Sentier Research LLC used these data to improve our tax model's estimate of the child and dependent care tax credit and we tested how our imputation would change if we also used the same data to model actual child care expenses. Specifically he used data collected in this survey to augment the ACS data by linking "similar" households in the March CPS using statistical matching techniques. Linkages were made at the household level and the child care expense amounts from the CPS were assigned to "matched" ACS households. The statistical match used the following list of variables to create the keys for the statistical match: age of the householder; race of householder; marital status of householder; number of children under age 15; household income class; gender of householder; presence of child under 6 years of age; presence of child age 6 to 14 years of age.

Our preliminary estimate is that imputed child care expenses would be lower using the ACS-CPS matched data, which likely reflects the high number of families reporting 0 in child care expenses. Lower child care expenses means higher levels of family resources (after adjusting for child care), and thus lower poverty rates. We estimate that overall poverty rates would drop from by 0.5 percentage points (from 11.5 percent to 11.0 percent) and that child poverty rates would drop by 1.3 percentage points (from 13.4 to 12.1). We may switch to this "actual" rather than expected amounts imputation for child care expenses in the future, to be more consistent with the Supplemental Poverty Measure. We also hope to improve the match, in part by expanding the size of the sample for Wisconsin by combining years of the CPS. The number of households available for Wisconsin from the CPS was only about 1,400 for the 2010 survey. As 2010 was the first year that child care expense data were collected in the CPS it was not possible to combine data sets from multiple years. We also would like to refine our model to better capture the reduction in out-of-pocket child care expenses for those families receiving public subsidies and paying modest co-payments. While fewer than 60,000 children received subsidized care through the Shares program in an average month in 2009, representing about 6 percent of Wisconsin's child population under age 13, many of these children may be in low-income families who are hovering near the poverty threshold.

**Work-Related Transportation and Other Expenses.** For work expenses other than child care, we used Census Bureau procedures, modified slightly to adjust for longer commuting times and higher commuting costs for rural households. The standard Census Bureau method is to use an expected amount, or a flat weekly amount, multiplied by usual weeks worked, for each working adult, and constrained to be less than or equal to the person's annual earnings. The expected amount is 85 percent of median weekly work expenses (derived from the Survey of Income and Program Participation (SIPP),, which in 2009 is \$33.00\*.85 or \$28.05 per week (personal communication, K. Short, February 15, 2011).

We then adjusted work expenses to account for the somewhat longer commuting times and thus higher gasoline costs of rural households. The vast majority (82 percent) of the Census Bureau estimate of work expenses is based on the number of miles driven to and from work (Short, Martin and Eller, 1996). Our tabulations of data from the 2009 National Household Transportation Survey indicate that person living outside metropolitan areas drive an average of 14.8 miles per travel day on trips to work, which is about 0.9 miles, or 6.2 percent, longer than the national average. Persons within metropolitan areas drive an average of 13.7 miles, or 1.3 percent less than the national average. Applying these adjustments to the mileage portion of the work expense estimates resulted in work expenses of \$29.48 for persons outside of MSAs multiplied by weeks worked and \$27.74 for persons within MSAs multiplied by weeks worked.

## APPENDIX I. WITHIN-STATE GEOGRAPHIC ADJUSTMENT METHODOLOGY

Our within-state geographic adjustment methodology builds off the approach used by the Census Bureau, in that variation in housing costs is used to model overall geographic differences in cost of living. However, we rely on ACS data on rental costs, rather than HUD estimates of Fair market rents. In addition, rather than showing only two adjustment, metro and non-metro, as in the Census Bureau approach, we ended up grouping the different counties and PUMAs into six different regions. We used the same method for both the second and third annual *Wisconsin Poverty Reports* and used the ratios we found for 2008 again for 2009 rather than calculating new ones, although this appendix also discusses an alternate approach similar to that in the Supplemental Poverty Measure.

### IRP Geographic Adjustment Method

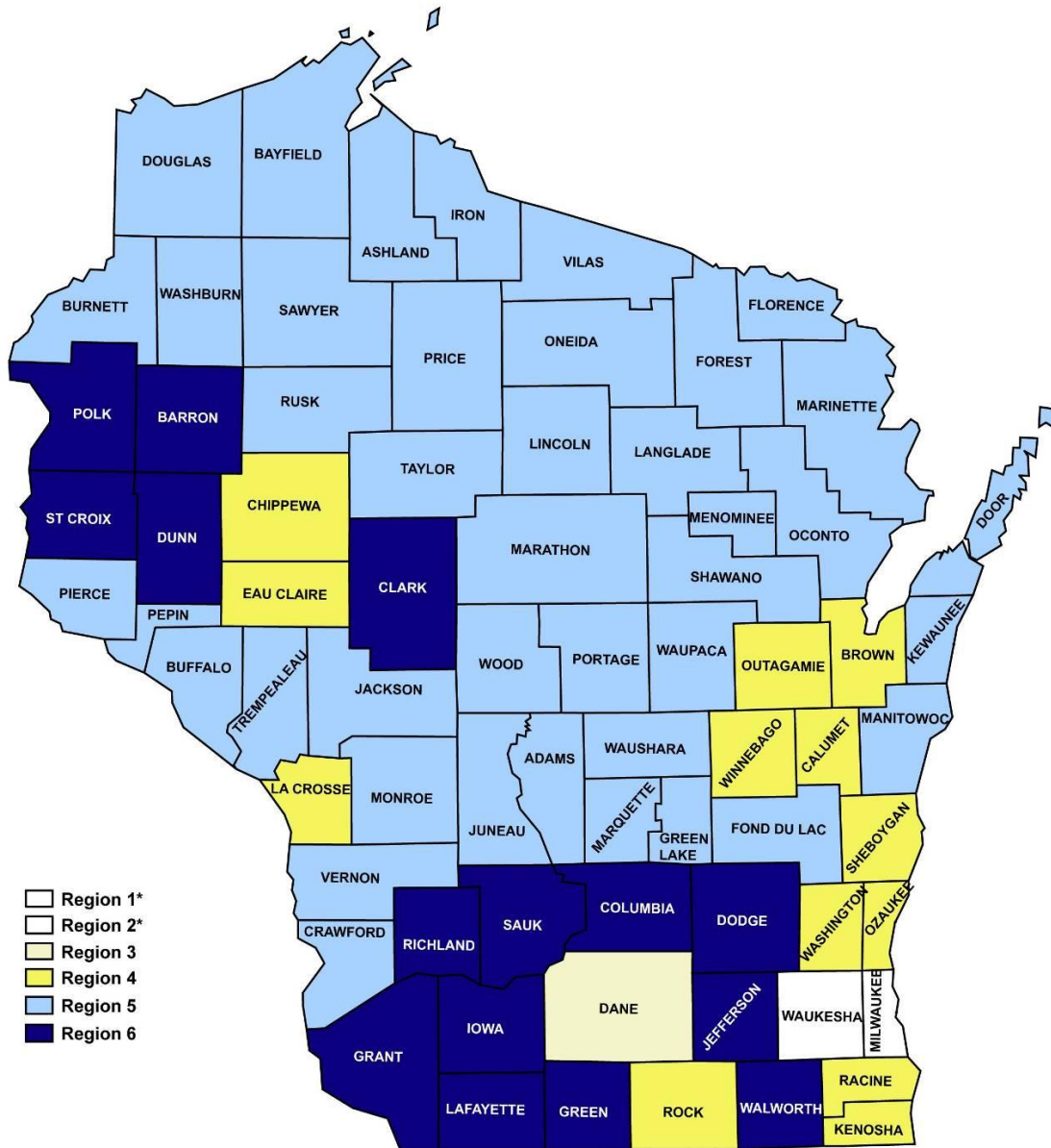
The ACS provides detailed data on various forms of housing costs. For our initial geographic cost of living index, we analyzed a subset of low- to moderate-income households and calculated median annual housing rents (including utilities) for households in each county or PUMA. We ranked households by income, and then selected those households in the 28<sup>th</sup> to 38<sup>th</sup> percentiles of income for this analysis.<sup>25</sup>

Our next step was to group the counties into six areas of the state, so as to establish regions of similar type (i.e., metro vs. non-metro), sufficient sample size, and somewhat similar costs (as shown by rental costs in our first index). We ended up grouping the 31 Wisconsin PUMAs into six regions—four metro areas and two generally non-metro areas—to account for these differences in costs of living (see Figure I 1). As shown in Table I 1, the central parts of Milwaukee (PUMAS 2002, 2003, and 2004) are in Region 1, while the outskirts (PUMAS 2001, 2101, and 2102) plus suburban Waukesha (2201, 2202 and 2203) form Region 2, a region with higher housing costs. Region 3 is Dane County, site of Madison, the second-largest city, and the outskirts of Madison. Region 4 is all other urban areas (encompassing a considerable range of cities). Finally, most rural counties are in Region 5, except more densely populated rural areas (nearer to Madison or Minneapolis) are in Region 6. One small city—Wausau, in Marathon County—is grouped with its surrounding rural counties in Region 5.

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<sup>25</sup>In this index, we are controlling for family income. Under an alternate version of the index, we analyzed rents for two-bedroom units, as is proposed in the SPM. The first version looks at variation in rental housing costs, controlling for family income, while the second version looks at variation in rental housing costs, controlling for the number of bedrooms in the housing unit. (We do not have sufficient sample size to control for both.) Both methods rely on the IPUMS variable RENTGRS for gross monthly rent.

**Figure I 1. Map of Regions Used for Within-State Geographic Adjustment<sup>26</sup>**



<sup>26</sup>The central parts of Milwaukee (PUMAs 2002, 2003, and 2004) are in Region 1, while the outskirts (PUMAs 2001, 2101, and 2102) plus Waukesha (PUMAs 2201, 2202, and 2203) form Region 2. Region 3 is Dane County, site of Madison, the second-largest city. Region 4 is all other urban areas (encompassing a considerable range of cities). Finally, most rural counties are in Region 5, except more densely populated rural areas (nearer to Madison or Minneapolis) are in Region 6. One small city—Wausau, in Marathon County—is grouped with its surrounding rural counties.

The next step was to create a rent index equal to the ratio of the median annual costs for renters within the 28<sup>th</sup> to 38<sup>th</sup> percentiles of income in the given region to the median annual costs for renters within the same income range statewide. In 2008, the median housing cost for Wisconsin renters within the 28<sup>th</sup> to 38<sup>th</sup> percentiles of income was \$8,640.

We then took our rental index (calculated from ACS data) and applied them to a portion of our thresholds, assuming that shelter and utilities costs represented 44 percent of the total threshold, following the methodology used by the Census Bureau in making geographic cost-of-living adjustments. Specifically, we used the following equation: Thresholds with geographic adjustment = [rent index \* 0.44] + [1 \* 0.56]\* base threshold.

Table I 1 shows ratios and sample thresholds for renters in each of the six regions.

**Table I 1. Multi-PUMA Regions, Ratio of Costs to Statewide Costs, and Sample Thresholds for Within-State Geographic Adjustment, 2009**

Region	Corresponding PUMAs	Ratio for Within-State Geographic Adjustment	Sample Threshold for Renters*
<b>Overall</b>	<b>N/A</b>	<b>N/A</b>	<b>\$25,312</b>
1. Inner Milwaukee	2002, 2003, 2004	1.00	\$25,312
2. Outer Milwaukee and Waukesha	2001, 2101, 2102, 2201, 2202, 2203	1.05	\$26,578
3. Dane County (Beige in Figure I 1)	1100, 1200	1.04	\$26,324
4. Other Metro areas (Yellow in Figure I 1)	200, 300, 500, 900, 1500, 1800, 1900, 2300, 2400, 2500	0.99	\$25,059
5. Rural 1 + Marathon (Light Blue in Figure I 1)	100, 600, 1300, 1400, 1600, 1700	0.92	\$23,287
6. Rural 2 (Dark Blue in Figure I 1)	400, 800, 1000, 1700	0.98	\$24,806

**Source:** IRP tabulations of 2008 and 2009 American Community Survey data and authors' choices in constructing geographic regions within the state of Wisconsin.

\*Two-Parent, Two-Child Family Renting Their Home by Geographic Region (No Medical Expenses in the Threshold).

### Alternate Method: Two-Bedroom Rent Index

Census Bureau research, including work on the proposed federal Supplemental Poverty Measure (SPM), relies on a housing-based index to make geographic adjustments for metro and non-metro areas in states. Specifically, the SPM uses “5-year ACS estimates of median gross rents for 2-bedroom apartments with complete kitchen and plumbing facilities” (Short, 2011).<sup>27, 28</sup> Medians are calculated for all 309 of the

<sup>27</sup>See also Renwick (2009) and Renwick (2011) for further work on geographic adjustments.

metropolitan statistical areas (MSAs) in the CPS public use file, all 48 non-metro areas, and all other metro areas within the state (combined).

### *Data Source*

Neither the five-year ACS nor the 2007–09 three-year sample was available in IPUMS, at the time of this analysis, so this work relies on the 2006–08 three-year ACS sample from IPUMS. Wisconsin MSAs were identified using the 2009 CPS public use file; 11 of the MSAs in the 2006–08 ACS IPUMS sample were included in the CPS file (see Table I 2).<sup>29</sup>

**Table I 2. CPS Metropolitan Code, IPUMS Metropolitan Area, and Corresponding Area**

<b>Value of CPS Variable GTCBSA (Metropolitan CBSA FIPS Code)</b>	<b>Value of IPUMS Variable METAREA (Metropolitan area)</b>	<b>Corresponding Area</b>
0	0	Not identifiable or not in an MSA
11540	460	Appleton-Oshkosh-Neenah, WI
20740	2290	Eau Claire, WI
24580	3080	Green Bay, WI
27500	3620	Janesville-Beloit, WI
29100	3800	Kenosha, WI
31540	4720	Madison, WI
33340	5080	Milwaukee, WI
36780	6600	Racine, WI
39540	7620	Sheboygan, WI
48140	8940	Wausau, WI

**Source:** Current Population Survey and IPUMS

### *Identifying Median Rent by Area and Calculating Ratios*

We examined gross rent for 2-bedroom homes in Wisconsin by MSA. The index was determined by taking the ratio of each MSA’s median rent to the statewide median rent. Table I 3 shows median rents and the index for 2006–08, with a comparison to the regional ratios we applied for 2008.

<sup>28</sup>The IRP geographic adjustment method does not restrict rental units those with full kitchen and plumbing facilities as Census did for SPM. However, 99.9 percent of renters of 2-bedroom units in Wisconsin in the 2006–08 ACS sample reported living in units with complete kitchen and shared or exclusive use of kitchen.

<sup>29</sup>The La Crosse MSA does not appear in the CPS public use file and therefore was recoded as 0 (Not identifiable or not in an MSA).

**Table I 3. Metropolitan Areas and Ratios of Rental Housing Costs to Statewide Costs under 2-Bedroom Rent Index and Income-Based Regional COLAs**

Metropolitan Area	2-Bedroom Rent Index*			6-Region COLAs (Based on 2008 Rents)**	
	Median	Ratio to State Median Rent	2BR Index (44% of Threshold)	Index	Corresponding PUMA/Area(s)
Not identifiable or not in an MSA	\$650	0.89	0.95	0.92; 0.98; 0.99	All other than those listed below
Appleton-Oshkosh-Neenah	690	0.95	0.98	0.99	1500
Eau Claire	690	0.95	0.98	0.99	500
Green Bay	690	0.95	0.98	0.99	200,300
Janesville-Beloit	730	1.00	1.00	0.99	2400
Kenosha	790	1.08	1.04	0.99	1800
Madison	870	1.19	1.08	1.04	1100,1200
Milwaukee	770	1.05	1.02	1.00; 1.05	Inner Milwaukee; Outer Milwaukee
Racine	690	0.95	0.98	0.99	1900
Sheboygan	650	0.89	0.95	0.99	500
Wausau	670	0.92	0.96	0.92	1600
State overall	730	1.00	1.00	1.00	N/A

**Source:** IRP tabulations of 2006–2008 American Community Survey data and 2009 Current Population Survey.

\*Based on median rent for 2-bedroom homes in 3-year ACS sample for Wisconsin.

\*\*Based on rent at 33rd percentile for all renters in WI as part of WPM model.

The greatest difference in the ratios for the two methods are Kenosha (1.04 versus 0.99), Madison/Dane County (1.08 versus 1.04), and Wausau (0.96 versus 0.92). A subsequent analysis comparing ratios under the 2005–07 and 2006–08 ACS three-year samples yielded differences ranging from 0.00 to  $\pm 0.03$ .

### ***Sample Sizes for 2-Bedroom Index by MSA***

In 2008, one reason we grouped PUMAs into 6 regions was to deal with the small sample size of renters within the specified percentiles of income within the given areas. We have a similar issue with the 2-bedroom index, as the pool of renters of two bedroom units in Wisconsin is somewhat small, and even smaller when broken into 11 geographic areas. Table I 4 shows the unweighted and weighted counts of renters in 2-bedroom units by metropolitan area using the 2006–08 ACS 3-year sample.

**Table I 4. Sample Count and Weighted Number of Observations for Renters in Two-Bedroom Units by Metropolitan Area**

<b>Metropolitan Area</b>	<b>Sample Count</b>	<b>Weighted Number of Observations</b>
0: Not identifiable or not in an MSA (includes La Crosse)	4,396	173,881
460: Appleton-Oshkosh-Neenah	759	41,088
2290: Eau Claire	311	16,445
3080: Green Bay	555	32,023
3620: Janesville-Beloit	275	15,807
3800: Kenosha	275	19,217
4720: Madison	946	52,372
5080: Milwaukee	3,223	191,435
6600: Racine	299	18,524
7620: Sheboygan	237	13,679
8940: Wausau	213	11,768
<b>Wisconsin</b>	<b>11,489</b>	<b>586,239</b>

**Source:** IRP tabulations of 2006–2008 American Community Survey data and 2009 Current Population Survey.



## APPENDIX J. NAS-BASED POVERTY THRESHOLDS

The Census Bureau has calculated four different versions of thresholds for two-adult, two-child families following NAS Recommendations (see Table J 1). We used the version that included repayment of mortgage principal for owned housing but did not include medical expenses (which we add in separately). In 2009, this base threshold was \$26,778 at the national level.

**Table J 1. Poverty Thresholds for Two-Adult-Two-Child Family Following NAS Recommendations, 1999–2009**

	Official	FCSU-CE <sup>a</sup>	FCSUM-CE <sup>a</sup>	FCSUB <sup>b</sup>	FCSUM <sup>b</sup>
<b>1999</b>	16,895	17,036	18,671	18,196	19,648
<b>2000</b>	17,463	17,884	19,549	19,097	20,731
<b>2001</b>	17,960	18,709	20,366	19,935	21,640
<b>2002</b>	18,244	19,329	21,088	20,757	22,600
<b>2003</b>	18,660	19,778	21,635	21,218	23,109
<b>2004</b>	19,157	19,984	22,034	21,895	23,738
<b>2005</b>	19,806	20,708	22,841	22,769	24,784
<b>2006</b>	20,444	21,818	23,935	24,026	25,834
<b>2007</b>	21,027	23,465	25,849	25,680	27,744
<b>2008</b>	21,834	24,755	27,601	27,043	29,654
<b>2009</b>	21,756	24,522	27,709	26,778	29,602

**Source:** U.S. Census Bureau, 2010.

**Notes:** FCSU(M) represents the groups of items deemed as necessary expenditures by the NAS report; food, clothing, shelter, utilities and medical expenditures.

<sup>a</sup>Based on out-of-pocket expenditures (based on CE definition of spending and omits repayment of mortgage principal for owned housing); food, clothing, shelter plus utilities, and MOOP (FCSUM)

<sup>b</sup>Based on out-of-pocket expenditures (including repayment of mortgage principal for owned housing).

Thresholds for 2007 forward reflect implementation of questionnaire improvements about expenditures on food away from home and type of mortgage in the Consumer Expenditures Interview Survey beginning in Quarter 2 of 2007. These results were produced by Thesia I. Garner, Research Economist, Division of Price and Index Number Research, Bureau of Labor Statistics, for research purposes only using the Consumer Expenditures Interview Survey. These results are released to inform interested parties of ongoing research and to encourage discussion of work in progress.

## **APPENDIX K. CALCULATION OF MEDICAL EXPENSES IN THRESHOLD**

We took an approach based on expected medical expenses, incorporating these into the threshold (MIT) rather than subtracting from income (MSI). We followed the Census Bureau methodology for calculating MIT as detailed in Short (2001), but we adjusted the national MIT value of \$2,121 (U.S. Census Bureau, 2010) downward for Wisconsin's standard of living, resulting in a Wisconsin-specific base MIT value of \$1,946 for our two-parent, two-child reference family.

The baseline MIT was then adjusted using risk factors, based on presence of elder (yes/no), health status (good vs. poor/fair), health insurance status (private, public, and, for non-elderly, no insurance) and (one, two, and three or more for non-elderly, one vs. two or more for elderly). Table K 1 details the risk factors and the corresponding MIT. Finally, these MIT adjustments were added to the equivalized threshold to determine the final threshold for each poverty unit.

**Table K 1. Estimated Medical Out-of-Pocket (MOOP) Expenses for Wisconsin, 2009**

Characteristics	MOOP in Thresholds for Wisconsin*	Risk Factors
Reference family	\$1,946	1.00
Families With No Elderly Members		
Private, 1 person		
Good health	817	0.42
Fair/poor health	1,498	0.77
Private, 2 people		
Good health	1,732	0.89
Fair/poor health	2,199	1.13
Private, 3 or more people		
Good health	1,946	1.00
Fair/poor health	2,452	1.26
Public, 1 person		
Good health	39	0.02
Fair/poor health	136	0.07
Public, 2 or more people		
Good health	58	0.03
Fair/poor health	175	0.09
Uninsured, 1 person		
Good health	934	0.48
Fair/poor health	1,751	0.90
Uninsured, 2 or more people		
Good health	1,985	1.02
Fair/poor health	2,102	1.08
Families With Elderly Members		
Private, 1 person		
Good health	2,316	1.19
Fair/poor health	2,549	1.31
Private, 2 or more people		
Good health	3,736	1.92
Fair/poor health	4,476	2.30
Public, 1 person		
Good health	954	0.49
Fair/poor health	876	0.45
Public, 2 or more people		
Good health	1,771	0.91
Fair/poor health	1,965	1.01

**Source:** Adapted from Short (2001) and U.S. Census Bureau (2010).

\*Wisconsin median of \$1,946 based on national median of \$2,121.

## APPENDIX L. POVERTY ESTIMATES WITH LOWER AND UPPER BOUNDS

The following tables show 90% lower and upper bounds to accompany the poverty rates reported under the Wisconsin Poverty Measure for 2009.

**Table L 1. Poverty Rates in Wisconsin by Age under the Wisconsin Poverty Measure, with 90% Lower and Upper Bounds, 2009**

	<b>Estimate under the Wisconsin Measure</b>	<b>90% Lower Bound</b>	<b>90% Upper Bound</b>
<b>All</b>	<b>11.5</b>	<b>11.1</b>	<b>12.0</b>
Children	13.4	12.4	14.5
Elderly	9.6	8.9	10.3
Adults 18–64	11.2	10.7	11.6

**Table L 2. Poverty Rates by County or Multi-County Area Under the Wisconsin Poverty Measure, with 90% Lower and Upper Bounds, 2009**

	Estimate under the Wisconsin Measure	90% Lower Bound	90% Upper Bound
<b>County</b>			
Milwaukee	19.6	17.7	21.5
Dane (Madison)	13.9	12.3	15.6
Waukesha	5.6	4.0	7.2
Brown (Green Bay)	13.3	10.9	15.7
Racine	11.3	8.5	14.1
Kenosha	12.0	9.2	14.9
Rock (Janesville)	10.7	7.9	13.4
Marathon (Wausau)	5.7	3.7	7.6
Sheboygan	7.1	4.8	9.5
La Crosse	14.2	10.9	17.5
<b>Multi-County Area</b>			
Ozaukee/Washington	5.6	3.8	7.5
Jefferson/Walworth	11.7	8.8	14.7
Chippewa/Eau Claire	12.6	10.4	14.9
Calumet/Outagamie/ Winnebago (Appleton)	11.2	9.2	13.1
Columbia/Dodge/Sauk (Baraboo)	5.4	4.1	6.8
5-county area (Menomonie)	9.6	7.6	11.7
5-county area (Dodgeville)	11.4	9.3	13.4
6-county area (Manitowoc)	7.5	5.7	9.3
7-county area (Fond du Lac)	9.9	8.3	11.6
8-county area (Sparta)	8.2	6.8	9.6
9-county area (Stevens Point, Crandon)	7.7	6.6	8.8
10-county area (Superior)	11.6	9.6	13.6
<b>State Total</b>	<b>11.5</b>	<b>11.1</b>	<b>12.0</b>

**Table L 3. Poverty Rates Within Milwaukee and Dane Counties Under the Wisconsin Poverty Measure, with 90% Lower and Upper Bounds, 2009**

<b>County/Area</b>	<b>Estimate under the Wisconsin Measure</b>	<b>90% Lower Bound</b>	<b>90% Upper Bound</b>
<b>Milwaukee (overall)</b>	<b>19.6</b>	<b>17.7</b>	<b>21.5</b>
Outer Northwest and East	25.9	21.2	30.5
Inner North	23.8	18.4	29.2
Central	23.8	32.4	46.0
South	39.2	12.7	21.6
Brown Deer, Glendale, Shorewood, Wauwatosa, Whitefish Bay, Other	17.1	2.9	7.7
Southern Suburbs*	5.3	8.7	14.2
<b>Dane (Overall)</b>	<b>13.9</b>	<b>12.3</b>	<b>15.6</b>
Madison	20.8	17.8	23.7
Fitchburg, Middleton, Stoughton, Sun Prairie, Other	8.2	6.3	10.2
<b>State Total</b>	<b>11.5</b>	<b>11.1</b>	<b>12.0</b>

**Table L 4. Wisconsin Poverty Rates without Adjustments to Thresholds and Resources, with 90% Lower and Upper Bounds, 2009**

<b>Measure Specification</b>	<b>Estimated Percent in Poverty</b>	<b>90% Lower Bound</b>	<b>90% Upper Bound</b>
<b>Wisconsin Poverty Measure</b>	<b>11.5</b>	<b>11.1</b>	<b>12.0</b>
without ownership ratio	11.7	11.2	12.1
without geographic adjustment	11.8	11.3	12.2
without medical expenses in the threshold	10.1	9.7	10.6
without SNAP	12.7	12.2	13.2
without public housing	12.0	11.5	12.5
without LIHEAP	11.8	11.4	12.3
without taxes	13.4	12.9	13.9
without work expenses	9.5	9.1	9.9
without taxes, public housing, LIHEAP, and SNAP	15.2	14.7	15.7

**Table L 5. Estimated Percentages of Individuals with Incomes below 50, 75, 100, 125, and 150 Percent of Poverty, Under Wisconsin Poverty Measure, with Lower and Upper Bounds, 2009**

<b>Age and Income as a Percent of Poverty</b>	<b>Estimated Percent in Poverty</b>	<b>90% Lower Bound</b>	<b>90% Upper Bound</b>
<b>All Individuals</b>	<b>11.5</b>	<b>11.1</b>	<b>12.0</b>
Below 50%	3.5	3.2	3.7
50% to 74%	3.2	2.9	3.5
75% to 99%	4.8	4.5	5.1
100% to 124%	6.9	6.6	7.3
125% to 149%	9.5	9.0	9.9
<b>Children</b>	<b>13.4</b>	<b>12.4</b>	<b>14.5</b>
Below 50%	3.4	2.8	3.9
50% to 74%	4.1	3.5	4.8
75% to 99%	6.0	5.2	6.8
100% to 124%	8.8	8.1	9.6
125% to 149%	13.3	12.3	14.3
<b>Elderly</b>	<b>9.6</b>	<b>8.9</b>	<b>10.3</b>
Below 50%	2.3	1.9	2.6
50% to 74%	2.4	2.1	2.8
75% to 99%	4.9	4.3	5.5
100% to 124%	7.3	6.6	7.9
125% to 149%	9.6	8.9	10.2

## APPENDIX M. COMPARISON OF METHODS FOR 2008 AND 2009

Although our methodology is largely the same for both 2008 and 2009, we did make some changes to reflect updated data and refinements to our model. Table M 1 summarizes these elements by model component for the two years.

**Table M 1. Model Components, 2008 Methods, and 2009 Methods**

Model Component	2008 Method	2009 Method
<b>THRESHOLD</b>		
Base threshold	\$27,043 (federal CE level for FCSU for 2008).	\$26,778 (federal CE level for FCSU for 2009). Available at <a href="http://www.census.gov/hhes/www/povmeas/tables.html">http://www.census.gov/hhes/www/povmeas/tables.html</a> .
WI:US adjustment	0.918648	0.917721
Within state geographic adjustment	Ratio only applied to housing portion of threshold for differences in cost of living for 6 regions: [(Ratio*.44 + 1*.56)*base threshold]	Same as 2008. Also explored an SPM-like alternate index based on 2-bedroom rents.
Housing tenure type	3 ratios by renter, owner with mortgage, owner without mortgage.	Same as 2008.
Family size and composition	3-parameter scale; reference family is 2-parent, 2-child.	Same as 2008.
Expected medical expenses	Medical out-of-pocket expenses in the threshold (MIT) using Census Bureau method with risk factors. Base allowance of \$2,101.	Same method as 2008, but updated for 2009 threshold. Base allowance of \$1,946 for 2009.

(table continues)



**Table M 1., continued**

<b>Model Component</b>	<b>2008 Method</b>	<b>2009 Method</b>
<b>RESOURCES</b>		
+ Cash income	Cash income as measured in ACS. Multiply dollar incomes by the IPUMS variable ADJUST, which has a single value each year (1.018389 for 2008).	Same method as 2008. Value of IPUMS ADJUST variable for 2009 ACS was 0.999480.
+ Taxes/credits	Simulation from Sentier Research.	Simulation from Sentier Research. The tax model was updated to incorporate changes in tax law, including those under the American Recovery and Reinvestment Act of 2009. Other refinements include a new statistical match with the CPS to improve estimates of child care expenses and thus estimates of the dependent and child care tax credit.
+ SNAP	Imputed benefit amounts from state administrative data.	Similar to 2008, but updated with new administrative data and slight model refinements.
+ LIHEAP	Imputed receipt & benefit amounts from state administrative data.	Same method as 2008, but using updated administrative data for 2009.
+ Public housing	Imputed receipt & benefit amounts from state administrative data.	Similar method to 2008, but refined for elderly demographic targets and to include Housing Voucher Choice program. Fair Market Rents and HUD income limits were also updated for 2009.
- Work expenses (child care, transportation, etc.)	Modeled expected costs using Census Bureau approach, but with small adjustment to account for longer rural commutes.	Same as 2008, but with update for 2009 costs. Also explored an alternate approach using a CPS match to simulate actual costs for child care expenses.

(table continues)

**Table M 1., continued**

<b>Model Component</b>	<b>2008 Method</b>	<b>2009 Method</b>
<b>OTHER</b>		
Definition of poverty unit	Poverty units created for 2008.	Same as 2008.
Treatment of students	Only excluded group quarters in main model; technical appendix included additional tables on what rates might look like with certain students excluded (those attending college, ages 18–23, living off-campus but not living with parents).	Final model excluded certain students living off-campus (those attending college, ages 18–23, living off-campus but not living with other family members or unmarried partners, and with limited earnings (<\$5,000) and limited work activity). Technical appendix shows poverty estimates under 2008 model.
Analytical tables	Wisconsin Overall By age: all, children, elderly By geography: by PUMA, large counties, Milwaukee vs. rest of state; Ratios for poverty levels; Marginal effects of resource & threshold adjustments; Compare poverty units to households; Standard errors.	Same as 2008, plus: Comparisons of 2008 to 2009; Results by family type for children; Results by family type and sex for the elderly.

## APPENDIX N. EFFECT OF PUBLIC POLICIES ON REDUCING POVERTY IN WISCONSIN BY INCOME TYPE

A comparison of poverty rates using market income (income from earnings and private sources, or MI) and disposable personal income (spendable income after deducting taxes and adding benefits, or DPI) illustrates the large changes in the poverty-reducing effects of policies from 2008 to 2009. Market-income-driven poverty rose from 21.3 percent to 23.8 percent largely due to the employment and earnings losses from the Great Recession. In 2008, public policy reduced overall poverty by 47 percent, but by even more (52 percent) in 2009, thus overcoming the recession's negative effect on poverty and leaving the after-tax-and-benefit poverty rate almost the same as in 2008 (11.2 percent compared to 11.5 percent). Child poverty decreased by 37 percent in 2008 due to the effects of antipoverty policies and by nearly half (46 percent) in 2009. Adults between the ages of 18 and 64 and seniors age 65 and older saw strong effects of public policies as well. The large difference for the elderly can be attributed to Social Security benefits in particular.

**Table N 1. Comparison of Poverty Rates Using Market Income and Disposable Income by Age, 2008 and 2009**

Year		All	Children under 18	Adults 18–64	Elderly 65 and Older
2008	Based on Market Income (MI)	21.3%	21.5%	15.4%	50.3%
	Based on Disposable Income (DPI)	11.2%	13.6%	10.5%	10.4%
	Difference (MI-DPI, in percentage points)	10.1	7.9	4.9	39.9
	Difference as Percent of MI	47.4%	36.8%	31.8%	79.3%
2009	Based on Market Income (MI)	23.8%	24.9%	17.9%	50.7%
	Based on Disposable Income (DPI)	11.5%	13.4%	11.2%	9.6%
	Difference (MI-DPI, in percentage points)	12.3	11.5	6.7	41.1
	Difference as Percent of MI	51.7%	46.1%	37.4%	81.1%

**Source:** IRP tabulations of 2008 and 2009 American Community Survey data.

**Notes:** MI and DPI use the same threshold used for the Wisconsin Poverty Measure. For definitions of the poverty universe for 2008 and 2009, including the different treatment of select college students in 2009 under the Wisconsin Poverty Measure, please see Appendix C.

## REFERENCES

- New York City Center for Economic Opportunity. 2011. *Policy Affects Poverty: The CEO Poverty Measure, 2005–2009*. Available at [http://www.nyc.gov/html/ceo/downloads/pdf/poverty\\_measure\\_2011.pdf](http://www.nyc.gov/html/ceo/downloads/pdf/poverty_measure_2011.pdf).
- Renwick, Trudi. 2009. “Alternative Geographic Adjustments of U.S. Poverty Thresholds: Impact on State Poverty Rates.” Paper presented at the Joint Statistical Meetings, Washington, D.C. Available at <http://www.census.gov/hhes/www/povmeas/papers/Geo-Adj-Pov-Thld8.pdf>.
- Renwick, Trudi. 2011. [Supplemental Poverty Measure: Geographic Adjustments from the American Community Survey](#), presented at the Allied Social Science Association Meetings, Denver, CO, January 2011. Available at [http://www.census.gov/hhes/povmeas/methodology/supplemental/research/Renwick\\_SGE2011.pdf](http://www.census.gov/hhes/povmeas/methodology/supplemental/research/Renwick_SGE2011.pdf).
- Ruggles, Steven, J. Trent Alexander, Katie Genadek, Ronald Goeken, Matthew B. Schroeder, and Matthew Sobek. Integrated Public Use Microdata Series: Version 5.0 [Machine-readable database]. Minneapolis: University of Minnesota, 2010. Available at <http://usa.ipums.org/usa>.
- Short, Kathleen. 2011. “Who is Poor? A New Look with the Supplemental Poverty Measure.” U.S. Census Bureau, SEHSD working paper # 2010-15, Washington, D.C. Available at [http://www.census.gov/hhes/povmeas/methodology/supplemental/research/SGE\\_Short.pdf](http://www.census.gov/hhes/povmeas/methodology/supplemental/research/SGE_Short.pdf).
- U.S. Department of Commerce. 2010. “Census Bureau to Develop Supplemental Poverty Measure.” Press release, March 2, 2010. Available at <http://www.commerce.gov/news/press-releases/2010/03/02/census-bureau-develop-supplemental-poverty-measure>.
- Zedlewski, Sheila, Linda Giannarelli, and Laura Wheaton. 2010. “Estimating the Potential Effects of Poverty Reduction Policies.” *Journal of Policy Analysis and Management* 29(2): 387–400.
- Zedlewski, Sheila, Linda Giannarelli, Laura Wheaton, and Joyce Morton. 2010. *Measuring Poverty at the State Level*. Washington, DC: The Urban Institute. Available at [http://www.urban.org/UploadedPDF/412063\\_measuring\\_poverty.pdf](http://www.urban.org/UploadedPDF/412063_measuring_poverty.pdf).