

# Measuring Poverty at the State Level

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# MEASURING POVERTY AT THE STATE LEVEL

Over the past several years, numerous states have initiated task forces and commissions focused on developing policies to reduce poverty.<sup>1</sup> States' recommendations frequently include expanding income supports such as the earned income tax credit (EITC), child care subsidies, nutritional assistance, and early childhood and postsecondary education investments. Some states focus solely on reducing child poverty, while others focus on options for reducing poverty more generally. States' interest in reducing poverty stems from their recognition of the economic costs of poverty, especially the toll that poverty exerts on children.

Most state commissions quickly recognize the need for a benchmark that would allow them to track progress in reducing poverty and to test the effects of different policy proposals on poverty reduction. Such a benchmark would incorporate all components of family resources as well as an up-to-date measure of family needs in their state. The official measure of poverty used in the United States, based solely on cash income and a national measure of need set back in the 1950s (and subsequently adjusted by changes in prices), does not provide a good benchmark. For example, the official measure would not capture the effects of increasing child care subsidies or the effects of increasing the EITC for low-income families.

The measure of poverty recommended by the National Academy of Sciences (NAS) in 1995 meets states' needs for a useful benchmark.<sup>2</sup> The NAS measure includes all types of income, including that received in kind and through the tax system. The measure accounts for the effects of nondiscretionary work and out-of-pocket health expenses on net family income. The NAS measure also uses an updated measure of the cost of basic needs and captures variations by geographic area.

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This report describes a model that implements the NAS measure of poverty at the state level. We use the American Community Survey (ACS) as the basic model input because this survey provides large, representative samples of the population in each state. We use the Transfer Income Model, Version 3 (TRIM3) for the model's platform. The TRIM3 model includes procedures to impute in-kind resources and taxes, and it corrects for underreporting of benefits from key government assistance programs. Since TRIM3 uses state-specific program rules to simulate benefit programs and taxes, it provides an excellent platform for the remaining work required to estimate the NAS poverty measure using the ACS. The statistical model measures poverty at the state level for the base year and can estimate the likely effects of a variety of policies designed to reduce poverty.

This paper begins by describing the NAS poverty measure and how it differs from the official measure. The next section describes how we implement the NAS poverty measure. We describe some key features of the ACS, highlighting how it compares with the Current Population Survey—the Census survey used for the official poverty measure—and how we implement the NAS poverty measure using the ACS. The next section shows the results of the NAS poverty measure for Minnesota in 2006 compared with those using the official measure. We chose this state and year because we had previously estimated the NAS poverty measure in Minnesota using the Current Population Survey, and this provides an important benchmark against we could validate and compare the ACS results.<sup>3</sup> Then we demonstrate how the model can be used to estimate the effects of alternative policies on poverty. We simulate several policies similar to those that Minnesota has considered. Our final section summarizes the benefits and challenges in implementing the NAS poverty using the ACS. The appendix provides more detail on model procedures, including results of the baseline simulations.

## Measuring Poverty

Researchers broadly agree that the official measure of poverty in the United States is flawed.<sup>4</sup> The official measure, based on cash income, fails to take into account many antipoverty policies implemented over the past several decades. Also, the thresholds for measuring whether a family is poor are based on outdated data about food consumption adjusted only for changes in the consumer price index. The NAS measure of poverty, in contrast, includes all family resources, accounts for nondiscretionary expenses, and updates the thresholds used to measure poverty.<sup>5</sup> Considerable research has vetted the NAS measure since 1995, and the Census Bureau annually provides estimates of poverty applying the alternative measure to the annual Current Population Survey (CPS), along with information about the sensitivity to various assumptions about thresholds and resources. Many experts support the NAS measure, although some disagree about the treatment of specific items such as out-of-pocket medical expenses and the value of home ownership.<sup>6</sup>

### Resources

The official poverty measure includes only pre-tax cash income sources in its resource definition, but the NAS measure includes a broader definition of resources that approximates the net income available to a family (table 1). The NAS measure begins with cash income, adds capital gains and in-kind benefits (Supplemental Nutrition Assistance Program [SNAP] benefits,<sup>7</sup> housing assistance, and others), deducts federal and state income taxes (including refundable credits), and subtracts nondiscretionary expenses such as the cost of child care and transportation to work.<sup>8</sup> Nondiscretionary out-of-pocket medical expenses can be taken into account either as a deduction from resources or through the thresholds used to measure poverty. With this broad definition of resources, the NAS poverty measure can show how government tax and benefit policies affect family income and poverty status.

TABLE 1. Key Concepts, Official and NAS Poverty Measures

| Concepts   | Census official  | NAS alternative  |
|------------|--|--|
| Resources  | <p>Cash income:</p> <ul style="list-style-type: none"> <li>Wages, salaries, self-employment</li> <li>Interest, dividends, rent, trusts</li> <li>Social Security &amp; Railroad Retirement</li> <li>Pensions</li> <li>Disability benefits</li> <li>Unemployment compensation</li> <li>Child support</li> <li>Veterans benefits</li> <li>Educational assistance</li> <li>Supplemental Security Income</li> <li>TANF</li> <li>Other cash public assistance</li> </ul> | <p>Cash income—same as official with these changes:</p> <ul style="list-style-type: none"> <li>+ capital gains</li> <li>+ food stamps/SNAP</li> <li>+ free/reduced-price school lunch</li> <li>+ WIC</li> <li>+ LIHEAP</li> <li>+ housing subsidies</li> <li>– federal income tax</li> <li>– payroll taxes</li> <li>– state income taxes</li> <li>+ federal EITC</li> <li>+ state EITC</li> <li>– child care expenses</li> <li>– other work expenses</li> <li>– child support paid</li> </ul>  |
| Thresholds | <p>National thresholds vary by age (less than 65 and 65+) and number of children and adults. The original thresholds were based on the share of income spent on food in 1963 and have been adjusted by the change in the consumer price index each year.</p>   | <p>Thresholds are based on an average of the previous three years of Consumer Expenditure Survey data and provided by the Census Bureau. The thresholds use a three-parameter scale that varies the thresholds for differences in family size and number of children. Geographic adjustments by state and by metropolitan and nonmetropolitan areas within state are based on fair-market rent values and provided by the Census. Out-of-pocket medical expenses may be included in the thresholds. The medical portion of the thresholds account for differences in elderly/nonelderly status, family size, health insurance coverage, and health status.</p> |

## Thresholds

The official measure of poverty uses thresholds based on a subsistence food budget times a factor of three. The measure was developed in 1963 and based on spending patterns observed in a 1955 consumption survey (Blank and Greenburg 2008). The thresholds represent nationwide spending averages and are adjusted by the change in the consumer price index (CPI) each year.

The NAS thresholds are based on an average of the last three years of the Consumer Expenditure Survey (CE) data.<sup>9</sup> The Census Bureau thresholds reflect differences in living costs for each state and in urban and rural areas within the states based on the fair-market value of rents across the country. The Census provides thresholds with and without medical out-of-pocket expenses. Experts differ in their recommendations for the treatment of out-of-pocket medical expenses in the poverty measure. The 1995 report recommended deducting expenses from income. Surveys used to measure poverty typically do not provide estimates of out-of-pocket medical expenses, and the skewed spending distribution makes it difficult to accurately estimate these expenses from one dataset and impute to another. Some experts therefore recommend including expected expenses in the thresholds rather than subtracting actual expenses from income (Iceland 2005).

Table 2 shows the official poverty threshold and alternative NAS-based thresholds for a reference family of two adults and two children living in Minnesota. The official calendar year 2006 poverty threshold for

TABLE 2. Official and NAS-Based Poverty Thresholds for a Family of Two Adults and Two Children, Calendar Year 2006

|  | No geographic adjustment | Geographic Adjustment for MN |                 |
|--|--------------------------|------------------------------|-----------------|
|  |                          | MN-urban                     | MN-rural        |
| <b>Official Poverty Threshold</b>                      | 20,444                   | NA <sup>a</sup>              | NA <sup>a</sup> |
| <b>Alternative NAS-Based Thresholds</b>                |                          |                              |                 |
| Exclude medical expenses from threshold                | 21,818                   | 22,763                       | 18,772          |
| Medical expenses in threshold: family has <sup>b</sup> |                          |                              |                 |
| Private insurance, good health                         | 23,935                   | 24,972                       | 20,593          |
| Private insurance, fair/poor health                    | 24,402                   | 25,459                       | 20,995          |
| Public insurance, good health                          | 22,194                   | 23,155                       | 19,095          |
| Public insurance, fair/poor health                     | 22,301                   | 23,268                       | 19,188          |
| No insurance, good health                              | 23,971                   | 25,010                       | 20,624          |
| No insurance, fair/poor health                         | 24,079                   | 25,122                       | 20,717          |

Sources: Official poverty threshold is from the U.S. Census Bureau: <http://www.census.gov/hhes/www/poverty/threshld/thresh06.html>. Alternative thresholds for a two-adult, two-child reference family are from [http://www.census.gov/hhes/www/povmeas/altmeas06/nas\\_experimentalthresholdsv2.xls](http://www.census.gov/hhes/www/povmeas/altmeas06/nas_experimentalthresholdsv2.xls) and are calculated using the most recently available 12 quarters of Consumer Expenditure Survey data.

a. The official poverty thresholds do not include geographic adjustments.

b. Following the Census Bureau's methodology, we adjust the threshold by insurance and health status using the risk factors in table A-10 of Short (2001).

a family of two adults and two children is \$20,444. The NAS estimate that does not account for geographic differences or medical expenses is \$21,818 (6.7 percent higher). Note that the two thresholds are not directly comparable, however, because they apply to two different measures of family resources. The thresholds that account for geographic differences in Minnesota living costs are \$22,763 for families living in urban areas (4 percent above the national average) and \$18,772 for families living in rural areas (14 percent below the national average and 18 percent below the threshold for Minnesota families living in urban areas).<sup>10</sup>

As noted above, the Census Bureau provides further thresholds that incorporate medical expenses. Using quarterly data from the Consumer Expenditure Survey and data from the 1996 Medical Expenditure Panel Survey (MEPS), the Census Bureau calculates thresholds that adjust for differences in medical costs observed by elderly/nonelderly status, health insurance coverage, and health status (Short 2001). The thresholds for uninsured families are based on medical expenses for insured families with similar characteristics since the expenses observed for the uninsured on average do not represent actual need (Short 2001).<sup>11</sup>

The inclusion of expected medical expenses increases the thresholds in Minnesota from 1.7 to 11.8 percent for a nonelderly family with two adults and two children depending on type of family health coverage and health status (table 2). Out-of-pocket health expenses are lowest for those with public insurance because Medicaid offers broad coverage with no copayments and highest for those with private insurance in fair to poor health because of expected costs for premiums, co-payments, and deductibles. These thresholds imply that privately insured families are counted as poor at higher income levels than publicly insured families, in recognition of their higher expected medical expenses. The NAS thresholds also vary by family size and number of children; medical out-of-pocket expenses also vary by whether adults are elderly or nonelderly.

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We implement the NAS measure, including geographic variation and out-of-pocket medical expenses in the thresholds, in this prototype model for Minnesota.<sup>12</sup> The measure closely approximates the general consensus of the Committee on National Statistics as published from their workshop on June 15–16, 2004 (Iceland 2005).<sup>13</sup> However, the committee members did not come to a single recommendation on every element of the measure. For example, many workshop participants favored incorporating the value of housing to home owners (not included in the measure used here), but there was little consensus on what method should be adopted.<sup>14</sup> The Census Bureau provides some variations in approaches for implementing the NAS recommendations (Dalaker 2005). The Measuring American Poverty Act of 2009 recently introduced by Representative Jim McDermott calls for developing a single “modern poverty measure.”<sup>15</sup> Current discussions among experts debate the treatment of housing costs for home owners without a mortgage (the NAS measure does not take this into account either in measuring resources or in the thresholds), estimation of medical out-of-pocket medical expenses, and geographic adjustments in the thresholds.

The ACS-based model of poverty developed for Minnesota can easily account further refinements in the thresholds and treatment of resources in the future. It also provides an excellent platform for estimating the sensitivity of poverty rates to different assumptions about thresholds and resource measures at the state level.

### **Measuring NAS Poverty with the ACS**

State estimates of the NAS poverty measure using the ACS require numerous imputations to meet the data requirements for the NAS. We discuss the key features of the survey data below, emphasizing differences for Minnesota between the ACS and the CPS. Then we briefly discuss how we model the various elements of family resources required for the NAS poverty measure. We include further details on model procedures and validation in appendix A.

#### **Survey Data**

The American Community Survey provides much larger state samples than the Annual Social and Economic Supplement to the CPS, the survey traditionally used for the annual measure of poverty.<sup>16</sup> For example, the 2006 ACS provides an unweighted sample size of 52,219 people for the state of Minnesota, including 11,607 people living below two times the official poverty threshold.<sup>17</sup> This is more than nine times the annual sample size provided by the CPS. Differences in sample sizes between the ACS and the CPS vary across states because of differences in survey sampling frames.<sup>18</sup> The ACS allows for examination of the incidence of poverty among subgroups and smaller geographic units within the state.

Other differences between the ACS and CPS must be kept in mind when comparing population and poverty estimates between the two files, including survey timing, residence rules, questionnaires, and family definitions.<sup>19</sup> The ACS collects data continuously throughout the year while the CPS collects data for the prior year in February–April of the year; the ACS uses current residence to define a household’s location and the CPS uses usual residence; the ACS uses a less detailed questionnaire to ask about individual income sources than the CPS; and the ACS collects family relationship information only in reference to the household head and does not identify unrelated subfamilies unlike the CPS.

Despite these differences in survey design, the Census Bureau reports that the two surveys produce similar estimates of the official poverty rate at both the national and state levels. For example, Census Bureau researchers Bishaw and Stern (2006) report that the 2003 ACS estimate of the poverty rate was

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12.7 percent (35.8 million people), compared with 12.5 percent for the CPS (35.9 million people). They also compare the ACS state-level official poverty rates with two-year average estimates from the CPS (to increase the reliability of the CPS state estimates). The comparisons in the 50 states and the District of Columbia show that 25 states differed by less than 1 percentage point and 15 states differed by less than 0.5 percentage points.<sup>20</sup>

We use the Integrated Public Use Microdata Series (IPUMS) version of the 2006 ACS as input to the model (Ruggles and Brower 2003; Ruggles et al. 2008). The Minnesota Population Center produces the IPUMS and assigns uniform variable coding over time, a consistent set of constructed variables on family relationship, and harmonized income and occupation variables. The family relationship coding provides pointers indicating the locations of every person's mother, father, and spouse within a household and assigns links between parents and children. Since poverty measurement is based on the income received by all members of a family related by blood, marriage, or adoption, the IPUMS family relationship coding helps users to identify poverty units consistently over time. The IPUMS relationship codes approximate those provided in the CPS as far as possible. The ACS does not identify biological relationships between cohabiting adults and children in the family, so the NAS recommendation to include both cohabiting biological parents in the poverty unit could not be implemented. Although the ACS began to include individuals living in both institutional and noninstitutional group quarters starting in 2006, these individuals are excluded from the prototype model.

We find some differences in the population estimates for Minnesota between the 2006 ACS and the ASEC/CPS (table 3). The weighted ACS indicates 5.025 million people living in Minnesota compared with the CPS estimate of 5.139 million. The ACS estimates 0.586 million people age 65 and older living in Minnesota, compared with 0.644 million in the CPS. Part of the lower estimate of older adults living in Minnesota could result from differences in survey methods. Retired adults living elsewhere during the winter would be recorded as living in their temporary residence in the ACS but not in the CPS. However, given the continuous sampling frame of the ACS, we would not expect that this could account for the entire difference in the population estimates. The difference in the count of the population of older adults could also result in part from problems with the weighted counts of older adults in some public-use Census Bureau files, documented recently by Alexander, Davern, and Stevenson (2010). Population counts by race and ethnicity and by citizenship status are fairly similar between the ACS and the CPS. The ACS indicates higher rates of poverty and near-poverty (below 150 percent of the poverty level) than the CPS, but these differences are not statistically significant.

Mean personal cash income is remarkably similar between the two surveys (table 4).<sup>21</sup> The CPS average, \$35,567, exceeds the ACS estimate by \$498 (1.4 percent) with differences for the two age groups varying between the two surveys by plus or minus 1–2 percent; none of these differences are statistically significant. Reports of receipt of the key sources of income (earnings for the nonelderly and pensions and Social Security for the elderly) are also similar between the two surveys. Receipt of public assistance payments also compares well. Receipt of income from interest, dividends, and rent differs substantially with only 18.6 percent of respondents on the ACS reporting this income source of income compared with 57.6 percent of CPS respondents.<sup>22</sup>

Some income amounts reported among those with each type of income differ substantially between the two surveys, especially for adults age 65 and older. For example, the average amount of Supplemental Security Income (SSI) benefits reported by seniors on the ACS is double the amount reported in the

TABLE 3. Minnesota Population and Poverty Data, 2006 ACS and 2005–06 CPS

|   | All Persons      |                  | Age < 18         |                  | Age 18–64        |                  | Age 65+          |                  |
|---|------------------|------------------|------------------|------------------|------------------|------------------|------------------|------------------|
|   | ACS <sup>a</sup> | CPS <sup>b</sup> | ACS <sup>a</sup> | CPS <sup>b</sup> | ACS <sup>a</sup> | CPS <sup>b</sup> | ACS <sup>a</sup> | CPS <sup>b</sup> |
| Unweighted persons in the data                  | 50,801           | 9,346            | 12,491           | 2,795            | 30,958           | 5,671            | 7,352            | 880              |
| Weighted persons (millions)                     | 5.025            | 5.139            | 1.248            | 1.243            | 3.191            | 3.252            | 0.586            | 0.644            |
| Persons by race (millions)                      |                  |                  |                  |                  |                  |                  |                  |                  |
| White non-Hispanic                              | 4.318            | 4.415            | 0.981            | 0.973            | 2.774            | 2.820            | 0.563            | 0.622            |
| Black non-Hispanic                              | 0.211            | 0.211            | 0.077            | 0.080            | 0.126            | 0.124            | 0.008            | 0.007            |
| Hispanic  | 0.195            | 0.216            | 0.074            | 0.086            | 0.117            | 0.128            | 0.004            | 0.003            |
| Other   | 0.301            | 0.298            | 0.117            | 0.105            | 0.174            | 0.180            | 0.011            | 0.013            |
| Persons by citizenship (millions)               |                  |                  |                  |                  |                  |                  |                  |                  |
| Citizens  | 4.840*           | 4.901            | 1.220            | 1.200            | 3.041            | 3.063            | 0.579            | 0.638            |
| Noncitizens                                     | 0.185*           | 0.238            | 0.028            | 0.043            | 0.150            | 0.189            | 0.007            | 0.006            |
| Poverty data (official definition) <sup>c</sup> |                  |                  |                  |                  |                  |                  |                  |                  |
| Poor (< 100% threshold)                         | 9.3%             | 8.0%             | 11.7%            | 10.0%            | 8.6%             | 8.0%             | 7.9%             | 4.5%             |
| Near poor (< 150%)                              | 16.4%            | 14.7%            | 19.7%            | 17.0%            | 14.3%            | 13.6%            | 20.2%            | 15.7%            |

Source: Authors' calculations based on data from the 2006 American Community Survey (ACS) and the 2005–06 Current Population Survey (CPS).

a. The ACS figures exclude individuals in both institutional and noninstitutional group quarters. (The CPS data include noninstitutional group quarters.)

b. Unweighted CPS sample counts are the sums of the unweighted samples for Minnesota in the calendar year 2005 and 2006 CPS data. Weighted counts and poverty rates for the CPS are the means of the figures from the two CPS files.

c. The poverty rate is computed using all the cash income of the broadly defined family that is reported in the survey, as a percentage of the official poverty threshold. No TRIM income adjustments/imputations are used. Children under age 15 not identified as being in a family are considered a part of the head of household's family for poverty purposes. For poverty estimates, persons age 18–64 who live with someone age 65+ are counted in the 65+ group, not the 18–64 group.

\* Difference between the ACS estimate and the two-year-average CPS estimate is statistically significant with 90 percent confidence. Computations use the formulas and factors in the CPS technical documentation for the three surveys (Census Bureau 2006, 2007, n.d.). Statistical significance is not computed for total population counts or for population by race because both surveys are weighted to hit control totals for populations size, and the CPS is weighted to achieve control totals by race.

CPS (\$7,123 compared with \$3,542). As we explain in more detail below, some seniors appear to mistakenly report Social Security as SSI payments; the benefits reported exceed the maximum amounts paid by SSI. The model corrects the SSI reports so this source of welfare income more closely matches administrative program totals. Reports of average income received from pensions are also significantly higher on the ACS than on the CPS.

The average amount of interest, dividends, and rent and other income, among recipients, is significantly higher for all persons on the ACS than those on the CPS (\$8,106 vs. \$3,818), probably because of both different survey responses and different treatment of couples' responses. That is, the per person incidence of asset income is lower, but average amounts are higher. Similarly, average amounts of other income are higher on the ACS, but the receipt of this type of income is lower on the ACS than the CPS.

Despite the differences in income amounts between the two surveys, the distributions of personal cash income do not differ significantly between the two surveys. Differences are larger for persons age 65 and older than for younger persons. For example, 5.6 percent of persons age 65 and older have incomes of \$5,000 or lower, compared with 2.4 percent of those on the CPS. The small sample size on the CPS means that those income estimates cannot be measured with great precision.

TABLE 4. Key Income Data for Minnesota Adults, 2006 ACS and 2005–06 CPS

|   | All 15+          |                  | Age 15–64        |                  | Age 65+          |                  |
|---|------------------|------------------|------------------|------------------|------------------|------------------|
|   | ACS <sup>a</sup> | CPS <sup>b</sup> | ACS <sup>a</sup> | CPS <sup>b</sup> | ACS <sup>a</sup> | CPS <sup>b</sup> |
| Unweighted persons in the data  | 40,723           | 7,063            | 33,371           | 6,183            | 7,352            | 880              |
| Weighted persons (millions)   | 4.001            | 4.123            | 3.416            | 3.479            | 0.586            | 0.644            |
| Mean personal cash income (incl. zeroes)                                    | \$35,069         | \$35,567         | \$36,410         | \$37,148         | \$27,251         | \$27,030         |
| Median personal cash income (incl. zeroes)                                  | \$26,161         | \$25,950         | \$27,570         | \$27,800         | \$20,225         | \$19,652         |
| Percent of people with various types of income                              |                  |                  |                  |                  |                  |                  |
| Earned income   | 75.9             | 74.3             | 85.1             | 84.5             | 22.0             | 19.2             |
| Pension   | 8.6              | 8.3              | 3.7              | 2.7              | 37.3             | 38.3             |
| Social Security   | 17.0             | 18.0             | 4.0              | 4.4              | 93.0             | 91.4             |
| Public assistance (SSI, TANF, other) <sup>c</sup>                           | 2.7              | 2.5              | 2.6              | 2.6              | 3.3              | 1.9              |
| Interest, dividends, rent <sup>d</sup>                                      | 18.6*            | 57.6             | 14.7*            | 55.1             | 40.9             | 70.8             |
| Other income <sup>e</sup>   | 7.4              | 11.9             | 7.1              | 12.9             | 9.4              | 6.3              |
| Mean cash income amounts among people with each type of income              |                  |                  |                  |                  |                  |                  |
| Earned income   | \$38,978         | \$39,269         | \$39,649         | \$39,724         | \$23,858         | \$28,154         |
| Pension   | \$17,485*        | \$15,297         | \$18,464         | \$16,141         | \$16,917*        | \$14,979         |
| Social Security   | \$10,480*        | \$11,169         | \$9,508          | \$9,701          | \$10,724*        | \$11,549         |
| Public assistance (SSI, TANF, other) <sup>c</sup>                           | \$5,394          | \$4,744          | \$5,025          | \$4,938          | \$7,123*         | \$3,542          |
| Interest, dividends, rent <sup>d</sup>                                      | \$8,106*         | \$3,818          | \$6,810*         | \$3,141          | \$10,831*        | \$6,669          |
| Other income <sup>e</sup>   | \$7,518          | \$6,828          | \$6,667          | \$6,761          | \$11,250*        | \$7,583          |
| Income distribution, personal cash income (percent of people in each range) |                  |                  |                  |                  |                  |                  |
| Negative or \$0 income  | 7.3              | 6.3              | 8.4              | 7.2              | 1.3              | 1.3              |
| More than \$0, < \$5,000  | 9.0              | 9.3              | 9.6              | 10.6             | 5.6              | 2.4              |
| \$5,000 to < \$10,000   | 8.8              | 8.8              | 7.4              | 7.3              | 16.8             | 17.1             |
| \$10,000 to < \$20,000  | 15.1             | 16.4             | 13.3             | 14.0             | 25.6             | 29.9             |
| \$20,000 to < \$30,000  | 13.9             | 13.5             | 13.7             | 13.0             | 15.1             | 16.4             |
| \$30,000 to < \$40,000  | 12.3             | 11.9             | 12.7             | 12.4             | 9.6              | 9.2              |
| \$40,000 to < \$50,000  | 9.6              | 9.3              | 10.1             | 10.0             | 7.0              | 5.2              |
| \$50,000 to < \$75,000  | 13.7             | 14.2             | 14.4             | 14.9             | 9.3              | 10.3             |
| \$75,000 to < \$100,000   | 4.6              | 4.8              | 4.7              | 5.0              | 3.8              | 3.2              |
| \$100,000 to < \$200,000  | 4.5              | 4.5              | 4.4              | 4.5              | 5.2              | 4.5              |
| \$200,000 or more   | 1.3              | 0.9              | 1.4              | 1.0              | 0.8              | 0.5              |

Source: Authors' calculations based on data from the 2006 American Community Survey (ACS) and the 2005–06 Current Population Survey (CPS).

a. The ACS figures exclude individuals in both institutional and noninstitutional group quarters. (The CPS data include noninstitutional group quarters.)

b. Unweighted CPS sample counts are the sums of the unweighted samples for Minnesota in the calendar year 2005 and 2006 CPS data. Weighted counts and income data for the CPS are the means of the figures from the two CPS files, with 2005 dollar amounts inflated to 2006 (using the CPI) before computing the means.

c. Figures for public assistance income are as reported in the surveys, before any adjustment by TRIM3.

d. In the CPS, these types of income are divided evenly between the spouses in a married couple; in the ACS, one spouse may report all of this income, or the two spouses may report different amounts.

e. "Other income" includes unemployment compensation, veterans benefits, workers compensation, alimony, child support, and regular contributions.

\* Difference between the ACS estimate and the two-year-average CPS estimate is statistically significant with 90 percent confidence. Computations use the formulas and factors in the CPS technical documentation for the three surveys (Census Bureau 2006, 2007, n.d.).

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## Baseline Poverty Estimation

We use TRIM3, a highly developed and detailed microsimulation model of the key tax and benefit programs affecting low-income families, as the starting platform for the state poverty model.<sup>23</sup> The TRIM3 project's web site, [trim3.urban.org](http://trim3.urban.org), provides full documentation of the national, CPS-based model. Here, we briefly describe key aspects of the model required to produce estimates of poverty in Minnesota for 2006 (the "baseline") and methods used to analyze policy alternatives. Appendix A provides more detail on modeling procedures, including validation results for each simulation module.

The NAS poverty estimation requires information not included in the survey such as in-kind assistance from WIC, housing assistance, personal income tax liability, and nondiscretionary expenses. In addition, like the CPS, the ACS underestimates receipt of government benefits.<sup>24</sup> We correct for this underreporting so the baseline represents the best estimate of the effect of government spending against which we can compare alternative program rules. We use simulation and imputation procedures to add the information required for the NAS poverty definition and to correct for underreporting on the ACS (table 5). These modeling procedures use the information available on the ACS, detailed state program rules, and administrative data sources to calculate government benefits and tax liability for families.

*Demographics.* Immigrant and disability status are important because they can determine eligibility for some government benefit programs such as SSI, TANF, and SNAP. We use reports of citizenship status, year of immigration to the United States, and country of origin to determine likely refugees.<sup>25</sup> Refugees are typically eligible for government assistance as soon as they arrive in the United States, while documented noncitizens typically must reside in the United States for five years before achieving eligibility. Lacking procedures to identify undocumented immigrants, we err on the side of assuming that all immigrants are documented and thereby eligible for assistance after five years of residence.

We use a combined strategy to assign disability status serious enough to qualify for government assistance. The ACS asks respondents to report whether they have various limitations and whether a disability prevents them from working. Analysis of the relationship between these measures and SSI receipt suggested that disability should be defined using three measures: work disability, cognitive difficulty, and difficulty with basic physical activities.

*Cash Income.* The ACS reports the key sources of cash income, although some questions are asked with less detail than those on the CPS. SSI income is reported but falls short of the administrative data by 17 percent for the caseload (59,000 compared with 71,000).<sup>26</sup> The reported amount of SSI benefits actually exceeds administrative targets (\$407 million compared with \$368 million). TRIM3 adjusts the benefit receipt so it matches the administrative data.<sup>27</sup> It is important to assess eligibility for SSI since it is an important source of income for those with serious disabilities and for the elderly poor. We simulate eligibility for SSI and select sufficient enrollees to meet the totals for elderly and disabled recipients in the state. All eligible individuals who reported receiving SSI are included in the simulated caseload. Other adult enrollees are selected based on reason for eligibility (age vs. disability), citizenship status, and level of potential benefit. The children's SSI caseload is selected to meet targets by family type, family income, and age group.

Receipt of TANF must also be imputed. The ACS includes a variable that combines TANF with other public assistance (such as General Assistance to adults). The number of families reporting public assistance income who appear eligible for TANF under Minnesota's TANF rules comes to only half the state's

TABLE 5. *Implementing the National Academy of Sciences (NAS) Definition of Poverty*

| Key data elements required   | Sources/procedures   |
|--|--|
| Immigrant status   | Use reports of citizenship to identify noncitizens. Identify refugees based on country of origin and year of entry. Assume others are legal permanent residents.   |
| Disability status  | Use reported data on functional limitations and reported receipt of disability-related income.   |
| <i>Cash income</i>   |  |
| Earnings, retirement, investments, and other cash Supplemental Security Income (SSI) | Reported<br>Correct for underreporting by simulating eligibility and selecting additional participants to match administrative data.   |
| TANF and public assistance   | Assign TANF if report “public assistance or welfare” and family has children under age 18. Correct for underreporting using detailed program rules to estimate eligibility and select additional enrollees to match administrative data.   |
| <i>Near-cash elements (added to cash income)<sup>a</sup></i>                         |  |
| Food Stamps/SNAP   | Correct for underreported SNAP benefits by simulating eligibility and potential benefit amount; select additional participants based on administrative data.   |
| Women, Infants and Children (WIC) benefits   | No information available on ACS. Simulate program rules to estimate eligibility and use state administrative data to select participants.  |
| Low-Income Home Energy Assistance Program (LIHEAP)                                   | Assign benefit values to participants.   |
| Public and subsidized housing  |  |
| <i>Taxes (deducted from income)</i>  |  |
| Federal income taxes and EITC  | Form tax filing units based on household characteristics, simulate 2006 tax rules, assume all take standard deduction. Use state rules and integration of state-federal income tax calculation.  |
| State income taxes and EITC  |  |
| Payroll taxes  | Use reported earnings and sector of employment to calculate payroll taxes using 2006 tax rules.  |
| <i>Expenses (deducted from income)</i>   |  |
| Child care subsidies and expenses  | Simulate eligibility for CCDF subsidies using program rules, select participants to match state administrative data, and assign co-pays. Estimate expenses for nonsubsidized working families based on 2002 National Survey of America’s Families, adjusted to reflect current prices. |
| Other work expenses (e.g., transportation)   | Impute using Census Bureau imputations.  |
| <i>Health insurance status (used to select appropriate poverty threshold)</i>        |  |
| Public coverage  | Assign Medicare coverage if report Social Security and simulate Medicaid/SCHIP eligibility using program rules. Select participants based on administrative data.  |
| Private coverage   | Impute private coverage for insurance units without public coverage based on regression estimates from the 2006 Medical Expenditure Panel Survey.  |

Note: We exclude capital gains, child support paid, and the value of school nutrition benefits, resources not included in the ACS and possible imputations were outside the scope of this prototype.

a. School nutrition benefits, not reported on the ACS, are omitted in this prototype.

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actual TANF caseload. We select additional enrollees from the TANF-eligible families that did not report public assistance income, based on type of TANF family (child only, two-parent family, single-parent family), level of potential TANF benefit, citizenship status, and other demographic characteristics.

*Near-Cash Income.* As noted in table 5, the ACF asks about receipt of SNAP, but other near-cash income resources required for the NAS must be imputed. The total number of households reporting SNAP in Minnesota (113,000) falls short of the number that reports benefits in an average month (126,000) in 2006 and even further away from the number that received SNAP sometime during the year (approximately 151,000). Also, ACS households report receiving only about half the amount of SNAP benefits reported in the program data for 2006 (\$148 million compared with \$285 million). The baseline SNAP benefit receipt and amount of benefits are adjusted using procedures similar to those described above for other welfare programs. Household eligibility and potential benefit receipt are estimated using detailed program rules and additional participants are selected to meet program totals.

In this prototype we also impute Women, Infants and Children (WIC), Low-Income Home Energy Assistance Program (LIHEAP), and housing assistance benefits. These near-cash benefits are imputed based on simulation modules that mimic program rules as applied to households in the ACS. For each program, the model selects that subset of individuals within an ACS household that may be eligible for benefits (based on characteristics such as cash income, assets and age of children, and renter/owner status, depending on the specific program) and then chooses a subset of eligible individuals to participate in the program based on their demographic and economic characteristics so the simulated caseload approximates the administrative data for 2006.

We omit realized capital gains because this type of information typically requires a statistical match or imputation based on data from the Statistics of Income (SOI), ideally with the match specific to a state's resident population.<sup>28</sup> The omission of capital gains receipt should not make a large difference in poverty estimates since the income is usually realized by high-income households. However, some households, especially older individuals, could receive a large share of income from capital gains and look poor based on their receipt of other types of cash income.

*Taxes.* The model also uses program rules and household information to calculate payroll taxes and federal and state income taxes. Payroll taxes are based on individuals' work status, wages reported, and industry (since many state government workers do not pay these taxes). Federal and state income taxes are calculated by first dividing households into tax filing units (based on family relationships and income to estimate dependency status), calculating adjusted gross income, and applying the tax rules in effect in 2006. In this prototype model, we assume that all tax units take the standard deduction. This assumption will overestimate taxes for higher-income families but should be accurate for those with lower incomes and at risk for poverty. According to IRS data, approximately 60 percent of Minnesota taxpayers file using the standard deduction.<sup>29</sup> The tax models include estimates of refundable tax credits in effect in 2006.

*Nondiscretionary Expenses.* As noted in table 5, we impute child care subsidies and expenses using fairly detailed procedures available in TRIM3 that estimate receipt of Child Care and Development Fund (CCDF) subsidies along with out-of-pocket expenses based on the receipt of subsidies and regression equations that predict child care expenses for those without subsidies. These procedures allow the model to simulate alternative CCDF policies such as broader availability of subsidies, holding constant current rules, or changes in payment policies for currently eligible CCDF families.

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We impute other work-related expenses, primarily transportation costs, using estimates available from the Census bureau. The Census estimate, \$25 a week per worker, is based on data from the 2004 Survey of Income and Program Participation and represents 85 percent of median expenses.<sup>30</sup> This calculation probably underestimates transportation for rural Minnesota families. Ideally, state-specific estimates for transportation costs could be used here, but they were not available for this prototype.

*Out-of-Pocket Health Spending.* As described earlier, this prototype uses thresholds for Minnesota that include the effect of out-of-pocket health spending on family needs in the thresholds. Since health spending varies by insurance coverage status, as well as age and health status, we impute health coverage for the ACS using a two-step procedure.<sup>31</sup> First we impute public coverage, one of the coverage categories in the thresholds. Persons age 65 and older are assigned Medicare coverage unless they do not report Social Security income and are simulated to receive SSI or TANF (in which case they are assigned Medicaid). Medicare coverage is also assigned to the nonelderly disabled who report Social Security income. Subsequently, we determine if each person is eligible for Medicaid or SCHIP based on the state rules, and then select enrollees based on administrative data for Minnesota. Second, we impute private insurance coverage using regression equations that predict private coverage based on health insurance units' income, employment, age, and health status.<sup>32</sup> Our private coverage estimates compare closely to two-year averages from the CPS for Minnesota.<sup>33</sup>

### **Estimating the Effects of Alternative Policies**

TRIM3 simulates the effects of different program rules on family incomes and poverty by first calculating the direct effect of the alternatives on families' program benefits and taxes. The model recalculates benefit and tax eligibility under different program rules for each family in the database to capture program interactions. For example, greater access to child care subsidies will reduce some low-income families' out-of-pocket child care expenses, and reduced expenses will in turn reduce SNAP benefits since child care expenses (up to a cap) are deducted from gross income in determining benefits. Lower child care expenses also will reduce NAS poverty since this expense is deducted from income.

Optionally, TRIM3 also simulates the indirect effects of changes in program rules. Many poverty-reduction policies potentially will alter individuals' work and earnings. For example, policies that increase the EITC could induce more individuals to seek and find work, policies that increase adult education could improve earnings outcomes and potentially work status, and policies that expand child care subsidies could increase work among secondary workers and single parents. The model uses estimates from the best-available economics literature to estimate these effects. Typically, this literature provides estimates of the percentage of adults likely to move into the labor market and the potential increase earnings in response to a percentage increase in net income. The model uses these estimates to change labor supply and earnings of individuals likely to be affected by the policy intervention. The model assumes that the labor market could absorb additional workers and higher wages. Thus, the estimates of poverty reduction that include labor supply effects should be considered best case or long-run scenarios.

The model subsequently recalculates all benefits and taxes based on these revised earned income estimates. Typically, we provide high and low employment earnings effects based on ranges that can be deduced from the literature. All the indirect estimates are, of course, illustrative since the estimates in the economic literature reflect a different point in time and often a somewhat different intervention and target group. Nonetheless, it is important for state policy makers to have some guidance on the potential effects of policies likely to affect work incentives on poverty.

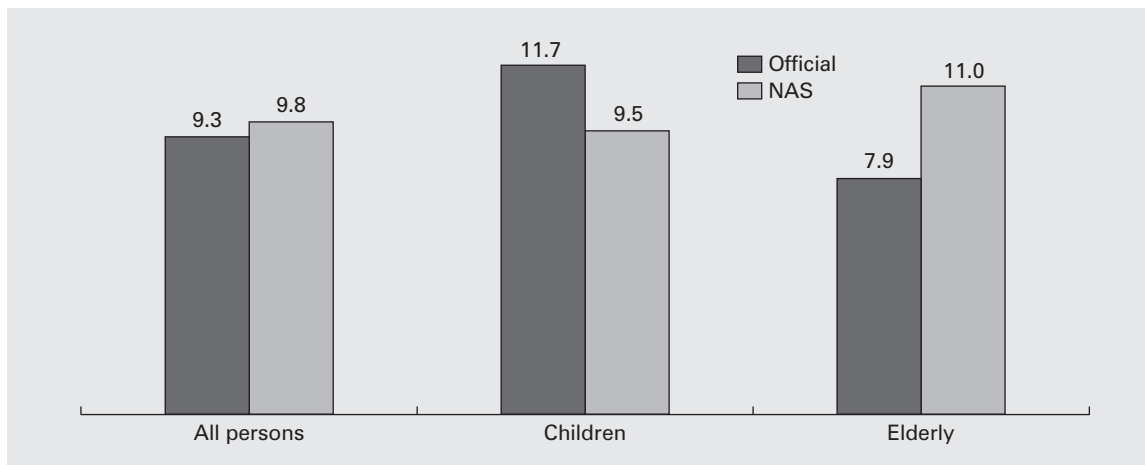
## Poverty Estimates for Minnesota

In 2006, 9.3 percent of the Minnesota population was poor according to the official definition; the share rises to 9.8 percent using the NAS definition (figure 1).<sup>34</sup> The NAS indicates that 9.5 percent of Minnesota children live in poor families, compared with 11.7 percent suggested by the official definition. The share of children living in poverty is lower using the NAS than using the official definition primarily because many government policies (such as the EITC, subsidized child care, and WIC) target families with children, and the official definition does not take these benefits into account. In contrast, poverty among families with individuals age 65 and older increases to 11.0 percent using the NAS definition from 7.9 percent using the official measure. NAS poverty is higher for seniors because they have relatively high out-of-pocket health expenses, and the NAS thresholds assume that nonmedical basic needs by family size are the same for older adults as for younger adults.

While differences in the resource definitions are very important in determining poverty under the new definition, it is also important to understand how the alternative thresholds affect relative poverty rates (table 6). For example, the thresholds for nonelderly single adults living in metropolitan areas in Minnesota that exclude health expenses are similar to the official thresholds, and the addition of health expenses pushes the NAS thresholds above the official levels by 2 to 11 percent depending on health insurance coverage. The NAS thresholds with two adults, however, are quite a bit higher than the official thresholds, reflecting differences in estimates of how needs change with the addition of another adult. The thresholds for an elderly single person living in a metropolitan area are 9 percent higher than the official thresholds and 20 to 34 percent higher after incorporating out-of-pocket health spending in the thresholds. Thresholds for those living in rural areas, however, are quite a bit lower than for those living in metropolitan areas in Minnesota.

Compared with the official definition, the NAS poverty definition results in very different estimates of need across the full income distribution (table 7). The share of persons living in deep poverty drops from

FIGURE 1. Minnesota Poverty Rate in 2006, Official versus NAS, ACS data



Source: Authors' calculations based on data from the 2005–06 ACS.

Note: The NAS poverty definition counts the value of noncash benefits in income and subtracts tax liability and work-related expenses. The NAS poverty thresholds are based on the latest consumer expenditure data, are adjusted for geographic differences in cost of living, and include out-of-pocket health expenses.

TABLE 6. Ratios of NAS Poverty Thresholds to Official Thresholds

|                                  | One adult | Two adults | Two adults, one child | Two adults, two children |
|----------------------------------|-----------|------------|-----------------------|--------------------------|
| <b>Nonelderly</b>                |           |            |                       |                          |
| Official threshold               | \$10,488  | \$13,500   | \$16,227              | \$20,444                 |
| NAS–metropolitan                 |           |            |                       |                          |
| No health in threshold           | 1.01      | 1.10       | 1.23                  | 1.11                     |
| Health in threshold <sup>a</sup> |           |            |                       |                          |
| Private insurance                | 1.10      | 1.24       | 1.37                  | 1.22                     |
| Public insurance                 | 1.02      | 1.12       | 1.26                  | 1.13                     |
| No insurance                     | 1.11      | 1.26       | 1.37                  | 1.22                     |
| NAS–rural                        |           |            |                       |                          |
| No health in threshold           | 0.83      | 0.91       | 1.02                  | 0.92                     |
| Health in threshold              |           |            |                       |                          |
| Private insurance                | 0.90      | 1.02       | 1.13                  | 1.01                     |
| Public insurance                 | 0.84      | 0.92       | 1.04                  | 0.93                     |
| No insurance                     | 0.91      | 1.04       | 1.13                  | 1.01                     |
| <b>Elderly</b>                   |           |            |                       |                          |
| Official threshold               | \$9,669   | \$12,186   | \$16,227              | \$20,444                 |
| NAS–metropolitan                 |           |            |                       |                          |
| No health in threshold           | 1.09      | 1.22       | 1.23                  | 1.11                     |
| Health in threshold              |           |            |                       |                          |
| Private insurance                | 1.34      | 1.53       | 1.47                  | 1.31                     |
| Public insurance                 | 1.20      | 1.38       | 1.36                  | 1.21                     |
| NAS–rural                        |           |            |                       |                          |
| No health in threshold           | 0.90      | 1.01       | 1.02                  | 0.92                     |
| Health in threshold              |           |            |                       |                          |
| Private insurance                | 1.10      | 1.26       | 1.22                  | 1.08                     |
| Public insurance                 | 0.99      | 1.14       | 1.12                  | 1.00                     |

Source: Authors' calculations based on data from the 2006 American Community Survey.

a. The NAS thresholds shown here are for families in good health.

3.4 percent to 2.5 percent for all persons and from 4.1 to 1.4 percent for children using the NAS poverty definition. The decline occurs because the NAS definition counts some key benefit programs that target very low income families such as SNAP benefits. In contrast, the NAS definition indicates that a far greater share of individuals live near the poverty level than is suggested using the official definition. For example, the share of children living in families with incomes between 100 and 150 percent of NAS poverty increases to 17.1 percent from 8 percent using the official definition. Benefits, typically tied to some percentage of the official poverty level, tend to phase out at the higher NAS thresholds, and families eligible for small benefits tend to participate at lower rates. For example, urban Minnesota families with incomes between 100 and 150 percent of the NAS threshold fall in the income range of \$25,000 to \$37,500 (counting all resources), as much as 83 percent higher than the official poverty threshold.<sup>35</sup>

The NAS poverty definition also indicates differences in the relative poverty rates of subgroups within the Minnesota population (table 8). Relative to the official poverty rates, the poverty rate for whites increases slightly from 7.0 to 7.9 percent, while the rates declines for blacks from 31.5 to 21.6 percent and increases for Hispanics from 19.5 to 24.8 percent. These differences reflect differences in resource definitions as well as differences in the thresholds between the two definitions. In general, black fami-

TABLE 7. Poverty in Minnesota in 2006, Official versus NAS Definition of Poverty, ACS Data

| Persons by family poverty status and type of person | All Persons by Family Type <sup>a</sup> |               |                           |                           |                   |
|---|---|---------------|---------------------------|---------------------------|-------------------|
|   | All persons                             | Children < 18 | In families with children | In families w/someone 65+ | In other families |
| <b>Official Poverty Definition</b>                  |   |               |                           |                           |                   |
| Poor  |   |               |                           |                           |                   |
| < 50% poverty                                       | 3.4%                                    | 4.1%          | 3.3%                      | 1.3%                      | 4.2%              |
| 50 < 100% poverty                                   | 5.9%                                    | 7.6%          | 6.3%                      | 6.6%                      | 5.2%              |
| Total < 100% poverty                                | 9.3%                                    | 11.7%         | 9.6%                      | 7.9%                      | 9.4%              |
| Nonpoor   |   |               |                           |                           |                   |
| 100 < 150% poverty                                  | 7.0%                                    | 8.0%          | 6.9%                      | 12.3%                     | 5.5%              |
| 150 < 200% poverty                                  | 7.9%                                    | 9.6%          | 9.0%                      | 11.0%                     | 5.2%              |
| 200 < 300% poverty                                  | 16.6%                                   | 18.9%         | 18.5%                     | 20.2%                     | 12.8%             |
| 300+% poverty                                       | 59.1%                                   | 51.6%         | 55.9%                     | 48.6%                     | 67.0%             |
| Total persons (thousands)                           | 5,025                                   | 1,245         | 2,578                     | 609                       | 1,839             |
| % poor (< 100% poverty)                             | 9.3%                                    | 11.7%         | 9.6%                      | 7.9%                      | 9.4%              |
| % poor or near-poor (< 200%)                        | 24.3%                                   | 29.3%         | 25.5%                     | 31.2%                     | 20.1%             |
| <b>Alternative (NAS) Poverty Definition</b>         |   |               |                           |                           |                   |
| Poor  |   |               |                           |                           |                   |
| < 50% poverty                                       | 2.5%                                    | 1.4%          | 1.2%                      | 1.3%                      | 4.7%              |
| 50 < 100% poverty                                   | 7.2%                                    | 8.1%          | 7.0%                      | 9.7%                      | 6.9%              |
| Total < 100% poverty                                | 9.8%                                    | 9.5%          | 8.2%                      | 11.0%                     | 11.5%             |
| Nonpoor   |   |               |                           |                           |                   |
| 100 < 150% poverty                                  | 13.9%                                   | 17.1%         | 15.4%                     | 20.4%                     | 9.6%              |
| 150 < 200% poverty                                  | 15.5%                                   | 18.3%         | 18.2%                     | 17.2%                     | 11.1%             |
| 200 < 300% poverty                                  | 29.0%                                   | 29.8%         | 31.4%                     | 26.4%                     | 26.4%             |
| 300+% poverty                                       | 31.9%                                   | 25.3%         | 26.8%                     | 24.8%                     | 41.4%             |
| Total persons (thousands)                           | 5,025                                   | 1,245         | 2,578                     | 609                       | 1,839             |
| Poor (< 100% poverty)                               | 9.8%                                    | 9.5%          | 8.2%                      | 11.0%                     | 11.5%             |
| Poor or near-poor (< 200%)                          | 39.1%                                   | 44.9%         | 41.8%                     | 48.6%                     | 32.2%             |

Source: Authors' calculations based on data from the 2006 American Community Survey (ACS).

Note: The NAS poverty definition counts the value of noncash benefits in income and subtracts tax liability and work-related expenses. The NAS poverty thresholds are based on the latest consumer expenditure data, are adjusted for geographic differences in cost of living, and include out-of-pocket health expenses.

a. Columns for persons by family type include both children and adults. Persons in families with both children and an elderly head are in the "families with children" column.

lies in Minnesota receive more in in-kind government assistance because more live in poverty and qualify for government assistance than white families.

Poverty rates by sex differ little between the two definitions. However, the shares of men and women with low incomes (below 200 percent of the poverty level) increase by 14.4 and 15.3 percentage points, respectively, using the NAS definition compared with the official definition. Similarly, the poverty rates for each education status group are similar between the two definitions, although the rate for those with high school degrees is higher using the NAS. The shares living in low-income families again increase dramatically.

TABLE 8. Poverty Rate of Population Subgroups in Minnesota, 2006

|                            | Number of people (mill.) | Poverty Rate, Official Poverty Definition |                             | Poverty Rate, NAS Poverty Definition <sup>a</sup> |                             |
|----------------------------|--------------------------|---|-----------------------------|---|-----------------------------|
|                            |                          | < 100% of poverty threshold               | < 200% of poverty threshold | < 100% of poverty threshold                       | < 200% of poverty threshold |
| All persons                | 5.025                    | 9.3%                                      | 24.2%                       | 9.8%  | 39.1%                       |
| Race                       |                          |   |                             |   |                             |
| White                      | 4.318                    | 7.0%                                      | 20.2%                       | 7.9%  | 34.5%                       |
| Black                      | 0.211                    | 31.5%                                     | 55.8%                       | 21.6%   | 75.1%                       |
| Hispanic                   | 0.195                    | 19.5%                                     | 58.5%                       | 24.8%   | 75.9%                       |
| Other                      | 0.301                    | 20.3%                                     | 38.1%                       | 18.2%   | 55.4%                       |
| Gender                     |                          |   |                             |   |                             |
| Male                       | 2.495                    | 8.4%                                      | 22.4%                       | 8.9%  | 36.8%                       |
| Female                     | 2.531                    | 10.3%                                     | 26.1%                       | 10.6%   | 41.4%                       |
| Age                        |                          |   |                             |   |                             |
| < 18                       | 1.248                    | 12.1%                                     | 29.7%                       | 9.7%  | 45.0%                       |
| 18–54                      | 2.660                    | 9.0%                                      | 22.1%                       | 10.2%   | 37.1%                       |
| 55+                        | 1.117                    | 7.0%                                      | 23.4%                       | 8.8%  | 37.1%                       |
| Work status (workers)      |                          |   |                             |   |                             |
| Full time, full year       | 1.719                    | 1.7%                                      | 9.9%                        | 2.7%  | 24.2%                       |
| Full time, part year       | 0.546                    | 10.2%                                     | 24.8%                       | 11.5%   | 39.5%                       |
| Part time, full year       | 0.341                    | 9.2%                                      | 27.1%                       | 13.5%   | 43.6%                       |
| Part time, part year       | 0.431                    | 16.0%                                     | 31.6%                       | 17.5%   | 46.9%                       |
| Education status (age 25+) |                          |   |                             |   |                             |
| Less than high school      | 0.289                    | 21.1%                                     | 51.2%                       | 21.9%   | 69.4%                       |
| High school                | 0.954                    | 8.8%                                      | 26.3%                       | 10.5%   | 44.7%                       |
| More than high school      | 2.068                    | 4.0%                                      | 12.8%                       | 4.6%  | 24.6%                       |

Source: Authors' calculations based on data from the 2006 American Community Survey and the 2005–06 Current Population Survey.

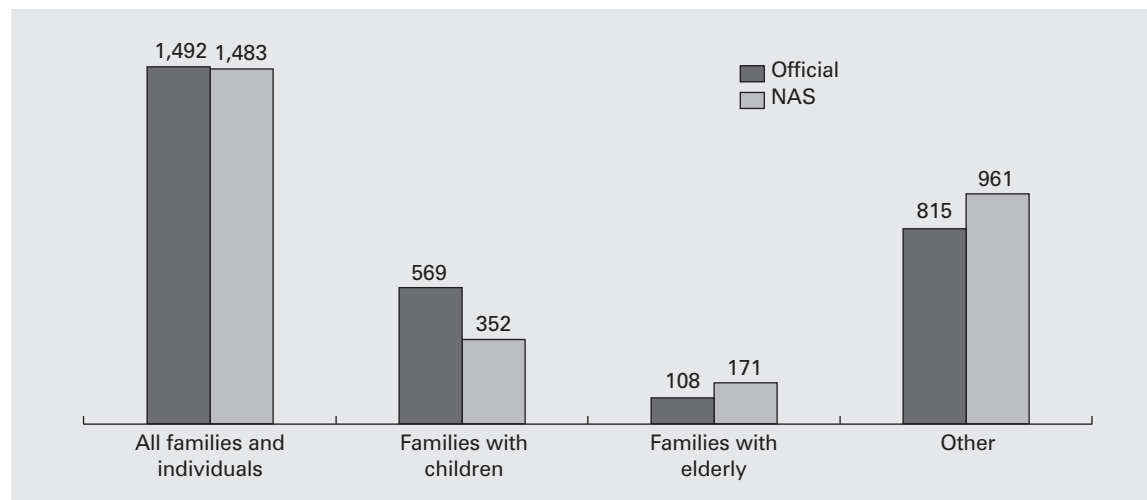
a. The NAS poverty definition counts the value of noncash benefits in income and subtracts tax liability and work-related expenses. The NAS poverty thresholds are based on the latest consumer expenditure data, are adjusted for geographic differences in cost of living, and include out-of-pocket health expenses.

The poverty gap provides a useful measure for assessing the depth of poverty and the effectiveness of policy. While the poverty gaps are generally similar between the official and NAS measures, the gap for families with children is much lower using the NAS definition (figure 2). The gap for families with children in Minnesota is \$352 million compared with \$569 million under the official measure. This drop is again mostly the result of targeting of government noncash benefits to low-income families with children; these benefits are not counted in the official measure. The gap increases for families with elderly persons and other families without children by \$63 and \$145 million, respectively, using the NAS definition. While the differences are obviously not as large as those for families with children, the NAS measure does indicate greater deprivation for the elderly and adults without children than the level measured using the official poverty definition.

### Estimating the Effects of Poverty-Reduction Policies

While the ACS baseline poverty estimates for Minnesota provide a better understanding of poverty, they also provide a benchmark against which we can compare the effects of alternative policies. As noted earlier, we completed work for the Minnesota poverty commission that estimated a range of policies to

FIGURE 2. Minnesota Poverty Gap in 2006, Official versus NAS, ACS data (\$millions)



Source: Authors' calculations based on data from the 2005–06 ACS.

Notes: The NAS poverty definition counts the value of noncash benefits in income and subtracts tax liability and work-related expenses. The NAS poverty thresholds are based on the latest consumer expenditure data, are adjusted for geographic differences in cost of living, and include out-of-pocket health expenses.

The poverty gap is the amount of money needed to lift all families currently below the poverty threshold up to the poverty threshold. The figure for all persons applies to families with children, families without children but with elderly members, and other families. The poverty gap for children applies to families with children.

reduce poverty over the next decade. We simulated four of those policies using the ACS model to illustrate how a model can estimate the effects of policies on poverty. We modeled an expansion of the EITC, an increase in the SNAP participation rate, an expansion of child care subsidies, and a scenario in which many more individuals receive two-year college degrees. We first show the direct effects of these policies on poverty and then include expected indirect effects on earnings. The NAS poverty measure allows us to capture the effects of the EITC, increases in SNAP, and reductions in child care subsidies; the official poverty measure would only capture changes in earnings.

### EITC Expansion

This proposal expands the childless federal EITC to 75 percent of the EITC for single taxpayers with one child.<sup>36</sup> Taxpayers must be age 21 to 54 and working 30 or more hours per week for 26 weeks or more during the year to qualify. The credit is also available to the lower-earning spouse in a married-couple family, calculated based on his or her earnings alone. The higher-earning spouse in a two-earner family receives the standard EITC (based on his or her own earnings).

The expansion of the EITC could increase employment among childless workers and married secondary earners. While the literature on the effect of the EITC on employment is based on female-headed families, we extrapolate from those results to develop an employment-effect assumption. Grogger (2003) finds that a \$1,000 increase in the maximum EITC leads to a 3.6 percent increase in employment for female-headed families. Given the uncertainty in extrapolating the effect from a population with primary responsibility for children to those without children, we cut the employment effect in half for childless workers. The employment rate for childless unmarried workers between the ages of 21 and 54 increases from just under 90 percent in the baseline to 92 percent in this scenario due to the maximum EITC of \$1,600.

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Very little effect has been found on employment for secondary earners in two-parent couples (Eissa and Leibman 1996); therefore, we do not model an employment effect for married couples.

The employment effect is simulated at the micro level. The model randomly selects a portion of unemployed single childless adults who are nondisabled and assumes that they become employed. Based on the characteristics of jobs held by Minnesota adults living in poverty, 18 percent of the jobs awarded are full-time and full-year, with the remainder assumed to be part-time (30 hours a week) and part-year (27 weeks). All the new jobs are assumed to be at the minimum wage. In total, 14,500 persons are assigned a job, and earnings from the new employment total \$94 million. The model subsequently recalculates all government benefits and taxes for individuals given new jobs. It also recalculates poverty for all families.

In the absence of an employment effect, the EITC expansion would increase federal EITC benefits for Minnesota residents by \$596 million. With an employment effect, the increase in EITC benefits would rise to \$616 million. The additional wages generated by the employment effect would generate some offsetting revenue from an increase in taxes paid and a reduction in government benefits; these effects are captured in the poverty estimates.

This type of expansion of the EITC would have relatively small effects on poverty overall (table 9). Poverty rates decline from 9.8 percent in the baseline to 9.3 percent in the simulation without the employment effect and to 9.1 percent in the simulation that includes employment effects. The expansion obviously targets nonelderly childless individuals, and those effects are larger. Poverty for this group drops from 11.6 to 10.3 percent, including the presumed employment effects. This policy also reduces the poverty gap, particularly for nonelderly adults without children. The poverty gap declines by \$98 million (6.6 percent), with \$89 million (91 percent) of the money helping nonelderly adults without children. The relatively small reduction in the poverty gap compared with the increased cost of the EITC indicates that a large share of the expansion would benefit families with incomes above the NAS poverty threshold.

### **Increasing SNAP Participation**

Numerous states have sought to increase participation in SNAP in order to increase discretionary income among low-income families. Some states have achieved participation rates of 85 percent or even higher (Cunyngham, Castner, and Schirm 2008). In contrast, the TRIM3 model estimates that the Minnesota baseline SNAP participation rate is about 46 percent.<sup>37</sup> This simulation increases the Minnesota SNAP participation rate to 85 percent. Note that SNAP offers benefits to households that have gross income below 130 percent of the official poverty guidelines in the prior year and net income (after certain deductions) below the poverty level. As shown in table 6, the NAS poverty threshold for an urban Minnesota family with two adults and two children is 13 to 22 percent higher than the official rate, and the rural rate is approximately the same as the official rate (or 7 percent lower if the family is publicly insured). This policy will affect the poverty rate only to the extent that some families' incomes are pushed above the NAS threshold.

Poverty among all persons in Minnesota drops from 9.8 to 9.2 percent with the increase in the SNAP participation rate (table 10). The share of families with incomes in the 100–150 percent of the poverty threshold category increases slightly because families that are no longer poor move into this group. This policy reduces the Minnesota poverty gap by \$114 million (7.7 percent), and SNAP benefits increase by a somewhat higher amount (\$160 million). Over half the poverty gap reduction occurs among

TABLE 9. Impact of Expanded Childless/Secondary Worker EITC on NAS Poverty in Minnesota, 2006

|  | All persons | Children < 18 | All Persons by Family Type <sup>a</sup> |                            |                   |
|--|-------------|---------------|---|----------------------------|-------------------|
|  |             |               | In families with children               | In families w/head age 65+ | In other families |
| Total persons (thousands)                          | 5,025       | 1,245         | 2,578                                   | 609                        | 1,839             |
| Baseline   |             |               |   |                            |                   |
| Deep poor (< 50% poverty)                          | 2.5%        | 1.4%          | 1.2%                                    | 1.3%                       | 4.7%              |
| <b>Poor (&lt; 100% poverty)</b>                    | <b>9.8%</b> | <b>9.5%</b>   | <b>8.2%</b>                             | <b>11.0%</b>               | <b>11.6%</b>      |
| Near-poor (100–<150%)                              | 13.9%       | 17.1%         | 15.4%                                   | 20.4%                      | 9.6%              |
| Poverty gap (millions, 2006\$) <sup>b</sup>        | \$1,483.0   | —             | \$352.0                                 | \$171.0                    | \$961.0           |
| Expanded EITC, no employment effect                |             |               |   |                            |                   |
| Deep poor (< 50% poverty)                          | 2.5%        | 1.4%          | 1.2%                                    | 1.3%                       | 4.6%              |
| <b>Poor (&lt; 100% poverty)</b>                    | <b>9.3%</b> | <b>9.3%</b>   | <b>8.0%</b>                             | <b>11.0%</b>               | <b>10.4%</b>      |
| Near-poor (100–<150%)                              | 13.3%       | 16.1%         | 14.4%                                   | 20.5%                      | 9.4%              |
| Poverty gap (millions, 2006\$) <sup>b</sup>        | \$1,426.0   | —             | \$349.0                                 | \$171.0                    | \$906.0           |
| Expanded EITC, with employment effect <sup>c</sup> |             |               |   |                            |                   |
| Deep poor (< 50% poverty)                          | 2.3%        | 1.4%          | 1.2%                                    | 1.3%                       | 4.2%              |
| <b>Poor (&lt; 100% poverty)</b>                    | <b>9.1%</b> | <b>9.1%</b>   | <b>7.9%</b>                             | <b>11.0%</b>               | <b>10.3%</b>      |
| Near-poor (100–<150%)                              | 13.4%       | 16.3%         | 14.5%                                   | 20.4%                      | 9.5%              |
| Poverty gap (millions, 2006\$) <sup>b</sup>        | \$1,385.0   | —             | \$343.0                                 | \$170.0                    | \$872.0           |

Source: Authors' calculations based on data from the 2006 American Community Survey.

Note: The NAS poverty definition counts the value of noncash benefits in income and subtracts tax liability and work-related expenses. The NAS poverty thresholds are based on the latest consumer expenditure data, are adjusted for geographic differences in cost of living, and include out-of-pocket health expenses.

a. Columns for persons by family type include both children and adults. Persons in families with both children and an elderly head are in the "families with children" column.

b. The poverty gap is the amount of money that would be needed to lift all families currently below poverty up to the poverty threshold. The figure for all persons applies to families with children, families without children but with elderly members, and other families. The poverty gap for children applies to families with children.

c. Results with employment effects assume that the expanded EITC would increase employment among childless workers (see text).

elderly-headed families and other families without children (\$72 million or 63 percent of the total) because these groups currently have the lowest participation rates.

### Expanding CCDF Subsidies

This policy simulation assumes that child care subsidies under the CCDF program become an entitlement, rather than a benefit available only as funding allows. The simulation also assumes expansion of eligibility and reduction of some co-payments. The eligibility threshold is set at 300 percent of the official poverty guideline for both initial eligibility (becoming eligible for subsidies) and continuing eligibility (retaining subsidies once participating in the program). In contrast, Minnesota's 2006 CCDF policies set the initial eligibility threshold at 175 percent of the poverty level and the continuing eligibility threshold at 250 percent. The simulation caps copayments at 10 percent of income, while 2006 policies required a family just below 250 percent of the poverty level to pay 18 percent of income. The simulation maintains Minnesota's eligibility requirement that parents work at least 20 hours a week.

TABLE 10. *Impact of 85 Percent Food Stamps Participation Rate on NAS Poverty in Minnesota, 2006*

|   | All persons | Children < 18 | All Persons by Family Type <sup>a</sup> |                            |                   |
|---|-------------|---------------|---|----------------------------|-------------------|
|   |             |               | In families with children               | In families w/head age 65+ | In other families |
| Total persons (thousands)                   | 5,025       | 1,245         | 2,578                                   | 609                        | 1,839             |
| Baseline                                    |             |               |   |                            |                   |
| Deep poor (< 50% poverty)                   | 2.5%        | 1.4%          | 1.2%                                    | 1.3%                       | 4.7%              |
| <b>Poor (&lt;100% poverty)</b>              | <b>9.8%</b> | <b>9.5%</b>   | <b>8.2%</b>                             | <b>11.0%</b>               | <b>11.6%</b>      |
| Near-poor (100—<150%)                       | 13.9%       | 17.1%         | 15.4%                                   | 20.4%                      | 9.6%              |
| Poverty gap (millions, 2006\$) <sup>b</sup> | \$1,483.0   | —             | \$352.0                                 | \$171.0                    | \$961.0           |
| Expanded Food Stamps, no employment effect  |             |               |   |                            |                   |
| Deep poor (< 50% poverty)                   | 2.2%        | 1.2%          | 1.0%                                    | 1.1%                       | 4.2%              |
| <b>Poor (&lt;100% poverty)</b>              | <b>9.2%</b> | <b>8.4%</b>   | <b>7.3%</b>                             | <b>10.4%</b>               | <b>11.4%</b>      |
| Near-poor (100—<150%)                       | 14.4%       | 18.1%         | 16.2%                                   | 21.0%                      | 9.7%              |
| Poverty gap (millions, 2006\$) <sup>b</sup> | \$1,369.0   | —             | \$309.0                                 | \$147.0                    | \$913.0           |

Source: Authors' calculations based on data from the 2006 American Community Survey.

Note: The NAS poverty definition counts the value of noncash benefits in income and subtracts tax liability and work-related expenses. The NAS poverty thresholds are based on the latest consumer expenditure data, are adjusted for geographic differences in cost of living, and include out-of-pocket health expenses.

a. Columns for persons by family type include both children and adults. Persons in families with both children and an elderly head are in the "families with children" column.

b. The poverty gap is the amount of money that would be needed to lift all families currently below poverty up to the poverty threshold. The figure for all persons applies to families with children, families without children but with elderly members, and other families. The poverty gap for children applies to families with children.

We model the child care expansion both with and without employment effects. In the simulation without employment effects, we assume that all parents with out-of-pocket child care expenses in the baseline that are eligible for the new subsidies would begin to receive them<sup>38</sup> and that all families that received subsidies in the baseline simulation continue to receive them. This simulation adds approximately 65,000 families to the monthly CCDF caseload, for a total monthly caseload of 81,000, approximately 53 percent of the total families eligible for the expanded program. Some previously participating families now pay lower co-payments, and many (but not all) newly participating families pay a co-payment lower than their prior unsubsidized child care expense.<sup>39</sup> Lower child care expenses increase family resources. Poverty declines from 9.8 to 9.5 percent overall, and from 8.2 to 7.8 percent for individuals in families with children (table 11). However, the percentage of near-poor increases, suggesting that the reduction in child care expenses does not raise many families beyond the near-poor level. The poverty gap falls by \$33 million (2.2 percent).

The second simulation assumes that expanded child care subsidies would increase employment among parents (Schaefer and Collins 2006). The literature finds a wide range of estimates, often varying with different study groups. For example, one study estimated that a \$1,000 annual increase in subsidies increases the employment for low-income families not on welfare by 11 percent (Bainbridge, Meyers, and Waldfogel 2003). Houser and Dickert-Conlin (1998) estimate a more modest effect, finding that a subsidy equal to 50 percent of the cost of care would increase labor force participation among single par-

TABLE 11. *Impact of Expanded CCDF on NAS Poverty in Minnesota, 2006*

|   | All persons | Children < 18 | All Persons by Family Type <sup>a</sup> |                            |                   |
|---|-------------|---------------|---|----------------------------|-------------------|
|   |             |               | In families with children               | In families w/head age 65+ | In other families |
| Total persons (thousands)                   | 5,025       | 1,245         | 2,578                                   | 609                        | 1,839             |
| Baseline                                    |             |               |   |                            |                   |
| Deep poor (< 50% poverty)                   | 2.5%        | 1.4%          | 1.2%                                    | 1.3%                       | 4.7%              |
| <b>Poor (&lt;100% poverty)</b>              | <b>9.8%</b> | <b>9.5%</b>   | <b>8.2%</b>                             | <b>11.0%</b>               | <b>11.6%</b>      |
| Near-poor (100—<150%)                       | 13.9%       | 17.1%         | 15.4%                                   | 20.4%                      | 9.6%              |
| Poverty gap (millions, 2006\$) <sup>b</sup> | \$1,483.0   | —             | \$352.0                                 | \$171.0                    | \$961.0           |
| Expanded CCDF, no employment effect         |             |               |   |                            |                   |
| Deep poor (< 50% poverty)                   | 2.4%        | 1.2%          | 1.1%                                    | 1.3%                       | 4.7%              |
| <b>Poor (&lt;100% poverty)</b>              | <b>9.5%</b> | <b>9.0%</b>   | <b>7.8%</b>                             | <b>11.0%</b>               | <b>11.6%</b>      |
| Near-poor (100—<150%)                       | 14.0%       | 17.3%         | 15.7%                                   | 20.4%                      | 9.6%              |
| Poverty gap (millions, 2006\$) <sup>b</sup> | \$1,450.0   | —             | \$318.0                                 | \$171.0                    | \$961.0           |
| Expanded CCDF, with employment effect       |             |               |   |                            |                   |
| Deep poor (< 50% poverty)                   | 2.3%        | 1.0%          | 0.9%                                    | 1.3%                       | 4.7%              |
| <b>Poor (&lt;100% poverty)</b>              | <b>9.4%</b> | <b>8.7%</b>   | <b>7.5%</b>                             | <b>11.0%</b>               | <b>11.6%</b>      |
| Near-poor (100—<150%)                       | 14.1%       | 17.7%         | 15.9%                                   | 20.4%                      | 9.6%              |
| Poverty gap (millions, 2006\$) <sup>b</sup> | \$1,415.0   | —             | \$284.0                                 | \$171.0                    | \$961.0           |

Source: Authors' calculations based on data from the 2006 American Community Survey (ACS).

Note: The NAS poverty definition counts the value of noncash benefits in income and subtracts tax liability and work-related expenses. The NAS poverty thresholds are based on the latest consumer expenditure data, are adjusted for geographic differences in cost of living, and include out-of-pocket health expenses.

a. Columns for persons by family type include both children and adults. Persons in families with both children and an elderly head are in the "families with children" column.

b. The poverty gap is the amount of money that would be needed to lift all families currently below poverty up to the poverty threshold. The figure for all persons applies to families with children, families without children but with elderly members, and other families. The poverty gap for children applies to families with children.

ents by 4.2 percent and secondary earners by 4.1 percent. We assume that the percentage of nonmarried parents with children under age 13 working at least 20 hours per week in the average month increases from 77 to 80 percent and the percentage of secondary workers with children under age 13 working at least half time increases from 63 to 65 percent. These estimates are consistent with the lower estimates found in the literature. As with the modeling of employment effects of an expanded EITC, we assume that only 18 percent of the new jobs are full-time full-year and all the new jobs are at the minimum wage.

Although the assumption of new employment results in over 17,000 new workers—all of whom receive subsidized child care—the estimated effect on poverty would be small (table 11). The poverty rate falls from 7.8 percent under the assumptions of expanded child care subsidies but no new jobs to 7.5 percent with the increase in employment among individuals in families with children. The relatively small effects occur for two reasons. First, in unmarried families in which the parent is assumed to take a part-time part-year job at the minimum wage, total earnings are not high enough to raise the family out of poverty. Second, among the married families in which a secondary worker is assumed to take a job, many already had

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incomes above 150 percent of poverty. To substantially reduce the poverty rate would require the availability of full-time full-year jobs at higher wages. However, even with the low-paying jobs assigned in the simulation, the increased employment reduces the poverty gap by an additional \$35 million.

### **Increasing Attainment of AA Degrees**

This policy simulation tests the potential effects of a major increase in the educational attainment of Minnesota workers. We assume that half of Minnesota adults under age 50 who are neither disabled nor in school, who possess a high school degree but no college degree, would attain a two-year associate of arts (AA) degree. This simulation does not represent the outcome of a specific set of government policies. Rather, it illustrates the potential effects on family incomes of a major increase in educational attainment, combined with an assumption that the economy can provide jobs that reward that education.

The recent economics literature indicates potentially significant employment and earnings increases from completion of postsecondary education. For example, postsecondary education participants achieved an employment rate 16 percentage points higher than nonparticipants in a set of experiments; they also achieved earnings gains of 47 percent (Bos et al. 2002). Lerman (2007) reports that the evidence on community college completion suggests an earnings gain of 30 percent for men who complete a vocational AA degree, 40 percent for women who complete an academically oriented AA degree, and 47 percent for women who complete a vocational AA degree. Extrapolating from those results, we assume that new AA recipients who already have a job increase their earnings by 40 percent and that 15 percent of new AA recipients without a job obtain a job. We assign new workers 35 hours of work a week for 50 weeks a year at \$17 per hour—the median hourly wage in Minnesota for those with an AA degree. We implement these assumptions by randomly choosing half of the target group—adults under age 50 who are neither in school nor disabled, and who have a diploma (or GED) but no college degree. Among that half, all of those already working receive a 40 percent wage increase (over 400,000 people), and a randomly chosen 15 percent of nonworkers get a new job (6,000 people).

The increased employment and wages reduce the poverty and the near-poverty rates. Overall, the poverty rate falls from 9.8 to 9.2 percent, and the percentage of individuals with incomes between 100 and 150 percent of poverty falls from 13.9 to 12.7 percent (table 12). The poverty gap falls by \$75 million, or 5 percent. The poverty rate drops relatively more for persons in families with children (from 8.2 to 7.4 percent) indicating the policies' focus on prime-age adults without disabilities. The relatively small effects on poverty indicate that the policy affects a broad range of individuals, some of whom are not poor. A policy that targeted on primary adults in low-income families for completion of the AA would have larger poverty-reduction effects.

### **Implications for State Poverty Measurement**

States need reliable sample sizes to measure poverty, and they need a measure that takes into account all family resources. The ACS provides ample sample sizes for annual poverty measurement at the state level, but it provides somewhat less information about families than the standard CPS typically used for poverty measurement. For example, the ACS asks about fewer individual elements of cash income. Income received from child support, unemployment insurance, and veterans benefits are grouped together in one question called “other cash income,” and public assistance benefits are grouped into a single category. We also show that the ACS reports of income from assets in Minnesota differ significantly from the CPS. The ACS contains less detail about family relationships, making it more difficult

TABLE 12. *Impact of Attainment of AA Degrees by Half of Adults with Diplomas on NAS Poverty in Minnesota, 2006*

|   | All persons | Children < 18 | All Persons by Family Type <sup>a</sup> |                            |                   |
|---|-------------|---------------|---|----------------------------|-------------------|
|   |             |               | In families with children               | In families w/head age 65+ | In other families |
| Total persons (thousands)                   | 5,025       | 1,245         | 2,578                                   | 609                        | 1,839             |
| Baseline                                    |             |               |   |                            |                   |
| Deep poor (< 50% poverty)                   | 2.5%        | 1.4%          | 1.2%                                    | 1.3%                       | 4.7%              |
| <b>Poor (&lt;100% poverty)</b>              | <b>9.8%</b> | <b>9.5%</b>   | <b>8.2%</b>                             | <b>11.0%</b>               | <b>11.6%</b>      |
| Near-poor (100–<150%)                       | 13.9%       | 17.1%         | 15.4%                                   | 20.4%                      | 9.6%              |
| Poverty gap (millions, 2006\$) <sup>b</sup> | \$1,483.0   | —             | \$352.0                                 | \$171.0                    | \$961.0           |
| Expanded attainment of AA degrees           |             |               |   |                            |                   |
| Deep poor (< 50% poverty)                   | 2.4%        | 1.3%          | 1.2%                                    | 1.3%                       | 4.5%              |
| <b>Poor (&lt;100% poverty)</b>              | <b>9.2%</b> | <b>8.7%</b>   | <b>7.4%</b>                             | <b>11.0%</b>               | <b>11.1%</b>      |
| Near-poor (100–<150%)                       | 12.7%       | 15.2%         | 13.6%                                   | 20.2%                      | 8.9%              |
| Poverty gap (millions, 2006\$) <sup>b</sup> | \$1,408.0   | —             | \$313.0                                 | \$171.0                    | \$924.0           |

Source: Authors' calculations based on data from the 2006 American Community Survey.

Note: The NAS poverty definition counts the value of noncash benefits in income and subtracts tax liability and work-related expenses. The NAS poverty thresholds are based on the latest consumer expenditure data, are adjusted for geographic differences in cost of living, and include out-of-pocket health expenses.

a. Columns for persons by family type include both children and adults. Persons in families with both children and an elderly head are in the “families with children” column.

b. The poverty gap is the amount of money that would be needed to lift all families currently below poverty up to the poverty threshold. The figure for all persons applies to families with children, families without children but with elderly members, and other families. The poverty gap for children applies to families with children.

to identify secondary families within the household. It also contains less data on near-cash benefits necessary for an NAS-type poverty measure. For example, the ACS does not contain information on whether a household lives in public or subsidized housing, does not report receipt of LIHEAP, WIC, or free or reduced-price school lunches, and (effective 2008) does not report the value of SNAP benefits.

The NAS poverty measure requires numerous imputations to correct for underreporting and add information regardless of the input survey. Government benefits are notoriously underreported on Census surveys, and the values of some benefits are not reported at all. Surveys used for income measurement typically do not include measures for out-of-pocket health, child care, or transportation expenses. Also, surveys do not provide information on taxes paid by households. All these data elements are required to complete the NAS measure.

This paper shows that the items required for the NAS can be imputed using simulation and imputation procedures. The TRIM3 model provides a good starting place because it already includes modules that impute the most important government benefits at the state level, and it provides calculators for payroll, federal, and state income taxes. As we describe, numerous decisions must be made to complete the simulations using the ACS. Ideally, surveys would provide more information, especially about income, and would increase the accuracy of what is reported in order to improve poverty measurement. The McDermott bill that recommends adoption of a NAS-like measure of poverty also calls for improving the data available for the poverty measure. This will require significant investment.

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In the mean time, models such as the one described here can be used to measure poverty at the state level and refined over time.<sup>40</sup> The NAS poverty measure produces significant differences in poverty status among different subpopulations relative to the official poverty measure. Poverty among children is somewhat lower using the NAS measure, while poverty among adults age 65 and older is much higher. While the results depend on numerous factors, including consideration of all resources and nondiscretionary expenses, the relative effect of out-of-pocket health care expenses and the geographic cost-of-living differentials importantly contribute to these effects. These initial results suggest the importance of understanding the sensitivity of the results to alternative treatment of these factors.

The Census Bureau provides a large body of research that shows the sensitivity of the NAS poverty definition to different definitions of resources and thresholds. The next step in poverty measurement using the ACS should include similar analysis applied to the ACS. It is important to know how relative poverty rates change given different assumptions such as geographic variation in thresholds and treatment of home value and out-of-pocket health spending. Also, the methods should be extended to more states. As described in this paper, careful imputations require using state-specific program rules and administrative data to validate results.

This analysis also demonstrates how a broader measure of poverty can be used to assess the effects of alternative policies on poverty. States often consider policies that would expand near-cash benefits such as child care subsidies, refundable tax credits, or SNAP. Since the official poverty measure does not take these into account, it does not provide a useful benchmark to measure the benefits to families. States also frequently want to estimate the effects of investment in education on poverty. While both the official and the NAS poverty measures take into account the potential effect of higher earnings on poverty, only the NAS measure also shows the related effects on the EITC, other government assistance, and taxes.

We show the effects of variants of policies considered by the Minnesota Legislative Commission to end poverty. The simulations show that each policy alone would have relatively little effect on poverty. Broad poverty reduction requires a package of policies that recognizes the heterogeneity among the state's poverty population. Estimates of the effects of policy changes on poverty can inform such policy development and show the potential cost to government of reducing poverty. Of course, these types of models and poverty measures show only short-term costs and reductions in poverty. In the long run, lower poverty rates could have much larger, positive effects on families and ultimately reduce government costs as more families no longer need assistance.

# APPENDIX A.

## MODELING PROCEDURES AND VALIDATION

As described earlier, the NAS definition of poverty requires numerous items of information either not available in the 2006 American Community Survey data or incompletely reported in the ACS data. This information must be simulated or imputed in order to create the “baseline” poverty estimates. We modified the TRIM3 microsimulation model to generate the required information for the Minnesota ACS data for 2006. TRIM3 is a comprehensive microsimulation model of the tax, transfer, and health programs affecting U.S. families that typically uses the Current Population Survey’s Annual Social and Economic Supplement (ASEC) data.<sup>41</sup>

This appendix augments the information in the body of the paper on the ACS data, the baseline simulations of tax and benefit programs, and the imputations of child care expenses and private health insurance status. TRIM3-generated data are compared to targets from government administrative data and other sources.

### **The ACS Data**

The ACS data provide most of the basic information needed to simulate government tax and benefit programs, including information about family relationships, demographic characteristics, and annual incomes and employment data. However, imputations and assumptions are required to support the simulations. These include imputation of subfamily relationships, refugee status, disability status, and monthly earned and unearned income.

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## Family Relationships

The ACS does not include sufficient information about household inter-relationships to explicitly identify whether the individuals who are unrelated to the household head are related to each other. However, the Minnesota Population Center's IPUMS (Integrated Public Use Microdata Series) version of the ACS data includes variables that identify likely parent and spouse relationships for all individuals in the household (Ruggles and Brower 2003; Ruggles et al. 2008). We use these variables to identify unrelated subfamilies in the ACS data. As noted earlier, however, the ACS does not identify biological relationships between cohabiting adults and children, and the NAS recommendation to include both cohabiting biological parents in the poverty unit could not be implemented. The ACS includes individuals in institutions and noninstitutional group quarters, but these individuals are excluded from this prototype.

## Noncitizens' Immigrant Status

The ACS identifies whether each individual is a native-born citizen, naturalized citizen, or noncitizen. However, some assumptions must be made about a noncitizen's immigrant status, since different groups of noncitizens are treated differently for purpose of eligibility for public benefits. Undocumented immigrants and temporary residents are not eligible for most government benefits; refugees are generally eligible for their first seven years in the country; and legal permanent residents are generally ineligible for their first five years in the country, after which they may or may not be eligible.

For this prototype model, we treat all the noncitizens as legal immigrants (rather than undocumented immigrants or temporary residents). However, we estimate which noncitizens are refugees based on their survey-reported country of birth and year of entry into the United States. The procedures follow those explained in Passel, Van Hook, and Bean (2006). Of the noncitizens in the 2006 Minnesota ACS data, 23 percent are identified as refugees. A fully developed ACS-based model would select undocumented immigrants from among the non-refugee noncitizens, as is done for CPS-based TRIM3 modeling.

## Disability Status

Disability status is needed to simulate eligibility for SSI and to determine which families receive additional deductions or disregards for disabled individuals in SNAP and the subsidized housing program. The identification of disability in the ACS is facilitated by the availability of six different variables identifying different types of limitations for individuals age 5 and older. Three limitations—limits on basic physical activities, difficulty learning/remembering/concentrating, and difficulty working at a job or business—appeared to have the strongest relationship with reported SSI receipt by nonelderly adults. For teenagers, the learning/remembering/concentrating limitation had the closest relationship with reported SSI.<sup>42</sup>

Thus, we assign disability status to nonelderly adults if they do not have any earnings during the year and report either one of those three types of limitations or receipt of disability income (SSI, or Social Security and the individual does not apparently qualify for benefits on the basis of survivorship or retirement age). Adults who report disability income are assigned disability status even if they report earnings, as long as earnings do not exceed the SSI program's "substantial gainful activity" test in any month. Children that report having difficulty learning, remembering, or concentrating are assigned disability status.

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## Earned Income

The ACS asks each economic adult (age 15 or older) to report annual earnings and annual self-employment income. However, the simulations require monthly earnings amounts to allow monthly simulation of benefit programs. When an individual reports having worked for fewer than 52 weeks, we randomly choose a month as the starting point for employment, and assume that the person earned the same amount of money in each week of work. For instance, if a person reports 26 weeks of work and earnings of \$12,000, and the randomly chosen starting month is April, the person is imputed to have earned \$2,000 in each month from April through September and to have no earnings in any of the other months.

## Unearned Income

The ACS also collects each adult's annual unearned income. Only two types of unearned income are reported individually: Social Security and SSI. Other unearned income is reported in four categories: income from interest, dividends, rent, royalties, and estates/trusts; public assistance or welfare payments; retirement, survivor, or disability pensions; and any other sources of income—which could include unemployment insurance, workers compensation, veterans benefits, child support, and alimony, among other types of income. All six annual unearned income amounts are assumed to be received evenly over the year.

The combined income amounts limit our ability to model some of the detailed rules of government programs. For example, because child support income is not reported separately, we cannot capture the fact that SNAP disregards a portion of child support income.

## The Baseline Simulations

The baseline simulations create the additional information needed to calculate the NAS definition of poverty. Specifically, TRIM3 simulates the following programs:

- SSI: Both adult and children's SSI benefits, including the federal portion of SSI and Minnesota's supplemental SSI payments.
- TANF: TANF-funded cash benefits (the Minnesota Family Independence Program, or MFIP).
- SNAP (Food Stamps): Household-level benefits, including the interactions between MFIP and food benefits.
- WIC: Benefits to infants, children, and mothers of infants.
- LIHEAP: Households are identified as receiving energy assistance and assigned the average value of that aid.
- Public and subsidized housing: Households are identified as living in public or subsidized housing, and the value of that benefit is estimated.
- Child care expenses: TRIM3 simulates child care subsidies funded through the CCDF program and imputes child care expenses to a portion of working families without a child care subsidy
- Payroll taxes: The employee's portion of payroll taxes.

- 
- Federal income taxes: Federal income tax liabilities and tax credits, including the EITC.
  - State income taxes and credits: Minnesota’s state income tax system.
  - Health insurance: Medicaid and SCHIP enrollment are simulated, Medicare enrollment is inferred from Social Security receipt, and private health insurance coverage is imputed. Health insurance status (public, private, and none) is required for selecting the appropriate NAS poverty thresholds that include out-of-pocket health spending.

As noted in the main text, we model tax and benefit rules in as much detail as permitted by the survey data, including Minnesota’s specific policies for programs that vary across states. We simulate filing units (that is, persons who must apply together for benefit programs) most closely to each program’s real-world operation. For instance, eligibility for public and subsidized housing depends on the income of the entire household, while the TANF assistance unit depends on a nuclear family, and income taxes depend on the income of each single individual or married couple. The model captures interactions across programs; simulation results for one tax or benefit program affect results in other modules. For example, the level of a family’s CCDF co-payment affects the family’s SNAP benefit since that program allows a portion of out-of-pocket child care expenses to be deducted from income.

### **Simulating Benefit Programs**

For each of the key benefit programs, the simulations calculate eligibility and potential benefits or, in the case of child care subsidies, the co-payment. Since these programs generally operate on a monthly basis in the real world, TRIM3’s simulates eligibility and participation on a monthly basis, capturing the fact that a family may be eligible for a benefit in part of the year or may become eligible for a higher or lower benefit because of a change in income at some point during the year.

Program rules—including income definitions, eligibility tests, and benefit or co-payment computation rules—are simulated in as much detail as possible. Rules that prohibit most benefits for undocumented aliens and temporary residents cannot be captured in this version of the model, which assumes all non-refugee noncitizens are legal permanent residents. Assets tests are approximated by applying a rate of return to asset-based incomes (interest, dividends, and rental income) to infer the value of an individual’s assets.

Since not all families and individuals eligible for a benefit receive that benefit, the simulations randomly select participants from among those who are eligible. The selection aims to come acceptably close to the actual caseload, in overall size and by key characteristics. In the case of benefits reported in the ACS data—SSI, SNAP, and TANF—the simulations augment the survey-reported data. The survey-reported recipients are included in the caseload as long as they pass the eligibility tests, and eligible non-reporters are included to the extent needed to reach program targets. Below we describe the results for the base-line simulations.

*SSI.* The Minnesota ACS data count 59.2 million people as receiving any SSI during 2006, well short of the actual monthly caseload of 67.3 million. (The true annual caseload should be above the monthly caseload.) The annual SSI benefits reported in the ACS amount to \$407 million, which *exceed* the \$368 million in federal and state SSI benefits paid to Minnesota residents in 2006 (table A1). However, many individuals who report SSI income on the ACS report amounts above the SSI maximum benefit, suggesting possible confusion between Social Security and SSI.<sup>43</sup> The simulation applies the program’s income and assets tests to elderly individuals and those who appear disabled based on

TABLE A1. TRIM-Simulated Benefit and Tax Data for Minnesota versus Targets

|  | ACS reports <sup>a</sup> | TRIM-simulated, 2006 ACS data | 2006 admin data <sup>b</sup> | TRIM ACS as % of admin |
|--|--------------------------|-------------------------------|------------------------------|------------------------|
| SSI (noninstitutionalized; includes state supplements)                     |                          |                               |                              |                        |
| Average monthly caseload (1,000s of people)                                |                          | 66.9                          | 67.3                         | 99.4%                  |
| Adults   |                          | 57.4                          | 57.7                         | 99.5%                  |
| Children   |                          | 9.5                           | 9.6                          | 98.7%                  |
| Annual benefits, adults + children (millions) <sup>c</sup>                 | \$407.1                  | \$367.2                       | \$367.8                      | 99.8%                  |
| TANF (including separate state programs)                                   |                          |                               |                              |                        |
| Average monthly caseload (1,000s of units)                                 |                          | 29.3                          | 29.5                         | 99.4%                  |
| Child only   |                          | 9.4                           | 9.8                          | 95.8%                  |
| Two parents in unit  |                          | 2.3                           | 2.3                          | 98.8%                  |
| One adult earner   |                          | 5.1                           | 4.9                          | 103.3%                 |
| One adult non-earner   |                          | 12.5                          | 12.5                         | 100.6%                 |
| Annual benefits (millions)   | \$97.3                   | \$139.7                       | \$126.5                      | 110.4%                 |
| SNAP   |                          |                               |                              |                        |
| Average monthly caseload (1,000s of units)                                 |                          | 123.1                         | 126.4                        | 97.4%                  |
| Annual benefits (millions)   | \$148.2                  | \$290.8                       | \$285.0                      | 102.0%                 |
| Public and subsidized housing  |                          |                               |                              |                        |
| Average monthly caseload (1,000s of households)                            | —                        | 76.3                          | 76.0                         | 100.4%                 |
| Ever-subsidized h'holds by characteristics (overlappng)                    |                          |                               |                              |                        |
| Elderly head or spouse   |                          | 20.1                          | 18.6                         | 107.7%                 |
| Disabled head or spouse  |                          | 37.0                          | 34.7                         | 106.8%                 |
| Household contains children  |                          | 32.2                          | 31.6                         | 101.9%                 |
| Female head of household (married and unmarried)                           |                          | 27.3                          | 28.5                         | 95.8%                  |
| Annual value of subsidy (millions)   | NA                       | \$406.3                       | —                            |                        |
| LIHEAP <sup>d</sup>  |                          |                               |                              |                        |
| Assisted households (1,000s)   |                          | 145.2                         | 146.9                        | 98.8%                  |
| % with a member age 60+  |                          | 43%                           | 31%                          |                        |
| % with a disabled member   |                          | 35%                           | 27%                          |                        |
| % with a child < age 5   |                          | 19%                           | 26%                          |                        |
| Annual benefits, regular and crisis (millions)                             | NA                       | \$89.0                        | \$90.0                       | 98.9%                  |
| WIC <sup>e</sup>   |                          |                               |                              |                        |
| Average monthly caseload of infants and children                           | NA                       | 94.2                          | 97.7                         | 96.4%                  |
| Annual benefits, total (millions)  | NA                       | \$52.1                        |                              |                        |
| CCDF-funded child care subsidies   |                          |                               |                              |                        |
| Average monthly caseload (1,000s of families)                              |                          | 16.9                          | 16.7                         | 101.0%                 |
| Aggregate co-payment (millions)  |                          | \$11.2                        | \$13.8                       | 81.6%                  |
| Families with co-payments (1,000s)   |                          | 10.7                          | 11.6                         | 92.0%                  |
| Average non-\$0 co-payment   |                          | \$87                          | \$98                         | 88.4%                  |
| Total child care expenses, unsubsidized and subsidized                     |                          |                               |                              |                        |
| Average non-\$0 monthly expenses, families with children ≤ 12 <sup>f</sup> | NA                       | \$450                         | \$477                        |                        |
| OASDHI taxes on private-sector wage/salary income, excluding railroad      |                          |                               |                              |                        |
| Workers subject to OASDI tax (1,000s)                                      | NA                       | 2,981                         | 3,155                        | 94%                    |
| Earnings subject to OASDI tax (millions)                                   |                          | \$102,894                     | \$103,858                    | 99%                    |
| OASDI and HI taxes paid by workers (millions)                              |                          | \$8,071                       | \$8,181                      | 99%                    |

(continued)

TABLE A1. TRIM-Simulated Benefit and Tax Data for Minnesota versus Targets (Continued)

|  | ACS reports <sup>a</sup> | TRIM-simulated, 2006 ACS data | 2006 admin data <sup>b</sup> | TRIM ACS as % of admin |
|--|--------------------------|-------------------------------|------------------------------|------------------------|
| Federal income taxes, returns, and liability         |                          |                               |                              |                        |
| Positive-tax returns (millions)                      | NA                       | 1,901                         | 1,855                        | 102%                   |
| with AGI < \$100,000                                 |                          | 1,569                         | 1,544                        | 102%                   |
| with AGI ≥ \$100,000                                 |                          | 332                           | 311                          | 107%                   |
| Total tax liability, positive-tax returns (millions) |                          | \$17,410                      | \$17,874                     | 97%                    |
| with AGI < \$100,000                                 |                          | \$6,741                       | \$5,420                      | 124%                   |
| with AGI ≥ \$100,000                                 |                          | \$10,669                      | \$12,454                     | 86%                    |
| Zero-tax returns (1,000s)                            |                          | 746                           | —                            |                        |
| Negative-tax returns (1,000s)                        |                          | 281                           | —                            |                        |
| Federal income tax credits                           |                          |                               |                              |                        |
| Earned income tax credit                             | NA                       |                               |                              |                        |
| Returns with credit (1,000s)                         |                          | 281                           | 282                          | 100%                   |
| Total credit (millions)                              |                          | \$416                         | \$474                        | 88%                    |
| Child tax credit (nonrefundable portion)             |                          |                               |                              |                        |
| Returns with credit (1,000s)                         |                          | 468                           | 458                          | 102%                   |
| Total credit (millions)                              |                          | \$692                         | \$629                        | 110%                   |
| Child tax credit (refundable portion)                |                          |                               |                              |                        |
| Returns with credit (1,000s)                         |                          | 145                           | 186                          | 78%                    |
| Total credit (millions)                              |                          | \$167                         | \$209                        | 80%                    |
| Total child tax credit (millions)                    |                          | \$859                         | \$838                        | 103%                   |
| Child and dependent care tax credit                  |                          |                               |                              |                        |
| Returns with credit (1,000s)                         |                          | 117                           | 145                          | 81%                    |
| Total credit (millions)                              |                          | \$83                          | \$65                         | 128%                   |
| State income tax                                     |                          |                               |                              |                        |
| Positive-tax returns (1,000s)                        | NA                       | 1,972                         | 2,024                        | 97%                    |
| Tax collections (millions)                           |                          | \$7,275                       | \$6,941                      | 105%                   |
| Returns with marriage credit (1,000s)                |                          | 458                           | 393                          | 117%                   |
| Returns with dependent care credit (1,000s)          |                          | 34                            | 36                           | 95%                    |
| Returns with working families credit (1,000s)        |                          | 311                           | 268                          | 116%                   |
| Total of three credits (millions)                    |                          | \$217                         | \$219                        | 99%                    |
| Medicaid and SCHIP (noninstitutionalized)            |                          |                               |                              |                        |
| Average monthly enrollment (1,000s)                  |                          | 559.5                         | 560.3                        | 99.9%                  |
| Children (nondisabled)                               |                          | 297.1                         | 298.1                        | 99.7%                  |
| Adults (nondisabled, nonelderly)                     |                          | 138.7                         | 138.5                        | 100.1%                 |
| Disabled (children and nonelderly adults)            |                          | 87.5                          | 87.4                         | 100.0%                 |
| Elderly (including disabled)                         |                          | 36.3                          | 36.3                         | 100.0%                 |
| Ever-enrolled during the calendar year (1,000s)      | NA                       | 722.8                         | 712.8                        | 101.4%                 |

Source: Authors' calculations based on data from the 2006 American Community Survey (ACS).

a. Dollars of benefits reported by ACS respondents. The ACS also provides estimates of the number that received benefits during the year and shows 59.2, 30.7 and 112.5 thousand recipients for SSI, TANF, and SNAP. (The TANF figure counts families with children who reported public assistance; the ACS does not separately capture TANF income.) TRIM3 and administrative data caseloads shown in the table are average monthly figures.

b. Administrative figures are adjusted or combined for consistency with simulation concepts—for example, benefits to the noninstitutionalized population during the calendar year (instead of fiscal year).

c. Administrative data for SSI include retroactive payments, which are approximately 9 percent of total payments. TRIM does not simulate retroactive payments.

d. Targets are from the fiscal year 2006 LIHEAP Report to Congress. An exact unduplicated number of assisted households is not available; an unduplicated count is estimated assuming two-third of households receiving crisis heating aid also receive regular heating aid.

e. Benefits to pregnant women are not captured.

f. The Minnesota target is derived from information in a state survey (Chase et al. 2005). The weekly non-\$0 expense amount from the survey (which includes non-work-related child care) is multiplied by 4.3 to estimate a monthly figure.

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the criteria described above, then computes potential federal benefits and potential state supplements. Selected from among the eligible individuals, the simulated caseload is within 0.6 percent of Minnesota's actual noninstitutionalized SSI caseload in 2006; simulated benefits are within 0.2 percent of the actual figure.

*TANF.* As mentioned above, the ACS data do not separately capture TANF income. Treating all the "other public assistance" reported by families with children as TANF income, the total is only 77 percent of the actual annual TANF cash benefits paid to Minnesota families in 2006. The model comes closer to the actual figure by simulating Minnesota's detailed rules for TANF-funded cash benefits (the Minnesota Family Investment Program, or MFIP) then selecting a TANF caseload from among the eligible families. The simulated caseload is only 0.6 percent below the actual average monthly caseload overall; the simulated caseload is within 5 percent of target for each major subgroup of TANF recipients—child-only cases, two-parent cases, and one-adult families with and without earnings. Despite this very close alignment on caseload size, total simulated benefits exceed the target by 10 percent; this may result from lower reported incomes among the simulated ACS caseload than among the actual caseload.

*SNAP.* The 2006 Minnesota ACS data capture \$148 million in SNAP (food stamp) benefits, only 52 percent of the actual figure of \$285 million. The simulation applies all the key eligibility and benefit rules, including the rules governing food assistance for MFIP families. The simulated caseload is only 2.6 percent below the actual SNAP caseload; simulated benefits are 2.0 percent above the actual figure.

*Public and Subsidized Housing.* The ACS does not capture whether a household resides in public or subsidized housing—a benefit that can have a major impact on a family's economic well-being. The model identifies a household as potentially eligible for public or subsidized housing if the household rents its home, passes the basic income criteria, and the fair-market rent for an apartment of the needed size exceeds 30 percent of the household's income.<sup>44</sup> The simulated caseload—selected from among the eligible households—is 0.4 percent from the actual number of households in public or subsidized housing in Minnesota in 2006. The simulated caseload includes somewhat too many elderly and disabled households, and somewhat too few female-headed households. For each subsidized household, the value of that subsidy is computed as the apartment's fair-market rent minus the household's co-payment. The model finds that Minnesota households received \$406 million in housing subsidies in 2006.

*LIHEAP.* Energy assistance for low-income families is a substantial benefit in Minnesota—\$90 million in 2006. The model identifies which households fall within the state-established income limits. The simulated caseload is very close to the actual in overall size (within 1.2 percent), but it includes somewhat too many elderly and disabled recipients and somewhat too few households with children. For each household in the simulated caseload, the same benefit value is used—equal to the average Minnesota 2006 LIHEAP grant from administrative data. The aggregate simulated benefit of \$89 million is just 1.1 percent below the actual figure.

*WIC.* The model identifies which infants, young children, and mothers of infants meet WIC income guidelines; nutritional risk criteria are not simulated, and the model does not capture benefits to pregnant women. Recipients are chosen at random from among the eligible individuals; the simulated caseload for infants and children is within 4 percent of the target. The benefit that is assigned is the average value of the food basket for each type of person (woman, infant, child) from administrative data.

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## Simulating Child Care Subsidies and Imputing Child Care Expenses

Child care subsidies are another major benefit not captured in the ACS data. Child care subsidies are modeled in conjunction with the estimation of unsubsidized child care expenses. The model identifies which families are eligible for child care subsidies for part or all of the year, computes the co-payment that a family would have to pay if subsidized (if any), and selects a simulated caseload. Overall, the simulated average number of subsidized families is just 1 percent above the actual number. The simulated caseload falls 8 percent short of the number of families that would have to pay a co-payment, and the average co-payment amount is 12 percent below target. (As mentioned earlier with the TANF simulation, this may result from lower incomes among the simulated ACS caseload than among the actual caseload.)

For families who are simulated to receive a child care subsidy, their child care expense equals their required co-payment. For other families, child care expenses are statistically imputed. Combining the simulated co-payments and the imputed unsubsidized expenses, the average monthly nonzero expense paid by Minnesota families in the model is \$450—close to the figure of \$477 that can be inferred from a survey of Minnesota child care expenses (Chase et al. 2005).

## Simulating Taxes

The model simulates three types of taxes: payroll taxes, federal income taxes, and state income taxes. All individuals are assumed to pay all taxes that they owe.

*Payroll Taxes.* TRIM3 simulates the employee's portion of the payroll tax. The model finds 2.981 million workers subject to OASDI taxes and 3.003 million subject to HI taxes, figures that are 6 percent and 5 percent, respectively, below targets. The total amount of payroll tax simulated for Minnesota workers in 2006 is \$8.071 billion, within 1 percent of the actual figure of \$8.181 billion.

*Federal Income Taxes.* TRIM3 models federal income tax liability—and income tax credits—in as much detail as possible. However, this preliminary version of ACS-based modeling does not include imputations for itemized deductions or capital gains; thus, all tax units are assumed to take the standard deduction, and any taxes owed based on capital gains are not captured. Overall, the model finds 1.901 million Minnesota tax units with positive federal income tax liability—2 percent above the actual figure. Aggregate simulated tax liability on positive-tax returns in Minnesota is \$17.410 billion, 3 percent below the actual amount. Tax liability is overestimated for tax units with adjusted gross income below \$100,000, but underestimated for tax units with AGI above \$100,000.

Simulated figures are reasonably close to actual reports for the receipt of federal income tax credits in Minnesota. The simulated number of tax returns with the federal EITC is exactly on target, although the total simulated credit is 12 percent below target. For the child and dependent care credit, TRIM3's simulated recipients fall 19 percent short of the actual figure, but the aggregate credit is 28 percent. The model comes very close to the number of returns with the child tax credit but is low on the number with the additional child tax credit; the simulated value of these two credits combined is 3 percent above target. For the child and dependent care credit, the model underestimates the number of tax units taking the credit by 19 percent, but it overestimates the total amount of credit by 28 percent.

*State Income Taxes.* The modeling of state income taxes captures Minnesota's actual state income tax rules for 2006 in as much detail as possible, including Minnesota's tax brackets and rates, the detailed tables used in computing Minnesota's working families credit, and so on. TRIM3 simulates 1.972 million Minnesota

tax units with positive state income tax liability, just 3 percent below the actual figure. Total simulated state income tax collections are 5 percent above the actual figure. For each key tax credit—the marriage credit, dependent credit, and working families tax credit—the simulated number using the credit is within 20 percent of the actual figure. The combined value of the three credits is 1 percent below target.

### Simulating Public Health Insurance and Imputing Private Health Insurance

The 2006 ACS does not include health insurance coverage information. As described earlier, we need insurance status to assign the appropriate poverty thresholds that vary by health insurance status. This imputation involves a two-step process. We first assign Medicare and Medicaid or SCHIP coverage. Then we impute private health insurance coverage.

The Medicaid and SCHIP estimates match closely to Minnesota administrative targets for 2006.<sup>45</sup> The simulated number of Medicaid/SCHIP enrollees in the average month of the year nearly matches the program administrative data, in total and for key subgroups of participants—children, adults, disabled individuals, and elderly individuals. The simulated annual caseload—the count of individuals who are enrolled in Medicaid or SCHIP in at least one month of the year—is 1.4 percent above the target figure.

We impute private health insurance coverage to 76 percent of health insurance units without an elderly member and 68 percent of health insurance units with at least one elderly member (table A2).<sup>46</sup> The model estimates that 13 percent of nonelderly health insurance units without private coverage have at least one member with public coverage, and 11 percent have no private or public coverage. The model does not classify any elderly units as uninsured. All elderly persons have either Medicare or Medicaid coverage (in addition to any private coverage they might have).

The private coverage imputations occur at the health insurance unit level and so are not directly comparable to person-level counts by health insurance status. Nevertheless, the resulting estimates come reasonably close to individual-level estimates. The CPS shows that 79 percent of Minnesota residents under age 65 and 74 percent of those age 65 and older had private coverage in 2006,<sup>47</sup> and data from the 2008 ACS show that 80 percent of nonelderly Minnesota residents have private health coverage (Kenney et al. 2009). As mentioned above, we classify 11 percent of nonelderly units as uninsured; the CPS and 2008 ACS show that 10 percent of nonelderly individuals in Minnesota are uninsured.

TABLE A2. Health Insurance Coverage Imputations Results, Minnesota, 2006

|                                 | Health Insurance Coverage Status <sup>a</sup> |        |           | Total |
|---------------------------------|---|--------|-----------|-------|
|                                 | Private                                       | Public | Uninsured |       |
| Health insurance units (1,000s) |   |        |           |       |
| No elderly in unit              | 1,632   | 291    | 231       | 2,154 |
| 1+ elderly in unit              | 300   | 139    | —         | 439   |
| Percentage distribution         |   |        |           |       |
| No elderly in unit              | 76%   | 13%    | 11%       | 100%  |
| 1+ elderly in unit              | 68%   | 32%    | —         | 100%  |

Source: Authors' calculations based on data from the 2006 American Community Survey.

a. A health insurance unit is classified as having private coverage if at least one member has private coverage. Otherwise, the unit is classified as having public coverage if at least one member has public coverage. The unit is classified as uninsured if all members are uninsured.



## NOTES

1. Levin-Epstein and Gorzelany (2008) describe the activities in 14 states and the District of Columbia. Additional states have issued reports calling for poverty reduction. For example, Delaware issued an analysis of child poverty and economic opportunity (2009).
2. The Measuring American Poverty Act of 2009, HR 2909, introduced by Representative Jim McDermott on June 17, 2009, recommends “largely following the recommendations of the NAS to improve and update the current poverty measurement.”
3. A report by the Legislative Commission to End Poverty in Minnesota by 2020 (2009) includes the TRIM3 CPS-based NAS poverty analysis for Minnesota. We also conducted state-level poverty analysis using the CPS for Connecticut. See Zedlewski, Giannarelli, and Wheaton (forthcoming), and Giannarelli and Zedlewski (2009).
4. See Blank and Greenberg (2008) for a discussion of the shortcomings in the official measure of poverty.
5. See Citro and Michael (1995) for a complete explanation of the academy’s recommendations.
6. Iceland (2005) summarizes much of the research completed to evaluate the new measure of poverty as well as expert opinion on its various elements.
7. The Supplemental Nutrition Assistance Program is the new name for the federal Food Stamp Program.
8. We follow Census Bureau procedures and cap the value of housing subsidies included as income at 44 percent of the non-medical portion of the poverty threshold—the percentage of the threshold considered to represent housing costs. Housing subsidies free up income for purchasing food and other necessities only to the extent that they enable a household to meet the need for shelter.
9. The Consumer Expenditure Survey is a nationally representative survey that asks respondents to record a diary of many types of expenditures and that interviews respondents about other expenses. The CE data are used to obtain national-level spending on food, clothing, shelter, and utilities for families whose spending is at approximately 80 percent of the median amount. Adjustments are made to allow for some spending on other items, and further adjustment is made for medical costs. See appendix A of Short (2001) for details.

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10. The Census Bureau calculates geographic adjustments to the poverty threshold, by state and by urban/rural area within state, using the Department of Housing and Urban Development (HUD) fair-market rents, or FMRs (Short 2001). FMRs, developed for HUD's Section 8 certificates and vouchers program, represent the 40th percentile of rent (including utilities) for rental units meeting a standard quality of rental housing.
  11. As Short explains, the medical out-of-pocket expense portion of the threshold is calculated based on health risk factors of families (age, health status, and type of insurance coverage) and then added to the thresholds that vary by family size.
  12. Some argue that including expected medical expenses in the thresholds rather than subtracting actual expenses overstates medical costs for many families and understates the costs for families that experience high medical expenses. Others argue that erroneous poverty classifications using this method are probably modest (Iceland 2005). We use the thresholds that include medical expenses since the ACS does not include out-of-pocket health expenses. Using the thresholds with medical costs is a straightforward way to examine how medical expenses affect poverty and omits the need to impute the distribution of medical expenses to individual families.

We do not incorporate health status variations in the thresholds in this prototype. The health status information available on the ACS differs from the health status used to determine the thresholds. Also, the differences in the thresholds, about \$500 higher for those in fair or poor health, should not make a large difference in the poverty results.
  13. The NAS also recommended that resources include the value of school lunch and breakfast and subtract child support payments made to another household; those elements could not be included in this analysis.
  14. Presumably, people who own a home outright or have low mortgages have more to spend on other basic needs than other families. Many approaches that deal with home ownership distinctions involve accounting for the flow of services that owners obtain from their homes by adding "imputed rent" to home owners' incomes. See Iceland (2005) for a description of this issue.
  15. *Congressional Record* (June 17, 2009): H 6971.
  16. The CPS is a monthly survey designed primarily to produce estimates of the labor force characteristics of the civilian non-institutionalized population. The CPS annual supplement, called the Annual Social and Economic Supplement or ASEC, is conducted between February and April and asks respondents for details about income received in the prior year. Throughout this report we refer to the use of these annual supplemental data as the CPS for simplicity.
  17. This sample count includes people living in institutions and group quarters. As we explain later, we do not include these people in this prototype model.
  18. The ACS interviews over 500,000 households providing data for states, counties, cities, congressional districts, American Indian Native areas, and all areas with a population of 65,000 or more. The CPS interviews about 77,000 housing units representing the nation and state populations. The ACS response rate was 96.7 percent in 2003 compared with the March 2004 CPS response rate of 91.8 percent.
  19. Bishaw and Stern (2006) discuss these differences comparing the 2003 ACS and the 2004 CPS (income year 2003).
  20. A more recent table available on the Census Bureau web site that compares the 2005 ACS to a 2004–05 CPS average indicates a larger difference in poverty rates between the two files; according to this table, the ACS official poverty rate is 9.2 percent compared with 7.5 percent from the CPS. See <http://www.census.gov/hhes/www/poverty/acscpscomp.html>.
  21. Table 4 shows income for all adults age 15 and older, reflecting how income is counted in the two surveys. Table 3, in contrast, shows results for children under age 17, following standard treatment of poverty estimates.
  22. Some portion of this difference results from the fact that in the CPS data, a married couple's income from interest and dividends is divided evenly between both spouses, while in the ACS data, respondents may report all their asset income as the income of one person. For example, in the 2006 Minnesota ACS data, when a married household head reports interest income, his or her spouse is reported to have the same amount of interest income only 27 percent of the time.
  23. The model has been developed and used at the Urban Institute for over 30 years, under primary funding from the Department of Health and Human Services, Office of the Assistant Secretary for Planning and Evaluation (HHS/ASPE). The federal government uses the model to understand the coverage and impacts of government programs. Recently, both the Center for American Progress (2007) and the Legislative Commission to End Poverty in Minnesota (2009) used TRIM3 to analyze recommendations to reduce poverty.
  24. See Wheaton (2007) for a description of underreporting on the CPS.

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25. The procedures are adapted from those described in Passel, Van Hook, and Bean (2006).
  26. See appendix table A1 for these baseline results.
  27. It is common for individual to mistake Social Security benefits for SSI benefits on survey questionnaires, and we assume that this must be the source of the error. Subsequent work will examine more carefully SSI benefit reports that exceed the maximum SSI payment level. Another issue in the reporting of SSI concerns married couples receiving a two-person SSI benefit; in the CPS data, a couple's benefit is divided between the spouses, while in the ACS data, it is possible that the couple's benefit is recorded as the income of just one spouse.
  28. The TRIM3 model imputes capital gains and losses along with itemized deductions using a statistical matching procedure that links data from filing units represented in the SOI data with filing units formed for the CPS. This prototype development did not have sufficient resources to reproduce such an imputation, and the lack of Minnesota-specific data raised questions about whether the national imputation could be appropriately applied to Minnesota.
  29. Internal Revenue Service, "Table 2. Individual Income and Tax Data, by State and Size of Adjusted Gross Income, Tax Year 2006," (SOI Bulletin), available at <http://www.irs.gov/taxstats/article/0,,id=171535,00.html>.
  30. See Short (2001) for a description of the methodology used for the imputation. The Census Bureau has continued to update these estimates using the most recently available data and provided us with the \$25 estimate used for this analysis.
  31. The 2008 ACS includes health insurance coverage for the first time. We find close alignment between our imputations of health insurance coverage for 2006 and those reported in the 2008 data.
  32. We use the 2006 Medical Expenditures Panel Survey to estimate these regressions. Significant explanatory variables include work status, marital status, family size, race, age, education, region of the country, MSA status, health status, income, firm size, industry, and whether a family member has public coverage (Mommaerts, Corina, and Sheila Zedlewski, "Estimating Health Insurance Coverage for the American Community Survey," internal memorandum, The Urban Institute, 2009).
  33. We also compare the uninsured results to those reported in the 2008 ACS that includes health insurance status and find close alignment.
  34. The Census Bureau estimates Minnesota's official poverty rate at 9.8 percent in 2006 (<http://www.census.gov/prod/2007pubs/acs-08.pdf>). Our lower estimate reflects corrections of underreporting of cash government assistance benefits and slight differences between family structure from the IPUMS and TRIM3 procedures.
  35. The federal EITC still provides benefits in this income range. Although the maximum federal EITC benefit (\$4,536 for families with two children in 2006) goes to families who are officially poor, a two-parent two-child family earning \$25,000 would be eligible for \$2,806 in federal EITC benefits, and the credit would not be completely phased out until earnings reached \$38,348.
  36. This proposal is modeled after that described in Berlin (2007).
  37. This is below the rate estimated by Cunyngnam, Castner, and Schirm (2008) for Minnesota in 2006 based on the CPS (69 percent). As described earlier, families in the ACS Minnesota sample generally report less income than what is reflected in the CPS. In addition, the single-year ACS sample size is larger than the CPS, and this will affect the accuracy of estimates. It is impossible to sort out the sources of differences without considerable additional research.
  38. Obviously, such a policy could induce some parents relying on free care to apply for the subsidies and move their children into paid child care settings. We did not model this effect.
  39. Even when a family's co-payment would be the same as its unsubsidized expense, participation in a subsidy program could expand the range of child care choices available for that expenditure, with potential benefits for a child's development. The model cannot capture that aspect of the impacts of a child care subsidy expansion.
  40. New York City has implemented a poverty measure based on the NAS recommendations using the ACS (Levitan et al. 2008.)
  41. Detailed documentation of the standard version of TRIM3 is available at <http://trim3.urban.org/>.
  42. The relationship between limitations and SSI receipt could not be examined for children age 5–14 since income amounts are reported only for persons age 15 and older.
  43. In 2006, the maximum federal SSI benefit for one person was \$603 monthly, and the maximum supplement was \$81 monthly, suggesting a maximum annual amount for one person of \$8,208. Of the 367 unmarried people in the 2006 Min-

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nesota ACS data with SSI income, 20 percent report more than that amount, and 15 percent report more than \$10,000 in annual SSI. Because the ACS survey is filled out by individuals without the involvement of interviewers, confusion between SSI and Social Security may be more likely.

44. The model uses the average Minnesota fair-market rents for rural areas for all rural households and the averages for Minnesota urban areas for all urban households. (In practice, FMRs vary by locality.)
45. Health insurance coverage questions are included in the 2008 ACS.
46. As described in the main text, private insurance coverage is imputed using regression methods and estimates from the 2006 Medical Expenditure Panel Survey.
47. Source: U.S. Census Bureau, Current Population Survey, 2007 Annual Social and Economic Supplement. Table HI05, "Health Insurance Coverage Status and Type of Coverage by State and Age for All People: 2006."

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