RESEARCH REPORT

TRIM: A Tool for Social Policy Analysis

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Executive Summary

Since the early 1970s, the Office of the Assistant Secretary for Planning and Evaluation (ASPE) has used the Transfer Income Model (TRIM) to assess how social welfare programs affect family incomes and poverty. TRIM began as a tool to analyze proposed reforms to the nation's cash welfare program during the Nixon administration. It evolved into a uniquely comprehensive model of social welfare and tax programs as ASPE responded to new administration and congressional proposals to reform welfare, taxes, Medicaid, health insurance, child support, and child care subsidies.

TRIM is a microsimulation model that starts with survey data representative of the US population and simulates federal and state program rules at the individual, family, and household levels. The model calculates program eligibility and potential benefits, program participation, and tax liability. All results are internally consistent, and simulations of current law program rules are aligned with official program data. Microsimulation allows the user to understand the effects of programs at a very detailed level—that is, by individual characteristics such as race, ethnicity, marital status, geography and poverty level and by individual program elements. The results are weighted to reflect US population totals and summed to produce aggregate results. The model easily simulates alternatives to current program rules to test out the effect of new policies on program benefits and costs as well as family incomes and poverty.

The model has evolved to include "modules" that simulate all the major social welfare and tax programs. Today's version of TRIM, called TRIM3, is unique among microsimulation models in its comprehensiveness.

- The benefit modules include Temporary Assistance for Needy Families (TANF); Supplemental Security Income (SSI); child care subsidies; child support; housing assistance; the Low Income Energy Assistance Program (LIHEAP); the Supplemental Nutrition Assistance Program (SNAP, formerly food stamps); and the Special Supplemental Nutrition Assistance for Women, Infants, and Children (WIC).
- The tax simulation modules include payroll taxes and federal and state individual income taxes.
- The health modules address Medicaid eligibility and enrollment, employer-sponsored health insurance, and subsidies under the Affordable Care Act.

TRIM3 provides a complete picture of how cash, near-cash, and tax programs affect the distribution of family incomes. In contrast to single-program models, a unique strength of TRIM3 is its capacity for analyzing program interactions across the social safety net and tax system. The TRIM3

model shows how changes in one program affect many other programs, such as how changes in TANF affect SNAP benefits or how changes in SSI status affect Medicaid eligibility. The model can calculate poverty using numerous measures, including the new supplemental poverty measure.

The TRIM3 computer model provides users with an accurate, flexible, and transparent policy analytic tool. Some of the key features of the modeling system include the following:

- Very detailed modeling of program eligibility and benefits, including state-specific policies.
- Imputations of immigrants' legal status, which is not available in survey data but which is critical to simulating government programs.
- Corrections for underreporting of government benefit receipt on the surveys used for input. This feature aligns program participation and benefits to federal and state administrative data so that the model produces an accurate picture of current benefit programs.
- Parameterized federal and state program rules that can easily be changed. An almost unlimited number of policy scenarios can be modeled simply by changing program rules. TRIM3 maintains a history of the program rules across all major safety net programs from the mid-1990s and as far back as 1975 for some programs.
- Numerous standardized tables showing detailed simulation results; users can also produce extracts from the micro-level data for their own analyses.
- Transparency and public access. Users can access TRIM3 data and documentation through http://trim.urban.org, a public web interface.

The TRIM3 model has been assessed over the years through formal review panels, including a National Academy of Sciences (NAS) study of the use of microsimulation for government policy analyses. TRIM's transparency has been enhanced through numerous presentations at conferences and publications in refereed journals. TRIM3 is a known and respected source of unbiased information. Multiple government agencies outside the US Department of Health and Human Services—including the Government Accountability Office, the Congressional Budget Office, the US Department of Labor, the Economic Research Service, and the Congressional Research Service—have used TRIM for special studies.

Although other government agencies and private organizations use the model for specific policy impact projects, TRIM3 is ASPE's model. ASPE has continuously funded and used the model and holds its copyright. ASPE's core support for annual updates has ensured that it is ready to go for analysis of current policy or new proposals as questions arise from the executive or legislative branches of government.

Current policy discussions suggest that the Congress and future administrations will continue to demand the kind of support that TRIM3 provides. Information developed during ongoing maintenance and development provides information about the current operation of programs, such as program participation rates and family dependency levels. The model's flexibility and parameterization allow quick analysis of changes to current programs, questions that often arise during heated budget debates. ASPE support has ensured that TRIM3 is immediately available to provide information to assess benefit, tax, and health programs and their effects on US families.

Introduction

The Office of the Assistant Secretary for Planning and Evaluation (ASPE) has used the Transfer Income Model (TRIM) to analyze social policy questions over the last 45 years.[1] The executive branch of government and the Congress became accustomed to requesting and receiving detailed estimates of the effects of social programs on individuals in the early 1970s (see Citro and Hanushek 1991). Such analysis requires a survey with data on individual economic units (households, families, and individuals) and a type of model called a microsimulation model, which operates on these individual units to calculate how they are affected by policies.

TRIM is the oldest of this group of microsimulation models that continues today. Its predecessor was designed for President Nixon's Commission on Income Maintenance in 1969. This commission considered replacing the Aid to Families with Dependent Children (AFDC) program with universal income guarantees. Commission discussions required better information about who would win and who would lose from such a change. The result was the Reforms in Income Maintenance (RIM) model developed to simulate the rules of AFDC and federal income taxes using input data from the 1967 Survey of Economic Opportunity (SEO).

RIM evolved into the TRIM at the Urban Institute with support from the Office of Economic Opportunity (OEO) and an internal investment by the Urban Institute.[2] This model, now TRIM3, has continuously been supported by OEO's successors at ASPE.[3] Other government agencies and foundations have contributed to the model's development, but ASPE's institutional support has been critical throughout TRIM's history. ASPE holds the copyright to the TRIM3 model but grants the Urban Institute permission to use it in other research. Microsimulation modeling has become even more critical as social policies have become more complex. The policies that affect family incomes include social insurance, the safety net (means-tested benefit programs), and the payroll and income tax systems. The safety net itself includes 10 major means-tested benefit programs or groups of programs (Falk 2012). Each program has unique rules defining who can get benefits (eligibility), how much they can get (benefits), and for how long. The payroll and federal and state individual tax systems also affect families in different ways depending on their family status, work, and income. Social insurance

[1] The original TRIM model was renamed TRIM2, followed by TRIM3, representing two major system redesigns. This paper uses the name TRIM when generally referencing the model and TRIM3 when discussing specifics of the current model.
[2] The history of the development of TRIM is detailed in Webb, Michel, and Bergsman (1990).
[3] OEO was originally an independent agency. Its name was changed to the Community Services Administration in 1974; it was moved into the US Department of Health and Human Services in 1977.

programs, focused on the unemployed, those with disabilities, and the retired, add another layer of complexity to social policy. Policies are defined by a combination of federal and state rules. The result is complex policies and program rules that can be analyzed only by using an economic model that captures each program and calculates the combined policy effects on families and individuals.

Today the TRIM3 model simulates eight cash and near-cash benefit programs, Medicaid and the Children's Health Insurance Program (CHIP), employer health insurance premiums, payroll taxes, federal and state income taxes, and child support (table 1). The model begins with a representative survey of US households and adds information from other data sources required to simulate all these programs. No single survey includes all the necessary data. The model requires, for example, data on immigration status, capital gains, and tax deductions, none of which is available on a household survey. These additional data are added through a number of procedures, including statistical imputations and matches with other data sets. After these additional data are added, the model proceeds to simulate, or calculate, benefits and taxes for each of the programs to develop a "baseline" of information. These baseline simulations require the best available data on program rules and official records of benefits paid to ensure that the model accurately captures how these programs work. Simulation model results are compared to official benefit records along a number of dimensions, such as family type and state of residence. Alignment procedures ensure that the model's program participation and benefit totals match those in the official administrative records as closely as possible.[4]

The baseline information is useful itself for addressing questions about the current social welfare system. For example, data can be summarized to show how many benefits each individual, family, or household receives, and how much these benefits add to family incomes. The model's capacity to simulate alternative program rules, including labor supply and program participation responses to the alternative rules, allows users to answer "what if" kinds of policy questions. An almost unlimited number of policy scenarios can be modeled simply by changing the rules of existing programs.

TRIM3's comprehensive representation of social welfare programs and individual income and payroll taxes makes it the only tool available to examine how programs interact to affect program eligibility, benefit levels, net incomes, poverty, and overall government spending on low-income populations. More recently, adaptation of the state-representative American Community Survey (ACS) as an alternate input database, coupled with the annual updates of state-level program rules, has enhanced TRIM3's ability to analyze state-level poverty reduction policies. The model's methods and

[4] See the appendix and the model's online documentation at http://trim.urban.org for more information about these alignments.

data are well documented and transparent. The result is a policy tool with broad usage and acceptance.

The next section of this paper describes how TRIM has been used historically at ASPE, including how TRIM has been used for policy analyses, quick data insights, and policy leadership. Next, the paper describes how TRIM works and summarizes how the model has been evaluated over time. The paper continues with some discussion of what the future might hold for TRIM and concludes with a short summary. The reference section to the paper guides interested readers to a host of additional information about the model's history, its uses, and its formal evaluations. The paper includes an appendix with information about TRIM3's current software system.

TABLE 1A

TRIM3 Benefit Program Simulation Modules and Their General Functions

Module	Type of benefit	Estimate potential recipients and benefits	Select participants, assign benefits	Policy simulations
Temporary Assistance for Needy Families (TANF)	Cash	✓	✓	✓
Supplemental Security Income (SSI)	Cash	✓	✓	✓
Unemployment compensation[a]	Cash	✓	✓	✓
Supplemental Nutrition Assistance Program (SNAP)	Noncash	✓	✓	✓
Special Supplemental Nutrition Assistance for Women, Infants, and Children (WIC)	Noncash	✓	✓	✓
Child care subsidies	Noncash	✓	✓	✓
Public and subsidized housing	Noncash	✓	✓	✓
Low Income Energy Assistance Program (LIHEAP)	Noncash	✓	✓	✓
Medicaid and CHIP	Health insurance	✓	✓	✓

a. Correction for underreporting of unemployment compensation is not part of the standard baseline process but is available for special purposes.

TABLE 1B

Other TRIM3 Simulation Modules and Their General Functions

Module	Type of program	General functions
Employer insurance	Health insurance	Assign premiums
Payroll tax	Taxes	Calculate payroll taxes
Federal income tax	Taxes	Calculate taxes, including earned income tax credit (EITC) and other tax credit eligibility
State income tax	Taxes	Calculate taxes, including state-level EITCs and other state-level tax credits
Child support	Private transfer	Identify recipients, estimate amounts for TANF families
Job change	Employment	Model wage changes or capture behavioral response to policy
Poverty	Special analyses	Compute poverty under official or alternative measures
Marginal tax rates	Special analyses	Compute implicit marginal tax rates due to changes in benefits and taxes
Winners and losers	Special analyses	Tabulate extent to which people/families gain or lose due to a policy change

How Has TRIM Historically Been Used at ASPE?

During its history, TRIM has been used by ASPE's principal policy offices. The Human Services Policy office with its focus on policies affecting vulnerable populations and the measurement of poverty has been TRIM's primary client. The Office of Health Policy used TRIM3 extensively during health reform discussions, particularly during the Clinton administration, given TRIM3's detailed representation of Medicaid and the private health insurance system. The Office of Disability, Aging, and Long-Term Care Policy benefits from access to data on the SSI program.

Not only has TRIM been used at ASPE to analyze major program reform ideas, but it also has played an important role in understanding how programs work and interact under current policies. Its annual baselines provide the means to track trends in eligibility and program participation. The model has often been used for quick insights into how current government policies affect different population subgroups. For example, for which programs are low-income families with young children eligible, how many different benefits do these families receive, and how do these benefits affect their poverty status? The annual corrections for underreporting of benefits reported on the Current Population Survey (CPS) enhance the accuracy of these types of analyses. ASPE's sponsorship of the model also has supported ASPE's role as a policy leader as other government agencies see the value in using a comprehensive model to address questions in their policy areas.

Policy Analyses Using TRIM

The evolution of domestic social policy has driven TRIM's development. As previously noted, its origins can be traced to welfare reforms initiated during the Nixon administration. The focus on welfare reform led to discussions of policies and programs that interact with welfare and affect the incomes of vulnerable populations. Development of new programs such as the EITC and child support enforcement in 1975, tax and budget reforms in the 1980s, and welfare and health reform discussions in the 1990s led to demands for modeling these new ideas and, later, their effects. More programs and capabilities were added to TRIM to address new and varied questions. The result is a comprehensive model with sophisticated output capacity available to address questions about human services, health, and poverty policy.

A model such as TRIM can address the following types of questions: Who would win and who would lose from new proposals affecting government benefit receipt, work, and income? What are the financial incentives or marginal tax rates generated by benefit and tax programs? Who receives benefits from which programs? Who is left out of the social safety net? What is the total value of benefits and cost to government? What are the trends in program eligibility and participation? The model can break down policy effects on population subgroups such as families with children, families with immigrants, adults with disabilities, and families living in different areas and with different racial characteristics.

Table 2 highlights the major types of policy analyses that have used TRIM3 and its predecessors over the past several decades. The major topic areas are welfare reform, human services for low-income families, tax reform, health reform, assistance for the elderly, and integrated program analyses, including poverty reduction. Other government agencies have used TRIM3 for related analyses, often in consultation with ASPE staff, and these initiatives are also summarized in the table.

TABLE 2A

Highlights of Policy Analyses Using TRIM, 1968–2014

Welfare, child support, and child care

Year	Analyses and types
	Major welfare reform initiatives
1968–70	President's Commission on Income Maintenance (RIM); Development of Family Assistance Plan (FAP)
1970–71	FAP extended to include food stamps, medical insurance payments, child care
1973	Income Supplement Program, comprehensive welfare reforms
1977–78	Better Jobs and Income Program, added jobs programs to changes in welfare program rules, benefits (ASPE)
1988	Family Support Act, including changes in AFDC, food stamps, child support, Medicaid (ASPE)
1993–95	Welfare reform, development of expanded income and poverty concept, simulation of hundreds of alternatives and assumptions about effects on labor supply and income (ASPE); eventually led to TANF
1996–current	Tracking effects of state TANF rules on eligibility and participation
	Child support analyses
1993–94	Effects of increased child support on poverty and government programs
1990–95	Child support assurance
1997	Analysis of trends in child support receipt
1997–2003	Avoidance of government benefits through child support receipt
2007	Increasing child support payments to TANF families
2009	Nonresident parent EITC simulations
2011	Disregarding child support in benefit programs; expanded pass-through in TANF; analyses of medical child support

Year	Analyses and types
2014	Effect of child support receipt and payment on poverty under the Supplemental Poverty Measure
	Child care and child nutrition analyses
1985	Reagan budget reforms
1999	Access to child care for low-income families
2000	Standardizing Child Care and Development Fund relative to state median income
2000–current	Eligibility for child care subsidies and numerous analyses of characteristics of families receiving
2007–08	Head Start eligibility analysis
2012–current	Costs and benefits of expansions in child care programs
Annual, 2004–present	Estimates used for computation of Government Performance Results Act statistic on access to subsidies

TABLE 2B

Highlights of Policy Analyses Using TRIM: 1968–2014

Taxes

Year	Analyses and types
	Federal income and payroll taxes
1975	Counts of families with earnings below the filing threshold given to Joint Committee on Taxation to estimate new filers under an EITC proposal (enacted in Tax Reduction Act of 1975)
1982–85	Tax Reform Act, comprehensive analysis of reforms, requiring sophisticated estimates of itemized deductions
1992–99	EITC distributional analysis of expansions with minimum wage increases
2008–09	EITC expansion to nonresident parents
2009	EITC expansion to childless workers
2012	Analysis of expansions to the child tax credit and child care tax credits combined with expanded child care subsidies
	Tax expenditures
1997	Distributional implications
	Taxation of insurance premiums, including state tax effects
2005	Individual insurance tax credit proposals

TABLE 2C

Highlights of Policy Analyses Using TRIM: 1968–2014

Medicaid, health insurance, the ACA, and assistance for the elderly

Year	Analyses and types
	Medicaid
1993	State-specific eligibility
1995	Block grant proposals, effects by state
1997–98	Eligible nonparticipants among children
1998	Medicaid expansions
1999	Restoring Medicaid to post–Personal Responsibility and Work Opportunity Reconciliation Act (PRWORA) legal immigrants
2002	Medicaid-Medicare dual eligible, state analysis
2002–09	Medicaid/State Children's Health Insurance Program (SCHIP) eligibility and enrollment
	Health insurance
1993	Numerous employer mandate alternatives, including interactions with Medicaid and distributional analyses by income group, including wage and employment effects
1993–94	Analytic support for development of the Health Security Act
1994	Effects of Health Security Act by state
1996–97	Insurance subsidies for unemployed
2004	Analysis of non–group insurance tax credit proposals
	Affordable Care Act
2010–11	Analysis of subsidized exchange coverage by reconciliation policy
2013–14	Overlaps in eligibility for ACA and other human service programs
	Assistance for the elderly
2010	SSI eligibility and participation
2007	Subsidized savings accounts to fund long-term care
2011	Long-term care Insurance purchase decisions

TABLE 2D

Highlights of Policy Analyses Using TRIM: 1968–2014

Integrated program analyses

Year	Analyses and types
	Multiple benefit programs
1995	Balanced Budget Act, effects of reductions in low-income supports (cash aid, housing and child care subsidies, Medicaid)
1998	Eligibility and participation in multiple programs; changing federal poverty guidelines, effects on food stamp and Medicaid eligibility
2000	Underreporting of means-tested benefits
1999–2012	Indicators of Welfare Dependence publication: Estimates of eligibility and participation in TANF, SSI, and SNAP for annual report to Congress
	Poverty measurement
1993	Valuation of near-cash assistance receipt for a more accurate measure of government assistance and income
2010	Supplemental poverty measures using ACS data
2012	Effects of geographically adjusting poverty guidelines
	Immigrant use of services
1999–2010	Various analyses of eligibility and receipt of benefits, payment of taxes, net effects on income

TABLE 2E

Highlights of Policy Analyses Using TRIM: 1968–2014

Examples of other government uses

Program	Year	Analyses
Food stamps	1991	Food stamp reforms in Deficit Reduction Act, US Department of Agriculture Food and Nutrition Service
Food programs	2014	Effects on poverty for Economic Research Service
Child support assurance	1990–95	Potential effects on low-income families, Congressional Budget Office
Child support cost avoidance	2000–03	Avoidance of government benefits through child support receipt for Federal Office of Child Support Enforcement
TANF	2010	Effects of 2008 recession on TANF participation
Medicaid	2002 and 2004	Eligibility estimates for US Department of Treasury
WIC	2001	Eligibility and participation, National Research Council
Multiple programs	2005	Eligibility and participation, Government Accountability Office
Multiple programs	2014	Impacts of Puerto Rico statehood on SSI and SNAP, Government Accountability Office

Welfare Reform: 1969–94

TRIM's precursor, RIM, simulated AFDC and included a rudimentary model of federal personal income taxes to test the universal income-conditioned transfer programs being considered as alternatives to AFDC. This was the first time that cost estimates were produced for extensive economic demographic subgroupings of the population in this country during a major policy discussion (Moeller 1972).

RIM was further developed and used to analyze the Nixon administration's Family Assistance Plan. FAP required substantial modifications to RIM to simulate different types of filing units that could apply for benefits. The FAP did not pass, but ASPE staff continued to test reforms to welfare. They developed the Income Supplement Plan in 1974, using TRIM to guide the definition of filing units and the levels of benefit guarantees. This initiative became the basis of major welfare reform proposals advanced by the Carter administration in 1977 and 1979. These proposals included new ways to encourage work, to treat second parents of a family, and to adjust benefits for families in differing circumstances.

Some of the proposed legislation passed.[5] For example, in 1984 two-parent, unemployed, or incapacitated parents were added as AFDC units. In 1988 the Family Support Act passed and enacted the Job Opportunities and Basic Skills program that required most AFDC mothers with children age 3 or older to engage in work or skill-building activities. TRIM's capacity to simulate how the welfare system worked continued to develop. For example, the model incorporated methods to assign income across the months of the year, since welfare eligibility and benefits can vary monthly.

TRIM3 was expanded to support major welfare reforms anticipated in the early 1990s in response to President Clinton's campaign promise to "end welfare as we know it."[6] A broad measure of income that included the value of near-cash benefit payments and taxes was developed, along with tables that could highlight how each source of income affected the distribution of income for families with different characteristics (such as race, marital status, ages of family members, and region). A labor supply response based on the latest econometric evidence was incorporated so the model could simulate earnings likely to replace welfare payments as different types of work requirements and time limits were tested. The model was used extensively to examine different strategies that finally led to the TANF program, the linchpin of the 1996 PRWORA.

[5] See http://www.aspe.hhs.gov/hsp/afdc/baseline/1history.pdf for a brief history of the AFDC program.
[6] Press release, White House Office of the Press Secretary, December 9, 1994, http://clinton6.nara.gov/1994/12/1994-12-09-president-statement-on-welfare-reform.html.

This model capacity continues to be maintained, supporting analyses of trends in eligibility and participation in state TANF programs. ASPE's annual *Indicators of Welfare Dependence* publication, for example, includes TRIM3-based estimates of AFDC and TANF participation rates from 1981 to the present and other tables that incorporate TRIM3's corrections for underreporting of TANF. Modeling cash benefits is critical for accurate analysis of interactions with poverty status and other benefit programs.

Human Services

Other programs and policies moved into the spotlight as different welfare reform policies were considered. For example, the fact that many single-parent families were poor and in need of government cash assistance because they lacked support from the absent parent led to passage of the Child Support Enforcement and Paternity Establishment Program (CSE) in 1975, passed as Part IV-D of the Social Security Act. The US Department of Health and Human Services (HHS) Assistant Secretary for Children and Families became responsible for CSE, but ASPE has for many years been involved in research and analysis related to child support.

CSE also led to a desire for better analysis of absent parents' circumstances to understand child support's potential for reducing poverty and the cost of welfare. TRIM has been used to analyze the connection between welfare and child support through numerous studies and analyses required by ASPE staff (table 2a). The model has been used for full analyses of the effects of child support collections on poverty and for numerous tests of policies that alter pass-through amounts for parents receiving welfare benefits.[7] The model can also simulate policies related to noncustodial parents, for example simulating proposals for expanded EITC benefits for low-income noncustodial parents who pay child support.

Child care also rose in prominence as more low-income parents were required to work to receive government assistance. In 1990 Congress passed the Child Care and Development Block Grant, providing some funds for states to subsidize child care for low-income families. The PRWORA consolidated and expanded child care subsidy programs through the Child Care and Development Fund in 1996. Child care expense imputations were added to TRIM3 so that these could be taken into account in the net income estimates used during welfare and health reform and poverty analyses. This capacity expanded to include a full representation of all 50 states' child care subsidy rules after passage of the Child Care and Development Fund. The recent addition of child care expenses to the CPS further enhanced TRIM3's capacity to analyze this policy. TRIM3's estimates of child care

[7] A pass-through amount is the portion of the amount of money collected by the government that is transferred to the custodial parent.

eligibility have been used in a series of ASPE briefs on program participation, and these estimates are used to compute the measure of access to child care assistance for the Government Performance and Results Act process. TRIM3's child care modeling capability has also been used to analyze the potential impacts of expansions to child care subsidies.

Nutrition benefits have long been a linchpin of the nation's safety net. Although responsibility for these programs lies outside HHS, their interactions with welfare and effects on low-income family incomes and poverty status have been important to ASPE. TRIM has included a detailed model of SNAP (formerly food stamps) since its initial analysis of the FAP.[8] Welfare reform analyses typically included net effects on both welfare and food stamp benefits because families on welfare have been automatically eligible for food stamps since the mid-1980s. SNAP also must be taken into account for general poverty and income analyses. In recent years, WIC and National School Lunch Program simulation capabilities have been added to TRIM3 so that benefits from these programs can be included in poverty and income analysis.[9]

Tax Reform and Expenditures

As noted earlier, federal income taxes were an important part of the model almost since its inception. Proposals to replace welfare with a negative income tax (discussed in the 1960s) placed taxes front and center in welfare discussions. Partially as an outgrowth of these earlier proposals, in 1975 Congress considered legislation to enact an EITC; in their analysis of the proposal's possible impact, staff of the Joint Committee on Taxation requested TRIM estimates of the number of families with earnings below the tax-filing threshold. Designed in part to offset payroll taxes, the EITC was enacted by the Tax Reduction Act of 1975 and became an important component of low-income families' incomes. The EITC structure and the simulation of payroll taxes were carefully incorporated into the TRIM model.

Discussions of the EITC and other tax expenditures (such as exclusion of employer-paid insurance premiums from income and the mortgage interest deduction) played prominent roles during the discus-sions leading up to the Tax Reform Act of 1985. ASPE analysts prepared TRIM for these discussions by requiring a more detailed representation of itemized deductions and capital gains

[8] The original TRIM was adapted for use by the Food and Nutrition Service in the 1970s under contract to Mathematica Policy Incorporated. Two former Urban Institute employees who previously worked on TRIM spearheaded this model development.
[9] The National School Lunch Program simulation is not mentioned elsewhere because it has not yet been used in policy simulations, nor does it include a history of program rules.

(through a statistical match of income tax records with the CPS data). The potential interactions between federal tax reform and state income tax receipts became another important part of the discussions. A detailed model of state income taxes was added using the tax forms from each state with a personal income tax. The completed model was used to test alternative tax proposals under discussion. ASPE used these results in discussions with other government agencies responsible for tax reform.

The TRIM3 model continues to be used for analyses of the effects of tax reforms and expenditures on poverty status and cross-program interactions. For example, an expansion of the EITC will encourage more work and less use of TANF. Recently, TRIM was used to analyze the effects of enhancements to two tax credits—the child tax credit and the child and dependent care tax credit—combined with expanded child care subsidies. The tax model also simulates eligibility for ACA Health Insurance Marketplace subsidies. These estimates have been used to understand the numbers of people eligible for ACA health insurance coverage who are also eligible for assistance from other government programs.

Health Reform

Medicaid, originally passed in 1965, rose in policy prominence as awareness grew that many low-income people lacked health insurance. The CPS began measuring the source of health insurance coverage for some household members to improve its measures of well-being, and the questions were improved to include all household members in 1988.[10] This change allowed tracking of coverage and uninsurance rates annually. Medicaid became a potential vehicle for expanding insurance coverage. TRIM3 was an excellent model for analyses of policy alternatives because the CPS served as its primary source of information, and it already included representation of other welfare programs. A detailed Medicaid module was implemented using private foundation funding, but ASPE monitored the development and saw its potential for future analyses (Holahan and Zedlewski 1989). ASPE used the model to analyze, for example, proposals for using block grants to give Medicaid monies to the states in the mid-1990s.

Other health insurance expansion ideas involved employer-provided health insurance.[11] An early idea, called "pay or play," proposed to mandate coverage by employers except for owners of small firms. The US Department of Labor, which oversees employer insurance, saw the need for an analytic

[10] See http://www.census.gov/content/dam/Census/library/infographics/measuring_health_insurance.pdf, "Measuring Health Insurance Coverage with the Current Population Survey: A history of improvement".
[11] Initiatives for a single-payer system suggested by Senator Edward M. Kennedy and a combination of mandates and incentives for expanding private insurance suggested by President Nixon predated these efforts.

tool to examine the various proposals. It awarded a contract to the Urban Institute to expand TRIM3 to model the current employer insurance system and analyze alternative proposals. New capabilities were added to TRIM3 for simulating employer health insurance plans (Zedlewski 1991).

TRIM3's capacity to simulate Medicaid and employer insurance made it an ideal vehicle for representation of the entire health insurance system, including nongroup plans and uncompensated care. These developments were funded through a private foundation grant and used to simulate and compare and contrast expansions of health insurance coverage through employer and individual insurance mandates (Holahan, Winterbottom, and Zedlewski 1994).

ASPE staff began to use the capacity themselves to analyze numerous ideas for insurance coverage expansions during the Clinton administration. Hundreds of TRIM3 simulations were completed that varied the nuances of different ideas for employer mandates, nongroup insurance, Medicaid expansion, and tax treatment of health insurance. Discussions based on this (and other) analyses led to the Clinton Health Security Act that eventually failed in Congress.

While interest in comprehensive health reform waned, ideas for modest reforms appeared again, often through the Medicaid program. ASPE staff used TRIM3 to test some of these new ideas, including the State Children's Health Insurance Program that passed in 1997, giving states the opportunity to expand coverage for children in families with incomes above Medicaid eligibility limits. ASPE staff continued to use TRIM3 to analyze a variety of additional Medicaid and SCHIP eligibility and enrollment scenarios during from 2002 to 2009.

The Urban Institute's Health Policy group developed a new microsimulation model of health insurance coverage called the Health Insurance Policy Simulation Model that incorporated a more sophisticated model of insurance purchasing behavior in anticipation of further debates over comprehensive health insurance reform. ASPE has accessed this model through the TRIM3 contract during debate over the ACA, although ASPE still uses the TRIM3 capacity when a more detailed and internally consistent representation of welfare and tax programs is required. TRIM3 has been an ideal vehicle for analyzing cross-program eligibility and participation in the post-ACA era. For example, what share of families receiving SNAP or WIC are eligible for ACA insurance subsidies and what share are eligible for expanded Medicaid coverage?

Assistance for Persons with Disabilities and the Elderly

TRIM3 includes a detailed representation of the SSI program, implemented in 1974. ASPE has used the model to analyze congressional initiatives to change the benefit structure and update asset tests. The SSI model has been an integral part of analyses of welfare reforms that required consideration of interaction with SSI. Many TANF beneficiaries have poor health, and some are waiting for SSI benefit eligibility determination. SSI also is an important part of general safety net analyses. Since the late 1990s, ASPE's *Indicators of Welfare Dependence* publication has included TRIM3-based estimates of the SSI participation rate, and other tables in the publication use TRIM3-adjusted SSI data in analyzing income and dependency.

Integrated Program Analyses

Conversations about who is poor and how poverty rates could be reduced require a full representation of both cash and near-cash benefits available to low-income families. For many analyses, including the cash value of benefits received from such programs as SNAP (food stamps), housing assistance, and the EITC is important. In addition, the new Supplemental Poverty Measure requires estimates of the value of nutrition and housing benefits, tax liability and tax credits, and child care and medical expenses. The CPS now includes all these elements, but many are underreported, so the survey misses some government spending.[12] TRIM3 can supply recipient and benefits data that are adjusted for underreporting, thereby creating an augmented CPS that is consistent with program administrative data. Moreover, the fact that TRIM3's adjustments involve detailed state-by-state program rules gives an analyst confidence that detailed analyses of poverty rates can be completed. As noted earlier, this poverty-measurement capacity was honed over time as part of various policy debates, but the capacity has also been further refined and used in subsequent analyses.

TRIM3 has often been used to measure cross-program eligibility and participation. What share of families receives the entire package of benefits for which they are eligible? Who does not and what are their characteristics? The PRWORA required that HHS submit an annual report to Congress on indicators of welfare dependence. TRIM3-adjusted data for SSI, TANF, and SNAP are key to the report's ongoing tracking of dependency.

[12] Means-tested benefits are substantially underreported in surveys. For example, less than 50 percent of TANF and food stamps/SNAP benefits were reported by respondents in the 2006 CPS-ASEC. The Census Bureau uses hot-deck procedures to fill in data when respondents do not answer questions, which increases the levels of benefits found in the public-use survey data, but the totals still fall far short of actual amounts (Wheaton 2007, table 3).

Other Government Uses

Over the course of TRIM's history, other government agencies have used the model for major program analyses. In 1973 the US Department of the Treasury linked TRIM with its tax model to enhance Treasury's analyses of a fuller set of income programs. The Congressional Budget Office took TRIM in house in the 1980s when it wanted to report distributional consequences of various budget reduction proposals to Congress (Webb, Michel, and Bergsman 1990). The Congressional Budget Office also used TRIM to analyze various child support assurance proposals in the early 1990s. As mentioned earlier, the Department of Labor issued a contract to use TRIM3 as the base for a model of employer-provided health insurance. The US Treasury Department has used TRIM3 data in analyzing potential tax credits based in part on Medicaid eligibility status. The Federal Office of Child Support Enforcement funded the development of child support cost-avoidance estimates in the early 2000s.

More recently, the Government Accountability Office has used TRIM3 to understand the effect of the 2008 recession on TANF participation, to examine multiple program eligibility and participation rates, and to estimate how statehood for Puerto Rico would affect the SSI and SNAP programs. TRIM's models of nutrition programs have been used by the Food and Nutrition Service, the Economic Research Service, and the National Research Council (see table 2e).

Quick Data Insights

Although this discussion has highlighted how TRIM has been used during major policy developments, perhaps TRIM's greatest value lies in its capacity for quick-turnaround policy answers in response to administration and congressional requests. The model gives ASPE access to detailed data on the receipt of government means-tested benefits at the individual, family, and household levels. Questions about gaps in the current system and the well-being of different population subgroups often precede major policy initiatives. Answers to these questions can also redirect policy conversations, showing, for example, the numbers of losers or increases in poverty rates that could result from new ideas. Having an up-to-date baseline model ready to go means that any ASPE office can get quick answers to questions raised internally or by congressional staffers.

Examples are too numerous for a complete listing. However, this type of analysis has recently included tabulations and simulations of child care subsidies (2012), SSI participation trends (2010), the effect of different asset maximums on TANF eligibility (2009), use of ACA concepts of income and

unit definitions for TANF eligibility (2011), and overlaps between receipt of ACA subsidies and enrollment in other human services programs (2013).

TRIM3 has also been used to develop Internet-accessible tools that let users see how policies affect specific families. In 2007, the Administration for Children and Families funded the Urban Institute to create an Internet-based "marriage calculator" tool that allowed users to see how the choice to marry would affect the benefits and taxes of a family with specific, user-defined characteristics; TRIM3 simulations performed all the behind-the-scenes calculations. In 2008, foundations funded a new tool, the Net Income Change Calculator (NICC), which lets users see how a chosen family's benefits and taxes change as the family's earnings increase—if there are benefit "cliffs" and what marginal tax rates families face. ASPE cofunded a 2012 update of NICC and is currently supporting enhancements to the tool.[13]

Policy Leadership

As described earlier, other agencies have used TRIM both in partnership with ASPE and through stand-alone contracts. Awareness of the model's capacity has occurred through interagency meetings and publications using the model's capacity.

The tax reform discussions in the 1980s and Medicaid reforms in the 1990s described earlier provide prime examples of how TRIM helped ensure ASPE analysts a seat at the table during discussions led by the Treasury Department, the Office of Management and Budget, and the Centers for Medicare and Medicaid Services. The model's comprehensive approach to modeling social programs and taxes made it an essential tool during the welfare and health reform debates during the Clinton administration.

Other governmental and nonprofit organizations have also used this capacity for poverty-reduction and income analyses. In the nonprofit arena, the Center for American Progress used TRIM3 to estimate the effects of several of its antipoverty policies in 2007 (Greenberg, Dutta-Gupta, and Minoff 2007). Analysis of strategies to reduce child poverty is forthcoming from the Children's Defense Fund. Several policy analysis projects have been conducted for state-level poverty commissions and nonprofit organizations; this work has further refined TRIM3's poverty measure.[14] This work also led to some collaboration with the US Census Bureau to enhance its capacity to

[13] The NICC can be accessed at http://nicc.urban.org/NetIncomeCalculator/.
[14] See, for example, Giannarelli, Lippold, and Martinez-Schiferl 2012, and Legislative Commission to End Poverty 2009.

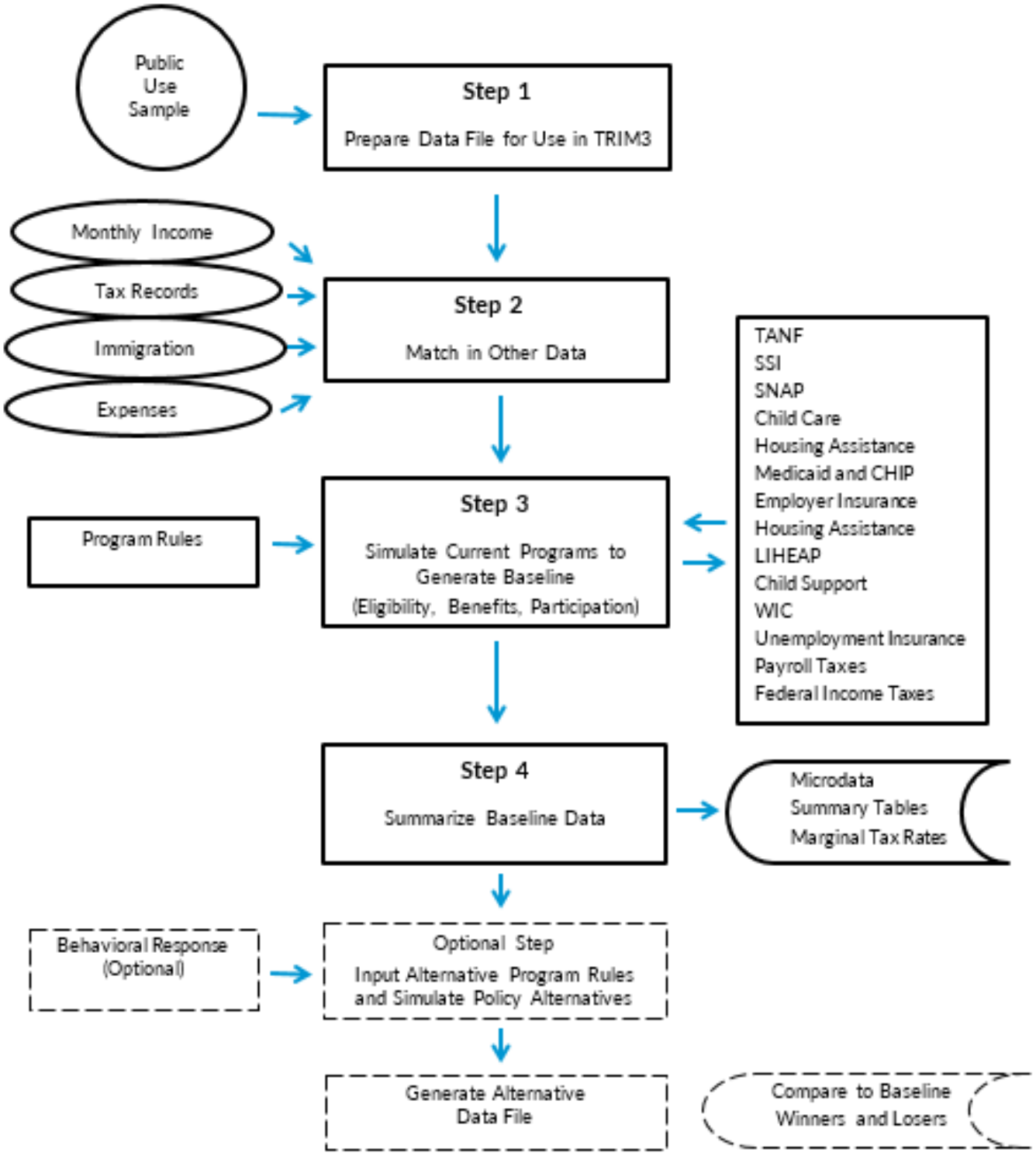
estimate the Supplemental Poverty Measure using data from the ACS and CPS. TRIM3 also was used recently to estimate the effect of a minimum wage increase in Washington, DC (Acs et al. 2014). These types of applications have enhanced the policy debate over poverty reduction in the United States. (They also have had practical value for the model, because additional capabilities added under these projects have become part of the standard version available to ASPE.)

How Does TRIM3 Work?

Four key steps form the core of TRIM3 (figure 1). The first step inputs data from a survey of households that is representative of the US population and that includes the type of detailed demographic and income information needed for microsimulation. The second step adds any key information missing from the survey data that the simulations require. For example, surveys typically do not include information about immigrants' legal status, nor do they include critical information required for calculating tax liability, such as itemized deductions. The third step uses all of these data plus detailed program rules to simulate or estimate program eligibility, program participation, and benefits for each individual, family, and household. The fourth step involves numerous techniques for summarizing and saving the information that is generated. Optionally, a user inputs alternative program rules and the model repeats steps three and four to simulate and summarize policy alternatives. A flexible user interface governs these steps.

FIGURE 1

TRIM3 Model Schematic



Input Data Step

TRIM3 requires an input database that is large and statistically representative of the US population (usually a large survey weighted to represent the population and available through the Census Bureau). The input data must include details on family structure, information about health status, disability, work and earnings for each adult, other sources of income outside of earnings (such as child support or private pensions), and information about benefits received from government programs (including social insurance and welfare programs). All these data elements typically are required to estimate eligibility for social programs.

Typically, the TRIM3 model uses the Census Bureau's Annual Social and Economic Supplement (ASEC) to the CPS as its input data source. This survey is representative of the US population and includes much of the information required by the program simulations. Table 3 summarizes the general types of CPS information used by TRIM3.

TABLE 3

General Data Used by TRIM3 from the Current Population Survey

Category of data	Basic elements of information
Relationships	Household; family
Demographics	Age; ethnicity; race; sex; marital status; veteran status; citizenship; year of entry (if nonnative); country of origin (if nonnative); health status
Geographic	State of residence
Health insurance	Individuals covered; employer coverage (union and nonunion); nongroup coverage
Work status	Labor force status; if not working, why not; weeks worked last year; usual hours worked; occupation; industry; firm size
Education	Highest grade of school completed
Cash income	Annual earnings amounts: wage and salary income; self-employment income, nonfarm; self-employment income, farm Income from social insurance, pensions, and disability: unemployment insurance; Social Security and railroad retirement; government pensions; private pensions; workers compensation Investment income: dividends, estates, trusts; rents and royalties; interest Other income: TANF; SSI; child support; alimony; regular contributions; educational grants Other
Noncash benefits	Food stamps (SNAP) (amount); LIHEAP (amount); WIC (whether received)
Government health insurance	Medicare; Medicaid

The model has used other surveys for its basic input over the years. Most recently, methods have been developed to be able to use the ACS as input to TRIM3. The advantage of the ACS is its size. For example, the public use ACS file for 2011 included 1.2 million households, with significant sample for analyses in all 50 states (and substate areas with at least 65,000 persons) (US Census Bureau 2009).[15] In contrast, the CPS with data for 2011 included 74,383 households, and the sample is not sufficient to support individual results for all 50 states.[16] (Frequently, multiple years of data are combined to increase the statistical reliability of state-level estimates.) The disadvantage of the ACS is that it lacks some of the details about families and their incomes that the CPS provides. In earlier years, TRIM3 and its predecessors obtained input data from the National Survey of America's Families (a privately funded survey with unusual detail on family and child well-being fielded two times in the 1990s), the Survey of Income and Program Participation (SIPP), and the SEO. The SIPP and the SEO surveys were designed to obtain better information about low-income families' program participation, but the SEO is quite out of date and the SIPP sample is small relative to the CPS.

Although using different surveys as input may sound simple, it actually requires a detailed development process. Each survey has unique sampling properties and information about families. Procedures have been developed to accommodate any missing information. For example, the ACS does not include as much detail about the work status of adults as the CPS provides; the gaps in information must be filled using new algorithms based on information that is available. Even information that is common to each survey may need to be recoded so that the coding schemes match those that are required by the simulation model.

Adding Critical Data

Despite the detail on the surveys used by TRIM3, modeling benefit eligibility and taxes usually requires additional information. For example, most benefit programs need to know the immigration status of all noncitizens in a family. Undocumented individuals are not eligible for means-tested benefits programs, but their children may be eligible if they were born in this country. For documented immigrants, whether they entered as refugees, legal permanent residents, or temporary residents affects their potential eligibility. Because surveys do not typically provide this information, the TRIM3 model relies on a combination of logical and probabilistic methods to assign immigrant status to

[15] The ACS is not large enough to analyze results for small areas (such as the District of Columbia) without pooling years of data.
[16] http://www.census.gov/cpsmethodology/techdocs.html.

noncitizens, with the assignments calibrated to come close to the numbers of legally present noncitizens that can be inferred from administrative data.[17]

Tax calculations also require additional information. Itemized deductions can substantially reduce a family's taxes, yet most of the information required to estimate itemized deductions, such as mortgage interest, real estate taxes, and charitable deductions, is not collected on these surveys. Capital gains are also important because tax units can have limited incomes but large capital holdings and a high tax liability. TRIM3 adds this information to the CPS (or other input file) through a statistical match with actual tax records stripped of identifying information from the Internal Revenue Service's Statistics of Income public use file.

Another element of information missing from the CPS and other annual surveys is how sources of income are distributed across the year. Most means-tested benefit programs award benefits on a monthly basis. Weeks of work are distributed through the year to match a worker's reported spells of employment and unemployment, as well as the aggregate trend in unemployment through the year, and each person's earnings are then assigned to the weeks of work. Some types of unearned income (e.g., Social Security) are assumed to be received evenly over the year, but TRIM3 uses an analysis of data from the SIPP to inform the process by which child support income is divided across the year.

Other types of data may be required, and information requirements can change over time as surveys adapt to new information requirements or drop information that is less valuable. For example, out-of-pocket child care expenses are required because several programs (TANF, SNAP, and subsidized housing) all provide deductions for part of these expenses. In 2010, the CPS ASEC began asking respondents to report child care expenses. Prior to the availability of this new information, TRIM3 relied on statistical imputations developed from other data sources.

Simulating Programs

This third step can be thought of as the heart of the model. To simulate a particular program, the rules of that program are applied to each household, family, and individual in the input database, one by one. The simulations are analogous to the steps that a caseworker would use when determining benefit eligibility. Researchers with specialized knowledge of the individual programs recommend the rules that must be included to produce accurate results.

[17] See Passel, Van Hook, and Bean (2006) for more information. Passel consults with the Urban Institute.

The rules of many of the programs simulated vary by state.[18] Each year states may vary the rules in major or minor ways in response to allowable federal options or budgetary and policy decisions at the state level. This state variation requires detailed research on state-level rules in the operation of child care subsidies, TANF, supplements to federal SSI benefits, Medicaid and CHIP, and state income taxes. Published state plans often accessed through the Internet and specialized databases maintained by the Urban Institute for other projects provide this information. The general SNAP rules are defined federally, but numerous eligibility and benefit options vary by state, and the Food and Nutrition Service provides annual summaries of the options states have adopted. In the operation of housing assistance programs, many rules apply at national level, but some subnational information (such as fair-market rents) must be researched. Payroll taxes and federal personal income taxes have purely federal program rules, but even these must be reviewed and updated annually. State income taxes are uniquely challenging and require a review of tax forms for all 50 states; Urban partners with an academic modeler to obtain this information.[19]

Once program rules are updated, the model estimates eligibility and potential benefits for each individual unit. Subsequently, the model selects program participants from the eligible population. Not all individuals participate in each of the means-tested benefit programs for which they are eligible. They may lack knowledge about the program or may choose not to participate. The model includes a participation function for each of the means-tested benefit programs. The participation functions typically are regression equations or look-up tables that assign a probability of participating; a random number is drawn and compared to a probability to determine whether the family or individual participates. Eligible units that report receipt of benefits in the input survey data are automatically selected to participate. Administrative data for each program showing the number of units receiving benefits in each state and their characteristics are used as targets to ensure that the models accurately capture actual caseloads. The modules are sequenced so that the output from one influences eligibility for another program. For example, the SNAP module needs to know whether a family is participating in TANF. This ensures that TRIM3 captures program interactions.

[18] Rules sometimes vary within a state. In these cases, TRIM3 uses the rules applicable in the most populous county or for the majority of the state.
[19] Dr. Jon Bakija at Williams College maintains a well-respected model of state income taxes.

Flexible Output

TRIM3 includes numerous output features to ensure documentation of baselines and simulations over time, to provide the user with standardized tables that summarize the results of each baseline and the distributional effects of the entire safety net, and to allow the flexibility to analyze the microdata using statistical summary programs such as SAS.

All the TRIM3 data preparation steps and the program simulations produce many new pieces of information for each household in the survey data—adding to the information that was included in the original survey. All of this newly created information can be used for tabulations and analyses along with the original survey variables. Users can create cross-tabulations through an online interface, or they can specify a set of variables to extract and then analyze that information using statistical packages such as SAS and Stata.

TRIM3 produces summary tables for each program simulation. For benefit programs, these tables show information about units eligible for the program (numbers, characteristics, potential benefits) and those simulated to participate in the program. The ratios of the number of program participants to the number eligible (by characteristics) provide estimates of program participation or "take-up" rates. For the tax simulations, tax units and tax payments are summarized, overall and by income level and filing-unit type, and with a special focus on low-income tax credits. For many programs, selected results are tabulated by state.[20]

TRIM3 includes other types of tables that have been developed over the years. Users can select these optional tables when setting up a simulation run. For example, the model includes detailed distributional tables showing how benefit and tax amounts are distributed across families by poverty level.

Alternative Policy Simulations

TRIM3 is built with considerable flexibility so that alternative policies can be simulated and the results compared to current law. As suggested in the earlier section, these alternatives may be narrow or broad. For example, an analyst may want to understand the effects of standardizing child care subsidy

[20] As mentioned earlier, a single year of the CPS is not sufficient to support analyses in each state. State-level results, however, are compared to state targets. Deviations are examined in detail to ensure that the simulations are accurately following state program rules, paying more attention to those states with the largest subsamples. Results for each state are reported in summary tables.

eligibility to a share of median income in the state. Compared with current law, how many more or fewer families would qualify for subsidies? How much would it cost? How would it affect poverty rates and gaps? This type of simulation requires a relatively simple replacement of the current income eligibility parameters for each state. The target module is resimulated using the new rules; other modules that may be affected are resimulated; and the results are compared to the baseline.

Other policy alternatives may require the development of new modules or the addition of new features or even a redesign of an existing module. For example, TANF represented a major redesign of cash assistance. A new module was developed that included strict work requirements and time limits. Obviously, this type of massive change to a core module required resimulating all other means-tested benefit programs affected by TANF. Detailed distributional output tables were designed to show the effects of each element of change on family income and poverty.

Simulating a Labor Supply Response. Alternative policies potentially can alter labor supply and demand. For example, the EITC encourages work because it provides a refundable tax credit to low-income workers (Eissa and Hoynes 2006). Other policies can alter employer demand for labor as well as individuals' labor supply. For example, the economics literature suggests that an increase in the minimum wage slightly dampens employers' demand for workers in the most affected industries, but it also increases individuals' desire to work at the higher wage (Congressional Budget Office 2014). Ideally, alternative policy simulations will include expected labor supply responses and clearly separate these effects from those of the policy changes alone.

TRIM3 includes a module that allows hypothetical changes to employment—either universal changes such as a minimum wage increase or more focused changes such as a transitional jobs program for a subset of unemployed people. The module can impose an externally estimated labor supply effect in response to policy change. Analysts turn to the best-available literature to provide probabilities for new employment (by individual characteristics), and TRIM3 selects individuals for new employment or job loss to meet the specified labor responses. The module adjusts these individuals' employment and earnings accordingly and calculates family income consistent with the alternative.

Analyzing Results. Alternative policy simulations produce micro-level data and tables similar to those produced for a baseline so that comparisons may be made. Optional tables show how alternative policies generate winners (those who gain benefits) and losers (those with lower benefits) by family characteristics. If the specification of the simulation includes predictions of how jobs and earnings will change as a result of a new policy (such as a change in the minimum wage), tables can be produced that summarize the marginal effects of the earnings changes on taxes and benefits.

How Has TRIM Been Assessed?

Trust in TRIM's results and its integrity is critical given the potential importance of the results in policy discussions. ASPE has encouraged evaluation by outside academics and through sponsorship of formal evaluations. Researchers have encouraged critique and evaluation through participation in expert panel meetings focused on microsimulation models and policy applications. Researchers also have published articles in books and academic journals outlining how TRIM is built and used to develop the results. The focus on detailed, online model documentation strives to achieve transparency and encourage public comment.

Two major evaluation events that bear mentioning are a Conference on Software Systems and Income Transfer Policy held in 1987 at the Urban Institute and the formal evaluation by the NAS sponsored by ASPE and the Food and Nutrition Service in 1990. The 1987 conference, planned jointly with researchers at Washington University, included papers and presentations by all of the major microsimulation model developers. The Urban Institute hosted the event and published a conference volume highlighting the development of static and dynamic microsimulation models in the United States and Canada (Lewis and Michel 1990). Although this conference was not designed to make specific recommendations, the editors discussed the critical issues faced by all microsimulation modeling developers, including databases, imputation and matching, timeliness, validity, and design.

The NAS evaluation resulted in two volumes detailing the development and use of microsimulation models by the federal government (Citro and Hanushek 1991). The volumes include detailed reviews of current models and recommendations by a distinguished group of panel members. The NAS panel made many recommendations for the future development of microsimulation models, such as improving the quality of input data, developing standards for design and practice, conducting regular evaluations of model estimates, and increasing user accessibility and documentation. The NAS also recommended that government agencies use publicly available, nonproprietary models for estimation. Partially in response to these recommendations, the design for TRIM3 included public access and an increased focus on documentation and transparency.

Of course, these large evaluation endeavors are expensive. More recently, model evaluation has continued by focusing on sectors or particular functions of the model. For example, the Medicaid model was first described in a book published by the Urban Institute (Holahan and Zedlewski 1989). The development of TRIM3's employer and nongroup health insurance modules was evaluated through several advisory panel meetings sponsored by the US Department of Labor. The model was

described in a book describing options for expanding the employer-provided health insurance system (Zedlewski 1991). Articles about different aspects of health reform were published in *Inquiry* (Holahan et al. 1994), a book chapter (Zedlewski et al. 1993), and *Health Affairs* (Zedlewski et al. 1992). The exposure was useful in advance of the health reform discussions in the mid-1990s because it provided ASPE with carefully documented information about the modules and the model's capacity.

As ASPE continued to focus on the issue of uninsured Americans in the early years of the 2000s, evaluation of TRIM3's Medicaid model (including the CHIP program) continued. Recognizing differences between some estimates produced by the TRIM3 model and those produced by researchers at Actuarial Research Corporation, ASPE commissioned an external review of the two models.[21] Although the review did not raise any major concerns with the TRIM3 methods, it suggested technical improvements that were adopted. ASPE also held an expert panel meeting in 2011 to review TRIM3's Medicaid and CHIP models. Participants included ASPE staff, other government and nongovernment health researchers, and TRIM3 project staff. The summary of the meeting listed suggestions offered by some participants, but no consensus was reached regarding any major changes in approach.[22]

Numerous presentations featuring the use of TRIM3 have occurred over the years at the American Statistical Association, the Association for Public Policy Analysis and Management, the National Association of Welfare Research and Statistics, and the American Economic Association. For example, TRIM3 senior staff member Laura Wheaton presented estimates of CPS underreporting and effects on family incomes and poverty at the American Statistical Association in 2007, and TRIM3 project director Linda Giannarelli presented findings from TRIM3 antipoverty analyses at a plenary session at the 2014 National Association of Welfare Research and Statistics conference. The "Further Reading" section of this paper includes many additional examples of articles and papers published that highlight the use of TRIM3.

[21] The review is summarized in Czajka, Hustead, and Sherman (2005).
[22] See Kenney (2011) for a summary of this meeting.

What Might the Future Hold?

The continued complexity of social programs in the United States, now including the ACA that subsidizes health insurance for lower-income individuals, demands continued monitoring of these programs and a model that can show their combined effects on family income and poverty. In addition, the broader acceptance of the Supplemental Poverty Measure as a measure of family well-being requires the numerous data imputations and accurate simulations of means-tested benefits programs and income taxes provided by TRIM3.

Future policy initiatives will likely continue to require a comprehensive microsimulation model for analyses. Questions can change with each new administration, and it is difficult to contemplate the questions in advance. However, numerous policy ideas are under discussion that might lead to requests for microsimulation analysis. For example, in July 2014 Representative Paul Ryan put forward a blueprint to reduce poverty that would consolidate a dozen social welfare programs into a single "Opportunity Grant" for each state.[23] Evaluation of such a proposal would require a multiprogram, comprehensive microsimulation model. Other initiatives may focus on a single program. Numerous suggestions have been made for reforming SSI. Some argue that the fixed-asset eligibility tests set in 1974 should be updated, and others suggest that SSI should be divided into separate programs serving children and adults with disabilities.[24] Other recent ideas for social policy reforms include increasing the EITC for adults without children and guaranteeing child care subsidies for eligible families. The questions that arise likely will include: What would be the net effect on family incomes and poverty? Who would win and who would lose benefits? What would be the effect on federal and state government outlays?

The model's future might also involve expansions into other program areas at the initiative of other federal or state agencies. For example, TRIM3 includes a housing assistance module and the tax treatment of homeownership, yet federal housing assistance has never been the subject of substantial analyses using this model. Many argue that these federal expenditures are poorly targeted.[25] TRIM3 would be an ideal vehicle for analyzing alternatives for federal housing assistance and estimating their effects on poverty. Recent uses of TRIM3 for state-level analysis also suggest ideas for expansion. For example, the model was used to analyze a proposal for a new transitional jobs program along with an expanded minimum wage and earnings supplements and senior and disabled tax credits in Wisconsin

[23] http://www.aei.org/events/2014/07/24/expanding-opportunity-in-america-a-conversation-with-house-budget-committee-chairman-paul-ryan/.
[24] The Congressional Budget Office (2012) discusses several SSI reform ideas.
[25] See, for example, Fischer and Sard (2013).

(Giannarelli, Lippold, and Martinez-Schiferl 2012). Such ideas for reform may also arise at the federal level.

One high priority for the future of TRIM is to take advantage of recent computer hardware and software advances. The last major revision of the TRIM software system was in the mid-1990s. At that time, the model was rewritten using an object-oriented programming language (C++), a Web interface was developed, and a new state-of-the art data storage system was adopted. Obviously, the technological possibilities for a model such as TRIM have exploded since the advent of multicore computers, faster processors, ever-expanding data storage capacity, cloud computing, and reduced costs of maintaining online systems. One could envision an online version of TRIM supporting broad access for multiple users at a time. The Urban Institute recently was awarded a National Science Foundation grant to support exploration of user needs and possible new computer architectures. ASPE staff will be welcome in these discussions.

Regardless of software redesign, one can easily predict greater demand for TRIM3 in state-level analyses. In the last few years, TRIM3 has been used to analyze antipoverty proposals for Connecticut, Minnesota, and Wisconsin.[26] The Connecticut and Minnesota analyses used multiple years of CPS data to ensure sufficient sample sizes to support the analyses. Researchers subsequently developed the capability to use the ACS as input to TRIM3, thus allowing more current analyses of poverty at the state level.[27] As previously mentioned, the ACS capability enabled simulations of a minimum wage increase in Washington, DC. Efficiencies that would reduce the model's costs and expand access to policy analysts at the state level could support more state-level analyses. Of course, expansion of the model to ensure it captures all state policy nuances would need to accompany the software enhancements.

Future challenges include ensuring that sufficient financial resources are available. As noted throughout this paper, TRIM has relied on the steady financial support of ASPE. This ongoing, regular support has been essential for maintaining and updating the model annually, especially as it has grown in complexity and comprehensiveness over the years. Other government agencies, foundations, and nonprofit groups have used TRIM for special-purpose analyses that depended on having the core model available with up-to-date data. In a world of shrinking government budgets, ASPE has had to continue sufficient financial support to maintain all parts of this interactive model. Urban Institute analysts try to seek additional work, as well, that helps enhance individual parts of the model or

[26] See Giannarelli and Zedlewski (2009) and Giannarelli, Lippold and Martinez-Schiferl 2012).
[27] Wheaton et al. (2011) used the ACS-based TRIM3 model to examine the extent to which the social safety net reduces poverty in three states with very different policy choices—Georgia, Illinois, and Massachusetts.

expand it into new areas. All users, especially ASPE, benefit when the model maintains a current picture of the complex and often changing social welfare and tax system.

Human capital resources must also be available. The TRIM modeling project has been fortunate to retain expert analytical and programming staff over time. The model is complex. It takes a long time to learn. Knowledgeable staff can harness the full power of the model for complex analyses, and experienced technical staff can quickly and accurately make the type of programming changes often needed for short-turnaround policy analyses. Continuous support from ASPE has enabled veteran staff to remain affiliated with the project while also developing the skills of newer staff.

Summary and Conclusions

TRIM has helped support the mission of ASPE and its predecessors over the past 45 years and has been important in establishing ASPE as a major policy shop. It is ASPE's microsimulation model—copyrighted by the office, and maintained and developed under the guidance of ASPE staff. The model has been used for high-profile analyses of social policy questions in both Democratic and Republican administrations. The questions have spanned the areas of means-tested cash assistance, noncash supports, tax expenditures, health benefits, and poverty. Most of the ASPE policy offices have used the model for different types of analyses. The results are trusted as unbiased because of TRIM's expansive documentation, transparency, and exposure through expert panel evaluators, conferences, published books, and journal articles.

The model has depended on ASPE's core financial support. That core support has ensured that ASPE has a model ready to go for the high-priority analytic demands of ASPE's policy offices. Congressional questions about the current safety net can and do arise at any time. The most unique and valuable feature of TRIM3 is its comprehensive approach to simulating all of the key social policy programs, including variation at the state level. This gives TRIM3 the ability to capture program interactions whenever new initiatives are being considered and when understanding the effects of social policy programs on family incomes is important. The NAS conclusion after its two-year evaluation of microsimulation models that microsimulation provides "important conceptual and operational benefits to the policy process" remains true today (Citro and Hanushek 1991, 1:114).

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Appendix: The TRIM3 Software System

TRIM3 was developed in the mid-1990s and became operational in 1997. TRIM3 is a client/server system with three tiers: the client, the application server, and the database. Because TRIM3 has a web-based interface, the only software required by the client is a web browser. The application and database servers conduct the bulk of TRIM3's work. One application server provides access to the public version of TRIM3 (the public server, accessed at http://trim.urban.org), while another provides access to the ASPE version (the ASPE-TRIM server, accessed by registered users at http://aspetrim.urban.org).

This appendix briefly describes the user interface (tier one), the TRIM3 engine (tier two), and the database (tier three). It also describes backup and security policies and version control, essential features for maintaining a reliable and well-documented system. The appendix is designed to give the reader a sense of the sophistication of the software required to handle TRIM3's simulations and their output. Much more documentation is available on the TRIM3 website, http://TRIM3.orban.org.

The Interface

TRIM3's web-based interface uses an IIS web server. The many web pages that provide TRIM3 with its extensive functionality have been developed primarily with PHP.

The website's "Welcome" page provides a brief overview of the TRIM3 model and links to other more detailed general user information, such as what programs are simulated, the difference between "baseline" and "alternative" simulations, and how to use results of baseline simulations and the database of program rules.

The "Documentation" page provides links to many other more detailed documentation pages grouped by category—for example, technical information, detailed information on the rules and functioning of each simulation module, and the concepts and procedures used to prepare public use data for the model. The "Research" page provides information about research uses of TRIM3, "What's New" lists recent developments, the "Staff" page lists core members of the TRIM3 staff, and "Contact

Us" provides an e-mail address for comments and questions. Other links handle management and registration tasks that are accessible only to programming staff.

The most important link is to the TRIM3 Navigator. The Navigator controls most of the user's interaction with TRIM and provides a way for a new user to register for access. The Navigator provides access to five major tools:

- *Data Dictionary* that provides variable definitions, codes and notes
- *Program Rules* for viewing the baseline values of public use program rules
- *Microdata* for viewing, extracting, and summarizing microresults
- *Simulation Runs* for setting up and running simulations
- *Summary Tables* for viewing summary tables from TRIM3 simulations

The Navigator was developed primarily using object-oriented concepts and classes from an in-house system called OOQM (Object-Oriented Question Maker).

The Database

All of TRIM3's data and program rules are stored in a MySQL relational database. Almost all database objects are contained in one of three primary database groups: Central TRIM Dictionary (CTD), Input, or Results.

The CTD contains the following:

- The dictionary of all TRIM3 data elements with definitions, user notes and possible values. TRIM data elements include national rules and state-level rules that hold numbers or categorical options, as well as "variable list" rules that hold the names of micro-level variables from either the input data or another TRIM simulation.
- Description of all simulations defined by users' national- and state-level program rules (instructions) for all simulations.

The *Input* databases store microdata imported into TRIM3 from statistical surveys, such as the CPS. Each year's data is in a separate database, as is each version of input data for a single year.

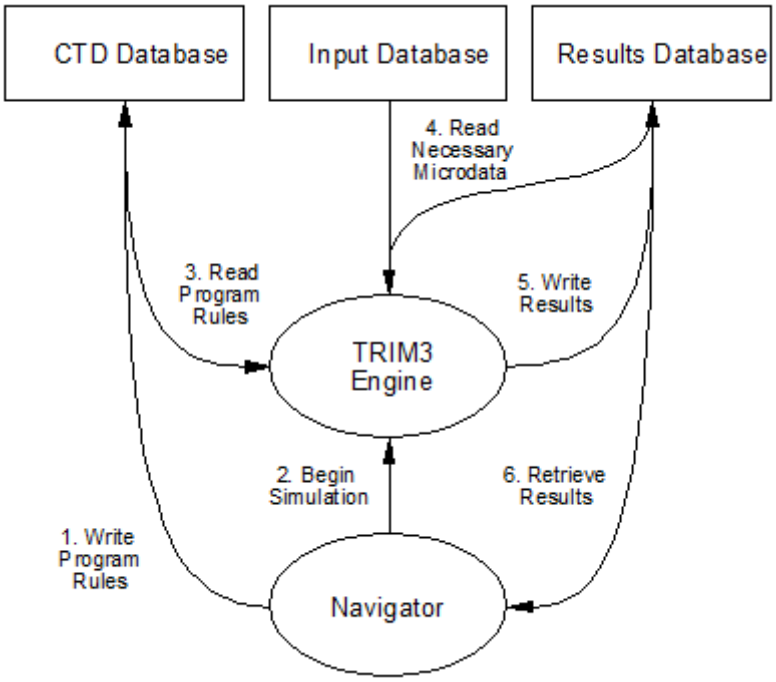
The *Results* database stores summary tables and microdata results from TRIM3 simulations. The summary tables provide an aggregate summary of simulations, while the microdata contain detailed variables at levels that correspond to the *Input* database.

The Engine

The TRIM3 engine provides a set of common functions required by all simulations and a structure—the *frame*—within which the separate simulation modules function. Both the engine and the simulation modules are coded in C++ using a Microsoft Visual C++ development environment. Working together, the TRIM3 engine and simulation modules read the input data, apply the program rules to each simulation being processed, pass results from one simulation to the next when multiple simulations are being processed in a single run setup, and calculate simulation results. The *frame* supplies each simulation module what it needs at run-time (e.g., reading the microdata and program rules, and writing the microresults and summary tables). Figure A.1 shows the flow of data in a typical TRIM3 simulation.

FIGURE A.1

The Flow of Data in a Typical TRIM3 Simulation



Backup Policy

The TRIM3 backup strategy primarily focuses on preventing the loss of program rules. It is rarely necessary to store any backup copies of results microdata because they may be recreated simply by running the simulation again with the stored values of its program rules. Backups of the full program rules database are done each day for each TRIM3 server. Daily backups are available on disk for four weeks and are archived afterward. The completed annual baselines are the only simulation results ever backed up so they can be used as input to a number of alternative simulations.

A backup server contains the latest version of the simulation engine, input microdata, and simulated baseline microdata results. The backup server does not maintain an up-to-date version of the program rules because of the frequency of changes made to them. Rather, the program rules on the backup server are updated only if the production server experiences an unrecoverable crash. In that case, the program rules are restored from the previous day's backup. Users have to reenter any changes made to the rules that day.

Security Policy

Most data available through the TRIM3 system is public use, and there are no access restrictions. Users of public use TRIM data only need to register before obtaining the data. When registering, users are asked for some basic information about who they are, how they may be contacted, and what their expected uses of the data will be. They are assigned a username and password for access to the public use data, but this does not allow the user to run his or her own simulations. Users wishing to run simulations or to access non–public use data must request an upgrade to their access. TRIM3 staff review these requests and place upgraded users into user groups that can share access to each member's runs and data. The HHS project officer must approve requests for access to nonpublic data for any persons other than TRIM3 project staff.

Version Control and Testing

All versions of the engine source code ever released to the server, along with descriptions and corresponding compiled code, are saved in the TRIM CTD database and assigned a major and minor version number. This allows the simulation engine to retrieve the executable code for a given version

on request. TRIM3 policy is to maintain backward compatibility among different versions so the results of an older version of the model can be reproduced.

Developers making changes to one of the TRIM3 simulation modules test the changes on their own PCs configured to run as test servers. After a module has been tested, the new version moves to the production server for further testing by policy analysts. Once a new or revised module is accepted, it is announced to the user community and made available for general use.

About the Authors

Sheila Zedlewski is an expert on income security policy. She was the center director of the Urban Institute's Income and Benefits Policy Center for 20 years. The center houses two microsimulation models, the Transfer Income Model (TRIM3), and the Dynamic Simulation Income Model. In the 1990s, Zedlewski led the analyses using TRIM to provide the US Department of Health and Human Services with analysis of health reform proposals. She has published widely on such topics as welfare policy, nutrition assistance, and poverty.

Linda Giannarelli, a senior fellow in the Urban Institute's Income and Benefits Policy Center, is the project director for the maintenance and development of the TRIM3 model. She also directs numerous other projects, including recent analyses for national and local organizations using TRIM3 to assess the antipoverty impacts of tax and benefit changes. In other research, she studies the Temporary Assistance to Needy Families program and the federally funded child care subsidy program.

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