Technical Working Paper: Creation of the 2011 MATH SIPP+ Microsimulation Model and Database

Final Report

February 28, 2014

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Joel Smith
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Policy Research

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Contract Number:
AG-3198-K-13-0006

Mathematica Reference Number:
40202.600

Submitted to:
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ACRONYMS

ACF	Administration for Children and Families
AREERA	Agricultural, Research, Extension, and Education Reform Act of 1998
ARRA	American Recovery and Reinvestment Act of 2009
ASEC	Annual Social and Economic Supplement
ASPE	HHS Office of the Assistant Secretary for Planning and Evaluation
BLS	Bureau of Labor Statistics
CPS	Current Population Survey
FMV	Fair Market Value
FNS	Food and Nutrition Service
GA	General Assistance
HCSUA	Heating and Cooling SUA
HHS	U.S. Department of Health and Human Services
IRA	Individual Retirement Account
LPR	Legal Permanent Resident
LTM	Legal Temporary Migrant
MATH	Micro Analysis of Transfers to Households
Mathematica	Mathematica Policy Research
MFIP	Minnesota Family Investment Program
MOE	Maintenance of Effort
OLS	Ordinary Least Squares
OMB	Office of Management and Budget
PA	Public Assistance
PRWORA	Personal Responsibility and Work Opportunity Reconciliation Act of 1996
SIPP	Survey of Income and Program Participation
SNAP	Supplemental Nutrition Assistance Program
SNAP QC	Supplemental Nutrition Assistance Program Quality Control
SSA	Social Security Administration
SSI	Supplemental Security Income
SUA	Supplement Utility Allowance
TANF	Temporary Assistance to Needy Families
TANF/MOE	Temporary Assistance to Needy Families/Maintenance of Effort
TFP	Thrifty Food Plan
2002 Farm Bill	Farm Security and Rural Investment Act of 2002
2008 Farm Bill	Food, Conservation, and Energy Act of 2008

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ACKNOWLEDGMENTS

This Technical Working Paper (TWP) was prepared by Mathematica Policy Research for the U.S. Department of Agriculture's Food and Nutrition Service, Office of Policy Support. Many individuals made important contributions to the development of the model and documentation. The authors thank Bruce Schechter for providing lead programming support and reviewing the TWP; Jackie Kauff for providing guidance and reviewing the TWP; Kai Filion, Randy Rosso, and Esa Eslami for preparing and reviewing model specifications; and Felita Buckner for preparing the manuscript. The authors also thank Jenny Genser, Julia Druhan, and Sangeetha Malaiyandi of the U.S. Department of Agriculture's Office of Policy Support for providing guidance and program information.

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TABLES

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I. INTRODUCTION

The Supplemental Nutritional Assistance Program (SNAP) is the largest domestic food and nutrition assistance program administered by the U.S. Department of Agriculture's (USDA) Food and Nutrition Service (FNS), providing millions of Americans with the means to purchase food for a nutritious diet. During fiscal year (FY) 2012, SNAP served 46.6 million people in an average month and paid out a total annual amount of $74.6 billion in benefits.

Policymakers and administrators want to understand the potential effects of proposed changes in eligibility and benefit determination rules on the SNAP caseload and costs. For instance, they are interested in knowing how a change in the maximum benefit (for example, the sunsetting of the American Recovery and Reinvestment Act of 2009 (ARRA) increase) affects the number eligible for SNAP and the amount of total benefits. They are also interested in knowing the characteristics of SNAP participants and nonparticipants in order to assess whether benefits are effectively reaching subgroups of interest, such as households with elderly, disabled, child, or working poor members.

One way to inform policymakers is to use a microsimulation model, which is composed of an underlying database, a set of parameters, and simulation techniques. The database is constructed from a nationally representative sample of households, and the set of parameters and simulation techniques apply the rules of a government program to each household to determine its eligibility for, participation in, and benefit amount for that program. By changing the parameters and simulation techniques, an analyst can evaluate whether a change to program rules will have a relatively small or large effect on SNAP caseloads and costs.

This document describes the 2011 MATH SIPP+ model. The MATH SIPP+ models, first developed in 2006, use Survey of Income and Program Participation (SIPP) data as the underlying database and Current Population Survey Annual Social and Economic Supplement (CPS ASEC) data to contribute additional timely economic and demographic information. For more information

about the initial development of the MATH SIPP+ models and the history of the Microanalysis of Transfers to Households (MATH) models, see Smith and Wang (2012). For information about FNS's other microsimulation model, the QC Minimodel, see Leftin et al. (2012).

The SIPP has advantages over the CPS ASEC data for determining eligibility and benefits for SNAP and other low-income programs, thereby serving as an excellent source for the model's underlying database. Unlike the CPS ASEC, the SIPP contains extensive monthly information about two major determinants of program eligibility–assets and expenses, the latter of which is also used for benefit determination. The SIPP also includes information on monthly income used in SNAP to determine eligibility, while the CPS ASEC provides only annual income. However, its sample is only about one-third the size of the CPS ASEC sample.

The MATH SIPP+ model relies on the primary strength of the SIPP data—the monthly income, asset, and expense information—to determine eligibility and exploits the demographic strengths of the CPS ASEC through a set of state weights. As explained in more detail in Chapter IV, each household is assigned a state weight for each of the 50 states and the District of Columbia.[1] Using the CPS ASEC-based state weights allows the model to produce state estimates of SNAP eligibility. National estimates are produced using the original SIPP weights.

This report documents the process of updating the MATH SIPP+ database and model to create the 2011 MATH SIPP+ model. In this introductory chapter, we briefly explain the processing steps and identify the major changes from the model described in Smith and Wang (2012). Chapter II describes the model's principal data; chapter III covers the creation of the model database; chapter IV describes the creation of the state weights; and chapter V discusses our methodology for assigning undocumented status for noncitizens. Chapters VI and VII, respectively, explain the

[1] Hereafter, we refer to the 50 states and the District of Columbia as the 51 states. Guam and the Virgin Islands, which are included in SNAP, and Puerto Rico and the Marianas Islands, which receive a block grant in lieu of SNAP, are not included in the SIPP data, and are thus not represented in the model.

simulations of Supplemental Security Income (SSI) and Temporary Assistance to Needy Families (TANF), which are necessary because participation in these programs is generally underreported in the SIPP. Chapter VIII describes the simulation of SNAP eligibility, participation, and benefits.

A. Processing Steps Overview

The 2011 MATH SIPP+ database was created using the following data sources and procedures:

Creation of the MATH SIPP+ model database (Chapter III)

- We extracted data on households, families, and individuals in the SIPP universe as of August 2011 from the Wave 10 core file of the 2008 SIPP panel.
- We converted the data into MATH format, which is a hierarchical database of households, families, and individuals.
- We extracted data on year of immigration and region of birth from the Wave 2 topical module file of the 2008 SIPP panel and merged it onto the MATH database.
- We extracted data on household composition and tenure in the fourth reference month from the Wave 10 core file of the 2008 SIPP panel and data on living expenses and asset holdings from the Wave 10 topical module file of the 2008 SIPP panel and merged them onto the MATH database. We imputed expenses and vehicle holdings for households and individuals present in the SIPP universe in August 2011 but not in the universe when these data were collected (September 2011 through December 2011).

Creation of the MATH SIPP+ model state weights (Chapter IV)

- Using the 2011 and 2012 CPS ASEC, we created an average distribution by state for 33 control or target populations as of August 2011.
- Using Wave 10 of the 2008 SIPP panel, we created national totals as of August 2011 for each control population.
- Using the CPS ASEC-based state distribution and the SIPP-based estimates of the national population, we created control populations by state.
- Using a Poisson regression re-weighting technique, we created a set of 51 state weights for each household present in Wave 10 of the 2008 SIPP panel, representing August 2011.

Noncitizen status (Chapter V)

- We imputed undocumented noncitizen status using a methodology originally developed by Dr. Jeffrey Passel that included: (1) correcting self-reported citizenship status, including legal permanent resident (LPR) status; (2) imputing year of immigration for adults who joined the SIPP panel after Wave 2; (3) assigning legal and undocumented citizenship status to all foreign-born individuals; and (4) assigning a portion of LPRs as refugees and asylees.

Program Simulation (Chapters VI, VII, and VIII)

- We simulated SSI and TANF eligibility, participation, and benefits based on program rules and the most recently available administrative data. For the SSI simulation, we use FY 2011 program rules and August 2011 administrative totals. For the TANF simulation, we use July 2011 program rules and 2010 administrative totals.
- We simulated August 2011 SNAP eligibility and benefit rules, and selected eligible households to participate based on administrative FY 2011 participation and benefit totals.

B. Changes

Smith and Wang (2012) describe the creation of the 2012 Baseline of the 2009 MATH SIPP+ model, which used data from Wave 4 of the 2008 SIPP panel (representing August 2009), the 2009 and 2010 CPS ASEC datafiles, and FY 2012 SNAP program rules. In addition to using more recent SIPP, CPS, and administrative data, we made the following changes for the 2011 MATH SIPP+ model:

1. Assignment of Undocumented Status

We imputed undocumented immigrant status, as described in chapter V.

2. Assignment of SNAP Disability

We used simulated SSI receipt to identify nonelderly disabled individuals under SNAP rules. See chapter VIII for more details on the SNAP disability simulation.

3. Standard Utility Allowances for SNAP Units Reporting Energy Assistance

We allowed SNAP units reporting energy assistance but no utility expenses to receive a standard utility allowance for heating and cooling expenses (HCSUA), described in chapter VIII.

4. Simulated Receipt of Nominal Energy Assistance Benefits that Confer an HCSUA

We modeled receipt of nominal energy assistance benefits to eligible households in states that use these benefits to confer an HCSUA. See chapter VIII for more details.

C. Other Reference Material

Schechter et al. (forthcoming) provides programmers and analysts with a tool to assist them in developing and maintaining the model. It describes all of the programs that create the baseline

MATH database. It also describes the various parts of the model, how they relate to each other, and the options available to the user.

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II. DATA SOURCES FOR THE MODEL

The MATH SIPP+ model is based on several data sources: the 2008 SIPP panel, the 2011 and 2012 CPS ASECs, and administrative data for the SSI, TANF, and SNAP programs. The SIPP provides the model with a sample of households that forms a basis for all calculations of SNAP eligibility; the CPS ASEC data are used to derive household state weights that match state distributions of economic and demographic characteristics in the CPS ASEC; and the administrative data are used to simulate SSI, TANF, and SNAP recipient populations that match national and state administrative totals and subgroup characteristics.

A. Survey of Income and Program Participation

The SIPP provides much of the information necessary to simulate program eligibility, making it an excellent choice for a microsimulation model database. In this section, we describe how the SIPP is administered and the types of data it provides. We also describe its weaknesses and changes to the survey since the previous panel.

1. Description of the SIPP

The SIPP is a nationally representative, longitudinal survey providing detailed monthly information on household composition, income, labor force activity, and participation in various government programs such as SNAP, TANF, SSI, and Medicaid. The interviewed population is based on a multistage stratified sample of the non-institutionalized resident population of the United States. This includes people living in households as well as in group quarters, such as college dormitories and rooming houses. Inmates or residents of institutions, such as homes for elderly individuals, and people living abroad are not included. Armed forces personnel are included, except for those living in military barracks (U.S. Census Bureau 2009).

People participating in the SIPP are interviewed every four months over a four-year period. To ease the administrative burden of interviewing such a large sample, the Census Bureau divided the participants into four rotation groups and interviewed one group each month. In each round (wave)

of interviews, people age 15 or older were asked a set of core questions about their demographic characteristics, income, program participation, and children for the preceding four months. These questions were supplemented with a set of questions on topical issues that vary from wave to wave (Table II.1).

For the 2011 MATH SIPP+ model, we used data from the 2008 SIPP panel. Information on migration, which we used to impute undocumented noncitizen status necessary to determine program eligibility, was collected in the Wave 2 topical module. Information on financial asset balances, vehicle data, shelter expenses, and medical and dependent care expenses, also needed to assess SNAP eligibility, was collected in the Wave 10 topical module. We used core data from Wave 10 to form the underlying database to match the period of data collection for the asset and expense data, and selected observations from the core sample that describe household characteristics as of August 2011, the wave's common reference month (Table II.2).

The Census Bureau successfully interviewed 31,382 households and 79,416 people for the SIPP regarding their demographic and economic characteristics as of August 2011. Weighted, this represents an estimate of 118,633,449 households and 298,125,001 individuals (Table II.3). The weighted totals are less than U.S. population counts because it excludes those living in territories and in institutions.

2. Challenges

Focusing on one specific month, August 2011, creates two challenges. First, information collected in the topical module about expenses, vehicles, and financial assets are reported as of the fourth reference month, the last month in the wave for each rotation group. For households in the first rotation group, August 2011 is the household's reference month. For households in the other rotation groups, however, the reference month occurs after August 2011. Therefore, if household composition, expenses, or assets change after August, then the information provided by the topical module for the fourth reference month will not necessarily reflect August 2011. For example, if a

person leaves the sample after August, then the person will be included in the MATH SIPP+ database, but will have no recorded vehicle, expense, or asset information.

For the majority of SIPP households, present in August, the reference person in August 2011 was also the reference person in the fourth reference month. However, for the small number of households where (1) the reference person changed between August 2011 and the fourth reference month, and (2) the reference person was not successfully interviewed for the topical module, we imputed the information using a statistical hot-deck matching technique, described in Chapter III.

A second challenge with the SIPP is that, like most household surveys, it generally underreports the number of people participating in government programs (Table II.4). The SNAP Statistical Summary of Operations reported 45.7 million SNAP participants in August 2011, while the SIPP estimates that 41.9 million people, 8 percent fewer, received SNAP benefits in that month. Underreporting increases to 24 percent when comparing the number of SNAP households. Underreporting of TANF in the SIPP is even higher—25 percent for individuals and nearly 53 percent for units. To address the underreporting, we simulate SSI, TANF, and SNAP eligibility according to federal and state policies, and select participants based on administrative data totals.

A third challenge with the SIPP is that the Census Bureau imputes asset amounts for some individuals (nearly 20 percent of simulated SNAP participants in the 2009 MATH SIPP+ model). In the majority of these cases, households reported having an asset type, but did not report the asset value. In a smaller number of cases, households did not report whether they have a particular asset type. In these latter cases, the Census Bureau may impute either positive or zero asset values. Based on research we conducted for FNS, we believe the imputation procedures used are reasonable and appear to produce at most a small upward bias in estimates of participating SNAP households with financial assets above the federal limit. We do not edit any reported or imputed asset values in the 2011 MATH SIPP+ model.

B. Current Population Survey

The CPS ASEC provides estimates of the demographic characteristics of households by state. It is a nationally representative survey of approximately 75,000 households, twice the size of the 2008 SIPP Panel. Since the ASEC is representative at the state level, we use it to reweight the SIPP to match the distribution of demographic characteristics of the U.S. population by state.

The CPS is a nationally representative monthly survey of households sponsored jointly by the U.S. Census Bureau and the U.S. Bureau of Labor Statistics (BLS). Each household is interviewed once a month for four consecutive months one year, and again in the corresponding time period a year later. The interviewed population is based on a multistage stratified sample of the noninstitutionalized resident population of the United States. As in the SIPP, this includes people living in households and in group quarters, such as college dormitories and rooming houses but does not include residents in institutions, such as homes for elderly individuals. Also like the SIPP, individuals living in military barracks are excluded from the survey.

Every month, the CPS ASEC asks a set of basic questions on household composition, demographic characteristics, and labor force participation. The CPS ASEC provides additional detailed data on migration, work experience, household income, noncash benefits, and participation in various government programs such as TANF, SSI, General Assistance (GA), and SNAP by adding a set of supplemental questions on a specific topic each month. It is these supplemental questions that make the ASEC an excellent data source for providing distributions by state for a number of household characteristics.

C. Overview of Administrative Data

We used three sources of administrative data for the MATH SIPP+ model: (1) unpublished 2011 data from the Social Security Administration (SSA), (2) the FY 2010 Administration for Children and Families (ACF) TANF datafile, and (3) the FY 2011 SNAP QC database. The data from SSA provide the number of SSI recipients by age group and state. The ACF TANF datafile

contains detailed demographic, economic, and TANF eligibility information for a nationally representative sample. The 2010 file included approximately 262,000 TANF units. These data are well suited for the creation of control totals of characteristics by state. The SNAP QC database is an edited version of the raw data file generated by the SNAP Quality Control System. This database contains detailed demographic, economic, and SNAP eligibility information for a nationally representative sample of approximately 50,000 SNAP units per year. These data are well suited for providing the control totals of SNAP units by state and household characteristic.

Table II.1. Topical Modules of the 2008 Panel

Wave	Subject Areas
1	Recipiency History, Employment History, Tax Rebates
2	Work Disability History, Education and Training History, Marital History, Migration History, Fertility History, Household Relationships, Tax Rebates
3	Welfare Reform, Retirement and Pension Plan Coverage
4	Assets and Liabilities, Medical Expenses/Utilization of Health Care, Work-Related Expenses, Child Well-Being
5	Child Care, Work Schedule, Annual Income and Retirement Account, Taxes
6	Adult Well-Being, Child Support Agreements, Support for Non-household Members, Functional Limitations and Disabilities, Employer Provided Health Benefits
7	Assets and Liabilities, Medical Expenses/Utilization of Health Care, Work-Related Expenses, Child Support Paid
8	Child Care, Work Schedule, Annual Income Retirement Accounts, Taxes
9	Informal Care-giving, Adult Well-Being
10	Assets and Liabilities, Medical Expenses/Utilization of Health Care, Work-Related Expenses, Child Well-Being, Child Support Paid
11	Retirement and Pension Plan Coverage

Source: U.S. Census Bureau, 2009 SIPP User Guide

Table II.2. Interview and Reference Months for Wave 10 of 2008 SIPP Panel

Interview			Reference Months						
Month	Year	Rotation Group	May 2011	Jun 2011	Jul 2011	Aug 2011	Sep 2011	Oct 2011	Nov 2011
September	2011	1	X	X	X	X			
October	2011	2		X	X	X	X		
November	2011	3			X	X	X	X	
December	2011	4				X	X	X	X

Source: U.S. Census Bureau (2009)

Table II.3. SIPP Sample Sizes for August 2011

	Unweighted	Weighted (Using Household Weight)
Households	31,382	118,633,449
Individuals	79,416	298,125,001

Source: Tabulations of 2008 SIPP Panel Wave 10 Core File.

Note: When tabulating the number of households and individuals read and written into the model development programs, the MATH SIPP+ model uses the household weight.

Table II.4. Comparison of Administrative Data and Reported Participation in SIPP, August 2011

	Individuals (000s)	Units (000s)
Administrative Data		
SNAP (excludes Guam and the Virgin Islands)	45,729	21,700
SSI	8,113	7,832
TANF (excludes, Guam, the Virgin Islands, and Puerto Rico)	4,294	1,822
SIPP Data		
SNAP	41,880	16,420
SSI	8,466	7,535
TANF	3,224	863
Percentage Difference		
SNAP	-8.42	-24.33
SSI	4.35	-3.79
TANF	-24.91	-52.64

Sources: **Administrative:** SNAP Program Operations Data; SSA; ACF, Office of Family Assistance.

SIPP Data: Wave 10 of the 2008 SIPP panel.

Note: When tabulating the number of households and individuals, the MATH SIPP+ model uses the household weight.

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III. CREATING THE MODEL DATABASE

The SIPP Wave 10 core questionnaire provides most of the information needed to simulate SSI, TANF, and SNAP. The Waves 2 and 10 topical module questionnaires provide the remaining information. Since the Census Bureau distributes the information collected by each questionnaire in separate data files, we must combine the files to create the model database. This process involves a series of over 20 programs. In this chapter, we describe in general terms how we compile the information needed to create the MATH SIPP+ model.

A. Extract Data for August 2011

Since each wave contains four months of data, we began by selecting from the 2008 SIPP panel Wave 10 core file everyone who was present in August 2011. We extracted all SIPP variables, including household composition, family composition, earned and unearned income, assets, and participation in various government programs. These data comprise the bulk of the data elements in the MATH database. Later in the process, we deleted variables that were not relevant to file development.

B. Convert SIPP Data into MATH Database

Next, we formatted the raw SIPP data into the MATH database, which consists of two files: the data file (MATHPC.BIN) and the header file (MATHPC.HDR). The data file is a hierarchical database of household, family, and person records. The header file is a text file that describes the contents, organization, and data types in the data file. The header file also includes information that needs to be readily available, such as poverty guidelines, year and month of the data, and the version number of the model.

C. Extract and Merge Immigration Data

Certain noncitizens are ineligible for SNAP, including undocumented noncitizens and most nondisabled adults who have been in the U.S. for less than five years. The Wave 10 core questionnaire collects information on citizenship status. However, information on year of

immigration and region of birth needed to impute undocumented noncitizen status and SNAP eligibility is only collected in the Wave 2 topical module. We extracted this information and merged it onto the MATH database. (See Chapter V for information on how we impute undocumented noncitizen status.)

D. Extract and Merge Fourth Reference Month Data

Data on asset holdings and expenses, needed to simulate program eligibility, is collected in the Wave 10 topical module. As mentioned in Chapter II, asset and expense data reflect values as of the fourth reference month. Therefore, if a sample member leaves the household after August 2011 or if the household composition, expenses, or assets change, then the information provided by the topical module for the fourth reference month will not necessarily reflect August 2011. The accuracy of the topical module information, consequently, depends on whether the household has undergone a change in composition between the fourth reference month and August. To enable us to identify household composition changes later in the file development process, we extract and merge onto the MATH database information on each person's household as of the fourth reference month.

E. Extract and Merge Assets and Expenses

The value of asset holdings, including financial assets and some vehicles, are subject to the federal SNAP asset test. In addition, expenses incurred for medical care, dependent care, shelter, and child support payments are used to determine SNAP net income.

Some Wave 10 topical module questions on assets and expenses are presented to every adult and some only to the household reference person who responds on behalf of all individuals in the household during the fourth reference month. Questions about financial assets, medical care expenses, and child support payments are asked of each person age 15 or older. We merge these data onto the MATH database for everyone who was present in both August 2011 and the fourth reference month.

Questions about shelter and dependent care expenses and vehicle ownership are asked of only the household reference person. Merging these data onto the MATH database is a complex process because the reference person in the fourth reference month may not be the same as the reference person in August 2011. We use the approach outlined below to merge expense data onto the MATH database.

Shelter Expenses. For non-group quarters households whose reference person changed from August 2011 to the fourth reference month and was not successfully interviewed for the Wave 10 topical module, we imputed shelter expenses using the characteristics of a group of "donor" households. Donor households were comprised of non-group quarters households with unedited reported shelter expenses. For all other households, including those in group quarters, we used the shelter expenses in the SIPP of the household reference person in the fourth reference month.

The majority of households (75.2 percent) were donor households (Table III.1). That is, (1) their shelter expenses, if any, were not imputed; (2) the reference person in August 2011 and the fourth reference month were the same; (3) the household did not move between August 2011 and the fourth reference month; and (4) the household was not a group quarter. Most other households (21.9 percent) did not have imputed shelter expenses, and thus retained the shelter expenses of the reference person in the fourth reference period. We assigned shelter expenses for only the 2.9 percent of households where the household head's expenses were imputed.

Dependent Care Expenses. For non-group quarters households whose reference person in the fourth reference month (1) changed from August 2011 to the fourth reference month and was not successfully interviewed for the Wave 10 topical module, (2) had dependents in August 2011, and (3) was employed, looking for work, or enrolled full-time in school, we imputed dependent care expenses from donor households. Donor households were comprised of non-group quarters households whose reference person in the fourth reference month (1) was the reference person in August 2011, (2) lived with the same number of people as in August 2011, (3) had dependents and

reported dependent care expenses, and (4) was employed, looking for work, or enrolled full-time in school. The reported dependent care expenses of these donor households were unedited. For all other households, including those in group quarters, we used the dependent care expenses in the SIPP of the household reference person in the fourth reference month.

The majority of households (74.2 percent) either had no dependents or experienced a change in reference person and were assigned the dependent care expenses of the household reference person in the fourth reference month. Most of the remaining households (24.6 percent) were donor households with unedited dependent care expenses. We imputed dependent care expenses for only 1.2 percent of households

Vehicles. Although questions on vehicle ownership are also asked only of the household reference person, they identify which household member owns each vehicle. As a result, merging vehicle data onto the MATH database is relatively straightforward in most cases. However, some scenarios are more complex. If someone present in August 2011 was not present in the fourth reference month or if the reference person in the fourth reference month was not successfully interviewed, we imputed the missing vehicle data from donor individuals. Donor individuals were comprised of adults (1) who were present in both August 2011 and the fourth reference month and (2) had their vehicle values reported by the household reference person. We also imputed values for vehicles that were assigned an average value of $7,113 by the Census Bureau because the value was unreported.

The majority of individuals (58.8) were donor individuals with no imputed vehicle information. Most of the remaining individuals (30.8) were either children, a vehicle's second owner, lived in group quarters, or had data imputed by the Census Bureau. We imputed vehicle information, such as the number of vehicles (if any) and the value of vehicles, for 10.3 percent of individuals.

F. Impute Missing Expenses and Vehicles

We used a hot-deck imputation matching technique to impute missing information on expenses and vehicles. That is, we matched households with no data to similar households with data and assigned the expenses or vehicle of the latter to the former. The characteristics that are highly correlated with the missing data differ according to the data that are being imputed. For shelter expenses, the characteristics we used to match households include household poverty status, geographic region, age and education of the reference person, and whether the reference person owns their home, rents, or pays no cash rent (Table III.2). For dependent care expenses, we used household poverty status, presence of children under age 4, presence of children age 12 to 17, employment and education level of parents in the household, and earnings of the highest paid parent (Table III.3). For vehicle ownership, we use household poverty status and the individual's relationship to the household head, employment status, earnings, gender, marital status, veteran status, and age (Table III.4).

G. Assign FMV to Vehicles

SNAP eligibility rules use the wholesale fair market value (FMV), or average trade-in value, of vehicles. However, the SIPP data contain the retail FMV, or the price the owner could garner selling the vehicle on the open market. To estimate the wholesale FMV, we used a methodology based on the retail value and age of the vehicle and data from the National Automobile Dealer's Association's (NADA) *Consumer Price Guide*. According to the NADA, all vehicles with a retail value less than $900 have a wholesale value of $225. Vehicles between $900 and $1,225 have a wholesale value of $250. NADA provides wholesale values for vehicles with a retail value above $1,225 by vehicle age.

In the MATH SIPP+ model, vehicles with a retail value less than $1,225 were assigned a wholesale value of either $225 or $250, as specified by NADA. For vehicles with a retail value greater than $1,225, we estimated two Ordinary Least Squares equations (Table III.5). The first, applied to vehicles with a reported age in the SIPP, estimated the wholesale value given the vehicle's

retail value and age. The second, applied to vehicles without a reported age, estimated the wholesale value given the vehicle's retail value. Vehicles were assigned the higher of the predicted wholesale value or $225.

Table III.1. Assignment of Expenses for Shelter and Dependent Care

	Unweighted Number	Percent
Total households in MATH database	31,382	100.0
Assignment of shelter expenses		
Donor households	23,594	75.2
Households with imputed expenses	901	2.9
All other households	6,887	21.9
Assignment of dependent care expenses		
Donor households	7,724	24.6
Households with imputed expenses	366	1.2
All other households	23,292	74.2
Total individuals in MATH database	79,416	100.0
Assignment of vehicle and vehicle values		
Donor individuals	46,730	58.8
Individuals with imputed vehicles	8,197	10.3
All other individuals	24,489	30.8

Source: 2011 MATH SIPP+ database

Table III.2. Imputation Selection Criteria: Shelter Expenses

Criteria	Categories
Gross Income as a Percentage of Poverty Threshold	Less than 1.85 Equal to or greater than 1.85
Geographic Region	South Northeast North Central West
Age of reference person	Less than 35 35 to 54 55 to 64 Older than 64
Education of reference person	At least college Less than college
Tenure	Own a home Rent No cash rent

Source: 2011 MATH SIPP+ database.

Table III.3. Imputation Selection Criteria: Dependent Care Expenses

Criteria	Categories
Gross Income as a Percentage of Poverty Threshold	Less than 1.85 Equal or greater than 1.85
Number of Children Under Age 4	Zero One More than one
Number of Children Ages 12 to 18	Zero More than one
Labor Force Participation of Family Heads and Spouses	All employed full time None employed full- or part-time Other
Earnings per Hour	No earnings for family heads and spouses Minimum wage for highest-paid family head or spouse Other
Educational Attainment	At least high school for at least one of the family heads or spouses Other

Source: 2011 MATH SIPP+ database.

Table III.4. Imputation Selection Criteria: Vehicles

Criteria	Categories
Gross Income as a Percentage of the Poverty Threshold	Less than 1.85 Equal to or greater than 1.85
Family Relationship	Family head Family spouse Other
Labor Force Participation	Employed full time Employed part time Other
Earnings per Hour	More than minimum wage Minimum wage or less No earnings
Gender	Male Female
Marital Status	Single Other
Veteran Status	Served in the armed forces Never served in the armed forces Other
Age	Less than 60 60 and older

Source: 2011 MATH SIPP+ database.

Table III.5. Regression Equations for Imputing Wholesale FMV for Vehicles with Retail Value of $1,225 or More

	Coefficient	
Explanatory Variable	Year of Vehicle Reported	Year of Vehicle Not Reported
Constant	-899.11746	-920.96543
Reported Retail FMV	0.89453	0.89151
Retail FMV Squared	0.0000006124145	0.000000675
Reported Age of Vehicle	-9.22732	NA
Retail FMV times Vehicle Age	-0.00067852	NA

Source: NADA's Consumer Price Guide.

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IV. CREATION OF STATE WEIGHTS

The 2011 MATH SIPP+ model has two versions: a national model and a state model. The national model uses the household weights from Wave 10 of the 2008 SIPP panel. Because the original SIPP weights were not designed to be representative at the state level, we used the CPS ASEC to create a new set of 51 state household weights for the state model. These weights allow us to use every SIPP household when simulating a particular state's program rules, regardless of the state in which the household is actually located. This chapter describes the development of the weights used in the state version of the MATH SIPP+ model.

We developed state weights for the MATH SIPP+ model using a Poisson regression algorithm developed by Schirm and Zaslavsky (1997). Each household in the MATH database is given a set of 51 weights where each weight estimates the number of households that the sample household represents in a particular state. The first state weight estimates the number of households that the sample household represents in Alabama; the 51st state weight estimates the number of households in Wyoming. In the 2011 MATH SIPP+ model, the sum of a household's set of 51 state weights equals the original household weights from Wave 10 of the 2008 SIPP panel.

The first step in creating the state weights is to obtain 33 population control totals, which include demographic, educational, and income characteristics of the population in each state (Table IV.1). For the 2011 MATH SIPP+ model, we used the 2011 and 2012 CPS ASECs and Wave 10 of the 2008 SIPP to derive the control totals, or targets, according to:

$$\text{Target}_{i,\text{State}}^{\text{Aug 2011}} = \frac{\text{CPS Target}_{i,\text{State}}}{\text{CPS Target}_{i,\text{Nation}}} \text{ x SIPP National Total}_{i}^{\text{Aug 2011}}$$

where

$$\text{CPS Target}_{i} = 0.5 \text{ x } \sum_{\text{y=2011}}^{2012} \text{CPS Estimate}_{i}^{\text{y}}$$

In other words, the state targets are constructed to estimate the averaged state distributions in the 2011 and 2012 CPS ASECs, while preserving the national totals in the SIPP for August 2011. We use the CPS ASEC to derive control totals because it contains detailed income as well as demographic information. We combine the 2011 and 2012 CPS ASEC datafiles to approximate the U.S. population as of August 2011 because a weighted average of these two time periods coincides with August 2011 and the use of two cross-sections of the ASEC increases the sample size.

When we use a particular state weight, the sum of all the values for a population target variable will equal the population target for that state. For instance, summing the number of children in the household under age 5 over all MATH SIPP+ households while using the Alabama state weight yields the target number of children under age 5 for Alabama.

Mathematically, the formula to produce state weights can be described as:

$$w_{h,s} = e^{\beta_s' x_h + \delta_h}\ \delta_h$$

Where $w_{h,s}$ is the state weight, or expected number of households of type h in state s. A household type is, practically speaking, unique in the database because no two households are exactly alike. Therefore, each household in the database represents its own type, and $w_{h,s}$ is the weight that will be given to household h when deriving estimates for state s. x_h is a column vector of I control variables, or household characteristics for household h. β_s is a vector of I unknown parameters to be estimated for each state s. δ_h is an unknown parameter to be estimated for each household h. $\beta_s' x_h$ reflects the prevalence in state s relative to other states of households with the same vector of observed characteristics as household h. δ_h reflects the national prevalence of households with the same vector of observed characteristics as household h. The β_s and δ_h parameters are estimated using a maximum likelihood method and satisfy the two first order conditions (constraints) of maximum likelihood estimation:

Constraint 1: $\sum_s w_{h,s} = w_h$

where w_h is the original national SIPP weight of household *h*), and:

Constraint 2: $\sum_h w_{h,s} x_{h,i} = x_{s,i}$ for each *s* and *i*

where $x_{s,i}$ is the control total for control variable *i* in state *s*. According to the first constraint, reweighting does not change the total weight given to a household across all states, ensuring that the household contributes the same to a national estimate after reweighting as it does before reweighting. The second constraint stipulates that all control totals are satisfied for every state.

While the MATH SIPP+ model offers greater precision in estimating eligibility by state, it also introduces measurement biases. The state weight assigned to every household in this database estimates the number of households that the sample household represents in a particular state. Since the state weight is an estimate, it introduces a bias in the measure of the number of households that the sample household represents. Since the measurement bias added to each household is equally likely to be an underestimate or overestimate, the overall effect of these biases is likely to be negligible. In addition, despite the measurement biases, the method used in producing the state weights has been thoroughly tested and shown to produce reliable and robust estimates (Schirm and Zaslavsky (1997)).

Table IV.1. Population Controls for MATH SIPP+ State Weights

#	Category (Number of)
1	People who are black
2	People of Hispanic ethnicity
3	Children under age 5
4	Children age 5 to 17
5	Elderly people (age 60 or older)
6	Disabled people
7	People with a high school diploma or higher
8	People with a bachelor's degree or higher
9	People with family income at or below 50 percent of the poverty guideline
10	People with family income 51 to 100 percent of the poverty guideline
11	People with family income 101 to 130 percent of the poverty guideline
12	People with family income 131 to 185 percent of the poverty guideline
13	People with family income 186 to 200 percent of the poverty guideline
14	People with family income 201 to 300 percent of the poverty guideline
15	Married people
16	People who have a pension
17	People with family income at or below 100 percent of poverty and household size of one
18	People with family income at or below 100 percent of poverty and household size of two
19	People with family income at or below 100 percent of poverty and household size of three or four
20	People with family income at or below 100 percent of poverty, earnings, and children
21	Children with family income at or below 100 percent of poverty
22	Elderly people with family income at or below 100 percent of poverty
23	Earners with family income at or below 100 percent of poverty
24	Children with family income at or below 50 percent of poverty
25	People living in a one-person household
26	People living in a two-person household
27	Earners
28	People who receive interest or dividends
29	Unemployed
30	People who rent housing
31	Noncitizens
32	People in the household
33	Households

Source: 2011 MATH SIPP+ database.

V. ASSIGNMENT OF UNDOCUMENTED STATUS

Undocumented noncitizens, people in the country illegally, are ineligible for SNAP benefits, so it is important to identify them when simulating SNAP eligibility. According to Passel and Cohn (December 2012), the undocumented immigrant population as of 2011 was 11.1 million individuals. The SIPP does not ask noncitizens whether they are legally in the United States, so we imputed undocumented immigrant status to a portion of the SIPP foreign-born population in the MATH SIPP+ model. In this chapter, we describe that imputation methodology. We first discuss how the method was developed. We then describe the imputation process and its effect on the citizenship status of the foreign-born population in the MATH SIPP+ model. Finally, we discuss how the current methodology is different from the previous methodology.

A. Development of the Imputation Methodology

The imputation methodology used to assign undocumented immigration status was originally developed by Dr. Jeffry Passel to assign immigration status and measure the size and characteristics of legal and undocumented immigrant populations using the CPS (Passel and Clark, 1998). Because Dr. Passel's estimates of the undocumented population are based on CPS data, the assignment of undocumented status in models using CPS data can be based directly on estimates provided by Dr. Passel. However, due to differences between the CPS and SIPP data, we cannot directly apply the CPS-based estimates, but must use a method more suited to the SIPP data.

RAND, with the help of Dr. Passel and support from the Assistant Secretary for Planning and Evaluation (ASPE) developed a method to assign undocumented status in SIPP data. The method first identifies all foreign-born SIPP survey members as either legal or "potentially undocumented," and then randomly assigns legal status to the potentially undocumented members up to the point where the total number of legal immigrants in SIPP matches the number estimated by Dr. Passel. The remaining potentially undocumented individuals are then assigned to be undocumented. Using

the programming code developed by RAND for ASPE, we implemented a similar process to assign a portion of foreign-born individuals in SIPP to be undocumented.

B. Imputation Methodology

The methodology for imputing undocumented immigrant status has seven key steps.

Step 1. Determine each sample member's self-reported citizenship status

We divided all SIPP individuals into four self-reported citizenship categories using the core variables ECITIZEN and ENATCIT: (a) native, born in the U.S., (b) native, born abroad of U.S. citizen parents, (c) naturalized, including those who report naturalization through own or spouse's military service or by adoption, and (d) noncitizen.

Step 2. Verify and correct self-reported status

We verified self-reported status using reported age in August 2011 and a Wave 2 topical module variable reporting year of entry. When the year of entry variable represented a range of years, as is the case for years 2002-2003, 2008-2009, and some earlier years, we randomly assigned a year of immigration from within the range. We also determined the year of immigration of the individual's spouse or parents if present in the SIPP. We then performed the following checks:

- If the individual reported being naturalized but spent less than five years in the U.S., then the individual was re-assigned as a noncitizen.
- If the individual reported being from Central America, then the individual was re-assigned as a noncitizen.
- If the individual reported immigrating before 1980, then the individual was re-assigned as naturalized.
- If the individual reported being a native and born abroad of U.S. citizens but does not have U.S. citizen parents or a U.S. citizen spouse, then the individual is re-assigned to noncitizen.

Step 3. Impute year of immigration for all foreign-born adults not present in Wave 2

Because the year of immigration is in the Wave 2 topical module, sample members who enter the panel after 2009, when the Wave 2 data were collected, will not have a reported year of immigration. Therefore, we imputed the year of immigration for adult individuals who joined the

SIPP panel after Wave 2. First, we separated adult foreign-born individuals into two groups—those who did not have a reported year of immigration and those who did. Then, we divided each sample into ten categories based on five age groups and whether the individual was Hispanic. Finally, we randomly matched each individual who did not have a reported immigration year to an individual who did and who was in the same age/ethnicity category.

Step 4. Assign certain legal statuses

We classified foreign-born individuals as Legal Temporary Migrants (LTM) if they were identified as temporarily residing in the U.S. (less than 5 years) and worked in the following occupations:[2]

- Diplomat
- Student
- Visiting professor or graduate assistant
- In the medical services field working as a medical scientist, or as a therapist, medical student, or speech pathologist
- Nurse
- Engineer, technician, or computer operator working for an international organization
- Religious worker
- Athlete or entertainer
- High school exchange student
- Au pair

We classified the remaining foreign-born individuals as legal permanent residents (LPRs) if they had the following characteristics:

- Individual married to a native spouse
- Individual or spouse ever in the U.S. armed forces
- Individual or spouse receiving SNAP, SSI, TANF or Medicaid

[2] For some occupations, such as doctor, nurse, and engineer, the individual also had to work in an industry (as identified by Dr. Passel) that commonly employs LTMs.

- Government worker or program eligibility interviewer
- Medical worker with a professional degree such as a physician, dentist, registered nurse, pharmacist, or therapist
- Teacher
- Lawyer or paralegal
- Police officer or firefighter
- Postal worker
- Accountant
- Inspector

We classified all individuals age 65 and over to be legal and all foreign-born individuals with U.S. citizen spouses to be citizens. We also re-classified non-native individuals who are not working but have a working noncitizen spouse as noncitizens.

Step 5. Derive target levels of the legal foreign-born population.

We determined the target size of the SIPP legal foreign-born adult population by state using independently-derived estimates of the legal foreign-born population provided by Dr. Passel. To be consistent the methodology Dr. Passel used to develop his estimates, we combined all states except California, Florida, Illinois, New Jersey, New York, and Texas. We subtracted LPRs, LTMs, and naturalized citizens in the MATH SIPP+ from Dr. Passel's estimates to derive targets for the next step. The national model targets were based on the SIPP household weight and the state model targets were based on the state household weight.

Step 6. Assign legal and undocumented citizenship status to adults.

To assign legal and undocumented citizenship status to individuals in the MATH SIPP+ model, we first divided the adult foreign-born population into two categories. Individuals who reported being naturalized were categorized as potentially documented and noncitizens who were not previously assigned to a legal group were categorized as potentially undocumented. We then assigned a randomly drawn value from a normal distribution to each individual. The distribution of the random value is determined by the following criteria:

- If an individual was in an occupation that requires a professional degree, such as architects and lawyers, and so has a high probability of being in the country legally, then the random value was drawn from a normal distribution with mean of 0.6.
- If an individual's occupation implies a low probability of being in the country legally, such as manual labor, then the random value was drawn from a normal distribution with a mean of 0.1.
- If an individual was in neither a low or high probability occupation and was age:
  - 18 to 39, then the random value was drawn from a normal distribution with a mean of 0.5
  - 40 to 64, then the random value was drawn from a normal distribution with a mean of 0.12

We sorted individuals by random value, state group, and potential status, and then assigned legal or undocumented status as follows:

- If the MATH SIPP+ model had fewer legal foreign-born individuals than the Passel estimate by state group, then individuals were selected randomly from the potentially undocumented group until the number of legal noncitizens equaled, within an acceptable level of tolerance, the target amount. All potential noncitizens not selected to be legal were assigned to be undocumented.
- If the MATH SIPP+ model had more legal foreign-born individuals than the Passel estimate by state group, then individuals were selected from the potentially documented group by random value until the number of legal noncitizens equaled, within an acceptable level, the target amount. The remaining potentially documented were then assigned to be naturalized citizens.

Step 7. Assign legal and undocumented citizenship status to children.

In the last step of the assignment process, we assigned the legal or undocumented status of foreign-born children according the status of their parents as follows:

- If a foreign-born child was assigned to be undocumented but had a native or naturalized parent, then the child was reclassified as a native or naturalized citizen, respectively.
- If a foreign-born child was reported to be naturalized but did not have native or naturalized parents (including those who did not have parents in the MATH SIPP+), then the child was reclassified as undocumented.
- If a foreign-born child was classified as an LTM but had a parent that was either naturalized or undocumented, then the child was given the status of the mother if she was present in the SIPP or else the father, if he is present.
- If a foreign-born child was reported as native, born abroad of U.S. citizen parents but had noncitizen parents, then the child was reclassified as undocumented.
- If a foreign-born child who is classified as a noncitizen:

- had undocumented parents, then the child was classified as undocumented
- had a citizen parent, then the child was reclassified as naturalized
- was born after the year the mother immigrated, then the child was reclassified as a native U.S. citizen
- was born before the year the mother immigrated, then the child was assigned the citizenship status of the mother.

The results of the imputation process in the 2011 MATH SIPP+ model are summarized in Table V.1. Overall, the process assigns 10.3 million and 12.2 million foreign-born individuals to be undocumented in the national and state models, respectively. It also assigns 12.2 million and 6.9 million foreign-born individuals to be naturalized in the national and state models, respectively. This difference in the imputation results between the national and state models is due to the difference in the distributions of the foreign-born populations in the two models. The national MATH SIPP+ simulation is based on the SIPP household weight whereas the state MATH SIPP+ simulation is based on the state household weight, which was created according to the CPS-based distribution of noncitizens. In both models, the net effect of the imputation process is that more foreign-born individuals are simulated to be categorically ineligible for SNAP.

C. Assignment of Refugees and Asylees

Noncitizens that are admitted to the U.S. as refugees or asylees are eligible for SNAP and other low-income programs, but are not identified in SIPP. Therefore, after completing the imputation process, we merged the revised citizenship status codes to SIPP and randomly selected a percentage of the LPRs to be refugees and asylees based on the year of arrival and data from the *Yearbook of Immigration Statistics* (See Table V.2).

D. Changes from the Previous Methodology

The imputation process changes the assignment of citizenship status in the MATH SIPP+ model in two key ways. First, the new method uses additional information in the SIPP to correct for possible errors in reported citizenship status. Second, the new method revises the assignment of legal permanent status.

Previous MATH SIPP+ models relied solely on reported citizenship and permanent resident status information. The new imputation process uses additional reported information, such as year of immigration, ethnicity, country of birth, occupation, industry, labor force attachment, and similar measures for the individual's spouse and parents to correct citizenship status when reported information is inconsistent with other measures.

Furthermore, in previous MATH SIPP+ models, an individual who reported being a noncitizen also had to report being a permanent resident to be simulated as potentially eligible for SNAP. Under the new methodology, legal noncitizen status is reassigned so state (or the combined state group) totals match independently-derived estimates of the number of legal noncitizens (Table V.3). This change had a substantial effect on the number of noncitizens simulated as potentially eligible for SNAP. In particular, of the 18.9 million weighted individuals classified as noncitizens in Wave 10 of the SIPP, only 10.0 million were classified as legal permanent residents and thus potentially eligible for SNAP. The remaining 8.8 million noncitizens[3] were considered to be ineligible for SNAP in the MATH SIPP+ model simulations. Under the imputation method, however, only 8.1 million noncitizens are assigned to be undocumented and thus ineligible for SNAP. The remaining noncitizens are assigned under the imputation method to be legal permanent residents, citizens, or legal temporary migrants. Of the 10.0 million noncitizens who report legal permanent resident status, 5.7 million remain as legal permanent residents, 3.9 million are reassigned as undocumented noncitizens, and 0.4 million are reassigned as LTMs or citizens.

[3] Due to rounding, the numbers of noncitizens classified as legal permanent residents and of remaining noncitizens presented here do not total the number of noncitizens.

Table V.1. Simulated Citizenship Status by State

	Simulated Citizenship Status				
	Legal Citizens		Legal Noncitizens		
	Native Citizens	Naturalized Citizens	Legal Permanent Residents	Legal Temporary Migrants	Undocumented Noncitizens
Number in National Model (000s)					
All states	260,906	12,250	13,767	870	10,332
California	26,075	2,825	2,935	204	3,183
Florida	14,015	1,342	2,019	126	48
Illinois	11,103	483	402	29	698
New Jersey	6,712	701	659	15	265
New York	15,229	1,668	1,115	37	569
Texas	20,694	725	1,894	115	964
All other states	167,078	4,506	4,744	344	4,606
Number in State Model (000s)					
All states	260,906	6,876	17,259	870	12,211
California	28,711	1,613	3,958	153	1,701
Florida	15,328	543	1,627	68	516
Illinois	10,828	382	742	41	407
New Jersey	6,848	273	788	40	284
New York	15,466	609	1,660	77	599
Texas	20,211	564	1,824	97	1,891
All other states	163,514	2,892	6,660	393	6,813

Source: Tabulations of 2008 SIPP Panel Wave 10 Core and Wave 2 Topical Module after simulating citizenship status.

Table V.2. Probability a Newly Arrived Noncitizen Is a Refugee or Asylee by Year of Entry into United States

Year of Entry	Probability	Year of Entry	Probability
1995	0.23	2004	0.12
1996	0.18	2005	0.13
1997	0.18	2006	0.09
1998	0.19	2007	0.11
1999	0.20	2008	0.12
2000	0.18	2009	0.14
2001	0.18	2010	0.13
2002	0.10	2011	0.11
2003	0.09		

Source: Tabulation based on Department of Homeland Security Yearbook of Immigration Statistics data.

Table V.3. Comparison of Reported and Simulated Citizenship Status

		Simulated Citizenship Status				
		Legal Citizens		Legal Noncitizens		
Reported Citizenship Status	Total	Native Citizens	Naturalized Citizens	Legal Permanent Resident (LPR)	Legal Temporary Migrant	Undocumented Noncitizens
Number in National Model (000s)						
Native, born in U.S.	260,784	259,152	519	545	89	478
Native, born abroad	2,038	1,178	12	417	52	380
Foreign born, naturalized	16,446	122	11,692	3,078	142	1,412
Foreign born, noncitizen	18,858	454	27	9,728	586	8,062
Not reported LPR	8,821	442	27	4,037	193	4,122
Reported LPR	10,037	12	0	5,691	393	3,941
Number in State Model (000s)						
Native, born in U.S.	260,784	259,152	374	576	89	592
Native, born abroad	2,035	1,178	8	420	52	376
Foreign born, naturalized	16,446	122	6,473	6,033	142	3,675
Foreign born, noncitizen	18,858	454	21	10,229	586	7,568
Not reported LPR	8,821	442	21	4,451	193	3,714
Reported LPR	10,037	12	0	5,778	393	3,853

Source: Tabulations of 2008 SIPP Panel Wave 10 Core and Wave 2 Topical Module before and after imputing citizenship status.

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VI. SIMULATING THE SUPPLEMENTAL SECURITY INCOME PROGRAM

The SSI program is funded primarily by the federal government and provides need-based financial assistance to elderly and disabled individuals. In the MATH SIPP+ model, we simulate eligibility for and participation in the program, rather than use SSI amounts reported in the underlying SIPP data, for two reasons. First, an SSI simulation enables the model to account for the misreporting of SSI income in comparison to SSI administrative data in the 2008 SIPP. Second, an SSI simulation enables policymakers to estimate the impact on SNAP due to policy reforms to SSI.

To be eligible for SSI, individuals must be age 65 or older or have a severe impairment lasting or expected to last at least one year. They also must pass income and asset tests. Certain noncitizens are categorically ineligible for SSI. To be potentially eligible, a noncitizen must be in one of the following categories:

- Refugees and asylees (for up to seven years)
- Legal permanent residents who were lawfully living in the U.S. on August 22, 1996, and are blind or disabled
- Legal permanent residents who were receiving SSI on August 22, 1996, and are lawfully living in the U.S.
- Legal permanent residents who have been lawfully in the U.S. for five or more years and have earned or can be credited (from their spouse or parents) with 40 qualifying quarters of earnings
- Legal permanent residents who are currently on active duty in the U.S. armed forces or are honorably discharged veterans; their spouses and dependent children are also potentially eligible

In the 2011 MATH SIPP+ model, we simulated SSI in three steps. First, we formed potential SSI units. Second, we applied asset and income eligibility tests to determine whether each unit was eligible for SSI, and we computed benefits for eligible units. Finally, we used a participation algorithm to select eligible units to participate so that the simulated caseload matched SSI administrative data by state and age. These steps are described below.

A. Create Potential SSI Units

All individuals age 65 or older, individuals reporting SSI (and their spouses), and other nonelderly disabled individuals with a severe impairment lasting or expected to last for at least one year were initially assigned to belong to an SSI unit. Because of SIPP data limitations, the disability status of children under age 15 could not be determined. Therefore, we randomly assigned some children to be potentially disabled and then determined whether they were eligible for SSI. If so, and if they were later selected to be SSI recipients, they were simulated to be disabled. If the potentially disabled children were not eligible for SSI or were not selected during the calibration process, we did not continue to simulate them as disabled. Ten percent of children under age 15 in eligible SSI units were selected to be disabled during this process. Most individuals cannot receive TANF and SSI simultaneously, so individuals reporting TANF receipt were excluded from SSI units.

Once initial SSI units were formed, ineligible noncitizens were excluded. Following the eligibility rules listed above, the following noncitizens were simulated to be potentially eligible for SSI:

- Those who arrived in the U.S. before 1996 and either were age 80 or older in August 2011 (and so were 65 or older in 1996) or are currently disabled
- Those simulated to be refugees who entered the U.S. in 2004 or later (and so had not been in the U.S. for more than seven years in August 2011)
- Those who have resided in the U.S. for at least five years who were randomly selected to have 40 qualifying quarters of work or were eligible veterans, based on Panel Study of Income Dynamics data (17.8 percent of remaining noncitizens)

B. Simulate SSI Eligibility

We simulated SSI income and asset eligibility based on the rules in effect in 2011. We then calculated the amount of SSI benefits to which an eligible unit is entitled, again using 2011 benefit amounts. These three steps are described below.

1. Income Eligibility

To be income eligible, an SSI unit is required to have countable income less than the combined federal and state guarantee for its state and living arrangement. We calculated countable income according to program rules by summing all income and deducting $20 of any income (deducted first from unearned income, and then from earned income), $65 of earned income, $1,640 of earnings of people under the age of 22 and regularly attending school, and 50 percent of the remaining earnings. Income deemed from an SSI-ineligible spouse or parent was also included in countable income.

The 2011 federal SSI guarantees were $674 per month for an individual and $1,011 per month for a couple. States have the option to supplement federal payments and may vary their supplement levels by whether the SSI recipient is elderly or disabled. States may also vary their supplement by the living arrangements of the recipients. Since individuals living in institutions, such as licensed group homes, are not included in the SIPP, we assumed that units eligible for a state SSI supplement received the "living independently" state supplement amount. Among states that supplemented SSI in 2011, guarantees for an individual living independently ranged from $5 to $362 per month (Table VI.1).

Some states have established income disregards that differ from the federal government. The MATH SIPP+ model does not separately test for income eligibility for state supplements because these differences do not have a substantial impact on the simulation results.

2. Asset Eligibility

To be asset eligible, SSI units are required to have countable assets less than the 2011 federal SSI asset limit of $2,000 for an individual or $3,000 for a couple. Two states, Connecticut and New Hampshire, had asset limits below the federal amounts (see Table V.2). Countable assets do not include the value of a home, burial plots, certain personal goods, life insurance policies under $1500, or the highest-valued vehicle.

To calculate countable assets of an SSI unit, we summed the value of: (1) the value of nonexempt vehicles whose principal drivers are members of the SSI unit; (2) financial assets of members of the SSI unit; and (3) assets deemed from ineligible parents or spouses. Countable financial assets include money in savings accounts, money markets, certificates of deposit, interest-earning checking accounts, and stock and mutual funds.

Although a few states have asset tests for the state supplement that are more restrictive than the federal asset test, the model does not separately test for asset eligibility for state supplements because these differences do not have a substantial impact on the simulation results.

3. Benefit Computation

SSI benefits were calculated for all SSI units that passed the asset and income tests. The simulated benefit amount was the difference (if positive) between the combined federal and state guarantee and the unit's countable income.

C. Select SSI Participants

The final step in the SSI simulation was the selection of SSI participants from the pool of simulated eligible individuals to match control totals from SSA administrative data (Tables VI.3a, b, c). The control totals represented households receiving federal SSI benefits and, in some cases, federally administered state SSI supplements. We also used reported receipt of SSI to ensure that individuals who reported SSI receipt were selected to participate in preference over those who did not. We began the participant selection process by dividing eligible households into groups by simulation state and age of the SSI unit head and, for each group, computing initial probabilities of SSI participation as the ratio of the SSA control total to the number of eligible SSI units. We then assigned each eligible SSI unit an initial probability of SSI participation for their group and a random number between zero and one, using the same random number across all simulation states. Eligible SSI units whose random number was less than or equal to its initial probability of SSI participation were assigned to participate. Finally, we iteratively adjusted participation probabilities until the

simulated SSI participant population approached the control totals. We first adjusted participation probabilities by the ratio of the SSA control totals to the number of units selected to participate and then by the ratio of all reported SSI units in the MATH database to the number of reported SSI units selected to participate.

D. SSI Participation Calibration Results

We evaluated the results of the SSI calibration by how closely the simulated totals matched both the administrative control totals and the number of SSI reporters in the SIPP for each state and age group. In general, the calibration results are close to administrative control totals. In particular, the difference between the administrative and simulated totals is less than four percent in all but two states for individuals under age 17, in all but two states for individuals age 18 through 64, and in all but eight states for individuals age 65 and older. In most of the cases where the number of simulated participants is substantially lower than the control target, the MATH SIPP+ model simulated fewer eligible SSI units than the administrative total, but selected all eligible units to participate. In the few cases where the number of simulated participants is more than 4 percent higher than the control target, the number of reported SSI recipients was larger than the administrative totals.

Although average SSI benefit amounts are not used in the calibration, they are another measure of how well the participant calibration process worked. Table VI.4 presents average SSI benefits for SSA administrative data and MATH SIPP+ simulated participants. The average benefit for all simulated SSI participants compares well with the actual average benefit ($509 versus $499). Among age groups, however, simulated average benefits are lower than administrative average benefits for children and individuals age 65 and over and higher than administrative average benefits for nonelderly adults.

Table VI.1. State SSI Supplements for Individuals and Couples Living Independently, January 2011

State	Elderly Individual	Disabled Individual	Elderly Couple	Disabled Couple
Alaska	362	362	528	528
California[a]	156	156	396	396
Colorado	25	25	387	387
Connecticut	168	168	274	274
Idaho	53	53	20	20
Maine	10	10	15	15
Massachusetts	129	114	202	180
Michigan	14	14	28	28
Minnesota	81	81	111	111
Nebraska	5	5	0	0
Nevada	36	0	74	0
New Hampshire	27	27	21	21
New Jersey	31	31	25	25
New York	87	87	104	104
Oklahoma	42	42	84	84
Pennsylvania	22	22	33	33
Rhode Island	40	40	79	79
South Dakota	15	15	15	15
Utah	0	0	5	5
Vermont	52	52	99	99
Washington	46	46	92	92
Wisconsin	84	84	132	132
Wyoming	25	25	56	56

Source: Social Security Administration (2011)

Note: States not listed do not provide an SSI supplement.

[a]In California, the values represent July, 2011.

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Table VI.2. State Asset Limits for States with SSI Supplements

State	Individual	Couple
Alaska, California, Colorado, Idaho, Maine, Massachusetts, Michigan, Minnesota, Nebraska, Nevada, New Jersey, New York, Oklahoma, Pennsylvania, Rhode Island, South Dakota, Utah, Vermont, Washington, Wisconsin, Wyoming	2,000	3,000
Connecticut	1,600	2,400
New Hampshire	1,500	1,500

Source: Social Security Administration (2011)

Note: Indiana, Missouri, and Ohio have lower asset limits than the federal limit for determining eligibility for state supplements, but because the state supplement in these states is not available to people "living independently," we do not model the state supplement in these states.

Table VI.3a. August 2011 State SSI Control and Simulated Participant Totals, Age 0-17

State	SSI Administrative Totals	Eligible Reporters	Simulated Eligibles	Simulated SSI Recipients	% Difference Between Administrative and Simulated Recipients
Alabama	30,295	25,257	61,425	30,294	0.00
Alaska	1,326	2,394	10,285	1,329	0.21
Arizona	21,135	13,845	72,628	20,819	-1.50
Arkansas	28,380	13,156	36,812	28,403	0.08
California	115,138	86,612	485,184	115,099	-0.03
Colorado	9,093	10,544	49,867	9,176	0.92
Connecticut	8,171	9,235	36,118	8,333	1.99
Delaware	3,691	3,544	11,447	3,717	0.70
District of Columbia	4,502	2,505	6,705	4,519	0.38
Florida	97,087	50,785	199,816	97,235	0.15
Georgia	42,859	43,228	137,794	42,386	-1.10
Hawaii	1,772	2,766	13,909	1,865	5.23
Idaho	5,397	4,032	22,718	5,391	-0.12
Illinois	44,934	37,562	149,847	44,929	-0.01
Indiana	26,184	24,634	83,794	26,248	0.24
Iowa	8,182	8,715	32,707	8,194	0.15
Kansas	9,174	11,057	35,544	9,302	1.39
Kentucky	30,409	18,009	56,383	30,501	0.30
Louisiana	36,514	25,379	66,349	36,728	0.59
Maine	4,026	3,535	11,722	4,054	0.68
Maryland	17,459	18,419	66,052	18,281	4.71
Massachusetts	23,910	23,881	71,551	24,210	1.26
Michigan	42,420	40,496	122,841	42,447	0.06
Minnesota	13,220	12,709	52,699	13,392	1.30
Mississippi	24,449	16,324	47,565	24,626	0.72
Missouri	23,473	28,144	75,574	23,926	1.93
Montana	2,574	2,121	11,118	2,616	1.64
Nebraska	4,185	5,364	20,771	4,281	2.29
Nevada	8,180	6,721	33,048	8,212	0.39
New Hampshire	2,499	2,620	9,884	2,564	2.60
New Jersey	25,552	22,133	89,509	26,180	2.46
New Mexico	9,189	5,191	25,317	9,249	0.65
New York	85,691	57,935	212,452	86,244	0.65
North Carolina	42,653	42,942	129,604	43,178	1.23
North Dakota	1,069	1,222	5,608	1,073	0.39
Ohio	49,730	47,633	148,180	49,772	0.08
Oklahoma	18,321	13,577	47,810	18,309	-0.07
Oregon	10,293	9,723	37,808	10,270	-0.23
Pennsylvania	72,967	42,782	140,688	72,893	-0.10
Rhode Island	4,721	3,704	12,002	4,720	-0.03
South Carolina	20,680	19,626	56,181	20,859	0.87
South Dakota	2,469	2,446	9,085	2,494	1.02
Tennessee	25,466	25,648	78,960	26,337	3.42
Texas	136,394	73,821	368,555	136,358	-0.03
Utah	5,523	10,211	41,662	5,740	3.93
Vermont	1,926	1,856	5,963	1,925	-0.07
Virginia	24,264	24,203	84,210	24,791	2.17
Washington	17,752	18,456	75,585	18,204	2.54
West Virginia	9,154	7,660	21,955	9,159	0.06
Wisconsin	21,330	15,301	56,617	21,333	0.01
Wyoming	981	1,602	6,415	1,011	3.03
U.S.	1,276,763	11,012,420	3,773,486	1,283,537	0.53

Source: Social Security Administration Monthly Update, August 2011 and MATH SIPP+ model.

Note: Age categories are based on the age of the unit head.

Table VI.3b. August 2011 State SSI Control and Simulated Participant Totals, Age 18-64

State	SSI Administrative Totals	Eligible Reporters	Simulated Eligibles	Simulated SSI Recipients	% Difference Between Administrative and Simulated Recipients
Alabama	115,586	90,055	137,798	115,608	0.02
Alaska	8,554	7,086	15,074	8,554	0.00
Arizona	65,292	66,240	120,530	66,279	1.51
Arkansas	65,841	56,722	89,768	65,943	0.15
California	623,643	403,360	823,805	623,222	-0.07
Colorado	43,880	41,827	79,479	43,904	0.06
Connecticut	37,966	30,501	55,639	37,970	0.01
Delaware	9,980	9,972	16,937	10,100	1.21
District of Columbia	16,840	7,296	11,527	11,527	-31.55
Florida	244,375	237,825	413,528	244,858	0.20
Georgia	143,848	113,982	203,837	143,841	-0.01
Hawaii	15,010	13,230	24,721	15,021	0.07
Idaho	18,912	14,062	26,282	18,915	0.01
Illinois	172,090	111,076	206,495	171,996	-0.05
Indiana	83,025	69,197	125,273	82,974	-0.06
Iowa	34,049	26,518	43,993	34,082	0.10
Kansas	31,856	26,954	43,762	31,862	0.02
Kentucky	131,488	79,474	128,999	128,999	-1.89
Louisiana	110,189	74,104	123,626	110,326	0.12
Maine	26,934	19,575	30,612	26,934	0.00
Maryland	68,431	48,372	80,893	68,357	-0.11
Massachusetts	122,418	87,456	141,772	122,443	0.02
Michigan	182,410	133,340	221,707	182,101	-0.17
Minnesota	56,871	39,959	67,101	56,831	-0.07
Mississippi	77,419	41,792	71,908	71,908	-7.12
Missouri	95,069	100,104	152,855	95,859	0.83
Montana	12,828	11,459	20,211	12,855	0.21
Nebraska	18,260	12,401	21,108	18,264	0.02
Nevada	23,735	21,648	43,877	23,720	-0.06
New Hampshire	14,045	10,559	17,789	14,039	-0.04
New Jersey	93,466	70,185	126,053	93,463	0.00
New Mexico	36,090	23,347	43,775	36,131	0.11
New York	369,362	263,999	467,760	369,516	0.04
North Carolina	137,506	125,714	209,446	137,399	-0.08
North Dakota	5,766	4,073	6,800	5,777	0.19
Ohio	205,640	140,331	240,780	205,899	0.13
Oklahoma	62,950	48,342	85,832	62,946	-0.01
Oregon	51,665	38,787	68,458	51,705	0.08
Pennsylvania	232,447	155,576	260,194	231,968	-0.21
Rhode Island	20,758	14,881	23,216	20,760	0.01
South Carolina	71,684	72,806	131,680	72,349	0.93
South Dakota	8,708	8,038	13,392	8,715	0.08
Tennessee	121,069	94,141	159,403	121,067	0.00
Texas	331,725	234,192	422,594	331,618	-0.03
Utah	19,083	15,833	31,092	19,067	-0.08
Vermont	11,335	6,841	11,250	11,250	-0.75
Virginia	93,043	67,096	116,721	92,944	-0.11
Washington	93,316	54,398	100,966	93,376	0.06
West Virginia	60,271	43,071	65,192	60,256	-0.02
Wisconsin	73,521	54,235	94,535	73,625	0.14
Wyoming	4,777	4,545	8,004	4,782	0.10
U.S.	4,775,026	3,606,874	6,335,679	4,774,041	-0.02

Source: August 2011 Social Security Administration Monthly Update and MATH SIPP+ model.

Note: Age categories are based on the age of the unit head.

Table VI.3c. August 2011 State SSI Control and Simulated Participant Totals, Age 65 or Older

State	SSI Administrative Totals	Eligible Reporters	Simulated Eligibles	Simulated SSI Recipients	% Difference Between Administrative and Simulated Recipients
Alabama	29,481	13,089	30,768	29,386	-0.32
Alaska	3,130	1,740	7,466	3,136	0.21
Arizona	26,452	17,998	38,596	26,360	-0.35
Arkansas	15,689	10,175	22,234	15,700	0.07
California	546,357	127,292	382,114	382,114	-30.06
Colorado	15,365	11,846	30,641	15,393	0.18
Connecticut	13,622	11,101	28,708	13,622	0.00
Delaware	2,541	2,370	5,815	2,543	0.06
District of Columbia	4,219	1,819	4,670	4,294	1.78
Florida	162,383	61,533	150,288	150,288	-7.45
Georgia	49,966	20,404	52,083	49,856	-0.22
Hawaii	8,576	4,318	10,275	8,580	0.04
Idaho	3,803	3,478	9,098	3,803	0.01
Illinois	60,458	32,837	75,192	60,560	0.17
Indiana	12,928	15,596	37,466	13,186	2.00
Iowa	6,921	8,054	17,487	7,000	1.14
Kansas	6,778	7,526	16,297	6,881	1.53
Kentucky	32,193	11,511	26,912	26,912	-16.41
Louisiana	31,973	12,208	29,567	29,567	-7.53
Maine	5,305	3,542	8,959	5,209	-1.81
Maryland	25,010	17,159	35,947	24,850	-0.64
Massachusetts	51,016	23,150	57,059	50,805	-0.41
Michigan	39,022	22,664	58,319	39,044	0.06
Minnesota	18,788	14,956	33,374	18,705	-0.44
Mississippi	25,309	8,882	22,195	22,195	-12.31
Missouri	19,024	13,965	32,745	19,307	1.49
Montana	2,824	2,607	6,486	2,824	-0.01
Nebraska	4,000	4,518	9,922	4,022	0.55
Nevada	11,135	7,765	17,966	11,144	0.08
New Hampshire	2,032	3,493	7,884	1,885	-7.26
New Jersey	54,299	28,317	58,374	54,194	-0.19
New Mexico	16,525	7,469	14,781	14,781	-10.55
New York	236,224	62,744	159,954	159,954	-32.29
North Carolina	44,279	23,625	56,373	44,337	0.13
North Dakota	1,604	1,844	3,811	1,600	-0.27
Ohio	39,292	26,981	64,978	39,649	0.91
Oklahoma	14,645	10,366	26,015	14,549	-0.66
Oregon	15,517	9,551	22,092	15,532	0.10
Pennsylvania	61,588	41,041	93,628	61,439	-0.24
Rhode Island	6,791	3,380	7,552	6,792	0.01
South Carolina	22,195	12,727	33,417	22,245	0.22
South Dakota	2,971	2,021	4,803	2,980	0.31
Tennessee	32,243	17,462	41,590	32,220	-0.07
Texas	170,188	68,952	143,234	143,234	-15.84
Utah	4,693	5,475	13,195	4,717	0.51
Vermont	2,500	1,598	3,959	2,471	-1.18
Virginia	34,084	21,312	45,560	34,049	-0.10
Washington	31,218	19,118	42,938	31,191	-0.09
West Virginia	11,588	5,043	12,318	11,496	-0.79
Wisconsin	16,032	14,665	37,630	16,053	0.13
Wyoming	807	1,407	3,182	810	0.31
U.S.	2,055,583	928,532	2,188,998	2,068,968	0.65

Source: August 2011 Social Security Administration Monthly Update and MATH SIPP+ model.

Note: Age categories are based on the age of the unit head.

Table VI.4. Average SSI Benefits in Administrative Data Versus 2011 MATH SIPP+ Model

	SSI Administrative Averages ($)	MATH SIPP+ Averages ($)
All Individuals	499	509
Age		
Under 18	598	558
18 to 64	514	550
65 or older	402	365

Source: August 2011 Social Security Administration Monthly Update and MATH SIPP+ model.

VII. SIMULATING TANF

TANF is a block grant program designed to provide temporary assistance to needy families while helping recipients move into work. States have wide latitude in establishing programs and setting eligibility requirements.

This chapter describes the simulation of TANF eligibility, which first places household members into TANF units and then identifies whether the unit is eligible for benefits and, if so, the amount of the benefit. It also describes the method used to select TANF participants and the results of the eligibility simulation and participant selection.

A. Create Potential TANF Units

We formed potential TANF units in households that contained children or a pregnant woman to include related children, the head of their family, and the spouse of the head. Adult pregnant women without dependents formed their own TANF units. In families reporting TANF receipt, we formed units consisting of (1) the individual who reported ownership of the TANF benefit, who we assigned to be the head, (2) individuals who reported being covered by the TANF benefit owned by the head, and (3) children under age 18 (or students age 18)[4] who were dependents of the head.

In families not reporting TANF but with children or a pregnant family member, we assigned the head of the family to be a TANF unit head and included spouses, pregnant family members, and children under 18 (or students age 18) who were dependents of the head in the unit. Grandparents formed units with their grandchildren when the parents of children were not residing in the household.

Ten states did not allow minors to head TANF units in July 2011—Delaware, Idaho, Kansas, Louisiana, Maryland, Michigan, Montana, North Carolina, West Virginia, and Wisconsin. If a unit in

[4] Under TANF rules, only certain students are considered part of the TANF unit. However, the SIPP does not distinguish between student type, so we include all students in the unit.

one of these states was headed by a mother under age 18, we made further adjustments to the unit formation. If one or both parents of the minor resided in the household, we added them to the unit. If the adult mother was present, we assigned her to be the unit head; otherwise we assigned the father, if present, to be the unit head. If neither adult parent was in the household, then we made all individuals in the unit headed by the mother under age 18 ineligible.

After forming TANF units, we removed individuals who were categorically ineligible for TANF, including:

- Foster children;
- Simulated SSI participants;
- Nondependent members in units with a pregnant woman; and
- Ineligible noncitizens.

We simulated noncitizens to be eligible for TANF if they were refugees (identified earlier in model development process) or legal permanent residents who have been in the U.S. for at least five years or have a military connection (veterans or active duty service members or spouse or child of veteran or active duty member).

B. Simulate TANF Eligibility

We simulated TANF eligibility rules in effect in July 2011 using information from the Welfare Rules Database. In states where program rules were more stringent for applicants than for ongoing recipients, we used the more generous eligibility requirements applicable to on-going recipients. We determined whether each TANF unit was eligible for the program by examining its available cash income and assets. If the unit was income and asset eligible, we then determined the amount of the TANF benefit.

1. Determine Asset Eligibility

To be asset eligible, TANF units had to have countable financial and vehicle assets at or below their state's asset limit (presented in Table VII.1). Countable financial assets include money in savings accounts, money markets, certificates of deposit, interest-earning checking accounts, stock

and mutual funds, and 401K, IRA and Keogh accounts (less an early withdrawal penalty fee). Rules for determining countable vehicle assets varied by state and are presented in Table VII.2. Seventeen states excluded all vehicles from countable assets while others excluded one or more vehicles or the value of vehicles over a state threshold, based on the TANF unit composition.

2. Determine Income Eligibility

TANF income eligibility rules were established by each state and could include a gross income test, a net income test, both types of income tests, or neither. States that did not have explicit income tests for ongoing recipients include Alabama, California, the District of Columbia, Idaho, Illinois, Kansas, Louisiana, Maryland, Michigan, Minnesota, Nebraska, New Hampshire, New Jersey, North Carolina, North Dakota, Ohio, Pennsylvania, Rhode Island, South Dakota, Vermont, and Wyoming. Income tests for other states are listed in Table VII.3. The first column after the state name indicates the type of income test(s) the state applied, along with the percentage of the state threshold under which the indicated type of income must fall. For instance, in Alaska, TANF units had to have gross income under 185 percent and net income under 100 percent of the listed threshold to be eligible. A few states limited their income tests to earned or unearned income, or had two income tests that used different sets of thresholds. Although Table VII.3 only presents thresholds for TANF units with up to six members, most states increase the thresholds for larger TANF units. These thresholds are available in the Welfare Rules Database and are used in the model.

Usually, unless indicated otherwise in Table VII.3, countable gross income was the sum of countable earned and unearned income. However, some states exclude all or some portion of interest and dividend income and child support collected by the state on behalf of TANF recipients. For example, interest and dividend income was entirely excluded in Florida, Georgia, Hawaii, Idaho, Iowa, Kentucky, Louisiana, Missouri, Montana, New Hampshire, North Dakota, South Dakota, and Vermont. (North Dakota considered interest and dividends countable assets.) Kansas, South

Carolina, Tennessee, and Virginia excluded $50, $33, $15, and $10, respectively, of interest and dividend income. The treatment of child support collected by the state on behalf of a TANF recipient is shown in Table VII.4.

To determine net income eligibility, an earnings deduction and, in some states, a dependent care deduction were subtracted from a unit's gross income. Earnings deductions varied by state. Some states disregarded a dollar amount of earnings (for instance, the first $150), others disregarded a percentage of earnings, and still others combined both approaches. States that allowed a dependent care expense deduction deducted dependent care expenses from gross income up to the maximum deduction amount or earnings, whichever was lower. Table VII.5 shows the earnings and dependent care deduction policies for the nine states with a net income test.

3. Determine Benefits

Most states calculated a TANF unit's benefit by subtracting net income from the maximum benefit amount for the unit's size. Several states used more complex benefit calculations, which are described in Table VII.6.

In Minnesota, the benefit was calculated according to the cash portion of the rules of the Minnesota Family Investment Program (MFIP). Under MFIP, a participants' SNAP benefit is calculated at the same time as the cash assistance benefit by subtracting total income from an income threshold (the Transitional Standard) that is based on family size and is higher for families with earnings (the Family Wage Level, which is 110 percent of the Transitional Standard). If the difference between total income and the threshold is greater than the maximum benefit set by Minnesota, the family receives the full food portion of its benefit, and possibly an additional cash benefit. MFIP participants are credited with a 37 percent earnings deduction but are not subject to other income deductions. After calculating the combined SNAP food and cash portion of the benefit, we subtract the food portion and give the unit any remaining amount as the TANF cash

benefit. The separate and combined cash and food portions of the Transitional Standards, and Family Wage Levels are listed in Table VII.7.

In some states, the net income used to calculate the TANF benefit differed from the net income used to determine eligibility. We describe these policies in Table VII.8. Table VII.9 lists state minimum and maximum benefit amounts.

If a TANF unit's calculated benefit was greater than zero, then we simulated the unit to be eligible for TANF.

C. Simulate TANF Participation

The final step in the TANF simulation was the selection of TANF participants from the pool of simulated eligible individuals to match control totals drawn from the FY 2010 ACF administrative data, the latest data available when the model was developed. We did this by first using the ACF data to establish a set of control totals, including TANF unit size, SNAP eligibility, presence of earnings, income as a percentage of the poverty guideline, and TANF benefit as a percentage of the maximum benefit. (Because SNAP eligibility was not reported in the ACF data, we set that control total equal to the number of TANF units that reported SNAP receipt and fifty percent of the remaining TANF units.) Next, we assigned eligible TANF units an initial probability of participation based on the unit's characteristics and a random number between zero and one, using the same random number across all simulation states. Eligible TANF units whose random number was less than or equal to its initial probability of TANF participation were assigned to participate. Finally, we iteratively adjusted the participation probabilities by the ratio of the control totals to the number of units selected to participate until the simulated TANF participant population matched the control totals.

D. TANF Simulation Results

Comparisons of the MATH SIPP+ simulated TANF participants with the ACF control totals are shown in Table VII.10. The total number of participating TANF units is within 1 percent of the control total in both the national and state models. For over half of the target characteristics we

controlled to, simulated participating TANF units in the national and state models were within five percent of the control total. However, the calibration under-selects units with gross income greater than fifty percent of poverty, and over-selects units with maximum benefits and with low benefits (minimum to 20 percent of the maximum). In spite of these discrepancies, the selected TANF units are representative of the TANF population in terms of the distribution of unit size, whether the unit has a member with positive earnings, and whether the unit is eligible for SNAP benefits.

Although means were not used in the calibration, they are another measure of how well the participant calibration process worked (Table VII.11). As has historically been the case, mean earnings for working individuals with TANF is lower in the MATH SIPP+ model than in the administrative data, especially in the state model. Mean TANF benefits are higher in the model than in the ACF data, and the mean number of noncitizens per unit is lower in the model.

Table VII.1. State TANF Asset Limits, July 2011

State	Asset Limits
Georgia, Oklahoma, Pennsylvania, Rhode Island, Texas, Washington	$1,000
Indiana	$1,500
Arizona, Florida, Idaho, Kansas, Maine, Mississippi, Nevada, New Hampshire, New Jersey, South Dakota, Tennessee, Utah, Vermont, West Virginia	$2,000
Kentucky	$2,000 for financial resources
Alaska, California, District of Columbia, New York	$2,000, $3,000 for units with elderly members
Illinois	$2,000 for one person, $3,000 for two, plus $50 for each additional person
Massachusetts, South Carolina, Wisconsin, Wyoming	$2,500
Arkansas, Connecticut, Michigan, Montana, North Carolina	$3,000
New Mexico	$1,500 for liquid resources, $2,000 for nonliquid resources
North Dakota	$3,000 for one person, $6,000 for two, plus $25 for each additional person
Nebraska	$4,000 for one person, $6,000 for two or more
Hawaii, Iowa, Minnesota, Missouri	$5,000
Delaware, Oregon	$10,000
Alabama, Colorado, Louisiana, Maryland, Ohio, Virginia	None

Source: Welfare Rules Database (Kassabian et al. 2012)

Table VII.2. State TANF Rules for Counting Vehicle Assets, July 2011

State	State Rule for Counting Vehicle Assets
Alabama, Arizona, Colorado, Delaware, District of Columbia, Hawaii, Kansas, Kentucky, Louisiana, Maryland, Michigan, Mississippi, New Jersey, North Carolina, Ohio, Utah, Virginia	Exempt all vehicles
Alaska, New Hampshire	Exempt one vehicle per driver and count the equity of remaining vehicles.
Arkansas	Exempt one vehicle and count the fair market value (FMV) of remaining vehicles.
California	Exempt vehicles with equity of $1,500 or less plus one vehicle per driver. Count remaining vehicles at the greater of their equity or their FMV less $4,650.
Connecticut	Exempt a vehicle used to produce income or transport a disabled person. If the unit does not have such a vehicle, count one vehicle at its equity less $9,500. Count the equity of remaining vehicles.
Florida, Indiana, Oklahoma, Oregon, Tennessee, Wisconsin	Count one vehicle at its equity less the state's equity threshold, and count the equity of remaining vehicles. Equity thresholds are $8,500 (Florida), $5,000 (Indiana and Oklahoma), $4,600 (Tennessee), and $10,000 (Oregon and Wisconsin)
Georgia	Exempt vehicles used to produce income or transport a disabled person. If someone in the unit works, count one vehicle at its equity less $4,650; if the unit contains a married couple and both work, count a second vehicle in the same manner. If no one in the unit works, count one vehicle at its equity less $1,500. Count the equity of remaining cars.
Idaho	Exempt one vehicle per driver and vehicles with a FMV of $1,500 or less.
Illinois, Maine, Nevada, North Dakota, Pennsylvania	Exempt one vehicle and count the equity of remaining vehicles.
Iowa	Exempt one vehicle. Count the equity less $4,658 for one vehicle per worker and the full equity of remaining vehicles.
Massachusetts	Count one vehicle at the greater of its FMV less $10,000 or its equity less $5,000. Count remaining vehicles at the greater of FMV or equity.
Minnesota	Exempt vehicles used to produce income or transport a disabled person. Count one vehicle at its FMV less $15,000. Count remaining vehicles at the sum of their FMV less $7,500.
Missouri	Exempt one vehicle. Count another vehicle at its equity less $1,500 and count the equity of remaining vehicles.
Montana, Nebraska	Exempt vehicles used to produce income or transport a disabled person and one remaining vehicle. Count the equity of non-excluded vehicles.
New Mexico	Exempt vehicles used to produce income or transport a disabled person plus additional vehicles up to the number of workers in the unit. Count the equity of remaining vehicles.
New York	Count one vehicle per worker at its FMV less $9,300. If the TANF unit does not contain workers, count one vehicle at its FMV less $4,650. Count the FMV of remaining vehicles.
Rhode Island	Exempt vehicles used to produce income or transport a disabled person and one vehicle per adult up to two. Count the equity of remaining vehicles.
South Carolina	Exempt vehicles used to produce income or transport a disabled person and additional vehicles up to the number of drivers. Count the equity of remaining vehicles.
South Dakota	Exempt one vehicle used to produce income or transport a disabled person. Count additional vehicles up to one per driver at their FMV less $4,650. Count the FMV of remaining vehicles.

Table VII.2 *(continued)*

State	State Rule for Counting Vehicle Assets
Texas	Exempt vehicles used to produce income or transport a disabled person. Count the FMV less $4,650 of remaining vehicles.
Vermont	Exempt one vehicle per adult and count the equity of remaining vehicles.
Washington	Exempt vehicles used to produce income or transport a disabled person. Count one vehicle at its equity less $5,000 and count the equity of remaining vehicles.
West Virginia	Exempt one vehicle and count the FMV of remaining vehicles.
Wyoming	Exempt one vehicle, or two if the unit contains a married-couple unit. Count the equity of remaining cars.

Source: Welfare Rules Database (Kassabian et al. 2012)

Table VII.3. State TANF Income Tests and Thresholds, July 2011

State	Type of Income and Percentage of Threshold	TANF Unit Size					
		1	2	3	4	5	6
Alaska	Gross <= 185%, net <= 100%	814	1,301	1,464	1,627	1,790	1,953
Arizona	Gross <= 185%, net <= 100%	567	765	964	1,162	1,360	1,559
Arkansas	Net <= 100%	223	223	223	223	223	223
Colorado	Gross unearned <= 100%	117	331	421	510	605	697
Connecticut	Gross unearned <= 100%	485	644	790	928	1,062	1,202
Connecticut	Gross earned <= 100%	903	1,215	1,526	1,838	2,150	2,461
Delaware	Gross <= 185%, net <= 100%	677	911	1,144	1,378	1,612	1,845
Florida	Gross <= 185%	903	1,215	1,526	1,838	2,150	2,461
Georgia	Gross <= 185%	235	356	424	500	573	621
Hawaii	Gross <= 185%, net <= 100%	939	1,265	1,590	1,916	2,242	2,568
Indiana	Net <= 100%	903	1,215	1,526	1,838	2,150	2,461
Iowa	Gross <= 185%	365	719	849	986	1,092	1,216
Kentucky	Gross <= 185%	401	460	526	592	658	724
Maine	Gross <= 100%	485	762	1,023	1,286	1,548	1,811
Massachusetts	Gross <= 185%	428	531	633	731	832	936
Mississippi	Gross <= 185%	218	293	368	443	518	593
Missouri	Gross <= 185%	393	678	846	990	1,123	1,247
Montana	Gross <= 185%	312	420	529	637	745	854
Montana	Net <= 100%	245	330	415	500	585	670
Nevada	Gross <= 130%	903	1,215	1,526	1,838	2,150	2,461
New Mexico	Gross <= 85%	903	1,215	1,526	1,838	2,150	2,461
New York	Gross <= 185%	443	548	753	905	1,063	1,172
Oklahoma	Gross <= 185%	398	499	645	798	933	1,068
Oregon	Gross <= 100%	345	499	616	795	932	1,060
South Carolina	Gross <= 185%	451	607	763	919	1,075	1,230
Tennessee	Gross <= 185%	696	896	1,066	1,211	1,335	1,441
Texas	Net <= 100%	78	163	188	226	251	288
Utah	Gross <= 185%, net<= 100%	329	456	568	665	757	834
Virginia	Gross <= 185%	174	257	322	386	457	509
Washington	Gross earned <= 100%	1,128	1,428	1,763	2,080	2,397	2,715
West Virginia	Gross <= 100%	581	786	991	1,196	1,401	1,606
Wisconsin	Gross <= 115%	903	1,215	1,526	1,838	2,150	2,461

Source: Welfare Rules Database (Kassabian et al. 2012)

Table VII.4. TANF Income Eligibility Child Support Policies by State, July 2011

State	Amount of Child Support Collected by State That Is Disregarded from Gross Income for TANF Income Eligibility Determination[1]
Alabama, Arizona, California, District of Columbia, Georgia, Idaho, Illinois, Indiana, Iowa, Kansas, Louisiana, Maryland, Michigan, Minnesota, Nebraska, New Hampshire, New Jersey, North Carolina, North Dakota, Ohio, Rhode Island, South Dakota, Tennessee, Vermont, Wisconsin, Wyoming	All, or state had no income eligibility tests.
Alaska, Connecticut, Delaware, Kentucky, Maine, Massachusetts, Oregon	$50
Arkansas, Colorado, Florida, Hawaii, Mississippi, Missouri, Nevada, Oklahoma, South Carolina, Utah, Washington	$0
Montana	All, up to $100 of collected child support is added to TANF payment.
New Mexico, Virginia	$100
New York, Pennsylvania, West Virginia	$100 for households with one child; $200 for households with two or more children.
Texas	All, and up to $75 of collected child support is added to TANF payment.

Source: Welfare Rules Database (Kassabian et al. 2012)

[1] Minnesota and Vermont exclude $0 and $50, respectively, of collected child support for benefit determination purposes.

Table VII.5. Earnings and Dependent Care Deduction Policies to Determine Net Income Eligibility for States with TANF Net Income Test, July 2011

State	Earnings Deduction	Maximum Dependent Care Expense Deduction per Dependent
Alaska	$150 plus 33% of remainder	$200 for child under age 2, $175 for older
Arizona	$90 plus 30% of remainder	No deduction
Arkansas	68%	No deduction
Delaware	$120	$200 for child under age 2, $175 for older
Hawaii	$200 plus 64% of remainder	If working 30 or more hours, no limit for child under age 2, $175 for older. If working less, $165 regardless of age.
Indiana	$120	If working 30 or more hours, $200 for child under age 2, $175 for older. If working less, $199 for children under age 2, $174 for older.
Montana	$200 plus 25% of remainder	$200 regardless of age
Texas	$120 plus 33% of remainder	$200 for child under age 2; $175 for older
Utah	$100 plus 50% of remainder	If working 30 or more hours, $200 for child under age 2, $175 for older. If working less, $160 for child under age 2, $140 for older.

Source: Welfare Rules Database (Kassabian et al. 2012)

Table VII.6. TANF Benefit Calculation, July 2011

State	Benefit Calculation Type
Alaska, Arizona, Kentucky, Mississippi, North Carolina, South Carolina	Benefit was the lesser of the Payment Standard minus net income, times the Benefit Percentage, or the Maximum Benefit. Benefit percentages were Alaska, 63.2 percent; Arizona, 80 percent; Kentucky, 55 percent; Mississippi, 60 percent; North Carolina, 50 percent; and South Carolina, 28.4 percent.
Arkansas	If gross income was less than $446, then the benefit equaled the Payment Standard; Otherwise, the benefit equaled half the Benefit Standard.
Delaware	Benefit was the lesser of half the Need Standard minus net income or the Maximum Benefit
Minnesota	MFIP benefit calculated as follows: **Recipients with only earned income:** Lesser of (Family Wage Level minus net) or Transitional Standard **Recipients with only unearned income:** Transitional Standard minus net unearned income. **Recipients with both earned and unearned income: If** Family Wage Level minus earned income is less than Transitional Standard, the benefit equals the Family Wage Level minus total net income (earned and unearned). If Family Wage Level minus earned income is equal or greater than Transitional Standard, the benefit equals the Transitional Standard minus unearned income. See Table VII.7 for Family Wage Levels, Transitional Standards, and a summary of the MFIP program.
New Mexico	Benefit was the lesser of the Payment Standard minus net income or the Maximum Benefit minus $39, $53, $67, $80, $94, $108, $121, $138, $152, $166, $180, and $194 for household sizes of 1 to 12, respectively.
Wisconsin	Benefit was $628 for all household sizes.
All other states	Benefit was the lesser of the Payment Standard minus net income or the Maximum Benefit

Source: Welfare Rules Database (Kassabian et al. 2012)

Table VII.7. Minnesota Family Investment Program (MFIP) Benefits, FY 2011

Unit Size	Family Wage Level (1.1 * Transitional Standard)	Transitional Standard (Cash Portion + Food Portion)	Cash Portion	Food Portion
One person	471	428	250	178
Two people	840	764	437	327
Three people	1,106	1,005	532	473
Four people	1,344	1,222	621	601
Five people	1,539	1,399	697	702
Six people	1,769	1,608	773	835
Seven people	1,929	1,754	850	904
Eight people	2,134	1,940	916	1,024
Nine people	2,338	2,125	980	1,145
Ten people	2,534	2,304	1,035	1,269
Each additional person	196	178	53	125

Table VII.8. Earnings and Dependent Care Deduction Policies to Determine Net Income For Benefits, July 2011

State	Earnings Deduction	Maximum Dependent Care Expense Deduction per Dependent
Alabama	20%	No limit
Alaska	$150 plus 33% of remainder	$200 for child under age 2, $175 for older
Arizona	$90 plus 30% of remainder	If working 21 or more hours, $200 for child under age 2, $175 for older. If working less, $100 for child under age 2, $88 for older.
Arkansas	No deduction	No deduction
California	$112 plus 50% of remainder	No deduction
Colorado	66.7%	$200 for child under age 2, $175 for older
Connecticut	100% up to the Federal Poverty Guideline	No deduction
Delaware	$120	$200 for child under age 2, $175 for older
District of Columbia	$160 plus 66.7% of remainder	$200 for child under age 2, $175 for older
Florida	$200 plus 50% of remainder	$200 for child under age 2, $175 for older
Georgia	$120	$200 for child under age 2, $175 for older
Hawaii	20% plus $200 plus 55% of remainder	If working 20 or more hours, no limit for child under age 2, $175 for older. If working less, $165 regardless of age.
Idaho	40%	No deduction
Illinois	75%	No deduction
Indiana	75%	If working 30 or more hours, $200 for child under age 2, $175 for older. If working less, $199 for children under age 2, $174 for older.
Iowa	66.4%	No deduction
Kansas	$90 plus 60% of remainder	$200 for child under age 2, $175 for older
Kentucky	$120	If working 30 or more hours, $200 for child under age 2, $175 for older. If working less, $200 for child under age 2, $150 for older.
Louisiana	$120	$200 for child under age 2, $175 for older
Maine	$108 plus 50% of remainder	$200 for child under age 2, $175 for older
Maryland	40%	If working 23 or more hours, $200 regardless of age. If working less, $100 regardless of age.
Massachusetts	$120 plus 33.3% of remainder	If working 30 or more hours, $200 for child under age 2, $175 for older. If working less, $120 regardless of age.
Michigan	$200 plus 20% of remainder	$200 for child under age 2, $175 for older
Minnesota	37%	No deduction
Mississippi	$90	No limit
Missouri	66.7% plus $90 of remainder	$200 for child under age 2, $175 for older
Montana	$200 plus 25% of remainder	$200 regardless of age
Nebraska	20%	No limit
Nevada	75%	No limit
New Hampshire	50%	If working 20 or more hours, $200 for child under age 2, $175 for older. If working less, $100 for child under age 2, $88 for older.

Table VII.8 *(continued)*

State	Earnings Deduction	Maximum Dependent Care Expense Deduction per Dependent
New Jersey	75%	No deduction
New Mexico	$125 plus 50% of remainder	$200 for child under age 2, $175 for older
New York	$90 plus 48% of remainder	No deduction
North Carolina	27.5%	No deduction
North Dakota	$180 or 27% (whichever is greater) and 35% of remainder	$460 for child under age 2, $400 for older
Ohio	$250 plus 50% of remainder	If working 35 or more hours, no limit. If working less, $120 regardless of age.
Oklahoma	$240 plus 50% of remainder	$200 for child under age 2, $175 for older
Oregon	50%	$200 for child under age 2, $175 for older
Pennsylvania	50%	No deduction
Rhode Island	$170 plus 50% of remainder	$200 for child under age 2, $175 for older
South Carolina	$100	No deduction
South Dakota	$90 plus 20% of remainder	No deduction
Tennessee	$250	$200 for child under age 2, $175 for older
Texas	$120	$200 for child under age 2; $175 for older
Utah	$100 plus 50% of remainder	If working 30 or more hours, $200 for child under age 2, $175 for older. If working less, $160 for child under age 2, $140 for older.
Vermont	$200 plus 25% of remainder	$200 for child under age 2, $175 for older
Virginia	$142 for 1-3 person families, $153 for 4 person families, $179 for 5 person families, $205 for 6+ person families; and 20% of remainder	If working 30 or more hours, $200 for child under age 2, $175 for older. If working less, $120 regardless of age.
Washington	50%	If working 28 or more hours, $200 for child under age 2, $175 for older. If working less, $150 for children under age 2, $131 for older.
West Virginia	40%	$200 for child under age 2, $175 for older
Wisconsin	No deduction	No deduction
Wyoming	$200	No deduction

Source: Welfare Rules Database (Kassabian et al. 2012)

Table VII.9. State Minimum and Maximum TANF Benefits

	Minimum Benefit ($)	Maximum Benefit by TANF Unit Size ($)					
		1	2	3	4	5	6
Alabama	10	165	190	215	245	275	305
Alaska	10	514	821	923	1,025	1,127	1,229
Arizona	10	163	220	278	334	392	449
Arkansas	10	81	162	204	247	286	331
California	10	345	561	694	828	941	1,057
Colorado	10	128	364	462	561	665	767
Connecticut	10	354	470	576	677	775	877
Delaware	10	201	270	338	407	475	544
District of Columbia	10	270	336	428	523	602	708
Florida	10	180	241	303	364	426	487
Georgia	10	155	235	280	330	378	410
Hawaii	10	376	486	610	736	861	986
Idaho	10	309	309	309	309	309	309
Illinois	1	243	318	432	474	555	623
Indiana	10	140	230	288	347	405	464
Iowa	10	183	361	426	495	548	610
Kansas	10	267	352	429	497	558	619
Kentucky	10	186	225	262	328	383	432
Louisiana	10	122	188	240	284	327	366
Maine	10	230	363	485	611	733	856
Maryland	10	259	453	574	695	805	885
Massachusetts	10	428	531	633	731	832	936
Michigan	10	306	403	492	597	694	828
Minnesota	1	250	437	532	621	697	773
Mississippi	10	110	146	170	194	218	242
Missouri	10	136	234	292	342	388	431
Montana	10	298	401	504	606	709	812
Nebraska	10	222	293	364	435	506	577
Nevada	10	253	318	383	448	513	578
New Hampshire	10	539	606	675	738	798	879
New Jersey	10	162	322	424	488	552	616
New Mexico	10	266	357	447	539	630	721
New York	10	443	548	753	905	1,063	1,172
North Carolina	25	181	236	272	297	324	349
North Dakota	10	232	328	427	523	620	717
Ohio	10	259	355	434	536	627	698
Oklahoma	10	180	225	292	361	422	483
Oregon	10	339	432	506	621	721	833
Pennsylvania	10	205	316	403	497	589	670
Rhode Island	10	327	449	554	634	714	794
South Carolina	10	128	172	217	261	305	349
South Dakota	10	405	496	555	613	671	730
Tennessee	10	95	142	185	226	264	305
Texas	10	102	211	244	293	325	374
Utah	1	288	399	498	583	663	731
Vermont	10	434	536	640	726	817	879
Virginia	10	173	254	320	382	451	479
Washington	10	359	453	562	661	762	866
West Virginia	1	262	301	340	384	420	460
Wisconsin	1	628	628	628	628	628	628
Wyoming	10	330	543	577	577	611	611

Source: Welfare Rules Database (Kassabian et al. 2012)

Tables VII.10. National and State Model TANF Control and Calibration Totals

TANF Caseload Characteristics	Control Totals (FY 2010 ACF Data)	Calibration Totals (MATH SIPP+ Model)		Percentage Difference Between Control and Calibration Totals	
		National Model	State Model	National Model	State Model
Total TANF Individuals	4,507,967	4,528,886	4,523,604	0.46	0.35
Total TANF Units	1,886,872	1,885,585	1,887,949	-0.07	0.06
Units by SNAP Eligibility					
Not eligible for SNAP	163,005	158,017	162,425	-3.06	-0.36
Eligible for SNAP	1,723,867	1,727,567	1,725,524	0.21	0.10
Units by Number of Participants					
1	471,307	465,413	468,045	-1.25	-0.69
2	699,176	684,664	696,373	-2.08	-0.40
3	404,827	420,462	407,411	3.86	0.64
4	193,955	188,212	194,560	-2.96	0.31
5	77,860	84,179	79,589	8.12	2.22
6+	39,747	42,655	41,971	7.32	5.60
Units by Benefit as a Percent of Maximum					
Minimum to 20	51,087	59,787	55,569	17.03	8.77
21 to 40	85,615	71,601	74,158	-16.37	-13.38
41 to 60	164,912	158,178	134,152	-4.08	-18.65
61 to 80	221,298	186,182	158,194	-15.87	-28.52
81 to 99	372,771	362,886	336,844	-2.65	-9.64
Maximum benefit	991,189	1,046,952	1,129,032	5.63	13.91
Units by Gross Income as a Percent of Poverty Level					
0 to 50	1,532,628	1,612,385	1,661,338	5.20	8.40
51 to 100	272,378	210,979	180,083	-22.54	-33.88
101 or more	81,866	62,220	46,528	-24.00	-43.17
Units by Presence of Earnings					
No Earnings	1,642,782	1,635,222	1,654,779	-0.46	0.73
With earnings	244,090	250,363	233,170	2.57	-4.47

Sources: ACF Administrative data and 2011 MATH SIPP+ model

Table VII.11. Comparison of Mean Values for Simulated and Administrative TANF Participants in 2011 MATH SIPP+ Model

TANF Caseload Characteristics	Administrative Data (FY 2010 ACF Data)	Simulation Results (MATH SIPP+)		Difference Between Administrative and Simulation Means	
		National Model	State Model	National Model	State Model
Mean TANF Unit Size	2.39	2.40	2.40	0.01	0.01
Mean TANF Benefit	373.49	389.66	386.27	16.17	12.78
Mean TANF Earnings, Where Earnings > 0	844.10	820.92	720.01	-23.18	-124.09
Mean Number of Noncitizens per Unit	1.73	1.19	1.16	-0.54	-0.57
Mean Number of Married Individuals per Unit	0.14	0.17	0.20	0.02	0.05
Mean TANF Gross Income	550.86	537.13	522.82	-13.73	-28.04
Mean Ratio of Income to Poverty Level	0.40	0.39	0.38	-0.01	-0.03
Mean Per-Person TANF Benefit	190.16	189.91	185.65	-0.25	-4.50

Sources: ACF Administrative data and 2011 MATH SIPP+ model

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VIII. SIMULATING SNAP

This chapter describes how we simulated SNAP eligibility. These steps involve determining disability status of each nonelderly individual, forming potential SNAP units, and determining whether each SNAP unit was eligible for a benefit and, if so, the benefit amount. It also describes the selection of participating SNAP units and the simulation results. For more details on federal and state SNAP program rules, see Strayer et al. 2012 and the FNS "State Options Report" (Tenth Edition).

A. Determine Disability Status of Individuals

SNAP units containing a disabled or elderly person are subject to different eligibility and benefit determination rules than SNAP units without disabled or elderly members. SNAP policy considers someone to be disabled if they receive SSI or certain other types of unearned income due to a disability. It is not always possible to determine whether an elderly person is also disabled, because individuals age 65 and older may receive SSI regardless of disability status and individuals age 62 and older may receive Social Security regardless of disability status. For this reason, and because SNAP policies are similar for elderly and disabled people, the MATH SIPP+ model only classifies individuals under age 60 as disabled. (Individuals age 60 and older are considered elderly under SNAP policy.)

The Wave 10 core questionnaire includes information about how much a person received from SSI, Social Security, government pensions, railroad retirement, veteran's benefits, workers' compensation, sickness benefits, and disability payments. Using this information, we determined if a person was classified as disabled by SNAP. Nonelderly individuals can only receive SSI if they are disabled, so those simulated as receiving SSI in the SIPP were automatically classified as disabled. The disability status of those receiving other types of unearned income was based on the reason for receipt. People receiving unearned income due to a disability in August 2011 were classified as

disabled. The MATH SIPP+ model estimates that there were 10.2 million nonelderly people who met the SNAP definition of disabled in August 2011.

B. Create Potential SNAP Units

Under SNAP rules, a SNAP unit is defined as individuals who live together and customarily purchase and prepare food together. Individuals who live together but do not customarily purchase and prepare food together usually may apply for SNAP as separate SNAP units. However, spouses must apply together, and parents must apply with their children under age 22 if they are living in the same household. Certain individuals are categorically ineligible for SNAP. These include (1) SSI recipients in California (who receive a small additional cash benefit instead of SNAP benefits), (2) individuals living in group quarters, (3) most full-time post-secondary students, (4) certain nonelderly nondisabled adults without children who were subject to work registration, and (5) ineligible noncitizens.

We created potential SNAP units using these rules and information reported in the SIPP on relationships between household members, age, SNAP receipt, and which household members share food expenses. In most cases, all members of a household were simulated as being in the same SNAP unit. However, for the relatively small percentage of households with multiple families or unrelated individuals, we sometimes simulated two or more groups of people forming separate SNAP units.

We formed three types of SNAP units using the following methodology:

- **Individuals reporting SNAP**. Individuals reporting receipt of SNAP benefits were divided into units according to reported SNAP unit membership. Children were placed in the same unit as their mother, father or guardian, regardless of reported information.
- **Individuals not reporting SNAP.** Individuals who did not report SNAP receipt, either because no household members reported SNAP receipt or because the individuals were not in the household's reported SNAP unit(s), were formed into SNAP units as described below.
    - **Family-based SNAP units**. Individuals that did not report SNAP receipt, we formed family-based SNAP units. We first separated household members into families and subfamilies, assigning the family head to be the unit head. If the

household head had an unmarried partner, we moved that person into the household head's unit, along with the unmarried partner's children. Next, we randomly selected certain adults age 22 and older to form their own SNAP units according to patterns seen in the FY 2002 SNAP QC datafile. Specifically, unmarried adults in the primary family who were not the household head and who were in a household with gross income less than 250 percent of the poverty threshold were randomly selected to form their own SNAP units along with their children. Finally, if a child from a non-primary family had a parent or guardian outside of its SNAP unit, then every member of the non-primary family was moved into the SNAP unit of the child's parent.

- **Food sharing-based SNAP units**. Within family-based SNAP units, if a family head age 22 or older reported sharing indicated they shared food expenses with another person in the household, then we moved all members of the family head's unit into the SNAP unit of the first person with whom the family head shared expenses.

We excluded the categorically ineligible individuals listed above from these units. Ineligible postsecondary students included nondisabled individuals age 17 to 50 who were enrolled in postsecondary education more than 50 percent of the time and were not working 20 or more hours per week. However, postsecondary students who were receiving TANF or were single parents of a child under age 12 were eligible for SNAP. We excluded all individuals living in group quarters because the SIPP does not include the data necessary to identify the small percentage of those living in group quarters who were eligible to apply for SNAP benefits.

Nondisabled individuals age 18 to 49 who are not living with children face time limits on their SNAP participation unless they (1) are working at least 20 hours per week; (2) are participating in an employment and training program, (3) live in area where the work requirements were waived due to high unemployment, or (4) receive a state exemption (available to no more than 15 percent of a state's caseload). The time limits were suspended by the American Recovery and Reinvestment Act of 2009 (ARRA) for April 2009 through September 2010. Subsequent legislation extended the time limit suspension, at states' discretion. As of August 2011, only two states—Nebraska and North Dakota—had re-implemented time limits on SNAP participation. For those states, we randomly selected some nondisabled adults age 18 to 49 not living with children to be ineligible for SNAP based on data from FNS and the U.S. Census Bureau, and on reported data in the SIPP.

To simulate noncitizen eligibility rules, we used the citizenship status developed earlier in the file development process and described in chapter V and section VI.A. The following categories of noncitizens were eligible to apply for SNAP in FY 2011:

- LPRs under age 18
- LPRs receiving disability benefits
- LPRs who had lived legally in the United States for at least five years
- Noncitizens who were admitted as refugees or granted asylum or a stay of deportation
- Other groups of noncitizens, such as LPRs with a military connection

Undocumented noncitizens and legal temporary migrants (LTMs) were categorically ineligible for SNAP.

In addition to the noncitizen eligibility rules just described, the SNAP simulation estimates a percentage of otherwise potentially eligible LPRs to be ineligible due to their sponsor's income or assets. Specifically, more stringent sponsor deeming provisions implemented in 1997 specify that certain noncitizens are subject to the deeming of their sponsors' income and assets until they have 40 quarters of work credited to them or until they naturalize. These noncitizens are likely either to not be eligible or to choose to remove themselves from the SNAP unit to avoid negative repercussions to their sponsors. This provision does not apply to immigrants without sponsors or to those who were sponsored by an institution or employer. It also does not apply to immigrants living with their sponsor, since the sponsor's income would already be considered under regular program rules.

We used data from the New Immigrant Survey (NIS) (Jasso et al. 2006) to estimate the percentage of noncitizens that were likely ineligible due to the more stringent sponsor deeming provisions. The 2003 NIS is a sample of all adult immigrants admitted to legal permanent residence between May and November of 2003, with a sample size of 8,572. The data file contains information from the U.S. Citizenship and Immigration Services about the class of admission of the

sampled immigrant, as well as self-reported information about sponsors, joint sponsors, income, and other members of the household.

According to NIS data, an estimated 26.4 percent of documented nonrefugee noncitizens who had been in the country between 5 and 10 years had a sponsor who lived in a separate household and whose income and assets would be deemed to the noncitizen during the SNAP eligibility determination. To simulate the likely ineligibility of noncitizens subject to sponsor deeming, we randomly assigned 26.4 percent of noncitizens who arrived after 1997 to be ineligible.

A prorated portion of ineligible noncitizens' income is assigned to the SNAP unit with which they are affiliated (based on unit size), and ineligible noncitizens' assets are included in the SNAP unit's countable assets.

C. Simulate SNAP Eligibility and Benefits

The 2011 MATH SIPP+ model simulates SNAP eligibility and benefit rules for August 2011. Below we describe how we identified categorically eligible SNAP units, determined income and asset eligibility, and computed SNAP benefits for eligible SNAP units.

1. Identify Categorically Eligibility SNAP Units

Certain units are categorically eligible for SNAP and are therefore not subject to SNAP income or asset limits. SNAP units are categorically eligible if (1) all members receive cash public assistance benefits, (2) the unit qualifies under state broad-based categorical eligibility (BBCE) policies, or (3) a unit member participates in a narrowly targeted program funded with federal TANF or state maintenance of effort (MOE) money.

SNAP units in which all members receive SSI, cash TANF benefits or, in some states, general assistance, have long been and remain categorically eligible for SNAP. We identify these "pure public assistance" SNAP units using simulated TANF and SSI receipt along with reported general assistance, foster child care, or other welfare receipt.

Many states use a simple TANF/MOE-funded service, such as a brochure on assistance programs, to confer categorical eligibility on a broad group of people. States with BBCE policies establish income and asset limits, and sometimes unit composition constraints, for the program. Table VIII.1 presents the state BBCE policies simulated in the 2011 MATH SIPP+ model. Eleven states—Alaska, Arkansas, Indiana, Kansas, Missouri, Nebraska, South Dakota, Tennessee, Utah, Virginia, and Wyoming —did not have a BBCE policy in August 2011.

Some states also provide narrowly targeted TANF/MOE-funded noncash services that confer categorical eligibility for SNAP to program participants. These services, which can include work support, child care, transportation, family preservation, and other short-term assistance, are generally provided to only a small number of people. Comprehensive data on participation in these types of programs is not available in the SIPP or from other data sources, so we are unable to simulate categorical eligibility conferred through narrowly targeted programs in the MATH SIPP+ model.

2. Determine Income Eligibility

Non-categorically eligible SNAP units must meet federal income limits to be eligible for SNAP. SNAP units without an elderly or disabled member must have gross countable income no greater than 130 percent of the U.S. Department of Health and Human Services (HHS) poverty guideline and net income no greater than 100 percent of the HHS poverty guideline. SNAP units with an elderly or disabled member only face the net income limit of 100 percent of the HHS poverty guideline. FY 2011 SNAP gross and net income screens are presented in Table VIII.2.

Countable gross income includes earned income and most sources of unearned income, such as TANF, SSI, general assistance, and Social Security. A prorated portion of ineligible noncitizens' income is also included. Energy assistance, education assistance, and the earnings of high school students are not included in countable gross income.

- Net income is calculated by subtracting the following deductions from gross income:
- Standard deduction, which varies by unit size and location. See Table VIII.3 for FY 2011 standard deduction amounts.

- Earnings deduction equal to 20 percent of earnings.
- Dependent care expense deduction for out-of-pocket costs for the care of children and other dependents while other SNAP unit members work, seek employment, or attend school.
- Deduction for medical expenses incurred by elderly or disabled members equal to total medical expenses minus $35. (The 2011 MATH SIPP+ model does not simulate state standard medical deduction demonstrations.)
- Deduction for legally-obligated child support payments. (The MATH SIPP+ model does not simulate the state option to exclude child support payments from gross income rather than deduct them from net income.)
- Excess shelter expense deduction equal to shelter expenses that exceed 50 percent of the unit's net income after the previous deductions are taken. SNAP units without an elderly or disabled person are subject to a shelter expense deduction cap, which varies by location (Table VIII.3).

Shelter expenses include rent or mortgage payments and either a SNAP unit's reported utility expenses or a state standard utility allowance (SUA). Some states use the higher of the applicable SUA or actual utility expenses while other states require the use of an SUA for units with utility expenses. SNAP rules allow for several types of SUAs, including an SUA for units with heating and cooling expenses (HCSUA), an SUA for units without heating and cooling expenses separate from rent, a telephone allowance, and SUAs for individual utilities. However, since the SIPP data do not include details on a household's type of utility expense, the MATH SIPP+ model uses only the HCSUA. These values are listed in Tables VIII.4a and VIII.4b.

SNAP units with energy assistance payments are allowed to claim an SUA even if they have no reported utility expenses. In FY 2011, 14 states gave certain SNAP units not already receiving the HCSUA a nominal energy assistance benefit so the unit would qualify for the HCSUA. These states and their criteria for receipt of a nominal energy assistance benefit, if any, are listed in Table VIII.5.

3. Determine Asset Eligibility

Non-categorically eligible SNAP units must also meet federal asset limits to be eligible for SNAP. In FY 2011, the federal asset limit for SNAP units without an elderly or disabled member was $2,000 and for SNAP units with an elderly or disabled member, $3,000.

Under SNAP rules, countable assets include cash, resources easily converted to cash (such as money in checking or savings accounts, savings certificates, stocks and bonds, and lump-sum payments), and some nonliquid resources. However, some types of property are not counted, such as retirement and educational savings accounts, family homes, tools of a trade, or business property used to earn income. We summed countable assets in the model accordingly.

Under federal rules, vehicles used for producing income or for transporting disabled individuals, or with equity less than $1,500 are excluded from countable resources. As many vehicles as there are adults in the SNAP unit, along with a vehicle for each teenager under age 18 who drives it to work, school, or training, are counted at the vehicles' FMV in excess of $4,650. Remaining vehicles are valued at the higher of the vehicles' FMV in excess of $4,650, or equity. However, states are allowed to use the vehicle rules of TANF or MOE-funded cash or non-cash programs in place of SNAP rules if the program rules are less restrictive. In August 2011, all but three States (Delaware, North Dakota, and Washington) aligned their vehicle rules for non-categorically eligible units with those of other programs. Twenty-nine States had adopted rules that exclude all vehicles from the asset test. Table VIII.6 describes the state rules simulated by the 2011 MATH SIPP+ model for counting the vehicle assets of non-categorically eligible SNAP units.

4. Determine SNAP Benefit

SNAP benefits are calculated by subtracting 30 percent of a SNAP unit's net income from the unit's maximum benefit. Following SNAP rules, eligible one- and two-person SNAP units are guaranteed a minimum benefit. Larger eligible SNAP units with net income high enough that they do not qualify for a positive benefit are simulated to be ineligible. Maximum and minimum monthly SNAP benefits for FY 2011 are presented in Table VIII.7.

D. Select Program Participants

The final step in the SNAP simulation was the selection of SNAP participants from the pool of simulated eligible units. Similarly to the SSI and TANF participant selection processes, we used an

algorithm that selected participants in such a way that the simulated SNAP caseload compares well with SNAP administrative data.

We did this by first establishing a set of control totals using the FY 2011 SNAP QC datafile, including SNAP unit size, numbers of elderly members, children age 0 to 4, and children age 5 to 17, presence of a disabled member or a noncitizen member, SNAP benefit as a percentage of the maximum benefit, income and earnings as percentages of the poverty guideline, receipt of SSI and of TANF, use of a shelter deduction, and simulation state. Next, we assigned eligible SNAP units an initial probability of participation based on the unit's characteristics and a random number between zero and one, using the same random number across all simulation states. Eligible SNAP units whose random number was less than or equal to its initial probability of SNAP participation were assigned to participate. Finally, we iteratively adjusted the participation probabilities by the ratio of the control totals to the number of units selected to participate until the simulated SNAP participant population approached the control totals.

E. SNAP Calibration and Simulation Results

Comparisons of 2011 MATH SIPP+ model simulated participants with the FY 2011 SNAP QC control totals are shown in Table VIII.8a (national totals by characteristic for both the national and state models) and Table VIII.8b (state totals for the state model). The total number of participating SNAP units is within 2 percent of the control total in both the national and state models.

For two thirds of the target characteristics that we controlled to, simulated participating SNAP units in the national model were within five percent of the control total. The SNAP calibration over-selected units with a benefit less than twenty percent of the maximum benefit and under-selected units with a benefit between eighty and one hundred percent of the maximum. These discrepancies may be due in part to the differences in the distribution of low income individuals in the administrative and SIPP datasets. The SNAP calibration also under-selected units receiving TANF

or SSI and units containing children and over-selected units containing noncitizens or elderly members.

For units with six or more members, the differences between the simulation and control totals ranged around 6 percent, which represents the greater likelihood that the simulated eligible SNAP population contains a greater proportion of larger units, whereas in the administrative data, SNAP unit sizes tend to be smaller. These discrepancies are similar to those in previous versions of SIPP-based models and are likely due to differences between the SIPP and SNAP QC samples.

Table VIII.1. State Broad-Based Categorical Eligibility Income, Asset, and Unit Composition Requirements, August 2011

State(s)	Unit Composition	Asset Limit	Income Limit	
			Gross	Net
Alabama	Pure elderly or disabled	None	200	100
	All other	None	130	None
Arizona, Connecticut, Maine, New Jersey, Oregon	All units	None	185	None
California, West Virginia	All units	None	130	None
Colorado	Elderly or disabled	None	200	100
	All other	None	130	100
Delaware, District of Columbia, Florida, Hawaii, Maryland, Michigan, Nevada, North Carolina, Washington, Wisconsin	All units	None	200	None
Georgia	Pure elderly or disabled	None	200	None
	All other	None	130	None
Idaho	Elderly or disabled	$5,000 (exclude one vehicle per adult)	200	100
	All other		130	100
Illinois, Kentucky, Ohio, South Carolina	Elderly or disabled	None	200	None
	All other	None	130	None
Iowa	All units	None	160	None
Louisiana, Mississippi, Oklahoma	Elderly or disabled	None	None	100
	All other	None	130	100
Massachusetts	Child (includes 18) and caretaker, elderly, or disabled	None	200	None
	All other	None	130	100
Minnesota, New Mexico	All units	None	165	None
Montana, North Dakota	All units	None	200	100
New Hampshire	Child under 22 and caretaker	None	185	None
New York	Elderly or disabled or dependent care expenses	None	200	None
	All other	None	130	None
Pennsylvania	Elderly or disabled	None	200	None
	All other	None	160	None
Rhode Island	Elderly or disabled	None	200	None
	All other	None	185	None
Texas	All units	$5,000 (exclude $15,000 FMV from one vehicle)	165	None
Vermont	All units	None	185	None

Source: U.S. Department of Agriculture

Tables VIII.2. SNAP Maximum Allowable Gross and Net Monthly Income Eligibility Standards, FY 2011

SNAP Unit Size	Gross Income ($)			Net Income ($)		
	48 Contiguous States	Alaska	Hawaii	48 Contiguous States	Alaska	Hawaii
1	1,174	1,466	1,350	903	1,128	1,039
2	1,579	1,973	1,816	1,215	1,518	1,397
3	1,984	2,480	2,282	1,526	1,908	1,755
4	2,389	2,987	2,748	1,838	2,298	2,114
5	2,794	3,494	3,214	2,150	2,688	2,472
6	3,200	4,001	3,679	2,461	3,078	2,830
7	3,605	4,508	4,145	2,773	3,468	3,189
8	4,010	5,015	4,611	3,085	3,858	3,547
Each Additional Member	406	507	466	312	390	359

Source: U.S. Department of Agriculture

Table VIII.3. SNAP Standard Deductions and Maximum Excess Shelter Expense Deductions, FY 2011

Deduction	48 Contiguous States	Alaska	Hawaii
Standard Deduction			
1–2 people	$142	$243	$201
3 people	142	243	201
4 people	153	243	201
5 people	179	243	205
6 or more people	205	256	235
Maximum Excess Shelter Expense Deduction	458	732	617

Source: U.S. Department of Agriculture

VIII.4a. Standard Utility Allowances (SUA) That Vary by SNAP Unit Size, FY 2011

State	Mandatory Use	Simulated SUA by SNAP Unit Size									
		1	2	3	4	5	6	7	8	9	10
Hawaii		217	237	271	332	332	389	445	445	445	445
North Carolina	Yes	277	305	336	336	366	366	366	366	366	366
Tennessee		314	326	338	350	360	372	384	396	408	419
Virginia	Yes	303	303	303	382	382	382	382	382	382	382

Source: U.S. Department of Agriculture

VIII.4b. Standard Utility Allowances (SUA) That Do Not Vary by SNAP Unit Size, FY 2011

State	Mandatory Use	Simulated SUA	Notes
Alabama	Yes	299	
Alaska	Yes	324	HCSUA for the Central region, which includes Anchorage and 52% of the state's SNAP population
Arizona	Yes	342	
Arkansas		271	
California	Yes	320	
Colorado	Yes	507	
Connecticut	Yes	662	
Delaware	Yes	414	
DC	Yes	300	
Florida	Yes	340	
Georgia	Yes	309	
Idaho	Yes	427	
Illinois	Yes	324	
Indiana	Yes	387	
Iowa	Yes	425	
Kansas	Yes	353	
Kentucky	Yes	307	
Louisiana		322	
Maine	Yes	634	
Maryland	Yes	403	
Massachusetts	Yes	575	
Michigan	Yes	588	
Minnesota	Yes	305	
Mississippi	Yes	242	
Missouri	Yes	262	
Montana	Yes	534	
Nebraska	Yes	395	
Nevada	Yes	292	
New Hampshire	Yes	518	
New Jersey	Yes	365	
New Mexico		261	
New York			We randomly selected a percentage of units living in a metropolitan area to receive the SUA for New York City or Long Island according to the percentages shown, based on data from the 2007-2011 ACS.
NY City (48%)			
Long Island (17%)			
Remainder			
North Dakota	Yes	653	
Ohio	Yes	599	
Oklahoma		350	
Oregon	Yes	397	
Pennsylvania	Yes	524	
Rhode Island	Yes	576	
South Carolina	Yes	272	
South Dakota	Yes	645	
Texas		325	
Utah	Yes	279	
Vermont	Yes	739	
Washington	Yes	385	
West Virginia	Yes	400	
Wisconsin	Yes	433	
Wyoming	Yes	317	

Source: U.S. Department of Agriculture

VIII.5. States Conferring Nominal Energy Assistance Benefits and Requirements for Receipt, FY 2011

State	Additional Requirements for Receipt beyond Not Yet Receiving the HCSUA
Connecticut	Must have rent or mortgage expenses
Delaware, District of Columbia, Massachusetts, Michigan, New Jersey, Pennsylvania, Rhode Island, Washington, Wisconsin	None
Maine	Must be living in public or subsidized housing and meet general energy assistance requirement of (1) gross income <= 150% of poverty guideline, (2) elderly or disabled member and gross income <= 170% of poverty guideline, or (3) child age 2 or under
New York	Must be living in public or subsidized housing and have rent or mortgage expenses
Oregon	SNAP benefit must be less than the maximum benefit; shelter deduction must be less than the maximum deduction (for units without elderly or disabled), and must have rent or mortgage expenses
Vermont	Must be living in public or subsidized housing

Source: U.S. Department of Agriculture

Table VIII.6. State Policies for Counting Vehicle Assets, FY 2011

State(s)	Vehicle Counting Rule
Delaware, North Dakota, Washington	Federal rules
Alabama, Arizona, California, Colorado, Connecticut, District of Columbia, Florida, Georgia, Hawaii, Indiana, Kansas, Kentucky, Louisiana, Maryland, Massachusetts, Michigan, Mississippi, Missouri, Montana, New Jersey, New Mexico, North Carolina, Ohio, Oklahoma, Tennessee, Utah, Virginia, West Virginia, Wisconsin	Exempt all vehicles
Arkansas, Illinois, Iowa, Maine, Nevada, Pennsylvania, South Dakota	Exempt one vehicle per unit
Alaska, New York, South Carolina	Exempt one vehicle per driver
Idaho, New Hampshire	Exempt one vehicle per adult
Rhode Island, Vermont	Exempt one vehicle per adult up to 2 vehicles
Minnesota	Exempt $7,500 FMV from each vehicle
Texas	Exempt $15,000 FMV from one vehicle
Nebraska	Exempt $12,000 FMV from one vehicle
Oregon	Exempt $10,000 equity from combined value of all vehicles
Wyoming	Exempt two vehicles for a unit with a married couple, one vehicle for other units

Source: U.S. Department of Agriculture

Table VIII.7. Maximum and Minimum Monthly SNAP Benefits, FY 2011

	Contiguous United States	Alaska	Hawaii
Maximum Monthly SNAP Benefits by Unit Size			
1	$200	$239	$314
2	367	438	575
3	526	627	824
4	668	797	1,046
5	793	946	1,243
6	952	1,135	1,491
7	1,052	1,255	1,648
8	1,202	1,434	1,884
Each Additional Member	150	179	236
Minimum Monthly SNAP Benefits by Unit Size			
1 – 2	$16	$19	$25

Source: U.S. Department of Agriculture

Table VIII.8a. Comparison of Control Totals with Simulated Results, National Totals

	Participating Units			Percentage Difference from SNAP QC	
		MATH SIPP+			
	FY 2011 SNAP QC	National Model	State Model	National Model	State Model
Total SNAP Units	20,781,551	20,417,943	20,390,713	-1.7	-1.9
Unit Size					
1	10,117,769	9,824,054	9,833,700	-2.9	-2.8
2	4,114,893	4,044,318	4,070,153	-1.7	-1.1
3	2,967,220	2,876,528	2,851,196	-3.1	-3.9
4	2,003,313	2,006,927	1,980,768	0.2	-1.1
5	986,240	1,036,153	1,027,646	5.1	4.2
6+	592,116	629,964	627,250	6.4	5.9
Unit Contained Disabled Member(s)	4,197,559	4,033,423	3,975,015	-3.9	-5.3
Number of Elderly Members					
None	17,359,915	16,818,887	16,696,247	-3.1	-3.8
1 elderly member	3,078,418	3,229,788	3,312,793	4.9	7.6
2 or more elderly members	343,218	369,268	381,673	7.6	11.2
Number of Children Age 0 to 4					
None	15,636,929	15,715,384	15,790,884	0.5	1.0
1 child	3,737,827	3,431,945	3,359,616	-8.2	-10.1
2 children	1,213,965	1,087,040	1,061,126	-10.5	-12.6
3 or more children	192,831	183,574	179,087	-4.8	-7.1
Number of Children Age 5 to 17					
None	13,488,687	13,446,682	13,429,051	-0.3	-0.4
1 child	3,535,993	3,388,750	3,403,033	-4.2	-3.8
2 or more children	3,756,871	3,582,512	3,558,629	-4.6	-5.3
Unit Contained Noncitizen(s)	1,211,395	1,327,848	1,319,157	9.6	8.9
Income as a Percentage of Poverty					
0 to 50 percent	8,814,564	8,717,232	8,653,749	-1.1	-1.8
51 to 100 percent	8,463,483	8,318,653	8,411,203	-1.7	-0.6
101 to 130 percent	2,496,363	2,400,236	2,376,393	-3.9	-4.8
131 percent or more	1,007,140	981,823	949,368	-2.5	-5.7
Earnings as a Percentage of Poverty					
No earnings	14,440,091	13,790,032	13,733,351	-4.5	-4.9
1 to 50 percent	2,263,301	2,383,742	2,372,362	5.3	4.8
51 to 100 percent	2,709,676	2,854,370	2,905,758	5.3	7.2
101 percent or more	1,368,483	1,389,799	1,379,242	1.6	0.8
Unit Received SSI	4,194,559	3,846,263	3,786,804	-8.3	-9.7
Unit Received TANF	1,589,176	1,400,193	1,383,624	-11.9	-12.9
Unit Received Shelter Deduction	14,926,243	14,858,813	14,781,047	-0.5	-1.0
Benefit as a Percentage of Maximum					
1 to 20 percent	1,602,710	1,763,757	1,770,066	10.0	10.4
21 to 40 percent	1,851,606	1,901,448	1,929,454	2.7	4.2
41 to 60 percent	2,546,896	2,622,504	2,632,772	3.0	3.4
61 to 80 percent	2,975,434	3,003,123	3,004,396	0.9	1.0
81 to 99 percent	3,318,951	2,711,683	2,654,214	-18.3	-20.0
100 percent	8,485,954	8,415,430	8,399,811	-0.8	-1.0

Source: FY 2011 SNAP QC data and 2011 MATH SIPP+ Model.

Table VIII.8b. Comparison of Control Totals with Simulated Results, State Totals

State	Participating Units		Percent Difference
	FY 2011 SNAP QC	MATH SIPP+ State Model	
Alabama	377,373	359,817	-4.7
Alaska	34,776	36,431	4.8
Arizona	455,580	450,307	-1.2
Arkansas	205,176	199,870	-2.6
California	1,602,898	1,729,817	7.9
Colorado	197,337	222,024	12.5
Connecticut	200,747	204,845	2.0
Delaware	60,942	59,533	-2.3
District of Columbia	75,714	63,473	-16.2
Florida	1,659,063	1,575,536	-5.0
Georgia	780,572	745,282	-4.5
Hawaii	78,999	86,131	9.0
Idaho	95,021	93,385	-1.7
Illinois	851,995	835,687	-1.9
Indiana	374,525	371,316	-0.9
Iowa	171,368	175,239	2.3
Kansas	136,346	138,755	1.8
Kentucky	374,173	361,690	-3.3
Louisiana	381,199	362,951	-4.8
Maine	125,534	117,331	-6.5
Maryland	324,668	323,727	-0.3
Massachusetts	443,012	441,746	-0.3
Michigan	964,400	876,878	-9.1
Minnesota	243,314	252,267	3.7
Mississippi	268,616	243,460	-9.4
Missouri	426,739	395,636	-7.3
Montana	56,215	61,352	9.1
Nebraska	74,719	76,063	1.8
Nevada	154,069	157,681	2.3
New Hampshire	53,414	55,910	4.7
New Jersey	366,588	393,695	7.4
New Mexico	176,680	166,854	-5.6
New York	1,573,333	1,558,532	-0.9
North Carolina	724,126	705,864	-2.5
North Dakota	27,302	29,905	9.5
Ohio	837,287	841,693	0.5
Oklahoma	267,142	262,389	-1.8
Oregon	415,700	349,734	-15.9
Pennsylvania	811,938	835,414	2.9
Rhode Island	84,667	83,878	-0.9
South Carolina	385,463	376,068	-2.4
South Dakota	42,893	44,177	3.0
Tennessee	589,527	507,707	-13.9
Texas	1,600,871	1,577,217	-1.5
Utah	110,421	111,771	1.2
Vermont	44,895	45,398	1.1
Virginia	398,818	391,158	-1.9
Washington	535,344	503,815	-5.9
West Virginia	156,449	152,531	-2.5
Wisconsin	369,053	362,246	-1.8
Wyoming	14,549	16,527	13.6

Source: FY 2011 SNAP QC data and 2011 MATH SIPP+ Model.

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IX. SIMULATING THE EFFECTS OF CHANGES IN SNAP POLICY

Once the MATH SIPP+ model is complete, we use it to estimate the effects of proposed changes to SNAP rules on SNAP eligibility, participation, and benefits. This chapter describes how we simulate program changes and estimate their effects using the 2011 MATH SIPP+ model. The steps, described below, involve (1) simulating existing SNAP policies (the baseline simulation), (2) simulating alternative policies (policy change simulation), and (3) measuring the differences between the baseline and policy change simulations. This chapter also discusses the methodology used to predict SNAP participation under policy change simulations, and describes the types of questions answered by model output and the measures of statistical significance provided.

A. Simulate Baseline Policies

As described in earlier chapters, the 2011 MATH SIPP+ model simulates SNAP eligibility, participation, and benefits under FY 2011 program rules. This simulation forms a FY 2011 baseline that serves as the basis for proposed changes to SNAP eligibility and benefit policies. This baseline can also be used to examine the detailed characteristics of the SNAP eligible population and SNAP participants in FY 2011.

B. Simulate Policy Changes

To simulate a change to SNAP policies, the user changes one or more program rules, and then the model redetermines unit composition (if necessary), unit eligibility, benefit amount, and participation for each sample SNAP unit. For SNAP rules that are parameterized, such as income eligibility limits, asset limits, standard deductions, and maximum benefit amounts, policy changes can be simulated by simply changing the values of the parameter. For example, the 13.6 percent increase in the maximum benefit implemented under ARRA was simulated in a previous MATH SIPP+ model by raising the dollar values of the maximum benefit parameter. Changes in SNAP policies that are not parameterized, however, must be simulated by changing the model's underlying code. For example, some rules for calculating the shelter deduction are hard-coded in the model, so

a policy change that involves setting a standard shelter deduction amount that varies by region of the country would require a code change.

In 2004, Mathematica created a web-based user interface, MATHWEB, which allows FNS and outside researchers granted permission by FNS to access the MATH SIPP+ model from any Internet-connected PC using a standard web browser. MATHWEB allows users to select and edit parameterized SNAP rules to simulate a policy change and view summary output tables. MATHWEB is continually updated to provide users with the most current version of the model, and a user's guide is available with instructions for how to use it to set up and run policy simulations (Schechter and Brinkley, 2013).

SNAP eligibility and benefit amounts under a policy change simulation are determined based on the particular program rules being proposed. However, the decision to participate for SNAP eligible units is a behavioral response. We assume all units that are participating under baseline and have a benefit increase under a policy change simulation will continue to participate. Similarly, we assume all eligible units that do not participate under baseline and have a benefit decrease under a policy change simulation will continue to not participate. However, we use equations to predict whether an eligible unit will participate under the three other possible policy simulation outcomes:

1. Not eligible under baseline, newly eligible under policy change
2. Eligible nonparticipant under baseline, still eligible with benefit increase under policy change
3. Eligible participant under baseline, still eligible with benefit decrease under policy change

Outcome 1. We assume the participation decision for newly-eligible SNAP units will be similar to the decision made by baseline-eligible SNAP units with similar characteristics. We implement this assumption in several steps. First, we estimated a logistic regression over baseline-eligible units as part of the model development process. The model predicts the probability that a SNAP unit will participate based on characteristics used in the baseline participant calibration process. These include

SNAP unit size, SNAP benefit as a percentage of the maximum benefit, presence of a disabled member, receipt of SSI, receipt of a shelter deduction, number of elderly members, number of children age 0 to 4, number of children age 5 to 17, income as a percentage of the poverty guideline, earnings as a percentage of the poverty guideline, and receipt of TANF (Table IX.1).

Next, after eligibility and benefits are redetermined under a policy change simulation, we assign newly-eligible SNAP units a probability of participation estimated by the logistic model and a random number between zero and one, using the same random number across all simulation states. Newly-eligible SNAP units whose random number is less than or equal to its probability of SNAP participation are predicted to participate.

Outcomes 2 and 3. We assume that some eligible nonparticipating units under baseline that experience a benefit increase under a policy change simulation (Outcome 2) will decide to participate, and some eligible participating units under baseline that experience a benefit decrease under a policy change simulation (Outcome 3) will decide not to participate. Further, we assume that changes in a unit's participation decision are based on the percent change in their simulated SNAP benefit and their unit characteristics. The greater the increase (or decrease) in the percent change in benefits, the greater (or lower) the probability of participation. We implement this assumption using a probit model estimated by Allin and Martini (1990). The model includes SNAP unit size, income as a percentage of the poverty guideline, age, race, and education of the unit reference person, presence of children, receipt of public assistance, receipt of countable assets, and receipt of earnings (Table IX.2). We assign eligible SNAP units experiencing a benefit change a probability of participation estimated by the probit model and a random number between zero and one, using the same random number across all simulation states. Eligible SNAP units whose random number is less than or equal to its probability of SNAP participation are assigned to participate.

C. Calculate Change in SNAP Caseload and Benefits

Comparing the results of the policy change simulation to the baseline simulation provides estimates of the effect of the proposed policy change on the SNAP eligible and participant populations and benefits. The results can also provide estimates of the effect of the change on different subgroups of the population, such as households with children or elderly individuals, and characteristics of "gainers" and "losers." The model produces a standard set of output tables that can be used to respond to questions such as:

- What would be the cost (in benefits) of a particular policy change?
- How many units would become newly eligible under the change?
- How many units would be worse off and how many better off under the change?
- Would some subgroups be affected more than others?

Because the SIPP data used in the MATHSIPP+ model consist of a sample of all households, estimates of the effect of proposed changes are subject to sampling error. To determine whether simulated changes are statistically significant, the model generates standard errors of the estimates. The standard errors can then be used to calculate confidence intervals around the estimates. We calculate the standard errors using "Fay's method" which was developed by the Census Bureau specifically for the sampling techniques used in the SIPP. This method consists of repeatedly selecting subsamples by applying 108 sets of replicate household weights to every household in the full sample. The variability of the replicated subsamples is then used to estimate the variance of the full sample (Smith, 2007).

Table IX.1.Coefficients for Equation Estimating the Probability of Participation for Newly-Eligible Units under Policy Change

Explanatory Variable	Coefficient
Constant	-0.82743
SNAP unit size of 1	2.14891
SNAP unit size of 2	1.66200
SNAP unit size of 3	2.12224
SNAP unit size of 4	1.26131
SNAP unit size of 5	0.38465
SNAP benefit is 1 to 20 percent of maximum	-4.22864
SNAP benefit is 21 to 40 percent of maximum	-2.69637
SNAP benefit is 41 to 60 percent of maximum	-1.06446
SNAP benefit is 61 to 80 percent of maximum	0.00226
SNAP benefit is 81 to 99 percent of maximum	3.39967
SNAP unit includes disabled member(s)	0.40353
SNAP unit receives SSI	1.63558
SNAP unit receives shelter deduction	-0.46699
SNAP unit includes 1 elderly member	-2.19935
SNAP unit includes 2 or more elderly members	-3.17339
SNAP unit includes 1 child age 0 to 4	1.36131
SNAP unit includes 2 children age 0 to 4	2.15089
SNAP unit includes 3 or more children age 0 to 4	1.97744
SNAP unit includes 1 child age 5 to 17	0.12653
SNAP unit includes 2 or more children age 5 to 17	0.30615
Gross income is 0 to 50 percent of poverty	1.13978
Gross income is 51 to 100 percent of poverty	0.63997
Gross income is 101 to 130 percent of poverty	0.47771
Earnings are 0 to 50 percent of poverty	2.24304
Earnings are 51 to 100 percent of poverty	1.42143
Earnings are 101 to 130 percent of poverty	-0.89156
SNAP unit receives TANF	1.35811

Source: 2011 MATH SIPP+ model, national version

Table IX.2. Coefficients for Equation Estimating the Probability of Participation for SNAP-Eligible Units with a Change in SNAP Benefit Amount under Policy Change

Explanatory Variable	Coefficient
Benefit change (log)	0.07422
Constant	-0.86552
SNAP unit size of 2	0.98990
SNAP unit size of 3	0.09972
SNAP unit size of 4	0.14850
SNAP unit size of 5	0.16682
SNAP unit size of 6 or more	0.18908
No gross income	-0.29316
Gross income is 1 to 50 percent of poverty	0.14619
Gross income is 51 to 75 percent of poverty	0.04351
Gross income is 100 percent of poverty or higher	-0.42800
Age of SNAP unit head is 30 to 39	-0.01460
Age of SNAP unit head is 40 to 59	0.52160
Age of SNAP unit head is 60 to 69	-0.69190
Age of SNAP unit head is 70 or more	-0.16480
SNAP unit head is Hispanic	-0.10017
SNAP unit head is black, non-Hispanic	0.17850
SNAP unit head has less than high school diploma	0.61930
SNAP unit head has more than high school diploma	-0.26654
SNAP unit includes children	0.36553
SNAP unit receives public assistance	1.26750
SNAP unit has countable assets	-0.36617
SNAP unit has earnings	-0.22707

Source: 1985 SIPP Panel

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