

RESEARCH REPORT

How Well Can Limited Data Predict Annual Tax Credits

The Importance of the Earned Income Tax Credit, Child Tax Credit, and An Option for Advancing Credits

Elaine Maag

Elizabeth Peters

Nikhita Airi

Karen Smith

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Executive Summary

Refundable tax credits provide benefits in excess of taxes owed and can play an important role in the financial lives of low-income families. For low-income families with children, the two refundable tax credits that provide the most support are the earned income tax credit (EITC) and the child tax credit (CTC). Families generally receive them as part of their tax refund, along with any other refund due, after filing a tax return.

Refundable tax credits differ from most programs that provide income support to low-income families in two significant ways: eligibility is determined on a calendar year basis and benefits are largely received as a single payment between February and May, after the year has ended and a tax return has been filed. Many benefit programs that operate outside the tax system consider periods that are much shorter when determining eligibility (and are not tied to the calendar year) and they typically pay benefits monthly.

In 2021, Congress experimented with a new mechanism to deliver the CTC, mandating that it be delivered as monthly payments paid in advance of filing a tax return. From July through December 2021, the families of over 60 million children received automatic monthly payments worth up to half the credit the Internal Revenue Service (Internal Revenue Service 2021) estimated they would be eligible for when they filed a tax return.

Monthly payments of the CTC were correlated with a drop in food insecurity among families with children relative to families without children (Karpman et al. 2022; Shafer et al. 2022). They also coincided with a decrease of 3 percentage points in the monthly poverty gap between Black families and white families. After reporting receipt of the monthly payments, many adults living with children favored advanced monthly payments, especially those with lower incomes (Maag and Karpman 2022).

For these and other reasons, members of Congress and the advocacy community have long proposed advancing refundable tax credits (Holt, Grant, and Aderonmu 2020). However, critics have pointed to potential problems with such an approach, including high error and low take-up rates as was the case with a previous experience involving the EITC (Government Accountability Office 1992).

How well the IRS can accurately predict credits will be key to the success of advance payment programs. Advancing too much credit puts families at risk of having to repay the credits at tax time unless a robust “hold harmless” provision is put in place that would limit how much errantly advanced credit must be repaid. Advancing too little credit means families miss out on needed support.

Using data from the 2018 Survey of Income and Program Participation (SIPP, which has monthly income amounts for 2017) and the National Bureau of Economic Research TAXSIM model, we estimate how accurately data from the first quarter of the year can predict credit amounts a person will ultimately qualify for based on their annual characteristics. Low-income people are more likely than higher-income people to experience financial difficulties, so we focus our analysis on families with children at some point in the year with incomes below 200 percent of (twice) the federal poverty level (FPL). If credits can be accurately predicted using data from the first quarter of the year, it may present a path forward toward advance payments of credits.

Accuracy of Credit Estimation

For most families, one quarter of data is sufficient to accurately estimate refundable tax credits. If number of dependents, filing status, and household income for families are stable enough throughout the year, the IRS could use information from the first quarter of the year to accurately estimate tax benefits a family will qualify for over the course of the year. Among all families with a dependent at some point in the year we find the following:

- 81 percent will be stable enough that first-quarter data will accurately predict their EITC (which we define as within 10 percent of the actual credit for which a family will be eligible)
- 75 percent will be stable enough that first-quarter data will accurately predict their CTC under the 2017 Tax Cuts and Jobs Act, which changed the CTC rules from 2018 through 2025 (referred to as 2018 law in this analysis)
- 77 percent will be stable enough that first-quarter data will accurately predict their CTC under the 2021 American Rescue Plan (2021 law)

Among low-income families with a dependent at some point in the year, we find the following under the same assumptions:

- 65 percent will be stable enough that first-quarter data will accurately predict their EITC
- 69 percent will be stable enough that first-quarter data will accurately predict their CTC under 2018 law
- 79 percent will be stable enough that first-quarter data will accurately predict their CTC under 2021 law

In general, EITCs are easier to predict than CTCs because, among all families with dependents, only about 40 percent are eligible for the EITC. First-quarter data will predict most families will be ineligible for the EITC. Around 90 percent of all families with children are eligible for the CTC, and predicting some credit is more difficult than predicting no credit.

However, overestimating credits will still happen. Among families with children at some point in the year, for 10 percent of all families and 18 percent of low-income families the first quarter of data leads to predicted EITCs higher than the credit they will qualify for at the end of the year. Similarly, the first quarter of data leads to CTC predictions that are too high for 12 percent of all families under the 2018 version of the credit and 13 percent under the 2021 version. Among low-income families, those numbers are 12 percent for the 2018 CTC and 11 percent for the 2021 CTC.

Underestimating credits will also happen. Among all families with children at some point in the year, we estimate first-quarter data would underestimate the EITC for 9 percent of all families and 17 percent of low-income families. First-quarter data would underestimate the CTC under 2018 law for 13 percent of families with a child at some point in the year. These data would underestimate the CTC under 2021 law for 10 percent of these families. Among low-income families, those shares are 19 percent for the 2018 CTC law and 9 percent for the 2021 CTC law.

Designing Credits for Advanced Payments

Phase-in and phase-out regions can complicate predictions. For example, most low-income families with children would be eligible for the maximum 2021 CTC whereas eligibility for the 2018 CTC phases in with income—some low-income families are eligible for no credit and many are eligible for a credit smaller than the maximum credit. Eliminating the phase-in of the 2021 CTC makes it much easier to predict compared to the EITC or the 2018 version of the CTC because a drop in earnings does not affect the credit. The relatively high phase-out range for both versions of the CTC makes it unlikely that a family will have an income jump big enough to make them ineligible under either 2018 or 2021 law.

Having very different credit amounts for families with children and those without children also complicates predictions. If a child benefit could be split across multiple households or workers without children could qualify for EITCs similar to workers with children, a child moving out of a household would have less impact on reducing a family's credit.

Even absent legislation to change the design of the EITC or CTC, it might still be possible to deliver advanced credits without creating undue risk for low-income families who may be unable to pay back

errantly advanced credits. We propose collecting data from the first quarter of the year when families file their tax returns. Those data would be used to predict a family's EITC and CTC, and for families that did not opt out, payments would begin in July. In some cases, families would know about upcoming changes in the number of children they have (e.g., birth of a child) and could report that information to improve credit predictions.

Working toward an advanced payment would better match credit timing to household needs, particularly for low-income families. It could also reduce income volatility for these same families that exacts a negative toll on families and children.

Introduction

Since the late 1980s, tax provisions have played a growing role in providing support for families with children (Hahn et al. 2021). These provisions deliver more federal spending on children than any other type of public support, eclipsing even health programs. Unlike most other categories of federal spending for families with children, tax provisions provide child benefits even to families well over median income. In 2021, support from tax provisions grew, in part because of a temporary increase to the child tax credit (CTC), which included a substantial credit increase for very low-income families with children. Low- and middle-income families with children also benefit from the earned income tax credit (EITC).

Even without the expanded CTC in 2021, in a typical year the EITC and CTC together lift about 7.5 million people out of poverty, and more than half are children (Fox 2020). If the 2021 expansion of the CTC were made permanent, the CTC alone would lift more people out of poverty than both the EITC and CTC in prior years, reducing child poverty by about one-third (Bastian 2022). Poverty reductions in 2021 were even larger among Black children who are often excluded from the full benefit of the CTC. A permanent expansion of the CTC would halve the poverty rate among Black children (Acs and Werner 2021.)

Fundamentally, tax credits differ from most programs that provide income support to low-income families in two significant ways: eligibility is determined on an annual basis, and benefits are largely received as a single payment between February and May, after the year has ended and a tax return has been filed. A person's eligibility for the credits is based on marital status on December 31 (which determines whose income will be counted in the tax unit), how long a child lives with a relative (usually a parent) throughout the year, and annual income (own income for single filers and combined income for married filers). Many benefit programs that operate outside the tax system have the advantage of considering much shorter periods when determining eligibility, and they do not need to coincide with the calendar year as personal income taxes do. Benefit programs can also deliver payments to different people as caregiving between households shifts. Benefits are typically paid monthly.

An exception to the timing of tax credit payments was made in 2021 when the CTC was paid in advance of filing a tax return: most families with children received half of the credit the IRS expected them to be eligible for in monthly installments from July through December 2021 in advance of filing their 2021 tax return.¹ Payments were based on information from a previously filed tax return. Families could receive the second half of their CTC when they filed their 2021 tax return in 2022. The law

included a robust hold harmless provision that allowed families with incomes below \$40,000 to \$60,000, depending on filing status, to keep credits that had been paid errantly in advance, rather than paying them back at tax time. How many people received errant credits is not yet known.

Tax credits can be used to offset taxes owed and, if they are refundable, can provide a tax refund in excess of taxes owed. Because low-income families do not typically owe federal income taxes, they can only benefit from tax credits that are refundable. Black and Hispanic families with children are overrepresented among households with low income, a product of a long history of people of color facing multiple disadvantages in the labor market (Cajner et al. 2017). This makes the credits particularly important for Black and Hispanic families and increases racial equity (Boteach et al. 2019). In 2018, over one-fifth of all Hispanic, non-Hispanic Black, and non-Hispanic Native American women benefited from the EITC, more than double the share of non-Hispanic white women who benefited from the EITC. Women of color were much more likely to receive the refundable portion of the CTC—the portion that exceeds taxes owed—than non-Hispanic white women in 2018.²

When tax credits are paid as a tax refund in a single payment, a large share of individuals with low income will receive a substantial share of their annual income in a single month. These large payments can be beneficial, providing an important opportunity for families to save, pay down debt, and make larger necessary purchases of durable goods (Maag, Congdon, and Yau 2021). However, one-time annual payments may undermine a family's ability to meet ongoing monthly expenses. This limitation is evidenced by a spike in health care spending at tax time that likely represents foregone health care in prior months (Farrell, Greig, and Hamoudi 2018) and increased spending on necessities such as groceries where consumers appear to be using their refunds to stock up in preparation for future times of need (Aladangady et al. 2018).

After briefly reviewing the design of the EITC and CTC, we calculate the share of income that comes from tax credits among various groups of people. Among families with annual income of less than twice poverty (about \$41,000 for a family of three in 2017), the EITC and CTC contribute about 17 percent of their annual income under the 2018 CTC rules. Under the 2021 CTC rules, the share of income coming from the EITC and CTC increases substantially to 29 percent. We also find slightly higher shares of annual income for Black families coming from tax credits when the CTC is fully refundable. As such, a fully refundable CTC can help further reduce racial disparities in income.

We then use data from SIPP, which collects monthly information on the members of households and their incomes, to identify how tax units and incomes change throughout the year and how those changes affect how well the IRS can predict the tax credit based on information available in the first

quarter of the year. Understanding how well people can predict tax credits based on the first quarter of the year can help assess the feasibility of an alternate payment schedule for the EITC or CTC that would rely on very recent information rather than information on previously filed tax returns, as was used in 2021 to advance credits.

We find that if we make the somewhat simplistic assumption that living situations will continue to be the same after the first quarter of the year has passed and families will have earned one-quarter of their annual earnings, we can accurately predict the EITC for 81 percent of families with dependents at some point in the year (which we define as within 10 percent of the actual credit a family will be eligible for). We can accurately predict the CTC for a lower share of these families, whether under 2018 law (75 percent) or under 2021 law (77 percent). We would expect that EITCs for the entire population of families with dependents at some point of the year are more likely to be predicted accurately compared with families with low income because families with children with higher income are not eligible for the EITC (zero EITC would be the correct prediction regardless of many changes that might occur), and first-quarter data suggest this to be the case. Among low-income families with a dependent at some point in the year, the CTC under the 2021 rules could be accurately predicted for a larger share (79 percent) than the CTC under 2018 law (69 percent) or the EITC (65 percent).

We conclude by describing why policymakers might consider finding a way to advance credits based on recent data while recognizing that it would require upgrades to IRS data processing abilities. We describe a payment schedule that would use information from the first quarter of the year to begin tax credit payments in July of the same year.

Description of the Earned Income Tax Credit and Child Tax Credit

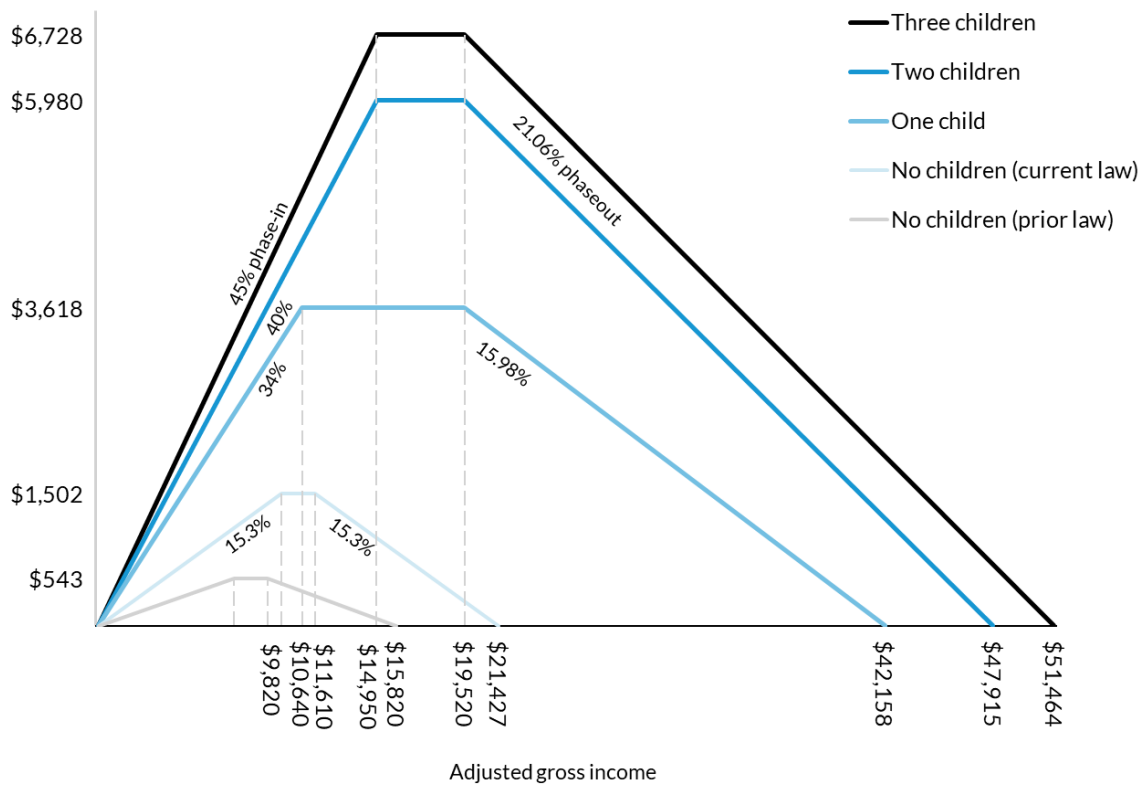
Together, the EITC and CTC lift about 7.5 million people out of poverty annually, a distant second to Social Security (Fox 2020).³ Black and Hispanic households are disproportionately represented among low-income families with children, making the EITC one of few tax programs that works to undo racial inequities.⁴ Critical differences between the tax credits and Social Security are that tax credits for low-income families are typically paid as a single payment after a family files a tax return after the year has ended, and families typically do not know how much credit they qualify for until calculating their taxes. Social Security payments are made monthly, and most recipients know the amount of Social Security benefits they will qualify for at the start of the year.

Government safety net programs typically direct the bulk of resources to low-income families. Some tax credits, such as the EITC, deliver most of its benefits to families with children in the bottom 40 percent of the income distribution.⁵ The CTC, on the other hand, has provided benefits to all but the highest income families since 2018. From 2018 through 2020, the CTC delivered smaller benefits, on average, to the bottom 20 percent of the income distribution than to those with slightly higher income because a family needed a minimum amount of earnings to qualify for the credit and other rules limited how much of the credit could be received as a tax refund. In 2021, when the credit was temporarily expanded as part of the American Rescue Plan (ARP), low-income families received average benefits that were similar to middle-income families because the CTC was made fully refundable.⁶

Earned Income Tax Credit

The EITC provides substantial support to low- and moderate-income working parents. Workers receive a credit equal to a percentage of their earnings up to a maximum credit. Both the credit rate and the maximum credit vary by family size, with larger credits available to families with more children. In 2021, the maximum credit for families with one child was \$3,618, while the maximum credit for families with three or more children was \$6,728. A much smaller credit is available to some workers without children. After the credit reaches its maximum value, it remains flat until earnings reach the point where the credit begins to phase out. Thereafter, it declines with each additional dollar of earnings until no credit is available (figure 1).

FIGURE 1
Earned Income Tax Credit
 2021



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Source: Urban-Brookings Tax Policy Center (2021); Internal Revenue Procedure 2020–45, Internal Revenue Service; and H.R. 1319, “American Rescue Plan Act of 2021,” 117th Congress (2021).

Notes: Assumes all income comes from earnings. Amounts are for taxpayers filing a single or head-of-household tax return. For married couples filing a joint tax return, the credit begins to phase out at income \$5,940 higher than shown, or \$5,950 if the couple has children.

For workers in the phase-in range of the credit, earning less would result in a smaller EITC and earning more often results in a larger credit (though earning significantly more can result in a reduced credit; figure 1). For workers in the flat region of the credit, modest changes in earnings might not affect the amount of credit a family qualifies for. But significantly lower earnings could result in being eligible for a smaller credit, and significantly higher earnings could result in a smaller credit if a family’s income exceeded the point at which the credit begins to phase out. For workers in the phase-out region of the credit, increases in earnings would result in a decreased credit, and small decrease in earnings could result in a higher credit. A family’s expected credit could also change if a family with fewer than three children added a child to their household (either because of a birth, adoption, or custody change) or a family with three or fewer children had a child move out of the house or become too old to qualify for

the credit. In addition, the credit could change with a change in filing status (e.g., married vs. single head of household). Interviews of former welfare recipients reported that correctly guessing their EITC was difficult (Anderson et al. 2022).

Families claim their EITC by filing a tax return, on which they calculate the credit they are owed. Tax returns are filed after the calendar year they apply to has ended. For example, people filed their 2021 tax return in early 2022. If a family owes federal income taxes, the EITC (along with any other credits the family qualifies for) will be used to first offset taxes owed. Any excess will be paid as a tax refund. The earliest a family can receive the EITC is February 15. Most benefits of the EITC are paid as a tax refund. The IRS estimates that less than 20 percent of EITC benefits offset income taxes owed and the rest are in excess of income taxes owed (Internal Revenue Service 2019).

Child Tax Credit

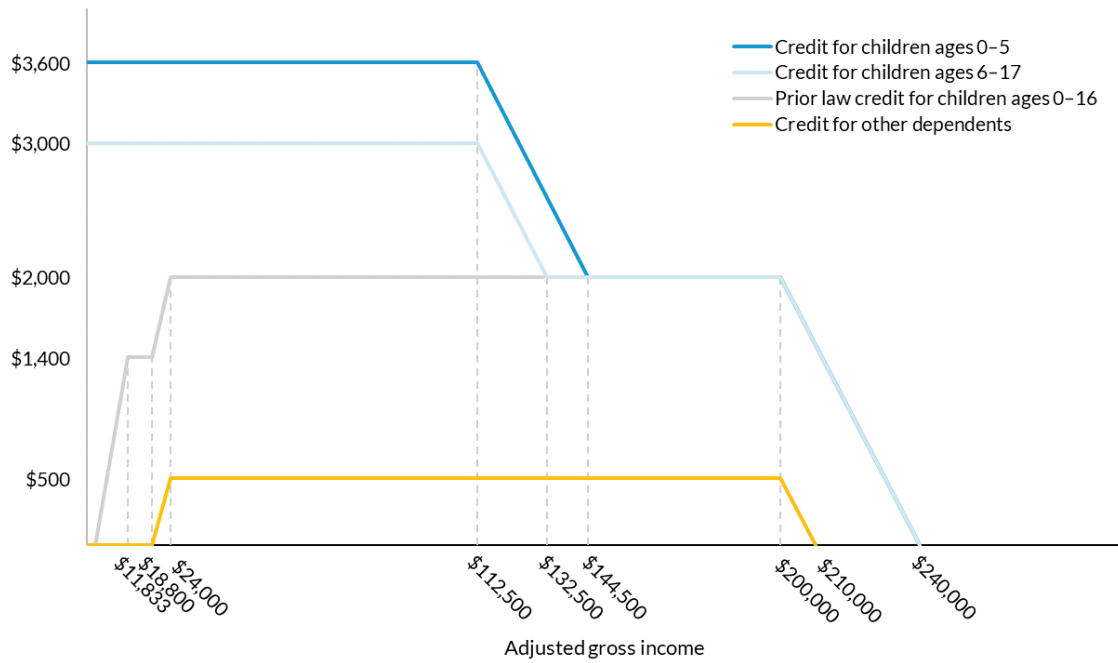
The CTC was changed in 2017, effective in 2018, so that taxpayers could claim a CTC of up to \$2,000 for each child under age 17. The credit decreases by 5 percent of adjusted gross income over \$200,000 for single parents and \$400,000 for married couples. If the credit exceeded taxes owed, taxpayers could receive up to \$1,400 as a tax refund known as the additional CTC or refundable CTC. The refundable portion of the credit was limited to 15 percent of earnings in excess of \$2,500. As a result of these rules, roughly 27 million children lived in families that did not receive the full value of the credit. These children were disproportionately Black and Hispanic (Burman and Wheaton 2005; Goldin and Michelmore 2021; Greenstein et al. 2018).

There is also a \$500 credit available to any dependent who is not eligible for the \$2,000 CTC. This includes dependents over age 17 and dependents who do not have a Social Security number eligible for work. This is commonly referred to as the other dependent tax credit. It phases out at the same income thresholds as the CTC.

The ARP of 2021 significantly expanded the CTC. In 2021, the CTC provided a benefit of up to \$3,600 per child under age 6 and up to \$3,000 per child ages 6 to 17 (figure 2). The credit was made fully refundable—even very low-income families qualify for the maximum credit. The credit phases out in two steps. First, the credit begins to decrease at \$112,500 of income for single parents (\$150,000 for married couples), declining in value at a rate of 5 percent of adjusted gross income over that amount until it reaches the pre-2021 level of up to \$2,000 per child. Second, the credit's value is further reduced by 5 percent of adjusted gross income over \$200,000 for single parents (\$400,000 for married couples).

Up to half of the credit was paid in advance of filing a tax return in monthly payments from July to December.

FIGURE 2
Child Tax Credit, Single Parent
For one child, 2021



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Source: Urban-Brookings Tax Policy Center calculations.

Notes: This figure assumes all income comes from earnings, and child meets all tests to be a CTC-qualifying dependent. Credits of \$3,000 and \$3,600 are fully refundable; prior law limited refunds to \$1,400 out of the maximum \$2,000 credit. Credit for married parents first phases out at \$150,000 of income until credit reaches the pre-2021 level; begins second phase-out at \$400,000 of income. Only citizen children qualify for the \$3,000 and \$3,600 credits for children under 18. Noncitizens under age 18 who meet the dependency tests of eligibility can qualify for other dependent credits.

Under the rules in place prior to 2021, if a family received less than \$1,400 per child, earning more income would likely result in receiving a higher CTC. Families receiving \$1,400 per child could see their credit drop if earnings dropped and could see their credit rise if earnings rose enough for them to owe federal income taxes. Families on the lower end of the flat range of the credit could lose some or all of their CTC if their earnings dropped, but if they were on the higher end of the flat range, they could also see a decrease in the CTC if their earnings increased. Likewise, if the number of children in a family increased (either through birth, adoption, or a change in custody) the CTC could increase, and if the number of children in a family dropped, so too could the credit.

Data and Methods

The first aim of our analysis is to assess the importance of the CTC and EITC in contributing to annual income and how that varies by household characteristics, such as race and ethnicity of the household head and poverty status. Our second aim is to estimate how accurately families' annual tax credit benefits could be estimated based on information available after the first quarter of the year has passed.

SIPP is one of few surveys available that contains the necessary monthly data for this type of analysis. We use wave 1 of the 2018 SIPP that contains information for all household members present at the interview date between February and July 2018. The information that we need for the analysis includes monthly data on income, household composition, and marital status, which SIPP collected retrospectively, covering the 12 months of 2017. SIPP also collected limited retrospective information for individuals who were not living in the household at the interview date but did live in the household sometime during 2017.

We use each respondent's household relationship (e.g., marital status, presence of children, etc.) to define tax units. We use National Bureau of Economic Research's TAXSIM model to calculate annual federal and state income taxes based on tax unit composition and annualized income first using information from the full year and then using information only from the first quarter of the year. SIPP data do not provide all information needed to calculate income taxes, so our tax calculation is only an estimate.⁷ Appendix A describes how we identify tax units and the variables TAXSIM requires to calculate federal and state income tax, as well as the SIPP variables we use for each item. Note that when calculating each type of tax credit, we use retrospective information reported in the 2018 SIPP about 2017 income and household composition, and we apply the EITC, 2018 CTC, and 2021 CTC rules to those data. Thus, our comparison between the 2018 and 2021 CTC is based solely on the difference in the tax rules and not on changes over time in the variability of economic and demographic outcomes. For the CTC, we focus on the 2018 rules, which are scheduled to be in place until 2025, and the 2021 rules, which were in place temporarily for just one year. Our estimates of CTC (both number of returns and total amount in the base year of our data) line up well with estimates from the IRS Statistics of Income. Similar to other analyses using survey data, using our data we estimate about \$19 billion (29 percent) too little EITC on 5 million (18 percent) too few returns. This might be a result of families shifting children across tax units to increase refundable credits (Splinter, Larrimore, and Mortenson 2017).

The tax unit for quarter 1 (Q1) is based on marital status at the end of March, and children are assumed to live in the household in each subsequent quarter the same amount of time they lived in the household in Q1. We calculate annual income by multiplying monthly income from January, February, and March (Q1) by 4 to fill in the remaining months. We compare the estimated tax benefit based on that Q1 information to the estimated tax benefit based on annual income reported on the survey, the marital status at the end of the calendar year or quarter 4 (Q4), and the presence of children based on a full year of information (table 1).

TABLE 1
Tax Unit Definition by Scenario

Scenario	Month Marital Status Unit is Defined	Month Child Residency is Defined	Annual Income
Q1 tax benefit	March	Months in Q1*4	Q1*4
Q4 tax benefit	December	Majority of year	Sum of months 1-12

Source: Authors' calculations.

Notes: Member composition, age, marital status, parent, spouse, and cohabiting partner numbers are defined in each month. We add incomes for all tax unit members in the selected months, even if a tax unit member was not in the tax unit in all months.

Our measure of how well the tax benefit can be predicted from information available only at the end of Q1, Prediction Accuracy Q1, is defined below:

$$Prediction\ Accuracy\ Q1 = \frac{Q1\ Tax\ Benefit}{Q4\ Tax\ Benefit}$$

We define an accurate prediction as the Q1 tax benefit being within 10 percent of the Q4 tax benefit. Thus, a prediction accuracy that is greater than 1.1 represents an overestimate of the tax benefit compared with using information from the full year; a prediction accuracy that is less than 0.9 reflects an underestimate of the tax benefit compared with using information from the full year.

Most of our sample is composed of households with an adult female and a dependent child in at least one month during the year. Note that at any point during the year she can be classified as married, head of household with a dependent child, or single with no child in the household.⁸ We also include men who, at some point in the survey, are not married (i.e., the tax status is not joint) but who have a dependent child that would allow them to claim a CTC or EITC and no adult female is on the tax return.

Results

We first describe how the EITC and CTC contribute to annual income among all families with a child at some point in the year and low-income families (those with income below twice poverty). Given the importance of the EITC and CTC as sources of income, we then estimate how well these credits could be predicted using just the first quarter of data. We then explore the implications of advancing tax credits based on information from the first quarter of the year.

Tax Credits Contribute Substantially to Annual Income for Low-Income Families

Tax credits can substantially boost income for families with children. In both our full sample and low-income samples, earnings make up the largest single source of income. For all families, earnings account for an average of 89 percent of all income. Among low-income families, this share drops to 67 percent. The EITC contributes 10 percent on average of income for low-income families (table 2).

Under the 2018 rules of the CTC, which limited benefits for lower-income families that owe no federal income tax to up to \$1,400 per child and had a maximum credit of \$2,000 per child for others, the CTC made up about 7 percent of average annual income for families with low incomes. In 2021, the average share of annual income that came from the CTC rose dramatically to 19 percent for low-income families, increasing the importance of considerations surrounding how it was paid.

TABLE 2

Share of Income from Various Sources, Full Year

Families with dependents at end of year

	All						Low Income					
	N ^a	Earnings (%)	Other (%)	EITC (%)	CTC 2018 (%)	CTC 2021 (%)	N ^a	Earnings (%)	Other (%)	EITC (%)	CTC 2018 (%)	CTC 2021 (%)
Total	44,149	89	7	1	2	5	16,682	67	17	10	7	19
Tax Unit Income												
≤ FPL	8,028	46	32	16	6	31	8,028	46	32	16	6	31
> FPL to ≥ 200% FPL	8,653	74	11	7	7	14	8,653	74	11	7	7	14
> 200% FPL	27,468	91	6	0	2	3						
Self-employment earnings												
No	38,789	89	7	1	3	5	15,336	67	17	9	7	19
Yes	5,360	90	8	0	2	3	1,346	61	16	13	10	24
Number of children under age 18												
1	19,897	88	9	1	1	3	7,467	68	18	9	5	13
2	15,440	91	6	1	2	4	4,820	67	15	11	7	19
3+	8,812	86	8	2	4	9	4,395	66	17	9	9	24
Filing status												
Married	27,850	91	6	1	2	4	6,299	71	12	8	8	18
Head of household												
Male	4,368	86	8	2	4	8	2,230	71	11	10	7	19
Female	11,932	76	16	4	4	11	8,153	60	24	11	6	20
Education												
Less than high school	4,882	80	11	5	5	12	3,691	66	18	10	7	20
High school	10,705	85	9	3	4	8	6,003	67	16	10	7	19
Some college	12,203	86	9	2	3	7	5,070	66	18	9	7	18
College graduate	16,359	92	6	0	2	3	1,918	69	15	9	7	17
Age at end of quarter												
> 25	2,018	82	8	6	5	14	4,882	80	18	10	7	20
25-34	12,129	88	5	2	4	8	10,705	85	16	10	7	19
35+	30,003	89	8	1	2	4	12,203	86	18	9	7	18

	All						Low Income					
	N ^a	Earnings (%)	Other (%)	EITC (%)	CTC 2018 (%)	CTC 2021 (%)	N ^a	Earnings (%)	Other (%)	EITC (%)	CTC 2018 (%)	CTC 2021 (%)
Race or ethnicity												
Non-Hispanic white	24,306	90	8	1	2	4	6,532	64	20	9	7	19
Non-Hispanic Black	6,214	85	10	2	3	8	3,451	60	24	10	6	21
Hispanic	9,498	87	6	3	4	8	5,354	72	10	10	7	18
Other	4,132	91	6	1	2	4	1,345	70	14	9	7	18
Change in number of kids (Q1 to Q4)												
No change	38,704	89	7	1	2	5	14,298	67	17	10	7	19
Increased	4,269	88	7	2	3	6	1,946	69	13	10	8	21
Decreased	1,177	87	10	1	2	5	438	66	19	8	7	17
Income change from predicted to actual (Q1 to Q4)												
Increased > 25%	4,154	89	6	2	2	6	2,501	66	16	12	6	21
Stayed within 25%	37,562	89	8	1	3	5	12,953	68	16	9	7	18
Decreased > 25%	2,434	90	7	1	2	5	1,228	58	22	13	7	24
Marital status change (Q1 to Q4)												
No change	1,352	84	10	3	3	9	832	68	14	12	6	21
Single to married	83	85	10	2	4	8	30	56	27	12	5	26
Married to single	468	79	15	2	4	8	184	66	16	11	8	18

Source: Authors' analysis of Survey of Income and Program Participation, 2018, Wave 1.

Notes: The sample includes one observation per tax unit with dependent children based on December 2017 household composition. CTC = child tax credit; EITC = earned income tax credit; FPL = federal poverty level. Low-income sample includes households with income less than 200% FPL. Characteristics shown are for the female in the household except when there is no female, in those cases, characteristics for the person identified as the head of the unit on the survey are shown. Table 2 shows the shares of income under the 2018 CTC rules, and the share of income from earnings, other income, the EITC, and the 2018 tax credit sum to 100%. If the 2021 rules were in place, the shares from components other than the CTC would drop because the 2021 CTC is larger than the 2018 CTC. For families with low income, the shares of income for each component using the 2021 CTC rules are as follows: Earnings (57%), Other (14%), EITC (9%), and 2021 CTC (19%).

^a Number of tax units in thousands.

Among low-income families, the share of income coming from tax credits does not vary substantially by race, education, and age. Female head of households have a smaller share of income from earnings and a larger share of income from other transfer programs compared with those with other filing statuses, but the share of income from tax credits is very similar across households with different filing statuses.

The 2021 CTC share of income increases substantially among low-income families for each additional child (13 percent for families with one child compared with 24 percent for families with three or more children), but the differences across families with different numbers of children are much smaller for the 2018 CTC and the EITC. It is also interesting to note that the EITC and 2021 CTC shares of income are much higher for families with income less than the FPL compared with families with incomes greater than the FPL but less than 200 percent of the FPL. That result is likely because earnings are a smaller share of income for those with incomes less than the federal poverty level. However, because those with low earnings get a much smaller CTC based on the 2018 formula, the share of income from the 2018 CTC is about the same for both low-income groups.

Although tax credits among low-income families contribute similar shares of income to people of different races and ethnicities, just as has been observed in other data, our data confirm that Black and Hispanic households are overrepresented in the group of people who are low income. Low-income families will most likely receive the bulk of the EITC and CTC as a tax refund. Although 55 percent of tax units are headed by a white person, only 40 percent of our low-income sample is white (table 3). In contrast, Black families make up about 14 percent of all families but 20 percent of low-income families. Finally, Hispanic families comprise 21 percent of all families but almost 32 percent of low-income families. This stems from Black and Hispanic families consisting of a large share of the low-wage labor market. Although Black workers made up 13 percent of the civilian labor force in 2019, they made up 23 percent of people marginally attached to the labor force. The Bureau of Labor Statistics notes that differences in the labor market for race and ethnicity groups are influenced by many factors, including educational attainment (which itself may be affected by race and ethnicity), the occupations and industries people work in, geographic areas where the groups are concentrated, and the degree of discrimination in the workplace.⁹ Because the EITC concentrates benefits on low-income workers and the CTC delivers benefits to low-income families, these two credits are critical to well-being among Black and Hispanic families.

TABLE 3

Share of Total Population and Low-Income Population*By race, 2017*

	Total (%)	Income <200% FPL (%)
Non-Hispanic white	55.0	39.9
Non-Hispanic Black	14.1	20.3
Hispanic	21.6	31.9
Other	9.3	7.9

Source: Survey of Income and Program Participation, 2018 Wave.

Notes: FPL = federal poverty level. In the most recent year that Current Population Survey data are available, the total US population was 326 million, of which 90 million people had income below 200% of the FPL.

Predicting Annual Tax Credits Based on First-Quarter Information

Traditionally, eligibility for tax credits is determined when filing a tax return—after the year has ended. For example, families filed their 2021 tax returns in spring of 2022. On their 2021 tax return, they calculated any EITC or CTC they were eligible for. The credits are used to first offset taxes owed and then, subject to the limitations described above, can be delivered as a tax refund along with any other refund owed. Because many low-income families do not owe federal income taxes, they receive their entire EITC and CTC as a tax refund the spring after the year they were eligible for the credits. Higher-income families can sometimes adjust their tax withholding to account for credits they will be eligible for and receive the credits throughout the year. For low-income families, the timing mismatch between when credits are paid and the period eligibility is determined over could create unnecessary hardship.

If the IRS delivers a credit in advance of filing a tax return based on information from prior years, some families who received the credit may not be determined eligible once they file their tax return. Other families will not receive a credit in advance, even though they are later determined to be eligible for the credit. In cases where families receive a credit they are ultimately determined ineligible for, they may be required to pay it back. Particularly for low-income families, this may be difficult and may represent a large financial burden—particularly in light of the relatively large share of annual income that low-income families with children can get from tax credits. Alternatively, a family that does not receive a credit during the year but instead receives it when filing a tax return may experience hardship that could have been avoided if the credit had been delivered throughout the year.

As noted earlier, when the advanced CTC payments were made from July through December 2021, the IRS delivered payments based on information that appeared on families' 2019 or 2020 tax return,

where possible, or information families reported to the IRS in 2021 when they claimed an Economic Impact Payment (also called an EIP or stimulus payment, which were payments delivered to most households during the COVID-19 pandemic). In some cases, the information the payments were based on was outdated by two years. It is not yet known how accurate these payments were and whether the payments based on more recent information were more likely to be accurate than payments based on older information, though presumably this is the case.

In 2021, if a family with married parents with income below \$60,000 received a CTC they were ultimately determined ineligible for, they were generally not required to pay the CTC back at tax time. Married families with incomes between \$60,000 and \$120,000 repaid only a share of the errant payment, and higher-income families were required to pay any errantly received payment back when they filed their tax return. The corresponding income thresholds were between \$50,000 and \$100,000 for single parent (head of household) families, and between \$40,000 and \$80,000 for single filers (Congressional Research Service 2021). Errant payments that do not need to be repaid add to the total cost of the credit, which may be politically unpopular. Moreover, recent experience with the premium tax credits, which are paid based on information from two years prior, has shown that hold harmless provisions can be vulnerable to being removed or shrunk (Congressional Research Service 2014; Straw 2017).

In 2021, if a family did not receive monthly advanced payments of the CTC but were eligible to receive them, they received the full value of their CTC when they filed a tax return.

Basing eligibility for advanced payments of the CTC on very recent information could improve the accuracy of advanced payments. We estimate a family's tax credits based on information for the first quarter of the year. We consider whether their very recent data—if accessible to the IRS—could provide a new way to calculate eligibility for advanced payment of tax credits. Even if the IRS did not have the information, families could use this information to predict their own credits if simple to understand tools were created to provide assistance. In future research, we could compare these results to advanced payments based on information from the previous one or two years given the recent availability of additional SIPP data.

We show the prediction accuracy in three groups: (1) Q1 tax benefit within 10 percent of the Q4 tax benefit, which we label **predicting accurately**; (2) Q1 tax benefit greater than 10 percent lower than the Q4 tax benefit, which we label **underestimating**; and (3) Q1 tax benefit greater than 10 percent higher than the Q4 tax benefit, which we label **overestimating**.

First-Quarter Data Accurately Predicts Earned Income Tax Credit and Child Tax Credit for Most Families

We find that in most cases, data from the first quarter of the year can be used to accurately predict (within 10 percent) actual tax credits that a family will be eligible for at the end of the year. First quarter data accurately predicts the EITC for 81 percent of the overall sample; underestimates the benefit for 9 percent of families with children and overestimates the benefit for 10 percent of families with children (table 4).

The EITC prediction accuracy for households with low income (those with income less than twice the federal poverty level, many of whom will be eligible for the EITC) is smaller than for those with higher incomes (65 compared with 92 percent). One explanation for this finding is that both earnings and household instability are greater for those with low incomes (Maag et al. 2017; Maag, Peters, and Edelstein 2016). In addition, most higher-income households are not eligible for the EITC based on Q1 earnings, and it is easier to predict receiving no credit than to predict a specific amount for those who actually receive it. For example, 96 percent of those who did not receive income from the EITC (based on full information from the year) also would not have received the EITC based on predictions from Q1.¹⁰

Overall, the Q1 information could accurately predict the 2018 CTC for 75 percent of the families in our analysis. Similar to the EITC results, predictions for households with low incomes were less likely to be correct for the 2018 CTC than for households with higher incomes. However, the differences in accuracy by income were smaller for the CTC (69 percent and 78 percent for the low- and higher-income families, respectively) than for the EITC. Lower-income households are generally more likely than higher-income households to experience changes in income, marital status, and number of children that can lead to inaccurate predictions. However, because most households are eligible for the CTC, regardless of income, higher-income households may also have income and family changes over the year that can affect the level of their CTC benefit.

A major difference between the 2018 and 2021 CTC law is that the latter eliminates the phase-in of the benefit with earnings for those with low income, making the benefit less dependent on changes in earnings for low-income families. This should make the credit easier to predict for very low-income households. Under the 2021 law, low-income families were not subjected to a cap on benefits, nor did the phase-in of the credit limit benefits. Even low-income families qualified for the maximum CTC. Consistent with this program change, our results show that the prediction accuracy for the low-income

sample is substantially higher for the 2021 CTC compared with the 2018 CTC (79 percent versus 69 percent).

Under the 2021 CTC, middle-income households are potentially affected by reductions in benefits as income increases because of the two phase-out ranges: first, the additional \$1,000 or \$1,600 per child of credit available to low- and middle-income parents phases out; next, the \$2,000 base credit phases out at the same point in 2018 and 2021. Families with incomes below 200 percent of the federal poverty level are typically below both of these phase-out ranges, so the prediction accuracy for these families will not be affected. But middle-income families may be subject to the initial phase-out, which could reduce the accuracy of credit prediction. In 2021, the prediction accuracy for low-income families (79 percent) is higher than for those with income greater than 200 percent of the federal poverty level (76 percent). Overall, the accuracy of predicting the CTC is somewhat higher for the 2021 law than for the 2018 law for the full sample (77 and 75 percent, respectively).

TABLE 4
Predicting Earned Income Tax Credit and Child Tax Credit: Summary Results
Using Q1 information

	EITC			CTC (2018 Law)			CTC (2021 Law)		
	All	Higher income ^a	Low income ^b	All	Higher income ^a	Low income ^b	All	Higher income ^a	Low income ^b
Predict within 10%	81%	92%	65%	75%	78%	69%	77%	76%	79%
Under predict	9%	4%	17%	13%	9%	19%	10%	10%	10%
Over predict	10%	5%	18%	12%	13%	12%	13%	14%	13%
Median error if under-predicted	-1,440	-1,150	-1,640	-1,400	-2,000	-980	-3,600	-3,600	-3,600
Median error if over-predicted	860	860	1,300	1,400	1,500	1,050	2,500	1,930	3,000

Source: Authors calculations from 2018 Survey of Income and Program Participation, wave 1.

Notes: The sample includes one observation per tax unit with dependent children. CTC = child tax credit; EITC = earned-income tax credit. All income is reported in 2017 dollars. Percentages may not sum to 100% because of rounding.

^aHouseholds with income greater than 200% FPL.

^bHouseholds with income less than 200% FPL.

In general, we focus here on low-income families because they will likely have less ability to repay overpayments at tax time and will likely be more affected by having credit payments delayed than higher-income families. Errors in credit prediction based on the first quarter of the year information can be substantial. Among low-income families with children at some point in the year, the median underestimate for families whose EITC is underestimated by more than 10 percent is \$1,640. For those

whose CTC is underestimated, the median amount under the 2018 law is \$980, and the median amount under the 2021 law is \$3,600. In 2021, that is equivalent to one child being born—an event families can likely predict with high accuracy early in the year. The median overestimation error for the EITC and 2021 CTC is smaller than the underestimation error. Among low-income families whose first-quarter information overestimates EITC, the median error is almost \$1,300. Among low-income families whose first quarter information overestimates CTC, the median error is \$1,050 under the 2018 law and \$3,000 under the 2021 law. Under the 2021 law, that is equivalent to one older child leaving the tax unit. Note that the under- and overprediction amounts for the EITC and 2021 CTC are greater (in absolute value) for low-income households compared with the sample as a whole, but they are slightly smaller for the 2018 CTC.

CHARACTERISTICS ASSOCIATED WITH ACCURATE CREDIT PREDICTIONS

We present results for all families and for low-income families but focus our discussion on low-income families. In Appendix A, we provide a multinomial regression analysis that controls for various characteristics and assesses the contribution of various characteristics to overestimating, predicting accurately, and underestimating tax credits. One advantage of the regression methodology is that it can account for many of the correlated characteristics (e.g., race/ethnicity and income). We note in the text where the multivariate analysis differs from the tabulations shown.

TABLE 5
Changes in Number of Children, Income, and Filing Status Drive Credit Prediction Errors Based on Quarter 1 Data

	All				Low Income			
	N ^a	Under predict	Predict within 10%	Over predict	N ^a	Under predict	Predict within 10%	Over predict
EITC								
<i>Change in number of kids (Q1 to Q4)</i>								
No change	38,827	6%	85%	9%	15,046	12%	72%	16%
Increased	4,079	36%	61%	3%	1,655	65%	28%	7%
Decreased	2,571	3%	60%	37%	1,105	5%	32%	63%
<i>Income change from predicted to actual (Q1 to Q4)</i>								
Increased > 25%	4,086	40%	37%	24%	3,246	49%	23%	27%
Stayed within 25%	38,620	5%	88%	8%	13,416	8%	78%	14%
Decreased > 25%	2,771	22%	58%	20%	1,144	28%	33%	39%

	All				Low Income			
	N ^a	Under predict	Predict within 10%	Over predict	N ^a	Under predict	Predict within 10%	Over predict
Filing status change (Q1 to Q4)								
No change	42,987	8%	83%	9%	16,499	15%	68%	17%
Single to joint or head	1,163	55%	44%	1%	656	74%	25%	1%
Head to joint	85	44%	22%	34%	60	38%	19%	42%
Joint to head	466	18%	60%	22%	178	16%	44%	40%
Joint or head to single	777	0%	52%	48%	414	1%	32%	67%
CTC (2018 Law)								
Change in number of kids (Q1 to Q4)								
No change	38,827	7%	84%	10%	15,046	15%	75%	10%
Increased	4,079	81%	16%	3%	1,655	63%	31%	6%
Decreased	2,571	5%	29%	67%	1,105	10%	47%	44%
Income change from predicted to actual (Q1 to Q4)								
Increased > 25 percent	4,086	56%	39%	5%	3,246	66%	31%	3%
Stayed within 25 percent	38,620	9%	80%	11%	13,416	9%	81%	10%
Decreased > 25 percent	2,771	11%	46%	43%	1,144	5%	33%	62%
Filing status change (Q1 to Q4)								
No change	42,987	11%	77%	11%	16,499	17%	72%	11%
Single to joint or head	1,163	81%	19%	0%	656	68%	32%	0%
Head to joint	85	57%	37%	6%	60	76%	16%	8%
Joint to head	466	18%	64%	18%	178	41%	57%	2%
Joint or head to single	777	0%	21%	79%	414	0%	36%	64%
CTC (2021 Law)								
Change in number of kids (Q1 to Q4)								
No change	38,827	2%	88%	10%	15,046	1%	91%	9%
Increased	4,079	92%	7%	1%	1,655	92%	8%	0%
Decreased	2,571	1%	27%	73%	1,105	1%	36%	63%

	All				Low Income			
	N ^a	Under predict	Predict within 10%	Over predict	N ^a	Under predict	Predict within 10%	Over predict
Income change from predicted to actual (Q1 to Q4)								
Increased > 25%	4,086	18%	66%	16%	3,246	19%	70%	11%
Stayed within 25%	38,620	8%	79%	12%	13,416	7%	83%	11%
Decreased > 25%	2,771	19%	60%	21%	1,144	9%	71%	20%
Filing status change (Q1 to Q4)								
No change	42,987	8%	80%	12%	16,499	6%	84%	10%
Single to joint or head	1,163	97%	3%	0%	656	95%	5%	0%
Head to joint	85	16%	75%	8%	60	18%	70%	12%
Joint to head	466	5%	84%	3%	178	6%	92%	0%
Joint or head to single	777	0%	10%	90%	414	0%	14%	0%

Source: Authors calculations from 2018 Survey of Income and Program Participation, wave 1.

Notes: The sample includes one observation per tax unit with dependent children. CTC = child tax credit; EITC = earned income tax credit. Low-income sample includes tax units with income less than 200% FPL.

^aNumber in thousands.

EARNED INCOME TAX CREDIT

The drivers of inaccurate prediction are within-year changes in income or earnings, changes in the number of children, and changes in filing status because these are the components the tax credit benefits are based on. For the low-income sample, the EITC prediction accuracy for those with no changes in the number of children between Q1 and Q4 is 72 percent compared with 28 percent for those who gain children over the year and 32 percent for those who lose children over the year (table 5). Similarly, the EITC prediction accuracy for those with Q1 income within 25 percent of annual income divided by 4 is 78 percent compared with a prediction accuracy of only 23 to 33 percent for those whose income changed by more than 25 percent across the year. Finally, the EITC prediction accuracy for families whose filing status was the same in Q1 and Q4 is 68 percent compared with 19 to 44 percent for those experiencing various filing status changes through the year with filers whose status changed from single with dependents (head) to married (joint) having the largest prediction error.

We see that the EITC prediction accuracy is the most sensitive to changes in income, and almost one-quarter of the low-income sample experiences a change in income across the year of more than 25 percent. Only 7.3 percent of low-income families experience a change in filing status, and 15.5 percent

experience a change in the numbers of children. We know that higher-income families are less likely to experience a change in all of these dimensions,¹¹ and our data show more income instability for the low-income sample compared with the sample as a whole (24.7 and 15.1 percent, respectively) than for either changes in dependents (15.5 and 14.6 percent, respectively) or changes in filing status (7.3 and 5.5 percent, respectively). Income instability may also be more difficult to anticipate relative to within-year changes in numbers of children (e.g., a birth) or filling status (e.g., a divorce or marriage).

Demographic characteristics can be associated with prediction accuracy when they are correlated with instability in income, numbers of children, and filing status. Table 6 shows how well households with children at some point in the year can predict their EITC using only information from the first quarter of the year by several characteristics. For the most part, we observe relatively modest differences in prediction accuracy by various demographic characteristics.

We focus most of our discussion on low-income families, those with income below 200 percent of the federal poverty level, but the table includes results for the full sample as well. Most families with income above 200 percent of the federal poverty level are unlikely to be eligible for the credit, even with modest declines in income, so the correct prediction is that they will be eligible for no credit based on their Q1 earnings.

TABLE 6
Predicting Earned Income Tax Credit with First Quarter Data, 2018 Law

	All				Low Income			
	N ^a	Under predict	Predict within 10%	Over predict	N ^a	Under predict	Predict within 10%	Over predict
Total	45,477	9%	81%	10%	17,806	17%	65%	18%
Tax unit income								
≤ FPL	8,639	21%	69%	10%	8,639	21%	69%	10%
> FPL to ≥ 200% FPL	9,167	13%	61%	26%	9,167	13%	61%	26%
> 200% FPL	27,671	4%	92%	5%				
Self-employment earnings								
No	39,924	9%	80%	10%	16,309	17%	65%	18%
Yes	5,553	6%	87%	7%	1,497	15%	64%	21%
Number of children under age 18								
0	2,136	40%	60%	0%	838	73%	26%	1%

	All				Low Income			
	N ^a	Under predict	Predict within 10%	Over predict	N ^a	Under predict	Predict within 10%	Over predict
1	19,758	7%	83%	10%	7,588	14%	71%	16%
2	14,959	7%	83%	11%	5,053	14%	64%	22%
3+	8,624	9%	80%	11%	4,326	15%	65%	20%
Filing status								
<i>Single</i>								
Male	563	53%	47%	0%	238	83%	17%	0%
Female	600	57%	42%	1%	418	68%	30%	1%
<i>Married</i>								
0 kids	926	21%	79%	0%	170	70%	30%	0%
1 or more kids	27,763	5%	87%	8%	6,758	14%	61%	25%
<i>Head of household</i>								
Male	4,083	8%	76%	17%	2,162	9%	69%	22%
Female	11,543	13%	73%	14%	8,060	16%	72%	13%
Education								
Less than high school	5,029	14%	73%	14%	3,874	15%	70%	15%
High school	11,229	13%	74%	13%	6,417	17%	66%	17%
Some college	12,639	11%	77%	12%	5,297	18%	63%	19%
College graduate	16,579	3%	92%	5%	2,218	17%	60%	23%
Age at end of quarter								
Under 25	2,657	25%	60%	14%	2,072	26%	58%	16%
25 to 34	13,053	13%	75%	12%	6,471	21%	60%	19%
35 and over	29,767	5%	86%	9%	9,263	12%	70%	18%
Race/ethnicity								
Non-Hispanic White	25,008	7%	85%	8%	7,098	17%	63%	20%
Non-Hispanic Black	6,427	14%	75%	11%	3,618	21%	66%	13%
Hispanic	9,828	11%	74%	14%	5,681	15%	66%	19%
Other	4,214	7%	85%	8%	1,409	16%	67%	17%

Source: Authors' analysis of Survey of Income and Program Participation, 2018 wave.

Notes: FPL = federal poverty level. Low-income sample includes households with income less than twice the federal poverty level.

Age breakouts for tax units led by someone under age 17 because of small sample size. They are included in totals.

^aNumber of tax units in thousands.

Data from the first quarter can better predict the EITC for those with very low incomes (below the federal poverty level) than for those with income between 100 and 200 percent of the federal poverty level (69 versus 61 percent), though prediction accuracy for both groups are well below families with incomes greater than 200 percent of the federal poverty level (92 percent). One possible explanation is that those with the lowest incomes are more likely to have very low incomes throughout the year, whereas those with somewhat higher income in Q1 may be on or near the phase-out portion of the EITC formula where small increases in income would reduce benefits or even make them ineligible for benefits later in the year or small decreases could increase tax benefits.

Our basic tabulations show EITC predictions for families with no children at the end of Q1 are much less likely to be accurate, especially for the low-income sample where only 26 percent predict accurately. This result, however, is built into the design of our analysis because we limit the sample to those who have a dependent child at some point in the year, so if they do not have children in Q1, they will have a child later in the year—often becoming eligible for much higher benefits. We see the same result when comparing the accuracy of prediction for those whose Q1 tax filing status is single (i.e., no children) with other tax filing statuses.

The data also show that low-income families with two or more dependents are less likely to predict accurately (64 to 65 percent) than families with one dependent (71 percent), which we also observe after accounting for other characteristics in the regression analysis. One possible explanation for this result could be that child care instability, which affects the ability to work, may be more likely when there are more children, thus increasing the variability of income for families with more children, leading to more inaccurate predictions.

For the full sample, EITC prediction accuracy increases when we include recipient education, which is consistent with the full sample income results—both higher income and more education are correlated with income stability. However, the results are different for low-income tax units where prediction accuracy is the lowest for those who are college educated and the highest for those with less than a high school education. One possible explanation for this finding is that low-income college-educated individuals may just be temporarily down on their luck and are more likely to experience upward changes in income, leading to lower prediction accuracy. In contrast, those without a high school diploma are likely to have the lowest incomes in the sample and less likely to have opportunities for upward mobility, thus leading to higher prediction accuracy. These results are consistent with the multivariate regression analysis.

In general, the share of households for which we are able to accurately predict EITC increases with respondent age. This result would be expected because households generally become more stable as they get older (Maag et al. 2017.) Overall, the age gradient is not as steep for low-income families, meaning that age has less of an effect on accuracy for the low-income sample. However, the group 55 and older (not shown separately in the table), has a high prediction accuracy for both the full- and low-income samples (90 and 82 percent, respectively). This age group is likely to consist of grandparents with dependent grandchildren.

The accuracy of the prediction also differs by race and ethnicity in our tabulations for the full sample. Non-Hispanic white people are the most likely to accurately predict their EITC (85 percent), and non-Hispanic Black and Hispanic people are about 10 percentage points less likely to predict accurately (74-75 percent). However, for the low-income sample, non-Hispanic Black and Hispanic people have slightly higher accuracy rates than white people, suggesting that the differences by race and ethnicity in the full sample are really reflecting differences in income. When we control for other characteristics in the regression analysis, we do not observe any significant differences in the EITC prediction accuracy by race and ethnicity among low-income families.

CHILD TAX CREDIT 2018

Similar to the EITC findings (Table 5), within-year changes in income, number of children, and filing status affect the 2018 CTC prediction accuracy. Again we see that changes in income have the strongest effect on CTC prediction accuracy for low-income families, with 81 percent of families with the most stable income having a correct prediction compared with a prediction accuracy of 75 percent for families with no change in the number of children and 72 percent for those with no change in filing status.

TABLE 7

Predicting Child Tax Credit with First Quarter Data, 2018 Law

	All				Low Income			
	N ^a	Under predict	Predict within 10%	Over predict	N ^a	Under predict	Predict within 10%	Over predict
Total	45,477	13%	75%	12%	17,806	19%	69%	12%
Tax unit income								
≤ FPL	8,639	25%	68%	8%	8,639	25%	68%	8%
> FPL to ≥ 200% FPL	9,167	14%	70%	15%	9,167	14%	70%	15%
> 200% FPL	27,671	9%	78%	13%				

	All				Low Income			
	N ^a	Under predict	Predict within 10%	Over predict	N ^a	Under predict	Predict within 10%	Over predict
Self-employment Earnings								
No	39,924	13%	74%	12%	16,309	19%	69%	12%
Yes	5,553	11%	75%	14%	1,497	20%	66%	13%
Number of children under age 18								
0	2,136	86%	14%	0%	838	70%	30%	0%
1	19,758	10%	78%	12%	7,588	16%	73%	11%
2	14,959	8%	79%	13%	5,053	19%	68%	13%
3+	8,624	10%	75%	15%	4,326	16%	71%	13%
Filing status								
<i>Single</i>								
Male	563	88%	12%	0%	238	73%	27%	0%
Female	600	73%	27%	0%	418	66%	34%	0%
<i>Married</i>								
0 kids	926	95%	5%	0%	170	80%	20%	0%
1 or more kids	27,763	9%	79%	12%	6,758	20%	69%	11%
<i>Head of household</i>								
Male	4,083	8%	75%	17%	2,162	13%	71%	16%
Female	11,543	12%	75%	13%	8,060	15%	73%	12%
Education								
Less than high school	5,029	15%	73%	12%	3,874	8%	79%	13%
High school	11,229	14%	73%	13%	6,417	11%	79%	10%
Some college	12,639	14%	72%	14%	5,297	8%	81%	11%
College graduate	16,579	11%	78%	11%	2,218	9%	79%	12%
Age at end of quarter								
Under 25	2,657	32%	61%	7%	2,072	30%	61%	9%
25 to 34	13,053	19%	74%	8%	6,471	21%	68%	11%
35 and over	29,767	9%	76%	15%	9,263	16%	72%	13%
Race/ethnicity								
Non-Hispanic White	25,008	12%	76%	13%	7,098	19%	69%	12%
Non-Hispanic Black	6,427	16%	72%	13%	3,618	19%	69%	11%
Hispanic	9,828	15%	73%	12%	5,681	19%	70%	11%

	All				Low Income			
	N ^a	Under predict	Predict within 10%	Over predict	N ^a	Under predict	Predict within 10%	Over predict
Other	4,214	14%	75%	11%	6,471	21%	68%	11%

Source: Authors' analysis of Survey of Income and Program Participation, 2018 wave.

Notes: FPL = federal poverty level. Low-income sample includes households with income less than twice the poverty level. Age breakouts for tax units led by someone under age 17 due to small sample size. They are included in totals.

^aNumber of tax units in thousands.

The associations between many family characteristics and prediction accuracy are broadly similar for both the EITC and the 2018 CTC, especially for the low-income sample and in the regression results that account for other characteristics. For example, prediction accuracy for the low-income sample is highest for families with one dependent (table 7). In addition, prediction accuracy increases with age: families led by an adult under age 25 are less likely (61 percent) to accurately predict their CTC than families led by someone ages 25 to 34 (68 percent) and those age 35 and older (72 percent). As with the EITC, the age gradient is steeper for the full sample than for the low-income sample. For low-income households, we again see no significant pattern with respect to race in our tabulations.

Under the 2018 rules, higher-income families have a higher CTC prediction accuracy based on first quarter information than lower-income families, a similar pattern to what we saw for the EITC. However, in contrast with the results for the EITC, very low-income families are slightly less likely to accurately predict their CTC than those with incomes between 100 and 200 percent of the federal poverty level.

Just as with the EITC, prediction accuracy among families that start the year as a married couple or as a single parent (as opposed to a family without children) is higher than for an adult that is single without a child.

CHILD TAX CREDIT 2021

Table 5 shows that similar to both the EITC and the 2018 CTC, prediction accuracy for the CTC under 2021 rules is high for those with a stable number of children throughout the year (91 percent for low-income families), compared with those who lose or gain dependents during the year (8 to 36 percent; see table 5). In addition, prediction accuracy is particularly low for those whose filing status changes from single (not eligible) in Q1 to any other status with dependents in Q4 or vice versa (5 to 14 percent for low-income families). In contrast with the EITC and the 2018 CTC, changes in income play less of a role in prediction accuracy. For example, the prediction accuracy for the 2021 CTC is much more similar

for low-income households with stable incomes and those whose incomes either decreased or increased substantially over the year. This is consistent with the fact that the 2021 CTC benefits do not change with income until household income exceeds \$112,000 (single parent households) or \$150,000 (married households), levels that most low-income households are unlikely to reach, even with substantial changes in income over the year.

Because the 2021 version of the CTC does not depend as much on income, it is also easier to accurately predict using Q1 information than the 2018 version of the CTC among low-income families. That expectation is supported by the higher 2021 CTC prediction accuracy we see in the data compared with the 2018 CTC (79 versus 69 percent tables 8 and 7 respectively).¹² Families with incomes below twice the federal poverty level are slightly more likely to have their CTC predicted accurately than families with incomes of above twice the federal poverty level (79 versus 76 percent see table 8). Very low-income people do not have to worry about a decrease in earnings that would also decrease their CTC as is the case with the EITC and 2018 version of the CTC.

The diminished importance of income instability for prediction accuracy also has implications for the association between family characteristics and prediction accuracy because many of these characteristics are correlated with income instability (table 8). For example, we see very small differences in prediction accuracy for households with different numbers of children, parent ages, race and ethnicity, education levels, and income levels. The regression results that control for other characteristics show similar results.

The only characteristics that substantially affect prediction accuracy for the 2021 CTC are the variables that capture changes over time in eligibility for benefits, such as those who are single (no dependents) or married with no children in Q1 who are not eligible for benefits based on Q1 information but who are included in our sample because they will have dependents at some time during the year and become eligible for CTC benefits.

TABLE 8
Predicting Child Tax Credit with First Quarter Data, 2021 Law

	All				Low Income			
	N ^a	Under predict	Predict within 10%	Over predict	N ^a	Under predict	Predict within 10%	Over predict
Total	45,477	10%	77%	13%	17,806	9%	79%	11%
Tax unit income								
≤ FPL	8,639	10%	79%	10%	8,639	10%	79%	10%

	All				Low Income			
	N ^a	Under predict	Predict within 10%	Over predict	N ^a	Under predict	Predict within 10%	Over predict
> FPL to	9,167	8%	79%	12%	9,167	8%	79%	12%
≥ 200% FPL								
> 200% FPL	27,671	10%	76%	14%				
Self-employment earnings								
No	39,924	10%	77%	13%	16,309	10%	79%	11%
Yes	5,553	8%	76%	16%	1,497	5%	82%	13%
Number of children under age 18								
0	2,136	96%	4%	0%	838	94%	6%	0%
1	19,758	7%	80%	13%	7,588	5%	84%	11%
2	14,959	4%	81%	15%	5,053	6%	81%	13%
3+	8,624	5%	81%	14%	4,326	4%	84%	12%
Filing Status								
<i>Single</i>								
Male	563	98%	2%	0%	238	96%	4%	0%
Female	600	95%	5%	0%	418	94%	6%	0%
<i>Married</i>								
0 kids	926	98%	2%	0%	170	97%	3%	0%
1 or more kids	27,763	7%	80%	13%	6,758	7%	83%	10%
<i>Head of household</i>								
Male	4,083	4%	78%	19%	2,162	4%	79%	18%
Female	11,543	4%	82%	14%	8,060	4%	84%	12%
Education								
Less than high school	5,029	8%	78%	14%	3,874	8%	79%	13%
High school	11,229	11%	76%	13%	6,417	11%	79%	10%
Some college	12,639	9%	77%	13%	5,297	8%	81%	11%
College graduate	16,579	10%	77%	13%	2,218	9%	79%	12%
Age at end of quarter								
Under 25	2,657	25%	67%	8%	2,072	21%	69%	9%
25 to 34	13,053	14%	78%	7%	6,471	12%	81%	7%
35 and over	29,767	6%	77%	16%	9,263	5%	81%	14%
Race/ethnicity								

	All				Low Income			
	N ^a	Under predict	Predict within 10%	Over predict	N ^a	Under predict	Predict within 10%	Over predict
Non-Hispanic White	25,008	9%	77%	14%	7,098	9%	78%	13%
Non-Hispanic Black	6,427	10%	77%	13%	3,618	9%	81%	9%
Hispanic	9,828	9%	79%	12%	5,681	9%	81%	11%
Other	4,214	12%	77%	11%	1,409	11%	78%	11%

Source: Authors' analysis of Survey of Income and Program Participation, 2018 wave.

Notes: FPL = federal poverty level. Low-income sample includes households with income less than twice the poverty level. Age breakouts for tax units led by someone under age 17 due to small sample size. They are included in totals.

^aNumber of tax units in thousands.

Overestimating Tax Credits

Overestimating a credit could put someone at risk of needing to repay any advanced credit when they file their tax return, depending on available protections. Even with robust protections, overestimating credits could be seen as problematic by some if a multiple people end up receiving the full credit for a single child. We focus our discussion on low-income families but report tabulations for the full set of families in tables 6 to 8.

EARNED INCOME TAX CREDIT

Those with incomes below poverty are 16 percentage points less likely to have their EITC overestimated compared with those with incomes between 100 and 200% of the federal poverty level (table 6). This supports our earlier suggestion that it is easier to accurately predict the EITC for very low-income families (below poverty) than families with incomes between the 100 and 200 percent of the federal poverty level because families with income below poverty are more likely to remain eligible and on the phase-in or flat portion of the EITC schedule throughout the year, while families with modest incomes may be more likely to experience a jump in earnings large enough to reduce the EITC at the end of the year, thus becoming vulnerable to overestimated actual benefits.

In addition to being less likely to have their EITC predicted accurately, low-income families with two or more children are also more likely to have their EITC overestimated compared with low-income families with one child. Earlier, we suggested that one possible explanation for this phenomenon could be a greater risk of child care instability for these families, which could lead to less stable and lower earnings, resulting in less accurate predictions and a greater likelihood to overestimate benefits based on information from early in the year.

Households classified as single in Q1 do not have any dependents, but because we require all households in our analysis to have a dependent child sometime during the year, single individuals will have a dependent later in the year. Thus, they would generally not be eligible for EITC benefits (or only for very low benefits) based on Q1 information, but could become eligible later in the year, leading to a lower overall accuracy in predictions of EITC benefits, but those errors would almost never result in an overestimation of benefits.

Non-Hispanic, Black families are less likely to have their EITC overestimated than people of other races and ethnicities, and this holds even after controlling for other characteristics.

CHILD TAX CREDIT 2018

Families with incomes below poverty are much less likely to have their CTC under 2018 law overestimated than families with incomes between 100 and 200 percent of the federal poverty level, even after accounting for other characteristics (table 7). This is the same result we observed with the EITC.

Although the probability of overestimating a CTC under 2018 law is similar among all families with dependents, after accounting for other characteristics, those with three or more children are more likely to have their CTC overestimated than those with just one child. This could reflect a child moving out of the house after the first quarter or may be due to a positive correlation between having more children and income instability.

People who start the year out as single or as married with no kids are much less likely to have their credits overestimated because their Q1 data would indicate that they were not eligible for the CTC, but they become eligible later in the year as kids enter the tax unit. We also observe this for the EITC.

After controlling for other characteristics, we do not observe large differences by race and ethnicity in over-estimating the 2018 CTC.

CHILD TAX CREDIT 2021

With the exception of the filing status variables, very few characteristics have a large association with the likelihood of overestimating the 2021 CTC for low-income families (table 8). Differences by race and ethnicity, by income, by numbers of children, and by education are all small. This may be because this benefit is easier to predict, leaving less scope for either under- or overestimating. Our evidence suggests those who are age 35 and older (14 percent) are more likely to have their benefits overestimated relative to those ages 25 to 34 (7 percent), and the difference remains when controlling

for other characteristics in the regression analysis. Similarly, those who are under 25 are also less likely to have their CTC underestimated compared with those ages 25 to 34. As with both the EITC and the 2018 CTC, those without children in Q1 but who gain children by Q4 will have their benefits underestimated based on Q1 information.

Underestimating Tax Credits

A family that has their credits underestimated would receive relatively larger tax credits when they filed a tax return than families that had their credits predicted accurately or overestimated. This means they are forgoing resources that could be needed throughout the year—but they are not at risk of having to pay the IRS back for errant overpayments. Again, we focus our discussion on low-income families—those with income below twice the federal poverty level.

EARNED INCOME TAX CREDIT

Sometimes a characteristic that increases the accuracy of prediction has the symmetrical effect of decreasing both the likelihood of underestimating and overestimating. This pattern occurs when the characteristic is associated with more stability over time in family structure, number of dependents, or income, leading to less under- and overestimation. Being age 35 and over (relative to those ages 25 to 34) fits that pattern for the EITC because the older age group is associated with a greater prediction accuracy and a lower likelihood of both under- and over-estimating.

More often, however, we find that characteristics have an asymmetric effect on the direction of inaccurate predictions, where they are either associated with being more likely to overestimate and less likely to underestimate or vice versa. This pattern is true for non-Hispanic Black people, those who are single (i.e., with no dependents), those married with no children, and those with income below the federal poverty level.

CHILD TAX CREDIT 2018

Just as we observe with the EITC, in general, characteristics associated with being more likely to have credits overestimated are associated with being less likely to have a credit underestimated and vice versa (table 7).

CHILD TAX CREDIT 2021

Underestimating the CTC under 2021 law is much less common under the 2021 law than under the 2018 law. Most people who would have their CTC underestimated based on the 2018 law (table 7) will

have their credit predicted accurately under the 2021 law (table 8). This happens when people have very low or no earnings in the first quarter of the year. Under the 2018 law, they would appear likely to be eligible for a very low or no CTC under the 2018 law. Under 2021 law, they would be eligible for the full credit even if they had very low or no earnings.

As a result of the differences in credit design, those previously subject to an uncertain phase-in can now have their CTCs predicted with the same certainty as others. After accounting for other characteristics, very low-income families are not significantly more likely to have their CTC underestimated than they are under the 2018 law. Likewise, those with higher education levels were more likely to have their CTC under 2018 underestimated, but that effect disappears under the 2021 law.

Discussion

Tax credits play an important role in finances for low-income families with children. These credits are typically delivered at tax time, which is not necessarily well aligned with need. We discuss reasons why monthly payments might be desirable and what has changed since advanced payments of the EITC were available (and very few families opted to receive these advanced payments). We also provide an example of how monthly payments could be estimated based on very limited—but recent—data.

Income Volatility Increasing and Harmful to Children

Many families who have low incomes experience wide swings in income throughout the year, including many that qualify to receive tax credits. Rather than having a low amount of income divided evenly over each month, income varies substantially across months. Prior analysis suggests that among families with incomes below twice the federal poverty level, almost two-thirds of working-age adults have household incomes that for at least one month of the year will spike above or dip below 25 percent of their average monthly income. Nearly 40 percent of low-income, working-age adults have household income that spikes or dips in at least six months of the year (Maag et al. 2017). That prior analysis did not include how tax refunds can affect a person's income.

To the extent that people can save money in months with more income to cover expenses in months with less income, families can still make ends meet. Among low-income families, this task can be difficult and can lead to high-cost borrowing and reductions in food security (Aspen Institute 2016).

Children whose families' incomes are volatile are more likely to drop out of high school, and income volatility reduces the likelihood of enrolling in post-secondary education (Hardy 2014). In New York City, children experiencing income volatility had lower school attendance (Gennetian et al. 2018). Households with volatile incomes are more likely to face food insufficiency (Bania and Leete 2006). Evidence suggests a link between early childhood food insufficiency and reduced cognitive and social-emotional skills in kindergarten (Johnson and Markowitz 2018). Due to losses of health insurance and increased food insecurity, income volatility negatively affects the health of low-income children as well (Wolf and Morrissey 2017).

Changes in income rarely coincide with changes in families' expenditures, which force families to cut back on necessities (Baker and Yannelis 2015; Farrell and Greig 2015; Ganong and Noel 2019). Families do not necessarily borrow money to weather drops in income, instead appearing to reduce

their borrowing toward the end of pay periods when money is more likely to have run out (Leary and Wang 2015). The disconnect between changes in income and surprise expenses forces families to dip into emergency savings, skip paying bills, and cut back on necessities, including food (Morduch et al. 2015; Gjertson 2016).

Tax Credits Reduce Poverty but Increase Income Volatility

Social safety net programs including refundable tax credits have reduced poverty substantially and mitigated changes in income caused by the Great Recession.¹³ But these programs stabilizing effects on income have waned in recent years because eligibility is increasingly tied to employment (Bitler, Hoynes, and Kuka 2017; Hardy 2017; Hill et al. 2017). In some cases, a drop in earnings can mean a drop in tax credits, compounding earnings' losses, but in other cases, a drop in earnings can be partly offset by an increase in tax credits, such as when earnings drop into the eligibility range for the full earned income tax credit (Williams and Maag 2008). In other words, tax credits can increase or offset underlying changes in income.

Low-income families with children can receive a substantial share of their annual income from a tax refund. We estimate that among families with children with income under twice the federal poverty level, the EITC provides about 10 percent of annual income, the CTC under 2018 law provides 7 percent of annual income, and the CTC under 2021 law provides 19 percent of annual income (table 2). In their reporting on a group of 115 low-income parents who received the EITC, Halpern-Meekin and colleagues (2015) note that tax time is often the only month of the year when income exceeds expenses. Tax refunds represent positive income volatility—a month in which income exceeds average annual income by at least 25 percent.

Paying Tax Credits Monthly Can Meet Ongoing Needs and Create Equity Between High- and Low-Income Families

Even before the pandemic, many families had trouble making ends meet. In 2019, just over 40 percent of US consumers reported having difficulty paying at least one bill in the prior year. This included 65 percent of Black people and 47 percent of Hispanic people—both higher shares than the 35 percent of

white people who reported similarly (Consumer Financial Protection Bureau 2020). Black people were more likely to have difficulty than non-Hispanic white people even after controlling for a variety of characteristics. Not surprisingly, the lower a household's annual income, the higher the probability they had trouble paying a bill (Consumer Financial Protection Bureau 2020).

Additionally, many families lack enough savings to carry them through a negative financial shock. This was particularly true among families of color. In 2019, prior to the pandemic, Black and Hispanic families had median cash reserves of just \$1,510 and \$1,950, respectively, significantly lower than white families who reported having cash reserves of \$8,200 (Holt, Grant, and Aderonmu 2020).

As noted earlier, from July to December of 2021, the IRS paid eligible families with children monthly CTC benefits based on previously filed tax returns in advance of filing their 2021 tax return. In some cases, families could update information with the IRS if they expected to be eligible for a CTC that differed from that calculated by the IRS based on prior returns via an online tool.

These monthly advanced CTC payments were positively correlated with a reduction in food insecurity among households with children that received the payments (Karpman et al. 2022). From July to December, just over half of families with children reported spending their credit on food. Other common uses included purchasing clothing, paying utilities, and purchasing schoolbooks and supplies (Karpman et al. 2021). In another survey, families with income below \$50,000 reported they planned to use their advanced CTC on household supplies, clothes, groceries, car expenses, and child care or toys.¹⁴ Just before the monthly CTC payments began in 2021, two-thirds of families with children with incomes below \$150,000 reported planning to use the credit on housing, food, and utilities—all recurring expenses. Among unemployed survey respondents, the share reporting that the credit would be used for recurring expenses was just over 80 percent (Hamilton et al. 2021).

Besides advanced monthly payments helping families meet ongoing needs, delivering the refundable portion of tax credits throughout the year could create greater equity between high- and low-income families. Higher-income families already have the opportunity to receive their CTC in advance of filing a tax return by reducing their federal income tax withholdings. Lower-income families that do not owe federal income taxes do not have the option to receive their credits in advance because an option to adjust withholding below \$0 does not exist.

Paying Tax Credits Annually as Part of Tax Refunds Can Provide Savings and Investment Opportunities

Some low-income families may prefer to receive their tax credits on an annual basis. Paying tax credits on an annual basis provides low-income families with a unique opportunity to receive a relatively large influx of income at a single time. In some cases, this is likely more meaningful than it would be if it were a smaller payment added to a monthly or biweekly paycheck. Income tax refunds can provide an important pathway for households with low incomes to save, build assets, and pay down debts (Grinstein-Weiss et al. 2015).

Before the CTC was extended to lower-income families, studies tracked how the annual payment of the EITC at tax time affected recipients. Researchers found that the EITC improved financial stability by increasing the likelihood that single mothers with some college would save and found that balances saved were larger after the EITC was expanded in the early 1990s. Among single mothers with a high school diploma or less, the EITC expansion was correlated with recipients being less likely to hold unsecured debt, such as payday loans, in part because people were working more in response to the EITC (Jones and Michelmore 2018). Tax refunds present an opportunity for low- and moderate-income taxpayers to save money and begin to build wealth (Consumer Financial Protection Bureau 2019).

Early studies also showed that tax refunds provided an opportunity to purchase durable goods including vehicles and household furnishings (Barrow and McGranahan 1999). Another study of about 200 low-income families found that over half of families planned to use their tax refund to save, a goal that almost 40 percent could meet (Mendenhall et al. 2012).

Previous Attempts to Pay the Earned-Income Tax Credit in Advance Largely Failed

From 1978 to 2010, some low-income families could receive a portion of their EITC in advance. This program was used by very few people who were eligible (Government Accountability Office 1992). Several reasons for low take-up have been posited including employers not offering the advance option to their employees, administering the benefit through employers and employees not wanting their employers to know about the benefit, individuals worrying about errors in predicting their advance credits that they would then need to pay back, and simple inertia (Brewer et al. 2010; Drumbl 2019; Government Accountability Office 1992; Holt 2008; Jones 2012).

Contemporary discussion of advance credit payment relies on the government making the payments rather than employers. Although this will address several factors related to the previous failure of advance payment, it would not address fears individuals have about potentially needing to pay back credits that had been advanced or inertia. When the CTC was advanced in 2021, robust protections were put in place to hold low-income families who received the credit in advance in error harmless. If the robust protections against overpayment were to remain in place, then fear of repayment would not discourage people from opting to have their credits delivered monthly. But over time, these types of provisions could become less popular, as has happened with the premium tax credits (Straw 2017), and finding a way to minimize risk of overpayments is important.

We estimate how well potential credit recipients could estimate their credits with only three months of information. In many cases, using data from this limited period can produce quite good estimates of whether a person will be eligible for a credit. Focusing only on the low-income group likely to have much more trouble repaying errant payments, we find that 65 percent of families that have a child at some point in the year can estimate their EITC within 10 percent of the actual credit due (table 6), 69 percent can estimate their CTC within 10 percent of the actual credit due under the 2018 rules (table 7), and 79 percent can estimate their CTC within 10 percent of the actual credit due under the 2021 rules (table 8). Eliminating the phase-in range of the credit improves a family's ability to estimate their CTC while also eliminating the risk of overestimating their credit if income drops.

A New Model for Delivering Advanced Payments

One model for advance credit delivery would be to have families fill in information about their first quarter of the calendar year when they file their tax returns. In some cases, this would happen a few weeks after a family would normally file their return if they tend to file at the opening of tax season in late January. In these cases, they would have less information about the full first quarter. This information could be used by the IRS to estimate eligibility for an EITC or CTC and payments could begin in July and continue until they file their next tax return. This would allow families to receive more than half of the CTC before filing their next tax return. When they filed their tax return, they could opt to receive any remaining payments as a portion of any tax refund owed, or they could opt to continue receiving payments through June. In July, the process would repeat for the next year.

The advantage to this system would be that families would not have to risk having to repay their entire credit because they would not have received their full credit when they filed taxes. A disadvantage is it is less robust than the hold harmless provisions that were in place in 2021.

Concern remains, of course, for those families that would overestimate their credit. A hold harmless provision could be enacted, suggesting that if families filled out their Q1 information in good faith, they would have only limited responsibility to repay any credit that had been advanced. Our estimates suggest that, on average, the median annualized error would be about \$1,300 for the EITC, \$1,050 for the CTC in 2018, and almost \$3,000 for the CTC in 2021. Most families would receive about two-thirds of their credit in advance of filing a return. That amounts to an overpayment of about \$900 for the EITC, \$700 for the CTC in 2018, and \$2,000 for the CTC in 2021. These are relatively large amounts of money for low-income families, so some protections would be needed.

Families may have different preferences for whether their tax credits are advanced throughout the year or delivered after the year has ended and tax returns have been filed. Allowing both options gives family needed flexibility. Our research sheds light on one advance payment system.

Appendix A. Multivariate Results

Because many of the characteristics that help explain how well predictions can be done using only information from early in the year are correlated with one another, we used a multinomial logit regression, which jointly estimates the association between household characteristics and our three outcomes: (1) the likelihood of underestimating tax benefits, (2) the likelihood of overestimating tax benefits, and (3) the likelihood of predicting correctly. Each coefficient in the table can be interpreted as the percentage-point change in the dependent variable given a one-unit change in the characteristic. Note that because mutually exclusive outcomes exist, the coefficients for a given characteristic will sum to zero across the three outcomes. In addition to reporting the magnitudes of any association, we also report whether each association is significantly different from zero. We ran these regressions only for the low-income sample, which as our earlier descriptive results showed is the group that is less likely to predict correctly. This is also the group that would likely be more affected by either overestimating and having to pay back or underestimating and not receiving potentially needed benefits.

Estimates for the characteristics are shown in table A-1. In the main body of the paper, we also note when the regression results differ substantially from the descriptive results.

TABLE A-1

Regression Results

Variables	EITC 2018 Levels			CTC 2018 Levels			CTC 2021 Levels		
	Under-estimate	Within 10%	Over-estimate	Under-estimate	Within 10%	Over-estimate	Under-estimate	Within 10%	Over-estimate
Race/ethnicity (relative to tax units with non-Hispanic white household head)									
Non-Hispanic Black	0.04**	0.01	-0.05***	0.01	0.00	-0.01	0.01	0.02	-0.03**
Hispanic	-0.00	0.01	-0.01	0.02*	-0.01	-0.01	0.00	0.02	-0.02
Other	-0.01	0.05*	-0.04*	0.01	-0.00	-0.00	0.01	0.00	-0.01
Age (relative to tax units with heads ages 25–34)									
Under 25	-0.03	0.00	0.02	0.00	-0.00	0.00	-0.01	-0.05*	0.05**
35 and over	-0.08***	0.11***	-0.03**	-0.07**	0.05***	0.02	-0.05***	-0.01	0.07***
Number of dependents (relative to tax units with 1 dependent)									
2 dependents	0.01	-0.05**	0.04***	0.02	-0.04**	0.02	-0.01	0.01	-0.00
3 dependents	0.00	-0.04*	0.04**	-0.02	-0.02	0.04**	-0.02***	-0.00	0.03*
Relative to tax units with no self-employment income									
Any self-employment	0.01	0.00	-0.01	-0.02	0.00	0.02	-0.02	0.01	0.01
Filing status (relative to tax units filing jointly, with kids)									
Married filing jointly, no kids	0.57***	-0.35***	-0.22***	0.61***	-0.51***	-0.10***	0.87***	-0.79***	-0.08***
Single	0.55***	-0.34***	-0.21***	0.45***	-0.35***	-0.10***	0.85***	-0.77***	-0.08***
Male head of household	-0.06***	0.06**	-0.00	-0.07***	0.01	0.05***	-0.04***	-0.04*	0.08***
Female head of household	-0.02	0.10***	-0.08***	-0.08***	0.04**	0.03***	-0.05***	0.01	0.04***

Variables	EITC 2018 Levels			CTC 2018 Levels			CTC 2021 Levels		
	Under-estimate	Within 10%	Over-estimate	Under-estimate	Within 10%	Over-estimate	Under-estimate	Within 10%	Over-estimate
Income to poverty ratio (relative to tax units with income from 100–200% FPL)									
Less than the FPL	0.07***	0.07***	-0.14***	0.10***	-0.03*	-0.08***	0.00	0.02	-0.02**
Education level (relative to tax units with heads who have HS diplomas)									
Less than high school	-0.00	0.03	-0.03*	-0.01	0.02	-0.01	-0.01	-0.00	0.01
Some college	0.02	-0.03	0.01	0.05***	-0.03*	-0.01	-0.01	0.01	-0.01
College or more	0.02	-0.06**	0.04	0.10***	-0.07**	-0.03**	-0.01	-0.00	0.01
Observations	3,595	3,595	3,595	3,595	3,595	3,595	3,595	3,595	3,595
Pseudo R-squared	0.0959	0.0959	0.0959	0.0744	0.0744	0.0744	0.205	0.205	0.205

Source: Authors' calculations from 2018 Survey of Income and Program Participation wave 1 data.

***/**/* p<0.01, p<0.05, p<0.1

Appendix B. Methods

TABLE B-1
Variable Definition for TAXSIM

TAXSIM Variable	SIPP Variable	Description
Taxsimid	Taxsimid	Case identifier; the SIPP variable is user generated
Year	2017	Tax year ending 2017
State	tehc_st	State of residence; SIPP values are remapped to TAXSIM values
Mstat	Mstat	Marital status: 1 = single with no dependents or single head of household with dependents, 2 = joint (married), 6 = married file separately, 8 = dependent filer We assume all married couples file jointly and ignore dependent filers
Page	TAGE_EHC (tax unit head)	Age of primary filer
Sage	TAGE_EHC (tax unit spouse)	Age of secondary filer
Depx	Depx	Calculated number of tax unit dependents
Dep13	Dep13	Calculated number of children under 13 with eligible child care expenses (dependent care credit)
Dep17	Dep17	Calculated number of children under 17 (child credit)
Dep18	Dep18	Calculated number of qualifying children for the EITC: under 19, under 24 and a full-time student, any age and disabled
Pwages	TPEARN (tax unit head)	Wage and salary earnings of the primary tax payer; the SIPP variable includes both wage and salary and self-employment earnings; the SIPP value is the sum of monthly amounts
swages	TPEARN (tax unit spouse)	Wage and salary earnings of the secondary tax payer; the SIPP variable includes both wage and salary and self-employment earnings (zero for unmarried filers); the SIPP value is the sum of monthly amounts
Dividends	TINC_STMF (annual amount)	Dividend income; the SIPP variable is the annual income from stock and mutual funds; the SIPP value is the tax unit sum
Intrec	TINC_BANK (annual) +TINC_BOND (annual)	Interest income; the SIPP value is the sum of interest income from financial institutions and sum of interest income from bond income for all members of the tax unit
Stcg	N/A	Short-term capital gains; not available on the SIPP and is set to zero for TAXSIM
Ltcg	N/A	Long-term capital gains; not available on the SIPP and is set to zero for TAXSIM
Otherprop	TOINVINC (annual) +TINC_RENT(annual)	Other property income subject to the net investment income tax (NIIT); the SIPP value is the sum of other

TAXSIM Variable	SIPP Variable	Description
		investment income (TOINVINC) and net rental income from properties (TINC_RENT)
Nonprop	TDEFERAMT (annual) +TLIFEAMT (annual) +TMINC_AMT (annual) +TALIAMT (monthly)	Other property income not subject to the NIIT. The SIPP value is the sum of deferred income (TDEFERAMT), life insurance payments (TLIFEAMT), miscellaneous income sources (TMINC_AMT), and alimony income (TALIAMT)
pensions	TDIS1AMT (monthly) +TDIS2AMT (monthly) +TDIS3AMT (monthly) +TDIS4AMT (monthly) +TDIS5AMT (monthly) +TDIS6AMT (monthly) +TDIS7AMT (monthly) +TDIS9AMT (monthly) +TDIS10AMT (monthly) +TRET1AMT (monthly) +TRET2AMT (monthly) +TRET3AMT (monthly) +TRET4AMT (monthly) +TRET5AMT (monthly) +TRET7AMT (monthly) +TRET8AMT (monthly) +TSUR1AMT (monthly) +TSUR2AMT (monthly) +TSUR3AMT (monthly) +TSUR5AMT (monthly) +TSUR6AMT (monthly) +TSUR7AMT (monthly) +TSUR8AMT (monthly) +TSUR11AMT (monthly) +TSUR13AMT (monthly) +TVA2AMT (monthly) +TVA3AMT (monthly) +TVA4AMT (monthly) +TANNINC (annual) +TTRINC (annual) +TLMPAMT (annual) -TROLLAMT (annual)	Taxable pension income and individual retirement account distributions; the SIPP value is the sum of disability pension, survivor pension, retirement pension (excluding railroad retirement pensions that are taxed with Social Security), annuity and trust income, and taxable lump sum distributions (TLMPAMT-TROLLAMT)

TAXSIM Variable	SIPP Variable	Description
Gssi	TSSSAMT (monthly) + TDIS8AMT (monthly) + TRET6AMT (monthly) + TSUR4AMT (monthly)	Gross Social Security and railroad retirement income
Ui	TUC1AMT (monthly) +TUC2AMT (monthly) +TUC3AMT (monthly)	Unemployment benefits
transfers	TTANF_AMT (monthly) +TSSI_AMT (monthly) +TGA_AMT (monthly) +TSSCAMT (monthly) +TVA1AMT (monthly)	Other nontaxable transfer income; SIPP value includes Temporary Assistance to Needy Families, Supplemental Security Income, general assistance, nontaxable child Social Security benefits, nontaxable veteran's benefits
Rentpaid	TRENTMORT (monthly) among renters	Rent paid used to calculate state property tax rebates
proptax	N/A	Real estate taxes paid (used for alternate minimum tax calculation and state property tax rebates)
otheritem	N/A	Other itemized deductions that are a preference for the alternate minimum tax calculation
childcare	TPAYWK (monthly) *RWKSPERM (monthly)	Child care expenses; the SIPP value is the weekly amount reference parent paid for child care arrangements times the number of weeks in the month
mortgage	Mortgage interest (annual) +medical expense deduction (annual)	Deductions not included in other item including deductible medical expenses, motor vehicle taxes paid, home mortgage interest, charitable contributions, casualty or theft losses. The SIPP value is limited to home mortgage interest and deductible medical expenses. Mortgage interest is calculated as the mortgage interest rate times the outstanding mortgage balance. Medical expense deduction is the amount annual medical expenses exceed 7.5 percent of adjusted gross income
Scorp	N/A	Active S-Corp income
Pbusinc	N/A	Primary taxpayer's qualified business income subject to a preferential rate without phase-out and assuming sufficient wages paid or capital to be eligible for the full deduction
Pprofinc	N/A	Primary taxpayer's specialized service trade or business service with preferential rate subject to claw-back
Sbusinc	N/A	Secondary taxpayer's qualified business income subject to a preferential rate without phase-out and assuming sufficient wages paid or capital to be eligible for the full deduction

TAXSIM Variable	SIPP Variable	Description
Sprofinc	N/A	Secondary taxpayer's specialized service trade or business service with preferential rate subject to claw-back.

Source: TAXSIM documentation and authors' calculations.

Note: SIPP = Survey of Income and Program Participation.

SIPP does not have information on workers' deferred retirement account contributions. Retirement account contributions lower taxable income by lowering taxable earnings. We impute retirement account contributions in two steps. We first impute whether the worker makes a retirement account contribution using probabilities generated from published W2 tax data by earnings and age (table B-2). Then, among those making deferred contributions, we impute the contribution amount by earnings and age (table B-3). We set the deferred contribution to zero when deferred contributions would lower their EITC.

TABLE B-2

Percent of Workers Making Elective Deferrals by Medicare Earnings and Age

Earned Income	<26 (%)	26-34 (%)	35-44 (%)	45-54 (%)	55-59 (%)	60-64 (%)	65+ (%)
\$1-\$4,999	2.1	4.7	5.2	5.5	7.7	7.5	6.4
\$5,000-\$9,999	5.9	9.5	9.5	9.7	8.5	13.1	9.6
\$10,000-\$14,999	10.3	13.9	13.6	14.3	15.5	17.0	16.0
\$15,000-\$19,999	15.9	19.0	17.7	21.4	22.4	24.0	21.2
\$20,000-\$24,999	24.9	24.9	24.7	26.9	28.3	32.1	27.1
\$25,000-\$29,999	29.9	35.8	32.6	36.3	37.8	40.7	33.8
\$30,000-\$39,999	36.6	42.3	43.4	44.4	48.3	47.7	38.6
\$40,000-\$49,999	50.1	50.9	49.6	50.7	52.6	55.1	44.5
\$50,000-\$74,999	62.5	61.5	57.8	59.8	62.0	60.4	51.1
\$75,000-\$99,999	65.2	73.3	67.7	69.1	69.8	73.1	58.7
\$100,000-\$199,999	76.5	76.8	77.2	76.9	79.3	73.7	64.2
\$200,000-\$499,999	90.0	82.0	83.5	84.3	83.4	79.2	66.0
\$500,000-\$999,999	38.5	82.5	84.9	87.0	84.8	78.8	65.0
\$1,000,000-\$1,499,999	68.3	76.1	85.5	86.7	83.6	77.6	62.2
\$1,500,000-\$1,999,999	71.6	82.9	83.6	87.8	85.6	79.0	65.0
\$2,000,000-\$4,999,999	82.2	76.9	84.2	85.6	80.6	77.6	59.9
\$5,000,000-\$9,999,999	78.9	81.0	78.0	85.0	81.6	77.4	62.4
\$10,000,000+	89.7	85.3	77.2	80.0	81.3	69.8	55.9

Source: Authors' calculations from Internal Revenue Service, 2020, SOI Tax-Stats – Individual Information Return Form W-2 Statistics, tables 1.C and 2.B.1, for calendar year 2017. <https://www.irs.gov/statistics/soi-tax-stats-individual-information-return-form-w2-statistics>

Notes: Earned income is gross earnings before deferred contribution reduction.

TABLE B-3

Average Deferred Contribution as a Percent of Earnings by Earnings and Age

Earned Income	<26 (%)	26-34 (%)	35-44 (%)	45-54 (%)	55-59 (%)	60-64 (%)	65+ (%)
\$1-\$4,999	3.6	16.1	42.8	64.3	54.7	52.8	50.9
\$5,000-\$9,999	3.2	4.3	16.0	21.8	32.3	27.2	17.0
\$10,000-\$14,999	3.7	5.1	7.3	13.2	15.2	12.5	13.8
\$15,000-\$19,999	3.7	4.5	6.4	8.6	10.8	15.3	12.6
\$20,000-\$24,999	3.9	4.6	6.2	7.3	9.4	11.7	9.5
\$25,000-\$29,999	3.8	4.4	5.1	6.8	9.8	8.1	10.3
\$30,000-\$39,999	4.4	4.7	5.2	6.4	8.1	9.6	10.7
\$40,000-\$49,999	4.8	4.7	5.3	6.5	8.3	9.3	10.7
\$50,000-\$74,999	5.5	5.5	5.7	7.0	8.3	9.6	11.0
\$75,000-\$99,999	6.4	6.4	6.4	7.7	8.7	10.0	10.7
\$100,000-\$199,999	5.7	6.5	6.7	7.7	8.7	9.4	9.8
\$200,000-\$499,999	5.7	4.9	4.9	5.4	6.1	6.2	6.1
\$500,000-\$999,999	2.2	2.5	2.6	2.7	3.0	3.1	3.1
\$1,000,000-\$1,499,999	2.5	1.6	1.5	1.6	1.8	1.8	1.8
\$1,500,000-\$1,999,999	2.1	1.1	1.0	1.2	1.3	1.2	1.3
\$2,000,000-\$4,999,999	0.9	0.7	0.6	0.7	0.8	0.8	0.8
\$5,000,000-\$9,999,999	0.5	0.4	0.3	0.3	0.3	0.3	0.3
\$10,000,000+	0.3	0.1	0.1	0.1	0.1	0.1	0.1

Source: Authors' calculations from Internal Revenue Service, 2020, SOI Tax-Stats – Individual Information Return Form W-2 Statistics, Table 2.B.1, for calendar year 2017. <https://www.irs.gov/statistics/soi-tax-stats-individual-information-return-form-w2-statistics>

Notes: Earned income is gross earnings before deferred contribution reduction.

Notes

- ¹ Between 1978 and 2010, some families could receive their anticipated EITC in advance of filing a tax return. Only a very small share of eligible families participated.
- ² “Women of Color Especially Benefit from Working Families Tax Credits,” Center on Budget and Policy Priorities, accessed January 7, 2022, <https://www.cbpp.org/research/federal-tax/women-of-color-especially-benefit-from-working-family-tax-credits>.
- ³ Analysis based on the Supplemental Poverty Measure, a more comprehensive measure of poverty than the official poverty measure. Under the official poverty measure, tax credits are not considered resources available to the household.
- ⁴ “How Income Taxes Interact with Racial Disparities,” *TaxVox*, accessed January 7, 2022, <https://www.taxpolicycenter.org/taxvox/how-income-taxes-interact-racial-disparities>.
- ⁵ “Tax Benefit of the Earned Income Tax Credit, by Expanded Cash Income Percentile, 2021,” Tax Policy Center, accessed January 7, 2022, <https://www.taxpolicycenter.org/model-estimates/tax-benefits-provisions-affecting-childrfen-march-2021/t21-0055-tax-benefit-earned>.
- ⁶ “Tax Benefit of the Child Tax Credit (CTC) under Pre-American Rescue Plan Act Law, by Expanded Cash Income Percentile, 2021,” Tax Policy Center, accessed January 7, 2022, <https://www.taxpolicycenter.org/model-estimates/tax-benefits-provisions-affecting-children-march-2021/t21-0043-tax-benefit-child-tax>.
- ⁷ Importantly, the SIPP does not include data for capital gains, business income subject to preferential tax rates, and all components of itemized deductions. Arguably these variables are less important for the low-income population that is the focus of this paper.
- ⁸ Note that our married sample also contains same-sex married couples, but the numbers are too small to classify them separately from opposite-sex married couples.
- ⁹ “Labor Force Characteristics by Race and Ethnicity, 2019,” US Bureau of Labor Statistics, accessed February 7, 2022, <https://www.bls.gov/opub/reports/race-and-ethnicity/2019/home.htm>. The BLS defines marginally attached workers as “persons who are not in the labor force, want and are available for work, and had looked for a job sometime in the prior 12 months.”
- ¹⁰ Authors’ calculations. Not shown in tables.
- ¹¹ “Two is Wealthier Than One: Marital Status and Wealth Outcomes among Preretirement Adults,” Institute for Family Studies, December 1, 2021, <https://ifstudies.org/blog/two-is-wealthier-than-one-marital-status-and-wealth-outcomes-among-preretirement-adults->.
- ¹² Research at the Treasury Department shows that about 85 percent of stimulus checks (which were broadly available and did not phase in – similar to the 2021 CTC) were well-predicted, with prior-year information. When not well-predicted, differences were evenly split between over- and under-estimates, which reflect our results as well (Splinter 2022).
- ¹³ “Reducing Poverty: The Progress We Have Made and the Path Forward,” Center on Budget and Policy Priorities, accessed February 7, 2022, https://obamawhitehouse.archives.gov/sites/default/files/page/files/20170117_furman_center_on_budget_poverty_cea.pdf.
- ¹⁴ “Memo Summarizing Key Findings from National CTC Poll,” National Women’s Law Center, accessed February 7, 2022, <https://nwlc.org/resource/memo-summarizing-key-findings-from-national-ctc-poll/>.

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About the Authors

Elaine Maag, a senior fellow in the Urban-Brookings Tax Policy Center at the Urban Institute, is an expert on the taxation of low- and middle-income families. Her work examines the interactions between tax and transfer programs, the impact of cash supports, how well taxes support families, and the administration of tax and transfer programs.

Maag has testified before state and federal congressional committees and advised congressional staff and administration officials on the taxation of families with children, higher education incentives in the tax code, and work incentives in the tax code. Maag codirected the creation of the Net Income Change Calculator, a tool that allows users to understand the trade-offs between tax and transfer benefits, and changes in earnings or marital status. She serves on the board of the Commonwealth Institute (Virginia) and Humanity Forward's bipartisan policy council.

Before joining Urban, Maag worked at the Internal Revenue Service and Government Accountability Office as a presidential management fellow. She holds an MS in public policy analysis from the University of Rochester.

H. Elizabeth Peters, an Institute Fellow in the Center on Labor, Human Services, and Population at Urban, is a labor economist and demographer with more than 35 years of experience in social and family policy research. Her work focuses on women's economic empowerment, work-family balance, the role of the family as a social safety net, social investments in children/youth, and the impacts of public policies on family and child outcomes. Her research has been widely published in journals of economics, demography, and sociology. Before joining Urban, Peters was a professor in the Department of Policy Analysis and Management at Cornell University and was the founding director of the Cornell Population Center. She is currently Professor Emerita at Cornell. Peters earned her MPP and PhD in economics from the University of Chicago.

Nikhita Airi is a research analyst in the Urban-Brookings Tax Policy Center and a contributor to the Urban Institute's State and Local Finance Initiative. Her research focuses on the earned-income tax credit and child tax credit, state income and sales taxes, and federal grants to state and local governments. Airi holds a BA in economics from Reed College.

Karen E. Smith is a senior fellow in the Income and Benefits Policy Center at Urban, where she is an internationally recognized expert in microsimulation. Over the past 30 years, she has developed

microsimulation models for evaluating Social Security, pensions, taxation, wealth and savings, labor supply, charitable giving, health expenditure, student aid, and welfare proposal. Smith has written extensively on demographic and economic trends, and their implications for the retirement well-being of current and future cohorts. She is a SIPP expert and was a member of the [National Academies of Sciences, Engineering, and Medicine](#) panel that evaluated the SIPP redesign.

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