



Helping People with Low Incomes Navigate Benefit Cliffs: Lessons Learned Deploying a Marginal Tax Rate Calculator

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KEY POINTS

- This project developed a calculator to help people anticipate how a change in earnings from employment would affect their net income, and in so doing, provide public benefit recipients with their estimated effective marginal tax rate on new earnings.
- The calculator was designed to support program participants and caseworkers. Policy makers and program administrators may also find the calculator useful.
- Calculators were fully developed for New Hampshire, Maine, Allegheny County in Pennsylvania, and Washington, D.C., and completely customized for their local programs and rules.
- The resulting calculators captured most major federal and local means-tested benefit programs. See demo calculators here: <http://frs.nccp.org/tools/mtrc/>
- Local governments and local organizations can download the open-source code (<https://github.com/HHS/effective-marginal-tax-rate-calculator>) to start creating a customized calculator for their families.
- Lessons learned from developing the calculator include: being mindful of the trade-off between the calculator's flexibility and user-friendliness; setting aside adequate time and resources to develop useful "next steps" for users who have their results in hand; and being mindful that web hosting the tool requires a high level of IT capacity from state and local governments.

WHAT ARE EFFECTIVE MARGINAL TAX RATES, AND HOW CAN TECHNOLOGY BE USED TO HELP PEOPLE NAVIGATE THEM?

Effective marginal tax rates ("marginal tax rates") refer to situations where a person's earnings increase result in public benefit reductions and higher household expenses, like transportation and child care. These benefit reductions and higher expenses act like a "tax" on new earnings. For families with children and with income between 100 to 200 percent of the federal poverty level, marginal tax rates can be quite high, typically hovering in the 40 to 50 percent range, and can be even higher.⁴ A marginal tax rate of 50 percent means that every new \$100 of earnings results in benefit reductions, income tax increases, and increases in household expenses equal to \$50. High marginal tax rates greater than 100 percent (often triggered when a household's income exceeds the income limit of a public benefit program) are commonly referred to as "benefit cliffs." High marginal tax rates and benefit cliffs make it challenging for families to achieve economic mobility through increasing earnings.

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⁴ <https://aspe.hhs.gov/sites/default/files/private/aspe-files/260661/brief2-overviewmtranalyses.pdf>

Many people who receive benefits do not understand how changes in earnings affect their overall income.⁵ Prior ASPE research⁶ suggests that increasing transparency about marginal tax rates could help people make more informed labor market decisions and reduce the risk and uncertainty they face. Program participants and caseworkers could benefit from a calculator that accurately estimates individualized marginal tax rates by combining benefit eligibility rules with information about household income and circumstances.

Other calculators of marginal tax rates exist, but they are not typically targeted to program recipients. For example, some tools are designed for researchers and policy makers,⁷ and the Federal Reserve Bank of Atlanta has a tool designed for career counselors.⁸ Another important consideration for developing a marginal tax rate calculator is that it must be adaptable – adaptable to the unique program rules of each local jurisdiction, and adaptable to rule changes from year to year.

THE MARGINAL TAX RATE CALCULATOR: A TOOL TO SUPPORT HOUSEHOLD LABOR MARKET DECISION-MAKING

The aim of this project was to develop a calculator that would help families navigate high marginal tax rates and benefit cliffs resulting from existing policies. Specifically, project objectives were:

1. To develop a marginal tax rate calculator that would help people anticipate how an earnings change would affect benefits and, in turn, overall household net income.
2. To make the code developed for the calculator available to jurisdictions who wish to host such a tool on their own program participant-facing websites.

Target Audience for the Calculator

Program recipients and their caseworkers were the target end-users for this calculator; this aim drove and informed each step of the development and design. Our goal was to design a calculator that would be publicly accessible on the internet, easy to use, flexible enough to accommodate real user circumstances, and provide results that were practical and easy to understand. In the development of this calculator, 13 beta testers (six benefit recipients and seven case workers) provided usability feedback in three rounds of testing that spanned four months. Their suggestions were incorporated into the design of the interface and results.

Policy makers and program administrators are a secondary audience who can use the calculator to better understand the intersection of programs serving their most vulnerable families. Oftentimes high marginal tax rates and benefit cliffs are unintentionally created, and the information provided by the calculator can be used to refine policies and explore ways to reduce high marginal tax rates.

Role of State and Local Partners

Many program rules vary at the state and local (county or municipality) level. Therefore, for a calculator to be accurate, it must be specific at the right level. We developed calculators that incorporated rules at the federal, state, and local levels for four jurisdictions:

- New Hampshire
- Maine

⁵ <https://aspe.hhs.gov/reports/complex-rules-barriers-self-sufficiency-safety-net-programs>

⁶ <https://aspe.hhs.gov/reports/risks-come-increasing-earnings-low-income-workers>

⁷ See <http://frs.nccp.org/tools/frs/> and <https://policyengine.org/us>

⁸ <https://www.atlantafed.org/economic-mobility-and-resilience/advancing-careers-for-low-income-families/cliff-tool>

- Allegheny County, Pennsylvania
- Washington, D.C.

Partners in each of these jurisdictions provided us with additional state or local program rules (where the rules were not publicly accessible) and checked their own respective calculators for accuracy. The calculators (one for each jurisdiction) can be found at: <http://frs.nccp.org/tools/mtrc/>

What the Calculator Does

This calculator models and provides estimates for most major federal, state, and local mean-tested benefit programs (see Table 1), based on applicable program rules.

Table 1. Federal, State, and Local Programs Included in the Effective Marginal Tax Rate Calculator.

Cash assistance	Food assistance	Child care assistance	Housing and utility assistance	Federal and state tax credits	Health care
<ul style="list-style-type: none"> • Temporary Assistance for Needy Families (TANF) cash assistance • Unemployment Insurance compensation • Supplemental Security Income (SSI) • Child support 	<ul style="list-style-type: none"> • Supplemental Nutrition Assistance Program (SNAP) • Special Supplemental Nutrition Program for Women, Infants, and Children (WIC) • National School Lunch Program • School Breakfast Program • Summer Food Service Program 	<ul style="list-style-type: none"> • Child Care Development Fund (CCDF) subsidies • Pre-K • Head Start • Early Head Start 	<ul style="list-style-type: none"> • Housing Choice Vouchers (Section 8) • Public Housing • Low Income Home Energy Assistance Program (LIHEAP) • Lifeline telephone subsidies 	<ul style="list-style-type: none"> • Earned Income Tax Credits (EITC) • Child Tax Credits (CTC) • Child and Dependent Care Tax Credits • Other state tax credits 	<ul style="list-style-type: none"> • Medicaid • Children’s Health Insurance Program (CHIP) • Affordable Care Act premium tax credits • Employer and marketplace health insurance

Note: For the purposes of this table, federal program names are used. When referring to these programs, the calculator uses local program names (e.g., “MaineCare” instead of “Medicaid”).

When computing net income, the calculator also estimates household expenses and federal and state income taxes paid, if any.

User Inputs

The calculator prompts users to enter the following information about themselves and their households:

- Household characteristics (e.g., age and number of children and adults)
- Current work situation (e.g., hours and earnings; see Figure 1)
- The increase in hours and/or wages the user wishes to consider, that is, the earnings increase for which the user wishes to estimate potential benefit reductions (see Figure 1)
- Current benefit program enrollment (from those listed in Table 1)
- Current out-of-pocket costs for child care and health care
- All other current household expenses (e.g., housing expenses, utilities, transportation costs) not already captured

The high level of detail required from users is necessary for generating accurate results. The calculator is interactive; for example, only users who indicate they have children would be asked questions about child care. Users may either enter their own, actual, household expenses or use pre-filled “standard” basic household expenses drawn

from federal standards (e.g., USDA’s low-cost food plan and HUD’s Fair Market Rents). For localities that have robust commuter transportation systems, users are asked whether they use public transportation to go to work or travel to work by car. Estimates for public transportation costs are calculated using local public transportation rates, including discounts for riders with disabilities.

Figure 1. Sample screenshot of user input step.

The screenshot shows the 'Benefit Cliffs Calculator' interface. At the top, there is a progress bar with eight steps: 1 (Location & Family Size), 2 (Household), 3 (Current Benefits), 4 (Work & Income), 5 (Child Care), 6 (Health Care), 7 (Other Expenses), and 8 (Results). Step 4 is currently active and highlighted in red. Below the progress bar, the title '4 Employment and Other Household Income' is displayed. To the right of the title are 'Back' and 'Save & Next' buttons. A note states: 'Note: If you are self-employed, enter your expected earnings. This calculator treats self-employment income like wage income.' Below the note, there is a section titled 'Currently, on average and before taxes ...' with input fields for 'I make \$15 per hour and work 20 hours per week.' Below this, there is a section titled 'I want to find out how my household's financial situation might change if...' with input fields for 'I start to make \$17 per hour and I work 30 hours per week.'

What the Calculator Produces for Users

After all user input is entered, the calculator provides results showing estimates of what the household's new financial situation would be following the hypothetical change in earnings specified; details of the households' current financial situation are also provided as a baseline for comparison. The following estimates are provided:

- Benefit amounts for each program
- Total income available to the household (including earnings and all cash benefits; see Figure 2)
- Total expenses, broken down into each expense category (e.g., child care, health care, housing; see Figure 2)
- Net household income (i.e., total income minus total expenses; see Figure 2)
- Effective marginal tax rate for the hypothetical earnings increase

After results are displayed, users may go back and change one or more inputs (e.g., the wage per hour) while keeping all other inputs the same. This allows users to easily explore financial situations resulting from different wage scenarios.

Accessing the Software Code to Develop a Calculator

State governments, local governments and other organizations are encouraged to apply the software code developed for this project toward creating a customized and updated calculator for families in their jurisdiction. The back-end code is written in Perl and the front-end code is written in PHP, HTML, and JavaScript, pulling some data from a MySQL database. The open-source code is located at <https://github.com/HHS/effective-marginal-tax-rate-calculator>. Agencies seeking to develop calculators based on this code are also encouraged to consider the below lessons learned to develop their own calculators.

Figure 2. Sample screenshot of output.

	Current Situation	New Situation
Yearly Income, Cash Assistance, and Tax Credits (money coming in)		
Earnings/Wage Income:	\$15,600	\$26,520
Other Income:	\$0	\$0
FANF Cash Assistance: *	\$0	\$0
SSI/SSP:	\$0	\$0
Unemployment Benefits:	\$0	\$0
Child Support Received:	\$0	\$0
Federal Tax Credits (EITC, CTC, and CDCTC):	\$7,945	\$8,078
State tax credits:	\$0	\$0
<i>Total Income:</i>	<i>\$23,545</i>	<i>\$34,598</i>
Yearly Expenses (money going out)		
Health Expenses:	\$0	\$0
Child Care Expenses:	\$741	\$4,319
Rent, Mortgage, and/or Utilities:	\$4,170	\$6,372
Transportation Expenses:	\$3,705	\$3,938
Food Expenses:	\$3,742	\$5,361
Phone Expenses:	\$773	\$773
Other Necessities:	\$3,041	\$3,041
Other Regular Payments:	\$0	\$0
Payroll Taxes:	\$1,193	\$2,029
Income Tax Before Credits:	\$0	\$772
<i>Total Expenses:</i>	<i>\$17,365</i>	<i>\$26,605</i>
What's Left (money coming in minus money going out):	\$6,180	\$7,993

*FANF (Financial Assistance to Needy Families) is New Hampshire's TANF program.

LESSONS IN DEVELOPING AND IMPLEMENTING THE CALCULATOR

Trade-off between the calculator’s flexibility and user-friendliness. People’s lives are complicated, and programs are complicated. Seeking to incorporate these interlocking layers of complexity comes a trade-off: a reduction in user-friendliness. For example, to compute child care subsidies and copays accurately, detailed user inputs are often needed, such as how many hours of child care are used, during which hours of the day and night, for which days of the week, and what type of child care is used. Requiring user input at that level of detail can be cumbersome and may result in inaccurate user inputs (e.g., some parents may not know what type of care they are using or may not be able to accurately predict how their child care schedules might change with a new job). On the other hand, not soliciting this level of user input would require the calculator to make assumptions about child care usage that would reduce the accuracy of estimates.

Programs change, and sometimes, change a lot. During the development of this calculator, the COVID-19 pandemic began, and the federal response included a range of policy changes, including changes to the tax code included in the American Rescue Plan Act. These developments necessitated an extensive amount of new code and recoding of existing program rules. A short while later, many of the American Rescue Plan provisions expired (e.g., the expansions to the Child Tax Credit), requiring updates yet again, while other program expansions (such as SNAP Emergency Allotments and Medicaid continuous coverage) were extended beyond their initial anticipated expiration. Keeping up with policy changes is no small task: each policy change requires changes to the back-end code to ensure they are modeled faithfully and interact correctly with each other and with existing policy rules.

Adequate time and resources for testing and improvement. The project dedicated much of its resources for the development of the calculator; funding was not available for comprehensive user-testing and improvements. Beta testing with end users occurred on earlier iterations of the calculator, but when the calculator was fully developed, further testing and improvements were outside of the project scope. The limited time for follow-up testing was partially borne from the additional time the project team took to incorporate the many changes prompted by earlier rounds of testing. For a calculator as complicated as this, adequate resources (both budgetary and time) should be invested in the development and in the testing and improvement phases of the calculator.

Adequate time and resources for building out “next steps” for users. Initial project plans included providing users with detailed information on action items and next steps, after they received their personalized results from the calculator. Such items could be referrals to social services, information about career consultation, and more. However, limited resources prevented us from fully building out this capability in a meaningful way. While the information provided by the calculator is critical for program participants to maximize family resources and chart a path forward towards employment mobility, we believe that information on its own may not be sufficient for all participants and their case managers. Future efforts using a calculator such as this could include resources to develop guidance on next steps and pilot test these steps to refine their utility.

The implementation team needs personnel with expertise in benefit policies *and* software development. Due to the complexity of policy rules that must be accurately reflected at each step of the calculator, it was challenging to divide the work between staff who were policy experts and staff who were software development experts. The team ultimately relied heavily on staff members who had both a high level of policy *and* software development expertise, an uncommon combination, which then required adjustments to planning and staffing. Staff who had only policy expertise had difficulty understanding what was required from the software programming code to capture the policy logic. Staff who had only software development expertise lacked an understanding of how sensitive the results were to policy inputs and interactions that had to be programmed exactly as they functioned in the real world. For example, Medicaid and Premium Tax Credits are each complicated systems, and how household members may move from one program to the other

is also complex. Developing software that can model these two systems requires a complete understanding of the two programs, including the myriad ways that household characteristics combine to determine eligibility and benefit amounts.

Web hosting the calculator requires adequate IT capacity. Putting this calculator up on a local government's website requires extensive IT capacity from the organization that hosts the website, even after the code is complete and functional on a separate test site. During the initial recruitment stage for state and local partners, the primary reason local governments backed out was because they felt they lacked the IT capacity to host this calculator on their website. Each of the four final state and local partners had significant IT capacity, but even for them (with dedicated IT teams or IT contractors), hosting the calculator on their public-facing websites presented significant challenges. These challenges included identifying a dedicated server appropriate for hosting the tool; ensuring a server's ability to connect to MySQL and run Perl, PHP, HTML, and JavaScript; ensuring compliance with security guidelines; and lacking sustainable resources for supporting updates to the tool when benefit program rules change.

DISCUSSION

To help families navigate high marginal tax rates and make progress towards achieving self-sufficiency, families need accurate, up-to-date information about benefit reductions and increases in expenses. Throughout this project and following its completion, the project team was reminded by numerous public benefit recipients, case managers, and program administrators that the type of information that benefit calculators could provide is both in high demand and would be very helpful to low-income families. Equipped with this information, families can plot a path towards self-sufficiency, for example, by planning ahead to weather temporary periods of high marginal tax rates. Despite the challenges described above, we hope that this calculator, the accompanying code, and our lessons learned brings the field closer to providing families with the information they need to navigate a pathway of upward economic mobility.

APPENDIX

Due to the additional complexity of modeling programs specific to some populations and special program rules that apply to some populations, this calculator did not model households with the following people and characteristics (i.e., the calculator would not produce accurate results for these households):

- People currently without housing
- People ages 65 or older
- People who receive Medicare or Social Security benefits
- Children who receive federal or state disability benefits
- Young adult students on SSI (Supplemental Security Income)
- Households with more than 5 children
- Households with more than 4 adults
- People convicted of a felony that may result in ineligibility for benefits
- Foster children
- Children only, with no adult household members
- Current or former military service members
- Someone whose spouse died in the last two years
- People who qualify for programs supporting American Indian/Alaskan Native populations
- Two or more married couples living together
- A married person whose spouse does not live in the household

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